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Road freight transport methodology

2025 edition

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Foreword

Transport activities contribute around 5% to the total GDP of the European Union, and the transport sector employs more than 10 million people in the EU. Freight transport is critical to European businesses and to their supply chains, with road freight transport playing a key role. However, road freight transport also has severe negative impacts on emissions of greenhouse gases and pollutants, noise, road accidents and congestion.

European transport statistics are vital for monitoring EU transport policies and targets, providing key information in a coherent and reliable manner. The European Green Deal has set out a clear objective of reducing emissions from transport by 90% by 2050, compared to 1990 levels. The European Commission's 'Sustainable and Smart Mobility Strategy' and its action plan defines initiatives to reach this target.

European road transport statistics is a high quality and reliable source, based on Regulation (EU) No 70/2012 of the European Parliament and of the Council of 18 January 2012 on statistical returns in respect of the carriage of goods by road (recast). This Regulation provides the legal base for collection of a wide range of data on road freight transport from the EU Member States, as well as EFTA/EEA countries and candidate countries and potential candidates. Regulation (EU) No 70/2012 replaced Council Regulation (EC) 1172/98 for collection of road freight transport statistics in the EU, which laid the emphasis on quality and comparability of statistical information and provided for transmission to Eurostat of micro-data from surveys of road freight operators.

This reference manual provides detailed guidance for implementation of Regulation (EU) No 70/2012. It is divided into three parts:

- Part A: Recommendations for sample surveys on the transport of goods by road
- Part B: Recommendations for the variables - definitions and explanatory notes
- Part C: Rules for transmission of data to Eurostat and dissemination recommendations

Some of the recommendations in this Manual are not legally binding, but form part of the voluntary co-operation. However, certain aspects of these recommendations were already incorporated into legally-binding Commission Regulations adopted under the committee procedure of Article 9(2) of the Regulation (EU) No 70/2012, based on the agreement of the Statistical Programme Committee. This applies to the country codes, data transmission to Eurostat, data dissemination and precision calculations.

Part A of this Manual, focusing on recommendations for surveys, is based on an initial version produced by Eurostat as part of its PHARE statistical co-operation programme with Central European countries. The other parts of the Manual were prepared by the staff of the Transport statistics unit at Eurostat, with the support of Artemis Information Management SA.

This Manual is updated regularly. The most recent version is available in electronic format in the Transport statistics section of Eurostat's website.

Detailed information on the implementation of Regulation (EU) No 70/2012 and national road freight surveys in individual countries can be found in 'Methodologies used in road freight transport surveys in Member States, EFTA and 3 candidate countries', which is also available in this section of the Eurostat website. This documentation is updated every year.

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Introduction

I. Regulation (EU) No 70/2012

A number of European Union legal acts dating from the 1970s and 1980s have provided basic statistical data on inland transport. Council Regulation 1172/98 was designed to provide the Commission, other European Union Institutions and national governments with comparable, reliable, harmonized, regular and comprehensive statistical data on scale and development of the carriage of goods by road necessary for framing, monitoring, controlling and evaluating European Union policy. This is achieved by expanding certain essential aspects of the data previously collected by the two Council Directives on road goods transport statistics (78/546/EEC and 89/462/EEC).

Regulation (EC) 1172/98 has introduced the following major changes in the data collected:

- Describing the regional origin and destination of intra-European Union transport on the same basis as national transport.
- Providing a link between the carriage of goods and the vehicle journeys by measuring the degree of utilization of vehicles carrying out this transport.
- Providing information on the load capacity, maximum permissible weight, axle configuration and age of vehicles.
- Providing information on the cargo type of goods and, where relevant, the category of dangerous goods.
- Providing Eurostat with micro-data from Member States rather than tabulated data. This gives Eurostat the ability, subject to safeguards on confidentiality, to produce information on many more aspects of the carriage of goods by road than hitherto.

Regulation (EU) No 70/2012 replaced Council Regulation (EC) 1172/98 to recast in one single legal act the amendments that have modified Council Regulation (EC) 1172/98 between 1999 and 2009 and ensure that its provisions are clear and readily understandable to users.

Regulation (EU) No 70/2012 does not introduce changes in the methodology and data to be provided; however it contains the following new aspects:

- The power to adopt acts in accordance with Article 290 of the Treaty on the Functioning of the European Union should be delegated to the Commission.
- This Regulation shall not apply to Malta, so long as the number of Maltese-registered goods road transport vehicles licensed to engage in the international carriage of goods by road does not exceed 400 vehicles.
- Eurostat has to disseminate the statistical results no later than 12 months after the end of the period to which the results refer.
- The Commission shall submit a report on the implementation of this Regulation to the European Parliament and to the Council – each three years. The report shall, if appropriate, be accompanied by proposals for modifying the list of variables.

In order to limit the statistical burden on enterprises, the Regulation:

- Allows countries to exclude from the scope of the survey all operations by very small vehicles (up to 3.5 tonnes payload or 6 tonnes maximum permissible laden weight). In general, these small vehicles are used in European Union countries for short-range transport, and particularly own account transport, which are not crucial to the common transport policy.

- Encourages countries to make the best use of the data which they currently collect to describe both the transport of goods and the vehicle journeys by introducing additional ad hoc codes into their national statistical services without further extending the questionnaires used at present, thus imposing little extra burden on enterprises.

The text of Regulation (EU) No 70/2012 is included in the Annexes of this Manual. To provide complete information, all Commission Regulations adopted for road freight transport statistics are also available in the Annexes.

II. Structure of the Manual

This Manual provides detailed information to support the implementation of Regulation (EU) No 70/2012 in Member States and EFTA countries. This information is structured as follows:

- Part A: Recommendations for sample surveys on the transport of goods by road

The aim of Part A of the Manual is to provide general guidelines for the execution of surveys on the transport of goods by road in countries that would collect the information required by Regulation (EU) No 70/2012. The assumption is made that the survey is of a sample of the activity of road goods vehicles. However, in some cases, it may be necessary to carry out a first stage sample of vehicle owners as it may not be possible to sample the vehicles directly.

This part of the Manual does not set out to provide a comprehensive or prescriptive description of how a survey should be carried out to collect the information required by Regulation (EU) No 70/2012. Rather, it covers principles and methods that can be and are being used. The Manual is relevant both for the setting up of new surveys and for the re-design of existing surveys.

Statistical information is the result of a series of operations. Each one of the operations has to be carefully controlled to ensure the eventual product is as good as possible; or, at the minimum, fit for its purpose–in this case of providing useful information to the reader. Basically, carrying out a sample survey is very comparable to any manufacturing process. At the start there is design and pre-production planning (not forgetting cost considerations), then there is production (for surveys this equates to despatch, receipt and processing of questionnaires) and finally marketing (presenting the data collected in the format best suited to needs of the user).

- Part B: Recommendations for the variables–Definitions and explanatory notes

Although the Regulation itself provides some definitions and some comments on methodology, experience in implementing statistical legislation has shown that it is useful to provide additional information to assist countries and to promote harmonisation in the collection of statistics.

Part B of the Manual therefore provides a systematic reference for all variables in the Regulation, with definitions, additional explanations and recommendations. The status of this information varies; some parts are taken directly from the Regulation, while others have been proposed by Eurostat and may or may not have been endorsed by the Working Group.

This part of the Manual will be continuously updated to reflect experience gained in the implementation of the Regulation. Wherever possible reference will also be made to the illustrated *Glossary for Transport Statistics*, the common reference of definitions for all transport modes (see also section IV–Inter-secretariat Working Group on Transport Statistics, later in this Chapter).

- Part C: Rules for transmission of data to Eurostat and dissemination recommendations

Part C of the Manual provides guidelines on the technical aspects of data transmission to Eurostat. It covers elements such as data structures, record formats, filenames, and electronic data transfer. It also covers the General Statistical Analysis Systems for Transport (GSAST) used by Eurostat to process the data and the validation checks of the data carried out by Eurostat. The disseminated tables and the anonymisation of data are also covered.

III. Statistical needs in relation to the European Union policies

The European Union Transport Policy was originally one that had as a target the completion of the internal market through the elimination of regulatory barriers to the provision of transport services. This has now been developed to a more widespread policy designed to maintain the efficient functioning of the European Union's transport systems, based on the internal market philosophy, while also taking account of new challenges facing transport services.

Foremost amongst these challenges are the environmental objectives and, as recognised by the Prague Declaration adopted by the Pan European Transport Conference in 1991, the necessity of developing transport networks on the complete European scale and of integrating the greater European transport market.

The availability of transport data of good quality, conforming to common definitions, is essential for good policy formulation, sound investment decisions, useful economic and market trend analyses.

Considerable progress has already been made within the European Union on the harmonization of transport statistics. Council Directives, on statistics of the carriage of goods by road, rail and inland waterway, have been in existence for many years and have been instrumental in setting out definitions of some of the basic data for inland transport. Eurostat has worked on similar lines in the fields of aviation and maritime statistics with the addition of the collection of statistics on the carriage of passengers for these modes of transport.

In the White Paper Roadmap to a single European transport area: towards a competitive and resource efficient transport system, 10 goals were defined for a competitive and resource-efficient transport system. These goals set a benchmark for achieving the target of reducing greenhouse gas emissions by 60%. Detailed road freight transport statistics are required to monitor progress towards achieving some of these goals (e.g., the goal of shifting 30% of road freight transport activity on distances longer than 300 km to other transport modes by 2030).

The European Green Deal is the growth strategy that aims to make the EU's economy sustainable by turning climate and environmental challenges into opportunities across all policy areas and by making the transition just and inclusive for all. To achieve climate neutrality, a 90% reduction in transport emissions is needed by 2050. Priority actions for a shift to sustainable and smart mobility include:

- boosting multimodal transport;
- supporting the deployment of automated and connected mobility solutions across modes;
- better addressing external costs of transport activities through pricing;
- ramping up the production and deployment of sustainable alternative transport fuels; and
- reducing pollution from transport, especially in cities.

In December 2020, the Commission put forward the Sustainable and Smart Mobility Strategy – putting European transport on track for the future, outlining the planned steps to transform the EU transport system in line with the ambition of the European Green Deal. The mobility strategy pursues the vision of sustainable, affordable, inclusive, smart, resilient as well as competitive mobility and demands a fundamental transformation of the transport sector. This translates into three approaches applied to all modes of transport. First, to reduce the dependence on fossil fuels by replacing existing fleets with low- and zero-emission vehicles and increasing the use of renewable and low-carbon fuels. Second, to increase the use of less-polluting modes and shift a substantial part of today's inland freight carried by road (75 %) onto rail and inland waterways and third, to internalise the external costs. The mobility strategy is complemented with an action plan listing 82 initiatives in 10 key areas for action with concrete measures to be adopted.

The data collected under Regulation (EU) No 70/2012 is of importance not only to decision makers but also to professional organisations, transport companies, researchers and modellers in the field of road transport. The survey results are

fundamental for monitoring the road haulage market in Europe. An in-depth knowledge of the market helps improve the competitiveness of companies in the sector.

IV. Intersecretariat Working Group on Transport Statistics

Frequent reference is made in this Manual to the illustrated *Glossary for Transport Statistics,* which is a product of the Intersecretariat Working Group (IWG) on Transport Statistics, set up in February 1991 by the Eurostat, ECMT and UNECE secretariats.

The IWG has worked to harmonize the definitions of transport data at international level in order to ensure comparability of the statistics published by the three international organizations. Related international organizations (such as the International Union of Railways, the International Road Transport Union, the International Road Federation, the International Union of Public Transport, etc.) and representatives from National Statistical Institutes have also participated in this work.

In 1994 the IWG produced the first edition of the *Glossary for Transport Statistics,* containing standard definitions for terms used in transport statistics in the fields of rail, road, inland waterway and oil pipeline transport. The *Glossary* has been published in English, French, German and Russian. Translations have also been made in Spanish and Arabic.

The IWG has continued its work on the *Glossary* to cover other modes of transport and to extend the definitions to cover accidents, market indicators and prices, urban and regional transport, and environmental factors. A second edition of the *Glossary* was published in 1998. This second edition includes new chapters for maritime and inter-modal transport statistics. A third edition of the *Glossary* has been published in 2003 and a fourth one in 2010.

The work on the Glossary has continued in order to prepare an illustrated *Glossary for Transport Statistics* that covers rail, road, inland waterways, pipeline, maritime, air and intermodal transport. This fifth edition has been published in 2019 and translations are available in all EU official languages.

The 5th Edition of the *Glossary for Transport Statistics* is available on Eurostat website.

V. Historical background to the Manual

The idea of statistical co-operation is to help introduce statistical systems that are compatible with providing the information called for in a democracy and market economy. Co-operation should also take account of the fundamental role of statistics during the transitional process, particularly as regards the prompt compilation of appropriate indicators to support national policies and aid supplied by the European Union, International Organisations and other donors.

In the area of transport statistics, technical assistance was provided in the form of two UNECE/ECMT/Eurostat Workshops. The first workshop, held in 1994 assessed the demands and requirements of statistical offices of countries in transition regarding transport data collection, organisation and automation. The second Workshop, in 1996, concentrated on the methodological problems in the collection of statistics on the transport of goods by road by means of sample surveys.

Following the training at the second workshop, Eurostat invited the central European countries to participate in a PHARE programme of pilot surveys on road freight transport. The aim was to collect data similar to that collected within the EU under the Directives in force at that time, as well as some of the extra data that would be required under the new Regulation then under consideration. The pilot surveys were completed in 1998 and the results were published by Eurostat in 1999. Most of the countries that participated in the pilot surveys now carry out such surveys on a regular basis.

A preceding version of this Manual was produced by Eurostat as part of the PHARE programme of pilot surveys. That Manual (corresponding mainly to Part A of the present Manual) consisted mainly of the relevant papers provided at the workshops on transport statistics and on the experiences gained in advising the countries that participated in the pilot surveys.

Recommendations for sample surveys on the transport of goods by road

Contents

1 General principles of sample surveys

1.1 The structure of part A

The structure of Part A of this Manual follows the natural sequence of work that should occur when designing and carrying out a sample survey regardless of the subject matter. In practice, it will be found that some of the stages set out in the manual need to run in parallel to achieve a desired timetable. Some stages may need to be varied slightly or even repeated. A major reason for this is the need to justify the demand for information of the user against the cost of the survey and the burden of providing the data placed on the respondents. This trade off can result in the need for modifications to the survey design and plans that may have been agreed previously.

The following stages should occur:

- The first stage is to explore demand and supply in the area of interest. As this manual is directed at the collection of information on the carriage of goods by road, and in particular, at meeting the data requirements of Regulation (EU) No 70/2012, it might be thought that the Regulation, in itself, would be sufficient justification. This is not so. Every country will have particular needs for data on this topic. A comprehensive inventory of user needs should be prepared. Subsequently, these needs have to be considered in the light of the priority attached to each of them by the country taking into account the requirement of consistency within the general framework of European Union road transport statistics. The constraints of the costs of data collection, response burden on data suppliers and also the feasibility of collecting a particular statistic have to be included in the equation. The final result should be an identification of the target population (that is, the set of road goods vehicles that will be the subject of the survey) and the set of variables and their definitions that will form the basis of the questionnaire to be sent to the operators of the vehicles selected for the sample.
- The focus of the first stage is mainly on the data user. The second stage deals mainly with the operational aspects of a survey. This covers the **theory** of survey sampling; the consideration of available **sampling registers; sample designs and questionnaire design**. However, an important component of this stage is to keep in mind that the most important person of any survey is the respondent. **No matter how perfect is the sample register or how sophisticated the sample design, the survey will not be a success unless the people approached for information–the respondents–do just that. RESPOND!!**
- The third stage should start at the same time as the second stage but should also continue throughout the rest of the survey. This stage covers the **management** requirements for surveys. Many surveys are carried out on an annual or a quarterly basis. Such a time scale provides some leeway for unforeseen events that lead to slippage in a survey timetable. Most surveys of goods road transport are carried out on a weekly basis. There is little or no scope for catching up. The planned timetable must build in, from the outset, sufficient leeway for both foreseen (for example, public holidays) and unforeseen eventualities.
- The next stage covers the collection and preparing the data for computer processing. This is followed by the processing and analysis of the data collected. The order of the work is **editing, imputation, estimation, validity checking and**

addition of weighting factors. The result of these operations leads to a database–the storehouse from which tabulations can be prepared for dissemination.

- A **dissemination policy** is essential to ensure that the results of the survey are communicated to all the users as soon as possible and in a format suitable for their needs. The presentational aspects and the mode of dissemination should be taken into consideration when deciding on the formats that will be used. An important aspect of the dissemination policy is **disclosure control**. This is covered in the final section of Part A.

1.2 General principles of sample surveys

The basic purpose of any survey is to collect information. The term 'survey' does not, in itself, convey any indication of the number or percentage of the total units that could be covered. If the survey attempts to cover all the units, the survey is termed a census. If only a few units are surveyed and little or no attempt is made to relate the units surveyed to the total number of units, the survey is normally termed a 'field study'.

The term 'population' is used to describe the total number of units that could be covered in a particular survey. The term arose because most surveys in the early days of development of the methodology were surveys of the social condition of people.

Where a population is large it is usually very expensive to carry out a census. However, small-scale field studies are unlikely to provide sufficient data to enable reliable estimates to be calculated of the desired attributes of the population. The aim of a sample survey is to collect information from a representative selection (the sample) of a population in such a way that the desired attributes of the population can be estimated to a known precision according to standard statistical theory. The difference between the estimate for a variable and the true value is termed the total error in the process. This is a combination of two types of error: sampling errors and non-sampling errors.

Sampling errors arise because the survey is restricted to a sub-set (the sample) of the population. The sampling error (usually termed standard error) is a measure of the expected variability between different results from repeated samples of the same size and design under the same survey conditions. Non-sampling errors are errors that would exist even if a census of the population was taken; for example, reporting errors, errors of coding and data processing.

There are two important basic points to be emphasised about sample surveys. The first is that estimates for a population based on a sample are probability statements. The second point is that the precision statements about these estimates rely on the assumption that the sample has been chosen at random. That is, the method of selection of the sample gave each unit of the population an equal (and non-zero) chance of being chosen for the sample.

A further point to bear in mind is that the theory of sampling assumes that responses will be received from all the selected units and that these responses will be accurate. In practice this never occurs. There will always be some non-response–some will refuse to answer; some cannot be contacted or there will be another reason for no reply. The information supplied may not be what was sought because the question was misunderstood; the respondent could not remember or deliberately has given wrong information.

All of these cases can result in the estimates derived from a sample survey being biased. The sampling error does not include the effect of errors in implementation of the sampling procedures, such as non-response, mistakes in sample selection or under coverage. In most cases it is not possible to calculate the bias that might exist in a sample estimate. The avoidance of bias is a very important consideration in sampling methodology. It is discussed later in chapter 3.

The general principles for the setting up of new sample surveys or the redesign of existing surveys are well documented in many textbooks on survey design. This Manual assumes that the reader is aware of these general principles and also of the terminology used in standard statistical theory. Some references for further reading on sample surveys are given in the Bibliography. The Manual aims to set out a framework of procedures that countries might follow if they wish to mount sample surveys of the carriage of goods by road by vehicles registered in their country.

The main aims of sampling are: to give all units in the population a known (usually equal) chance of inclusion; and, to achieve minimum variance for a given sample number, or a minimum sample number for a given variance.

2 Setting the survey objectives

2.1 Principles of data quality

The starting point of any survey should be a detailed examination with users of their needs for data that might be obtained from the survey. This should lead to the creation of an inventory of user requirements with some indication of the priority attached to each request. In these discussions the statistician should keep in mind the basic principles underlying the production of good quality data.

2.1.1. Quality criteria for statistical data

- Data should be available

Demand for data is always greater than the availability of data (however, some data are available but not needed). Not all of the data available are accessible (i.e., data sets open to the public). Not all of the data available and known are used (user–friendliness of statistics needs improvement).

- Data should be relevant

Available resources normally cannot cover demand for data (priorities to be set, resources need to be shifted to the data most urgently needed). There are, however, data that are not needed–where there are redundancies in the data sets (concerning new activities, the data sets with the least redundancy should have the highest priority).

- Data should be comprehensive and complete

The more complete the data sets are, the greater the value for analyses (the more synergies):

  – Time: development over time.
  – Space: comparison of countries, regions, policies.
  – Modes: comparison of modes, modal split.

- Data should be comparable, consistent and compatible

Data sets should be as consistent as possible. Comparability of data over time, between countries and modes is important at the international level (there is a conflict of goals between internal and external comparability–to achieve international comparability some countries would have to change their time series).

- Data should be understandable

Results can change due to real developments or due to changes in the statistical system. To allow interpretation of statistical data, changes in time series and differences in definitions / methods between countries or modes have to be indicated and explained.

- Data should be current

The shorter the delay between the reference period and the availability of data, the bigger is the benefit; a short delay is generally more important for aggregated data than for disaggregated data (the overall trend is more interesting for policy-makers).

- Data should be precise

The benefits of statistical information decrease with decreasing precision of the data. Developments (trends) are more important than the absolute data. If the direction of the development is not mirrored correctly by statistics, data are harmful.

2.1.2. Development of data quality

- Availability

Due to the strong growth of international transport, data on international transport are becoming more important (e.g., European dimension of more and more transport infrastructure projects: TENs). However, due to the removal of border controls, data availability is decreasing. The liberalisation of the transport markets and the decreasing budgets of statistical institutions also have led to decreasing availability of data.

- Relevance

While existing data sets (transport market: demand and supply) are still relevant, there is an increasing demand for data on the impact of transport and on transport infrastructure. Data needs of policies are problem oriented: growth of transport demand and modal-shift creates problems in some fields (infrastructure, safety and environment). Data are needed to develop and monitor policies to solve problems.

- Comprehensiveness

Data is needed for more modes and countries; the enlargement of the EU makes it more difficult to achieve comprehensiveness of data sets (time series). This enlargement factor needs to be considered well in advance. If the data sets are not comprehensive about data, its availability should nevertheless be given.

- Comparability, consistency and compatibility

There is conflict between comparability of data within time series and the goal of international harmonisation of data. When new data sets are created, efforts are now made to harmonise data (standard definitions, comparable methods, etc.). Internationally these are of special importance.

- Understandability

Understandability of data and information about data becomes more important since the use of data is widening (in non-expert circles). At the same time, understandability becomes more difficult to achieve, since breaks in series accumulate and definitions and methods change.

- Delay

The need for current data is increasing. There is a growing demand for topical data from politicians and the public. The gap between demand and availability of data is more and more bridged by estimates (especially when only trends are interesting), with the risk of data pollution (different estimates).

- Precision

The precision of data is in general decreasing since data from censuses are partially replaced by sample surveys (which implies extrapolation calculation), and estimates are increasingly being applied.

2.1.3. Data dimensions and data needs

- Absolute quantity

The absolute quantity of the variable as such does not provide much information. Added information value is created if quantities are put into relation to other quantities (calculation of growth rates, modal shares or per capita data). Absolute quantities are used less than growth rates or relative quantities (e.g., modal shares); absolute quantities provide, however, a basis for further evaluations.

- Quantity with relation to other data

Data sets should be comprehensive to allow calculation of relative quantities (e.g., modal shares). Calculation of shares depends also on comparability and precision of data (not always given in the case of transport demand data, where modal shares are often calculated). Data on modal shares and their development are often used in transport policy, and therefore they are important.

- Change over time

Growth rates are often more interesting than the absolute size of a variable. There is a strong demand for data on recent trends; the more current data are the better. Data should allow differentiation between recent (short-term) trends and long-term development. The calculation of growth rates requires a certain minimum of quality of data, otherwise growth rates are misleading; planners and politicians sometimes require statistical information that is not available from statistical institutions, but available statistics can serve as a basis to produce the data needed.

There is a great demand for current data and current trends; future growth rates for the development of policies and for planning purposes are more interesting than growth rates of the past.

- Interaction with other data (elasticities)

Information about interaction between variables (statistical data) is especially important if there is a big difference in availability of data, i.e., if one variable is given and the other variable has to be calculated. If elasticities are known, the given development of the one variable can be used to forecast the development of the other variable. For example, price–demand elasticities can be used to forecast the impact of fuel price increase on road transport demand; forecasts on GDP or on motorization growth are used to forecast the transport development. Data are very important for transport policy. Information is especially needed for the development of new policies.

- Meta-information

Information on information, i.e., on the availability of the data and on definitions, on methodologies and on the scope and quality of data is required in order to understand and use statistical data. Although it is not directly needed for policies, it is important background information for providers and direct users of data.

2.2 Data needs

2.2.1. Identifying user groups – who wants what

It is important that all potential users who might be interested in the subject matter of the survey are involved in the discussions of the information that might be collected in a survey.

- Government is often the main user group as well as the source of funds for the survey. The data needs of government are reviewed in the following section.
- Research institutes need the same data as government but may require more detail. These institutions often carry out work commissioned by others. For example, analysing the consequences of a policy measure or a proposed measure.
- Educational establishments' needs are very diverse but it is also very difficult to obtain a consensus view, as most users from this area tend to want very detailed data for a very narrow field of interest.
- Businesses want information about their industry group as well as data on general economic indicators.

- Trade associations and other non-profit organisations want similar information as businesses.
- The general public is an important market for statistics. It is difficult to gain a view of their demand for data, as their needs are widespread. One way to assess these needs is to maintain a note of all the requests for data in the subject field of a survey that had been received over the past three years.
- Although this manual concentrates on the data needs of the European Commission and the Member States, the needs of other international organisations should not be overlooked.

2.2.1.1 Data requirements of governments

- General considerations

Politicians need certain data on transport, mainly for forecasting and transport planning purposes. However, data required by Governments to facilitate transport policy and planning are not synonymous with official transport statistics.

Regardless of the data type, changes over time (e.g., direction and magnitude) are of more interest than the absolute level (i.e., 1 billion tonne-kilometres) of a given transport variable.

Statistics are often misunderstood as accounting tools, which in the end cause further delays while not necessarily giving any added value to the statistical data.

- Requirements concerning transport data availability

It is important to be able to obtain highly aggregated transport data at short notice. For example, figures of tonnes and tonne-kilometres by mode of transport should be available as a first priority.

Time requirements, however, regarding disaggregated transport data are less strict because these data take longer to collect and analyse. For example, the production of detailed Origin/Destination matrices for purposes of trade analyses may take a couple of months.

The statistical reporting system for transport must be readily available and should respond to non-standardised, 'all-of-a-sudden' requests (i.e., 'Please produce–by lunch time–a cross-tabulation of variable X with variable Y over time').

Servicing of data, utilising contemporary storage and telecommunication methods is highly advisable. For example, it is quite difficult, sometimes, to 'sell' plain figures; reformulating the data for visualisation purposes may increase their 'sale'.

Build-up and maintenance of a data bank on (statistical standards) methods are recommended (i.e., is there any change in the correlation between variable X and variable Y over time?).

2.2.2. Monitoring user needs

Asking users to list requests or select items from a number of pre-printed suggestions is unlikely to produce an adequate or useful set of proposals.

- The statistician should guide the user to express needs in clear and unambiguous language. To do this the statistician should ask about the intended application of the data by the user in order to evaluate the request and to judge its relevance. It is also important to define with precision the information you have been asked to collect. Discuss with those who will use the data what they think they want and what they want to do with the data when you have collected it. Not all of the people who may have asked you to collect the data may have thought through their proposed analytical work, and some may not have a good knowledge of how the road haulage industry operates!
- User requests tend to be open ended, particularly where cost considerations are not the concern of the user. It is useful to distinguish between proven needs and potential needs. Users also may have conflicting needs; they want data to be detailed, accurate and quick. Asking a user to rank their requests in order of preference can provide a useful guide provided users are not permitted to give equivalent ranking to items–equal rankings can result in every item being given top priority!

- It often occurs that different user groups have related but deviating needs on a certain topic. It is better for the statistician to try to establish a consensus on the topic rather than add the varying wishes to the inventory of needs. Joint consultations with these users can prove helpful.
- Choices will always have to be made. Preference should always be given to needs that fit best with the general framework of the survey and are consistent with those of existing harmonised statistics.

There is a dilemma in modern statistical policies. There is a growing tendency towards client-orientation that could lead to tailor-made statistical products. Although the latter would be geared to the specific requirements of specific user groups, the needs of the wider clientele groups for comparable data should not be overlooked. Thus, the need for tailor-made data has a counterbalance in the need for standardisation, not only for harmonised statistics but also to limit response burden.

2.3 Stock taking

The order in which the items are considered before starting data collection is important, although the order in which they are tackled in a data collection project may depend upon the conclusions reached about an earlier item.

Of course, many of the points made in this manual apply to the collection of statistics in any area. Basically, these points are straightforward and obvious; however, the success of any data collection usually depends in great part upon the care taken in planning at every stage of the collection process. The odd 'obvious' point sometimes gets overlooked when you are involved in the detail of a project. Mechanical or resource problems rather than statistical problems are more likely to be the main reason for a data collection exercise not to realise its full potential.

2.3.1. What should be collected

After you have had the discussions suggested in section 2.2, make a list of the data that you would like to collect and all the requests you have received that you are prepared to consider. Allocate the variables to four groups:

- The essential data – if you cannot collect this data, then you need to go back to those who asked you to collect it in the first place for some very serious discussions.
- The desirable data–in this group comes data which is almost essential but you may need to give operators sufficient time to organise their recording systems to be able to provide the information to you.
- The useful data–helps interpretation but be careful not to overload the questionnaire. Asking too many 'nice to know' questions may be a major reason for poor response rates.
- The 'not this time' data–in this group will come the requests that do not readily fit into the general scope of the survey or are too expensive, too detailed, likely to cause offence to the respondents, etc. If extensive discussions have been held with a wide variety of user groups, it is likely that quite a number of the requests received will fall into this fourth group.

2.3.2. What is already available

Having decided what you would like to collect, you need to put each of the data items of the first three groups into one of five categories:

- Already collected, from at least some operators if not all.
- Not collected, but the operator/user ought to know the information as it should form an essential part of their activity; provided advance notice is given to the respondent, there should be no problem in collecting the data.
- Not collected, but likely to be available in normal operational circumstances. More notice of the need for this data may be required and, in some cases, in the early months of the survey, you will have to accept that the information may not be available.
- Not collected, but operators might be able to provide it if sufficient warning is given in advance (and operators could be persuaded to do it!).
- Not collected and unlikely to be available in normal operational circumstances.

If you cannot allocate the data items you wish to collect to one of the first three categories above, you need to consider carefully whether, given sufficient notice, the operator/user would be able, and willing, to record and retain the information in order to give it to you (at minimal cost and little inconvenience). If not, you need to reconsider whether you should collect this data item.

2.3.3. Who are the potential respondents – problems of co-operation

Having got this far and decided what to collect, you need to consider how to collect it. You need to look at the structure of the industry: is it mainly large companies or mainly small companies with a few large ones?

In most countries the road haulage industry is characterised by consisting of a large number of owner-operators–a single person with one lorry, or a small company with one or two lorries. At the other end of the scale, there will be one or two very large companies owning a large number of vehicles, possibly spread around a number of depots. Although around 80 per cent of the companies may be owner operators with only one or two vehicles, they are likely to account for only 20–30 per cent of the total road haulage activity. The 20 per cent of companies being larger will deal with 70–80 per cent of activity (measured in terms of tonne-kilometres).

Is there a trade association you can consult about the industry? Speak to it, explain your reasons for wanting to collect the information and try to get it to support your data collection activity. If not a trade association, there may be a government body or an international body to whom you could speak to get their support for your survey. It is a significant help in getting response to these surveys if you can say in a letter which goes out with the survey form that the trade association of the industry supports this survey.

Are there special factors in this transport mode in your country? Is activity very seasonal (due to weather)? Is the mode fairly homogeneous, or is it broken up into very specific specialisations, which could affect your data collection?

2.3.4. The population

It is important to define exactly the area of interest – the statistical population. Is it to cover:

- 'Hire or reward' and 'own account'. Are separate estimates of these types of activity required?
- All goods vehicles (including small pick-up trucks and vans with a carrying capacity under one tonne) or should there be a 'cut-off', e.g., only goods vehicles with a carrying capacity of one tonne or more? The Regulation permits Member States to apply a 'cut-off' of up to 3.5 tonnes carrying capacity or 6 tonnes gross vehicle weight. When carrying out surveys of goods road transport, countries should consider the structure of their road transport industry when deciding the exclusion level of small vehicles from their survey. For the first survey carried out by a country, it is often useful to include vehicles with a smaller payload than 3.5 tonnes (from 1 or 1.5 tonnes) in order to measure the amount of national transport performed by these small vehicles. Having measured the work of these small vehicles on the first survey, they can be excluded from future surveys if their work is only a small percentage of the total. Alternatively, the smaller vehicles might be included in a survey once every five years.
- Additionally, the Regulation does not apply to 'vehicles whose weight or dimensions exceed the normal permitted limits of a country' or to 'agricultural vehicles, military vehicles and vehicles used by public administrations and public services with the exception of road vehicles used by railway administrations'.
- Information about the operator (i.e., the road haulage company), the activity (i.e., the carriage of goods) or the client (i.e., the freight forwarder or the customer)?
- Regional estimates as well as national figures?

2.3.5. Budgetary and other resource constraints

Before going ahead with any collection of information, an assessment must be made of the resources needed:

- The first resource is **staff**.

How many will be needed in the setting up and the pilot stages?

How many are needed on an annual basis when the data is being collected? There will be encoding and data analysis staff costs, as well as staff for the sample selection, questionnaire dispatch and survey management.

Do not overlook the staff costs of reminder exercises–response rates are rarely satisfactory without at least one or two reminders to those who do not reply to your first approach; if a reporting obligation exists, penalty procedures could be enforced.

Will all the staff be under your direct control, or do you have to negotiate with others (e.g., in regional offices) for their services?

- The second resource is **computing**–use a computer wherever possible in place of staff. But this means you will need computer-literate staff.

Can samples be selected from the register by computer?

Can the computer be used as a tool to manage and control the questionnaire dispatch and receipt?

Are off-the-shelf computer programs available to help in any part of the survey process?

Include the computing costs of data preparation and data analysis.

- Do not forget that **'time'** is a resource. It is a truism that everything takes three times longer than it should!
- In addition to the cost of the above three resources, include the **monetary cost of printing questionnaires and guidance notes, telephone and postage, travel expenses** if field staff are going to be used for personal interviews, and costs of chasing later respondents, or of penalty procedures.
- There are bound to be additional **set-up costs** (e.g., the cost of equipment; buying off-the- shelf computer programs or having purpose-built programs written).
- Add a **contingency allowance** to your costs.

2.3.6. Legal aspects

If you are going to collect some information, will the respondents be invited to provide it on a voluntary basis or is it to be compulsory? You can only have a compulsory survey if you have a statistical law compelling people to respond and, most importantly, if your politicians are willing to permit you to use this statistical law against those who refuse to comply.

Are there legal requirements to be met before a new survey may be carried out, or extra questions added to an existing survey? In some countries, the National Statistical Institute has to seek the approval of Parliament before the start of a year for all the surveys it wishes to carry out in that year.

2.4 Best practices for EU road freight surveys

This paragraph presents the best practices to follow for some key parts of the road freight transport surveys.

Register: Preferably base the sampling frame on the national goods road vehicles register. It is very important to have a good quality and regularly updated register.

Transmission of data to Eurostat: Every quarter, no later than 5 months after the end of the reference period.

Time unit: 1 week; all time units should be included per quarter.

Sampling unit: Tractive vehicle (preferably) or the transport enterprise.

Types of units to be excluded from the sampling frame:

(a) goods road transport vehicles whose authorised weight or dimensions exceed the limits normally permitted in the Member States concerned;

(b) agricultural vehicles, military vehicles and vehicles belonging to central or local public administrations, with the exception of goods road transport vehicles belonging to public undertakings, and in particular railway undertakings.

Member State may exclude goods road transport vehicles with load capacity below 3.5 tonnes or maximum permissible weight below 6 tonnes (for a single motor vehicle).

Reminder system: At least one reminder two weeks after the end of the relevant survey week, and potentially a second reminder two weeks later.

Multi-stop journeys: The information to be reported in the A3 (goods) records should be of consignments according to loading and unloading of goods (see chapter 11.6). Detailed recommendations for the treatment of journeys with more than one stop are available in chapter 6.4.

Weight of goods: Gross weight; weight of containers, swap bodies and pallets should be excluded.

Detailed guidance and recommendations for all aspects of the realisation of sample surveys on the transport of goods by road is presented in the next chapters of Part A.

3

Preparation for the survey – Sample design

3.1 General principles of sample surveys applied to goods road vehicles

The journeys undertaken by goods road vehicles are sufficiently homogeneous that sampling can be carried out either of a vehicle journey or a vehicle time period (usually a week). A vehicle time period of a vehicle-week has been used here. It is important that sampling is carried out throughout the time period of interest–normally a calendar year. Almost certainly there will be considerable variation in the tonnes carried and tonne-kilometres performed between the very small rigid goods vehicles and the large articulated road tractors with semi-trailers. The sampling strategy should take this into account.

In designing any sample, the following points have to be considered:

- Can you limit the burden on respondents:
  - by excluding some areas (for example, one-man businesses–not a good idea for road haulage)?
  - by limiting the frequency any hauler is approached, or ensuring no vehicle is selected more frequently than once a year?
- Will stratification of the sample improve the efficiency?

3.1.1. Sampling in space

Is the data collection to be from a sample, or must you have a census? It is unlikely, but the data may already exist in an administrative system–if this is a new survey a check of likely administrative sources should be made.

If the data is not collected already, can a representative sample be taken to reduce your processing costs? A sample is likely to be cheaper than a census for you to carry out and put less of a burden on the respondents. But in order to use a sample, you have to ensure there are enough events occurring over the period you are covering of a sufficiently homogeneous nature in order to give you the sample estimates you want with sufficient accuracy. This may well depend upon whether you want information about domestic and/or international movements; whether you want regional and/or national estimates; whether the respondents are owner-operators or companies, and, if companies, whether they are carrying out own account or hire or reward transport.

The information about the carriage of goods by road is collected basically from the loaded journeys made by goods road vehicles. For most countries, the vehicles making these journeys are sufficiently numerous for a sample of these vehicles to provide sufficiently precise estimates of the required measures of activity. If there are 100 000 relevant goods road vehicles on a national vehicle register and a sample of 10 000 such vehicles are selected over a survey period of one year, then the sampling density in space would be 10 per cent.

However, in some cases it is not possible or it is inefficient to use a national vehicle register as a sample frame for the survey. For instance, if international journeys form a very small percentage of all journeys, a sample of vehicles from the national vehicle register might not produce a sufficient number of international journeys to provide the required activity measures with the necessary precision. In such cases a register of operators authorised to carry out international transport might be used as the sample frame. Operators selected from this register would be asked to provide information about international journeys made by their vehicles. The number of operators on the register might be such that it would be necessary to approach every operator during a survey year. In such a case the sampling density in space would be 100 per cent.

3.1.2. Sampling over time

Even where the sampling density in space has to be 100 per cent, which means that every sampling unit has to be approached during a survey, the journeys undertaken by goods road vehicles are sufficiently homogeneous that sampling can be carried out either of a vehicle journey or of the activity of a vehicle over a number of days.

A time period can be chosen to limit the amount of information that would have to be returned for any one vehicle. The period normally chosen is for activity during one week. It does not matter which day is chosen to start a week, provided that the same start day is used throughout a year and each week comprises seven days. Where the choice is made for the recording of the activity of a selected vehicle over one week, the sampling density over time is 1.92 per cent (1/52).

For international journeys the problem can arise that a vehicle may be on a journey that started before the week selected for that vehicle; the end of that journey may be during the selected week or even after that. Journeys may also start in the selected week and extend beyond the end of that week. The solution here is to provide instructions that the journeys to be recorded are all those that start in the selected week and to record the details of the full journey even if it ends after the selected week.

Trade patterns and seasonal effects have to be taken into account when carrying out surveys. These are likely to be important in road haulage surveys. This means that to avoid the possibility of bias in the results, a survey of the carriage of goods by road should aim to cover activity throughout the survey period (that is, all 52 weeks of a year should be surveyed to produce estimates of activity for the year).

3.1.3. Sampling over domains

Almost certainly there will be considerable variation in the tonnes carried and tonne-kilometres performed between the very small rigid goods vehicles (lorries) and large articulated road tractors coupled to semi-trailers. The sampling strategy should take this into account. The best way to do this is to stratify the sample by the load capacity (or gross weight) of the vehicles (the reason for this is covered later in this chapter). Road tractors should form separate strata of the sample. Although they do not have a load capacity as such, in most countries the registration details for these vehicles include a maximum load capacity (or gross vehicle weight) that the tractor is permitted to tow. If the weight data is not available for road tractors, they should still form a separate stratum of the sample.

In larger countries it is also helpful to stratify the sample by region or by some other geographical division.

3.1.4. Sampling size

This is often a source of confusion. There is no handy formula providing a number. The statistician would like as large a sample as possible. The person having to finance the project wants the smallest number possible. The only useful guidance is that the number of units in a sample should be:

- No larger than you can handle.
- What you can afford.
- What you need for your chosen maximum sample standard error.

In the guidance produced by Eurostat to Member States on the precision standards desired for the information collected under Council Regulation (EU) No 70/2012 on the statistics of road goods transport, it was initially recommended that a

minimum of 5 000 vehicle-weeks of vehicle activity should be collected over a 12-month period. That is, the achieved sample reported to Eurostat should consist of at least 5 000 vehicle-week records. Where a country does not ask for the activity of a vehicle over a week, the sample should consist of at least 35 000 vehicle-days. In practice, most countries with large vehicle fleets cover around 15 000 vehicle-week records. However, based on the analyses of data submitted by some Member States under Regulation (EU) No 70/2012, it appears that for some countries an achieved sample size of 1 000 vehicle-weeks of vehicle activity per quarter would produce the desired precision standards.

3.1.5. Avoiding bias

Bias in a sample can cause systematic, non-compensating errors that cannot be reduced or eliminated by increasing the sample size. Bias in sample selection can arise:

- If the sample is selected other than randomly.
- If the sampling frame does not cover the population adequately, completely or accurately.
- If some of the selected units refuse to reply or cannot be contacted.
- If some of the questions are answered incorrectly (response errors).

Drawing the sample randomly is essential. Where information is available to allocate the units in the population into groups (strata) with similar characteristics, drawing a random sample from each group does not destroy the randomness of a sample. In fact, the use of stratification is very beneficial if applied sensibly as it can lead to a significant improvement in the precision of the estimates.

If the sample frame does not cover the population adequately, then the units which are not in the sampling frame have no chance of being included in the sample. For road vehicles, this is most likely to occur for newly registered vehicles. Hence, if a vehicle register is used as a sampling frame, the older the vehicle register is in relation to the date of the survey period of the sample, the greater the likelihood of bias. It is usual for the sample for a quarter of a year to be selected from a vehicle register about 6 weeks before the start of that quarter. The sample for the 13th week of that quarter will have been chosen from a register that is some 4 months out of date. If the sample had been chosen for a full year, the one for the last month of the year would have been based on a register that was over a year old–all newly registered vehicles during that year would have no chance of being included in the sample.

The steps that can be taken to reduce the likelihood of refusals are covered later in this chapter.

Keeping response errors to a minimum depends upon good questionnaire design and good management practice in the survey office. Mis-coding and data encoding errors are included as response errors although they do not arise through the respondents. The provision of false information by a respondent is very difficult to detect. Fortunately, for road transport surveys, it is probably more difficult for a respondent to create false information about journeys that to provide details of the actual journeys made. The greatest problem is that some respondents will claim that the vehicle has not worked during the survey week rather than record the actual activity, as this reduces markedly the work required.

3.2 Registers for road transport survey

To draw a sample, we need a sampling frame–a register that lists all the units we wish to sample (in this case goods road vehicles) and a contact address of the owner, or a register that will enable us to sample these vehicles through their operators. For a survey of the carriage of goods by road, the best register will be that of the goods road vehicles. If this is not available or not sufficiently reliable, a register of persons licensed to operate as road hauliers (company/registered owner for private hauliers) or a business register of companies could be considered.

For each possible register the following questions need to be asked:

- Who produces the register?
  - Can you gain access to it?
  - Will the owners allow you to use it to draw a sample?
  - Or will they draw the samples for you?

  - How frequently will the owners allow a sample to be drawn–monthly, quarterly?
  (There may be legal restrictions against the use of some registers!)

- How good is the register in terms of quality?
  - Is the information accurate?
  - Is the information up-to-date?
  - How long is it before new registrations are included–a month, a year, two years?
  - Does it identify the vehicles you wish to sample or will your sample include vehicles outside your range of interest (e.g., cranes)?

- Cut offs? How comprehensive is the register?
  - Does it exclude small companies?
  - Does it exclude vehicles in certain categories (vehicles owned by public bodies, goods vehicles with a very low carrying capacity)?

- If there are deficiencies in the register you would like to use, can you work with the owners of the register to improve it?

For a survey of the carriage of goods by road, the best register will be one that includes goods road vehicles. This is because the activity we wish to measure is the work that is done by goods road vehicles. That is, the weight and type of goods carried; the place of loading and unloading and the distance travelled; the characteristics of the vehicle and some information about the operator of the vehicle. Sampling vehicles also means that the burden of filling in questionnaires for operators with a large number of vehicles will be spread over time.

If a vehicle register is not available or not sufficiently reliable, there may be a system of licensing road haulage operators and a register of persons licensed to operate as road hauliers (company/registered owner for private hauliers) could be considered as a sampling frame. Using such a register means that the sample of vehicles will be clustered as the operator will be the sampling unit and thus the burden of questionnaire completion for operators with large numbers of vehicles will be concentrated into one time period–which could have an adverse effect on response.

Alternatively, a business register of companies could be used. However, since this is a register of companies it has the defects of the licensed operators register. In addition, it will exclude any operator whose business does not have to appear on the business register. In addition, the use of the business register as a first stage-sampling unit means that the main business of most of the companies selected will not be road haulage and many of them may not carry out even own account transport.

It is strongly recommended that, if at all possible, a vehicle register should be used as the sampling frame for surveys of the carriage of goods by road. Even if there are problems with the quality of data recorded on the register, a vehicle register is usually the only one available that lists directly the units (vehicles) which one wishes to sample. Throughout this chapter it has been assumed that the vehicle register will be used as the sampling frame.

Nevertheless, despite the recommendation to use a vehicle register, if at all possible, experience has shown that there may be considerable problems with their use as a sampling frame. Firstly, it is unusual for the organisation responsible for the maintenance of the vehicle register to be the same as that carrying out road haulage surveys. Road haulage surveys are normally carried out by the National Statistical Institute but the vehicle register is usually the responsibility of the police or another Ministry (often the Ministry of the Interior or the Ministry of Transport). Access to the register by the National Statistical Institute may require delicate negotiations at a very senior level in both organisations.

Secondly, despite any assurances to the contrary given by those maintaining the vehicle register, be prepared for errors in the data on the register and for it to be out of date. Vehicles may have been sold or scrapped within the last few months and the information not yet been added to the register. This may also have occurred between the time the sample was drawn and the questionnaire posted to the respondent. For vehicle registers that are used to collect vehicle taxes and have been running for many years, the number of such cases is likely to be very small. However, for registers that have only been set up for a few years, or are in the process of being created, experience has shown that the number of cases is quite considerable where the person contacted no longer possesses the vehicle.

Another problem with vehicle registers is that the address recorded may be insufficient for questionnaires to be delivered by post. If the vehicle register also includes a business reference number for the owner, it may be possible to amplify the address from the vehicle register by checking the address on the business register for that reference number.

A further problem relates to the long-term hire of vehicles. The owner of a vehicle recorded on the vehicle register may hire it out to another operator on a long-term basis. By the time the survey team have received the information about the name and address of the true operator it is usually too late to send a questionnaire to the true operator.

What can be done to overcome these problems? To some extent a slightly larger initial sample of vehicles can be selected where it is expected that the register may be not completely up to date. However, care needs to be taken when grossing up the sample results to national estimates. The assumption made is that the raw survey results are representative of the total numbers recorded on the vehicle register. If, from the sample drawn, say, 5 per cent of the returned questionnaires indicate that the vehicle has been scrapped, these returns need to be treated as valid responses since they indicate that around 5 per cent of the vehicles of that type on the vehicle register are actually scrapped. To exclude the scrapped vehicles found on the survey from the sample numbers when grossing up to national figures would result in an over-estimate of the tonnage and tonne-kilometres performed. The calculation of weighting factors for grossing-up the survey results where registers may not be up to date is covered in chapter 7, (section 7.2.3).

Close liaison should be maintained with those responsible for maintaining the vehicle record. The experience where some of these problems have occurred is that, where the evidence of errors has been shown to those responsible for the vehicle registers, there has been co-operation and a willingness to take steps to improve the data on the vehicle register. However, it is likely to take some years to make a significant improvement to the quality of the data on registers where more than one in five of the entries prove to be in error.

3.3 Defining the sampling frame

Having identified the best register to use to draw the sample for the survey and obtained the agreement of those responsible for the maintenance of this register that it may be used as a source for the sample of statistical units, it is necessary to examine the data that is held on this register.

The first step is to make a list of the statistical units (vehicles in the case of a vehicle register) that should be excluded from the survey. What these exclusions are (for example, vehicles with a load capacity less than 1 tonne) should have been decided when the objectives of the survey were agreed. However, it may be that the register that will be used does not contain all the necessary information to permit the desired exclusion. This may lead to a review of the coverage of the sample.

The second step is to list all the information on the register that you would wish to capture to add to the survey record. If the register already contains all the data you wish to have about a vehicle, it is sensible to abstract that data from the register and include it on the questionnaire sent to the respondent. The respondent then can be asked to check this data and correct it if it is wrong. This is much less of a burden than asking the respondent to write this information on the questionnaire.

3.4 Sample design

Sections 3.4.1 to 3.4.4 cover the sampling strategies that can be adopted when a vehicle register is available. All the units (vehicles) on the register are called the population (of vehicles). Section 3.4.5 on cluster sampling covers the sampling of vehicles via a register of operators or businesses.

Stratification by load capacity of vehicle and by region (if the register permits) is strongly recommended.

The use of disproportionate stratified sampling (the use of variable sampling fractions–section 3.4.2.2) needs care. The added complexity of drawing the samples and data analysis need to be taken into consideration when planning the first survey.

A move to a more complex sample design can always be made in a subsequent year after gaining experience in carrying out the first year's survey. Furthermore, the first survey will provide information of statistical measures (sample standard deviations) that will be needed for efficient disproportionate stratified sampling.

3.4.1. Simple random sampling

The simplest sample is to select at random from the population register the number of units you require for your sample.

Let **N** be the number of units in the population (on the register) and n be the number of units in your sample in one year; then a sample for a week could be drawn as follows:

- Number the units in the register from **1** to **N**.
- Take from a table of random numbers **n / 52** numbers between **1** and **N**.
- The numbered register units matching these random numbers would be units selected for that week.

The process above would be repeated each week. However, this process takes up much time and resources. A more efficient way to draw the sample is:

- Calculate the sampling interval **F = N 52/n**.
- Take, from a random number table, a starting number (**M**) between **1** and **F**; and, from the register select the unit which matches the starting number **M** and thereafter the units at intervals of **F**, i.e., **M+F**, **M+2F**, **M+3F**, etc.

The system described above could be used to draw the samples for a number of weeks at a time or even a quarter of a year. Section 3.5 of this chapter illustrates the methodology for drawing a sample for a quarter of a year. If resources permit, drawing samples for four weeks at a time is probably most efficient in use of resources and ensuring samples are drawn from the latest version of the register. However, in most countries, samples are drawn quarterly.

The above method of selecting samples can also be applied to stratified random samples where the calculations are made for each strata of the sample. In this case the register has to be sorted by the strata used for sampling. It is important that random numbers are used and not any number chosen by the survey statistician at what they might consider 'random' ('off the top of my head'). Equally, if the sample is stratified a separate random number should be taken for each of the strata.

- The formulae

The formulae for a simple random sample are:

  - Where x_i is the i^{th} unit in the sample of n units
  - The mean: $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$
  - The standard deviation: $s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$
  - The standard error: $se = \sqrt{s^2 \frac{(N-n)}{nN}}$
  - The percentage standard error (95% confidence): $= \sqrt{s^2 \frac{(N-n)}{nN}} \frac{1.96}{\bar{x}} 100$

Where, as is true for the illustrative case in the paragraph below, the factor **(N–n) / N** is close to unity because the population is very large relative to the sample, the factor can be omitted and the formula for the standard error reduces to:

$$se = \frac{s}{\sqrt{n}} \qquad \text{percentage standard error} \qquad se_{\%} = se \frac{1.96}{\bar{x}} 100$$

- An example

For illustration purposes of the sample designs given in this chapter, the example is given of a country with 100 000 goods road vehicles (=**N**). It is assumed that resources are available to take a sample of 4 000 vehicle-weeks (=**n**) activity spread over a year. Each vehicle sampled being asked to report activity over one week. The 'population'–total possible vehicle weeks–is 5 200 000 (100 000 * 52). The sampling percentage is, therefore 4 000 / (100 000 * 52) = 0.08%.

When a simple random sample (SRS) of the activity of goods road vehicles was carried out, the estimate from the survey data of the average tonne-kilometres performed per vehicle per week (the mean) was 248 tonne-kilometres. The standard deviation (the most usual measure of the spread of the distribution) was 480 tonne-kilometres. The standard error around the mean (95% confidence), expressed as a percentage, was 6.0%. The estimated total tonne kilometres performed over the year was 1 289.6 million tonne-kilometres (248 * 100 000 * 52). The percentage standard error of a total is the same as that of the mean. So, the percentage standard error of the above total is also 6 per cent.

3.4.2. Stratified sampling

If intelligently used, stratification nearly always results in a smaller sample error for the estimated mean (or total) than is given by a comparable simple random sample. Stratification does not imply any departure from the principle of random selection of units. It means that before selecting the units, the population is divided into a number of strata and then a random sample is selected from each stratum. Knowledge of the population is used to increase the precision of the sample.

The total variation (for any variable or attribute) in a population will be composed of two elements: the variation between the strata and the variation within strata. In stratified sampling the variation between strata does not come into the standard error because the stratification ensures that this component of variation in the population is reflected exactly in the sample.

Since only the variation within strata comes into the calculation of the standard error, the greater the proportion of the total variation in a population that is accounted for by the between-strata variation, the greater will be the gain due to stratification. The object, therefore, is to try to arrange the strata so that they differ as widely as possible from each other. For the carriage of goods by road, stratification by the load capacity of vehicles is an obvious step and, as experience has shown, the most effective way of increasing the precision of estimates of vehicle activity.

Even if the sampling fraction is the same for every stratum (that is, the sample size from a stratum is proportional to the population size of the stratum), there should be a gain over simple random sampling. This is because the sample design makes sure that the various strata in the population (vehicle types, regions) are correctly represented in the sample, which is reflected in a reduction in the standard error.

The sampling fraction does not have to be the same for every stratum for stratified sampling. If there is a uniform sampling fraction, the sample design is known as a proportional stratified sample. If the sampling fraction varies between strata, the design is called a disproportionate stratified sample.

3.4.2.1 Proportionate stratified sampling

- The formulae

Assume the population is divided into **H** strata where:

- $\bar{x}_h$ is the sample mean of the h^{th} stratum;
- s_h is the standard deviation of the h^{th} stratum; and
- se_h is the standard error of the mean in the h^{th} stratum.

The formulae for the mean, standard deviation and standard error of the mean of each stratum is the same as those given in the paragraph above, but applied to the sampled units in the relevant stratum.

In proportionate samples, the sampling fraction in each stratum is equal to the sampling fraction for the whole population. That is, n_h/N_h is equal to n/N for all **h**. This design gives a self-weighted sample. One result is that the mean (x_{prop}) for the

whole sample can be calculated as if the design was a simple random sample; there is no need first to calculate and then weight the strata sample means to estimate the overall mean.

However, the standard error for each stratum (se_h) does have to be calculated to compute the overall standard error (se_{prop}). As n_h/N_h is equal to n/N for all **h**, $n_h/n = N_h/N$. The formula for the percentage standard error of the overall mean is:

$$se_{\%\,prop} = \sqrt{\frac{N-n}{N}\frac{1}{n^2}\sum_{h-1}^{H} n_h * s_h^2}\frac{1.96}{\bar{x}}100$$

as previously, the term (N–n)/N can usually be omitted.

- An example

Table 3.1 illustrates the effect of using a proportionate stratified sample of 4 000 units where 8 vehicle groups have been used as strata. The vehicle groups are by maximum loading capacity (in tonnes)–for road tractors the maximum loading capacity of the semi-trailer that the tractor is permitted to pull is used. The population and total sample size of vehicles is the same as used in the example for simple random sampling (in section 3.4.1). The means and standard deviations of the strata come from an actual sample of the carriage of goods by road in a country of the European Union but the population and sample numbers have been changed to simplify the presentation.

TABLE 3.1

Stratified sample design proportional to population

Vehicle load capacity (tonnes)	Mean ($\bar{x}$)	Standard deviation (s)	Sample size (n)	Population (N)	Standard error % ($se_{\%}$)
Lorries					
up to 4.9	28	45	1 600	2 080 000	7.72
5–9.9	60	80	400	520 000	12.80
10–11.9	153	180	800	1 040 000	7.99
12–14.9	256	296	240	312 000	14.33
15+	551	481	200	260 000	11.85
Road tractors					
up to 14.9	341	431	160	208 000	19.19
15–19.9	603	565	200	260 000	12.72
20+	1 135	851	400	520 000	7.20
All types	248		4.000	5 200 000	4.25

The overall mean is the same as that for the simple random sample, but the standard error has been reduced to 4.25 per cent. However, if one aim of the survey was to obtain reasonably accurate estimates (say standard errors within 10%) of the activity by the various carrying capacities of vehicles, the table shows that for this sample design, five of the eight strata would be outside the desired limits if the sample number has to be restricted to 4 000 units. The largest percentage standard error is nearly 20 per cent, but the sample size for that stratum is only 160.

3.4.2.2 Disproportionate sampling – equal allocation

- The formulae

As the standard error of any stratum depends upon the number sampled in the stratum and not upon the number in the population stratum, a sample design having an equal number of sample units in each stratum might be considered. In this case, $\mathbf{n_h = n/H = a}$ constant **(c)**. In the illustrative example used here of a sample of 4 000 units in 8 strata, **c = 500**.

The general formulae for stratified sampling:

– For the overall mean: $\bar{x}_{(strat)} = \frac{1}{N}\sum_{h=1}^{H} N_h \bar{x}_h$

– The standard error: $se_{\%\,(strat)} = \sqrt{\frac{1}{N^2}\sum_{h=1}^{H} \frac{N_h - n_h}{N_h}\frac{N_h^2 * S_h^2}{n_h}} \frac{1.96}{\bar{x}} 100$

As previously, the terms $(N_h - n_h)/N_h$ can usually be omitted, but a check should be made to ensure that, for some strata, they are not significantly smaller than one.

- An example

Table 3.2 shows the result of using equal numbers of sample units in each stratum. The overall standard error has reduced to 3.59 per cent. Apart from the stratum of the lorries with the smallest load capacity, the strata standard errors are close to or below 10 per cent. The standard error for the stratum '*lorries up to 4.9 load capacity*' has risen from 7.72 per cent to 14 per cent as the sample size fell from 1 600 to 500. Increasing the sample size from 160 to 500 for '*road tractors up to 14.9 tonnes load*' has reduced the stratum standard error from 19.19 per cent to 10.36 per cent.

TABLE 3.2

Equal number allocation stratified sample design

Vehicle load capacity (tonnes)	Mean ($\bar{x}$)	Standard deviation (s)	Sample size (n)	Population (N)	Standard error % ($se_{\%}$)
Lorries					
up to 4.9	28	45	500	2 080 000	14.00
5–9.9	60	80	500	520 000	11.39
10–11.9	153	180	500	1 040 000	10.18
12–14.9	256	296	500	312 000	9.70
15+	551	481	500	260 000	7.26
Road tractors					
up to 14.9	341	431	500	208 000	10.36
15–19.9	603	565	500	260 000	7.79
20+	1 135	851	500	520 000	6.41
All types	248		4 000	5 200 000	3.59

3.4.3. Disproportionate sampling – optimal allocation

Increasing sampling rates in strata where the variance among the units is large and reducing rates where the variance is smaller reduces the overall standard error. The term optimal allocation is used where the aim is to assign sampling rates to the strata so that the standard error of the overall mean is as small as possible. If the total number of units in a sample is fixed, the overall standard error will be a minimum if the sampling rate within each stratum is proportional to the standard deviation within the stratum. That is, the number of sample units in stratum h is calculated:

$$n_h = \frac{N_h s_h}{\sum_{h=1}^{H} N_h s_h} n$$

Table 3.3 shows the effect of using optimal allocation sampling rates with a sample of 4 000 (the formulae are those given in sub-section 3.4.2.2). The overall standard error has reduced to 2.8%, but the standard error in two of the strata is high.

TABLE 3.3

Optimal allocation stratified sample design

Vehicle load capacity (tonnes)	Mean ($\bar{x}$)	Standard deviation (s)	Sample size (n)	Population (N)	Standard error % ($se_{\%}$)
Lorries					
up to 4.9	28	45	307	2 080 000	17.90
5–9.9	60	80	137	520 000	22.21
10–11.9	153	180	614	1 040 000	9.16
12–14.9	256	296	303	312 000	12.26
15+	551	481	410	260 000	8.09
Road tractors					
up to 14.9	341	431	294	208 000	13.90
15–19.9	603	565	482	260 000	7.95
20+	1 135	851	1 453	520 000	3.57
All types	248		4 000	5 200 000	2.80

3.4.4. Compromise solution in stratified sampling

The aim may be to try to estimate the means of the strata with the same precision. That is, to aim for the same standard error for each strata. This has been done in Table 3.4; the sample numbers were worked out by taking the numbers in Table 3.3 and modifying them successively until a solution was achieved. Although the strata standard errors are now all below 10 per cent, the overall standard error is now 5.07 per cent.

TABLE 3.4

Modified stratified sample design to equalise strata standard errors

Vehicle load capacity (tonnes)	Mean ($\bar{x}$)	Standard deviation (s)	Sample size (n)	Population (N)	Standard error % ($se_{\%}$)
Lorries					
up to 4.9	28	45	985	2 080 000	9.91
5–9.9	60	80	650	520 000	9.91
10–11.9	153	180	530	1 040 000	9.88
12–14.9	256	296	480	312 000	9.92
15+	551	481	280	260 000	9.93
Road tractors					
up to 14.9	341	431	540	208 000	9.91
15–19.9	603	565	320	260 000	9.93
20+	1 135	851	215	520 000	9.91
All types	248		4 000	5 200 000	5.07

Tables 3.3 and 3.4 illustrate that, in most cases when taking samples, you are unlikely to be able to have a sample design that will give both the minimum overall standard error and equal strata standard errors. If you wish to have reasonable precision for the estimates of stratum means and the overall mean there will have to be a compromise between the two approaches. This can be done in the same way that Table 3.4 was derived from Table 3.3. Such a compromise solution is given in Table 3.5.

Of course, as well as the estimate for tonne-kilometres, there will be an equal interest in the estimate of tonnes carried. The percentage standard errors for tonnes and for tonne-kilometres are likely to differ significantly in any sample design. Compromise is again needed to provide reasonable precision for both estimates. In addition, the requirement that the samples should be the same size for each of the weeks covered by the survey means that the sample size in each stratum should be a multiple of 52 (assuming the survey covers a year).

TABLE 3.5

Modified stratified sample design – compromise 1

Vehicle load capacity (tonnes)	Mean ($\bar{x}$)	Standard deviation (s)	Sample size (n)	Population (N)	Standard error % ($se_{\%}$)
Lorries					
up to 4.9	28	45	500	2 080 000	14.00
5–9.9	60	80	500	520 000	11.39
10–11.9	153	180	500	1 040 000	10.18
12–14.9	256	296	400	312 000	10.95
15+	551	481	350	260 000	8.82
Road tractors					
up to 14.9	341	431	500	208 000	10.36
15–19.9	603	565	480	260 000	7.97
20+	1 135	851	770	520 000	5.09
All types	248		4 000	5 200 000	3.19

An alternative approach is, having worked out what the overall standard error would be with an optimal allocation, to start with the equal allocation of Table 3.2 and make the minimum necessary changes to strata sample numbers to obtain a satisfactory solution. This is illustrated in Table 3.6. Both the sample designs shown in Table 3.5 or Table 3.6 would meet the aim of reasonable stratum and overall estimates. Table 3.5 gives a slightly better overall estimate while the Table 3.6 solution favours the strata.

TABLE 3.6

Modified stratified sample design – compromise 2

Vehicle load capacity (tonnes)	Mean ($\bar{x}$)	Standard deviation (s)	Sample size (n)	Population (N)	Standard error % ($se_{\%}$)
Lorries					
up to 4.9	28	45	700	2 080 000	11.80
5–9.9	60	80	500	520 000	11.39
10–11.9	153	180	500	1 040 000	10.18
12–14.9	256	296	400	312 000	10.95
15+	551	481	300	260 000	8.82
Road tractors					
up to 14.9	341	431	500	208 000	10.36
15–19.9	603	565	480	260 000	7.97
20+	1 135	851	620	520 000	5.72
All types	248		4 000	5 200 000	3.41

Table 3.7 provides a summary of the percentage standard errors in the previous tables. It also shows the percentage reduction over a simple random sample in the overall standard error that can be achieved with stratified sample designs for a given fixed overall sample number. In the survey example illustrated in the tables, a simple random sample of 4 000 units gave an overall standard error of 6 per cent. Using a stratified optimal allocation design with the same number of units would reduce the overall standard error to 2.8 per cent (a 53 per cent reduction). However, some of the stratum means would not be estimated with much precision.

TABLE 3.7

Comparison of standard errors for various sample designs

Vehicle load capacity (tonnes)	Percentage standard error around Mean (95% confidence)						
	Simple random sample (SRS)	Stratified sample					
		Proportional population	Equal allocation	Optimal allocation	Equal errors	Compromise	
						1	2
Lorries							
up to 4.9		7.72	14.00	17.90	9.91	14.00	11.80
5–9.9		12.80	11.39	22.21	9.91	11.39	11.39
10–11.9		7.99	10.18	9.16	9.88	10.18	10.18
12–14.9		14.33	9.70	12.68	9.92	10.95	10.95
15+		11.85	7.26	8.09	9.93	8.82	8.82
Road tractors							
up to 14.9		19.19	10.36	13.90	9.91	10.36	10.36
15–19.9		12.72	7.79	7.95	9.93	7.97	7.97
20+		7.20	6.41	3.57	9.91	5.09	5.72
All types	6.00	4.25	3.59	2.80	5.07	3.19	3.41
% gain over SRS		29	40	53	16	47	43

To achieve an overall standard error of 2.8 per cent with a simple random sample, a sample of 18 370 units would have been needed. A sample of 8 750 units would be needed to achieve the same standard error with a proportionate stratified sample, and a sample of 6 400 units with an equal allocation design.

However, it was only possible to calculate the standard errors and (for some designs) the sample numbers for each stratum because information was already available about the population, the means and the standard deviations of each of the strata (from a previous year's survey).

A further complication for road freight surveys is that estimates are usually needed of both tonnes carried and tonne-kilometres performed. This means that the standard errors of both estimates have to be calculated and, for an efficient sample design, a compromise made between the optimal designs for both variables.

If you are carrying out the first survey in an area, it is recommended that a fairly simple sample design should be used. Disproportionate stratified sampling may be more efficient, but it is more complex to control the selection of units to sample and to calculate the weighting factors to gross up the sample results to national estimates. A move to a more complex sample design can always be made in a subsequent year after gaining experience in carrying out the first year's survey. Furthermore, the first survey will provide information on strata standard deviations that will be needed for optimal disproportionate stratified sampling.

3.4.5. Cluster and multi-stage sampling

If the vehicle register is not available as a sampling frame and a register of owners/operators or businesses has to be used, sampling has to be a two-stage process. The primary stage sample unit will be the owner/operator or business (primary unit) and the secondary stage the vehicle (secondary unit). This method of sampling is known as multi-stage sampling. A special case of multi-stage sampling, where a sample is drawn at the first stage and all second stage units are required to respond is known as cluster sampling.

If sampling of vehicles is done by a two-stage process with the selection of a sample of operators asked to provide details of the activity of all their vehicles for one given week, the sample is technically a cluster sample. This is because, although details of the vehicles owned are required for only one week of the year and not for the whole year, the first stage sample of owners is technically a sample of owner-weeks.

Intra-class correlation is of crucial importance in sample design and is nearly always positive. The work carried out by vehicles operated by one haulier is likely to be similar and different from that of other hauliers. For example, an operator in the construction business is likely to use mainly tipper lorries. The work done by these vehicles will be very different to that of an operator concentrating on deliveries to large chains of food stores. And that will be different from operators using tankers to deliver petrol-to-petrol stations. Also, the journeys done by large hauliers are likely to be different from that of small hauliers. If every operator carried out a similar mix of work in road goods haulage, multi-stage sampling would be as precise as single-stage sampling.

In most cases multi-stage sampling will increase the sampling variance over that which would be calculated if the survey was a single stage random sample. The effect on the sampling variance can be illustrated for the simplified case where there is a population of KN units consisting of K first stage units (primary survey units–PSUs) each PSU consisting of N secondary units. If a sample of k PSUs is taken and all the secondary units in these PSUs are surveyed, then the sampling variance Var (M) for the mean (or total) value of a variable is:

$$\text{Var}(M) = \text{Var}(R)[1 + (N-1)p]$$

where Var (R) is the sampling variance for a simple random sample of the same size (kN) and p is the intra-class correlation. The intra-class correlation can vary between 0 and 1. The ratio Var (M)/Var (R) is called the design effect (Deff)–a measure of the increase of the standard error for the design over that which would be calculated if the sample was considered as a simple random sample.

In the above equation, if $N = 1$, that is there is only one second stage unit for each first stage unit, the sample is the same as a simple random sample. If $p = 0$, that is there is no intra-class correlation it implies that each of the PSUs is as heterogeneous as the population generally. Neither of these cases is likely to arise for a sample of road goods operators as PSUs.

If the units of a cluster are very similar to each other and markedly different from that of other clusters, p (the intra-class correlation) is likely to be nearer 1 than 0. The closer p approaches 1, the greater will be the design effect, which will always be greater than 1.

Even a small value of p could result in a large design effect if the numbers in a cluster are of any magnitude. The product of $p(N-1)$ can be large if N is large even if p is small. For example, if $p = 0.1$ and $N = 50$, then the variance from a sample of clusters would be 4.9 times that from a simple random sample of the same number of units.

This leads to an important feature of cluster sampling. The more heterogeneous the clusters are within themselves (that is the more the clusters are like the population), the less the precision will be lost by clustering. This is the opposite of the aim of stratification, where the aim is to make the strata as homogeneous within themselves as possible. Therefore, if it is possible to do so, it is better to take a large number of clusters with a small number of secondary units. Unfortunately, this is unlikely to be the case in surveying the activity of goods road vehicles through an initial sample of operators and the prospect of a very considerable increase in sampling error that results from clustering has to be faced.

A major problem when the PSUs vary markedly in size is the control over the sample size. There are sample designs for multi-stage sampling where the number of secondary stage units per PSU vary markedly. Each situation for which a multi-stage sample has to be used needs to be studied carefully. Solutions are often 'tailor-made'. To cover all the possible designs for multi-stage sampling are beyond the scope of this Manual. If such a survey design is required, the reader should refer to the books 'for further reading' listed in the Bibliography.

The calculation of standard errors for complex sample designs can require considerable effort. A design that gives simple formulae for standard errors is the 'paired selection' design. This is described in Kish (1965). Another approach is using 'replicated' sampling–see Deming (1960). See the references in the Bibliography.

3.5 Drawing the sample

3.5.1. Extraction of data from vehicle register

Obtain an extract from the vehicle register of the records of all the vehicles that will be covered by the survey. The extract should, ideally, be taken to record the state of the register as at the mid-point of a quarter of a year. (For example, obtain extracts as at 15th day of February, May, August, and November).

The process outlined below is carried out for each extract. If it is not possible to obtain an extract of the complete vehicle register from the controllers of the register, possibly due to legal restrictions, the controllers of the register would have to be commissioned to carry out the extraction process specified in the following section.

Sort the vehicle records from the vehicle register into groups according to the stratification agreed for the survey (this may be type of vehicle, gross vehicle weight, region, etc.). Then sort each group by some variable as instructed by the head of transport statistics (i.e., region, year of manufacture, carrying capacity, gross vehicle weight). Produce a count of the number of vehicles in each group.

3.5.2. Calculation of start and interval numbers for the survey and selection of sample

When selecting the sample for one quarter of the year, let the total number in any vehicle group = **N**.

For that vehicle group let '**n**' = number of vehicles to be sampled per week – 13 * **n** per quarter.

Then, Interval number '**I**' for that group = **N/(13*n)**.

For each group select a start number **S** = random number between 1 and **I** (use table of random numbers or computer to obtain the random number–a new random number should be used for each group).

For each sorted group of vehicle records select the **S**th record, the **S+I**th record, the **S+2*I**th record and so on until the end of the group. Copy to the vehicle computer file of the survey all the data required for the selected vehicles.

3.5.3. Allocation of records to relevant weeks in quarter

Week 1 records for each group are records 1, 14, 27, 40, etc. on file.

Week 2 records are records 2, 15, 28, 41, etc. on file.

Week 13 records are records 13, 26, 39, 52, etc. on file.

Transfer to the vehicle computer file, all the fields of which should be created at the same time–add the relevant survey week, year and unique record reference number.

3.6 Drawing the sample

The reason why most, if not all, people run a business is to make a profit. Any work which is done in business hours that does not assist the aim of making money is normally avoided if possible, and if not, is unlikely to be done with much care or enthusiasm.

Those working in the road haulage industry are not noted for their co-operation with the State. Competition is tough; too many road hauliers are competing for the business available. Time spent filling in statistical forms, in the view of the road haulier, could be better spent earning money.

So, what can the statistician do to get a reasonable response rate to his survey? What weapons can be used to encourage operators to reply?

Filling in forms from the State will not be welcome tasks to any business–unless there is a good incentive to do so. There are basically two types of incentive–**rewards** and **fear**. Receiving a worthwhile sum of money (usually a subsidy from the State) is always an excellent incentive. Getting permission to operate legally is also an incentive for most people. Filling in statistical forms rarely provides anyone with an incentive, although the fear of prosecution under a Statistical Law for not sending in a return may persuade many people to return the questionnaire. However, it is more likely that a company would be more concerned that a prosecution under a Statistical Law would be used as a reason to refuse the company permission to operate legally in a future year.

Before considering the incentives, however, the statistician should make sure that every practical step has been taken to make the survey acceptable as possible to those who are to be asked to fill in the questionnaire. These steps can be summarised under three headings: publicity, simplicity, checking.

3.6.1. The benefit of publicity

The more publicity you can get for your survey the better. Make sure all the publicity gives the reasons why the data are needed and stresses the fact that the survey has been designed to place the minimum possible burden of extra work on those asked to fill in the questionnaire.

Try to get the publicity directed at those who will have to fill in your questionnaire. Is there a trade press – can you get articles about the survey published in it some months before the survey is due to start and when the first questionnaires are being sent out?

If there is a trade association, make an early contact with it to explain the need for the data and the reasons for the survey. Also discuss the survey design with the trade association's officials and invite them to give their comments on the questionnaire you propose to use. Keep in regular contact; do everything you can to get the trade association to support the survey. A trade association's support for a statistical survey is a valuable asset that can do much to persuade the association's members to complete your questionnaire.

It is also useful to visit a number of road haulage companies, particularly any company that is considered by the road haulage industry to be a leader in the industry. During the visit, the need for the data and the reasons for the survey would be explained and comments sought on the questionnaire.

3.6.2. Minimising the response burden

This means making sure that everything possible has been done to make the filling in of the questionnaire as simple as possible. Remember that those completing the questionnaire will not be as interested as you in the answers, will not take much care in accuracy, and are unlikely to have your level of education.

Wherever possible, provide boxes for the haulier to put a tick (√) in the box against the right response or a box in which to write the answer. Try to avoid asking the haulier to code an answer. It may save you staff who would have to code a written answer but the quality of coding is likely to be much worse and, more importantly, will almost certainly mean that some hauliers will not reply because of the extra difficulty of coding answers.

Make a first draft of the questionnaire (together with notes of guidance on completing the questionnaire). Put as many notes of guidance as possible on the actual questionnaire, but make sure the questionnaire layout looks clear and attractive.

Show the draft to one or two staff in another branch of your organisation and ask them to tell you what information they think you have asked for in the questionnaire or have given in the notes of guidance. It is very easy when drafting a questionnaire to use a phrase that you believe everyone will understand only to find that the phrase is interpreted differently by some other people.

After clearing the language within the office, get comments from the trade association and some road hauliers. Redraft your questionnaire as far as possible to take account of the comments received and ask some road hauliers to complete it as a pilot study and to give you any further comments. It is useful to ask for a record to be made of the time it took these hauliers

to complete the questionnaire – useful ammunition if you get a complaint in the future about how long it takes to fill in your questionnaire.

3.6.3. Checking

Checking means making sure that everything is going according to plan:

- The questionnaires are sent out to the selected hauliers in sufficient time to give a haulier notice to keep whatever records are required to fill in your questionnaire.
- You have a system in place to check that a selected haulier has received the questionnaire; a reply-paid post card or a telephone check.
- Your survey management system can keep track of incoming responses from different weeks of the survey so that you can identify which hauliers have not replied after a given period and you can send them a reminder.

3.6.4. The benefits of a reminder system

A first reminder (by post or telephone–whichever is cheaper) should be sent about two weeks after the end of the relevant survey week. This allows a reasonable time for the haulier to complete the questionnaire and for any postal service delays. This first reminder should produce a significant increase in overall response rate and should form an important feature of your survey strategy. Make sure your survey plan and costing include staff and resources for the reminder exercises.

A second reminder (sent between three and four weeks after the end of the relevant survey week) is also worthwhile. This reminder should include any threat you can make about prosecution under a Statistical Law.

A third reminder by telephone (one week after the issue of the second reminder) can also be worthwhile. It is unlikely any further reminders would be of much benefit, as hauliers would use the excuse that the relevant survey week would be too far in the past for them to recall the information. The experience of countries that have used reminders for surveys of goods road transport is that around 30 to 40 per cent of the total response is received after the issue of reminders.

3.6.5. Incentives

Fear of prosecution can be a useful incentive, provided you can be sure that those who have to sanction the use of the prosecution process are willing to do so. News that some hauliers have been prosecuted (and hopefully made to pay a reasonably large fine) for not completing your survey will probably spread quickly within the road haulage industry and lead to an increase in response. Just as equally, threatening to prosecute and never doing so could lead to this fact becoming known in the industry and response rates could therefore fall over time.

Finally, if the laws of your country permit and you can find the finance, you can give hauliers a reward or the opportunity to receive a reward if they return their completed questionnaire. A reward scheme on one of the following lines can prove very successful in getting a high response from road hauliers:

- One response is selected at random from all the responses to the survey for a quarter of the year and that haulier is sent a credit note for (say) 100 litres of fuel. The reward needs to be sufficiently high to make it an attraction to hauliers, but not too expensive for the survey management.
- A small gift is sent to every respondent. Clearly, this could not be financed by the survey management. It might be possible to come to an arrangement with a national state oil company to provide the gift, such as a road map or a working jacket with the name of that oil company on the back of the jacket.

4

Preparation for the survey – Questionnaire design

4.1 Questionnaire design

For reasons of cost, surveys which aim to collect information about the transport of goods by road must necessarily be postal surveys or internet surveys (i.e., electronic versions of questionnaires sent by email or web questionnaires); interview surveys, whether face-to-face or telephone, are generally too expensive and are better suited to gathering attitudes rather than facts. Postal surveys do, however, have a potential drawback; their response rates are generally lower than interview surveys.

The topics 'Encouraging response' in the previous chapter and 'Dealing with non-response' in chapter 6 are relevant to the subject of questionnaire design. It is impossible to avoid the subject of response rates altogether since the main criteria – in judging whether or not a questionnaire is well designed – is whether it is successful in eliciting full and accurate information.

4.1.1. Principles of questionnaire design

Given that, generally, surveys of goods road transport will be postal surveys, this affects the design and content of the questionnaire:

- The questionnaire must have a simple structure; it is not a good idea to ask respondents to skip certain questions according to their replies to others (or if certain conditions apply). If this is done it should be used sparingly. What is a good system for interview-based surveys which cannot lead to some questions being overlooked?
- Questions must be crisp, unambiguous and use words that will be familiar to the respondent since (as it is a postal survey) no further explanation will be forthcoming.

The questionnaire is going to be completed – hopefully – by a lorry driver or a transport manager. Both are busy, often stressful, occupations. Therefore, regarding the content of the questionnaire itself, it must:

- Aim to collect only information which is readily available – information which the respondent knows or which is easily accessible from records and information which the respondent is willing to disclose. For example, hauliers are generally very unwilling to divulge the price they are charging a customer for a journey for which they may be willing to disclose other details of the journey.
- Not ask for too much information. In some countries information is requested about each stage of every trip made by a specified vehicle in a week (e.g., distance travelled, load carried). However, simplified information on a different part of the questionnaire is gathered when the trip consists of five or more stops – since it is recognised that asking for details of every stage of such multi-stage journeys would be too burdensome, otherwise the haulier would either not respond at all or under-report work.

- Contain questions that are easily understood and unambiguous. Even if the questionnaire contains a phone number that respondents can call in case of difficulty, many will be attempting to complete the questionnaire outside office hours.

To help in obtaining a good and accurate response, the questionnaire should be accompanied by a covering letter that tells the haulier:

- Who is conducting the survey, and why;
- The importance of the survey and the importance of the individual's co-operation;
- What penalties (if any) will ensue should he fail to complete and return the questionnaire;
- That telephone help is available should he need assistance in filling out the questionnaire; and,
- That all information on the questionnaire will be treated in confidence and the individual detail will not be made available to anyone outside the Statistical Office.

Sometimes, instead of being reluctant to complete the questionnaires, hauliers are too eager to help. They discover, on receiving a questionnaire asking for details of work undertaken by a vehicle in a specified week that the actual vehicle was laid up during that week and so, anxious to provide some information, they complete the questionnaire giving details of another vehicle's work. The covering letter should ask them not to do this since the survey aims to collect accurate and unbiased information about the activity of all goods vehicles, whether working or not.

A unique reference number (perhaps the registration number of the vehicle) should be printed on the questionnaire itself. If a questionnaire is returned without any identification and if there is missing information, it will not be possible to contact the haulier who completed the questionnaire. If the vehicle has been sampled from an administrative database, the data on the returned questionnaire should be combined with vehicle data derived from the administrative database. This will not be possible if the vehicle's identity is not known.

It is often useful, when sending the questionnaire, to include notes which are designed to help the haulier in filling out the questionnaire. Such notes should be as short and as clear as possible and, ideally, should not be necessary. However, since the respondent is often asked to code some parts of the questionnaire as well as provide written information, 'Notes for completion' are inevitable.

Certain items of information (i.e., the nature of the business to whom the questionnaire has been sent, or the commodity carried on a particular journey) will be written onto the questionnaire by the respondent and coded when the questionnaire is returned. In general, it is not reasonable to ask the haulier to decide, for example, which NST commodity code applies to the goods he carried; there are too many codes and it is too much work for the haulier to select the correct code. Therefore, most coding takes place in the office when the forms have been returned.

However, it is reasonable to ask the haulier to indicate whether or not the commodity carried was classifiable as 'dangerous' and, if it was, to ask him to add a code on the questionnaire, using the standard codes, indicating the type of dangerous goods carried. Statistical Office staff would sometimes not know, for example, from a written description of an exotic chemical, whether a load was dangerous, and a haulier must by law know the nature of the dangerous goods he carried.

It is a good idea to ask hauliers to add codes themselves onto the questionnaire where the numbers of possible codes are few; it saves space and reduces the size of the questionnaire. For example, it is useful to record how each load is carried – in an ISO container, on pallets, in bulk, etc., and it is relatively simple to provide the haulier, either on the questionnaire or in the 'Notes for Completion', with a code list. It saves space and relieves the haulier from the chore of having to write the information in full against each trip.

However, if it is decided to allow hauliers to code or to select a code from a number of choices, it is important to ensure that the choices offered cover the full range of alternatives. This is usually achieved in three main ways: by pre-testing the questionnaire, by sending it to a small number of potential hauliers, and by monitoring the codes which are actually being used when information from the questionnaires is put into the computer. As an example, the following codes were used in a survey carried out some years ago to record how each load was carried (note: these codes do not cover the full breakdown by cargo type required by the Regulation):

IC ISO container or swap body.

PL On pallets.

PK Other packaging (semi-bulk, but not in a container or swap body).

BU Liquid / solid bulk.

OT Other.

It was apparent that a large number of 'Other' codes were being used. After examining the questionnaires, it turned out that there are other types of transportation bodies/packaging that hauliers considered were not covered by the above scheme (for example, goods in wire cages). Also, in some cases, hauliers misunderstood the coding scheme (e.g., sand carried in tipper lorries being coded as OT and not BU).

These problems could have been covered in the notes for guidance or by some slight expansion of the coding details given on the questionnaire if they had been discovered during the pilot tests of the codes.

It is essential to monitor constantly the codes that the Statistical Office staff and the hauliers are using to classify commodities and other variables. One should not have to wait until all the data for a year have been collected and put into the computer to discover that, for certain items, 'Other' or 'Miscellaneous' had been used 80 per cent of the time.

Since the information collected by the questionnaires will be analysed by computer, it is important when designing the questionnaire and the coding of the information to consider the data processing aspects. In particular:

- Data that cannot be analysed easily by computer should not be collected; generally, this restricts such information to quantities and codes. For example, it might be thought worthwhile to collect information about the make and model of the lorry, but textual descriptions cannot be analysed; groupings are not possible due to variations in spelling, and coding staff cannot realistically be expected to assign a unique code to each make and model since there are far too many;
- The questionnaire should be designed to leave space for the codes (e.g., for origin, destination, commodity, etc.) to be written onto the questionnaire so that the data can be keyed (if facilities are available) without having to transcribe the information onto a 'keying document'; and,
- The same journey may be repeated many times a day (for example, a lorry travelling between a quarry and a ready-mix concrete factory). Some indication ought to be given to the haulier that, in such cases, he need only enter the journey details once and indicate how many such identical journeys were made on the same day. The processing software should allow for such multiple trips and should not require the same information to be input repeatedly. However, in this case it should be made very clear to hauliers that the journey details to be entered should refer only to one of the journeys. In some surveys where questionnaires have allowed for the recording of a single such journey and the number of identical journeys, it has been obvious that in some cases a haulier has recorded the total tonnage carried and total kilometres travelled on all these journeys.

4.1.2. The data required

We turn now from the general aspects of the design and layout of vehicle activity questionnaires towards more specific remarks about their content – about the information which hauliers are asked to provide for Regulation (EU) No 70/2012. Most European Union Member States sample individual vehicles and ask the vehicle's operator to supply three sets of details for a specified survey period (generally seven days):

- Details of the enterprise (where it is located and the nature of the business).
- Information about the vehicle.
- Information about all the work – including empty running (although this is an optional variable under the Regulation) – that the vehicle undertook in the period.

By carrying out the survey continuously throughout the year, by sampling the same number of vehicles every week and taking all possible steps to obtain a high response, unbiased statistics can be compiled of annual road freight activity.

It is useful to describe and comment upon the various data items that such questionnaires could request. Although questionnaires will vary from country to country (due to differences in regulatory regimes and other factors), essentially questionnaires used in EU countries are very similar. This is because the surveys are carried out in a similar fashion and each

Member State must, under the terms of the Regulation, submit the same statistics on the carriage of goods by road to Eurostat.

4.1.2.1. Data on the enterprises

The definitions of all the data items required under the Regulation are covered in Part B of this Manual.

Data collected about the enterprise, whose vehicles have been sampled, comprise location and type of business (coded to NACE Rev. 2). The latter is of some use in determining the split in road haulage between own account (firms carrying goods in the course of their own business and not for anyone else) and hire or reward (road haulage firms), but the same information is collected about the vehicle journeys. For own account operations, this data item – 'Type of business' is useful because it shows the relative contribution to road freight by different types of industry.

It should be noted that in some cases data that might be considered as vehicle-related is actually recorded as journey-related because the value of the variable may change from journey to journey. An example of this is the addition of a trailer to a lorry for some journeys but not for others. However, the Regulation permits countries, if they wish, to simplify the recording of these variables where the vehicle configuration may change during the survey week or the vehicle may be used for both types of transport (see Annex I of Regulation, 'Successive configurations' and 'Change in type of transport'). In such cases either the configuration for the first journey recorded or that used most is to be recorded. For the type of transport, the main mode of utilisation is to be recorded.

4.1.2.2. Data on the vehicle

Data collected about the vehicle for the Regulation include the following (some of this data is not obligatory for the first few years of operation of the Regulation):

- **Age of vehicle (in years) since its first registration**: in general, this variable has to relate to the date of first registration in the country carrying out the survey. Where a significant percentage of the vehicle stock has been imported second-hand from other countries, it may be impossible to collect data on the actual age of these vehicles.
- **Possibility of using vehicle for combined transport**: the classification and coding of this vehicle had not been agreed at the time of the preparation of this manual. The aim of the variable is to identify those vehicles that are specifically designed for use in combined transport.
- **Kilometres covered during survey period when loaded and (separately) when empty**: the kilometres covered when a vehicle is not carrying a load was an optional variable when the Regulation was adopted. However, Eurostat hopes that most countries will find it possible to collect this information from the first year of collecting data under this Regulation.
- **Reason for non-use**: if no activity is reported it is essential to ask why. It is important to know both the percentage of vehicles not working in an average week, and the reasons. However, this question may help deter the haulier from reporting activity during the week simply to avoid the chore of completing the questionnaire. One way to try to prevent this (as illustrated in the model questionnaire in section 4.2 of this chapter) is to ask the haulier to record the number of days in the survey week when the vehicle was not used and the reason why.

Other data variables which countries might find useful to collect for their own internal uses are:

- **Fuel purchased during survey week**: very important as it enables estimates of average fuel consumption to be made. Satisfactorily reported, but sometimes omitted.
- **Vehicle's mileage within last 12 months (or since vehicle acquired if less than 12 months)**: if traffic counts are available for a country, this variable provides a way of estimating the amount of under-reporting of vehicle activity. Reported well; some evidence of rounding to thousands of kilometres.
- **Body type of goods road motor vehicle**: useful in some countries if there is no other source of information.
- **Body type of trailer/semi-trailer**: useful in some countries where trailers are not registered and there is no other source of information about the usage of different types of trailers.
- **Type of fuel used**: useful in some countries if the survey covers small vehicles and there is no other source of information.

Some of these data items (for example, date of first registration, body type, taxation class, type of fuel used) may be available from the vehicle-licensing database from which the sample may be drawn. As has been mentioned previously in this chapter, such data items should be included in the questionnaire and the respondent asked to check that the data are correct.

4.1.2.3. Data on journeys

During the survey period, a goods road transport vehicle (or vehicle combination of motor vehicle plus (semi-) trailer(s)–for the rest of this chapter the term 'goods vehicle' will be used to refer to both a single vehicle or a combination) may make a number of journeys. These journeys will be either loaded (there are goods and/or waste material in the lorry, trailer or semi-trailer; waste material being treated as a particular type of goods) or unloaded (there are no goods or waste material in the road goods vehicle(s)).

A loaded journey is defined (see illustrated *Glossary for Transport Statistics* and Part B of this Manual) as starting when goods are first placed in a goods vehicle, the vehicle previously being empty, and ending when goods are unloaded from the vehicle and the vehicle is subsequently completely empty. A laden journey, therefore, can cover several basic transport operations; a basic transport operation being defined as the transport of one type of goods between its place of loading and its place of unloading.

Information on basic freight transport operations by road is collected on the basis of:

- Either a description of each basic goods transport operation (with additional details on unladen journeys),
- Or a description of the journeys made by the vehicle in carrying out these basic goods transport operations.

For the majority of journeys, a laden journey represents one basic transport operation with:

- A single type of goods loaded (as classified to the 20 divisions of the NST classification);
- A single point of loading for the goods; and,
- A single point of unloading for the goods.

In this case the two methods are equivalent.

However, several basic transport operations can be carried out during one laden journey because:

- There are several points of loading and/or unloading of the goods (limited in number and normally no more than four to avoid placing an excessive burden on the respondent. There is separate treatment for 'collection and/or distribution' journeys);
- And/or there are several different types of goods transported during the single laden journey.

The various points of loading and unloading (up to four) need to be recorded in order to calculate the tonne-kilometres performed during the journey. Where countries record only the main type of goods carried, Eurostat accepts the loss of information due to this permitted simplification but requires Member States to make mention of this simplification in their communications to Eurostat.

The data items collected for ***journeys of up to four stops*** include the following:

- **Day of week**: useful in examining policies aimed at restricting the movement of lorries at weekends (strictly defined as the day upon which the journey started) as well as a check on the recording of all the vehicle activity during the survey reference period.
- **Maximum permissible weight**: very important for analysis as it can determine vehicle taxation rate. May be available from administrative records but can vary according to whether a trailer is attached to the vehicle or the type of semi-trailer attached to a road tractor.
- **Load capacity**: helpful for sample stratification, checking information on weight of goods carried and for policy investigation purposes (e.g., those affecting vehicle weight); reported very accurately, well known by the haulier – if he carries a heavier load he will be overloaded and liable to prosecution.
- **Number of axles**: important for policies concerning vehicle tax (axle loading determines road wear and hence helps determine the relative amount of tax payable by vehicle having differing numbers of axles). The number of axles on the

tractive vehicle and on the trailer/semi-trailer are recorded separately. If the vehicle tows two trailers the code appropriate for the total number of axles on all trailers should be used.
- **Type of transport**: hire or reward or own account.
- **First place of loading/ last place of unloading of the goods**: a computerised gazetteer covering a single country (or the whole of Europe) is useful to determine where each location lies. The same software that provides the gazetteer also estimates the distance of the optimum route between the origin and destination. Useful for checking stage distances (see below).
- **Countries crossed in transit** (up to five).
- **Places of loading/unloading if vehicle was transported by another means of transport for part of its journey**.

For each ***stage of the journey***:

- **Weight of goods carried**: the questionnaire must make it clear to the haulier whether the weight of any packaging or the container is to be included or excluded.
- **Whether vehicle fully loaded, not fully loaded, or empty (in terms of volume)**.
- **Loaded (or empty) distance travelled**: this can be checked by software that, using a detailed description of the road network together with a comprehensive place name gazetteer, works out an optimum route. Actually, the main market for this computer software is road haulage companies.

4.1.2.4. Data on the goods

The following data should be collected about the **goods** carried on each journey:

- **Type of goods carried**: haulier describes goods that are then coded by Statistical Office staff to NST two-digit divisions. It is not recommended that hauliers be asked to code this data themselves as the codes are too numerous and the ability to check the quality of data returned is lost. Fairly well reported, although there is a tendency for the haulier to record 'Goods' (!) or 'Sundries'.
- **Weight of goods carried**: the questionnaire must make it clear to the haulier whether the weight of any packaging or the container is to be included or excluded.
- **Cargo type (how carried)**: not well recorded; hauliers confuse type of vehicle (e.g., tipper) and how the goods are carried on the vehicle.
- **Dangerous goods**: often coded by the haulier from notes. Essential information which is well recorded.
- **Places of loading/unloading of the goods**: a computerised gazetteer covering a single country (or the whole of Europe) is useful to determine where each location lies. The same software that provides the gazetteer also estimates the distance of the optimum route between the origin and destination.
- **Distance travelled**: this can be checked by software that, using a detailed description of the road network together with a comprehensive place name gazetteer, works out an optimum route.

4.1.2.5. Collection and delivery journeys

The haulier is not asked to supply details of every stage of a journey of four or more stops. For this type of journey, it is not feasible to ask the transport operators to describe the individual transport operations. Instead, in a separate section of the questionnaire, he supplies the same data items as above but for the whole journey. 'Weight of goods' is replaced by 'Total weight of goods collected' and 'Total weight of goods delivered'. The 'Number of stops for delivery' and 'Number of stops for collection' are also to be recorded. This information allows a rather involved calculation to be made of the journey's total tonne-kilometres.

4.1.2.6. Possible additional variables

Many other questions could be asked on freight activity questionnaires but are often omitted for a variety of reasons, mainly to reduce the burden of completing the questionnaire, or because it is thought that their data quality would be poor. Examples include:

- **Make and model**: if it were possible to record make and model, then this data would be very useful to market researchers who could determine what kinds of road freight work were being undertaken by different makes of lorry. Make and model cannot easily be coded, but may be available from the administrative records from which the vehicle sample is drawn.
- **Detailed vehicle data**: some information such as the number and type of lorries fitted with 'road friendly' (air) suspension is not available from any source, but would be useful to policy makers, particularly those who are concerned with regulations governing the construction of goods vehicles. Such data would probably be readily available, but we do not collect it to avoid increasing the overall burden on hauliers.
- **Motorway usage**: policy makers would like to know what types of goods are transported on motorways (the proportion of goods vehicle mileage travelled on motorways can be obtained from traffic studies, but such studies cannot detect the commodities that are being carried). However, hauliers cannot realistically be asked to record separately distance travelled on motorways. However, it may be possible, if the computer software previously described (which calculates optimum routes) is developed, to have that software calculate motorway distance separately.
- **Fleet size**: in investigating the likely consequences of developments in road freight policies that will affect small operators in a different way from large operators, it would be useful to know the size of the fleet of the sampled vehicle. That is, how many other vehicles does the owner of the sampled vehicle operate? In this way, analysis of road freight activity by fleet size could be produced. This is a reasonable question to ask, but it may be left out purely to reduce the number of questions.
- **Stage start/end times**: this would be useful in enabling studies of the speed of road freight to be made. In practice, such a request would place far too great a burden on the operator, who would either not respond or fake the data.

4.1.2.7. A model of questions

This section sets out a list of questions that could be included on a questionnaire for a survey of the carriage of goods by road. All the data (including the optional ones) required by Regulation (EU) No 70/2012 are covered in this list of questions. Some information (marked *) may be available from the sample vehicle register and need not be asked of the respondent but it is useful to include this data on the questionnaire and ask the respondent to check the accuracy of the register. Load capacity should always be checked.

Some of the information about the vehicle (marked #) may change during the survey period; for example, a lorry may do some journeys with a trailer and some without. Annex I of Regulation (EU) No 70/2012, under the heading 'Successive configurations' indicates that Eurostat would wish to have these successive configurations recorded and the data supplied for each journey. However, where countries find it is not possible to record these successive configurations, the Regulation indicates that the configuration corresponding to either that of the first laden journey made during the survey period or that most frequently used during the period should be recorded.

- Questions of owner (operator)

1. Name of operator of vehicle*
2. Address of operator*
   ZIP code–Town/Settlement
   Street–number
3. Survey reference week
4. Identifier of operator*
5. Private operator or business*
6. Type of business (main activity–NACE)*

- Questions of vehicle

7. Vehicle registration mark*
8. Type of vehicle (lorry/road tractor)*
9. Year of first registration*
10. Number of axles on vehicle
11. Unladen weight (kg)*

12. Maximum permissible laden weight (kg)*
13. Load capacity (kg)*
14. If vehicle sold or scrapped
15. Date of selling/scrapping
16. Name of new operator if sold
17. Address of new operator–ZIP code–Town/Settlement–Street–number
18. If vehicle used trailer/semi-trailer in week (#)
19. Number of axles on trailer/semi-trailer (#)
20. Load capacity of trailer/semi-trailer (kg) (#)
21. Body type of vehicle/semi-trailer (#)
22. Type of use:–hire or reward–own account–household–mixed activity
23. Type of fuel used
24. Quantity of fuel purchased in the reference week
25. Days in work / out of operation:
    In work–Repair–Holiday–No driver available
    No work–Driver gone for holiday–Other causes
    Total (7 days)
26. Kilometres in the last 12 months
27. Usage period of vehicle in last 12 months

28-30. Three optional fields for specific country use

- Questions on journeys with 1–4 stops

31. Date of journey started–Day–Month
32. Place of origin (settlement or country)
33. Place of destination (settlement or country)
34. Distance travelled
35. Weight of goods loaded (kg)
36. Type of goods (according 20 NST divisions)
37. Type of dangerous goods
38. Type of cargo
39. Weight of goods unloaded (kg)
40. Trailer used or not (if lorry)
41. Type of transport–Hire or reward–Own account
42. Number of journeys of exactly the same type during that day

- Questions on journeys with 5 or more stops – 'collection-delivery journeys'

43. Date of journey started–Day–Month
44. Place of origin (settlement or country)
45. Place of last destination (settlement or country)
46. Distance travelled loaded
47. Distance travelled empty
48. Weight of goods delivered (kg)
49. Weight of goods collected (kg)
50. Type of goods (according NST)
51. Type of dangerous goods
52. Type of cargo
53. Number of stops on journey
54. Trailer used or not (if lorry)
55. Type of transport – Hire or reward – Own account
56. Number of journeys of exactly the same type during that day

4.1.3. Pilot testing

Having designed the layout and content of the questionnaire, it is essential to pre-test the questionnaire before beginning the full survey. Changes to an existing questionnaire should also be pre-tested. The amount of pre-testing needed depends on the familiarity of the respondents with the survey. For a new survey, a colleague in the Statistical Office should be asked to give a first view on the questionnaire. It should then be sent to a small sample of vehicle operators (or even better taken personally by the questionnaire designer to the operators) asking them to fill in the questionnaire and to comment on any difficulties experienced. This will help reveal:

- Which questions are unclear or ambiguous.
- Which questions are poorly answered either because the information requested is not readily available or because the haulier is unwilling to provide the information.
- Whether the range of alternatives provided for certain questions does, in fact, cover most possibilities.
- The adequacy, or otherwise, of the notes which are designed to help the haulier complete the form.
- Whether the layout of the questionnaire is satisfactory.

If this is a first survey the above testing should then be followed by a larger pre-test sample carried out, ideally at least three months before the planned start date of fieldwork of the actual survey. This will provide a further check on the points mentioned above and, provided the completed questionnaires are then processed, whether the survey management procedures for processing are adequate.

This testing should be carried out sufficiently far in advance of the planned date of the start of the actual survey to allow for modifications to the wording of questions (and for a further re-test!).

Pre-testing the questionnaire will also inform you about the completeness and accuracy of the database from which the sample is drawn. For example, a survey was carried out in one country of the freight activity of the heaviest 44 tonne articulated vehicles. At the time of that survey, such vehicles were only allowed to operate at that weight when taking goods to or from a railhead. The computer staff operating the vehicle-licensing database was instructed how the sample was to be selected but, unwisely, a pilot test of the survey was not carried out. After the first few batches of questionnaires were sent out, it became apparent that the owners of the vehicles to whom the questionnaires were sent did not generally operate the vehicles.

There are also a few instances of this discovered during regular surveys of road freight. However, for some rather obscure financial reasons, it turned out that most 44 tonne vehicles were leased to a third party. Thus, a great deal of unexpected extra work had to be expended in redirecting questionnaires to the actual operators of the vehicle. This work could have been anticipated and allowed for had the survey been piloted.

4.2 A model vehicle questionnaire

In some cases, several basic transport operations are carried out in the course of one laden journey. There may be several points of loading and/or unloading or several different types of goods transported during a journey. Countries have the option of recording only the main type of goods carried, the maximum tonnage carried at any point in the journey and the total tonne-kilometres performed during the journey. Other countries may collect information about each type of good carried and its place of loading/unloading.

The questionnaire design must reflect the option of data recording chosen. For this reason, it is not possible to set out a single model questionnaire that would collect only the data required for both the above options. Of course, a questionnaire design that collected information on all the types of goods carried would also provide the data on the main type of good but this would place a considerable extra burden of work on the respondents.

The treatment of journeys with more than one stop is covered in detail in chapter 6. Where countries exercise the option to record only the main type of good carried on a journey, it is possible to use the computer to identify the various types of journey if one extra piece of information is collected about each stage of a journey.

On the next four pages a model questionnaire is shown, that could be used to collect all the data required by Regulation (EU) No 70/2012 (including the optional variables) if the options are exercised of recording only the main type of good carried and the main vehicle configuration during the week.

The computer is used to identify the various types of journey and to calculate the tonnage carried and the tonne-kilometres performed during the journey. The model computer database records in chapter 7 of this Manual are based upon the same questionnaire.

Following the model questionnaire there is a model set of notes of guidance on the completion of the questionnaire.

Survey on the transport of goods by road

Wilful falsification of data, refusal to or delay in supplying data may entail punitive sanctions.

National Statistical Authority: Name and contact details

Respondents: Owners or operators of selected motor vehicles

Section 1. Information for the vehicle owner/operator

Respondent's details	
Name:	
Address:	
Email:	

Details of selected vehicle		
Registration number:	Number of axles:	
Year first registered	Gross vehicle weight, (kg):	
Survey year, week:	Unladen weight, (kg):	
First day - Last day	Load capacity, (kg):	

If the licence details are different, please enter correct details in the box below.

Respondent's details	
Name:	
Address:	
Email:	

Details of selected vehicle		
Registration number:	Gross vehicle weight, (kg):	
Year first registered	Unladen weight, (kg):	
Number of axles:	Load capacity, (kg):	

Survey status code

If you are a private operator (that is, not a company) please specify your core business: ……

For official use

NACE code:

Please return 1 copy to the NSA at the above address

To be returned no later than the 8th calendar day after the last day of the survey

Estimated time for completing the questionnaire, including the preparation of data asked, (minutes):

Date: ……..…Day …….…. Month …….…. Year

Name of Director / Operator
(Please write in block letters)
……

Phone number: ……

Signature: ……

Name of the respondent completing this questionnaire
(Please write in block letters)
……

Phone number: ……

Signature: ……

Section 2: Changes in the operation of the motor vehicles

1. The motor vehicle is: (Please tick the appropriate box)

01.	Sold	
02.	Leased out permanently	
03.	Subcontractedfor operation	

Details of the new owners / lease / operator
Name: ……
Address ……

2. The motor vehicle is withdrawn from opera (Please tick the appropriate box)

01.	Temporarily	
02.	Permanently	

Date of change (if any):
…….Day, …….Month, …….Year

Section 3: Data for the motor vehicle and trailer/semi-trailer

Warning: All questions relate only to the use of the vehicle during the survey week.

1. Was a trailer/semi-trailer attached to the motor vehicle?

YES ☐ Answer question 2.

NO ☐ Skip to question 3.
(If the motor vehicle is a road tractor, skip to question 5).

(Please tick the appropriate box)

2. Details of the trailer/semi-trailer attached typically to the motor vehicle:

01.	Loading capacity	…….. Kg
02.	Number of axles	……..

3. Body type (Please tick the appropriate box)
(For tractors specify the type of trailer/semi-trailer.)

01.	Open box	
02.	Open box with canvas cover	
03.	Ordinary closed box	
04.	Temperature controlled box	
05.	Tipper	
06.	Livestock carrier	
07.	Liquid/fuel tanker	
08.	Tanker for solids	
09.	Car transporter	
10.	Transport of containers	
11.	Concrete mixer truck	
12.	Rebuilt for passenger transport	
13.	Other ……	

4. Is the vehicle or trailer designed for combined transport If YES tick the box ☐

5. Details of transport activity: (Please tick the appropriate box)

01.	Hire or reward		For official use
02.	Own account		

6. Fuel purchased during the survey week (regardless of mileage):

01.	Petrol	……..….. Litres
02.	Diesel oil	……..... Litres

7. Number of days in and out of service:

01.	Transport of goods and empty running	days	06.	No work	days
02.	Internationla transport excluded from surv	days	07.	Driver gone on vacation	days
03.	Passenger transport only	days	08.	Holiday	days
04.	Repair	days	09.	Other	days
05.	No driver	days	10.	Total (from 01 to 08)	7 days

8. Mileageand operating performance of the motor vehicle in the last 12 months:

01.	Distance travelled	…….. Km
02.	Usage	……..…. mon

Section 4. Description of the journeys carried out by the vehicle during the survey week

PLEASE READ THE DEFINITIONS AND EXPLANATIONS GIVEN BELOW AND IN THE ATTACHED NOTES BEFORE COMPLETING THIS SECTION

(Delivery-collection journeys on the 4th page.)

N°	Date		Origin	Goods loaded				Destination	Weight of goods unloaded, tonnes (1) (If empty put 0)	Distance travelled, kilometres	Number of journeys (4)	Type of transport (code 1 or 2) (5)
	Day	Month	Name of the village/town (for international transport also write the name of the foreign country - see notes on transit)	Weight in tonnes (1) (If empty put 0)	Please describe the goods carried (In case of several kind of goods loaded please describe the largest weight)	ADR code (2)	Type of cargo (3)	Name of the village/town (for international transport also write the name of the foreign country - see notes on transit)				
	a	b	c	d	e	f	g	h	i	j	k	l
1												
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22												
23												
24												
25												

(1) Tonnes: Give tonnes to one digit of decimals (example: 7.1).

(2) ADR code: In case of transport fo dagerous goods please write the code given in the notes. This code is based on the four digit identification number according to classification of dangerous goods by ADR.

(3) Type of cargo: Please write the appropriate number (0,1,2,3,4,5,6,7,9):

0= Liquid bulk, 1= Solid bulk, 2= Large freight containers, 3= Other freight containers, 4= Palletized goods, 5= Pre-slung goods, 6= Mobile self-propelled units, 7= Other mobile units, 9= Other cargo types.

(4) Number of journeys: The journey means the travelled distance between each origin and destination. In case of recurring transport (if the origin, the destination and weight of goods carried are the same), it is sufficient to complete one row only and indicate the number of journeys in column "k" (provided the same transport was repeated on the same day). In this case write the information for one journey only in columns "c" to "j".

(5) Type of transport: 1= Hire or reward, 2= Own account.

Section 5. Description of the delivery and/or colection journeys carried out by the vehicle during the survey week

PLEASE READ THE DEFINITIONS AND EXPLANATIONS GIVEN BELOW AND IN THE ATTACHED NOTES BEFORE COMPLETING THIS SECTION

N°	Date		Name of the village/town		Type of goods delivered Do not write here if collection journey only!				Type of goods collected Do not write here if delivery journey only!				Distance traveled, kilometres		Number of stops (4)	Number of journeys (5)	Type of transport (code 1 or 2) (6)
	Day	Month	Origin	Destination	Please describe	Total weight of goods delivered, tonnes (1)	ADR code (2)	Type of cargo (3)	Please describe	Total weight of goods collected, tonnes (1)	ADR code (2)	Type of cargo (3)	Loaded	Empty			
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
1																	
2																	
3																	
4																	
5																	
6																	
7																	
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25																	

(1) Tonnes: Give tonnes to one digit of decimals (example: 7.1).

(2) ADR code: In case of transport fo dagerous goods please write the code given in the notes. This code is based on the four digit identification number according to classification of dangerous goods by ADR.

(3) Type of cargo: Please write the appropriate number (0,1,2,3,4,5,6,7,9):

0= Liquid bulk, 1= Solid bulk, 2= Large freight containers, 3= Other freight containers, 4= Palletized goods, 5= Pre-slung goods, 6= Mobile self-propelled units, 7= Other mobile units, 9= Other cargo types.

(4) Number of stops: The total number of stops to load/unload the vehicle. If over 20, enter "M" to indicate many stops.

(5) Number of journey: The journey means the travelled distance between each origin and destination. In case of recurring transport (if the origin, the destination and weight of goods carried are the same), it is sufficient to complete one row only and indicate the number of journeys in column "k" (provided the same transport was repeated on the same day). In this case write the information for one journey only in columns "c" to "j".

(6) Type of transport: 1= Hire or reward, 2= Own account.

4.3 Instruction for completing the questionnaire on the survey of road transport of goods

PURPOSE AND METHOD OF THE SURVEY

To provide a comprehensive survey of road transport performances in and outside the transport sector of the national economy, covering lorries and road-tractors (referred to as motor vehicles in the rest of these notes) of at least (insert chosen cut-off limit) tonne loading capacity, selected at random. Duration of the survey: **one week for each motor vehicle (but see international section for these journeys)**.

STATUTORY OBLIGATIONS OF RESPONDENTS

'The relevant laws of the country of respondents are referred to.'

CONFIDENTIALITY

The Statistical Office will treat as confidential information all the details provided by the respondents in the questionnaire. The Statistical Office shall use all the details provided for the purposes of statistics only and shall not disclose them to any third party.

HOW TO RETURN THE QUESTIONNAIRE?

Mail one copy of the questionnaire with a label attached containing the details of the motor vehicle and its owner/operator to the address of the Statistical Office, **not later than the 8th calendar day following the last day of the survey week**.

HOW TO COMPLETE THE QUESTIONNAIRE

- FIRST PAGE

Please check carefully the printed details on the front page of the questionnaire, including your name/address and the details of the vehicle that has been selected for the survey. If you find any discrepancy between your actual details and the details (as recorded on the vehicle register) of the vehicle on the printed label, please enter the correct details in the appropriate boxes of the label below the first one.

If you are a private entrepreneur (or a farmer), please enter the brief description of your core business in the appropriate box.

In the telephone number box of the director/entrepreneur on the front page of the questionnaire enter only the telephone number(s) (fixed and/or mobile), where the owner and/or respondent is available during the working hours for the clarification of any issues.

The questionnaire must be completed for those motor vehicles, for which the owner/operator received a complete package. Please enter the requested details for the survey week only. Details for the survey week must be provided from Monday to Sunday (refer to the number of the week and first day–last day details shown on the label of the front page). The number of the survey week is a reference number for official use only.

- SECOND PAGE

I. CHANGES IN THE OWNERSHIP/OPERATION OF THE MOTOR VEHICLE

1. If the motor vehicle was sold (1), leased out permanently (2) or subcontracted for operation (3) before the survey week, please enter the appropriate code (shown in parentheses) in the box to the right, and give the name and address of the new owner/lessee/operator.
2. If the motor vehicle is temporarily (1) or permanently (2) out of operation, please enter the appropriate code (shown in parentheses) in the box to the right.
3. Enter here the actual date when the change in ownership or took place or the vehicle became unusable.

II. MAJOR DETAILS OF THE MOTOR VEHICLE AND TRAILER/SEMI-TRAILER

(Please note: All questions relate to the survey week only)

1. Was a trailer/semi-trailer attached to the motor vehicle?

Tick the Yes or No box accordingly. If you ticked 'Yes' for a lorry or road-tractor, proceed according to the instructions. If you ticked 'No' for a lorry, skip to Question 3 or to Question 5 for a road-tractor.

2. Details of the trailer/semi-trailer attached typically to the motor vehicle

Enter details only if you ticked 'Yes' for the previous question. Since various trailers/semi-trailers may be attached to lorries and tractors in the survey week, enter the loading capacity and axle number of the one used in the majority of cases during the survey week.

3. Body type:

For tractors enter only details of the trailer/semi-trailer used, because tractors are not suitable for goods transport alone. Select from Items 1–13 the appropriate one, and tick the box to the right of the selected item.

4. Vehicle design for combined transport:

If the motor vehicle, or the trailer whose details are given for question 2 above, has been specially designed or modified for combined transport purposes, please tick the 'Yes' box. There are two cases:

a. The lorry, trailer or semi-trailer is equipped (e.g., twist locks to fasten the loading units) to carry inter-modal loading units (containers or swap bodies).
b. The semi-trailer is suitable for vertical loading (craning) and certificated as a transport vessel for rail transport.

5. Details of the transport activity:

The Statistical Office completes this box on the basis of details provided in Sections III and IV.

6. Fuel purchased during the survey week:

Enter in this field the amount (in litres) and type (Petrol, Diesel oil) of the fuel purchased during the survey week, regardless of the actual mileage.

7. Number of days in and out of service:

Enter in this field the number of days the vehicle was used for freight transport (items 01–02) and not working (items 03–09) during the survey week. Please give account of **all the days of the week**. All the days spent abroad during the survey week as part of a transport activity that began before the survey week must be entered into the field 'International transport excluded survey' (see description of international transport). **Transport activities performed within the confines of a private area (factory site, construction site or forest) and without the use of a public road is excluded from this survey of goods transport**. Enter such transport in field 09 '0ther'.

8. Mileage and operating performance of the motor vehicle in the past 12 months:

Enter in field 01 the total mileage (in kilometres) of the motor vehicle for the 12 months preceding the month of the survey (e.g., if the survey week of the motor vehicle is in August 2022, the preceding 12 months are the months between August 2021 and July 2022). If the requested data cannot be retrieved from the bills of lading/logbooks, please give an estimated value. If the vehicle is less than 12 months old, please give the number of months in service in the preceding 12 months.

- THIRD PAGE

III. JOURNEYS DURING THE SURVEY WEEK

Complete this section regularly, in chronological order, for all days of **vehicle activity** during the survey week. For journeys with several stops enter each stage of the journey between the stops on a separate line (for example, *a journey from A to B, then from B to C; then from C to A must be entered on three separate lines to show each stage of the journey*).

(For international journeys please refer to the section, 'International transport' later in these notes).

If the operator completes a bill of loading and/or trip logbook, enter the same details in this section.

For regular delivery and collection journeys with more than 5 (five) stops of loading/unloading use Section IV.

SPECIAL RULES FOR TRANSIT

Where a journey involves the transit of a foreign country (that is crossing the country without loading or unloading goods) the names of the countries transited (up to the first five such countries) should be recorded on the line immediately below the line recording the other details of the journey. Start recording the countries in column 'c' and continue across the columns as necessary.

SPECIAL RULES FOR COMBINED TRANSPORT–WHERE ANOTHER MODE OF TRANSPORT IS USED FOR PART OF THE JOURNEY

Where a ship or railway wagon is used as the primary mode of transport for part of the journey the place of loading and of unloading of the vehicle and the mode of transport (ship or train) should be recorded on the line immediately below the line recording the other details of the journey. Record the place of loading in column 'c', the other mode of transport (ship or train) in column 'e' and the place of unloading in column 'h'. The distance travelled using this other mode of transport should be excluded from the journey distance recorded for your vehicle.

If a journey involves both transit and combined transport use two lines below the details of the main journey to record the two pieces of information.

INTERNATIONAL TRANSPORT

International road transport round-journeys often take more than one week and only the day of departure or arrival may fall during the survey week. For statistical considerations **please enter only the details of international transports with a departure on any day of the survey week, from foreign or inland origin**.

- If departure takes place **on the week before survey and arrival falls on any day of the survey week, do not enter the details in Section III**, however, enter the number of days to departure on the survey week on the second page in field II/6/02 'International transport excluded survey' (e.g., *if departure took place before the survey week and the cargo arrived on Wednesday of the survey week and there are no more departures for other transports on the same day enter 3 in field II/6/02 for Monday, Tuesday and Wednesday. If the cargo arrives on Wednesday and the motor vehicle departs for a new transport on the same day, enter 2 in field II/6/02 for Monday and Tuesday*).
- If both **departure and arrival fall on the survey week**, enter details in accordance with the general rules.
- If the date of **departure** falls **on any day of the survey week and arrival is scheduled after the survey week**, enter the actual details of the full journey, no matter how many days the journey will take, in accordance with the general rules. An estimated distance in the column 'Distance travelled' will be accepted (the questionnaire must be returned completed with the actual and estimated details regardless of the date of arrival of the motor vehicle).
- If the date of **departure** falls **on the week before survey and arrival is scheduled beyond the week of survey**, do not enter any details in Section lll but enter 7 (seven) days in Section II, question 6, row 02.

In contrast to the general rules, for international road transport, enter in **columns Origin and Destination the name of the place and the countries of origin and destination**. Enter **separate lines** for **each stop** if the journey has more than one stop.

For the remaining fields in Section III of the Questionnaire proceed according to the general rules.

GENERAL RULES FOR THIRD AND FOURTH PAGES OF QUESTIONNAIRE

- **In columns a and b** enter the date of departure for the journey.
- **In columns c and h (Origin, Destination)** enter the complete and accurate name of the village/town. If the motor vehicle provided service in road construction or agriculture, enter the name of the village/town where the location of activity belongs in administration. If the journey involves the transit of a foreign country and/or the carriage of the vehicle, for part of the journey, by another mode of transport (for example the use of a ferry or a train) please read the **Special Rules for Transit and for Combined Transport** that are given in the preceding paragraphs.
- **In column d** enter the weight (in tonnes) of the cargo loaded on the motor vehicle, *with the accuracy of one decimal* (for example, 10.0 tonnes or 6.3 tonnes). If an accurate weight is not available, please make your best estimate. For empty (unladen) journeys enter 0 in this field.

– **In column e** enter the description of the cargo loaded on the motor vehicle. This description must be identical to the one shown in the bill of lading and/or trip logbook. For several types of cargo loaded on the motor vehicle enter the description of the one of **largest weight**.
– Enter **column f** for the transport of **dangerous goods**. Enter here the **appropriate code** using the definitions below (Each category is either a class or a division of a class of the ADR–European treaty on the international transport of dangerous goods). If no dangerous goods are carried, there is no need to enter anything.

TABLE 4.1

Classification of dangerous goods

Dangerous goods	Code
Explosives	1
Gases, compressed, liquefied or dissolved under pressure	2
Flammable liquids	3
Flammable solids	41
Substances liable to spontaneous combustion	42
Substances which, in contact with water, emit flammable gases	43
Oxidising substances	51
Organic peroxides	52
Toxic substances	61
Substances liable to cause infections	62
Radioactive material	7
Corrosives	8
Miscellaneous dangerous substances	9

– **In column g** enter the type of cargo using the definitions below:

TABLE 4.2

Classification of type of cargo

Type of cargo	Code
Liquid bulk goods	0
Solid bulk	1
Large freight containers	2
Other freight containers	3
Palletised goods	4
Pre-slung goods	5
Mobile, self-propelled units and live animals	6
Other mobile units	7
Other cargo types	9

- **In column i** enter the weight (in tonnes) of cargo unloaded at the destination, with the accuracy of one decimal. If no unloading takes place at the destination (e.g., *the freight is composed of collections from several cities/towns, therefore no unloading takes place at the locations of loading*), enter 0 in this field.
- **In column j** enter the actual distance (in kilometres) travelled, whether unladen or loaded, from the place of origin to the destination. This figure should be equal to the distance shown in the official bill of lading and/or logbook of the motor vehicle.
- **In column k** enter the number of journeys of **recurring transports, where the places of loading and unloading and the weight and type of the cargo are identical**. In such cases **give the details of one such journey only on one line** according to the above instructions and enter the number of daily recurring journeys in this column. DO NOT TOTAL the cargo **weights and distances travelled** for the number of journeys made. Enter the details of one single journey only. For identical transports carried out on several days of the week complete one line for each day and enter the number of journeys during the day. For non-recurrent transports **enter 1**.
- **In column l** enter the type of transport using the codes below:

TABLE 4.3

Classification of type of transport

Type of transport	Code
Hire or reward:	1
Own account:	2

- FOURTH PAGE

IV. DELIVERY AND/OR COLLECTIONS JOURNEYS DURING THE SURVEY WEEK

Deliveries are regularly recurring transports, when a motor vehicle **departing loaded, makes more than 5 (five) stops** along a predefined route, unloads the cargo at those locations, then returns to the place of departure unladen.

Collections are regularly recurring transports, when a motor vehicle **departing unladen, makes more than 5 (five) stops** along a predefined route, picks up the cargo at those locations, then returns to the place of departure loaded with the cargo. Cargo in this case may cover both goods and empty packaging (e.g., returnable bottles).

For delivery only journeys always complete columns 'e' to 'h'. For collection only journeys, complete columns 'I' to 'l'. For both types of journey complete columns 'a' to 'd' and 'm' to 'q'. Complete all columns for a journey including both delivery and collection.

- **In column c (Origin)** enter the name of the village/town of the location of departure for delivery/collection.
- **In column d (Destination)** enter the name of the village/town of the farthest location of loading for delivery/collection.
- **In columns m and n (Distance travelled with load and empty)** enter in kilometres the total length of the route from the location of departure through all the stops of loading/unloading back to the place of departure, distinguishing separately the loaded and empty distances travelled.
- **In column o (Number of stops)** enter only those locations where cargo was actually loaded or unloaded. Where the number of stops is so many that it is not possible to give an accurate figure, enter the letter 'M'. If the number of stops is less than 20, it would be helpful if the actual figure was given. Enter a separate line for each round-journey of delivery/collection transport recurring during the day along different routes.
- **In column p (Number of journeys)** complete only one line for each round-journey of delivery/collection transport recurring during the day along the same route, and enter in this column the number of recurring journeys per day.

For the remaining fields in Section IV of the questionnaire proceed according to the general rules.

5

Preparation for the survey – Management aspects

5.1 Management of road freight surveys

There are a number of things that characterise surveys of road freight transport, but perhaps the feature which distinguishes such surveys from most other surveys is that road freight surveys are generally carried out continuously throughout the year. This necessarily imposes a more rigorous management discipline than would be the case for annual, quarterly or 'one-off' surveys because the various operations involved in carrying out the surveys must be carried out, and completed, according to a strict schedule.

In an annual or 'one-off' survey, a delay of a week or so in sending out the questionnaires generally does not matter very much, unless the delay is the week before the questionnaire should be sent out. If the coding and keying of the questionnaires takes 25 per cent longer than expected, this only means that results from the survey will be available slightly later than planned. In the case of surveys of road freight activity both problems would have much more serious consequences; completed questionnaires must be coded and keyed at the same rate as they are received, otherwise a backlog builds up.

There are three sides to survey management, with some interconnection between them, although it is helpful to consider each separately:

- Control of the operations leading to the setting up of a new survey in this area or the introduction of major modifications in an existing survey (project control).
- Management of the survey's operations (for example, sending out the questionnaires and logging their return).
- Transferring information recorded on the questionnaire into a form in which it can be analysed (including coding and keying the information).

Of course, before starting a survey there is much preparatory work to be done, and the management of each aspect of the survey should be set out in as much detail as possible, with a certain amount of flexibility built in to the survey.

5.1.1. Project control

When starting a new survey or making a major change to an existing survey, it is essential to set up a team to control the many and varied steps that have to be carried out. The first two members of the team should be a project leader, usually acting as chairman, and a project controller, usually the person who will have day-to-day responsibility for the survey. Other members, who will cover specific aspects of the survey, being added to the team as the project develops.

Throughout the project, a detailed note should be kept of all the points considered, the decisions reached and the date this was done. Without these notes, much time may be wasted at later stages of planning in going back to points already

covered. This does not mean that you should never change a decision made at an earlier stage. In some cases, very good reasons may emerge to change an earlier decision–resource constraints, higher management decisions, or feedback from the haulage industry. The keeping of detailed notes will ensure that you have ready access to all the reasons for the earlier decision. The project controller should be given responsibility for keeping the detailed notes and for ensuring that all the various aspects of the project are on target.

The project team, with members covering all aspects of the survey, should consider that every member of the team is responsible for the management of the project. The project controller should not be seen as the only person responsible for ensuring that all the various aspects of the project are running to target.

To control all the many activities that are necessary in setting up a data collection project, it is helpful to use a management aid, such as critical path analysis:

- A chart showing all the activities;
- Who should carry them out;
- The ideal start dates, with also the earliest and latest such dates;
- The actual start dates;
- Some indication of progress on the task–the percentage of task completed;
- The latest date for completion;
- The actual date of completion;
- The number of person-weeks the task should take;
- The number of person-weeks the task has taken.

The chart should be maintained by the project controller and kept up to date. It is useful if a copy of the chart is displayed in a prominent position in the project controller's office.

Examples of two possible charts that can be created as spreadsheets are shown on the following pages. The first chart covers the many tasks that have to be done before the first questionnaires are sent out. The second chart covers the tasks that have to be done each week when the survey starts. In fact, these weekly tasks have to be carried out for every week of the survey. If a computer system is used to assist the management of the survey, the system can, eventually, take the place of the second control chart. The second chart has a very useful role to play when a survey is being set up for the first time, by visually displaying the many tasks that have to be carried out in the same week.

On the charts the light grey coloured squares indicate the period when the activity should commence and the black squares the latest time (or the actual time) when the activity should be completed.

MANAGEMENT CHART FOR SURVEY OF GOODS ROAD TRANSPORT

PROJECT PHASES BY TYPE OF WORK

	Months (Month 1 is survey start)															
	-9	-8	-7	-6	-5	-4	-3	-2	-1	1	2	3	4	5	6	7
Project initiation																
Resource estimation																
Quantify resources - staff																
Quantify resources - hardware																
Quantify resources - software																
Quantify resources - materials																
Sampling methodology & procedures																
Define statistical unit																
Specify sampling frame (vehicle register)																
Improve sampling frame (vehicle register)																
Get output from improved register																
Specify sample methodology																
Specify sample rotation procedure																
Specify estimation methodology																
Build and test sampling and rotation system																
Design estimation procedures																
Build and test estimation system																
Data collection and editing																
Specify data variables																
Define data despatch & collection method																
Specify data collection procedure																
Design questionnaire																
Pilot questionnaire - personal visits																
Field trial of pilot questionnaires																
Print questionnaires																
Specify data editing procedure																
Build and test coding and data capture																
Build and test data editing procedure																
Define training programme for staff																
Recruit and train staff																
Draw test sample																
Prepare test sample																
Despatch test sample																
Reminder exercise for test sample																
Draw first live sample																
Prepare first live sample																
Despatch first live sample																
Survey management and analysis																
Design survey management system																
Build and test survey management system																
Monitor response																
Specify data analysis procedures																
Design data analysis procedures																
Build & test data analysis procedures																
Define tabulation methodology																
Design tabulation system																
Data analysis of pilot survey																

SURVEY OF GOODS ROAD TRANSPORT

CONTROL OF WEEKLY STAGES OF WORK

	WEEK REFERENCE NUMBER - 1 = WEEK OF FIRST ACTUAL SURVEY																			
	-4	-3	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Recruit and train staff																					
Draw sample for weeks 1 - 13 of survey																					
Prepare sample for week 1																					
Despatch sample for week 1																					
Prepare sample for week 2																					
Deal with questions from hauliers																					
Despatch sample for week 2																					
Prepare sample for week 3																					
Despatch sample for week 3																					
Prepare sample for week 4																					
Note receipt of questionnaires																					
Code and input data																					
Contact hauliers on data queries																					
First Reminder for week 1																					
Despatch sample for week 4																					
Prepare sample for week 5																					
First Reminder for week 2																					
Second reminder for week 1																					
Despatch sample for week 5																					
Prepare sample for week 6																					
First Reminder for week 3																					
Second reminder for week 2																					
Third reminder for week 1																					
Despatch sample for week 6																					
Prepare sample for week 7																					
First Reminder for week 4																					
Second reminder for week 3																					
Third reminder for week 2																					
Despatch sample for week 7																					
Prepare sample for week 8																					
and continue for weeks 7 to 10																					
First Reminder for week 9																					
Second reminder for week 8																					
Third reminder for week 7																					
Despatch sample for week 12																					
Prepare sample for week 13																					
Draw sample for weeks 14 -26 of survey																					
First Reminder for week 10																					
Second reminder for week 9																					
Third reminder for week 8																					
Despatch sample for week 13																					
Prepare sample for week 14																					
and continue for weeks13 onwards																					

Always allow sufficient time for initial development work and pilot tests. Take all the time that senior management will permit. This is most important. Some data collection exercises have not been as successful as they could have been because not enough time was allowed at the start for initial development and pilot testing. The pressure to get some results quickly can lead to loss of quality to the extent that the information is subsequently found to be unreliable. This is not to say that statisticians should produce a system that in English might be called a 'gold-plated Rolls Royce job'. Aim to produce a 'standard model Ford', but spend sufficient time to ensure it has been serviced properly and the engine is running smoothly.

Time has to be allowed for the following activities, many of which can run in parallel:

- Setting up the management system;
- Setting up any fieldwork system; developing computer systems;
- Designing and printing the questionnaire; pilot-testing the questionnaire;
- Pilot-testing both management and the fieldwork computer systems;
- Training staff;
- Visiting respondents; and,
- Publicity about the forthcoming survey.

5.1.2. Overview of the survey management system

Road freight activity surveys normally run on a weekly cycle. The work required is:

- Receipt of the sample;
- Dispatch of the questionnaires;
- Handling telephone calls;
- Receipt of questionnaires; and,
- Production and dispatch of reminder letters, or initiation of a penalty procedure.

That is in a rather simplified form what the survey management system comprises, but it is as well to bear in mind what the objectives of the survey management system are:

- To ensure the timely and accurate dispatch of questionnaires and reminder letters;
- To ensure the exact status and location of any questionnaire;
- To ensure the data for any sampled vehicle can easily be retrieved; and,
- To provide statistics of the status of the survey, for example, number of questionnaires posted, number returned and hence the response rate.

It is important to consider in detail each aspect of the survey management system.

However well-planned a survey may be, the unexpected always seems to occur, and, as far as possible, the survey management procedures and the coding rules ought to be designed for all eventualities. Perhaps a few examples might be helpful.

In surveys that are vehicle-based, a sample of vehicles is taken from an administrative database and a questionnaire is sent to the address in the register for the selected vehicle. However, the survey management system must be able to cope with vehicles that have been sold and which are now operated by someone else and with vehicles which, whilst owned by the person to whom the questionnaire was sent, are being operated by someone else. The staff running the survey must be given procedures to follow in cases where the 'owner' claims to know nothing about the vehicle or where the owner reports that the vehicle has been stolen or scrapped.

Staff coding the questionnaires must be given explicit rules about what kind of activities are, and are not, within the scope of 'road freight activity'. For example, an owner gives details of his vehicle's work, which consists of carrying logs to a forest sawmill; all of the activity is 'off-road'. Another owner reports activity all of which takes place in a foreign country because that is where his vehicle is based.

These examples, of the peculiar and rather rare things that a survey management system must cope with, may seem trivial, even pedantic, but they are not. Unless the survey management system is designed to allow for these rare instances and unless staff knows how to handle such peculiarities, it is possible that 50 per cent of staff time can be spent dealing with 5 per cent of unusual responses.

The survey management system can either be based purely on paper records or upon a mixture of paper and computer-based systems. The principles outlined below and other remarks are applicable to both types of system and may be useful in designing a survey of road freight activity.

It would be possible to manage the survey without a computer system as some Member States have done previously. However, a manual system is far more time-consuming and laborious, as well as having a greater potential for mistakes to occur. It is therefore highly recommended that a computer system be used to manage the survey.

5.1.3. Before the start of field work

- Receipt/generation of the sample

If you are doing this yourself through direct access to administrative records of firms or of vehicles, then this task is relatively simple. It is your responsibility to ensure that the weekly samples are extracted according to the sample design criteria. However, in most cases it is necessary to rely on someone else to draw the sample according to the specification of the survey statistician, sometimes by a specially written computer program. Therefore, it is important to examine the characteristics of the sample to see whether it accords with the specification, as computer programmers and computer operators can make mistakes.

Also, it is important to examine the sample to extract vehicles that the computer program cannot identify as ineligible (e.g., police vehicles), from those which are obviously ineligible (e.g., hearses), but which have somehow been included in the sample.

- Recording names and addresses of vehicle owners

If a computer-based survey management system is used, then the sample details must be entered into the survey management system. If a paper or card index-based system is used, details of the weekly sample should be added, allowing room for survey management information (e.g., date of dispatch, date returned) to be added later. All the records relating to one survey week should be grouped together and should be ordered in such a way as to enable a particular vehicle's record to be easily located, perhaps ordered by vehicle registration number.

Either, create a separate address record linked to the vehicle record to contain the name and address of the vehicle owner (if there are security reasons to keep names and addresses separate from other details), or add fields to the vehicle record to contain the name and address of the vehicle owner.

- Creation of address lists

Print out or prepare for an email sending 2 weeks before the start of the relevant survey week for each record:

  – Vehicle registration number.
  – Record reference number.
  – Name and address of owner.

The aim should be to send out the questionnaires so that vehicle owners will receive them one week before the start of the survey week. Allowance should be made for any holiday periods between sending out the questionnaires and their receipt by vehicle owners.

In case of sending the questionnaires by post, if using self-adhesive peel-off labels, print 2 copies of address labels, including vehicle registration number and record reference number – one for questionnaire and one for envelope (without vehicle registration number) plus one copy on normal paper for checking purposes. If self-adhesive labels are not available, the address labels can be printed on plain paper and stuck on envelopes and questionnaires. Either method is much more efficient than staff writing addresses by hand on questionnaires and envelopes.

When sending the questionnaires by email, include owner contact details, vehicle registration number and record reference number in the questionnaire and indicate owner contact details and record reference number in the email.

- Dispatch (by post or email) of questionnaires

This is a relatively simple task made easier if a computer system is used. It is not sufficient simply to send a questionnaire, a cover letter and explanatory notes instructing the respondent. The haulier has to be told both the identity of the vehicle and the week for which details of work are required. It is better to over-print or to write this information onto the questionnaire itself (in that way, this important information will not be separated from the questionnaire and, possibly, lost).

The name and address of the haulier should be included on the questionnaire and a window envelope used. If this is not done, that is, if the name and address are just written onto the envelope, it becomes difficult and time-consuming to contact hauliers who have returned incomplete questionnaires. After dispatch, each sample record for that week should be updated, adding the date of dispatch and the date due back.

5.1.4. During the field work

- Handling telephone calls

This involves a wide variety of topics. Examples are helping hauliers who have telephoned for advice about completing the questionnaire; dealing with hauliers who report that the sampled vehicle has been sold, hired out, scrapped; and responding to requests for duplicate questionnaires, usually from hauliers who mislaid the original questionnaire and subsequently received a reminder letter.

In the case of a vehicle that is 'on hire', staff should record the new address if this is given, record a new dispatch date and 'date due back' and send out a new questionnaire. For vehicles reported by telephone as scrapped, stolen, etc., staff must update the sample record with this information; otherwise, a reminder letter will be issued (since the questionnaire will not have been recorded as 'returned').

Reminder letters generate the most telephone calls. The survey management system must be able to be interrogated quickly so that the frequent claim made by hauliers that 'I sent the questionnaire back ages ago' can be checked quickly. Staff should also be given guidelines about when and in what circumstances, potential respondents may be excused from having to complete the questionnaire. It is important that staff handling telephone calls know a good deal about the survey and something of the road haulage industry.

A haulier, who has received a questionnaire and/or a reminder letter, may telephone to complain. Occasionally hauliers will verbally refuse to comply with the regulations regarding the provision of statistics. Staff must be prepared and able to handle complaints politely and firmly. Familiarisation with frequently asked questions (FAQs) by hauliers and answers as to why statistics are required is vital. It is helpful for staff to have to hand a hard copy list of FAQs and answers in preparation for such occasions.

It is vital that, where appropriate and after the telephone call, staff update the survey management records to record the information obtained from the telephone call.

Written complaints are occasionally received. These need to be replied to promptly stating the legal requirements to comply, what the information is used for and any other information that might induce the correspondent to fill in the questionnaire. If the haulier still refuses to fill out the questionnaire, the matter may need to be referred to the senior official in charge of the survey to take follow-up action.

- Receipt of questionnaires

This is a relatively straightforward task, but should not be regarded as simply a matter of recording the receipt of questionnaires. Each form should be inspected to ensure that it is complete and that the information has been supplied for the vehicle and for the week for which information was requested. Some hauliers are so anxious to help, that if the vehicle was laid up in the specified week, the haulier provides details of work done in another week or in the specified week by another of their vehicles–which is pleasant, but statistically unacceptable. At this stage such forms and those which are obviously incorrect should be discarded, replacement forms posted, and the survey management details updated with a revised dispatch date and date-due-back, together with a short note describing the problem with the original returned form.

In addition, when questionnaires are being logged in, staff must check that the questionnaire has not already been received. This sometimes occurs because a haulier receives a reminder letter, cannot find the original questionnaire, requests a duplicate, which he completes and returns. He then finds the original which, thinking it is new, he completes and returns.

Once the questionnaires have been checked, they should be stamped with the receipt date, their survey control record should be updated adding date of receipt, and the questionnaire should be added to those passed to the staff who will

prepare the information for analysis. Such questionnaires - those awaiting coding/keying–should be batched together in survey weeks, so that the earliest questionnaires are coded and keyed first, and, as always, should be ordered within the survey week so that individual questionnaires can be located quickly.

- Production and dispatch of reminder letters, launching of penalty procedures

It is important that the operators of sampled vehicles who did not respond initially must be chased, despite the work involved. If a computer system is used, then the generation of reminder letters is straightforward. If a manual system is used, however, then preparing the reminder letters involves a considerable amount of work. Each survey management record for every sampled vehicle must be inspected, and those eligible for reminders selected as follows:

  – If the questionnaire has not been returned;
  – If the current date is after the date when the questionnaire was due back; and,
  – If the survey management record has not been marked excused, scrapped, stolen etc.

If a response obligation exists and response is still refused after the reminders, a penalty procedure should eventually be launched.

Actually, the selection is a little more complex because, in a single trawl through the survey management records, candidates for second reminders and third reminders by telephone (if used) or those for which eventual penalty procedures should be launched will also be identified as well as those to whom first reminders should be sent. When the first reminder and second reminder lists have been compiled, standard letters are addressed and dispatched. Then the survey management records should be updated with the date of first and, where appropriate, the date of the second and third reminder, or the launching of a penalty procedure.

In summary, the survey management information that ought to be kept for each sample vehicle might be as follows:

- Registration number.
- Name & address of owner/operator.
- Survey week.
- Reason (if any) why invalid, e.g., police vehicle, mobile crane.
- Date dispatched.
- Date due back.
- Date received.
- Result–Good reply or reason why discarded, e.g., excused, sold, scrapped, refused.
- Date of first reminder.
- Date of second reminder.
- Date telephoned.
- Date of penalty procedure launching.

Note that certain fields should be capable of being over-written. For example, 'Name and address of owner' could be replaced by the name and address of the person who hired the vehicle. 'Date due back' would also be amended (otherwise the hirer might receive a reminder letter almost as soon as he received the redirected questionnaire).

In terms of the overall management of the survey, certain tasks–receipt of questionnaires, responding to telephone calls–are carried out daily; others are carried out on certain days according to a weekly schedule. The weekly dispatch may take place on a Thursday, 10 days before the start of the survey week, the week for which activity information is sought. The reminders, or penalty procedures, may be done each Wednesday and produce not only first reminder lists but also second and eventual third reminder lists or penalty procedure lists. It is good practice if survey management tasks and telephone answering duties are shared amongst the staff whose main task is the coding and keying of questionnaires; this provides a variety of work and ensures cover for sickness and leave.

However, a checklist has to be kept for each week:

- Sample received from register operator?
- Questionnaires posted?
- Reminders generated and posted?
- Penalty procedure launched?

Otherwise, there is a danger that nobody will carry out the task, each thinking that it is the responsibility of someone else.

A member of staff–perhaps the team leader–ought to be made personally responsible for ensuring that adequate supplies of stationery are maintained. Large-scale continuous surveys such as surveys of road freight activity use a large quantity, and a wide variety, of stationery including the actual questionnaires themselves, explanatory notes, different types of envelopes, reminder letters etc. The time taken to replenish such stocks of special stationery, from placing the order to delivery, might be as much as three to four weeks; so, a well-managed stationery stock control system is essential.

A number of things can go wrong over the years of managing road freight surveys. Potentially the most serious problem that could occur is to run out of questionnaires. This nearly happened in one country. The reorder time was four weeks and it looked as if the survey would have to stop for a month! Fortunately, a box of questionnaires was found that they did not know they had so the survey could continue. Since then, they keep a detailed track of the stock of every item of stationery!

5.2 Computer controlled survey administration

5.2.1 The aim of the system

The aim of such a system is to support the administration of the survey on road transport by computer. The following sections describe the procedures that such a system should include. The computer system described deals with the treatment of a sample drawn from a Register but not with the actual drawing of the sample. The drawing of the sample is best handled by a separate system.

It is not possible to cover all the possible variations of survey practice in the description of a single computer system. The following sections relate to a sample drawn from a national vehicle register where all weeks in a year are included in the sample and a selected vehicle reports the work done over one week (a period of 7 days). A similar system, suitably modified, could be used where a sample of companies was drawn from a business register or where a different length of period of reporting was used.

5.2.2 Development of the system

It can take some time for vehicle registers to reflect changes such as vehicle ownership, scrapping of vehicles or change of address of owner. The system treats vehicles in the sample and operators owning them separately. After the drawing of the sampling, in principle, it would seem to be good practice to check the names and addresses of the operators selected for the survey in the Business Register of the Statistical Office. This is to avoid sending questionnaires to operators no longer in business. However, it should be recognised that such a register might not be fully comprehensive. For example, they might exclude businesses below a certain size; small businesses are however a feature of the road freight industry. Moreover, there may be insufficient time and resources to undertake thorough checks against Business Registers.

The second aspect of checking is the accuracy of the Vehicle Register regarding the owner (operator) of the vehicle. If, in carrying out these checks or considering past experience, it is clear that the name and address of the operators on the Vehicle Register agree with those on the Business Register, it is not necessary to carry out the Business Register check.

For large companies especially, all vehicles may be registered at one address but many of the vehicles may be based at other depots in different parts of the country. The head office will normally forward the questionnaires to the relevant depot but this can be time consuming and quite often means a late return of the questionnaire. It may be advisable, therefore, to maintain records for these large companies enabling appropriate checks to be made before questionnaires are despatched. This would enable staff to phone head office to check where the selected vehicle is actually based and then despatch the questionnaire to the relevant depot directly.

Other sources can be explored if necessary. Some Member States have lists of all registered operators with names and addresses, together with the number of vehicles they are licensed to operate. Such lists can be used to check complaints of excessive sampling and to confirm names and addresses of operators.

- Setting-up the operator register and vehicle register of the survey

This procedure sets up the vehicle register file from the sample drawn with data items abstracted from the Vehicle Register. As much information as possible about a selected vehicle and its operator should be taken from the vehicle register. The registration number and an identifier of the operator are essential. Useful information is gross vehicle weight, load capacity, type of body, axle configuration. Added to the operator register file, there have to be data items to identify the operator, such as name, address and, where the laws of a country require it, the type of operator (legal entity or natural person).

- Distribution of vehicles by week

After drawing the sample, the next step is to distribute the vehicles between survey weeks within each of the strata of the survey design. Taking into consideration that the reporting obligation of data suppliers concerning a given sampled vehicle refers only to a single week in a quarter, the task of the system is to distribute the sampled vehicles within each stratum one by one among the 13 weeks of a quarter.

The distribution of vehicles by week should be performed by means of a random number generator. Unbiased statistics of quarterly performance can be compiled by sampling the same number of vehicles for each week.

- Introduction of the system at the regional offices (if regional statistical offices are involved)

In some countries the work of dispatch and receipt of survey questionnaires is handled by the regional offices of the National Statistical Institute. The main principles to follow are:

  – Installation of the system in the regional offices should be carried out through the network if possible.
  – The regional offices have access only to the records of the vehicles and operators in their area.
  – The application nomenclatures are installed in full in each regional office.

5.2.3 Functions of the system

The system should provide a uniform framework for the integration of all activities performed by the survey team. Producing questionnaires to send to respondents, chasing up non-response, entering the data from received questionnaires, checking, and many other activities should be supported by the computer-controlled system.

- Identification of the week of execution

This function has a particular importance, because from week to week, questionnaires relating to vehicles of different data suppliers are processed and the system determines which vehicles are to be dealt with on the week sequence number basis.

- Weekly tasks

These activities are used to get information regarding the jobs which have already been performed this week and on the rest of the tasks which are still to be executed. The following tasks are covered:

  – Tasks in connection with the questionnaire

  This function is used to check whether the tasks necessary for mailing the questionnaires have been performed. The computer system reminds statisticians which vehicles on a given week are involved and generates an address label for postal delivery. The label contains information on the vehicle (the registration number) and its operator (name and address). In case of failure to meet the deadline for response, the computer system helps the statisticians first to remind, second to warn respondents on their duties by sending letters to them.

  – Tasks in connection with first reminder

  This function is used to check whether it is necessary to send reminder letters or all questionnaires had been returned.

  – Tasks in connection with second reminder (or third reminder, if used).

  This function is used to check whether it is necessary to send second reminder letters (or a third reminder telephone call) or all questionnaires had been returned.

  – Penalty procedures

  This function is used to check whether a penalty procedure must be launched or whether all surveys were returned.

– Checking list for tasks not yet performed

This function checks whether there are activities that had not been performed prior to the reference week.

- Mailing of the questionnaires

This function provides tasks related to the mailing of the questionnaires:

– Producing labels referring to the operators

Using this function, the operator's label and address list (including all suppliers) will be produced. The use of self-adhesive labels will reduce considerably the clerical workload.

– Producing labels referring to the vehicles

Using this function individual vehicle label lists comprising the data characteristics of the vehicles can be produced. The list can contain registration number, make and model, weight, week of data collection, first and last day of the survey week.

– Checklist for the labels

This function creates a list of items to be sent. The completeness of the list can be checked item by item.

- Entering the returned questionnaires

The input of the data recorded on the returned questionnaires is carried out by an interactive application. After a brief visual check, the management computer file is also used to record and check the data from the questionnaires. It is essential for the input of the completed questionnaires to be a day-to-day activity.

The data entry system includes many data check routines. In some cases, the computer is used to correct automatically the errors found, based on earlier experiences. Through the input of the data from the questionnaire, different specially formatted data entry screens should be displayed according to sections in the questionnaire.

On the basic screen, data entry application consists of input of the registration number of the sampled vehicle, as well as the survey year and survey week from the returned questionnaire. The entered data are checked and then the identification characteristics of the vehicle and its operator appear on the screen.

After checking data on the front page of the questionnaire the content of the fields can be modified. However, the controlling aspects specified in advance must be considered. Leaving the screen, the continuation of the data entry run depends on the answers given by the data supplier, that is, the data recorded on the questionnaire.

- Mailing letters

This function is used for the preparation of notices, reminders, labels and addresses lists necessary for mailing the letters:

– Producing first reminder

A first reminder should be sent to data suppliers, who do not return the questionnaire by the third week following the survey week. An individual label relating to the operator is prepared.

– Second reminder

A second reminder should be sent in the fourth week following the survey week to data suppliers, who did not respond to the first reminder. An individual label relating to the operator is prepared.

– Third reminder (if used) or launching of penalty procedure

A third telephone reminder should be made in the fifth week following the survey week to data suppliers, who did not respond to the second reminder. In the case of response obligation, a penalty procedure should be launched. A list of the relevant vehicle operators is prepared.

– Producing check-list

An itemised label list of vehicle operators to be mailed is produced.

- Quarterly closing activities

Quarterly closing activities include tasks performed in connection with the end of the quarter:

– Producing the list of questionnaires mailed to the vehicle operators but not returned in the quarter

This task prepares an itemized list of the questionnaires (vehicles) which were mailed in the quarter but had not been returned after the second reminder.

– Reporting the progress of the survey

Using this task, the summary of the progress of the survey can be obtained.

5.2.4 Suggested working processes for the statisticians

The following tasks should be undertaken at the start of each week:

– Identification of the week of execution.
– Check if there are delayed tasks from previous weeks. If so, allocate resources to deal with them as top priority.
– Check if you have prepared tasks relating to weekly Reminder 1, Reminder 2 and Reminder 3 or the launching of the penalty procedure.
  If no, and it is necessary, then you can learn if you have a delayed entry.
  If yes, then enter those before mailing the letters.
– Prepare weekly Reminder 1, Reminder 2 and Reminder 3, or launch penalty procedure.
– Before printing, check the prepared labels and the different control-lists displaying the appropriate Report on the screen.
– Print the necessary files on a good quality printer.
– Promptly enter returned questionnaires, because it is an essential requirement for correct follow-up.
– Continuous weekly reporting on the efficiency of the survey. This might comprise:
  Number of forms despatched.
  Number of forms returned.
  Number of forms for which data have been input to the database.
  Number of 'discards', that is, vehicles scrapped, not taxed, under repair, etc.

6

Data collection and data entry

6.1 Flexible organisation of statistical automation

In processing statistics, the computer is playing an increasingly important role. Without computers it would be impossible to process the large amount of information, which is necessary to compile statistics. However, a great deal has changed as well in the use of computers over the last fifteen years. In most Western European countries there has been a movement from a highly centralised system of data processing using purpose-written software by programmers to a mainly decentralised and flexible system of data using standardised software.

6.1.1. The statistical production process

The production of statistical information is a complex process. Data on persons, households and in this case of data on road transport, collected by means of surveys or otherwise, have to be transformed into accurate and useful statistics. The survey process follows several steps to achieve this goal:

- Data collection;
- Data processing;
- Tabulation and analyses;
- Publication.

The first and last items are dealt with elsewhere in this manual. This section will mainly cover changes in processing and tabulation of statistics that have taken place in Western European countries.

Traditional data processing falls into the following separate phases:

- Manual treatment of the basic documents – questionnaires and preparation for data entry;
- Data entry in batches;
- Transfer to the main frame;
- Batch-wise check of the input;
- Lists of errors;
- Manual corrections (which once more had to be input and checked);
- Processing of the statistics;
- Tabulation and analyses;
- Publication.

This way of processing has considerable disadvantages. It is time consuming because of repeated feedback; because several parties are involved, knowledge has to be transferred from subject matter specialists to computer specialists. There are

several computer systems involved for data input and data processing and correction, and it seems to be inefficient because of the repeated specification in each step of the process: record definition, data validation and consistency checks.

6.1.2. Traditional (centralised) computerised data processing

Traditionally in most countries, automation was a very centralised activity. There was a central computer department dealing with all software and hardware related activities. Subject matter specialists had to formulate their wishes far in advance, and the translation in terms of computer systems took place by system analysts and programmers. These people were experts in computer matters, but not experts in the statistical subject. The transfer of work was necessary because it was hardly possible to combine both the knowledge on statistics and that of complex computer languages and computers in one and the same person. As previously mentioned, statistical experts had to formulate their wishes far in advance and very clearly, and it was very difficult, if not time consuming, to make corrections and changes afterwards. In many cases communication problems were the causes of incomplete and at least very delayed statistics.

In the case of the processing of data, it was not much better. After manual coding of the incoming questionnaires in the subject matter division, input to the computer was done by specialised keyboard typists in the computer division. The input was checked on the central computer and the results transferred to the subject matter division for correction. This process could have a cyclic character and sometimes had to be repeated several times. When the data were considered to be clean, the real processing of the statistics took place on the mainframe, and once more the results were transferred to the subject matter specialists who had to take care of analyses and tabulation in a format suitable for publication.

It will be clear that this way of working was time consuming, and not very efficient or flexible. Fortunately, the Personal Computer (PC) appeared on the scene and made possible a completely different way of working. Decentralisation, standardisation and integrated survey processing appeared to be the answer.

6.1.3. Changing roles in automation

The PC made computing accessible to non-computer experts in the literal as well as in the metaphorical sense of the word. PCs appeared on everyone's desk and gave access to a powerful computing environment. In addition, user-friendly software made it possible for non-computer experts to produce the computer programs they required for their work.

This led to changes in the roles of the parties involved. For subject matter specialists, the simplified access to the computer made it possible to develop their own systems using standard software tools and to take care of their own data input and data processing. In fact, subject matter knowledge and the knowledge to make the computer really do the work could be combined in one and the same person. By working interactively with the computer, it became possible to integrate the input and the correction phase in order to have more flexible manipulation of the processed data and results.

There was also a changed role of the central computer department. From an executive body it became a policy-making and supporting part of the organisation. The central computer division of a Statistical Office now designs the general automation policy, develops standard tools, provides training and support, and supplies specific expertise.

Another advantage of the advance of the PC and the related changed way of working lies in the costs. Within a few years of the advent of the PC the costs of automation decreased by 20% while at the same time much more computing power became available to more users (the number of terminals doubled in a short period of time) and the processing power increased (by a factor far in excess of 100). This process has continued at an accelerating rate. PC power can now be found which exceeds the power of standard mainframe computers of 15 years ago and costs continue to fall.

However, with the advantages of working in a decentralised PC environment, there are certainly a number of disadvantages, and even dangers, of which the most important are mentioned below:

- Problems with the data security.
- The back-up of data files.
- Different programs for the same job.
- No data sharing between users.

The solution for many of these problems has been found in the introduction of Local Area Networks (LAN). Each division has its own LAN. All networks are inter-linked and connected to minicomputers and database servers. Backup of the LAN file servers takes place centrally on a daily basis. Data security can be improved by removing the disk drives from nearly all PC's. In most cases, only one PC per LAN offers facilities to enter or remove data from the network and only under rather strict conditions. After the introduction of a LAN, standardisation of software was considered to be a very important weapon against the dangers of decentralisation. Set against a limited number of disadvantages like less flexibility, the fact that it could be considered as patronising and that wrong choices may have considerable consequences, there are the following advantages:

- Training is more efficient.
- Everybody speaks the same language.
- Less support and maintenance.
- Better exchangeability.
- Less selection problems.
- Large quantity discounts.

6.2 Preparing the data for analysis

At this stage an important distinction has to be made between returned questionnaires which are discarded, because the vehicle has been sold, stolen or because the haulier was excused and told he need not complete the questionnaire, and those that report that the vehicle did not work during the specified week.

The first set, the 'discards', is treated as though the questionnaires were never returned and do not form part of the analysis database. On the other hand, questionnaires reporting no work do form part of the analysis database since they, together with those giving details of freight activity, give an overall picture of road freight transport (activity and inactivity).

An inevitable part of the work involved in preparing the data for analysis is in interpreting the information provided on the questionnaire. It often is not feasible to telephone hauliers to ask for clarification on why they are out at work. The main reason why questionnaires have to be interpreted is because hauliers may leave out stages where the lorry was empty believing–incorrectly–that such information is of no interest to the inquirer.

After interpreting the questionnaire, certain information has to be coded. The coded information is then keyed directly into a database via a computer terminal or a personal computer. The latter is preferable because the person keys the information into field on a screen which can be made to resemble the layout of the original questionnaire and because the data can be checked immediately.

In a main frame computer system, it is generally a matter of days, or even weeks, before an error report is received and then there is the difficulty of managing, in indirect input systems, the re-input of records previously rejected because of errors. However, in both systems, indirect and direct-data-entry, the survey manager must specify checks, and these are of two types:

- **Plausibility checks**: checks for things which, whilst unlikely, are nevertheless possible (e.g., national journeys over 750 kilometres, a weekly total greater than 7 000 kilometres);
- **Logic checks**: comprise range checks (e.g., dangerous goods code must be in the range 1–9); valid value checks (e.g., commodity code must be a valid NST division code); contradictory information (e.g., load capacity exceeds gross vehicle weight).

Plausibility checks ought to be kept to an absolute minimum. If, on examining a large number of implausibility checks thrown up by the system, staff find that almost all, whilst unlikely, are in fact correct then they will tend to overlook the few that in fact indicate errors.

The information, that is prepared for computer analysis by coding and then keying information from the questionnaires, should contain something which identifies the person who coded the questionnaire. Also, the questionnaire itself should be initialled by the person who coded the information. In this way if someone has been subsequently found to be consistently

misapplying coding rules, questionnaires processed by that person can be identified and re-input. The person can also be re-trained to make the correct entries.

In the case where the data is keyed directly, the date when the data was input should be written onto the questionnaire so that if the computer system 'crashes' and one- or two-days' work is lost then it is possible to identify the questionnaires that must be re-input.

It is essential to check that questionnaires have been interpreted consistently and correctly and that the correct codes have been assigned to variables. It is perfectly possible for information to be input which is consistent and which passes every computer check but which is, in fact, wrong. It is usually best to ensure that the team leader checks the questionnaires to ensure that they have been correctly interpreted and coded.

The survey management system should include a periodic check to identify questionnaires which, whilst having been recorded as returned, have not been coded/keyed. Questionnaires do go astray whilst awaiting coding and keying and a check must be made to ensure that a bundle of questionnaires have not been put away, missing the coding and keying stage altogether.

Finally, when the questionnaires have been keyed/coded, they must be stored methodically so that an individual questionnaire can easily be retrieved. It sometimes happens that, when the information is later processed, the analyst notices a very odd, implausible record and will ask for the original questionnaire to be checked.

6.3 Dealing with non-response

6.3.1 What is non-response

Take a traditional survey, where a sample is drawn from a suitable register and the appropriate persons or organisations are asked for information about the sample. In a simple case, forms will be sent out through the post, with an envelope provided for the reply.

It would be a miracle if all forms were returned promptly, giving all the information requested. Inevitably, some forms are returned incomplete (possibly with a message of explanation or justification) and other forms are not returned at all. The aim is to obtain as complete information as sensible. Even with all efforts to get maximum response, a survey must have a closedown date and at that date it is highly likely that information will be incomplete.

One possibility is that the firm approached has gone out of business, or the vehicle sampled has been sold, leased or scrapped. This is not 'non-response'–information has been provided in answer to the approach by the survey team–but this may be a warning signal that the sampling frame is out of date, and that other errors and biases may arise on this account.

Another problem with sample registers is that the address of the business held on the register may be insufficient for the postal authorities to deliver the questionnaire or the address is wrong. The questionnaire is returned by the postal authorities marked as 'unable to deliver' or 'not known at this address'. This is also not 'non-response'–information has been obtained about the inadequacy of the register as a sampling frame for a postal survey.

This lack of completeness in the information sought can be divided into two categories.

The first is the unusable response due to the information on the register being wrong, incomplete or out-of-date. In calculating an overall response rate to a survey, the unusable responses should be added to the useable responses.

The other category is known as **'non-response'** and it is helpful to start by dividing this into two groups.

- The first group is **unit non-response**, where no information at all is received in respect of a particular form by the time of the closedown of the survey. (There will often be a need to balance completeness against speed of production of results). Unit non-response can arise in a number of ways, of which the most frequent are:
  - **No reply** – no response is received from the unit despite all attempts made to contact the unit.

  - **A refusal** – where the form is returned with an explicit refusal to complete it, or where there is a verbal refusal over the telephone, or at a visit. Attempts should be made to persuade the potential respondent to take part in the survey, but some refusals may remain.
  - **Effective refusals** – where there is no explicit refusal, but the information returned is so incomplete that it is not possible to include the data in the survey.
- The second is **item non-response**, where information is received in answer to some questions on the form but not all and it is possible to use the data provided (often with some imputation of missing information).

6.3.2 What is the effect of non-response

At the simplest level, non-response reduces the **sample size** below what was intended and as a result increases the sampling errors of estimates. A crude way of allowing for this is to select an original sample that, after expected non-response, gives an achieved sample of the appropriate size. The effect of non-response then translates into an increase in the cost of the survey, beyond what would be required if non-response were low.

However, the main danger of non-response is that bias may be introduced into the results. If an estimate of, for example, number of tonnes of freight transported is taken from a sample with high non-response without any adjustment, this estimate will be misleading as an estimate for the population, to the extent that non-respondents are different from respondents.

If for a particular variable the average value for non-respondents differs from that for respondents by **d** per cent and if the response rate is **r** per cent, then the error in the unadjusted mean for respondents is **d**(100-**r**/100) per cent. So, for example, if response is 90 per cent the mean for respondents will be within 2 per cent of the true mean if the mean for non-respondents does not differ by more than 20 per cent from the mean for respondents. At a 50 per cent response rate, a sample mean within 2 per cent of the true mean requires the non-respondent mean to differ by no more than 4 per cent from the respondent mean; and at 20 per cent response no more than 2.5 per cent.

Non-respondents are particularly likely to introduce bias in samples from a heavily skewed distribution with a relatively small number of large firms, if the large firms are not properly represented. In such cases, of course, the survey will often aim to include all the large firms.

Information on outright refusals is difficult to obtain, though for business surveys comparisons can sometimes be made of the characteristics of respondent and non-respondent businesses against a register of businesses. This may give some guidance on differing characteristics. For businesses, generally for most countries, it is likely that outright refusals to a statutory survey will be predominantly from smaller companies, since larger companies normally take these obligations seriously.

There is evidence that the characteristics of those who respond more slowly to surveys are different from those who respond quickly. Tables 6.1 and 6.2 give some illustrations from an annual survey of bus operators in one country and a special detailed analysis of the household National Travel Survey of that country.

TABLE 6.1

Speed of response of respondents to bus operators' enquiry by size of firm

Week from sending out form	Response by							
	Large operators		Medium operators		Small operators		Total	
	No	%	No	%	No	%	No	%
4	6	5	21	6	197	23	224	17
8	16	13	48	14	290	34	354	27
12	45	36	118	34	581	67	744	56
16	91	73	226	65	686	79	1 003	75
20	107	86	274	80	735	85	1 116	84
24	122	98	309	90	743	86	1 174	88
Sample size	124		343		865		1 332	

The table shows that by the closedown date of the survey virtually all the largest operators had responded. Medium and smaller operators had lower response rates, but it is noticeable that those smaller operators who responded tended to send in returns more quickly–a reflection of the ease of supplying information, since the smaller operators received a simplified form.

TABLE 6.2

Average distance travelled per week per person by ease of contact

Number of attempts to successful household contact	Percent of households	Average weekly distance travelled per person (kilometres)	Average weekly distance travelled per person in this group and earlier groups (kilometres)
1	56.0	180	180
2	23.0	208	189
3	10.0	222	192
4	5.0	238	195
5–6	4.0	240	197
7–10	2.0	250	197
11+	0.3	267	198
Total	**100**	**198**	**198**

The results from the National Travel Survey show that if only one visit had been made to each household, the estimate of the distance travelled per week would have been around 10 per cent less than the estimate based on more complete coverage. The 56 per cent of respondent households who were able to respond on a first visit travelled on average 18 per cent less distance per week than those who were contacted on the second and subsequent visits. In other words, those who travelled most were less likely to be at home when an interviewer called–a fairly obvious fact.

6.3.3 What should be done about non-response

The first simple answer is to **minimise it**, within a sensible use of resources. A second simple answer is that if non-response is high there is little that can be done: it would be rare for there to be sufficient knowledge of the likely characteristics of non-responders compared with responders to enable estimates to be made on the basis of low response.

With highly skewed distributions, where relatively few large firms dominate the results, it is desirable to obtain estimates for these firms individually. If results are not available for some of these, for whatever reason, they need to be estimated or 'imputed' through analogue conclusions. Results may be available for the missing firms from the previous year and these can then be updated in line with changes in similar firms, taking into account any knowledge there might be about particular features of a firm's activities or recent history. Otherwise, it may be sensible to base the estimate on the average of the results for the most similar firms for which results have been obtained.

6.3.4 Item non-response

It frequently happens that in a set of responses to a survey, some questionnaires are missing information on one or a small number of questionnaire items. This is the 'item non-response' mentioned in section 6.3.1.

It is probably not economical to go back to a single respondent for a single missing piece of information. If this piece of information is missing from a large number of respondents, it suggests that the question is not understood, or that the information is not available either easily or at all. In these circumstances, the information sought by the question cannot be given with any confidence from the survey. Of course, if the respondent needs to be contacted for any other reason the opportunity should be taken to fill in any gaps in response.

Rather than exclude the whole of the questionnaire from the analysis (i.e., treat it as a unit non-response) it is clearly desirable to use the information which is present and to make an estimate of the missing values–to 'impute' them. There are many ways of doing this; a report by a government statistical service task force lists no fewer than 16. Without going in detail here are a few comments:

- Where possible, estimates should be made from other information on the questionnaire at the data entry stage. For example, if the origin and destination of a journey are recorded, but the distance travelled is missing, a reasonable estimate of the distance can be made.
- Depending on the type of survey, an estimate for the missing value may be possible by referring to information provided from the same firm in an earlier period. This will often not be possible or practicable. The possibility that the omission reflects some change in circumstances since the previous return should be considered.
- The simplest way of handling item non-response is to replace the missing item with the average of similar units in that stratum in the remainder of the survey–very much the same in principle as the handling of unit non-response. This can be handled by direct imputation of missing values, or by adjusting the weighting factor so that it differs for different questions on the questionnaire.
- In certain cases, it may be possible to do a rather more complicated imputation based on the information available on a form and averages for others in similar circumstances. For example, if the amount of fuel used is not recorded on the form, an estimate can be made from the average fuel consumption of similar vehicles and the distance travelled by the vehicle for which the information is missing.

If imputation for missing items is an important feature of a survey, this should be noted and quantified in the description of the results. It should be noted also that the analysis of the results may be affected by simple imputation in two ways.

First, even if the correct mean value is calculated for non-respondents (and, of course, it may not be, thus producing bias), the estimated sampling error of the resulting mix of observed and imputed values will be under-stated. Table 6.3 gives an artificial example, showing that imputation for 20 per cent of a sample for a particular variable leads to an underestimate of the sampling error of 10 per cent. (In fact, if the non-response rate is the same for all values of the variable in question, the increase in sampling error is independent of the particular underlying distribution.).

TABLE 6.3

Effect of non-response on variance

Item values (e.g. tonnes mean)	Number in full sample	Non-response (20%)	Number in achieved sample	Numbers after imputation
1	5	1	4	4
2	10	2	8	8
3	20	4	16	16
4	30	6	24	44
5	20	4	16	16
6	10	2	8	8
7	5	1	4	4
Total	**100**	**20**	**80**	**100**
Mean	**4.00**	**4.00**	**4.00**	**4.00**
Standard deviation	**0.36**	**0.36**	**0.36**	

Secondly, any analysis that attempts to relate particular individual values of one item in the sample to others–for example, through a regression analysis – will be adversely affected, because the averages inserted for imputed values will not demonstrate the associations present in the underlying true values. This, however, is generally more of a concern for household surveys than for surveys of businesses. In the case of businesses, analysis is more likely to be of results from the survey compared with external information–of changes in freight movements against changes in GDP, for example.

6.4 Treatment of journeys with more than one stop

Everyone carrying out medium to large-scale surveys has to transform the data which are collected during the survey into a form which can be analysed by computer. However, in the case of data that has a complicated structure, some first stage simplification–often a restructuring of the data into a simpler form–must be carried out beforehand. This is usually the case for surveys of road freight.

The problem is that data are collected about journeys, and journeys can be quite complicated. For example, a haulier sets off empty from his depot, picks up a first load, travels to a second pick-up point where he takes on a second load, travels to a factory where he unloads both loads and then travels empty back to base.

It is an unfortunate fact, but a fact nevertheless, that if we try to structure the data so that details of the linkage between each part of a journey are maintained, then, when the data are transferred to computer, even the simplest analysis will require fairly complex logic and, therefore, a fairly complicated computer program.

If the coding staff has had plenty of experience in dealing with surveys of road freight, these staff are often able to restructure the details provided by the haulier on the questionnaire to preserve the details of the linkage between each part of the journey, as well as ensuring that the main statistics of tonnes and tonne-kilometres are correctly calculated. This section and section 6.5 of this chapter set out the treatment that is possible for journeys with more than one stop where experienced coding staff is available.

Where a road freight survey is being attempted for the first time or the coding staff do not have much experience of this type of survey, it is possible to use the computer to a greater extent if a few extra pieces of information are collected from the questionnaire but without the loss of essential information. Section 6.6 of this chapter covers this situation. The model questionnaire set out in chapter 4 of this manual and the computer processing section in the following chapter are designed for this latter case. That is, it is a new survey or the coding staff does not have much experience of this type of survey.

Here is a specific example to try and illustrate the potential complications that can arise. A lorry is loaded at the depot with 20 tonnes of goods. It travels 30 kilometres to A where it unloads 10 tonnes, then 15 kilometres to B where it unloads 5 tonnes, then 10 kilometres to C where it unloads the rest (5 tonnes) and travels empty 10 kilometres back to the depot. Remember that the main statistics that the road freight survey is attempting to estimate are tonne-kilometres and tonnes lifted.

In the above, tonne kilometres are easily calculated, as follows:

$$\text{Tonne-kilometres} = (20*30) + (10*15) + (5*10) = 800$$

So, for the purposes of calculating total tonne-kilometres, each stage can be taken separately. However total tonnes lifted for the journey above is just 20 tonnes. The total distance travelled is one loaded journey of 55 kilometres and one empty journey of 10 kilometres. Notice that in this case, the total distance travelled has to be calculated as the sum of the stages travelled. The calculation tonne-kilometres divided by tonnes lifted does not give the total distance travelled, as it would for a one-stop journey. In the above case, tonne-kilometres divided by tonnes would be 40, not the 55 kilometres of the total multiple stop journey.

If the journey were to be broken down into individual stages, then there would be no way, as far as the computer is concerned, of distinguishing the journey described above from a journey in which 20 tonnes was off-loaded at A, 10 tonnes loaded at A, taken to B where it was all unloaded and where 5 tonnes was loaded and taken to C and unloaded. In this case, the tonne-kilometres and distance travelled would be the same but there would be four journeys recorded and the total tonnes lifted would be 35 tonnes.

Returning to the original question: how should we treat journeys of more than one stop? 'Journeys' - as defined, for the purposes of this Regulation, in Part B, chapter 10–can be classified into three types:

One stop one stage, out or back loaded or empty, the return stage being a separate journey.

2–4 stops discussed above: very strictly defined; no empty stages.

Collection/delivery where it is not feasible to collect details of every stage of the journey (in general, journeys of 5 or more stops may be treated as collection/delivery journeys).

It is the task of the coding staff to restructure what are often quite complicated lorry movements into one of the above three classifications. This section outlines the methodology for the formal treatment of journeys with more than one stop where the expertise of the coding staff is used to classify the journey types. An alternative methodology that uses the computer is set out in section 6.6. This is helpful where the survey is being conducted for the first time or coding staff is inexperienced.

The only 'true' 2–4 stop journeys are journeys where the load decreases and where there is no loading or journeys where the load gradually increases and there is no unloading. Such 'journeys' have to be separated out because, as mentioned above, tonnes lifted are calculated differently in such cases.

A few examples might help:

Origin	Destination	Commodity	Tonnes carried
A	B	Empty	0
B	C	Waste paper	10
C	D	Waste paper	12
D	E	Waste paper	16
E	F	Newsprint	16
F	A	Empty	0

This is a simple example of how data might appear on a questionnaire. The lorry seems to have picked up waste paper at three locations B, C and D; that waste paper was unloaded at E where 16 tonnes of newsprint–paper for newspapers–was loaded; this was unloaded at F and the lorry travelled empty back to its depot at A. The first task, of the staff that is

processing this survey information, is to restructure the data into separate journeys of either 1 stop or 2–4 stops (there are no 5 or more stop journeys–they are a completely separate category). The above 'journey' should be broken down, as follows:

Journey type	Origin	Destination	Commodity	Tonnes carried
1 stop	A	B	Empty	0
2–4 stops	B	C	Waste paper	10
	C	D	Waste paper	12
	D	E	Waste paper	16
1 stop	E	F	Newsprint	16
1 stop	F	A	Empty	0

So, the original 'journey' has been restructured into four new journeys. Genuine 2 to 4 stop journeys are very rare and in the most countries will comprise less than 5 per cent of all restructured journeys. Most journeys that, from the information provided on the questionnaire, appear to be 2 to 4 stop journeys can be safely restructured into 1 stop journeys. Of far greater importance is the treatment of collection/delivery journeys comprising 5 or more stops.

Further guidance on the recording of distance travelled and the calculation of tonne-kilometres for journeys with more than one stop, specific to the implementation of Regulation (EU) No 70/2012 is provided in chapter 11, sections 11.5 and 11.6.

6.5 Treatment of collection and delivery journeys

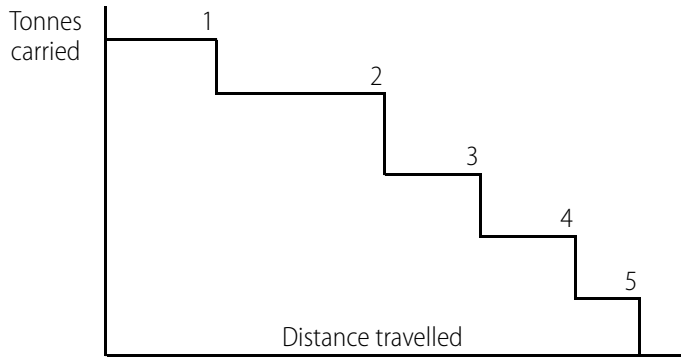
If a journey comprised 5 or more stops then the haulier is not asked to complete information for every single stage (a 'stage' is that part of a journey between two stops). Instead, he is asked for the following summary information.

- Origin
- Final destination
- Type of goods
- Total loaded distance travelled (LM)
- Total empty distance travelled (LE)
- Total weight of goods delivered (TD)
- Total number of delivery stops (ND)
- Total weight of goods collected (TC)
- Total number of collection stops (NC)

The symbols (e.g., LM for Total Loaded Distance Travelled) will be used later on in this section in formulae.

There is a potential loss of data. It is possible that, within a multi-stop journey, a haulier could transport more than a single type of commodity but he will only record the main type of commodity transported. Only the final destination of such journeys is recorded so there will not be complete detailed data about inter-regional flows. However, most of these multi-stop journeys will be relatively short and only involve the delivery or collection of a single commodity. There is obviously no problem in deriving total tonnes lifted: the questionnaire asks for that directly. However, in order to estimate tonne-kilometres, journeys of 5 or more stops must be classified into different types, as follows:

Type 1

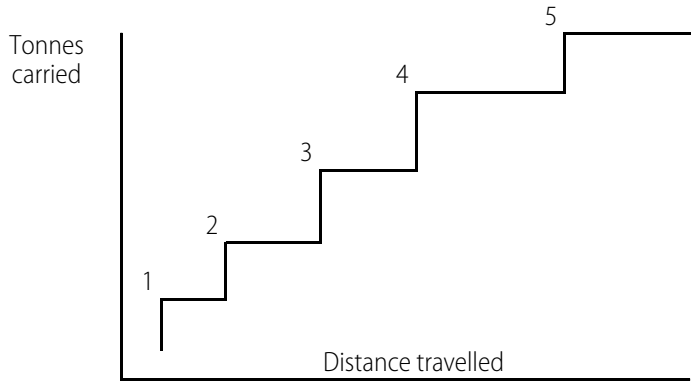


Deliveries only. It is assumed that equal loads are delivered at each stop of the loaded part of the journey, and that the distance between each stop is the same.

The example shown above as a diagram is a journey that involves 5 stops for delivery. After the fifth stop the vehicle is empty so any distance which the vehicle subsequently travelled (for example, returning to the depot) does not add to the total tonne-kilometres. Total tonne-kilometres is the area under the line. This is the sum of a number of rectangles of equal width but varying height, where the number of rectangles equals the number of delivery stops and the height is a proportion of the tonnage. This leads to:

$$Tonne - kilometres = \frac{1}{2}TD * LM\left(1 + \frac{1}{ND}\right)$$

Type 2



Collections only: as for type 1 but for collections, not deliveries. The same assumptions apply.

The above example is a journey that involves 5 stops for collection and the vehicle travelled empty to the first collection stop. Once again, the total tonne-kilometres is the area under the line, which is:

$$Tonne - kilometres = \frac{1}{2}TC * LM\left(1 + \frac{1}{NC}\right)$$

Type 3

Deliveries only, like type 1, but with an unknown number of delivery stops (coded M on the model questionnaire–see chapter 4). It is assumed that the number of delivery stops is large, and so 1/ND becomes negligible. Then tonne-kilometres approximate to the area of a right-angled triangle with height equal to the initial tonnage and base length equal to the loaded distance. This leads to:

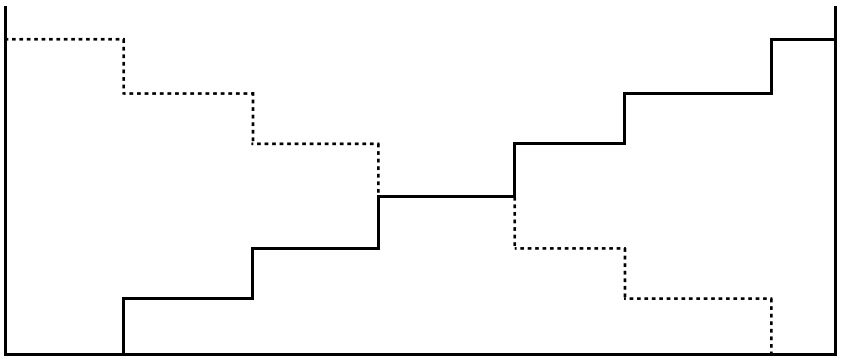
$$Tonne - kilometres = \frac{1}{2}TD * LM$$

Type 4

Collections only, like type 2, but with an unknown number of collection stops. It is assumed that the number of collection stops is large, and so 1/NC becomes negligible. Then tonne-kilometres approximate to the area of a right-angled triangle with height equal to the final tonnage and base length equal to the loaded distance. This leads to:

$$Tonne - kilometres = \frac{1}{2} TC * LM$$

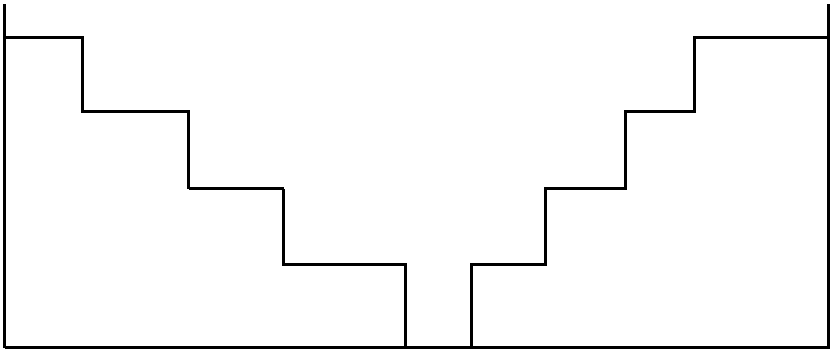
Type 5



Collections and deliveries take place simultaneously, with no empty stages. It is assumed that there are many collections and deliveries, and presumably there are an equal number of collections and deliveries if these are simultaneous. E.g., milk round, where empty bottles are collected from each house and full bottles delivered to each house. Since there are many stops, the tonne-kilometres are simply the addition of the tonne-kilometres for type 3 and type 4. This leads to:

$$Tonne - kilometres = \frac{1}{2} LM(TD + TC)$$

Type 6

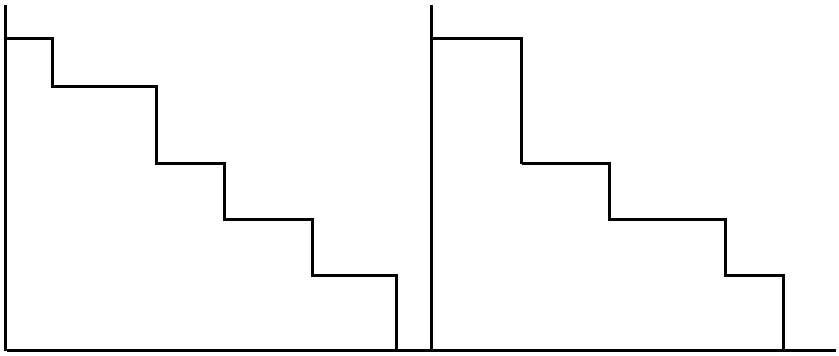


Deliveries are made, then some distance is travelled empty, then collections are made. The loaded distance must be divided into loaded distance delivering and loaded distance collecting. It is assumed that, excluding the empty distance, the distance between each stop is the same. The total loaded distance is therefore divided in proportion to the number of delivery stops and the number of collection stops. This means that the loaded distance delivering is a proportion ND/(ND+NC) of the total loaded distance, and similarly the loaded distance collecting is a proportion NC/ (ND+NC) of the total loaded distance. These weights are then applied to the cases of type=1 and type=2 respectively, and so the assumptions made in those two cases apply. These are then summed to give tonne- kilometres. This leads to:

$$Tonne - kilometres = \frac{1}{2} TD * LM \left(1 + \frac{1}{ND}\right) \frac{ND}{NC + ND} + \frac{1}{2} TC * LM \left(1 + \frac{1}{NC}\right) \frac{NC}{NC + ND}$$

$$i.e., \quad Tonne-kilometres = \frac{1}{2}\frac{LM}{NC+ND}(TD(1+ND)+TC(1+NC))$$

Type 7



There are only a small number of collections but a much larger number of deliveries, e.g., coal round. Tonnes collected are equal to tonnes delivered, and this usually exceeds the carrying capacity of the vehicle. This is really a series of journeys, with each delivery section being one journey. But only totals are given on the questionnaire for tonnes delivered, tonnes collected and loaded distance, and so the journeys are treated as one.

It is assumed that some tonnage is first collected and then delivered in equal amounts to a number of delivery stops that are equidistant from each other. Having made the last delivery, another collection is made and the delivery process starts again. This should have been recorded on the questionnaire as a number of type 1 journeys but you must be prepared for the respondent to overlook this and record these series of journeys as just one delivery journey.

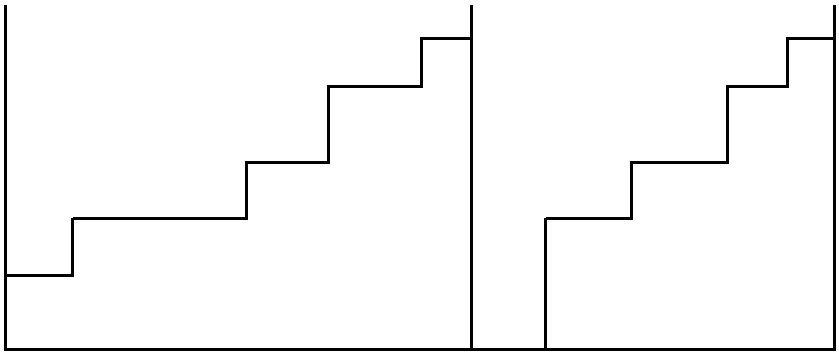
The number of journeys in the 'series' is equal to the number of collection stops. It is assumed that there are an equal number of delivery stops in each series, and so there are ND/NC delivery stops in each series. Similarly, it is assumed that an equal tonnage in delivered on each series, and so the tonnes delivered during each series are TD/NC. It is also assumed that the loaded distance travelled is the same for each series, and so this is equal to LM/NC. The tonne-kilometres calculation for each series is based on the case TYPE=1. Substituting the three fractions into the formula for TYPE=1 gives:

$$Tonne-kilometres\ for\ each\ series = \frac{1}{2}\frac{TD}{NC}\frac{LM}{NC}\left(1+\frac{1}{\frac{ND}{NC}}\right)$$

To get total tonne-kilometres, the tonne-kilometres for each series are multiplied by the number of series (which is equal to the number of collection stops). This leads to:

$$Tonne-kilometres = \frac{1}{2}\frac{TD}{NC}LM\left(1+\frac{NC}{ND}\right)$$

Type 8



There are only a small number of deliveries but a much larger number of collections, e.g., collection of milk churns from farms that are delivered back to depots.

This is the reverse of case TYPE=7. So, for each series:

$$Tonnes\ collected = \frac{TC}{ND}$$

$$Loaded\ distance = \frac{LM}{ND}$$

$$Number\ of\ collection\ stops = \frac{NC}{ND}$$

The tonne-kilometres calculation for each series is based on the case of TYPE=2. Substituting the three fractions into the formula for TYPE=2 gives:

$$Tonne - kilometres\ for\ each\ series = \frac{1}{2}\frac{TC}{ND}\frac{LM}{ND}\left(1 + \frac{1}{\frac{NC}{ND}}\right)$$

To get total tonne-kilometres, the tonne-kilometres for each series are multiplied by the number of series (which is equal to the number of delivery stops). This leads to:

$$Tonne - kilometres = \frac{1}{2}\frac{TD}{ND}LM\left(1 + \frac{ND}{NC}\right)$$

It is all too easy to be disconcerted by these rather complicated formulae. It is not necessary to remember the formula. These will be 'built-into' the processing software. Tonne-kilometres are estimated automatically when the 5 or more stop trip is classified by the coding staff into 1 of the 8 types described above and when other information – for example, total tonnage delivered, total number of deliveries – is input to the computer system.

To summarise:

For journeys of more than one stop the coding staff must first work out from information recorded on the questionnaire what work the lorry actually did. The quality of information supplied for multi-stop journeys is often significantly worse than for the more straightforward single stop, 'out-and-back' journeys. For multi-stop journeys the coding staff must restructure and simplify, breaking down each journey into components:

- 1 stop journeys.
- 2–4 stop journeys.
- 5 or more stop journeys.

For every 5 or more stop journey, the coding staff must classify the journey into one of eight types described above. The following statistics from surveys over a number of years in a Member State may be of interest.

After the reported journeys had been restructured and simplified the breakdown of the number of simplified journeys was as follows:

1 stop journeys	88%
2–4 stop journeys	2%
5 or more stop journeys	10%

The 5 or more stop journeys break down by type was as follows:

Type 1 (Deliveries only, number of stops known)	44%
Type 2 (Collections only, number of stops known)	2%
Type 3 (Deliveries only, number of stops not known)	10%
Type 4 (Collections only, number of stops not known)	1%

Type 5 (Simultaneous collections & deliveries)	18%
Type 6 (Deliveries then collections)	6%
Type 7 (Few collections, much larger number of deliveries)	5%
Type 8 (Few deliveries, much larger number of collections)	14%

6.6 Modified treatment for new surveys

The model questionnaire set out in chapter 4 above and the computer processing section in chapter 7 have been designed for the case where the survey is being conducted for the first time. In this case the coding staff will be relatively inexperienced in being able to identify with ease the various types of journey.

The part of the questionnaire that records journeys with up to 4 stops asks for the information of the weight of goods loaded and weight of goods unloaded at each stage of the journey rather than the weight of goods carried. The computer then works out if, at any intermediate stage of a journey recorded on the questionnaire, the vehicle has any residual load or is empty before any loading is done at that intermediate stage. Tonne-kilometres performed at each stage are calculated by the computer from the data of tonnage loaded at that stage plus any residual load from the previous stage. The variable of tonnage lifted is calculated from the data of weight loaded. Tonne-kilometres are calculated as tonnes carried multiplied by distance loaded. If the residual load is zero at any stage of the recorded journey, the computer indicates that a new journey has started.

For journeys with more than five stops, described in the model questionnaire as collection and/or delivery journeys (because this is the usual activity performed on these multi-stop journeys), the computer can be programmed to identify the various types of journey listed in section 6.5 of this chapter and carry out the appropriate calculation.

7 Processing and analysis

7.1 Computer processing and record layout

7.1.1 Computer processing

If the information collected in road freight surveys is input to the computer in the same format as recorded on the questionnaire, even the simplest analysis will require fairly complicated logic (e.g., computer program). It is, therefore, useful if it is simplified before it is put into a form that is suitable for computer analysis.

The exact form of the computer records will of course depend upon the software chosen for the analysis. Nevertheless, there are some general principles.

There will be a group of records relating to the sampled vehicle and the road haulage work that the vehicle reported during the survey week. Within each group there will be one record which contains information about the vehicle; one record for each 1 stop trip; one record for each 2 to 4 stop trip (if the modified system set out in section 6.4 of the previous chapter is being used there will be a record for each stage of a 2 to 4 stop trip), and one record for each 5 or more (collection/delivery) stop trip. In addition, to make it easier to analyse the information, a number of 'stage' records can be derived from the information on the vehicle and journey records.

Each record consists of a number of 'variables', for example, in the case of vehicle records, age of vehicle. These data items are called `variables' because they vary from record to record. Variables are of two types: data that was collected directly, as part of the survey and derived variables, that is, variables that were calculated either from other variables or that were calculated externally.

Derived variables, calculated from other variables for each vehicle, include total tonnes lifted during the survey week, total tonne-kilometres performed and kilometres travelled during the survey week. The weighting factor, which is a number indicating how many other vehicles in the country are represented by this sampled vehicle, is an example of an externally calculated variable.

In processing the survey, the first task is to check the journey details. The coding staff first simplifies the information, which has been recorded by the haulier. This mostly involves breaking down what may seem to be multi-stop journeys into a number of 1- stop journeys. After this is done, codes must be assigned to those variables that the respondent has not been asked to code (such as the NST codes for commodities).

The information, that is the data variables comprising each record, is then keyed into the computer system. In the older system, referred to at the beginning of this chapter, the data was keyed onto punched cards or magnetic tape before being read in by the software. However, this rather time-consuming method of data entry has almost become obsolete and has

been replaced by 'direct-data-entry' systems in which the data is entered into specially formatted VDU screens of PCs. The advantage of inputting by direct-data-entry is that the data can be checked immediately and some of the derived variables can be calculated. Other derived variables, for example the weighting factor and the total tonnage lifted during the survey week, must be added to the record later, when the 'stage' records (see below) have been derived.

The information about the vehicle recorded on the returned questionnaire will be combined with the data already recorded about the vehicle and the owner when the sample was selected.

7.1.2 Elaboration and application of nomenclatures

The information required for the classification of collected data and for controlling the survey processing is stored in separate files. They have to include:

- Classification of axle configuration.
- NACE Rev. 2 (four-digit) category of activity.
- Classification of type of transport.
- Classification of type of journey.
- NUTS and Country codes, names and categories.
- EUROSTAT transport nomenclature for commodities (NST).
- Classification of dangerous goods.
- Classification of mode of appearance.
- Classification for any variable collected by a country in addition to those required by Regulation (EU) No 72/2012 (for example, body types for lorry (or semi-trailer)).
- Questionnaire return deadlines.

7.1.3 Model layout for computer records

Model layouts for the computer records for the survey are set out below. These layouts are based on the model questionnaire shown in chapter 4. All the data required by Regulation (EU) No 72/2012 (including the optional variables) are included, if the options are exercised of recording only the main type of good carried and the main vehicle configuration during the week.

The computer is used to identify the various types of journey and to calculate the tonnage carried and the tonne-kilometres performed during the journey.

Layouts of the pre-recorded information are shown in Table 7.1 for the Operator Register (OPREG) and Table 7.2 for the Vehicle Register (VEHREG) showing the source of the variables and the permissible codes. It will be noticed that all this information for these two records is as obtained from the survey register. It does NOT include information obtained from the first two pages of the model survey questionnaire shown in chapter 4.

TABLE 7.1

Model layout of Operator Register (OPREG)

No.	Field description	Format	Length	Source
1	Identifier of the operator in the survey	numeric	4	
2	Identifier of the operator in Business Register	numeric	13	Business Register
3	Name of operator	alphanumeric	25	Register
4	Address of operator–settlement, name	alphanumeric	25	Register
5	Address of operator–settlement, id.	numeric	5	Register
6	Address of operator–street	alphanumeric	25	Register
7	Address of operator–house-number	alphanumeric	5	Register
8	Address of operator–ZIP code	numeric	6	Register
9	Main activity of the operator (NACE code)	numeric	6	Business Register
10	Type of the operator (Private or business)	numeric	1	Register

TABLE 7.2

Model layout of Vehicle Register (VEHREG)

No.	Field description	Format	Length	Source
1	Registration (license) mark (number)	alphanumeric	12	Register
2	Identifier of the operator	numeric	4	OPREG.N01
3	Type of vehicle	numeric	1	Register
4	Year of first registration	numeric	4	Register
5	Number of axles	numeric	1	Register
6	Unloaded (own) weight (kg)	numeric	5	Register
7	Maximum permissible laden weight (kg)	numeric	5	Register
8	Loading capacity (kg)	numeric	5	Register or (07-06)
9	Body type	alphanumeric	2	Register
10	Type of fuel used	alphanumeric	1	Register
11	Survey year and week	numeric	4	Survey
12	Strata group	numeric	2	Survey
13	Status on reference week	numeric	2	Survey

Hereafter the fields from each record will be referenced with the name of the record and the field number in record description. So, the field 'strata group' from VEHREG record will be referenced as VEHREG.N12. When the name of record is omitted, the referenced field is in the same record.

A model record layout for the basic data entry on the vehicle from the questionnaire is set out in Table 7.3 (ENTRYREC), showing the source of the variables and the permissible codes. It includes the information obtained from the first two pages of the model survey questionnaire shown in chapter 4.

TABLE 7.3

Model basic data entry-record for VEHICLE (ENTRYREC)

No	Field description	Format	Length	Permissible codes / source
1	Registration (licence) mark (number)	AN	12	VEHREG.N01
2	Record number	N	5	Program
3	Date of input	N	2	01-31
4	Month of input	N	2	01-12
5	Year of input	N	2	Year of survey or next year
6	Name of operator of vehicle	AN	25	
7	Operators region/county code	N	5	
8	Address of operator - ZIP code	N	6	
9	Address of operator - settlement	AN	25	
10	Street	AN	25	
11	House number	N	5	
12	Settlement code	N	5	
13	Type of vehicle	N	1	1, 2
14	Year of first registration	N	2([4])	1975 - year of survey1
15	Number of axles on vehicle	N	1	2 - 61
16	Unladen weight (kg)	N	5	500 - 30 0001
17	Maximum permissible laden weight (kg)	N	5	1 000 - 50 0001
18	Load capacity (kg)	N	5	500 - 30 0001
19	Survey reference week	N	2	VEHREG.N11 (last 2 digits)
20	Status on reference week	N	2	
21	Identifier of operator	N	13	
22	Private operator or business	N	1	1, 2
23	Type of business (main activity)	N	6	
24	If vehicle sold/scrapped	N	1	1, 2
25	Date of selling/scrapping	N	6	
26	Name of new operator if sold	AN	25	
27	Address of new operator - ZIP code	AN	6	
28	County (region) code	N	5	
29	Settlement	AN	25	
30	Street	AN	25	
31	House number	N	5	
32	If vehicle used trailer/semi-trailer in week	N	1	0, 1
33	Number of axles on trailer/semi-trailer	N	1	0 - 41
34	Load capacity of trailer/semi-trailer (kg)	N	5	0 - 25 0001
35	Body type of vehicle/semi-trailer	N	2	01-13
36	Type of use	N	1	1-4

No	Field description	Format	Length	Permissible codes / source
37	Type of fuel used	N	1	1-3
38	Fuel purchased in reference week	N	4	
39	Days in work/out of operation	N	1	sum 40 to 46 must = 7
40	In work	N	1	0 - 7
41	Repair	N	1	0 - 7
42	Holiday	N	1	0 - 7
43	No driver	N	1	0 - 7
44	No work	N	1	0 - 7
45	Drivers holiday	N	1	0 - 7
46	Other causes	N	1	0 - 7
47	Kilometres in past 12 months	N	5	
48	Usage of vehicle in past 12 months	N	2	
49	Strata group	N	2	VEHREG.N12
50	Possibility of using vehicle for combined transport	N	1	
51	Optional field for country use	N	5	
52	Optional field for country use	N	5	

[1] Program to query entry if outside range but limit can be over-ridden by data input operator.

A model for the record layout for the information about the journeys–the `journey' records (ENTRYJY1) and (ENTRYJY2) is set out in Table 7.4, again showing the source for each field and the permissible codes. This data comes from pages 3 and 4 of the model survey questionnaire shown in chapter 4.

TABLE 7.4

Model basic data entry record for JOURNEYS (ENTRYJY1, ENTRYJY2)

Model basic data entry record for NORMAL JOURNEY (ENTRYJY1)				
No	**Field description**	**Format**	**Length**	**Permissible codes or source of field**
1	Registration (licence) mark (number)	AN	12	ENTRYREC.N01
2	Record number	N	5	ENTRYREC.N02
3	Kind of journey I	N	1	1 entered by program
4	Sequence number of journey	N	2	entered by program
5	Date of journey	N	2	01-31
6	Month of journey	N	2	01-12
7	Place of origin	N	6	
8	Place of last destination	N	6	
9	Distance travelled	N	4	
10	Weight of goods loaded (kg)	N	5	less than 1,25 load capacity1
11	Type of goods	N	3	NST
12	Dangerous goods	N	2	1, 2, 3, 41, 42, 43, 51, 52, 61, 62, 7, 8, 9

Model basic data entry record for NORMAL JOURNEY (ENTRYJY1)				
No	**Field description**	**Format**	**Length**	**Permissible codes or source of field**
13	Type of cargo	N	1	0 - 7, 9
14	Weight of goods unloaded (kg)	N	5	less than 1,25 load capacity1
15	Trailer used	N	1	0, 1
16	Type of transport	N	1	1, 2
17	Number of journeys	N	2	01 - 101
18	Place of loading on another mode	N	6	
19	Place of unloading from another mode	N	6	
20	Other mode used	N	1	1, 2
21	Volumetric loading	N	1	0,1,2
22	Transit country A	N	3	
23	Transit country B	N	3	
24	Transit country C	N	3	
25	Transit country D	N	3	
26	Transit country E	N	3	

Model basic data entry JOURNEY record for collection and delivery (ENTRYJY2) (assumes no transit or international journeys)				
No	**Field description**	**Format**	**Length**	**Permissible codes or source of field**
1	Registration (licence) mark	AN	12	ENTRYREC.N01
2	Record number	N	5	ENTRYREC.N02
3	Kind of journey II	N	1	2 entered by program
4	Sequence number of journey	N	2	Entered by program
5	Date of journey	N	2	01-31
6	Month of journey	N	2	01-12
7	Place of origin	N	6	
8	Place of last destination	N	6	
9	Distance travelled loaded	N	4	
10	Distance travelled empty	N	4	
11	Weight of goods loaded (kg)	N	5	Less than 1,25 load capacity1
12	Weight of goods collected (kg)	N	5	Less than 1,25 load capacity1
13	Type of goods	N	3	NST
14	Dangerous goods	N	2	
15	Type of cargo	N	1	
16	Number of stops	N	2	4 +
17	Trailer used	N	1	0, 1
18	Type of transport	N	1	1,2
19	Volumetric loading	N	1	0,1, 2

[1] Program to query entry if outside range but limit can be over-ridden by data input operator.

A model for the record layout for the complete survey information about the vehicle – the `vehicle' record (RECVEH)–is set out in Table 7.5, showing the source of each field. The derived variables for this record must be added when the stage records have been derived. A weighting factor must be calculated and added to the record before the analyses are made.

TABLE 7.5

Model computer VEHICLE record (RECVEH) [1]

No	Field description	Format	Length	Source of field
1	Registration (licence) mark (number)	AN	12	ENTRYREC.N01
2	Record number	N	5	ENTRYREC.N02
3	Survey week	N	2	ENTRYREC.N19
4	Date of input	N	2	ENTRYREC.N03
5	Month of input	N	2	ENTRYREC.N04
6	Year of input	N	2	ENTRYREC.N05
7	Status of the vehicle in survey week	N	2	ENTRYREC.N20
8	County (region) of operator	N	2	ENTRYREC.N07
9	Private operator or business	N	1	ENTRYREC.N22
10	Business of operator	N	6	ENTRYREC.N23
11	Type of vehicle	N	1	ENTRYREC.N13
12	Number of axles on vehicle	N	1	ENTRYREC.N15
13	Number of axles on trailer/semi-trailer	N	1	ENTRYREC.N33
14	Year of first registration	N	4	ENTRYREC.N14
15	Load capacity of vehicle (kg)	N	5	ENTRYREC.N18
16	Load capacity of unit (kg)	N	5	ENTRYREC.N18+ENTRYREC.N34
17	Body type of vehicle/semi-trailer	N	2	ENTRYREC.N35
18	Days in work	N	1	ENTRYREC.N40
19	Non use - days	N	1	ENTRYREC.N39-ENTRYREC.N40
20	Main reason of non use	N	1	Max. size of ENTRYREC N40 to N46
21	If vehicle used trailer/semi-trailer	N	1	ENTRYREC.N32
22	Load capacity of trailer (kg)	N	5	ENTRYREC.N34
23	Type of transport	N	1	ENTRYREC.N36
24	Type of fuel used	N	1	ENTRYREC.N37
25	Fuel purchased in reference week	N	4	ENTRYREC.N38
26	Total kilometres in last 12 months	N	5	ENTRYREC.N47
27	Usage of vehicle in past 12 months	N	2	ENTRYREC.N48
28	Possibility of using vehicle for combined transport	N	1	ENTRYREC.N50
29	Optional field for country use	N	5	ENTRYREC.N51
30	Optional field for country use	N	5	ENTRYREC.N52
31	Total number of journeys in survey period	N	2	Sum of RECJOUR records
32	Total vehicle kilometres - loaded in survey period	N	4	Sum of N12 of RECJOUR records

No	Field description	Format	Length	Source of field
33	Total kilometres - empty in survey period	N	4	Sum of N13 of RECJOUR records
34	Total kilometres travelled in survey period	N	4	N32 + N33
35	Total tonnage in survey period	N	4	Sum of N28 of RECJOUR records
36	Total tonne-kilometres in survey period	N	5	Sum of N29 of RECJOUR records
37	Strata group	N	2	ENTRYREC.N49
38	Survey grossing factor	N	6	Input by program

[1] Created from ENTRYREC, OPREG and RECJOUR after creation of all RECJOUR records.

It would be complicated if, every time an analysis run was required, journey records had to be processed in one of three ways depending upon which type of journey was being processed. Stage records can be derived from each journey record to overcome this problem and, in analysis runs, it is these records which are processed. A model stage record (RECJOUR) is set out in Table 7.6, which indicates how each of the variables are derived and the source of the data (vehicle or journey record).

If the same journey has been made many times in a day (e.g., a lorry taking gravel from a quarry to a cement factory) then it would be inefficient if the details of every single journey had to be entered into the computer. So, the variables need only be entered once but the 'journey multiplier' indicated on the questionnaire should be added, for example if 10 such journeys were made in the day, then enter 10, to indicate that 10 identical journeys were undertaken. When such a journey is processed, after passing all the consistency checks, to derive stage records the computer will produce 10 identical stage records.

TABLE 7.6

Model computer JOURNEY record (RECJOUR) [1]

No	Field description	Format	Length	Source of field or method of calculation
1	Registration (licence) mark (number)	N	1	ENTRYJY1.N01 or ENTRYJY2.N01
2	Survey week	N	2	ENTRYREC.N19
3	Strata group	N	2	ENTRYREC.N49
4	Record number	N	4	ENTRYREC.N02
5	Kind of journey	N	1	ENTRYJY1.N03 or ENTRYJY2.N03 If N05=2 then N.05 = 3 GO TO sub-routine A If N05=1 then N.05 = 1 GO TO sub-routine B
SUB-ROUTINE A - DELIVERY/COLLECTION JOURNEYS				
6	Sequence No of journey	N	2	ENTRYJY2.N04
7	Day of journey (Monday, etc 1 to 7)	N	1	Calculate from (ENTRYJY2.N05 and ENTRYJY2.N06) with calendar
8	Month of journey (01 to 12)	N	2	ENTRYJY2.N06
9	Place of origin	N	6	ENTRYJY2.N07
10	Place of destination	N	6	ENTRYJY2.N08
11	Domestic/international journey	N	1	Calculate from first digit of N09 and N10 [2]
12	Distance travelled loaded	N	4	IF RECVEH.N16 = 0 THEN blank ELSE ENTRYJY2.N09
13	Distance travelled empty	N	4	ENTRYJY2.N10
14	Weight of goods delivered	N	5	ENTRYJY2.N11
15	Type of goods	N	3	ENTRYJY2.N13
16	Dangerous goods	N	2	ENTRYJY2.N14
17	Type of cargo	N	1	ENTRYJY2.N15
18	Weight of goods collected	N	5	ENTRYJY2.N12
19	Number of stops	N	2	ENTRYJY2.N16
20	Trailer used	N	1	ENTRYJY2.N17
21	Type of transport	N	1	ENTRYJY2.N18
22	Type of vehicle	N	1	RECVEH.N11
23	Number of axles on vehicle	N	1	RECVEH.N12
24	Number of axles on trailer/semi-trailer	N	1	RECVEH.N13
25	Body type of unit (vehicle/semi-trailer)	N	2	RECVEH.N17
26	Load capacity of unit (tonnes)	N	2,1	RECVEH.N16 / 1 000
27	Weight carried (kg)	N	5	"If N13>0 and N14>0 and N18>0 THEN max (N14, N18) ELSE = N14 + N18"

No	Field description	Format	Length	Source of field or method of calculation
28	Weight after delivery (kg)	N	5	Blank
29	Total tonnes	N	2,2	N27/ 1000
30	Tonne-kilometres	N	4,2	if N13>0 and N14>0 and N18>0 then N12*0,25*(N14+N18)*(N19+2)/ (N19*1 000) else N12*0,5*(N14+N18)*(N19+1)/ (N19*1 000)
31	Total distance on journey	N	4	N12 + N13
32	Volumetric loading	N	1	ENTRYJY2.N19
33 to 40	Combined transport and transit countries			Blank (assumption that delivery and collection journeys will not be international)
41	Survey grossing factor	N	4,2	Program input

[1] Created from ENTRYREC, ENTRYJY2, RECVEH
[2] For kind of journey: if first digit of N09=0 and first digit of N10 = 0 then N11 = 0 (domestic journey) else "error report"

Then process next record.

TABLE 7.6 (CONTINUED)

SUB-ROUTINE B for Model computer JOURNEY record (RECJOUR) [1] – NORMAL JOURNEYS

No	Field description	Format	Length	Source of field or method of calculation
6	Sequence No of journey	N	2	ENTRYJY1.N04
7	Day of journey (Monday, etc 1 to 7)	N	1	Calculate from (ENTRYJY1.N05 and ENTRYJY1.N06) with calendar
8	Month of journey(01 to 12)	N	2	ENTRYJY1.N06
9	Place of origin	N	6	ENTRYJY1.N07
10	Place of destination	N	6	ENTRYJY1.N08
11	Domestic/international journey	N	1	Calculate from first digit of N09 and N10 2
12	Distance travelled loaded	N	4	IF ENTRY JY1.N10 = 0 THEN blank ELSE ENTRYJY1.N09
13	Distance travelled empty	N	4	IF ENTRY JY1.N10 = 0 THEN ENTRYJY1.N09 AND N05 = 4
14	Weight of goods loaded	N	5	ENTRYJY1.N10
15	Type of goods	N	3	ENTRYJY1.N11
16	Dangerous goods	N	2	ENTRYJY1 field 12
17	Type of cargo	N	1	ENTRYJY1.N13

No	Field description	Format	Length	Source of field or method of calculation
18	Weight of goods unloaded	N	5	ENTRYJY1.N14
19	Number of stops	N	1	N19 = 1
20	Trailer used	N	1	ENTRYJY1.N15
21	Type of transport	N	1	ENTRYJY1.N16
22	Type of vehicle	N	1	RECVEH.N11
23	Number of axles on vehicle	N	1	RECVEH.N12
24	Number of axles on trailer/semi-trailer	N	1	RECVEH.N13
25	Body type of unit (vehicle/semi-trailer)	N	2	RECVEH.N17
26	Load capacity of unit (tonnes)		2,1	RECVEH.N16 / 1 000
27	Weight carried (kg)	N	5	N14
28	Weight after delivery	N	5	N14 - N18
29	Total tonnes	N	2,2	N27 / 1000
30	Tonne-kilometres	N	4,2	N12*N27 / 1 000
31	Total distance on journey	N	4	N12 + N13
32	Volumetric loading	N	1	ENTRYJY1.N21
33	Place loaded - transport by another mode	N	6	ENTRYJY1.N18
34	Place unloaded from transport by another mode	N	6	ENTRYJY1.N19
35	Other mode of transport	N	1	ENTRYJY1.N20
36	Transit country A	N	3	ENTRYJY1.N22
37	Transit country B	N	3	ENTRYJY1.N23
38	Transit country C	N	3	ENTRYJY1.N24
39	Transit country D	N	3	ENTRYJY1.N25
40	Transit country E	N	3	ENTRYJY1.N26
41	Number of journeys		0	IF ENTRY JY1.N17 > 1 REPRODUCE N-1 EXTRA IDENTICAL "RECJOUR" RECORDS THEN NEXT RECORD IF ENTRY JY1.N17 = 1 AND N28 = 0 THEN NEXT RECORD IF ENTRY JY1.N17 = 1 AND N28 > 0 THEN SUB-ROUTINE C FOR NEXT RECORD IF ENTRY JY1.N17 = 1 AND N28 < 0 THEN ERROR REPORT AND NEXT RECORD
42	Survey grossing factor	N	4,2	Program input

[1] Created from ENTRYREC, ENTRYJY1, RECVEH

[2] For kind of journey: if first digit of N09=0 and first digit of N10 = 0 then N11 = 0 (domestic journey)
if first digit of N09=0 and first digit of N10 = 1 then N11 = 1 (international journey)
if first digit of N09=1 and first digit of N10 = 0 then N11 = 1 (international journey)
if first digit of N09=1 and first digit of N10 = 1 and N09 # N10 then N11= 2 (cross-trade)
if first digit of N09=1 and first digit of N10 = 1 and N09 = N10 then N11= 3 (cabotage)

TABLE 7.6 (CONTINUED)

SUB-ROUTINE C for Model computer JOURNEY record (RECJOUR) [1] – TWO TO FOUR STOP JOURNEYS

No	Field description	Format	Length	Source of field or method of calculation
10	Place of destination	N	6	N10 = ENTRYJY1.N08
11	Domestic/international journey	N	1	Calculate from first digit of N09 and N10 [2]
12	Distance travelled on stage	N	4	ENTRYJY1.N09
14	Weight of goods loaded)	N	5	ENTRYJY1.N10
18	Weight of goods unloaded	N	5	ENTRYJY1.N14
19	Number of stops	N	1	N19 + 1
27	Weight carried	N	5	N28 + N14
28	Weight after delivery	N	5	N27 - N18
29	Total tonnes	N	2,2	MAXIMUM (N29 , N18/1 000)
30	Tonne-kilometres	N	4,2	N30 + N12*N27/1000
31	Total distance on journey	N	4	N31 + N12
32	Volumetric loading	N	1	IF ENTRYJY1.N21 = 2 THEN N32 = 2
33	Place loaded - transport by another mode	N	6	IF N33 = blank THEN ENTRYJY1.N18
34	Place unloaded from transport by another mode	N	6	IF N33 = blank THEN ENTRYJY1.N19
35	Other mode of transport	N	1	IF N33 = blank THEN ENTRYJY1.N20
36	Transit country A	N	3	IF N33 = blank THEN ENTRYJY1.N22
37	Transit country B	N	3	IF N33 = blank THEN ENTRYJY1.N23
38	Transit country C	N	3	IF N33 = blank THEN ENTRYJY1.N24
39	Transit country D	N	3	IF N33 = blank THEN ENTRYJY1.N25
40	Transit country E	N	3	IF N33 = blank THEN ENTRYJY1.N26
41	End of journey?		0	IF N28 = 0 THEN N05 = 2 AND NEXT RECORD IF N28 > 0 THEN SUB-ROUTINE C FOR NEXT RECORD IF N28 < 0 THEN ERROR REPORT AND NEXT RECORD
42	Survey grossing factor	N	4,2	Program input

[1] Created from ENTRYREC, ENTRYJY1, RECVEH

[2] For kind of journey: if first digit of N09=0 and first digit of N10 = 0 then N11 = 0 (domestic journey)
if first digit of N09=0 and first digit of N10 = 1 then N11 = 1 (international journey)
if first digit of N09=1 and first digit of N10 = 0 then N11 = 1 (international journey)
if first digit of N09=1 and first digit of N10 = 1 and N09 # N10 then N11= 2 (cross-trade)
if first digit of N09=1 and first digit of N10 = 1 and N09 = N10 then N11= 3 (cabotage)

7.2 The calculation of weighting factors for the survey

7.2.1 General principles

The technique to estimate population totals on the basis of the achieved sample is by **weighting** (sometimes referred to as grossing-up), that implicitly assumes that non-respondents have the same characteristics as respondents. To minimise the possible bias discussed in the previous chapter, the weighting is done separately for sub-samples (strata) of the main sample that are expected to be relatively homogeneous and where there is a reasonable chance that non-respondents have similar experience to respondents.

The **denominator** of the weighting factor for a stratum of a survey should be the number of active vehicles (that is, the number of A1 records sent to Eurostat) plus the number of non-working vehicles in the survey period that could be considered part of the active stock of vehicles. **Note that A1 records should NOT be sent to Eurostat for vehicles claimed to be not working in a survey period but that could be considered as part of the active stock of vehicles**. A new error check has been introduced to identify the submission of any such records.

The numerator of the weighting factor for a stratum of a survey should be the total park of vehicles in that strata **multiplied by the number of relevant survey periods**. If the survey period (the length of time for which information is required about the transport activity of any selected vehicle) is a week and the survey covered a quarter of a year, the number of relevant survey periods would normally be 13 (or very occasionally 14).

As an example, Table 7.7 on the next page shows the weighting factors for a country's domestic road freight survey. An achieved sample of 16 852 vehicles was drawn from the population of 437 657 vehicles. The sample was drawn independently from a matrix of 8 types of goods vehicles by 12 areas of the country. Sampling fractions and response were different in each cell of the matrix (though overall response exceeded 95 per cent).

It is reasonable to suppose that a non-respondent small rigid vehicle in the North region will be adequately represented by the 166 other similar vehicles in the survey–certainly better than by articulated vehicles in the South-East region. These 166 vehicles represent in fact 7 638 small rigid vehicles in the North, the whole population of these vehicles in that region. In the analysis, therefore, each sample vehicle in this group is taken to represent 46.01 vehicles in the population (7 638/166) or 2 393 vehicle weeks (52 * 46.01) when making annual estimates. (In practice, the analysis is a little more complicated than this, as it is done on a quarterly basis and uses an estimate of the average vehicle population in the period.)

In some cases, other control totals may be available and these should normally be used in calculating the weighting factors.

TABLE 7.7

Grossing up to a survey of domestic road haulage

Population	North	North Midlands	North West	West Midlands	East Midlands	East	South	West	South East	Metropolitan	South West	North East	Total
Rigid vehicles													
Up to 7.5 t	7,638	15,183	20,484	21,047	12,945	10,322	5,236	12,467	10,684	25,643	8,189	3,610	153,490
Between 7.5 and 14 t	1,752	3,236	4,541	5,720	3,659	2,185	1,212	3,189	2,985	5,504	1,775	695	36,453
Between 14 and 17 t	4,357	7,691	10,457	11,761	7,911	5,487	2,543	7,198	5,344	11,766	4,734	2,140	81,651
Between 17 and 25 t	1,405	2,077	2,601	3,490	2,082	1,645	927	2,526	1,370	2,711	1,557	1,072	23,463
Over 25 t	1,426	2,386	3,566	3,596	2,896	2,135	858	2,636	1,674	4,452	1,600	892	28,107
Total rigids	16,579	30,843	41,640	45,614	29,493	21,744	10,816	28,017	22,047	50,078	17,854	8,410	323,164
Articulated vehicles													
Between 3.5 and 30 t	703	1,201	2,014	2,661	1,534	978	455	1,084	872	1,484	562	169	13,717
Between 30 and 33 t	812	1,733	2,768	2,832	2,375	1,620	422	1,296	1,095	3,355	605	363	19,277
Over 33 t	6,023	8,936	10,267	8,930	9,632	9,418	2,491	6,029	4,440	7,841	4,381	3,112	81,499
Total artics	7,538	11,870	15,049	15,049	13,541	12,016	3,368	8,409	6,407	12,680	5,548	3,644	114,493
Grand total	24,117	42,713	56,689	56,689	43,034	21,744	14,184	36,425	28,454	62,758	23,402	12,054	437,657
Achieved sample Rigid vehicles													
Up to 7.5 t	166	163	167	170	162	165	158	172	157	156	237	102	1,975
Between 7.5 and 14 t	110	99	105	108	104	118	94	115	109	103	149	64	1,278
Between 14 and 17 t	193	196	190	184	182	193	184	189	192	187	273	122	2,285
Between 17 and 25 t	86	92	89	90	83	100	93	91	96	91	92	72	1,075
Over 25 t	132	145	148	148	131	152	134	146	148	139	178	108	1,709
Total rigids	687	695	699	700	662	728	663	713	702	676	929	468	8,322

Population	North	North Midlands	North West	West Midlands	East Midlands	East	South	West	South East	Metropolitan	South West	North East	Total
Articulated vehicles													
Between 3.5 and 30 t	111	114	115	132	116	113	74	114	108	117	87	23	1,224
Between 30 and 33 t	142	207	218	228	215	204	72	188	190	218	119	66	2,067
Over 33 t	431	443	451	459	431	474	391	449	433	416	514	347	5,239
Total artics	684	764	784	819	762	791	537	751	731	751	720	436	8,530
Grand total	1,371	1,459	1,483	1,519	1,424	1,519	1200	1,464	1,433	1,427	1,649	904	16,852
Weighting factors Rigid vehicles													
Up to 7.5 t	2,393	4,844	6,378	6,438	4,015	3,253	1,736	3,769	3,539	8,548	1,797	1,841	
Between 7.5 and 14 t	828	1,700	2,249	2,754	1,830	963	671	1,442	1,424	2,779	619	565	
Between 14 and 17 t	1,174	2,112	2,862	3,234	2,260	1,478	719	1,981	1,445	3,272	902	912	
Between 17 and 25 t	850	1,174	1,520	2,017	1,304	856	518	1,443	742	1,549	880	774	
Over 25 t	562	856	1,249	1,263	1,150	730	333	939	588	1,666	467	429	
Articulated vehicles													
Between 3.5 and 30 t	329	548	910	1,048	688	450	320	494	420	660	336	383	
Between 30 and 33 t	297	435	660	646	574	574	305	358	300	800	265	286	
Over 33 t	727	1,049	1,049	1,012	1,162	1,162	331	698	533	980	443	466	

7.2.2 Methodology where the vehicle register is reliable and updated regularly

These weighting factors are calculated each quarter for each group (strata) of vehicles in the stratified sample. It is unnecessarily complicated to attempt to calculate these weighting factors for each time period (week) of a survey or even to produce monthly weighting factors. A weighting factor based upon the data for the quarter for each stratum will provide sufficient accuracy.

Let **N** = total number of vehicles in a group (strata) on the vehicle register at the mid-point of the relevant quarter of the year.

Note: this number is not the number used when the sample was drawn. That number would be for a previous quarter of the year.

Let **S** = number of usable questionnaires (including those not working during the reference week) in that group returned for the 13 weeks of the relevant quarter of the year. Then the grossing factor to be applied to the vehicle and journey records for the sampled vehicles in the relevant group in the stratified sample for that quarter is:

$$13\frac{N}{S}$$

The reason for 13***N** is that the sample is of vehicle weeks. **S** vehicle weeks data has been obtained from the survey and the number of vehicle weeks for all vehicles in the country of that group is the total number of vehicles on the register (**=N**) times the number of weeks (=13) in the quarter.

7.2.3 Methodology where the vehicle register is observed to be out-of-date and inaccurate

In the chapter on non-response, it was pointed out that when these surveys are undertaken for the first time it is not unusual to discover that the vehicle register is not as accurate as those responsible for its upkeep have claimed. The register may contain many vehicles that have been scrapped or sold. It may also include vehicles that are outside the scope of the survey (for example, goods vehicles under 1 tonne, specialist vehicles not adapted for carrying goods such as cranes).

In these cases, an allowance has to be made for the inaccuracies of the vehicle register. Calculating the weighting factors in the way set out in section 7.2.2 would lead to over-estimates of tonnes and tonne-kilometres. This is because the assumption would be made that the scrapped and out of scope vehicles would have worked (on average) like the vehicles in the survey–and that is clearly wrong.

There are two ways of making the allowance for the inaccuracies of the vehicle register. Both ways produce the same weighting factor. The first way is to include in **S** (the number of useable questionnaires) the responses where there is positive information about the status of the vehicle. That is, to include the number of scrapped and out of scope vehicles on the grounds that the proportion of those vehicles found on the survey is representative of their proportion on the vehicle register. Where the vehicle has been sold or leased, business closed or questionnaire cannot be delivered, it is not possible to use this information because there is no positive information about whether the vehicle still exists, is being used or not.

Let **S'** = the number of scrapped and out of scope vehicles in the relevant group returned for the 13 weeks of the relevant quarter of the year.

Then the weighting factor to be applied to the vehicle and journey records for the sampled vehicles in the relevant group in the stratified sample for that quarter is:

$$13\frac{N}{S+S'}$$

The second way is to modify **N** (the number of vehicles on the register). This is done by reducing **N** by the proportion that the scrapped and out of scope vehicles form of the total of useable questionnaires plus the scrapped and out of scope vehicles reported on the survey.

Let this modified N be **N'**

Then the grossing factor to be applied to the vehicle and journey records for the sampled vehicles in the relevant group in the stratified sample for that quarter is:

$$13\frac{N'}{S}$$

where:

$$N' = N\frac{S}{S+S'}\frac{N'}{S}$$

$$= 13\frac{N}{S}\frac{S}{S+S'} = 13\frac{N}{S+S'}$$

7.3 Calculation of sample standard errors of the survey

To estimate the standard errors for the survey the following calculations should be carried out. The calculations should be carried out on the raw survey data, that is, before the data is multiplied by the weighting factors to provide estimates of national figures. The calculations can be carried out for any period but are usually done annually. However, if this is the first such survey it may be helpful to do them for the first quarter or half of the year in order to use the results to improve the sample design for the following year.

The calculations should use the number of active (working) vehicles as the effective sample size for precision calculations. Where the number of non-working vehicles forms a very small proportion of the total, the addition of non-working vehicles (that is, vehicles claiming not to have worked during the survey period) would give very similar results and the underlying theory assumptions can be justified. For cases where international work is surveyed separately, in general, data is only available of the number of working vehicles.

However, where the proportion of non-working vehicles is large the underlying assumption of a 'normal' or Gaussian (bell-shaped) distribution of vehicles for a variable is open to challenge. In these cases where there is a large number of vehicles recording (for example) zero tonne-kilometres, including them with the distribution of the tonne-kilometres of active vehicles would produce a bell-shaped distribution with an additional large peak at the zero point – a distribution shape far from the 'normal' shape assumed for the theory to apply. Since most surveys of goods road transport record a significant number of surveyed vehicles as non-working, only the active vehicle data should be used in the precision calculations because of the constraints of the underlying assumption of the requirements for a 'normal' distribution. The assumed total population for the precision calculation is taken as the total population likely to have been working in the reference sample time period.

Section 7.3.1 illustrates the procedure for the calculation of the standard errors for the total tonnes and tonne-kilometres for an annual survey. The same methodology can be used to calculate the standard error for any of the variables collected on the survey.

The method in section 7.3.1 calculates the standard errors for each strata group and then derives the standard error for the total of all vehicles from the data obtained from the different strata. Calculating the standard errors for the different strata group allows analysing in details important deviations and to identify problematic strata. Such analysis allows then to improve the stratification method for the future surveys in order to increase the precision of the survey. When the survey precision is already good, it might be sufficient to calculate the standard error directly for the total of all vehicles (considering that there is only one strata equal to the total population). This approach has been chosen by Eurostat in its annual exercise of calculating standard error for all Member States. It has to be noted that a calculation per strata is still done when the statistical unit is the enterprise and not the tractive vehicle.

More information on the theory of stratified sampling and the calculation of these standard errors is given in chapter 3, 'Preparations for the survey–sample design'.

7.3.1 Calculations from sample survey for error estimation of total tonnes and tonne-kilometres

For **EACH VEHICLE** in the sample that has recorded activity (that is, excluding non-response, scrapped and not-applicable vehicles and vehicles not working during survey week). Calculate

- Total tonnes carried by the vehicle over the survey week (= **T**).
- Square this figure (= **T^2**).
- Total tonne-kilometres performed by the vehicle over the survey week (= **K**).
- Square this figure (= **K^2**).

The sample will be stratified into a number of groups (normally by vehicle type, region, etc.).

For **EACH STRATA GROUP / TOTAL SAMPLE** calculate:

- The number of vehicles in the group for which calculations above have been made (=**n**).
- The sum of **T** for the vehicles in the group.
- The sum of **T^2** for the vehicles in the group.
- The sum of **K** for the vehicles in the group.
- The sum of **K^2** for the vehicles in the group.

As a simplified example of these calculations, suppose these were 1 000 vehicles in a stratum from which a sample of 10 was taken of which 2 recorded no activity and 1 was scrapped. The total tonnes and tonne-kilometres for each of the other vehicles was:

	Tonnes (T)	Tonne-kilometres (K)	Square of T (=T^2)	Square of K (=K^2)
Vehicle 1	50	300	2 500	90 000
Vehicle 2	40	200	1 600	40 000
Vehicle 3	10	100	100	10 000
Vehicle 4	20	200	400	40 000
Vehicle 5	30	400	900	160 000
Vehicle 6	10	200	100	40 000
Vehicle 7	30	400	900	160 000
Sum of all vehicles	**190**	**1 800**	**6 500**	**540 000**

For each stratified group obtain the information of the number of vehicles in that group on the vehicle register at the mid-point of the survey period (assumed 1 000 for the example).

Modify this figure as indicated in section 7.2.3 if the vehicle register is somewhat out-of-date

$$1\,000\frac{10-1}{10}=900$$

Multiply this figure by the number of weeks in the survey period (900 * 52 = 46 800)–the reason for this multiplication is that the survey sample is actually of work done in vehicle weeks.

Multiply this figure by the proportion that the active vehicles represent of the total of active and inactive vehicles in the achieved sample (= **N**). In the above example:

$$N=1\,000\frac{10-1}{10}52\frac{7}{7+2}=46\,800\frac{7}{7+2}=36\,400$$

Enter these figures where indicated on spreadsheets, examples of which follow this text (Table 7.8 for tonnes, Table 7.9 for tonne-kilometres). The calculations to be performed for columns E, F, H and I of the spreadsheets are indicated underneath the relevant table. The figures in the example above have been entered in the first row of table 7.8 as an illustration. As a

further assistance tables 7.8A and 7.9A have been included giving typical figures that might be obtained from a survey of the carriage of goods by road in an EU Member State and showing the calculations that would be performed to obtain the percentage standard error. For some Member States the sample size over a year may be well in excess (by a factor of 10) of the sample size shown in this example.

When calculating the standard error for annual data, the annual sample size is the sum of the sample sizes for the four quarters, whereas the number of vehicles on the register for the whole year is the average of the number of vehicles for each quarter.

The figure of the percentage standard error (95% confidence) for the total of the variable estimated from the survey is that shown in bold type in the bottom right-hand corner of the table. As has already been stated in section 3.4.1, the percentage standard error of a total is the same as that of the mean of a variable.

7.4 Use of estimated sample errors to improve the precision of future surveys

This section indicates how the standard errors from a current survey may be used to improve the sample design for a future survey.

Table 7.10 is an example of a spreadsheet that can be used to optimise the sample survey design for a future year. The same data is entered as in Tables 7.8 and 7.9 but in addition there is a further column (G) where the desired sample size for the future year can be entered in the final row of the table. By carrying out the calculations listed below table 7.10, the spreadsheet will indicate the required sample size for each stratified group and the expected sample error for each group and overall. It should be noted that these calculations will indicate the required effective sample size of active vehicles. This number will have to be increased for the expected number of inactive and inapplicable vehicles as well as for the expected non-response.

It is unlikely that the optimum stratified sample will be the same for both the tonnes and tonne-kilometres variables. As indicated in chapter 3, 'Preparations for the survey–sample design', the sample numbers in column G of the spreadsheet can be adjusted until a satisfactory set of sample errors is obtained for both of the important variables.

TABLE 7.8

Spreadsheet for calculation of standard errors of survey

Mean and Standard deviation by weight group: tonnes

Vehicle type (capacity)	Survey data - (not grossed)					Vehicle weeks in country	Sums of squares	% Standard error around mean (95% confidence)
	Sample size	Sums of tonnes	Squares summed	Mean tonnes	Standard deviation			
Symbols	n_i	Σt_i	Σt_i^2	$\bar{t}_i$	s_i	N_i	ss_i	$\%\ se_i$
Rigid vehicles								
Capacity group 1	7	190	6.500	27,14	14,96	36.400	42.362.666.667	40,83
Capacity group 2								
Capacity group 3								
Etc.								
Articulated vehicles								
Capacity group 1								
Capacity group 2								
All vehicle types								
	B	C	D	E	F	G	H	I

For each 'capacity group' row

Enter in Column B = Number of active vehicles in sample.
Column C = The sum of the number of tonnes carried by sample vehicles in that group.
Column D = The sum of the squares of the number of tonnes carried by each sample vehicle in the group.
Column G = The number of relevant vehicles in the group in the country multiplied by the number of weeks covered by the survey.

Calculate Column E = Column C / column B.
Column F = Square root of {column D / (column B–1)–column E * column E * column B / (column B–1)}
Column H = Column F * column F * column G * column G / column B
Column I = 1.96 * column F * 100 / (column E * square root of column B) – (figures are percentages).

For 'All types' row

Add data in columns B, C, D, G, H.
Column E = sum of (column E * column G for each capacity group) divided by column G of 'All types' row.
Column I = 1.96 * square root of column H * 100 / (column E * column G) – (figure is a percentage).

TABLE 7.8A

Spreadsheet for calculation of standard errors of tonnes with example data

Mean and Standard deviation by weight group: tonnes

Vehicle type (capacity)	Survey data - (not grossed)					Vehicle weeks in country	Sums of squares	% Standard error around mean (95% confidence)
	Sample size	Sums of tonnes	Squares summed	Mean tonnes	Standard deviation			
Symbols	n_i	Σt_i	Σt_i^2	$\bar{t}_i$	s_i	N_i	ss_i	$\% se_i$
Lorry 1.5< 5.0	115	8.603	1.637.301	74,81	93,36	990.600	7,44E+13	22,81
Lorry 5.0< 7.0	73	11.601	7.208.293	158,92	272,96	647.140	4,27E+14	39,4
Lorry 7.0< 10.0	155	25.629	9.421.877	165,35	183,48	692.328	1,04E+14	17,47
Lorry 10.0< 12.0	424	145.179	160.608.651	342,4	512,03	813.176	4,09E+14	14,23
Lorry 12.0< 15.0	371	201.224	275.400.342	542,38	670,34	396.708	1,91E+14	12,58
Lorry 15.0< 20.0	432	520.564	1.698.191.206	1205,01	1.576,29	497.484	1,42E+15	12,34
Lorry 20+	271	288.309	937.938.973	1063,87	1.529,00	310.388	8,31E+14	17,11
Road tractor	2.324	3.733.262	15.828.079.564	1606,4	2.057,19	2.047.552	7,63E+15	5,21
All vehicle types	4.165	4.934.371	18.918.486.207	782,42		6.395.376	1,11E+16	4,13
	B	C	D	E	F	G	H	I

TABLE 7.9

Spreadsheet for calculation of standard errors of survey

Mean and Standard deviation by weight group: tonne-kilometres

Vehicle type (capacity)	Survey data - (not grossed)					Vehicle weeks in country	Sums of squares	% Standard error around mean (95% confidence)
	Sample size	Sums of Tkms	Squares summed	Mean Tkms	Standard deviation			
Symbols	n_i	Σk_i	Σk_i^2	$\bar{k_i}$	s_i	N_i	ss_i	$\% se_i$
Rigid vehicles								
Capacity group 1								
Capacity group 2								
Capacity group 3								
Etc.								
Articulated vehicles								
Capacity group 1								
Capacity group 2								
All vehicle types								
	B	C	D	E	F	G	H	I

For each 'capacity group' row

Enter in Column B = Number of active vehicles in sample.
Column C = The sum of the number of tonne-kilometres carried by sample vehicles in that group.
Column D = The sum of the squares of the number of tonne-kilometres carried by each sample vehicle in the group.
Column G = The number of relevant vehicles in the group in the country multiplied by the number of weeks covered by the survey.

Calculate Column E = Column C / column B.
Column F = Square root of {column D / (column B–1)–column E * column E * column B / (column B–1)}
Column H = Column F * column F * column G * column G / column B
Column I = 1.96 * column F * 100 / (column E * square root of column B) – (figures are percentages).

For 'All types' row

Add data in columns B, C, D, G, H.
Column E = sum of (column E * column G for each capacity group) divided by column G of 'All types' row.
Column I = 1.96 * square root of column H * 100 / (column E * column G) – (figure is a percentage).

TABLE 7.9A

Spreadsheet for calculation of standard errors of tonne-kilometres with example data

Mean and Standard deviation by weight group: tonne-kilometres

Vehicle type (capacity)	Survey data - (not grossed)					Vehicle weeks in country	Sums of Squares	% Standard error around mean (95% confidence)
	Sample Size	Sums of Tkms	Squares summed	Mean Tkms	Standard deviation			
Symbols	n_i	Σk_i	Σk_i^2	$\bar{k}_i$	s_i	N_i	ss_i	% se_i
Lorry 1.5< 5.0	115	46.993	54.436.761	408,63	555,94	990.600	2,64E+15	24,87
Lorry 5.0< 7.0	73	59.937	2,19E+08	821,05	1.534,61	647.140	1,35E+16	42,88
Lorry 7.0< 10.0	155	221.392	9,32E+08	1.428,34	2.000,26	692.328	1,24E+16	22,05
Lorry 10.0< 12.0	424	1.287.928	1,25E+10	3.037,57	4.502,78	813.176	3,16E+16	14,11
Lorry 12.0< 15.0	371	1.583.729	2,02E+10	4.268,81	6.019,20	396.708	1,54E+16	14,35
Lorry 15.0< 20.0	432	2.371.783	2,87E+10	5.490,24	6.034,29	497.484	2,09E+16	10,36
Lorry 20+	271	1.678.355	2,15E+10	6.193,19	6.407,30	310.388	1,46E+16	12,32
Road tractor	2.324	57.213.623	2,24E+12	24.618,60	18.966,34	2.047.552	6,49E+17	3,13
All vehicle types	4.165	64.463.740	2,33E+12	9.561,60		6.395.376	7,60E+17	2,79
	B	C	D	E	F	G	H	I

TABLE 7.10

Spreadsheet for calculation of standard errors of next year's survey

Weight Group: tonnes (repeat for tonne-kilometres)

Vehicle type (capacity)	This year's survey data - (not grossed)			Required sample			Vehicle weeks in country	Column F * column H	Sums of Squares	% Standard error around mean (95% confidence)
	Sample Size	Sums of Tonnes	Squares summed	Mean Tonnes	Standard deviation	Size for next year				
Symbols	n_i	Σt_i	Σt_i^2	$\bar{t}_i$	s_i	m_i	s_i	$N_i s_i$	ss_i	$\% se_i$
Rigid vehicles										
Capacity group 1										
Capacity group 2										
Capacity group 3										
Etc										
Articulated vehicles										
Capacity group 1										
Capacity group 2										
All vehicle types								M		
	B	C	D	E	F	G	H	I	J	K

For each 'capacity group; row

Enter in Column B = Number of active vehicles in sample.
Column C = The sum of the number of tonnes carried by sample vehicles in that group.
Column D = The sum of the squares of the number of tonnes carried by each sample vehicle in the group.
Column H = The number of relevant vehicles in the group in the country at end of year multiplied by the number of weeks covered by the survey.

Calculate Column E = Column C / column B.
Column F = Square root of {column D / (column B–1)–column E * column E * column B / (column B–1)}
Column G = 'M'(= 'All types' row column G) * column I / 'All types' row column I
Column J = Column F * column F * column H * column H / column G
Column K = 1.96 * column F * 100 / (column E * square root of column G) – (figures are percentages).

For 'All types' row

Column G chosen and entered at start.
Add data in columns B, C, D, H, I, J.
Column E = Sum of (column E * column H for each capacity group) divided by column H of 'All types' row.
Column K = 1.96 * square root of column J * 100 / (column E * column H) – (figure is a percentage).

7.5 The calculation of unbiased estimators

If there is a complete or nearly complete response rate to a survey from an accurate sample register, unbiased or nearly unbiased estimators can be calculated from the formulae given in chapter 3. In some surveys, guaranteeing anonymity to respondents has led to virtually a 100 per cent response rate. Almost certainly this would not work with road haulage operators.

If a sub-sample of non-respondents could be carried out and a 100 per cent response rate obtained from the sub-sample, then it is possible to calculate unbiased estimators. However, given the nature of the non-response in goods road transport surveys, this technique seems impossible even if the high cost and time-consuming nature of the exercise could be afforded. Hence, it must be accepted that some non-response will arise. The task is to ensure that the best possible estimates are produced from the data actually collected. When non-response is not small, it is extremely important to keep bias within reasonable limits. Section 3.1.5 of chapter 3 indicates important steps that should be taken to reduce bias.

It is possible to construct estimators with the aid of response models. Each model is based on a set of assumptions about the actual but unknown response distribution. The application of these models is time-consuming and is frequently looked upon as a research exercise rather than an application tool of the survey statistician concerned with the day-to-day running of a road goods transport survey.

An example of one possible, fairly simple, response model will illustrate the nature of the calculations that have to be carried out. If the survey has been stratified by load capacity, each stratum will consist of responses from businesses in two categories; those businesses that are classified as being in the transport sector and those that are not. The hypothesis for this model is that the response rate differs between these two groups. In the model, estimates (total tonnes and tonne-kilometres) are calculated separately for each of the two groups in each stratum. These figures are compared with the estimate obtained when no account is taken of any possible difference in response rate between these two groups.

Another possible approach is to make use of the information on time taken to respond. In most road goods surveys, contacts will be sent reminders if a response has not been received by a given date. The survey procedure may allow up to three reminders. The assumption made for this model is that the work done by the vehicles that is reported by the due date differs from that reported by those that respond after the first reminder, and similarly for second and third reminders. Hence, an estimate of the average tonnage carried by vehicles reported up to the time of sending out the second reminder is a better estimate than that based on the corresponding figure based on reports received by the due date. Similarly, a better estimate is obtained using results based on second reminders and even better on all results received by the survey close down date. The assumption is that a relationship exists between work done by vehicles and the time taken to respond to the survey.

It should be noted that the assumption made for the model proposed in the previous paragraph may not actually be correct. However, a similar situation is illustrated in table 6.2 in section 6.3.2 of chapter 6 of this Manual for the survey where the average distance travelled per week per person increased markedly according to the number of attempts made before a person could be contacted.

The model postulates that if these four estimates are plotted on a graph against the number of reporting vehicles on which these estimates are based and a line of best fit calculated for these points, then a best estimate is obtained where the line meets the place equating to the total number of units (responders plus non-responders) in the survey. Of course, where the survey is stratified these calculations have to be carried out separately for each stratum.

To carry out these calculations requires considerable extra resources than will be used on the survey normally and the accurate recording of dates of receipt of information from respondents. For this reason, the use of response models for estimation may be undertaken infrequently and only as research exercises.

It should not be assumed that the above models, or any other response model on which adjustments to estimates are based, provides a complete and accurate answer to deal with the problem of non-response. All that these models attempt to do is to improve on the assumption that the non-response is randomly distributed amongst the sample. A reference to further reading on these response models is provided in the Bibliography.

8

Publication and dissemination at national level

8.1 Production methods

The successful outcome of a survey is measured not only by a high response rate to the survey and the rapid production of the information collected, but also by the use that is made of the data produced. A good publication and dissemination policy is required.

In most countries it is no longer the practice to design and produce a large set of tabulations when the survey is first analysed and try to answer all queries for data from these tabulations. When the analysis and production of data from surveys was dependent upon computer programmers to write purpose-built programs for these actions, statisticians had to accept these limitations. Today there are many on-line data retrieval systems that can be used to provide a much wider range of information from surveys than was possible in the past.

However, many enquiries for data start with a letter, telephone call or fax that cannot be answered from standard tabulations. Many of these requests for information can be provided from a survey fairly rapidly if an adequate on-line data retrieval system has been set up.

8.2 Publication and dissemination strategies

Even for the traditional paper publication, the preparation methods have changed markedly. Desktop publication packages (DTP) have enabled users to produce camera-ready copy of a quality (provided a good standard of printer is used) to rival a traditional typeset publication. Even spreadsheet packages now have facilities enabling a wide range of fonts, font sizes, footnotes, etc. to be used. A table of survey data can be produced with a survey analysis package; the table can be transferred electronically to a spreadsheet or DTP package where the necessary changes can be made to table headings, stubs, adding footnotes, etc., and then it can be printed as camera-ready copy. This saves valuable time as it means that transcription and proof reading are not required and avoids errors that may have arisen in the past when these actions were necessary for a traditional typeset publication.

In addition to the traditional publication of tabular data on paper, dissemination should also be done through electronic media–Internet, CD-ROMs.

8.3 Disclosure control of tabulated data

It is important that the data in published tables are based upon a sufficient number of survey reports to provide a reliable estimate. It is also important that the information provided in published tables does not inadvertently disclose information about an individual company. Therefore, it is necessary to institute a system of control over the data published in tables.

The National Statistical Institutes of many countries practice some form of disclosure control. In most cases this control is based upon not publishing the figure for any cell of a table that is based on less than a number of records. The number of records chosen normally is either 5 or 10. Eurostat has adopted the practice of some Member States of not publishing cells of tables based on less than 10 observations.

On first inspection such a procedure appears fairly straightforward. However, a closer look indicates there are a number of serious problems in applying a system of disclosure control. If only one cell in a table is concealed, the missing value can be easily deduced by subtracting the total of the figure in the other cells in that row (or in that column) from the total. If the value for one cell has to be concealed then, to avoid disclosure, the value of another cell in the same row (and also of another cell in the same column) has to be omitted. But even that is not sufficient. To ensure non-disclosure, every row (and column) where the value for one cell has to be concealed, must have at least two cells where values are concealed.

The problem with concealing values for cells that could be shown, but for the need to prevent inadvertent disclosure, is that some of the concealed information may be essential to the understanding of the message being presented in the table.

Sometimes the value of a cell is concealed by adding the figure to an adjacent cell. The information for the combined cells is published across the two cell boundaries. This practice has the same problems discussed in the previous paragraph. If only one cell in a row (or column) has to be concealed in a table, other cells have to be given similar treatment to prevent disclosure. There is the added problem that it does not always make sense to combine adjacent rows or columns.

8.4 Profile of a standard publication

8.4.1 Introduction

In designing and structuring the contents of a publication, one should always bear in mind the likely use to be made of the material by those to whom the publication is aimed. Experts in the subject will normally be satisfied with detailed tables and relevant explanatory notes, but the general reader welcomes textual description and graphic material.

A description of the survey methodology should be included, to inform the user about the scope of the survey, the sampling frame, the sample design, the questionnaire used, non-response rates and the estimation methods used. If the publication is reporting the results of an annual survey and methodology has not changed, it would be sufficient for the description of the survey methodology to appear in every third publication. This would to reduce the publication cost to purchasers. A reference should be included in each publication to the latest publication containing the description of the survey methodology.

8.4.2 Specimen tables

A set of tables is attached which could form the basis of a standard publication reporting the results of a survey on the carriage of goods by road at national level. Chapter 15 of Part C of this manual includes the list of tabulated information that Eurostat disseminate from the data submitted under Regulation (EU) No 70/2012. That set of information is far more extensive than is proposed in this chapter and it is not suggested that any publication at national level should include it all. However, the Eurostat list provides ideas for further tables that a country might include in its own publication.

The first four tables (tables 8.1 to 8.4) provide a summary of the results and the following eight tables (tables 8.5 to 8.12) provide more detailed information. All of these tables should be modified in the light of the information collected to avoid producing tables with a large number of empty cells. For example, Table 8.7 should be modified to show only those countries where there is at least one positive entry. In addition to these tables, there should also be a table providing information on the transport of goods by road between the regions of the country.

As suggested above, text and graphics commenting on the results would greatly assist the understanding of the material by the general reader.

TABLE 8.1

Summary of activity according to type of transport and type of journey

Type of journey	Own account		Hire or reward		Total	
	Tonnes	Tkm	Tonnes	Tkm	Tonnes	Tkm
Loaded journeys						
National journey						
International journey						
Cross-trade						
Cabotage						
All loaded journeys						
Unladen journeys	Vehicle-kilometres		Vehicle-kilometres		Vehicle-kilometres	
National journey						
International journey						
All empty journeys						

TABLE 8.2

Summary of activity according to vehicle capacity and type of transport

Type of transport and vehicle capacity	Own account		Hire or reward		Total	
	Tonnes	Tkm	Tonnes	Tkm	Tonnes	Tkm
National journeys						
Vehicle capacity ([1])						
Lorries under 5 tonnes						
Lorries of 5 to 9.9 tonnes						
Lorries of 10 tonnes and over						
Road tractors						
Other journeys						
Vehicle capacity ([1])						
Lorries under 5 tonnes						
Lorries of 5 to 9.9 tonnes						
Lorries of 10 tonnes and over						
Road tractors						
All journeys						
Vehicle capacity ([1])						
Lorries under 5 tonnes						
Lorries of 5 to 9.9 tonnes						
Lorries of 10 tonnes and over						
Road tractors						

([1]) Countries should choose the groups of vehicle capacity which are the easiest to compute.

TABLE 8.3

Summary of vehicle-kilometres travelled according to type of transport and type of journey

Thousand vehicle-kilometres

Type of transport and type of journey	Loaded	Empty	Total
Own account			
National journey			
International journey			
Cross-trade			
Cabotage			
All own account journeys			
Hire or reward			
National journey			
International journey			
Cross-trade			
Cabotage			
All hire or reward journeys			
Total			
National journey			
International journey			
Cross-trade			
Cabotage			
All journeys			

TABLE 8.4

Vehicle-kilometres travelled by type of journey, type of vehicle and type of transport

Thousand vehicle-kilometres

Type of journey and type of vehicle	Own account		Hire or reward		Total
	Loaded	Empty	Loaded	Empty	
National journey					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Road tractor alone					
Total					
Other journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Road tractor alone					
Total					
All journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Road tractor alone					
Total					

TABLE 8.5

National transport according to type of transport and nature of goods

Nature of goods (NST division)	Own account		Hire or reward		Total	
	Tonnes	TKM	Tonnes	Tkm	Tonnes	TKM
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
Total goods						

TABLE 8.6

National transport: by type of transport, length of journey and nature of goods transported

Type of transport and length of journey	20 NST divisions of goods (tonnes)							TKM
	1	2	...	...	19	20	Total	
a. Own account								
0 to 49 km								
50 to 149 km								
150 to 499 km								
500 km and over								
Total								
b. For hire or reward								
0 to 49 km								
50 to 149 km								
150 to 499 km								
500 km and over								
Total								
c. Total								
0 to 49 km								
50 to 149 km								
150 to 499 km								
500 km and over								
Total								

TABLE 8.7

National transport according to type of vehicle and type of transport

Type of vehicle	Own account		Hire or reward		Total	
	Tonnes	TKM	Tonnes	TKM	Tonnes	TKM
Lorries						
Open box–flat/drop sided						
Tipper						
Tanker						
Temperature controlled box						
Other closed box						
Livestock carrier						
Other						
Total						
Road tractor and semi-trailer ([1])						
Open box–flat/drop sided						
Tipper						
Tanker						
Temperature controlled box						
Other closed box						
Livestock carrier						
Other						
Total						
All vehicles						
Open box–flat/drop sided						
Tipper						
Tanker						
Temperature controlled box						
Other closed box						
Livestock carrier						
Other						
Total						

([1]) Body type of semi-trailer.

TABLE 8.8

National transport of dangerous goods

Dangerous goods	Own account		Hire or reward		Total	
	Tonnes	TKM	Tonnes	TKM	Tonnes	TKM
Explosives						
Gases						
Flammable liquids						
Flammable solids						
Substances liable to spontaneous combustion						
Substances which in contact with water emit flammable gases						
Oxidising substances						
Organic peroxides						
Toxic substances						
Substances liable to cause infections						
Radioactive material						
Corrosive materials						
Other dangerous goods						
Total dangerous goods						

TABLE 8.9

National transport by type of cargo and type of transport

Type of cargo	Own account		Hire or reward		Total	
	Tonnes	TKM	Tonnes	TKM	Tonnes	TKM
Liquid bulk goods						
Solid bulk goods						
Large freight containers						
Other freight containers						
Palletised goods						
Pre-slung goods						
Mobile, self-propelled units, live animals						
Other mobile units						
Other cargo types						
Total all goods						

TABLE 8.10

International transport according to nature of goods and country of origin or destination

Carriage on own account

	20 NST divisions of goods (tonnes)						TKM
	1	2	...	19	20	Total	
1. Tonnage of goods received from:							
A. Total EU Member States							
of which: Austria							
Belgium							
…							
B. Total Other countries							
of which: Albania							
Belarus							
…							
Other European countries							
North African countries							
Near & Middle East							
Other countries							
2. Tonnage of goods dispatched to:							
A. Total EU Member States							
of which: Austria							
Belgium							
…							
B. Total Other countries							
of which: Albania							
Belarus							
…							
Other European countries							
North African countries							
Near & Middle East							
Other countries							

TABLE 8.10

International transport according to nature of goods and country of origin or destination (continuation)

Carriage for hire or reward

	20 NST divisions of goods (tonnes)						TKM
	1	2	...	19	20	Total	
1. Tonnage of goods received from:							
A. Total EU Member States							
of which: Austria							
Belgium							
…							
B. Total Other countries							
of which: Albania							
Belarus							
…							
Other European countries							
North African countries							
Near & Middle East							
Other countries							
2. Tonnage of goods dispatched to:							
A. Total EU Member States							
of which: Austria							
Belgium							
…							
B. Total Other countries							
of which: Albania							
Belarus							
…							
Other European countries							
North African countries							
Near & Middle East							
Other countries							

TABLE 8.11

Tonnes carried by type of transport, type of vehicle and axle configuration

Type of transport	Number of axles				Total tonnes
	2	3	4	Other	
Own account					
National journey					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Other journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
All own account journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Hire or reward					
National journey					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Other journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
All hire or reward journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Total					
National journey					
Lorry					

Type of transport	Number of axles				Total tonnes
	2	3	4	Other	
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Other journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
All journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					

TABLE 8.12

Tonne-kilometres performed by type of transport, type of vehicle and axle configuration

Type of transport	Number of axles				Total TKM
	2	3	4	Other	
Own account					
National journey					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Other journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
All own account journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Hire or reward					
National journey					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Other journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
All hire or reward journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Total					
National journey					

Type of transport	Number of axles				Total TKM
	2	3	4	Other	
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
Other journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					
All journeys					
Lorry					
Lorry with trailer					
Road tractor & semi-trailer					
Total					

B

Recommendations for the variables – Definitions and explanatory notes

Contents

9

General concepts on definitions and regulation on precision standards

9.1 Classifications and definitions in road transport statistics

Statistics is a method to get an insight, by means of figures, of massive phenomena of social, economic or natural scientific nature. In other words and more simply said, statistics tries to describe various aspects of society in figures. In statistics, definitions and classifications are indispensable. Without well-defined and grouped variables it is impossible to get a comprehensible and comparable description of a certain phenomenon. This chapter provides a statistical description of Road Transport and to the way it is described in the European Union.

Statistics of Road freight transport in the European Union were basically settled in Directive 87/546/EEC of June 1987. In July 1989, this Directive was amended by Directive 89/462/EEC. A complete revision was undertaken in the 1990s leading to the issue of Council Regulation (EC) No 1172/98 of 25 May 1998. This Regulation provides for the compilation of statistical returns on national and international road freight transport by Member States.

In the view of Eurostat and of the Member States as reported at the meetings of the Working Group on Road Transport Statistics, the main objective of Council Regulation (EC) No 1172/98 was the collection of accurate data of the tonnage of goods carried by road freight transport and their place of loading and unloading, the tonne-kilometres performed, the kilometres travelled loaded by vehicles and the kilometres travelled unloaded by vehicles (at present this last variable is optional).

Regulation (EU) No 70/2012 replaced Council Regulation (EC) No 1172/98 to recast in one single legal act the amendments that have modified Council Regulation (EC) No 1172/98 between 1999 and 2009 and to ensure that its provisions are clear and readily understandable to users. The new Regulation (EU) No 70/2012 does not introduce changes in the methodology and data to be provided.

An important element of the current Regulation is that the information to be reported in the A3 (goods) records should be of consignments according to loading and unloading of goods. If the A3 records report information according to stops of the vehicle (stages of a journey), for multi-stop journeys there could be an over-reporting or under-reporting of the tonnage of goods carried and the tonnages unloaded at stopping places.

Without going too much in to detail, the most important characteristics of the data collection are:

- The coverage of Road Transport statistics as set out in the Regulation.
- Vehicle-related data.
- Journey-related data.
- Goods-related data.
- Recommendations on precision standards.

9.2 The coverage of road transport statistics

The Regulation on road transport applies to the national and international carriage of goods by road by means of goods road transport vehicles registered in a Member State. Excluded are:

- Commercial vehicles whose weight or dimensions exceed the normal permitted limits.
- Agricultural vehicles, military vehicles and vehicles belonging to public administrations and public services with the exception of road vehicles used by public services such as road and railway administrations, energy supply or waste management.
- Each Member State may exclude vehicles whose payload or total permissible laden weight falls below a certain limit. This limit shall not exceed a load capacity of 3.5 tonnes or a maximum permissible laden weight of 6 tonnes in the case of single motor vehicles.

National transport is defined as the transport by road within the territory of the Member State. That is to say that both loading and unloading will take place in the same country. In international transport, either loading or unloading takes place in another country. The statistics on international road transport, based on the nationality concept, are in contradiction with statistics for other modes that are based on the territoriality concept.

Statistics based on the territoriality concept reflect the goods and vehicles entering or leaving a country irrespective of the nationality of the transporting vehicle. In fact, they present a complete picture of international goods transport of the reporting country.

Statistics based on the nationality concept only reflect the performance of the vehicles registered in the reporting country (transport of national vehicles to/from the reporting country and the performances in and between third countries).

The statistical data collected on the basis of the territoriality concept reflect the total flow of goods and vehicles entering or leaving a country. It may be stated that statistics based on the territoriality concept show the most complete picture of transport to/from a country and correspond best with the needs of most users.

At present the data collection for road transport statistics is mainly based on (sample) surveys of transport companies or of vehicles registered in the reporting country sampled directly from a vehicle register.

In the past, borders played an important role in the process of data collection on international road transport statistics. Since the introduction of the Single Administrative Document in 1988, the Member States of the EU, in the case of goods carried by intra-European Union carriers, were no longer allowed to collect statistics at the "physical" intra-European Union borders. After 1st January 1993, even Customs documents disappeared as a possible data source for transport statistics between the Member States.

In principle it is possible to transform data on intra-EU road transport collected according to the nationality concept into data according to the territoriality concept. The following simplified example may clarify the issue:

Germany and the Netherlands collect their data on international goods transport by road by means of direct inquiries of their national companies. The national statistics based on these surveys only give a view of the international transport by the respective companies. In the framework of the Regulation these data are also transferred to Eurostat. Presupposing that road transport between those countries is only done by carriers of German and Dutch nationality, Eurostat will be in a position to give an overall picture of the complete flows between both counties by adding both data sets together.

9.3 Vehicle-related data

Statistics on road transport in the European Union cover transport by commercial motor vehicles registered in the reporting country.

A commercial vehicle is any single vehicle (lorry) or coupled combination of goods road motor vehicles, such as lorries with a trailer or a tractor vehicle with trailer or semi-trailer that is forwarding goods.

A vehicle is registered in a country when it is entered in a register of commercial motor vehicles kept by an official body, whether or not such registration is combined with the issue of a registration plate. For some time it was unclear whether the

drawing vehicle (tractor) or the drawn vehicle (trailer, semi trailer) was the basis for inclusion of the statistics of a country. Regulation (EU) No 70/2012 makes it clear that the "drawing vehicle" (the road motor vehicle) has to be the basis for the statistical information.

The subdivision of transport "on own account" and transport "for hire or reward" may be considered to be a business-related, a vehicle-related or a journey-related aspect depending on the regulations for goods road transport in a particular country and the methodology of survey practice. Although these notions are not defined in the Regulation definitions, they can be found in the Eurostat, UNECE and ECMT Glossary for Transport Statistics. Transport for "hire or reward" is defined as the carriage for remuneration of goods or passengers on behalf of third parties. Transport "on own account" is transport of goods or passengers that is not for "hire or reward".

9.4 Journey-related data

In the Regulation, the following subdivision of type of journey is made:

- Laden journeys, involving one single basic transport operation.
- Laden journeys, involving several transport operations but not considered as a collection or distribution round.
- Laden journeys, of the collection or distribution round type.
- Unladen journeys.

9.4.1 Coding of place of loading/unloading

In goods road transport statistics, the place of loading/unloading of the goods plays an important role. The place of loading for a laden journey is the first place where the goods are loaded on the goods road vehicle that was previously completely empty (or where a road tractor is coupled up to a loaded semi-trailer). The place of unloading for a laden journey is the last place where the goods are unloaded off the goods road vehicle that then is subsequently completely empty (or where the road tractor is uncoupled from a semi-trailer). Where a lorry and trailer(s) combination is in use, a loaded journey will end when both lorry and trailer(s) are completely empty.

For an unladen journey, the place of loading is the place where the unladen journey started, and the place of unloading is the place where the unladen journey finished.

According to the Regulation, the place of loading/unloading should be coded according to NUTS level 3 for Member States of the European Union. Starting with the reference year 2024, NUTS 2024 should be used. It has to be noted that the NUTS classification is revised every three years and that the current version of this classification has to be taken into account. For States that are not members of the European Union but which are contracting parties to the Agreement on the European Economic Area (EEA), coding should be according to the lists of administrative regions supplied by the third countries concerned (list of administrative regions for non-EU states). For countries outside the EEA, the 2-alpha ISO-3166 country codes should be used, except for Albania, Montenegro, North Macedonia, Serbia, Türkiye and Kosovo which should be declared at NUTS level 3. Refer to Eurostat's Classification Server, for detailed information on these classifications.

9.4.2 A coding tool TERCET

Eurostat developed a gazetteer index tool to assist Member States in identifying the correct NUTS 3 code for any locality. The tool was provided to Member States for the first time at the Working Group in May 1999 under the name ILSE (Index of Locations for Statistics in Europe). It included data files containing correspondence tables between locality names and NUTS 3 codes, as well as an application allowing users to search these data files. Since then, the coding tool has been and is continuously improved and updated.

The current version of the coding tool is a web application, TERCET, available to authorised users. It includes an interactive search tool for postal codes, locality names and railway station names and codes; it aims at mapping these codes to NUTS regions. The tool also allows searching for distances between airports and between NUTS regions. It is also possible to download flat files with these data.

TERCET is regularly updated to take into account the modifications introduced in the NUTS classification. The current version is based on NUTS 2024 codes.

The TERCET NUTS-postal codes matching tables contain a lookup-list of European postal codes and their corresponding NUTS codes for the NUTS versions 2010, 2013, 2016, 2021 and 2024. There are matching tables for most of the EU, Candidate, EFTA and the United Kingdom.

9.5 Goods-related data

9.5.1 General remarks

For goods transport, generally speaking the following aspects of the cargo are of importance:

- The type of cargo (mode of appearance).
- The commodity.
- The indication whether goods are dangerous.

It would theoretically be ideal to have one classification in which all these aspects are combined, but in practice this appears to be a fiction. Generally speaking, the basic documentation to be used for the compilation of transport statistics is, in most cases, not detailed enough to derive that kind of complicated information. For this reason, for example, some years ago a separate classification for mode of appearance was developed in the framework of the Economic Commission for Europe. In principle, the mode of appearance (basically how the goods are packaged (if at all) for conveyance) seems to be the most important aspect for the transport world. It will determine the kind of vehicle one has to use. However, as there is a strong relation between the kind of commodity and the mode of appearance (the commodity will to a high extent determine the mode of appearance), for prognoses of the latter, information on the kind of commodity is indispensable.

It might be thought that the commodity would provide sufficient indication of whether the goods were dangerous. However, this is not the case. A separate classification is needed. The regulations for the carriage of dangerous goods are such that any haulier carrying these goods will have no difficulty in providing the data required.

Transport is a "derived activity". That is to say that transport never takes place for sake of transport only. It is always closely related to other activities such as trade, industry and agriculture. One could ask the question whether, apart from continuity reasons, in the long run a special classification for transport statistics could be desirable and necessary.

Because transport is a derived activity, it could be considered desirable to use for transport statistics the same classifications as those used for the activities to which transport is closely related instead of a specific commodity nomenclature. In this case, it would not be necessary to use these classifications in all their details, but (aggregates of) the upper levels could be considered.

Using a classification that will facilitate the linking of transport statistics with statistics on these activities will have obvious advantages. The disadvantage, however, of "a move" towards, for example the HS (Harmonised System) or CPA (Statistical classification of products by activity) is the problem of discontinuity. The NST is not only used in some national statistics, but is also integrated by users in models and other applications and even in administrative systems.

9.5.2 The commodity

Starting with the reference year 2008, the NST 2007 is "the" commodity classification to be used in all **European Union Statistics on transport.**

At the beginning, the NST (Nomenclature uniforme de marchandises pour les Statistiques de Transport) came into force on the basis of a Recommendation of the Commission of the European Economic Community to the Member States in 1961.

The NST was developed in close co-operation with experts of the original six Member States of the European Economic Communities (EEC), the Economic Commission for Europe of the United Nations (UN-ECE) in Geneva as well as with other

international organisations. It was completely harmonised with the CSTE (Classification de Marchandises pour les Statistiques de Transport en Europe).

To harmonise and improve European transport statistics after 1961, a limited number of changes were made which came into force on the 1st of January 1967. Up to 2007, the nomenclature was indicated as NST/R (Nomenclature uniforme des marchandises pour les statistiques de transport revisée) and used in the statistics of the European Union in publications for all modes of transport.

At a Eurostat meeting in March 2000, the principle of a new goods classification to replace NST/R was approved. The main principle of the proposed new classification is that the criterion for classification of goods should be the economic activity from which the goods originate. This approach is the same as used in the CPA (2008), where the structure (divisions) of CPA is the same as NACE Rev 2. NST 2007 will, therefore, be based on the CPA categories and not on the physical form of the goods.

Originally the NST/R was defined by the NIMEXE (the harmonised nomenclature for the statistics on external trade of the Member States of the European Economic Community). Since 1 January 1988, the Combined Nomenclature (CN) has been the European Union's tariff and statistical nomenclature replacing the old European Union nomenclatures NIMEXE (statistical) and CCT (customs tariff). The Combined Nomenclature is aligned with the Harmonised Commodity Description and coding system (HS). The main principle of the new classification NST 2007 is that the criterion for classification of goods should be the economic activity from which the goods originate. This approach is the same as used in the CPA (2008), where the structure (divisions) of CPA is the same as NACE Rev 2.

NST 2007 takes account of the economic activity from which the goods originate. This means that each of its items is strongly interrelated with an item of the European CPA (Classification of Products by Activity) and NACE (statistical classification of economic activities), which are themselves consistent with CPC and ISIC, their counterparts at UN level.

NST 2007 (Nomenclature uniforme des marchandises pour les statistiques des transports)

The NST 2007 consists of 81 headings grouped into 20 divisions according to a systematic 3-digit code:

The two first digits indicate the division.

The third digit indicates the group within that division.

Criteria for the grouping of the 81 positions were the kind of commodity, the degree of processing, transport conditions and transported quantities.

In road freight transport statistics, the 20 divisions of NST 2007 are used for coding the type of goods. NST 2007 includes also a correspondence table with CPA 2008.

For detailed information on the above classifications, please refer to Eurostat's Classification Server.

The following information is available on CIRCABC:

The correspondence table between NST 2007 and NST/R (at 3-digits level)

The correspondence between NST 2007 and CPA 2008

CPA (Classification of Products by Activity)

CPA is the European statistical classification of products by activity. CPA includes all outputs of economic activities, either goods or services and it provides a common EU framework for the comparison of statistical data on goods and services. CPA is linked to NACE (the European Classification of economic activities) and the first four digits of the CPA items are the NACE codes corresponding to the economic activity producing the specific products. CPA is also linked to the PRODCOM and CN European classifications of goods. CPA 2008 is more detailed than the previous versions and includes more than 3 000 sub headings at 6 digits level.

9.6 Precision standards

At a meeting of the Working Group on Road Transport Statistics held in Luxembourg in May 1999, a document (Road/99/8) was presented by Eurostat on the precision standards to meet the requirements of Article 4 of Council Regulation (EC) No 1172/98. The paper set out specific proposals by Eurostat on (a) measures of precision, (b) sample size, (c) time based sampling and (d) response rate.

At that time, Eurostat stated that it did not intend to move rapidly to a formal Commission Regulation but rather to establish targets based on the good practices of the majority of Member States. Efficient sampling methods could achieve better quality results without increasing the response burden on enterprises.

Experience over the next four years gained from the surveys carried out by Member States under Regulation (EC) No 1172/98 indicated that the majority of countries were able to achieve the targets for measures of precision and time-based sampling. The target for response rate was difficult to achieve for some countries due, in the main, to problems with the quality of the sample registers.

9.6.1 Commission Regulation on precision standards

As a result of the above experience, Commission Regulation (EC) No 642/2004 on precision requirements for data collected in accordance with Council Regulation (EC) No 1172/98 on statistical returns in respect of the carriage of goods by road was approved to formalize the precision standard requirements. A copy of this Regulation is available in the Annexes of this Manual.

1. **Article 1** of Commission Regulation (EC) No 642/2004 sets out the time periods to be covered in a survey. The sampling schemes of Member States should cover every possible time period in a year to avoid bias. If not all the time periods of a quarter are covered, it is difficult to calculate and apply weighting factors to account for the variations in transport activity over a quarter (due, for example to holidays and weather).

Where the total stock of goods road motor vehicles in a Member State that can be included in the survey is less than 25 000 vehicles, or the total stock of such vehicles engaged in international transport is less than 3 000, the minimum number of weeks covered by a survey should be 7 out of the 13 in each quarter.

2. **Article 2** of the Regulation prescribes **the percentage standard error required of the annual estimates** for the three main transport variables collected by Member States in the surveys carried out under Regulation (EU) No 70/2012. The measure of precision required is the percentage standard error (95% confidence) of the annual estimates for total tonnes transported, tonne-kilometres performed and total kilometres travelled loaded for total goods road transport and for national road goods transport. It is calculated by dividing the standard error of the estimated parameter by the estimated value of the parameter and multiplying by 1.96 times 100. See chapter 3.4 and 7.3 for further information on standard error.

Commission Regulation (EC) No 642/2004 states that percentage standard error (95% confidence) of the annual estimates for the above six variables should be not greater than $\pm$ 5%. As in Article 1, the limit is raised to not greater than $\pm$ 7% for countries where the total stock of relevant vehicles is less than 25 000 vehicles, or the total stock of such vehicles engaged in international transport is less than 3 000.

3. **Article 3** of the Regulation sets out the information that a Member State should provide each quarter to enable Eurostat to calculate sample size, response rates and register quality rates. This information is to be provided in the format of table B of the supplementary tables (see chapter 13.4 or the annex to Regulation (EC) No 642/2004 for the detail of the table). The information in the table Bs should relate to the complete quarter covered by the survey period, data for each month is not required.

Article 3 also gives the definitions of response rate and register quality rate for the purposes of this Regulation. The **response rate** measuring the percentage of the sample sent out for which a reply was received (whether usable or not, apart from refusals to participate) is defined as "the number of questionnaires despatched to sample units minus the

aggregate of the number refusing to participate and the number for which no information was received of any kind divided by the number of questionnaires despatched expressed as a percentage".

The **register quality rate** is defined as "the number of usable questionnaires from sample units divided by the number of questionnaires despatched minus those classified as non-response" expressed as a percentage.

4. **Article 4 of** the Regulation exempts Member States with a very small total stock of goods road motor vehicles that are engaged in international transport (less than 1 000 vehicles) from the application of the Regulation.

9.6.2 Application of Regulation on precision standards where vehicle stock is small

For Member States with a relatively small total vehicle stock, Articles 1.2 and 2.2 of the Regulation permit less stringent requirements than for other countries. Similarly Article 4 exempts a Member State from the application of the complete Regulation where a Member State has a very small fleet of vehicles engaged in international transport.

Some Member States carry out separate surveys of national and international goods road transport, particularly where international transport forms a very small percentage of total transport. Other countries use a single survey to cover all goods road transport.

Where the total stock of goods road motor vehicles in a Member State that can be included in the survey is less than 25 000 vehicles, Articles 1.2 and 2.2 of the Regulation apply whether that country carries out one survey or separate surveys of national and international goods road transport.

Where the total stock of goods road motor vehicles engaged in international transport is less than 3 000, regardless of the total stock of relevant vehicles in that country, Articles 1.2 and 2.2 of the Regulation also apply.

Where the total stock of goods road motor vehicles engaged in international transport is less than 1 000, regardless of the total stock of relevant vehicles in that country, the Member State does not have to follow the Regulation. However, Eurostat would hope that in such a case, the Member State would try to achieve the precision standards set out in articles 1.2 and 2.2 for national goods road transport.

10

Definitions of variables, classification and codes

10.1 Definition and coding of variables

The following pages set out the definitions of all the variables mentioned in Regulation (EU) No 70/2012. Included, where relevant, are the codes that should be used for these variables when data are submitted to Eurostat under the Regulation.

The variables are grouped under four headings:

- General variables.
- Vehicle -related variables.
- Journey-related variables.
- Goods-related variables.

Within these four headings the variables are listed in a logical sequence of definitions. Where the data for a variable should be submitted to Eurostat under the Regulation, the Eurostat field reference of the computer record is given (see Part C, chapter 11).

Many of the variables mentioned in the Regulation have already been defined in the illustrated *Glossary for Transport Statistics* (see Introduction, section IV). In a number of cases the English version of the Regulation has used slightly different wording for some of the variables. Where this has occurred, the English wording used in the *Glossary for Transport Statistics* is given for the variable in this chapter followed by the alternative wording used in the Regulation.

For ease of reference each variable starts on a separate page. A list of variables in alphabetical order and the page number in this chapter where the definition of each variable commences is given in at the end of this chapter.

10.1.1 General variables

REPORTING COUNTRY

Computer record field reference <**Rcount**>

First reference in Regulation

Referred to as Member State in Article 1.

Definition

A reporting country is a Member State of the European Union or a country belonging to the European Free Trade Association (EFTA). The Regulation shall not apply to Malta, so long as the number of Maltese-registered goods road transport vehicles licensed to engage in the international carriage of goods by road does not exceed 400 vehicles. Iceland is exempted from transmitting the data required by this Regulation.

Classification and Codes to be used

EU Member States (corresponding to NUTS 2-alpha country codes) and EFTA countries.

EU Member States	
Country name	**Code**
Belgium	BE
Bulgaria	BG
Czechia	CZ
Denmark	DK
Germany	DE
Estonia	EE
Ireland	IE
Greece	EL
Spain	ES
France	FR
Croatia	HR
Italy	IT
Cyprus	CY
Latvia	LV
Lithuania	LT
Luxembourg	LU
Hungary	HU
Malta	MT
Netherlands	NL
Austria	AT
Poland	PL

EU Member States	
Country name	**Code**
Portugal	PT
Romania	RO
Slovenia	SI
Slovakia	SK
Finland	FI
Sweden	SE
EFTA countries	
Iceland	IS
Liechtenstein	LI
Norway	NO
Switzerland	CH

More information on the country codes is available here.

YEAR

Computer record field reference <**Year**>

First reference in Regulation

Article 7.

Definition

The time occupied by one revolution of the earth around the sun.

Source of definition

Dictionary.

Explanation and examples

For the purposes of the Regulation a year does not have to relate exactly to a calendar year. It will consist of the four quarters covering the majority of the relevant days in that year. It may include some days in the previous year and/or days in the following year.

For example, the data collection for the first quarter for 2015 may have started in a country on 5 January and that for the fourth quarter ended on 3 January 2016.

Codes to be used

The four numerical digits of the year should be used.

That is, 2020; 2021; 2022 as relevant.

QUARTER (OF A YEAR)

Computer record field reference <**Quarter**>

First reference in Regulation

Article 5.

Definition

One-fourth part of a year.

Source of definition

Dictionary.

Explanation and examples

For the purposes of the Regulation it is not necessary for a quarter of a year to cover the relevant calendar months or for the first quarter of a year to start on 1 January.

A quarter of a year will normally consist of 13 weeks. Occasionally a year may consist of 53 weeks. Where this occurs, the fourth quarter of that year should consist of 14 weeks.

The start of the first quarter can be the first day in a year that is the normal first day of a survey period. For example, if the survey period is a week and the first day of each period is a Monday but, as in the year 2000, 1 January is a Saturday, then the first quarter should cover the 13 weeks commencing Monday 3 January.

Classification and codes to be used

Label	Code
First quarter of a year	Q1
Second quarter of a year	Q2
Third quarter of a year	Q3
Fourth quarter of a year	Q4

EUROSTAT

First reference in Regulation

Article 2.

Definition

The Commission department responsible for carrying out the tasks incumbent on that institution in the field of production of European Union statistics.

Source of definition

Article 2 of Regulation (EU) No 70/2012.

MODE OF TRANSPORT

Alternative terminology

Means of transport.

First reference in Regulation

Annex I.

Definition

One of the six general methods of transportation.

Explanation and examples

The main modes of transport are:

- Air
- Sea
- Rail
- Road
- Inland waterways
- Pipeline

Annex I of Regulation (EU) No 70/2012 uses an alternative terminology of "means of transport" for the usual terminology of "mode of transport".

ROAD

First reference in Regulation

In title of Regulation.

Definition

Line of communication (travelled way) using a stabilised base other than rails or air strips open to public traffic, primarily for the use of road motor vehicles running on their own wheels.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section I.01.

Explanation and examples

Included are roads over and under bridges, tunnels, supporting structures, junctions, crossings and interchanges. Toll roads are also included. Excluded are dedicated cycle paths.

For the Regulation, the important part of the definition is that the road must be open to public traffic.

ROAD TRANSPORT

First reference in Regulation

Article 1.

Definition

Any movement of goods and/or passengers using a road vehicle on a given network.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section V.01

Explanation and examples

When a road vehicle is being carried on another vehicle, only the movement of the carrying vehicle (active mode) is considered.

NATIONAL TRANSPORT

First reference in Regulation

Introduction, paragraph (4).

Alternative terminology

May be referred to as 'domestic' transport.

Definition

Road transport between two places (a place of loading and a place of unloading) located in the same country by a vehicle registered in that country.

Source of definition and explanation

In the *Glossary for Transport Statistics*, national road transport is defined as the transport by road within the territory of a State irrespective of the country in which the vehicle is registered (Part B, Section V.02). That is to say that the definition is based on the territoriality concept (see chapter 9, section 9-2).

For the Regulation, a restricted definition of national road transport has been adopted to exclude those cases where both loading and unloading take place in the same country but the road motor vehicle used is not registered in that country. This type of excluded transport is referred to as 'cabotage'.

National transport may involve transit (without loading or unloading) through a second country. For example, a journey from Lille to Strasbourg (national transport for France) might involve transit through Luxembourg to use the motorway.

INTERNATIONAL TRANSPORT

First reference in Regulation

Article 1.

Definition

Road transport between two places (a place of loading and a place of unloading) in two different countries and cabotage by road. It may involve transit through one or more additional country or countries.

Source of definition and explanation

In the *Glossary for Transport Statistics* (Part B, Section V.04), international road transport is, according to the territoriality principle, defined as the transport by road between two places (a place of loading and a place of unloading) in two different countries irrespective of the country in which the vehicle is registered. This definition thus includes the (according to the nationality concept) declared cross-trade transport; that is, transport between two countries performed by a haulier from a third country.

For the Regulation, an expanded definition of international road transport has been adopted to include 'cabotage'–cases where both loading and unloading take place in the same country but the road motor vehicle used is not registered in that country.

According to the Regulation, international road transport is composed of 4 categories:

International dispatch–Place of loading of goods in declaring country and place of unloading in a different country.

International receipt–Place of unloading of goods in declaring country and place of loading in a different country.

Cross-trade–Place of loading and place of unloading of goods in two different countries outside the declaring country.

Cabotage–Place of loading and unloading of goods in the same country outside the declaring country.

Examples of international transport for a German haulier are:

Loading in Germany and unloading in Belgium.

Loading in Italy, transit through Austria with unloading in Germany.

Loading in United Kingdom, transit through France, Belgium, Germany, and Austria with unloading in Hungary.

(See following page on "Cabotage" in this chapter for examples of this form of transport).

CABOTAGE

First reference in Regulation

Cabotage is not mentioned specifically in the Regulation although this type of transport is to be included in the statistical returns sent to Eurostat.

Definition

'Road cabotage transport': Road transport between two places (a place of loading and a place of unloading) in the same country by a vehicle not registered in that country. It may involve transit through one or more additional country or countries.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section V.03.

Explanation and examples

In the territoriality concept, cabotage is a form of national transport. However, as the Regulation requires the collection of statistics on a nationality basis, the data on cabotage road transport has to be considered as a part of international transport, as the work performed does not take place within the same country as that of the registered vehicle.

As an example, a vehicle registered in Germany loads goods in Munich and unloads them in Paris–this is an international journey. If it then loads goods in Paris and unloads these goods in Lille (France)–this would be a cabotage journey and considered as an international journey under the Regulation. This same vehicle might then load goods in Lille and unload them in Munich–another international journey.

Note

The term cabotage has its origins in maritime transport where it is defined as the carriage of goods by sea between two ports in the same country regardless of the nationality of the vessel.

CROSS-TRADE

First reference in Regulation

Cross trading is not mentioned specifically in the Regulation although this type of transport is to be included in the statistical returns sent to Eurostat.

Definition

International road transport between two different countries performed by a road motor vehicle registered in a third country.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section V.05.

Explanation and examples

A third country is a country other than the country of loading or than the country of unloading.

An example is of a vehicle registered in the Netherlands loading goods in Germany and unloading them in Spain (this would involve a transit through France).

SAMPLE–SAMPLE SIZE

First reference in Regulation

Article 7.

Definition

Sample A part of a population or a subset from a set of units, that is provided by some process or other, usually by deliberate selection with the object of investigating the properties of the parent population or set.

Sample size The number of sampling units that are to be included in a sample. In the case of a Multi-stage Sample this number refers to the number of units at the final stage in the sample.

Source of definition

A Dictionary of Statistical Terms, Kendal & Buckland, (Longman 1975).

Explanation and examples

Experience gained from the surveys of goods road transport carried out by Member States under Regulation (EU) No 70/2012 has indicated that the precision of the estimates of the variables is, in general, broadly related to the number of vehicle records contributing information to the estimates. This comment applies to all countries carrying out surveys of goods road transport to meet the requirements of Regulation (EU) No 70/2012. The relationship is not exact. For some countries, the types of work undertaken and the geographical nature of the surrounding areas, as well as the stratification of the survey that is possible, may result in either better precision or wider precision than average.

If a country carries out a survey where the primary sampling unit is an enterprise rather than a goods road vehicle, the sample size has to be larger to achieve the same precision estimate provided by a survey with the primary sampling unit of road vehicles, due to the clustering effect of the survey sample (see chapter 3.4.5 on multi-stage and cluster sampling).

As a general guide, if there are 5 000 or more vehicle records (A1 records) in a survey of goods road transport, the percentage standard error (95% confidence) of the annual estimates of tonnes carried, tonne-kilometres performed or loaded kilometres travelled will be less than $\pm$ 5%. See chapter 9.6 for information on percentage standard error.

Article 1 of Commission Regulation 642/2004 (see chapter 9.6 and Annexes) sets out **the time periods to be covered in a survey**. The sampling schemes of Member States should cover every possible time period in a year to avoid bias. If not all the time periods of a quarter are covered, it is difficult to calculate and apply weighting factors to account for the variations in transport activity over a quarter (due, for example to holidays and weather).

Where the total stock of goods road motor vehicles in a Member State that can be included in the survey is less than 25 000 vehicles, or the total stock of such vehicles engaged in international transport is less than 3 000, the minimum number of weeks covered by a survey should be 7 out of the 13 in each quarter.

NON-RESPONSE RATE

First reference in Regulation

Article 7.

Definition

Non-response to a sample survey arises when no communication in any form has been received from the statistical unit approached within the time-scale of the survey or the unit has indicated its refusal to participate in the survey. Also, to be treated as non-response are cases where a reply has been received and the information would have been included in the survey but for the poor quality of, or incomplete, answers to the questions. The proportion of such units of the sample is called the non-response rate.

Source of definition

Article 3 of Commission Regulation (EC) No 642/2004

Explanation and examples

The failure to obtain information from a designated individual (or unit) for reasons such as wrong information in the register used to select the sample (vehicle sold, scrapped or leased, company no longer in business, etc) is sometimes also called non-response but these are unusable responses not non-response. If this information had been available to the survey team, that unit would have been excluded from the sampling frame from the outset.

The terms incomplete response or incomplete achievement may be used for cases where information is available for most aspects of a sampling unit but not for all items desired.

Article 3 of Commission Regulation (EC) No 642/2004 sets out the information that a Member State should provide each quarter to enable Eurostat to calculate sample size, response rates and register quality rates. This information is to be provided in the format of table B of the supplementary tables (see the annex to Regulation (EC) No 642/2004 for the detail of the table). Article 3 also gives the definitions of response rate and register quality rate for the purposes of this Regulation.

The **response rate** measuring the percentage of the sample sent out for which a reply was received (whether usable or not, apart from refusals to participate) is defined as "the number of questionnaires despatched to sample units minus the aggregate of the number refusing to participate and the number for which no information was received of any kind divided by the number of questionnaires despatched expressed as a percentage".

The **register quality rate** is defined as "the number of usable questionnaires from sample units divided by the number of questionnaires despatched minus those classified as non-response" expressed as a percentage.

Commission Regulation (EC) No 642/2004 does not specify any levels of required response rate. At a meeting of the Working Group on Road Transport Statistics held in Luxembourg in July 2002 and, a document (Road 2003/9/EN) was presented by Eurostat that included specific proposals on response rate. Eurostat proposed that Member States should aim to achieve a minimum of a 90% response rate and a minimum of 75% for register quality.

STANDARD ERROR

First reference in Regulation

Article 7.

Definition

The positive square root of the variance of the sampling distribution of a statistic.

Source of definition

A Dictionary of Statistical Terms, Kendal & Buckland, (Longman 1975).

Explanation and examples

In estimation or prediction the estimated or predicted value is bracketed by a range of value determined by standard errors, confidence intervals or similar methods within which the value may be supposed to lie with a certain probability. This is called the **Error Band**.

In a sample survey, a parameter to be estimated is generally the average (mean) value or the total value of a variable. The standard error provides a measure of the variation of the mean or the total value of the estimated parameter. Each unit in the sample will contribute a value for the parameter and from this information the estimated mean value and standard deviation of the sample distribution for the parameter can be calculated. The standard deviation (the positive square root of the variance) in this case, providing a measure of the variation in the value of the parameter of the sampled units.

Where the number in the sample is a small percentage of the total population, for simple random sampling, the standard error of a mean is the standard deviation of the sample divided by the positive square root of the number of observations in the sample. The standard error of the aggregate value of a parameter is the standard error of the mean multiplied by the total number in the population from which the sample was drawn. The formulae for the standard errors for stratified samples are given in Part A, Chapter 3.

The measure reported to Eurostat should be termed "**Percentage standard error of estimate** (**95% confidence**)". It is calculated by dividing the standard error of the estimated parameter by the estimated value of the parameter and multiplying by 1.96 times 100. It can also be calculated by multiplying the coefficient of variation of the parameter by 1.96 times 100.

Article 2 of Commission Regulation (EC) No 642/2004 (see chapter 9.6 and Annexes) states that the percentage standard error (95% confidence) required that the annual estimates for the three main transport variables collected by Member States in the surveys carried out under Regulation (EU) No 70/2012 should be not greater than $\pm$ 5%. The limit is raised to not greater than $\pm$ 7% for a country where the total stock of relevant vehicles is less than 25 000 vehicles, or the total stock of such vehicles engaged in international transport is less than 3 000.

CONFIDENCE INTERVAL

First reference in Regulation

Article 7.

Definition

If it is possible to define two statistics t_1 and t_2 (functions of sample values only) such that, Θ being a parameter under estimate, Pr (t_1 Ω Θ Ω t_2) = α, where α is some fixed probability, the interval between t_1 and t_2 is called a confidence interval.

The assertion that Θ lies in this interval will be true, on the average, in a proportion α of the cases when the assertion is made.

Source of definition

A Dictionary of Statistical Terms, Kendal & Buckland, (Longman 1975).

Explanation and examples

In estimation or prediction, the estimated or predicted value is bracketed by a range of values determined by standard errors, confidence intervals or similar methods within which the value may be supposed to lie with a certain probability. This is called the Error Band.

The 95% confidence interval of a parameter is the interval obtained by adding and subtracting 1.96 standard errors of the parameter to and from the estimated value of the parameter. It is often useful to express this confidence interval as a percentage of the estimated value, particularly when wishing to compare confidence intervals from a number of surveys or the precision of the estimates for a number of parameters from a single survey.

CENTRAL ADMINISTRATION

First reference in Regulation

Article 1.

Definition

An organisation of the central government of a country.

Explanation and examples

In terms of activity classifications the following classes are involved:

NACE Rev. 2–Statistical Classification of Economic Activities in the European Union, Official Journal, No. L 216, 21 August 2007.

SECTION O–PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY

Division 84. Public administration and defence; compulsory social security

Group 84.1 Administration of the State and the economic and social policy of the community

84.11 General public administration activities

84.12 Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security

84.13 Regulation of and contribution to more efficient operation of businesses

Group 84.2 Provision of services to the community as a whole

84.21 Foreign affairs

84.22 Defence activities

84.23 Justice and judicial activities

84.24 Public order and safety activities

84.25 Fire service activities

Group 84.3 Compulsory social security activities

84.30 Compulsory social security activities

LOCAL PUBLIC ADMINISTRATION

First reference in Regulation

Article 1.

Definition

An organisation of local government of a country.

Explanation and examples

In terms of activity classifications the following classes are involved:

NACE Rev. 2–Statistical Classification of Economic Activities in the European Union, Official Journal, No. L 216, 21 August 2007.

SECTION O–PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY

Division 84. Public administration and defence; compulsory social security

Group 84.1 Administration of the State and the economic and social policy of the community

84.11 General public administration activities

84.12 Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security

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Group 84.2 Provision of services to the community as a whole

84.21 Foreign affairs

84.22 Defence activities

84.23 Justice and judicial activities

84.24 Public order and safety activities

84.25 Fire service activities

Group 84.3 Compulsory social security activities

84.30 Compulsory social security activities

PUBLIC UNDERTAKINGS

First reference in Regulation

Article 1.

Definition

Organisations of central and local government providing services to the general public, particularly in the fields of transport, communications and energy supply.

Explanation and examples

In terms of activity classifications the following classes are involved:

NACE Rev. 2–Statistical Classification of Economic Activities in the European Union, Official Journal, No. L 216, 21 August 2007.

SECTION O–PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY

Division 84. Public administration and defence; compulsory social security

Group 84.1 Administration of the State and the economic and social policy of the community

84.11 General public administration activities

84.12 Regulation of the activities of providing health care, education, cultural services and other social services, excluding social security

84.13 Regulation of and contribution to more efficient operation of businesses

Group 84.2 Provision of services to the community as a whole

84.21 Foreign affairs

84.22 Defence activities

84.23 Justice and judicial activities

84.24 Public order and safety activities

84.25 Fire service activities

Group 84.3 Compulsory social security activities

84.30 Compulsory social security activities

GOODS CARRIED BY ROAD

Alternative terminology in Regulation

Carriage of goods by road.

First reference in Regulation

Article 1.

Definition

Any goods moved by goods road vehicles.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section V.18.

Article 2 of Regulation (EU) No 70/2012 uses the alternative terminology of "Carriage of goods by road" with the definition: "All transport of goods by means of a goods road transport vehicle". These terms and the definitions are identical.

Explanation and examples

In this context, goods include all packaging and equipment such as containers, swap-bodies or pallets as well as waste material of no intrinsic value.

10.1.2. Vehicle-related variables

ROAD MOTOR VEHICLE

Alternative terminology

Road transport vehicle.

First reference in Regulation

Article 1.

Definition

A road vehicle fitted with an engine whence it derives its sole means of propulsion, which is normally used for carrying persons or goods by road, or for drawing, on the road, vehicles used for the carriage of persons or goods.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section II.05

Article 2 of Regulation (EU) No 70/2012 uses the alternative terminology of "road transport vehicle" with the same definition. Although the definitions are identical, the word "transport" has a different meaning to "motor" in the English language.

The definition excludes motor vehicles running on rails embedded in roads.

Explanation and examples

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SINGLE MOTOR VEHICLE

First reference in Regulation

Article 1.

Definition

A road vehicle fitted with an engine whence it derives its sole means of propulsion, which is normally used for carrying persons or goods by road, or for drawing, on the road, vehicles used for the carriage of persons or goods.

Source of definition

See definition for road transport vehicle on previous page.

Explanation and examples

Since a road tractor alone cannot forward goods, it is excluded from single motor vehicles.

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GOODS ROAD MOTOR VEHICLE

Related terminology

Goods road transport vehicle.

First reference in Regulation

Article 1.

Definition

Any single road transport vehicle (lorry), or combination of road vehicles, namely road train (lorry with trailer) or articulated vehicle (road tractor with semi-trailer), designed to carry goods.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section II.24

Article 2 of Regulation (EU) No 70/2012 uses the terminology of "goods road transport vehicle" with the same definition.

Explanation and examples

Vehicles designed for the transport of both passengers and goods should be classified either among the passenger road vehicles or among the goods road vehicles, depending on their primary purpose, as determined either by their technical characteristics or by their category for tax purposes.

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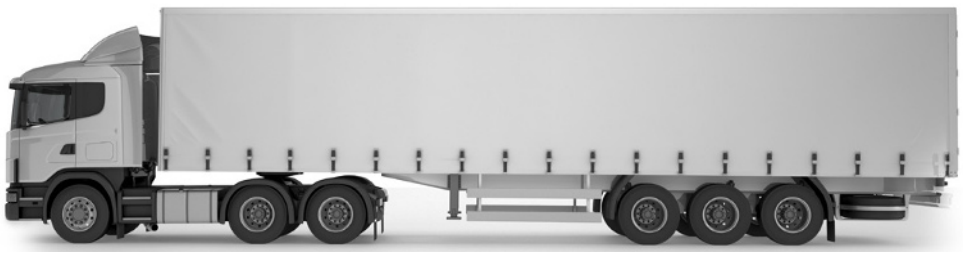

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GOODS ROAD VEHICLE

Alternative terminology

Road vehicle for the transport of goods.

First reference in Regulation

Article 1.

Definition

A road vehicle designed exclusively or primarily to carry goods (lorry, trailer, semi-trailer).

Source of definition

The *Glossary for Transport Statistics*, Part B, Section II.20.

Article 2 of Regulation (EU) No 70/2012 uses the alternative terminology of "road vehicle for the transport of goods" with the same definition.

Explanation and examples

Vehicles designed for the transport of both passengers and goods should be classified either among the passenger road vehicles or among the goods road vehicles, depending on their primary purpose, as determined either by their technical characteristics or by their category for tax purposes.

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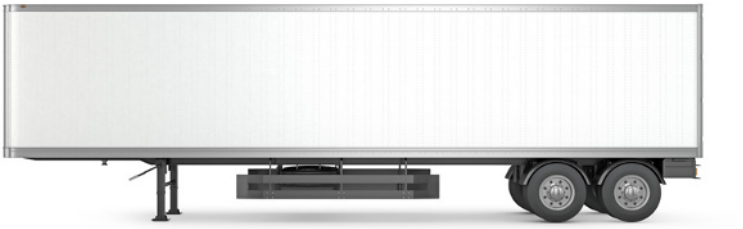

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LORRY

First reference in Regulation

Article 2.

Definition

A rigid road motor vehicle designed exclusively or primarily to carry goods.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section II.25.

Article 2 of Regulation (EU) No 70/2012 gives the same definition with the exclusion of the word "motor" after "road".

Explanation and examples

This category includes vans which are rigid road motor vehicles designed exclusively or primarily to carry goods with a gross vehicle weight of not more than 3 500 Kg. This category may also include "pick-ups".

Regulation (EU) No 70/2012 permits a country to exclude the collection of data for vehicles with a load capacity 3 500 kilograms or less or a maximum vehicle weight not exceeding 6 tonnes.

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Classification and Codes to be used

No separate coding is provided for lorries but the coding for axle configuration provides, in the first digit of the code, a method of identification of lorries and road tractors. A first digit of 1 or 2 in the axle configuration code indicates that the powered vehicle is a lorry.

ROAD TRACTOR

First reference in Regulation

Article 2.

Definition

A road motor vehicle designed exclusively or primarily to haul other road vehicles which are not power-driven (mainly semi-trailers).

Source of definition

The *Glossary for Transport Statistics*, Part B, Section II.26.

Article 2 of Regulation (EU) No 70/2012 gives the same definition with the replacement of the word "transport" for "motor".

Explanation and examples

Agricultural tractors are excluded.

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Classification and Codes to be used

No separate coding is provided for road tractors but the coding for axle configuration provides, in the first digit of the code, a method of identification of lorries and road tractors. A first digit of 3 or 4 in the axle configuration code indicates that the powered vehicle is a road tractor.

TRAILER

First reference in Regulation

Article 2.

Definition

Goods road vehicle designed to be hauled by a road motor vehicle.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section II.28.

Article 2 of Regulation (EU) No 70/2012 gives the same definition but using slightly different wording, namely "A road vehicle for the transport of goods designed to be hauled by a road transport vehicle".

Explanation and examples

This category excludes agricultural trailers and caravans.

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Classification and Codes to be used

No separate coding is provided for trailers but the coding for axle configuration provides, in the first digit of the code, a method of identification of a combination of a lorry and trailer(s). A first digit of the axle configuration code of '2' indicates that the lorry has at least one trailer attached.

SEMI-TRAILER

First reference in Regulation

Article 2.

Definition

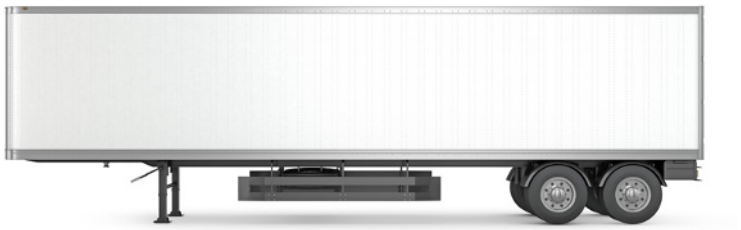
A road vehicle for transporting goods with no front axle so designed that part of the vehicle and a substantial part of its loaded weight rest on the road tractor.

Source of definition

Article 2 of Regulation (EU) No 70/2012.

The *Glossary for Transport Statistics*, Part B, Section II.30 gives an identical definition.

Explanation and examples



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Classification and Codes to be used

No separate coding is provided for semi-trailers but the coding for axle configuration provides, in the first digit of the code, a method of identification of a combination of a road tractor and semi-trailer. A first digit of the axle configuration code of '3' indicates that the road tractor has a semi-trailer attached.

ARTICULATED VEHICLE

First reference in Regulation

Article 2.

Definition

A road tractor coupled to a semi-trailer.

Source of definition

Article 2 of Regulation (EU) No 70/2012.

The *Glossary for Transport Statistics*, Part B, Section II.31 gives an identical definition.

Explanation and examples

Classification and Codes to be used

No separate coding is provided for articulated vehicles but the coding for axle configuration provides, in the first digit of the code, a method of identification of an articulated vehicle. A first digit of the axle configuration code of '3' indicates that the road tractor has a semi-trailer attached (an articulated vehicle).

ROAD TRAIN

First reference in Regulation

Article 2.

Definition

A goods road motor vehicle coupled to a trailer.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section II.32.

Article 2 of Regulation (EU) No 70/2012 gives the same definition with the replacement of the word "transport" for "motor".

Explanation and examples

An articulated vehicle with a further trailer attached is included.

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AGRICULTURAL VEHICLES

First reference in Regulation

Article 1.

Definition

'Agricultural tractor': Motor vehicle designed exclusively or primarily for agricultural purposes whether or not permitted to use roads opened to public traffic.

'Agricultural trailer': Trailer designed exclusively or primarily for agricultural purposes and to be hauled by an agricultural tractor, whether or not permitted to use roads opened to public traffic.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section II.27 and II.29.

Explanation and examples

Agricultural tractors

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Agricultural trailer

© Adobestock/3D Horse

The activity of agricultural vehicles is excluded from Regulation (EU) No 70/2012.

MILITARY VEHICLES

First reference in Regulation

Article 1.

Definition

All road vehicles operated by branches of the armed forces.

Explanation and examples

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The activity of all road vehicles operated by branches of the armed forces is excluded from Regulation (EU) No 70/2012.

REGISTERED IN

First reference in Regulation

Article 1.

Definition

The state of having been entered in a register of road transport vehicles, kept by an official body in a Member State, whether or not the registration is accompanied by the issue of a registration plate.

Source of definition

Article 2 of Regulation (EU) No 70/2012.

USE OF VEHICLE FOR COMBINED TRANSPORT

Computer record field reference <**A1.1**>

First reference in Regulation

Annex I.

Definition

A goods road vehicle designed for use in combined transport operations.

Source of definition

This variable has not yet been defined officially.

Explanation and examples

To be developed later.

Classification and Codes to be used

If this variable is collected, Eurostat recommends to use values Y (yes), N (no) or X (unknown) for the coding of this variable.

If the variable is not collected, the field must be left empty.

AGE OF GOODS ROAD MOTOR VEHICLE FROM FIRST REGISTRATION

Computer record field reference <**A1.3**>

First reference in Regulation

Annex I.

Definition

Length of time after the first registration of the goods road vehicle, irrespective of the registering country.

Source of definition

The Glossary for Transport Statistics, Part B, Section II. 39.

Explanation and examples

Where a country has a large number of goods road motor vehicles that are imported second-hand, the year of first registration in the other country may not be known. In this case the year of manufacture should be used as a proxy.

The age to be reported is that of the goods road motor vehicle in complete years after the first registration of the vehicle, irrespective of the registering country. That is, vehicles less than 12 months old should be recorded as zero. Those between 12 months and less than 24 months should be recorded as 1. The code 99 should be used for "age not known".

This variable may be used for various analyses. For example, in conjunction with vehicle-kilometres (relevant for estimation of pollutant emissions), type of transport operations (national/international, short/long distance), transit countries.

NACE REV 2

Computer record field reference <**A1.6**>

First reference in Regulation

Annex I.

Definition

The main economic activity of the business.

Source of definition

NACE Rev. 2–Statistical Classification of Economic Activities in the European Union, Official Journal, No. L 216, 21 August 2007.

Explanation and examples

The coding of the enterprise operating the vehicle should be identical to that used in the business register.

Examples

NACE Rev.2 coding	Enterprise category
FA120	Construction of residential and non-residential buildings: typical NACE code for a general construction company
G4711	Retail sale in non-specialised stores with food, beverages or tobacco predominating: typical NACE code for a vehicle belonging to a supermarket chain
H4941	Freight transport by road: the usual code for a road haulage company

Classification and Codes to be used

The four-digit level of NACE (activity class code of the vehicle operator) should be recorded using the letter of the section and the 4 numbers of the class, without separator. Starting with the reference year 2008, NACE Rev. 2. should be used.

See Eurostat publication "NACE Rev. 2 Statistical Classification of Economic Activities in the European Union" (Eurostat's Classification Server).

LOADED

First reference in Regulation

Article 2.

Definition

There are either goods or waste material in the lorry, the trailer or the semi-trailer, waste material being a particular type of good.

Source of definition

Annex I of Regulation (EU) No 70/2012.

Explanation and examples

A goods road vehicle is loaded when it contains any article that is to be unloaded at a given destination regardless of whether that article has any value. Thus, in addition to the carriage of goods in the normal purposes of trade, the carriage of waste products, empty packaging, unloaded pallets or empty containers constitutes a loaded vehicle. The minimum weight of a laden journey is 1 (100 kg). (See "Weight (of goods)" under section 10.1.3.). Where the weight carried is less than 50 kilograms, the figure 1 (implying 100 kilograms) should be reported in order to distinguish a loaded journey from an empty journey.

EMPTY

First reference in Regulation

Annex I.

Definition

The goods road vehicle contains no article or any item of transport equipment that has to be unloaded at a given destination.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section IV.03

Explanation and examples

Within the context of the Regulation, on an empty journey, the road vehicle will not carry any goods, nor transport bodies that will be unloaded at a certain destination. Movements of vehicles that carry empty packaging and transport bodies like containers, swap-bodies and pallets are not considered as empty journeys. Where a road tractor makes a journey without a semi-trailer it is performing an empty journey.

VEHICLE-KILOMETRE

Computer record field references - loaded vehicle kilometres <**A1.8.1**>

- empty vehicle kilometres <**A1.8.2**>

First reference in Regulation

Annex I.

Definition

Unit of measurement representing the movement of a road motor vehicle over one kilometre.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section IV.10.

Explanation and examples

The distance to be considered is the distance actually run. Units made up of a tractor and a semi-trailer or a lorry and a trailer are counted as one vehicle. It excludes the distance covered with the goods road motor vehicle while being transported by another means of transport, for example, when a vehicle is on board a ferry.

For the purposes of the Regulation, loaded vehicle-kilometres include cases where the vehicle may only be carrying empty packaging, material of no commercial value or empty transport equipment (other than trailers and semi-trailers) to be unloaded at a given destination.

Empty vehicle-kilometres relate to cases where a vehicle carries no load of any kind. It includes the running of a road tractor with an empty semi-trailer and where a road tractor travels without a semi-trailer.

As the A2 journey record also includes a field (A2.5) for the kilometres travelled during the journey, the expectation is that for loaded A2 journeys (journey types 1,2 and 3) the total sum of the kilometres recorded on the A2 records for a vehicle would be the figure shown in the A1 field of number of kilometres travelled loaded.

Similarly, where the data is collected (this is an optional variable at present) the sum of the kilometres travelled on type 4 (empty) journeys would be the same as the figure shown in the A1 field of number of kilometres travelled empty. However, for type 3 journeys (collection/delivery) there may be a difficulty in the recording of kilometres of any unloaded sections of this type of journey. The kilometres travelled loaded recorded in the A2 records for type 3 journeys can be summed to add to the relevant field in the A1 record. However, there is a difficulty with recording information on the kilometres of any empty section of such a journey. This information may be excluded from the data sent to Eurostat. Alternatively, it may be included in the relevant field of the A1 record. However, if it is included in the A1 field, an A2 type 4 journey record cannot be created because information is not available on the start and end places of the empty section. For this reason, it is accepted that the A1.8.2 field (empty vehicle kilometres) may be slightly higher than the sum of the A2 records of type 4 journeys because the empty sections of type 3 (collection/delivery) journeys have been included in the A1 record.

The kilometres are to be recorded to the nearest unit.

If the vehicle has not been used during the survey period, no records should be reported.

10.1.3. Journey-related variables

JOURNEY

First reference in Regulation

Introduction, Article (3).

Definition

A movement of a road vehicle from a specified point of origin to a specified point of destination.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section IV.06.

Explanation and examples

The general principle of the Regulation is that statistics of the transport of goods by road are based upon the movements of the goods road motor vehicles registered in the reporting country.

A journey may be divided into a number of sections or stages.

A journey may be laden or unladen. A laden journey starts at the place where goods are first loaded onto a goods road vehicle that was previously empty (or where a road tractor is coupled up to a laden semi-trailer). A laden journey ends at the place where goods are unloaded from the goods road vehicle and that vehicle is subsequently completely empty (or where the road tractor is uncoupled from a laden semi-trailer).

In the course of a laden journey, the vehicle may make one or more stops to unload or pick up goods but at none of these stops (apart from the last unloading place) does the vehicle become completely empty. For example, a lorry loads first 10 tonnes of goods at place A, travels to place B and unloads 5 tonnes. It then travels to place C and unloads the remaining 5 tonnes. The laden journey is from place A to place C. If that vehicle had unloaded all the 10 tonnes at place B and then subsequently loaded another 5 tonnes at place B for unloading at place C, then 2 laden journeys would have been made– one from A to B and the second from B to C.

For an unladen journey, the notion of the place where an unladen journey begins is the place where a vehicle leaves a place completely empty. This may be the place of unloading of the preceding laden journey or the depot of the vehicle if the vehicle travels empty from the depot to another place to pick up a load. The place of ending an unladen journey is the place of loading of the subsequent laden journey (or the depot if the vehicle is returning empty to the depot after a day's work.

Classification and Codes to be used

For the Regulation, journeys are classified into four types. These types and their coding are given for the variable "Type of journey" covered later in this chapter.

STAGE OF A JOURNEY

First reference in Regulation

Annex I.

Definition

The section of a journey between one stopping point and the next.

Explanation and examples

For example, a lorry first loads 10 tonnes of goods at place A, travels to place B and unloads 5 tonnes. It then travels to place C and unloads the remaining 5 tonnes. The laden journey is from place A to place C. The first stage of the journey is from A to B and the second stage from B to C.

SUCCESSIVE CONFIGURATIONS

First reference in Regulation

Annex I.

Definition

The changes during a survey period of the configuration of a goods road vehicle (road train or articulated vehicle).

Source of definition

Annex I of Regulation (EU) No 70/2012.

Explanation and examples

When the road transport vehicle chosen for the survey is a lorry used alone, that is, without trailer throughout the survey period, it constitutes in itself the road vehicle for transporting goods.

However, when the road transport vehicle chosen for the survey is a road tractor – in which case it will have a semi-trailer coupled–or when it is a lorry to which a trailer is coupled, the data required under the Regulation concern the road vehicle for the transport of goods taken as a whole. In this case, there may be a change of configuration during the survey period (with a lorry acquiring a trailer or changing trailer during the period, or a road tractor changing its semi-trailer). In such a case, these successive configurations should be recorded, and the data on the vehicle must be supplied for each journey.

However, if it is not possible to record these successive configurations, it is agreed that, for the vehicle-related variables, those corresponding to the configuration at the beginning of the first laden journey made during the survey period or to the configuration used most during that period should be recorded.

For example, if during the survey period a lorry made all its journeys apart from one without a trailer, Eurostat would accept the recording of the configuration of that vehicle as a lorry without a trailer. In the same way, a road tractor may be coupled to a number of semi-trailers during the survey week, some of which had two axles and some three axles. If these successive configurations cannot be recorded for each journey, Eurostat would accept the data of the configuration of the articulated vehicle either for the first journey made during the survey period or the most frequent configuration.

BASIC TRANSPORT OPERATION

First reference in Regulation

Annex I.

Definition

The transport of one type of goods (defined by reference to a particular nomenclature level) between its place of loading and its place of unloading.

Source of definition

Annex I of Regulation (EU) No 70/2012.

Explanation and examples

The Regulation permits the collection of information on the basis of:

Either a description of each basic goods transport operation (with additional details on unladen journeys).

Or a description of the journeys made by the vehicle in carrying out these basic goods transport operations.

In the great majority of cases, when a laden journey is made, this represents one basic transport operation only with:

- One type of goods carried.
- One point of loading of the goods.
- One point of unloading of the goods.

In this case the two methods used are completely equivalent.

The problem arises when several basic transport operations are carried out in the course of one laden journey. This may be because more than one type of goods is transported during the journey and/or there are several points of loading and/or unloading of the goods.

In this latter case these various loading/unloading points are recorded, in order to calculate directly the tonne-kilometres effected during the journey, and the Statistical Office can reconstitute the basic transport operations.

A consequence of this is that the information to be reported to Eurostat in the A3 (goods) records should be of consignments according to loading and unloading of goods. If the A3 records report information according to stops of the vehicle (stages of a journey), for multi-stop journeys there could be an over-reporting or under-reporting of the tonnage of goods carried and the tonnages unloaded at stopping places.

See Part A, chapters 6.4 and 6.5 and Part C, chapters 11.6 and 11.7 for guidance on and examples of these journeys.

AXLE CONFIGURATION

Computer record field reference <**A1.2**>

Note: In order to simplify the recording of successive configurations, this variable should be transmitted as part of the A2 data file (journey-related variables).

First reference in Regulation

Annex I.

Definition

The total number of axles of a road vehicle or combination of vehicles and their disposition.

Source of definition

Annex II of Regulation (EU) No 70/2012.

Explanation and examples

Where a combination of vehicles is used, the axle configuration counts the total number of axles, that is, the axles of the lorry or the road tractor, plus those of the trailer(s) or semi-trailer. All axles are to be counted even if one axle may not be in contact with the road surface during a particular journey.

Classification and Codes to be used

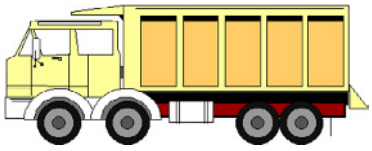
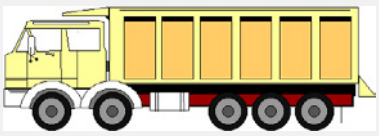
The axle categories and the codes to be used to classify the configuration are as follows:

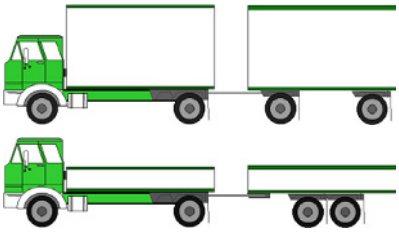
The logic of the coding is that the first digit identifies the vehicle type or combination, the second and third digits indicate the number of axles on the road motor vehicle and trailer/semi-trailer respectively. Where a combination consists of more than one trailer, the third digit should record the total number of axles on all the trailers. The digit 9 is used to indicate "other".

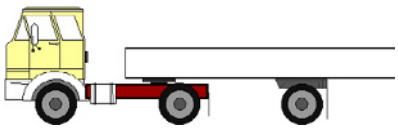
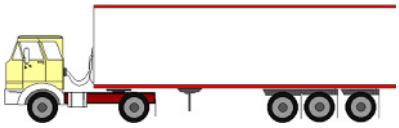
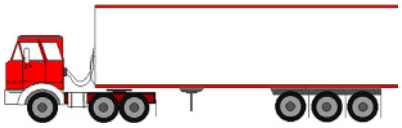
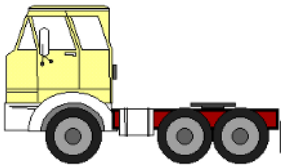
For a road tractor, an axle code 499 should be used only if the journey is unloaded (type 4). Where a country, as a simplification, has chosen to use the same codes for axles, Maximum Permissible Weight and load capacity for all journeys of a road tractor, code 499 for axle configuration should not be used unless all the journeys made by that road tractor during the sampled period were unloaded. Where a country, as a simplification, has chosen to use these same codes for all journeys, the codes used should relate to either the configuration of the first loaded journey in the surveyed period made by that vehicle or to the configuration used most during that period.

Where the axle configuration changes during the course of a journey (for example, when a trailer is attached to a lorry for part of a multi-stop journey), it is recommended that the code corresponding to the maximum axle configuration during that journey is used.

Configuration	Illustration	Coding
Number of axles of single vehicles (lorries)		
2 axles		120

Configuration	Illustration	Coding
3 axles		130
4 axles		140
Other		199

Configuration	Illustration	Coding
Number of axles for combinations of vehicles:		
Lorry and trailer		
2 axles on lorry +1 axle on trailer		221
2 axles on lorry +2 axles on trailer		222
2 axles on lorry +3 axles on trailer		223
3 axles on lorry +2 axles on trailer		232
3 axles on lorry +3 axles on trailer		233
Other		299
Road tractor and semi-trailer		

Configuration	Illustration	Coding
2 axles on road tractor +1 axle on semi-trailer		321
2 axles on road tractor +2 axles on semi-trailer		322
2 axles on road tractor +3 axles on semi-trailer		323
3 axles on road tractor +2 axles on semi-trailer		332
3 axles on road tractor +3 axles on semi-trailer		333
Other		399
Road tractor alone		499

MAXIMUM PERMISSIBLE WEIGHT

Computer record field reference <**A1.4**>

Note: In order to simplify the recording of successive configurations, this variable should be transmitted as part of the A2 data file (journey-related variables).

Alternative terminology

Maximum permissible laden weight

First reference in Regulation

Article 1.

Definition

Total weight of the vehicle (or vehicle combination) when stationary and ready for the road and of the weight of the load declared permissible by the competent authority of the country of registration of the vehicle.

Source of definition

Article 2 of Regulation (EU) No 70/2012.

Commission Regulation (EC) No 2163/2001 uses the term "maximum permissible laden weight".

The *Glossary for Transport Statistics*, Part B, Section II. 38 uses the term: 'Gross vehicle weight (legally permissible maximum weight)': total weight of the vehicle (or combination of vehicles) including its load when stationary and ready for the road declared permissible by the competent authority of the country of registration.

These terms have an identical meaning.

Explanation and examples

The maximum permissible weight is the legal maximum that the vehicle (or vehicle combination) is permitted to weigh, by the competent authority of the country of registration of the vehicle, when the vehicle (combination) is stationary on a public road in that country.

The maximum permissible weight includes the weight of the load capacity as well as the weight of the driver and of all other persons carried at the same time plus the weight of the vehicle (or vehicle combination) with its equipment and a full fuel tank.

The maximum permissible weight for a vehicle combination may vary according to the particular configuration of the vehicle combination. For this reason, this variable has to be treated as a journey-related variable. If, during a single journey, the vehicle combination changes (for example, the addition of a trailer for part of a journey) the largest "maximum permissible weight" during that journey should be recorded.

The vehicle register in many countries quotes the Maximum Permissible Weight for a road tractor as the maximum permitted for the combination of that road tractor and a semi-trailer. The Maximum Permissible Weight given for an unloaded journey by a road tractor should be the same as it would be for a loaded journey as these two variables are the maximum of what is legally permitted for the vehicle on any journey, not what may occur on the specific journey being recorded on the questionnaire.

For the purposes of the Regulation, the maximum permissible weight is to be recorded to the nearest 100 kilograms.

If available, information on maximum permissible weight should be taken from the vehicle registers. If this information is not available in the vehicle registers, typical figures for maximum permissible weight according to vehicle types, axle weights and configurations available on CIRCABC can be used.

LOAD CAPACITY

Computer record field reference <**A1.5**>

Note: In order to simplify the recording of successive configurations, this variable should be transmitted as part of the A2 data file (journey-related variables).

First reference in Regulation

Article 1.

Definition

Maximum weight of goods declared permissible by the competent authority of the country of registration of the vehicle.

Source of definition

Article 2 of Regulation (EU) No 70/2012.

The *Glossary for Transport Statistics*, Part B, Section II. 35.

Explanation and examples

The weight to be taken into account includes the weight of all packaging of the goods including the tare weight of any container, swap body or pallets used to contain the goods.

The load capacity for a vehicle combination may vary according to the particular configuration of the vehicle combination. For this reason, this variable has to be treated as a journey-related variable. If, during a single journey, the vehicle combination changes (for example, the addition of a trailer for part of a journey) the largest "load capacity" during that journey should be recorded.

A road tractor does not have a load capacity itself. However, the vehicle register in many countries quotes the Maximum permissible weight and load capacity as the maximum permitted for the combination of that road tractor and a semi-trailer. The Maximum Permissible Weight and load capacity given for an unloaded journey by a road tractor should be the same as it would be for a loaded journey as these two variables are the maximum of what is legally permitted for the vehicle on any journey, not what may occur on the specific journey being recorded on the questionnaire.

For the purposes of the Regulation, the load capacity is to be recorded to the nearest 100 kilograms.

TYPE OF TRANSPORT

Computer record field reference <**A1.7**>

Note: In order to simplify the recording of successive configurations, this variable should be transmitted as part of the A2 data file (journey-related variables).

First reference in Regulation

Annex I.

Definition

Transport for hire or reward: the carriage for remuneration of persons or goods on behalf of third parties.

Transport on own account: transport that is not for hire or reward.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section III.01 and III.02.

Explanation and examples

Change in type of transport: Depending on the journey, a transport may be carried out on own account or for hire or reward. The type of transport should be recorded for each journey. However, if it is not possible to record these changes, the type of transport to be recorded should be that corresponding to the main mode of utilisation.

Classification and Codes to be used

Type of transport	Code	Remarks
Hire or reward	1	
Own account	2	
Unknown	9	This code should be used only in cases where the type of transport has not been recorded

TYPE OF JOURNEY

Computer record field reference <**A2.1**>

First reference in Regulation

Annex I.

Definitions

Two types of journey can be distinguished according whether basic transport operations took place in the course of a journey (laden journey) or not (unladen journey). These two types are defined below.

Unladen journey. The goods road vehicle travels from location A to location B without a load, that is, a journey without any basic transport operation (this type of journey may also be called an "empty" journey).

Laden journey. Throughout the journey the goods road vehicle carries goods. One or more basic transport operations can be conducted during the course of the journey. The Regulation categorises laden journeys into three types. These are defined below.

Laden journey involving one single basic transport operation. The loading of one type of goods at one point of loading and the unloading of all the goods at another point of unloading.

Laden journey of the collection or distribution round type. The major feature of this type of journey is that there are many stopping points for loading and/or unloading of goods in the course of a single journey.

Laden journey involving several transport operations, but not considered as a collection or distribution round.

Source of definition

Annex III of Regulation (EU) No 70/2012.

Explanation and examples

One clearly distinguishable type of laden journey is that consisting of one single basic transport operation. The loading of one type of goods at one point of loading and the unloading of all the goods at another point of unloading.

Another, fairly easily distinguishable type of laden journey is that of a collection/distribution round. The delivery of bottled soft or alcoholic drinks to retail establishments and the collection of empty bottles and the delivery of bread to retailers are examples of this type of journey. The major feature of this type of journey is that there are many stopping points in the course of a single journey. These journeys often are carried out within the same locality and frequently the place of starting the journey is the same as the end point of the journey, for example a factory or a bakery.

Laden journeys that are not single basic transport operations or collection/delivery rounds can comprise a vast number of alternatives, although are likely to form a very small percentage of the total number of journeys performed. Examples are the loading of two or more type of goods at a single location and unloading the goods at more than one location. For the purposes of the Regulation, all these types of multi-stop journey are given the same code. In some cases it may be difficult to decide whether a journey is multi-stop or collection/delivery. Because of the form-filling burden placed on respondents, a general rule is that any journey with five or more stops may be classified as a collection/delivery journey.

See Part A, chapter 6.4 for more information and Part C, chapter 11.6 for examples of multi-stop journeys.

Simplifying assumptions permitted

In Annex I of Regulation (EU) No 70/2012 under the section TRANSPORT OPERATIONS CARRIED OUT DURING A 'COLLECTION OR DISTRIBUTION ROUND' TYPE OF JOURNEY (journey type 3), each Member State is required to "inform the Commission of

its definition of this type of journey and explain the simplifying assumptions it is obliged to apply when collecting data on the corresponding transport operations".

The last paragraph of the methodological appendix to Annex I of Regulation (EU) No 70/2012 on laden journeys and basic transport operations notes that problems of recording goods information may arise when several basic transport operations are carried out in the course of one laden journey. Some loss of information is accepted but Member States are required to make explicit mention to the Commission of the simplifying assumptions made.

Classification and Codes to be used

Classification of type of journey	Code
Laden journey involving one single basic transport operation	1
Laden journey involving several transport operations, but not considered as a collection or distribution round	2
Laden journey of the collection or distribution round type	3
Unladen journeys	4

COLLECTION OR DISTRIBUTION JOURNEYS

Computer record field reference for "type of journey "<**A2.1**>

First reference in Regulation

Annex I.

Definition

A single journey in which there are many stopping points for loading and/or unloading in the course of the journey.

Source of definition

Annex I of Regulation (EU) No 70/2012.

Explanation and examples

The delivery of bottled soft or alcoholic drinks to retail establishments and the collection of empty bottles and the delivery of bread to retailers are examples of this type of journey.

The major feature of this type of journey is that there are many stopping points in the course of a single journey. These journeys often are carried out within the same locality and frequently the place of starting the journey is the same as the end point of the journey, for example a factory or a bakery.

These journeys may comprise deliveries only, collections only, deliveries and collections either of the same goods or different goods.

For this type of journey, with several loading and/or unloading points, it is practically impossible to ask the transport operators to describe the basic transport operations.

For these journeys, when identified as such, a single, notional, basic transport operation is generally generated on the basis of the information on the journey.

Each Member State will inform the Commission of its definition of this type of journey and explain the simplifying assumptions it is obliged to apply when collecting data on the corresponding transport operations.

As a general guideline, Eurostat would accept that any single journey with more than 4 stops may be classified as a collection or distribution journey.

See Part A, chapter 6.5 and Part C, chapter 11.7 for more information on these journeys.

Classification and Codes to be used

Collection or distribution journeys are coded 3 for "type of journey"–computer variable A2.1.

WEIGHT (OF GOODS)

Computer record field reference <**A2.2**>; <**A3.2**>.

First reference in Regulation

Article 1.

Definition

Gross weight of goods: total weight of the goods and all packaging, but excluding the tare-weight of any container, swap-body and pallets containing goods.

Source of definition

Annex I of Regulation (EU) No 70/2012.

Explanation and examples

The *Glossary for Transport Statistics*, Part B, Section V.20 defines the weight as gross-gross. The gross-gross weight includes the weight of the goods, all packaging, and tare-weight of any container, swap-body and pallets containing goods.

Classification and Codes to be used

The gross weight is to be recorded to the nearest 100 kilograms. Where the weight carried is less than 50 kilograms, the figure 1 (implying 100 kilograms) should be reported in order to distinguish a loaded journey from an empty journey.

If empty journeys are reported, a zero should be entered in field A2.2 rather than leave it blank and a zero should also be entered for the variable A2.6 (tonne-kilometres).

A goods record (A3 record) should not be created for empty journeys.

PLACE OF LOADING/UNLOADING

Computer record field references <**A2.3**>; <**A3.5**>; <**A2.4**>; <**A3.6**>.

First reference in Regulation

Annex I.

Definition

'Place of loading' (of the goods road transport vehicle, for a laden journey);

The place of loading is the first place in which goods are loaded on the goods road transport vehicle, which was previously completely empty (or where the road tractor is coupled up to a laden semi-trailer).

For an unladen journey, it is the place of unloading of the preceding laden journey or the departure from a vehicle depot without a load (this is the notion of 'place where unladen journey begins').

'Place of unloading' (of the goods road transport vehicle, for a laden journey);

The place of unloading is the last place in which goods are unloaded from the goods road transport vehicle, which is subsequently completely empty (or where the road tractor is uncoupled from a semi-trailer).

For an unladen journey, it is the place of loading of the subsequent laden journey or the arrival at a vehicle depot without a load (this is the notion of 'place where unladen journey ends').

Source of definition

Annex I of Regulation (EU) No 70/2012 and Commission Regulation (EC) No 2691/1999 on rules for implementing Council Regulation (EC) No 1172/98 on statistical returns in respect of the carriage of goods by road.

Explanation and examples

A vehicle travels empty from its depot at place **A** to a warehouse at place **B** where it is loaded. It then visits places **C** and **D** where it unloads half its tonnage at each place. It is then empty and travels back to the warehouse at **B**. The vehicle has made two unladen journeys–from **A** to **B** and from **D** back to **B**. It made one laden journey from **B** to **D**.

Classification and Codes to be used

For the Member States of the European Union the codes are those at level 3 of the Nomenclature of Territorial Units for Statistics (NUTS 2024). The full 5-character code–that is, the 2-character alpha country code indicator (for example, FR for France and GR for Greece) followed by the 3-character alphanumeric region code should be given. These codes are available on Eurostat's Classification Server.

For countries that are not members of the European Union but are contracting parties to the Agreement on the European Economic Area (EEA), the coding is according to lists of administrative regions supplied by the country concerned. These codes are available on Eurostat's Classification Server.

For other countries, the 2-alpha ISO-3166 codes of these countries are used, except for Albania, Montenegro, North Macedonia, Serbia, Türkiye and Kosovo for which NUTS level 3 codes are used. These codes are available on Eurostat's Classification Server.

The variables 'Place of loading' and 'Place of unloading' should be coded according to the common classification of territorial units for statistics (NUTS 2024) as defined in Commission Delegated Regulation 2019/1755. For the coding of countries crossed in transit (Annex I of the Regulation, A2 Journey-Related variables, section 7), the 2-alpha part of the NUTS codes should be used for Member States of the European Union and the 2-alpha ISO-3166 codes for all other countries. See chapter 9, section 9.4.2 for information on the development by Eurostat of a tool to aid countries in the coding at NUTS 3 level.

DISTANCE TRAVELLED

Computer record field reference <**A2.5**>; <**A3.7**>

First reference in Regulation

Annex I.

Definition

The actual distance travelled on roads excluding the distance covered by the goods road motor vehicle while being transported by another mode of transport.

Source of definition

Annex I of Regulation (EU) No 70/2012.

Explanation and examples

Where in the course of a single journey a goods road motor vehicle is placed on another mode of transport and the other mode of transport becomes the prime mover in transporting the motor vehicle to another destination, the distance travelled whilst on the other mode of transport is excluded from the recorded distance travelled by the goods road motor vehicle.

A typical example is provided by the means by which goods road motor vehicles are transported between Great Britain and France. For these movements the goods road motor vehicles are carried either by ship or by rail wagon through the Channel Tunnel. The distance travelled by the motor vehicles whilst on board the ship or rail wagon should NOT be included in the vehicle kilometres reported under Regulation (EU) No 70/2012.

See section 10.1.2. on Vehicle-kilometre for information on the expected link between the data recorded in field A2.5 and the fields A1.8.1 and A1.8.2.

Classification and Codes to be used

The distance is recorded in kilometres to the nearest unit.

TONNE-KILOMETRES BY ROAD

Computer record field reference <**A2.6**>

Alternative expression

Kilometres loaded in road transport, actual transport performance in road transport.

First reference in Regulation

Annex I.

Definition

Unit of measure of goods transport that represents the transport of one tonne by road over one kilometre.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section V.22.

Explanation and examples

The distance to be taken into consideration is the distance actually run. It excludes the distance covered when the goods road vehicle is being transported by another means of transport.

The figures to report

The tonne-kilometres performed on each journey are to be reported to Eurostat to the nearest superior unit. The calculation should be based upon the product of the kilometres travelled and the tonnage of the transported goods (to the nearest 100 kilograms) as reported to Eurostat. The calculation should NOT be based on kilograms to the nearest unit, if they are collected at unit level by a country.

Guidance on the calculation of tonne-kilometres on multi-stop and collection/delivery journeys is provided in chapters 6.4, 6.5 and 11.6.

TRANSIT

Computer record field reference for "countries crossed in transit "<**A2.7**>

First reference in Regulation

Annex I.

Definition

Any loaded or empty road motor vehicle, which enters and leaves a country at different points by whatever means of transport, provided the total journey within the country is by road and that there is no loading or unloading in the country.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section IV.13.

Explanation and examples

For a journey from the Netherlands to Portugal passing through Belgium, France and Spain where no goods were loaded or unloaded in Belgium, France or Spain, the transit countries would be Belgium, France and Spain.

A road motor vehicle loaded/unloaded at the frontier of that country onto/from another mode of transport is included.

Classification and Codes to be used

The country codes to be used are the same as those for the variable "Place of loading/unloading". Up to 5 2-alpha codes, without separators, should be entered.

In the example given above the codes for the computer field A2.7 would be BEFRES.

If there are more than five transit countries for one journey, the first two after the loading of goods and the last 3 before the unloading of goods should be recorded.

PLACE OF LOADING/UNLOADING OF A GOODS ROAD VEHICLE ON ANOTHER MODE OF TRANSPORT

Computer record field reference <**A2.8**>; <**A2.9**>

Alternative terminology

Place of loading/unloading of a vehicle on another means of transport.

First reference in Regulation

Annex I.

Definition

'Place of loading' (of the goods road transport vehicle on another mode of transport):

The place of loading is the first place where the goods road motor vehicle was loaded on to another mode of transport (usually a ship or a rail wagon).

'Place of unloading' (of the goods road transport vehicle from another mode of transport):

The place of unloading is the last place where the goods road motor vehicle was unloaded from another mode of transport (usually a ship or a rail wagon).

Source of definition

Annex I of Regulation (EU) No 70/2012 uses an alternative terminology of "means of transport" for the usual terminology of "mode of transport".

Explanation and examples

The place of loading to be recorded is the place, if any, where in the course of a single journey a goods road motor vehicle is placed on another mode of transport and that other mode of transport becomes the prime mover in transporting the motor vehicle to another destination.

The variable to be recorded is the place of loading/unloading of the goods road motor vehicle itself onto another mode of transport (ferry or rail wagon). The English translation published in the Official Journal has used the term "goods road transport vehicle" whereas the original working English version used the term "goods road motor vehicle" (=FR: "vehicule routier a moteur") throughout the Regulation. It is definitely the goods road motor vehicle that is targeted here.

A typical example is provided by the means by which goods road motor vehicles are transported between Great Britain and France. For these movements the goods road motor vehicles are carried either by ship or by rail wagon through the Channel Tunnel.

If a trailer or semi-trailer is loaded on to a ferry or rail wagon without its accompanying road motor vehicle, according to the Regulation one journey ends at the place where the trailer or semi-trailer is uncoupled from its road motor vehicle. A new journey will start at the place where that trailer or semi-trailer is off-loaded from the ferry or rail wagon and coupled up to (normally) a different road motor vehicle.

For example, if a French-registered road tractor takes a semi-trailer from Paris to Calais and the semi-trailer is uncoupled and placed on board a ferry going to Dover where it is coupled to a British-registered road tractor and taken to Manchester, then two journeys are performed; one national French journey and one national British journey. Note however, that if the British journey was performed by a French-registered road tractor, this would be a cabotage journey. If the French-registered road

tractor accompanied the semi-trailer on the ferry and carried the goods to Manchester, this should be recorded as one international journey by a French operator.

If a goods road motor vehicle is loaded onto a ferry (or rail wagon), there is an important point relating to variable A2.5. The distance travelled whilst the road vehicle is being carried by the other mode of transport should not be recorded as part of variable A2.5. Annex I of the Regulation indicates this in the A2 Journey-related variables, section 5–distance travelled: actual distance excluding the distance covered by the goods road transport vehicle while being transported by another means of transport.

If only a trailer is being placed on another mode of transport and the single motor vehicle is not yet completely emptied, this operation is to be considered as an intermediate stop, and the journey of the goods road vehicle has not yet ended.

Classification and Codes to be used

The codes to be used are the same as those for the variable "Place of loading/unloading".

VOLUMETRIC SITUATION (DEGREE OF LOADING)

Computer record field reference <**A2.10**>

Alternative terminology

Degree of loading of vehicle (in terms of maximum volume of space used during the journey). Degree of use of the volume-related load capacity.

First reference in Regulation

Annex I.

Definition

Degree of loading of vehicle (in terms of maximum volume of space used during the journey): the load carried by a goods road vehicle (or combination of goods road vehicles) in terms of the volumetric capacity of that vehicle available for goods.

Source of definition

Annex I of Regulation (EU) No 70/2012.

Explanation and examples

The aim of this variable is to provide an indication of the degree of loading of the vehicle in volumetric terms, and thus a measure of spare capacity on vehicle journeys. If the weight of goods carried is less than the load capacity of a vehicle, this does not necessarily mean that the vehicle is not fully loaded in the sense that it is not possible to put more goods into the vehicle. In many cases vehicles will be fully loaded with goods although the weight of the goods is well below the load capacity of the vehicle.

While unladen journeys should be coded as '0', laden journeys should be distinguished by the degree of loading into two categories.

In many cases it is difficult to judge whether a goods vehicle is "fully loaded" in the sense that it is not possible to squeeze one more package into the vehicle if the total weight being carried is well below the load capacity. It is also the case that a vehicle may well start its journey "fully loaded" in volumetric terms but gradually unload at a number of stops during the journey. For this reason, "fully loaded" has been defined that at least 90 per cent of the available volume is occupied at least for part of the journey.

Classification and Codes to be used

	Volumatric situation	Code
Procedure 0	Unladen journeys	0
Procedure 1	Not fully loaded: less than 90% of available volume is used throughout the journey	1
Procedure 2	Fully loaded: at least 90% of available volume is used for at least part of the journey	2
Procedure 3	Unknown	3

10.1.4. Goods-related variables

GOODS LOADED

Computer record field reference for "place of loading of the goods" <**A3.5**>

First reference in Regulation

Annex I.

Definition

Goods placed on a goods road vehicle and dispatched by road.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section V.27

Explanation and examples

Transhipment from one goods road vehicle to another or change of the road tractor is regarded as loading after unloading.

Classification and Codes to be used

The codes to be used for place of loading of the goods are the same as those for the variable "Place of loading/unloading".

GOODS UNLOADED

Computer record field reference for "place of unloading of the goods" <**A3.6**>

First reference in Regulation

Annex I.

Definition

Goods taken off a goods road vehicle after transport by road.

Source of definition

The *Glossary for Transport Statistics*, Part B, Section V.28

Explanation and examples

The transhipment from one goods road vehicle to another or the change of the road tractor is regarded as unloading before reloading.

If, however, only a trailer is unloaded and the single goods road motor vehicle is not completely emptied, this operation is to be considered as an intermediate stop and the journey has not yet ended.

Classification and Codes to be used

The codes to be used for place of unloading of the goods are the same as those for the variable "Place of loading/ unloading".

TYPE OF GOODS (NST 2007)

Computer record field reference <**A3.1**>

First reference in Regulation

Annex I.

Definition

The classification of goods carried by road shall be according to the NST 2007 nomenclature (Standard Goods Nomenclature for Transport Statistics 2007–Eurostat).

Source of definition

Annex IV of Regulation (EU) No 70/2012.

Standard Goods Nomenclature for Transport Statistics 2007, published by the Statistical Office of the European Communities (2007 edition).

Explanation and examples

The NST 2007 consists of 81 headings grouped into 20 divisions according to a systematic 3-digit code. Criteria for the grouping of the 81 positions were the kind of commodity, the degree of processing, transport conditions and transported quantities. A detailed note on the NST 2007 is given in Chapter 9, section 9.5.2.

Classification and Codes to be used

The Regulation requires the coding of the type of goods carried to the 20 divisions of goods. The description of goods, NST divisions and NST groups are given in Annex IV of Regulation (EU) No 70/2012. The codes to be used are the 2-digits of the 20 divisions (with a leading zero for divisions 1 to 9). A description of the 20 divisions is available on CIRCABC.

A note on an aid, available on CIRCABC, for the coding of specific commodities to the 20 NST 2007 divisions can be found in the previous chapter, section 9.5.2.

Within the NST 2007, a code (group 16.2) has been created for empty packaging. Therefore, empty packaging should be reported in the division 16 of the NST 2007.

Within the NST 2007, the division code 19 has been created for unidentifiable goods (unidentifiable goods in containers or swap bodies or other unidentifiable goods). However this code should be used ONLY in the case of goods that could not be identified.

Waste is now recorded as such in the NST 2007 and appears under groups 14.1 and 14.2. Therefore, waste should be reported in the division 14 of the NST 2007.

DANGEROUS GOODS

Computer record field reference <**A3.3**>

First reference in Regulation

Annex I.

Alternative terminology

Hazardous goods.

Definition

Classification of goods as dangerous according to the main categories of Directive 2008/68/EC.

Source of definition

The classification of the type of dangerous goods as defined in Directive 2008/68/EC, Annex A, part I.

Explanation and examples

The carriage of dangerous goods is closely controlled under stringent conditions in Europe. Hauliers engaged in this business will be conversant with the categories of the classification and should have no difficulty to allocate the correct code.

Classification and Codes to be used

The classification to be used is given in Annex V of Regulation (EU) No 70/2012. This is reproduced below together with the codes to be used. A category "Unknown" can be added to the classification of categories of dangerous goods, with the code 99. If the goods are not dangerous, there is no need to enter anything.

Classification of categories of dangerous goods

Categories of dangerous goods	Code
Explosives	1
Gases, compressed, liquefied or dissolved under pressure	2
Flammable liquids	3
Flammable solids	41
Substances liable to spontaneous combustion	42
Substances that, in contact with water, emit flammable gases	43
Oxidising substances	51
Organic peroxides	52
Toxic substances	61
Substances liable to cause infections	62
Radioactive material	7
Corrosives	8
Miscellaneous dangerous substances	9
Unknown	99

TYPE OF FREIGHT

Computer record field reference <**A3.4**>

First reference in Regulation

Annex I.

Alternative terminology

Cargo types; mode of appearance.

Definition

The appearance of the cargo unit on presentation for transportation.

Explanation and examples

The classification of cargo types and the "Codes for types of cargo, packages and packing materials, Recommendation 21" were adopted by the United Nations Economic Commission for Europe Working Party on Facilitation of International Trade Procedures, Geneva, March 1986.

The principle of the classification is the outward appearance on the road–that is, the final type of transport equipment used. The type of freight is determined by the exterior packaging, including any unit of transport equipment, surrounding the goods at the point of loading onto the goods road vehicle. The type of goods road vehicle is not taken into account.

To a large extent the body type of a goods road vehicle determines the range of cargo types that can be carried. For example, tankers are designed to carry either liquid bulk or solid (in powder form) bulk. Tipper trucks are designed to carry solid bulk.

A container is defined as an article of transport equipment that is:

Of a permanent character and strong enough to be suitable for repeated use.

Specially designed to facilitate the carriage of goods, by one or more modes of transport, without intermediate re-packing.

Fitted with devices permitting its ready handling, particularly its transfer from one mode of transport to another.

So designed as to be easy to fill and empty.

Stackable; and having an internal volume of one cubic metre or more.

Large freight containers (code 2) are the 20 foot and 40 foot ISO containers and the super high cube (oversize) containers–i.e. a freight container 20 feet (6m) or more in external length. Swap bodies–carrying units strong enough for repeated use but not enough to be top-lifted or stackable when loaded – should be classified as large freight containers (UN Recommendation 21).

Freight container less than 20 ft (6m) in external length should be coded as other freight containers (code 3).

Pallets–raised platforms, intended to facilitate the lifting and stacking of goods. They are usually made of wood and of standard dimensions:

- 1000 mm **.** 1200 mm (ISO) or
- 800 mm **.** 1200 mm.

Pre-slung goods are normally in large sacks that have straps attached for top-lifting by crane. The important aspect of these goods is that the sling for top-lifting is a permanent feature of the packaging.

Live animals are considered as mobile, self-propelled units.

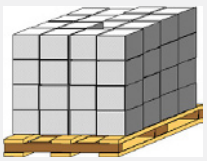
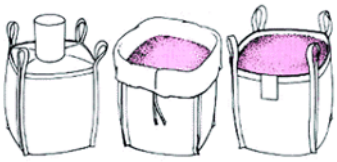
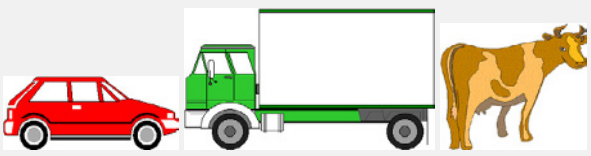
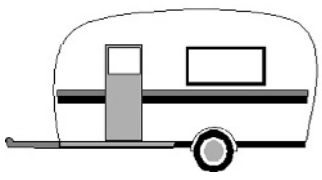
Classification and Codes to be used

Bottles in boxes or crates and gasses in metal containers designed to hold these gases are coded 9.

A code is not required for empty journeys because goods records (A3) should not be created for empty journeys.

The classification and codes (shown below) are also given in Annex VI of Regulation (EU) No 70/2012.

Classification of Cargo types

Cargo type	Code	Illustration
Liquid bulk (no cargo unit)	0	
Solid bulk (no cargo unit)	1	
Large freight containers	2	
Other freight containers	3	
Palletised goods	4	
Pre-slung goods	5	
Mobile, self-propelled units – live animals	6	
Other mobile units	7	 

Cargo type	Code	Illustration
This code is not allocated	8	
Other cargo types	9	

10.2 Alphabetical reference list of variables

This list gives, in alphabetical order, the page number in this chapter where the definition of each variable commences and the codes to be used for each variable when submitting the data to Eurostat are given.

Rules for transmission of data to Eurostat and dissemination recommendations

Contents

11 Data transmission and structure of files

11.1 Data transmission

11.1.1 Deadline for data transmission

According to Regulation (EU) 70/2012, the deadline for the data transmission for all datasets is five months after the end of the reporting period.

Datasets	Periodicity of datasets	Deadline
A1, A2, A3, B1, B2	Quarter 1 of year T	August (year T)
	Quarter 2 of year T	November (year T)
	Quarter 3 of year T	February (year T+1)
	Quarter 4 of year T	May (year T+1)

11.1.2 Naming of datasets

Managing data transmission is not only a technical issue. Before all, it is a matter of good organisation to make possible an effective cooperation between the parties involved: senders, receivers and applications. The basis of this organisation is the monitoring of 'Who is sending What to Whom' and the very first step is a clear identification of the datasets to send.

The eDAMIS Dataset Naming Convention (DSNC) should be strictly applied. For each data transmission, it is very important to clearly identify the datasets to be sent in accordance with the DSNC.

A separate file by dataset of the Regulation and period has to be sent.

A separate file has to be transmitted for each respective quarter.

The following file naming convention is required:

"ROAD;DatasetID;Frequency;Country;Year;Quarter;Version;Format", where:

ROAD	For Road transport data
DataseID	A1, A2, A3, B1 and B2
Frequency	"Q" for Quarterly

Country	Reporting country, according to Annex VII of Regulation (EU) No 70/2012
Year	Year of the data on 4 positions (e.g. 2022)
Quarter	"0001" for the first quarter "0002" for the second quarter "0003" for the third quarter "0004" for the fourth quarter
Version	Alphanumeric values to use: V0001, V0002, V0003, …V0009, V0010, V0011, … etc.
Format	File format: (CSV for Comma Separated Value, XML for SDMX-ML file)

Example:

The data set " ROAD_A1_Q_ES_2023_0002_V0003.csv" is the dataset that contains Road freight transport data for Spain, year 2023, Quarter 2, the dataset A1.

11.1.3 Transmission using eDAMIS

General information

The electronic Data files Administration and Management Information System (eDAMIS) is the "Single-entry point" for data exchange between NSIs, ONAs and Eurostat, allowing the monitoring of data exchange and the management of users.

eDAMIS informs the users having Provider rights (senders) about the transfer of their data files as well as the users having Consumer rights (receivers) about the delivery of the files.

When data providers (senders) transmit data, they receive two kinds of notifications:

- An acknowledgement that a file has been transferred.
- A 'feedback delivery' notification on the results of STRUVAL and/or CONVAL (validation report)

In the same way, users having Consumer rights (receivers) in a dataset receive a mail:

- When a data file has been delivered to their organisation.
- When a validation report is sent (feedback delivery).

Upon transmission, data providers receive information on validation errors to be corrected. eDAMIS is, in this case, providing a validation report (feedback delivery), which informs about the status of the file transmitted (successfully passed validation or not).

Double authentication to log in to eDAMIS

Access to eDAMIS environment requires a 2-Factor authentication (EU Login and the use of a private device). The 2-Factor Authentication is mandatory as part of the security policy of the Directorate-General for Informatics of the European Commission. It has been applied to eDAMIS Acceptance since August 2022 and to eDAMIS Production as of January 2023.

This change has been announced in several communications and in the 2022 meeting of the Data Transmission Coordination Group (DTCG).

If you have specific questions on eDAMIS, please contact either your national transmission coordinator or the eDAMIS support team: ESTAT-SUPPORT-EDAMIS@ec.europa.eu.

Pre-validation in EDAMIS

An eDAMIS pre-validation service is enabled for all rail datasets. Until May 2023, the pre-validation process will take place in eDAMIS Acceptance environment. As of May 2023, it will be transferred to the eDAMIS Production environment where a pre-validation button will have to be ticked. This feature is available to data providers who would like to validate their dataset transmissions ahead of official transmissions. The pre-validation is optional and not linked to official transmissions. The service offers to data providers the same validation rules as for the official transmissions. All pre-validation transmissions are automatically deleted from Eurostat's systems after 3 days. The data will be neither further transmitted and processed nor published, so it is a very easy way to test the data prior to official transmission and validation.

STRUVAL/CONVAL

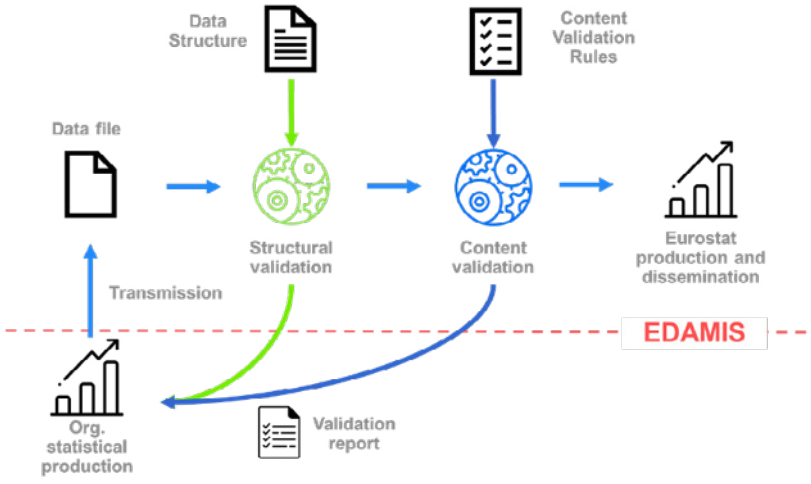
STRUVAL (Structural Validation) is a tool that is able to check the format and the structure of the incoming data files (number of fields, presence of mandatory fields and use of correct code lists defined by the Data Structure Definition (DSD)).

CONVAL (Content Validation) is based on validation rules and is a tool performing checks on the content of the received data (e.g. aggregation checks, consistency of data etc.). The CONVAL tool can only perform intra-dataset checks but no consistency checks between different datasets.

More detailed information on STRUVAL and CONVAL is available here for STRUVAL; and here for CONVAL. The Validation user guide can be found under this link. The validation rules implemented in CONVAL for road freight transport are listed in section 10.10.

FIGURE 11.1

Double validation process through eDAMIS



There are three types of validation level defined: Error, Warning and Info. In CONVAL, the severity level can be set to one of the three types for every validation rule separately. In STRUVAL, the severity level is always set to Error.

More information

For more information and training / support material for eDAMIS, the links below can be consulted.

- A general presentation of eDAMIS, along with links to available training material is available here.
- Tutorial videos on how to transmit files via eDAMIS can be found here.
- The eDAMIS Web Portal (eWP) is accessible here.

- The national Transmission Coordinators (TCOs) can provide support to users at national level. The list of National Transmission Coordinators can be found here.
- Eurostat Support can be contacted at the following address: estat-support-edamis@ec.europa.eu

Convention for transmission of revised data

Revised datasets provided by the countries are imported by Eurostat in the production database according to the following process:

- Eurostat receives data revisions from the participating countries
- All the figures already stored in the production database for the given dataset and the corresponding period are deleted
- The revised figures are imported in the production database.

This process has as consequence that the countries should provide all full updated datasets when revising data, and not only the records to be revised.

11.2 Structure of files

The new IT architecture, which is based on the SDMX standard, supports two formats of data files to be transmitted: CSV format and the SDMX-ML format.

11.2.1 List of fields

The following information is provided for each field:

- **Field number**: this identifies the position of the field in the record.
- **Variable**: this is either the reference to the variable in Regulation (EU) No 70/2012, or an internal identifier.
- **Description**: short description of the contents of the field.
- **Coding**: variables are to be coded according to Annexes I-VII of Regulation (EU) No 70/2012. Some additional coding rules are noted here. Further explanations and recommendations on coding are provided in Chapter 10 of this manual.
- **Field type**: indicates whether field contains a numeric quantity or a text string
- **Maximum length**: the maximum expected length of the data for this field. Data which are too long cannot be loaded,
- **Key field**: the combination of the values of the key fields for a data set must constitute a unique key value within that data set. If duplicate key values are found, the loading of the data set and its linked data sets is blocked, since the vehicle, journey and goods records cannot be correctly linked.
- **Optional variable**: a flag for variables which are optional according to Annex I of Regulation (EU) No 70/2012. The field for these optional variables must be included in the data records even if the data for that variable is not collected. It should be coded as an empty field (no data between two successive field separators).

TABLE 11.1

Data set A1: Vehicle-related variables

Field number	Variable	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field	* = optional variable	Specific codes for missing values
1	RCOUNT	REF_AREA	Reference area	Annex VII of Regulation (EU) No 70/2012	Text	2	*		
2	DSetID	TABLE_ IDENTIFIER	Table identifier	A1	Text	2	*		
3	TIME_ PERIOD	TIME_ PERIOD	Time period (a combination of Year and Quarter fields in the form of: YYYY-Qx)	4 digits followed by '-' and QUARTER dictionary	Text	10	*		
4	FREQUENCY	FREQ	Frequency of observation	Q (quarterly)	Text	1	*		
5	QuestN	QUEST_ID	Questionnaire identifier		Text	9	*		
6	A1_1	COMB_ TRANSPORT	Possibility of using vehicle for combined transport	Y (Yes) / N (No)	Text	1		*	X
7	A1_3	VEH_AGE	Age of the road motor vehicle(lorry or road tractor)	Years from first registration	Numeric	2			99
8	A1_6	ACTIVITY	NACE Revision 2 activity class of the vehicle operator	NACE 4-digit level	Text	5		*	
9	A1_8_1	KM_ LOADED	Total vehicle kilometres during the survey period-loaded	km	Numeric	4			

Field number	Variable	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field	* = optional variable	Specific codes for missing values
10	A1_8_2	KM_EMPTY	Total vehicle kilometres during the survey period - empty (including road tractor journeys without semi-trailer)	km	Numeric	4		*	
11	A1_9	VEH_ WEIGHTING	Vehicle weighting to be used to get full results from individual data, if the collection of data is carried out from sample ([1])		Numeric	8			
12	Stratum	STRATUM	Stratum identifier of sample in which vehicle appears		Text	7			
13	A2link	A2_LINK	Number of linked A2 records	Numeric	Numeric	5			

([1]) Weighting factor: is a number indicating how many other vehicles in the country are represented by this sampled vehicle.

TABLE 11.2

Data set A2: Journey-related variables

Field number	Variable	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field	* = optional variable	Specific codes for missing values
1	RCOUNT	REF_AREA	Reference area	Annex VII of Regulation (EU) No 70/2012	Text	2	*		
2	DSetID	TABLE_ IDENTIFIER	Table identifier	A2	Text	2	*		
3	TIME_ PERIOD	TIME_PERIOD	Time period(a combination of Year and Quarter fields in the form: YYYY-Qx)	4 digits followed by '-' and QUARTER dictionary	Text	10	*		
4	FREQUENCY	FREQ	Frequency of observation	Q (quarterly)	Text	1	*		
5	QuestN	QUEST_ID	Questionnaire identifier		Text	9	*		
6	JournN	JOURNEY_ID	Journey identifier		Text	5	*		
7	A1_2	AXLE	Axle configuration	Annex II of Regulation (EU) No 70/2012	Text	3		*	
8	A1_4	MAX_WEIGHT	Maximum permissible laden weight	100kg	Numeric	4			
9	A1_5	LOAD_ CAPACITY	Load capacity	100kg	Numeric	4			
10	A1_7	TRANSPORT_ TYPE	Type of transport	Annex I of Regulation (EU) No 70/2012	Text	1			9
11	A2_1	JOURNEY_ TYPE	Type of journey	Annex III of Regulation (EU) No 70/2012	Text	1			
12	A2_2	GOODS_ WEIGHT	Weight of goods	Gross weight in 100kg	Numeric	4			

Field number	Variable	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field	* = optional variable	Specific codes for missing values
13	A2_3	REGION_ LOADING	Place of loading(of the goods road motor vehicle, for a laden journey)	Annex VII of Regulation (EU) No 70/2012	Text	5			<CC>XX[1]
14	A2_4	REGION_ UNLOADING	Place of unloading(of the goods road motor vehicle, for a laden journey)	Annex VII of Regulation (EU) No 70/2012	Text	5			<CC>XX[1]
15	A2_5	KM_TRAVEL	Distance travelled: actual distance excluding the distance covered by the goods road motor vehicle while being transported by another	km	Numeric	4			
16	A2_6	TONNES_KM_ TRAVEL	Tonnes x km effected during the journey	tkm	Numeric	8			
17	A2_7	TRANSIT_ COUNTRY	Countries crossed in transit (not more than 5)	Annex VII of Regulation (EU) No 70/2012	Text	10			
18	A2_8	REGION_ LOADING_ OTH	Place of loading, if any, of the goods road motor vehicle on another means of transport	Annex VII of Regulation (EU) No 70/2012	Text	5		*	XX

Field number	Variable	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field	* = optional variable	Specific codes for missing values
19	A2_9	REGION_ UNLOADING_ OTH	Place of unloading, if any, of the goods road motor vehicle from another means of transport	Annex VII of Regulation (EU) No 70/2012	Text	5		*	XX
20	A2_10	LOAD_ DEGREE	Degree of loading of vehicle (in terms of maximum volume of space used during the journey)		Text	1		*	9
21	A3link	A3_LINK	Number of linked A3 records		Numeric	8			

([1]) If the place of loading or unloading is not a EU Member State, the code XX should be used for missing values.

TABLE 11.3

Data set A3: Goods-related variables (in the basic transport operation)

Field number	Variable	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field	* = optional variable	Specific codes for missing values
1	RCOUNT	REF_AREA	Reference area	Annex VII of Regulation (EU) No 70/2012	Text	2	*		
2	DSetID	TABLE_ IDENTIFIER	Table identifier	A3	Text	2	*		
3	TIME_ PERIOD	TIME_PERIOD	Time period	4 digits followed by '-' and QUARTER dictionary	Text	10	*		

Field number	Variable	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field	* = optional variable	Specific codes for missing values
4	FREQUENCY	FREQ	Frequency of observation(a combination of Year and Quarter fields in the form: YYYY-Qx)	Q (quarterly)	Text	1	*		
5	QuestN	QUEST_ID	Questionnaire identifier		Text	9	*		
6	JournN	JOURNEY_ID	Journey identifier		Text	5	*		
7	GoodsN	GOODS_ OPERATION_ ID	Goods operation identifier		Text	6	*		
8	A3_1	GOODS	Type of goods, according to the groups referring to an appropriate classification	Annex of Regulation (EC) No 1304/2007 (NST 2007)	Text	2			
9	A3_2	GOODS_ WEIGHT	Weight of goods	Gross weight in 100 kg	Numeric	4			
10	A3_3	DANGEROUS_ GOODS	Classification of dangerous goods	Annex V of Regulation (EU) No 70/2012 (main categories of Directive 2008/68/ EC)	Text	3			
11	A3_4	CARGO_TYPE	Type of cargo	Annex VI of Regulation (EU) No 70/2012 (1-digit level of UN Recommendation No 21)	Text	1		*	X
12	A3_5	REGION_ LOADING	Place of loading(of the goods road motor vehicle, for a laden journey)	Annex VII of Regulation (EU) No 70/2012	Text	5			<CC>XX[1]

Field number	Variable	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field	* = optional variable	Specific codes for missing values
13	A3_6	REGION_ UNLOADING	Place of unloading(of the goods road motor vehicle, for a laden journey)	Annex VII of Regulation (EU) No 70/2012	Text	5			<CC>XX[1]
14	A3_7	KM_TRAVEL	Distance travelled: actual distance excluding the distance covered by the goods road motor vehicle while being transported by another	km	Numeric	4			

([1]) If the place of loading or unloading is not a EU Member State, the code XX should be used for missing values.

TABLE 11.4

Data set B1: Supplementary table for surveys where the goods motor vehicle is the statistical unit: information on sample

Field number	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field
1	REF_AREA	Reference area	Annex VII of Regulation (EU) No 70/2012	Text	2	*
2	TABLE_ IDENTIFIER	Table identifier	B1	Text	2	*
3	TIME_PERIOD	Time period	4 digits followed by '-' and QUARTER dictionary	Text	10	*
4	FREQ	Frequency of observation(a combination of Year and Quarter fields in the form: YYYY-Qx)	Q (quarterly)	Text	1	*
5	STRATUM	Stratum Identifier	Alphanumeric codes	Text	7	
6	B1.1	Number of vehicles in the country in each stratum	Numbers only	Numeric	8	
7	B1.2	Number of vehicles selected for initial sample and questionnaires despatched to vehicle owners	Numbers only	Numeric	8	
8	B1.3	Number of cases classified as non-respondents	Numbers only	Numeric	8	
9	B1.4	Number of cases where sample register information was wrong and response could not be used	Numbers only	Numeric	8	
10	B1.5	Number of questionnaires used in analysis	Numbers only	Numeric	8	
11	B1.6	Number of vehicles where no activity was recorded during the sampled period but the vehicle could be considered as part of the active stock	Numbers only	Numeric	8	
12	B1.7	Grossing factor used	Numbers only	Numeric	8	

TABLE 11.5

Data set B2: Supplementary table for surveys where the goods motor vehicle is not the statistical unit: information on sample

Field number	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field
1	REF_AREA	Reference area	Annex VII of Regulation (EU) No 70/2012	Text	2	*
2	TABLE_ IDENTIFIER	Table identifier	B1	Text	2	*
3	TIME_PERIOD	Time period	4 digits followed by '-' and QUARTER dictionary	Text	10	*
4	FREQ	Frequency of observation(a combination of Year and Quarter fields in the form: YYYY-Qx)	Q (quarterly)	Text	1	*
5	STRATUM	Stratum Identifier	Alphanumeric codes	Text	7	
6	B2.1	Number of primary statistical units in the country in each stratum	Numbers only	Numeric	8	
7	B2.2	Number of primary statistical units selected for initial sample and questionnaires despatched to vehicle owners	Numbers only	Numeric	8	
8	B2.3	Number of cases classified as non-respondents	Numbers only	Numeric	8	
9	B2.4	Number of cases where sample register information was wrong and response could not be used	Numbers only	Numeric	8	
10	B2.5	Number of primary statistical units providing information about vehicles	Numbers only	Numeric	8	
11	B2.6	Of the statistical units in row 5, total number of vehicles for which information was supplied on journeys made in survey period	Numbers only	Numeric	8	
12	B2.7	Of the statistical units in row 5, total number of vehicles where no vehicle activity was recorded during the sampled period but the vehicle could be considered as part of the active stock.	Numbers only	Numeric	8	

Field number	SDMX compliant variable	Description	Coding	Field type	Maximum length	* = key field
13	B2.8	Estimated number of vehicles in country by stratum	Numbers only	Numeric	8	
14	B2.9	Grossing factor used	Numbers only	Numeric	8	

11.2.2 Structure of CSV files

The first line of the files should contain a header with the names of the concepts used. Semicolon (";") should be used as a field separator in the CSV files. The structure of each dataset is described hereafter.

Dataset A1

Header:

REF_AREA;TABLE_IDENTIFIER;TIME_PERIOD;FREQ;QUEST_ID;COMB_TRANSPORT;VEH_AGE;ACTIVITY;KM_LOADED;KM_EMPTY;VEH_WEIGHTING;STRATUM;A2_LINK

Example of records:

SI;A1;2022-Q1;Q1;1344297;;11;C1629;101;128;151.1189;14;2
SI;A1;2022-Q1;Q1;2249540;;13;H4941;1138;828;151.1189;14;4
SI;A1;2022-Q1;Q1;2334227;;14;I5530;32;12;151.1189;14;5

Dataset A2

Header:

REF_AREA;TABLE_IDENTIFIER;TIME_PERIOD;FREQ;QUEST_ID;JOURNEY_ID;AXLE;MAX_WEIGHT;LOAD_CAPACITY;TRANSPORT_TYPE;JOURNEY_TYPE;GOODS_WEIGHT;REGION_LOADING;REGION_UNLOADING;KM_TRAVEL;TONNES_KM_TRAVEL;TRANSIT_COUNTRY;REGION_LOADING_OTH;REGION_UNLOADING_OTH;LOAD_DEGREE;A3_LINK

Example of records:

SI;A2;2022-Q1;Q1; 2344297;14;423;578;490;2;1;46;SI041;SI041;12;147;;;;;1
SI;A2;2022-Q1;Q1; 2349540;1;353;300;280;1;1;4;SI041;UKXXX;423;423;ATDEBEFR;;;;1
SI;A2;2022-Q1;Q1; 2344227;15;160;360;171;2;4;0;SI032;SI032;7;0;;;;;0

Dataset A3

Header:

REF_AREA;TABLE_IDENTIFIER;TIME_PERIOD;FREQ;QUEST_ID;JOURNEY_ID;GOODS_OPERATION_ID;GOODS;GOODS_WEIGHT;DANGEROUS_GOODS;CARGO_TYPE;REGION_LOADING;REGION_UNLOADING;KM_TRAVEL

Example of records:

SI;A3;2022-Q1;Q1;1356376;2;1;13;18;;4;AT312;AL;406
SI;A3;2022-Q1;Q1;2243877;2;1;10;54;;4;DE600;AL;850
SI;A3;2022-Q1;Q1;2331456;2;1;11;21;;4;BGXXX;AL;352

Dataset B1

Header:

REF_AREA;TABLE_IDENTIFIER;TIME_PERIOD;FREQ;STRATUM;B1.1;B1.2;B1.3;B1.4;B1.5;B1.6;B1.7

Example of records:

SI;B1;2022-Q1;Q;1051;7782;510;25;68;282;135;243

Dataset B2

Header:

REF_AREA;TABLE_IDENTIFIER;TIME_PERIOD;FREQ;STRATUM;B2.1;B2.2;B2.3;B2.4;B2.5;B2.6;B2.7;B2.8;B2.9

Example of records:

SI;B2;2021-Q1;Q;2400;2497;0;0;0;249;35;0;0;141

11.2.3 Structure of SDMX-ML files

The second format for data transmission is the SDMX-ML format, which was developed under the SDMX standard (see www.sdmx.org for more information). Apart from data exchange, it supports validation (code and format) of data files before transmission to Eurostat.

For the latest version of the data structure for rail datasets, consult the SDMX Registry. On the homepage of the Registry, use the search window on the top right corner to look for ROAD. Once the results of the search appear, look for the DSDs (column 'Type' on the main window) and choose their latest version. Alternatively, after getting the results of the search, it is possible to locate the DSDs for ROAD faster, by selecting "Data structures" in the artefacts list on the left side of the interface.

Detailed instructions on usage of standard software to convert CSV formatted files into SDMX-ML and on finding ways of generating SDMX-ML formatted files directly from internal database management systems are available here.

11.2.4 Links between datasets

Article 3 of Regulation (EU) No 70/2012 (see Annexes of this Manual) set out the statistical data that Member States should compile on the carriage of goods by road. The Annexes to the Regulation indicated the definitions for the data and levels within the classification used for the breakdown. Article 5 stated that duly verified individual data corresponding to the variables referred to in Article 3 should be transmitted to Eurostat every quarter. The arrangements for transmitting the data (including the provision of any statistical tables based upon that data) would be laid down in accordance with the procedure specified in Article 9.

Individual data records should not be sent to Eurostat for any vehicle that had not recorded any activity during the time period that the vehicle was surveyed.

Commission Regulation (EC) No 2163/2001 (see Annexes of this Manual) has specified the format in which the data are to be transmitted by Member States to Eurostat to ensure that the data can be processed rapidly and in a cost-effective way.

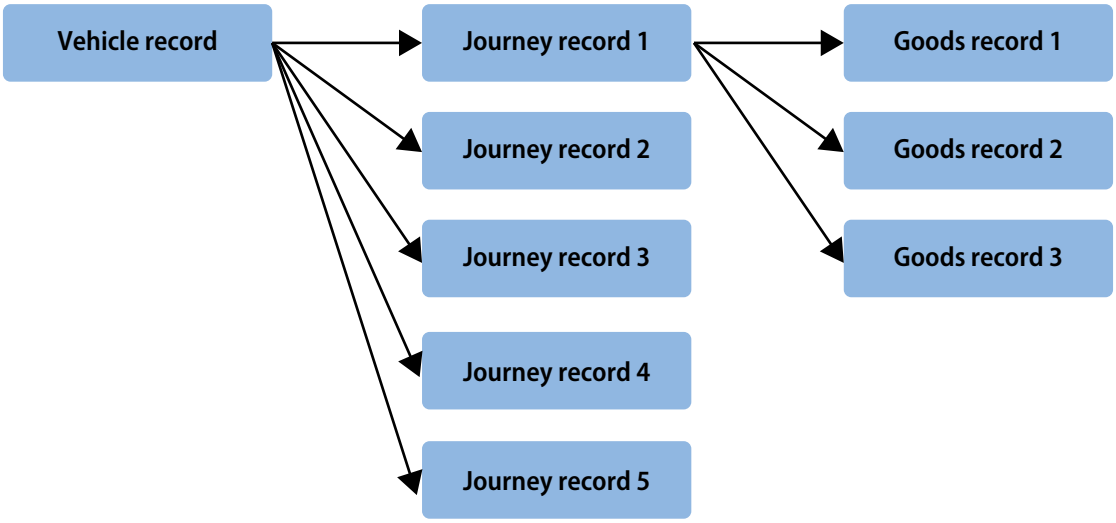
The individual data records for each quarter, which are to be sent to Eurostat, must consist of 3 linked data sets covering:

A1 Vehicle-related variables.
A2 Journey-related variables.
A3 Goods-related variables (in the basic transport operation).

The link between the data sets is illustrated in figure 11.1.

FIGURE 11.2

Link between data sets



Each A1 "vehicle record" is linked to 1-n "journey records" (A2 data set) that contain data on the journeys made by that vehicle during the survey period (normally one week). Each journey record is in turn linked to 0-m "goods records" (A3 data set) which contain data on the basic transport operations that make up that journey. It should be noted that multiple goods records may not exist for each journey record. For laden journeys, depending on the method used to record journeys, and/or on the type of journey, there may be only one goods record linked to each journey record. However, for A2 journey records where the journey type (A2.1) is = 2 (a multi-stop journey), there should be more than one A3 goods record. Normally there would be an A3 goods record for each stop of the journey.

For unladen journeys, there should be no linked goods records in A3. The carriage of waste material, empty packaging or transport equipment such as pallets and containers is considered as a loaded journey.

In the view of Eurostat and of the Member States as reported at the meetings of the Working Group on Road Transport Statistics, the main objective of Regulation (EU) No 70/2012 is the collection of accurate data of the tonnage of goods carried by road freight transport and their place of loading and unloading, the tonne-kilometres performed, the kilometres travelled loaded by vehicles and the kilometres travelled unloaded by vehicles.

A consequence of this is that the information to be reported in the A3 (goods) records should be of consignments according to loading and unloading of goods. If the A3 records report information according to stops of the vehicle (stages of a journey), for multi-stop journeys there could be an over-reporting or under-reporting of the tonnage of goods carried and the tonnages unloaded at stopping places.

11.3 Missing values

By default, missing values in data records should be coded as an empty field (no data between two successive field separators). For certain fields, the use of specific codes for missing values or other special values (see column "specific codes for missing values") are recommended. Additional information is provided in chapter 10 of this manual.

11.4 Change in configuration or type of transport

Annex I of Regulation (EU) No 70/2012 noted that during a survey period a vehicle might be subject to a change in configuration (addition of a trailer giving rise to a change in axle configuration and load capacity) or the type of transport might vary between journeys. These changes should be recorded, although this is not obligatory.

11.5 The recording of distances in A1 records and the relationship with distances in linked A2 and A3 records

The sum of the kilometres recorded on A3 records is not necessarily equal to the kilometres of the linked A2 record for journey types 1, 2 or 3. This is because sometimes more than one A3 goods record will exist for the same A2 journey record. For example on a simple one-stop journey, two types of goods may be carried that can be coded to separate NST divisions and the reporting country chooses to record this. However, the sum of the kilometres of loaded A2 records should equal the loaded kilometres recorded in field 9 (A1.8.1) of the linked A1 record.

Where a country records empty journeys, the unloaded kilometres recorded in field 10 (A1.8.2) of an A1 record should be equal to (or greater than) the sum of the unloaded kilometres of the linked (type 4) A2 records.

The reason why the kilometres recorded in field 10 of an A1 record may be greater than the sum of the unloaded kilometres of the linked (type 4) A2 records is due to the method chosen by a country in recording any empty stages of a collection/delivery journey (type 3). If a country records the distance travelled on an unloaded stage of a collection/delivery journey separately from the loaded distance, it is not possible to create a separate A2 record for this stage because the start and end locations of the stage are normally not recorded. In such a case, it is permitted to add the distance of this unloaded stage of the journey to field 10 (A1.8.2) of the linked A1 record without including this distance in the linked A2 record.

11.6 Some points on multi-stop journeys

Chapter 6 in Part A has covered, in general terms, the problems faced by those carrying out surveys of transforming the data collected into a format that can be analysed by computer. Data collected about some road freight transport journeys can be quite complicated, particularly if a journey comprises a number of stops to load or unload goods.

Chapter 6.4 describes a procedure that is possible where coding staff in a statistical office is well experienced in dealing with surveys of road freight. Less experience staff in such an environment can refer difficult cases to more experience staff to ensure that the main statistics of tonnes, tonne-kilometres and vehicle kilometres are correctly calculated. Where this is not possible, the survey questionnaire can be adapted by the collection of a few additional pieces of information so that a computer can be used to a greater extent to calculate the statistics required. Chapter 6.6 describes this procedure.

International journeys which are continuous. A small number of international journeys occur where goods are loaded at the start and a number of unloading stops are made but during the journey other goods are loaded either to unload at a later stage during the journey or to bring back to the country of the start of the journey. Advice on the treatment of these journeys is given in chapter 11.7 below.

The calculation of tonnes and tonne-kilometres. It would be expected that for these journey types (journey types 2 and 3) the apparent tonne-kilometres calculated from the A2 record of weight (A2.2) times distance (A2.5) should be greater than the tonne-kilometres given in field 16 (A2.6) of the A2 record. This is because some of the load will not have been carried the full distance of the journey – hence the reason for more than one stop on the journey.

Regulation (EU) No 70/2012 covers this in the methodological appendix to Annex I

"The problem will arise when several basic transport operations are carried out in the course of one laden journey, which may arise because there are several points of loading and/ or unloading of the goods. In this case these various loading/unloading points are recorded, in order to calculate directly the tonne-kilometres effected during the journey, and the Statistical Office can reconstitute the basic transport operations."

A type 2 journey is defined as "Laden journey involving several transport operations but not considered as a collection or distribution round". It is important to bear in mind when recording multi-stop journeys that a laden journey is completed

when goods are unloaded from a vehicle and that vehicle is subsequently completely empty, even for a very short interval (or where a road tractor is uncoupled from a laden semi-trailer). If, after becoming completely empty, the vehicle is loaded at the same stopping place, a new journey is started.

As indicated the section above, the information to be reported in the A3 (goods) records should be of consignments according to loading and unloading of goods. Thus the total tonnage of goods loaded during a journey should be reported to Eurostat If the A3 records report information according to stops of the vehicle (stages of a journey), for multi-stop journeys there could be either an over-reporting or under-reporting of the tonnage of goods carried and the tonnages unloaded at stopping places.

Where A3 records are reported of consignments, the tonnage for the A2 record will be the sum of the tonnes carried of the A3 records, the tonne-kilometres for A2 will be the sum of the product of the tonnes and the kilometres of the A3 records and the kilometres travelled for the A2 record will be the **maximum** of the kilometres recorded in the associated A3 records. This is true for one-stop (journey type = 1) and multi-stop (journey type = 2) journeys.

If the A3 records reported information according to stages of a journey, for multi-stop journeys and if all the goods are loaded at the start of the journey, the vehicle kilometres travelled for the A2 record would be the sum of the kilometres of the A3 records, the tonne-kilometres for A2 would be the sum of the product of the tonnes and the kilometres of the A3 records, and the tonnage for A2 should be the **maximum** of the tonnes carried recorded in the associated A3 records. **However,** the information of the tonnage of goods unloaded at the various stops cannot be obtained from the A3 records.

Furthermore, if during a multi-stop journey, goods are loaded at an intermediate stage of the journey as well as the start, there is no way of recording the correct tonnage for the A2 record, unless information is collected of the weight unloaded at the various stops as well as the weights loaded.

Examples of the reconstitution of the data from stage records to provide relevant A3 records are given below.

Journey 1, from location A to location C with an interim stop at location B. The tonne-kilometres calculated from the A3 records are shown in brackets as they do not appear in the A3 records but are the data from which the relevant A2 field should be calculated. As the journey is recorded as a type 2 (multi-stop journey) some of the weight recorded on the stage A to B must have been unloaded at B and the remainder carried to C. If all the weight had been unloaded at B, two separate type 1 journeys would have been created.

Data collected

	Goods Weight (100 kg)	Distance	TKM
A–B	42.65	20	85.3
B–C	17.06	4	6.82
A3 records that should be reconstituted from data collected			
A–B	26 (=42.65-17.06)	20	(52; 51.18 if to nearest kg)
A–C	17	24	(41; 40.94 if to nearest kg)
A2 record details			
A–C	43	24	(93; 92 if to nearest kg)

Journey 2 where there are 6 stops to illustrate that although it is permitted to describe journeys with 5 or more stops as type 3 (collection/delivery journeys), a country may record journeys with more than 5 stops as type 2 journeys if it chooses to do so.

Only the data for the relevant fields that should be recorded on the A2 and A3 records are shown below. (POL is place of load, POU place of unload).

Data collected

	Goods Weight (100 kg)	Distance	TKM
A–B	240	140	3360
B–C	220	40	880
C–D	155	15	232.5
D–E	112	5	56
E–F	82	5	41
F–G	40	30	120

	Goods Weight (100 kg)	POL	POU	Distance	TKM
A2 record	240	**A**	**G**	235	4690
A3 record	20	**A**	**B**	140	(280)
A3 record	65	**A**	**C**	180	(1170)
A3 record	43	**A**	**D**	195	(838.5)
A3 record	30	**A**	**E**	200	(600)
A3 record	42	**A**	**F**	205	(861)
A3 record	40	**A**	**G**	235	(940)

Journey 3 from location A to location C with an interim stop at location B where additional goods are loaded. The tonne-kilometres calculated from the A3 records are shown in brackets as they do not appear in the A3 records but are the data from which the relevant A2 field should be calculated. As the journey is recorded as a type 2 (multi-stop journey), at B there must have been unloading of some part of the load or further loading of additional goods or both of these occurrences. If only the weight carried on each stage is collected the available information would be:

Data collected

	Goods Weight (100 kg)	Distance	TKM
A–B	43	20	86
B–C	37	4	14.8
A3 records that would be reconstituted from data collected			
A–B	6 (=43-37)	20	(12)
A–C	37	24	(88.8)
A2 record details			
A–C	43	24	100.8

But this would give the wrong tonnage because the assumption had been made, wrongly, that there was no loading at B. The tonne-kilometres and the kilometres of the journey would be correct. Even if the data had been collected of the weight loaded at each stop instead of the weight carried on each stage, without the information of the weight unloaded at each stop it is not possible to reconstitute the data correctly. For the above example, with information of weights loaded and unloaded at each stop, the calculation would be:

Data collected

	Goods Weight (100 kg)	Distance	TKM
A–B	43 loaded at A	20	86
	26 unloaded at B		
B–C	20 loaded at B		
	37 unloaded at C	4	14.8
A3 records that should be reconstituted from data collected			
A–B	26	20	(52)
A–C	17	24	(40.8)
B–C	20	4	(8)
A2 record details			
A–C	63	24	100.8

However, simplification of the reporting of multi-stop journeys (2-4 stops) is accepted, but only in the case of reporting countries that are not able to provide complete information. All reporting countries are encouraged to provide complete data for multi-stops journeys. The reporting countries wishing to apply simplified reporting of multi-stop journeys should use a common methodology.

1. The structure of the road freight data transmitted to Eurostat should not be modified.
2. No simplification for the reporting of JT2 should be introduced for international transport.
3. For national transport, the supply of only one goods record per JT2 record can be accepted by Eurostat. In this case a common methodology should be followed for:

- Type of goods: the commodity with the highest weight should be indicated.
- Journey distance: sum of the distances corresponding to each stage of the journey.
- Weight of goods: sum of the goods loaded at each stage of the journey.
- Calculation of tonne-kilometres: One possibility is an approximation based on the following formula:

½ x Total weight loaded in tonnes (A2.2) x total distance travelled (A2.5) x (1+1/2)

In the case of this simplified reporting, the previous examples would give the following A2 and A3 records. The type of goods to be provided is A3 is the commodity with the highest weight.

Journey 1:

	Goods weight (100 kg)	Distance	TKM
A2 record			
A–C	43	24	77
A3 record			
A–C	43	24	-

Journey 2:

	Goods weight (100 kg)	Distance	TKM
A2 record			
A–G	240	235	4230
A3 record			
A–G	240	235	-

Journey 3:

	Goods weight (100 kg)	Distance	TKM
A2 record			
A–C	63 (43+20)	24	113
A3 record			
A – C	63	24	-

11.7 Some points on collection/delivery journeys

For this type of journey, with many loading and /or unloading points, it is not feasible to ask the transport operators to describe all the basic transport operations performed. Simplifying assumptions have to be made when collecting the data of the corresponding transport operations. Chapter 6.5 provides guidance on the information that could be sought from the transport operators and a methodology for calculating the tonnes and tonne-kilometres.

Eight types of collection/delivery journeys are shown in chapter 6.5 but five of them require the information of the number of stops made for delivery and/or collection. If information is not collected on the number of stops made, then the assumption is made that the tonne-kilometres performed approximates to the area of a right-angled triangle (1/2 base length multiplied by height) with height equal to the tonnage loaded and/or collected and the base length equal to the distance travelled – types 3, 4 and 5 in chapter 6.5.

It is important that where a type 3 journey includes both collection and delivery, the weight recorded in the A2 record should include both the weight of goods collected and the weight of goods delivered.

As the data of weight are collected to the nearest 100 kilograms, the calculation of tonne kilometres always requires the division of the recorded weight by 10. For collection/delivery journeys, the formulae for tonne-kilometres also require a division by 2. Hence a total division by 20 is needed for these journeys.

Empty stages of a collection/delivery journey. If a country records the distance travelled on an unloaded stage of a collection/delivery journey separately from the loaded distance, it is not possible to create a separate A2 record for this stage because the start and end locations of the stage are normally not recorded. If the start and end locations of the stage are recorded, then a separate unloaded journey can be created. If this cannot be done, it is permitted to add the distance of this unloaded stage of the journey to field 10 (A1.8.2) of the linked A1 record without including this distance in the linked A2 record. It is acceptable to make the assumption that all the stages of a collection/delivery journey will be loaded.

International journeys which are continuous. A small number of international journeys occur where goods are loaded at the start and a number of unloading stops are made but during the journey other goods are loaded either to unload at a later stage during the journey or to bring back to the country of the start of the journey. These journeys could be considered as collection/delivery journeys but the distance travelled and the time taken over the journey are much longer than usual. For a typical collection/delivery journey the distance travelled is usually fairly short and rarely lasts more than one day. It is recommended that for these long international journeys which are continuous, two multi-stop (journey type = 2) journeys should be created, the first journey ending at the furthest stop reached from the start of the journey.

11.8 Validation

Eurostat will apply some validation checks to the data transmitted by Member States, before the data are loaded into the production database. The detail of these validation checks is covered in the next Chapter of this manual.

12 Validation for micro-data

12.1 Validation process

Data received by Eurostat are validated before they can go into production.

The first step consists in pre-validation using STRUVAL (STRUctural Validation) and CONVAL validations (CONtent Validation), followed by validation in GSAST (General Statistical Analysis Systems for Transport) production system.

The different steps of the data validation are described in the following sections in this chapter.

12.1.1 STRUVAL

Records of individual datasets which do not comply with the established rules will trigger errors and not pass the validation stage.

This step consists in the following checks:

- Dataset identifier is correct
- Non numeric characters in fields are not defined as numeric
- Number of characters doesn't exceed defined field length
- Number of fields in the record is correct
- Value of field exists within a reference table (for codes)
- A value is given for mandatory fields
- Record is not duplicated
- Vehicle weighting has a full stop as decimal separator

12.1.2 CONVAL

Records of individual datasets which do not comply with the established rules will trigger errors and/or warning. The records which encountered errors will fail the validation, while the records which encountered warning will go through the validation process.

This step consists in the following checks:

- Value is non negative value for specific fields
- Value of field matches with file name (for Country, Year and Quarter)
- Value of field must be within a specified range (for quantitative fields)

12.1.3 GSAST validations and processes

Once passed the CONVAL/STRUVAL validation, the validated micro-data are uploaded on the GSAST and are ready for the importation flow.

This step consists in checking if data from one type of record is coherent with data from associated records (e.g. journey record with associated goods records).

Some checks generate an error, which means that the given record is rejected. Other checks only generate a warning, allowing the data to be loaded in the production database.

Important notes about validation

- When a record is rejected, all its associated records in the hierarchy are also deleted; e.g. if a journey record is rejected, the associated goods and vehicle records are also rejected. Vehicle hierarchies that are deleted will appear in the Error report with the R0001 Message ("This vehicle and all its linked records will be deleted because of errors detected").
- Where a significant number of records fail these checks, Eurostat will notify the Member State of the records in error and provide an indication of the reasons for non-acceptance. The Member State will be requested to rectify the errors noted and then to resubmit the complete set of 3 data files for that quarter (not just the records that were in error). This procedure is necessary in order to guarantee the correctness of the weighting factors and the coherence between the vehicle, journey and goods records.
- Where the number of records containing errors is very small and the likely effect on any analysis insignificant, Eurostat will load those records that pass the verification checks and discard the records in error. In such a case a Member State will be informed of the records not passing the checks and the reasons. The Member State will be invited, if it wished, to correct the errors found and to resubmit the complete set of 3 data files for that quarter (not just the records that were in error). Where a resubmission is made, Eurostat will load the revised data but if no resubmission is made, Eurostat will use the data already accepted for the preparation of aggregated tables.
- Some checks that initially (when setting up the data base and associated validation procedures) caused an error message have been transferred to warning messages in order to have a higher rate of data loaded in the production database. Evidence obtained when preparing data for publication and processing data for precision calculations implies however that for some variables information has been stored that is not consistent or complete. Therefore, a re-examination of the validation procedures became necessary.
- Some validation checks are intended to flag only unusually high or low values. It does not mean that these values are necessarily errors, unless they appear very frequently in a data file. However, there was evidence that some additional checks were required to ensure that unusually high values for weights are not the result of entering data in kilograms instead of units of 100 kilograms.

12.1.4 Integer figures versus decimal figures

Some Member States collect data about the weight of goods transported to the nearest kilogram and use these figures in the calculation of tonne-kilometres (tkm). When these figures are sent to Eurostat, the GSAST system does not consider the decimal part of the weight figures (as these are expressed as decimals of 100 kilograms–the unit to be reported under the Regulation). The GSAST system truncates them (it does not round the figures) when aggregating data into indicators tables. Therefore, data provided by countries calculating tonne-kilometres on the basis of the weight in units of kilograms may differ from any Eurostat calculation using weight in units of 100 kilograms (without decimals). Hence differences in tonne-kilometres and tonnes (linking checks in the GSAST system) appear as warnings. However, the linking checks in the GSAST system (L0065, L0069) do allow for the difference that may occur in the data of tonne-kilometres supplied by a Member State and that calculated by Eurostat using weight in units of 100 kilograms.

Commission Regulation (EC) No 2163/2001 on technical arrangements for data transmission specifies that all numerical data (except vehicle weighting) should be submitted to Eurostat as integer figures.

TABLE 12.1

STRUVAL validation rules

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
1	Rcount	Reporting Country	Text 2	V0021	Reporting Country must be present	E	
				V0022	Reporting Country is not recognised	E	Code does not exist in Reference table Ref table COUNTRY
				V0214	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN
				J0031	Reporting Country must be present	E	
				J0032	Reporting Country is not recognised	E	Code does not exist in Reference table Ref table COUNTRY
				J0315	Duplicated Record	E	Key = Rcount + Year Quarter + QuestN + JourN
				G0041	Reporting Country must be present	E	
				G0042	Reporting Country is not recognised	E	Code does not exist in Reference table
				G0416	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN +JourN+ GoodsN
2	DsetID	Data Set Identification	Text 2	V0024	Dataset Identification must be present	E	
				V0025	Dataset Identification must be equal to A1	E	
				J0034	Dataset Identification must be present	E	
				J0035	Dataset Identification must be equal to A2	E	
				G0044	Dataset Identification must be present	E	
				G0045	Dataset Identification must be equal to A3	E	
3	Year	Year of the Data Set	Text 4	V0026	Year of survey must be present	E	
				V0214	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN
				J0036	Year of survey must be present	E	
				J0315	Duplicated Record	E	Key = Rcount + Year Quarter + QuestN + JourN
				G0046	Year of survey must be present	E	
				G0416	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN +JourN + GoodsN

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
4	Quarter	Quarter of the Data Set	Text 2	V0028	Quarter of survey must be present	E	
				V0029	Quarter of survey is not recognised	E	Q1 -> Q4
				V0214	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN
				J0038	Quarter of survey must be present	E	
				J0039	Quarter of survey is not recognised	E	Q1 -> Q4
				J0315	Duplicated Record	E	Key = Rcount + Year Quarter + QuestN + JourN
				G0048	Quarter of survey must be present	E	
				G0049	Quarter of survey is not recognised	E	Q1 -> Q4
				G0416	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN +JourN+ GoodsN
5	QuestN	Questionnaire Number	Text 9	V0210	Questionnaire Number must be present	E	
				V0214	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN
				J0310	Questionnaire Number must be present	E	
				J0315	Duplicated Record	E	Key = Rcount + Year Quarter + QuestN + JourN
				G0410	Questionnaire Number must be present	E	
				G0416	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN +JourN+ GoodsN
6	A1.3	Age of the road motor vehicle (lorry or road tractor)	Num 2	V0215	Vehicle Age must be present	E	If age is not known, special code for missing value (99) should be reported
7	A1.6	Code Activity Class of the vehicle operator (Code NACE – Revision 2)	Text 5	V0222	Vehicle NACE activity class is not recognised	E	Verifies that correct NACE classification is used for specified period.
8	A1.9	Vehicle weighting to be used to get full results from individual data, if the collection of data is carried out from a sample	Num 8	V0223	Vehicle weighting must be present	E	
				V0224	Vehicle weighting must have a comma as decimal separator instead of full stop	E	
				V0227	Vehicle weighting must be numeric	E	
9	Stratum	Stratum of sample in which vehicle appears	Text 7	V0225	Vehicle Stratum must be present	E	

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
10	A2link	Number of linked A2 records	Num 5	L0055	Vehicle number of linked journey records must be present and different from zero	E	This field will be calculated during the "Correct data" step
11	JourN	Journey Sequence Number	Text 5	J0311	Journey Sequence Number must be present	E	
				J0315	Duplicated Record	E	Key = Rcount + Year Quarter + QuestN + JourN
				G0411	Journey Sequence Number must be present	E	
				G0416	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN +JourN+ GoodsN
12	GoodsN	Goods Operation Sequence Number	Text 6	G0412	Sequence Number must be present	E	
				G0416	Duplicated Record	E	Key = Rcount + Year + Quarter + QuestN +JourN+ GoodsN
13	A1.2	Code Axle Configuration	Text 3	J0316	Axle Undefined	E	Code does not exist in Reference table Ref table AXLE
14	A1.4	Maximum Permissible laden weight	Num 4	J0357	Vehicle Maximum Permissible Laden Weight must be present	E	
15	A1.5	Load Capacity	Num 4	J0317	Load Capacity must be present	E	
16	A1.7	Code Type of Transport	Text 1	J0320	Type of Transport must be present	E	
				J0321	Type of Transport is not recognised	E	Code does not exist in Reference table Ref table TRANSPORT_TYPE
17	A2.1	Code Type of Journey	Text 1	J0322	Type of Journey must be present	E	
				J0323	Type of Journey is not recognised	E	Code does not exist in Reference table Ref table JOURNEY_TYPE
18	A2.2	Weight of goods	Num 4	J0324	Weight of Goods must be present for unladen journeys	E	
				J0326	Weight of Goods must be present for laden journeys	E	

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
19	A2.3	Place of loading (for a laden journey): either country code or full region code with country	Text 5	J0329	Country of Loading must be present for laden journeys	E	
				J0331	Country of Loading is not recognised	E	Code does not exist in Reference table when type of journey is unladen (=4)
				J0335	Region of Loading must be present for National Transport [3]	E	
				J0336	Region of Loading is not recognised	E	Code does not exist in Reference table, for data before year 2008
				J0369	Region of loading must be present and valid for all Transports intra EEA	E	This rule checks for data greater than or equal to 2008, for the national and international transport, if the load country is part of the EEA then the loading region must be encoded with a level 3, and the classification of the region must be valid (region_classification).
20	A2.4	Place of unloading (for a laden journey): either country code or full region code with country	Text 5	J0332	Country of Unloading must be present for laden journeys	E	
				J0334	Country of Unloading is not recognised	E	Code does not exist in Reference table
				J0370	Region of unloading must be present and valid for all Transport intra EEA	E	This rule checks for data greater than or equal to 2008, for the national and international transport, if the unload country is part of the EEA then the unloading region must be encoded with a level 3, and the classification of the region must be valid (region_classification).
21	A2.5	Distance travelled: actual distance excluding the distance covered by the goods road motor vehicle while being transported by another means of transport	Num 4	J0339	Distance travelled must be present	E	

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
22	A2.6	Tonne-kilometres carried out during the journey	Num 8	J0342	Tonne-kilometres must be present for unladen journeys	E	Control that the TKM travelled is present when type of journey is unladen (= 4)
				J0344	Tonne-kilometres must be present for laden journeys	E	
23	A2.7	Countries crossed in transit (not more than 5)	Text 10	J0347	Transit Country is not recognised	E	Code does not exist in Reference table
24	A2.8	Place of loading of the goods road motor vehicle on another means of transport	Text 5	J0349	Country of Loading (for other means of transport) is not recognised	E	Code does not exist in Reference table
				J0352	Region of Loading (for other means of transport) is not recognised	E	Control that the load region other exists in the region reference table when: id_country_load_oth = id_country, before year 2008
				J0372	Region of Loading, on another means of transport, must be valid for all Transports intra EEA	E	This rule checks for data greater than or equal to 2008, for the national and international transport, if the place loading, of the goods road motor vehicle from another means of transport is part of the EEA then the loading region must be encoded with a level 3, and the classification of the region must be valid (region_classification).
25	A2.9	Place of unloading of the goods road motor vehicle on another means of transport	Text 5	J0351	Country of Unloading (for other means of transport) is not recognised	E	Control that the other unload country exists in the country reference table when presents
				J0353	Region of Unloading (for other means of transport) is not recognised	E	Control that the unload region other exists in the region reference table when: id_country_unload_oth = id_country, before year 2008
				J0373	Region of Unloading, on another means of transport, must be valid for all Transports in EEA	E	This rule checks for data greater than or equal to 2008, for the national and international transport, if the place unloading, of the goods road motor vehicle from another means of transport is part of the EEA then the unloading region must be encoded with a level 3, and the classification of the region must be valid (region_classification).

N°	ID	Description	Format ([1])	Error Code	Error Message	Error Type ([2])	Details
26	A2.10	Code degree of loading of vehicle (in terms of maximum volume of space used during the journey)	Text 1	J0354	Degree of Loading not recognised	E	Control that the load degree exists in the load degree reference table when present
27	A3.1	Code Type of Goods	Text 2	G0417	Good classification must be present	E	
				G0418	Good classification is not recognised	E	Code does not exist in Reference table
28	A3.2	Weight of goods	Num. 4	G0419	Goods weight must be present	E	
29	A3.3	Code dangerous goods	Text 3	G0422	Hazardous type goods is not recognised	E	Code does not exist in Reference table
				G0423	Hazardous type goods is syntactically incorrect (use of full stop)	E	For codes between 41 and 62, the full stop will be inserted during the "Correct data" step
							Control of the existence of the dangerous good code in the dangerous good correction reference table and that the correction will be made
30	A3.4	Type of cargo	Text 1	G0424	Cargo Type is not recognised	E	Code does not exist in Reference table
31	A3.5	Place of loading of the goods: either country code or full region code with country	Text 5	G0425	Country of Loading must be present	E	
				G0426	Country of Loading is not recognised	E	Code does not exist in Reference table
				G0438	Region of Loading is not recognized	E	Control that the load region exists in region reference table
32	A3.6	Place of unloading of the goods: either country code or full region code with country	Text 5	G0427	Country of Unloading must be present	E	
				G0428	Country of Unloading is not recognised	E	Code does not exist in Reference table
				G0439	Region of Unloading is not recognized	E	Control that the unload region exists in region reference table
33	A3.7	Distance travelled: actual distance excluding the distance covered by the goods road motor vehicle while being transported by another means of transport	Num. 4	G0433	Distance travelled must be present	E	

([1]) Format = Type of field (Text, Num) followed by Maximum length.
([2]) E = Error (Record is rejected), W = Warning (Record can be accepted, with some automatic corrections as indicated).
([3]) National Transport: Reporting Country = Loading Country = Unloading Country.

TABLE 12.2

CONVAL validation rules

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
1	Rcount	Reporting Country	Text 2	V0023	Country is not a reporting country for the currently processed year	E	Country must belong to REPORTING country group
				V0211	Reporting Country <> filename Country	E	
				J0033	Country is not a reporting country for the currently processed year	E	Country must belong to REPORTING country group
				J0312	Reporting Country <> filename Country	E	
				G0043	Country is not a reporting country for the currently processed year	E	Country must belong to REPORTING country group
				G0413	Reporting Country <> filename Country	E	
2	Year	Year of the Data Set	Text 4	V0027	Year of survey must be greater than 1998	E	
				V0212	Year <> filename Year	E	
				J0037	Year of survey must be greater than 1998	E	
				J0313	Year <> filename Year	E	
				G0047	Year of survey must be greater than 1998	E	
				G0414	Year <> filename Year	E	
3	Quarter	Quarter of the Data Set	Text 2	V0213	Quarter <> filename Quarter	E	
				J0314	Quarter <> filename Quarter	E	
				G0415	Quarter <> filename Quarter	E	
				L0072	Goods records for empty journeys found	E	Control that there is A3 linked records for an empty journey
4	A1.3	Age of the road motor vehicle (lorry or road tractor)	Num 2	V0216	Vehicle Age is negative	E	
				V0217	Vehicle Age over 30 years old	W	Flags unusual values. Control that the vehicle age is less than 30 or equal to 99

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
5	A1.8.1	Total vehicle-kilometres during the survey period–loaded	Num 5	V0228	Very high km travelled loaded during the survey period	W	Flags values > 10 000 km
6	A1.9	Vehicle weighting to be used to get full results from individual data, if the collection of data is carried out from a sample	Num 8	V0226	Vehicle weighting must be smaller than 99999.9999	E	
				V0226	Vehicle weighting must be smaller than 99999.9999	E	
				V0229	Vehicle weighting must not be zero	E	Recently implemented
7	A1.4	Maximum Permissible laden weight	Num 4	J0358	Low Vehicle Maximum Permissible Laden Weight	W	Must be >= 5
				J0359	High Vehicle Maximum Permissible Laden Weight	W	Must be <= 700
				J0360	Too high Vehicle Maximum Permissible Laden Weight	E	Must be <= 1 700 but 9999 is accepted
8	A1.5	Load Capacity	Num 4	J0318	Low Journey Load Capacity	W	Must be >= 3
							No error if ID_AXLE=499 AND LOAD_CAPACITY=0
				J0319	High Journey Load Capacity	W	Must be <= 400
				J0361	Too high Journey Load Capacity	E	Load capacity must be =< 1 200 (120t)
				J0362	LC must be less than 70-85 % of MPLW; depends on vehicle	W	IF Axle like 1XX then LC must be <= 70% of MPLW;
							IF Axle like 2XX then LC must be <= 80% of MPLW;
							IF Axle like 3XX then LC must be <= 85% of MPLW;
							IF Axle is not declared then LC must be <= 80% of MPLW;
							IF Axle = 499 rule does not apply
				J0363	Weight exceeds LC for journey type=1	W	Control that Weight exceeds LC for journey type 1
				J0364	Weight exceeds LC for journey type=2	W	Control that Weight exceeds LC for journey type 2
				J0365	Weight exceeds LC for journey type=3	W	Control that Weight exceeds LC for journey type 3

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
9	A2.2	Weight of goods	Num 4	J0325	Weight of Goods must be equal to zero for unladen journeys	E	The goods weight is equal to zero when type of journey is unladen (= 4) and goods weight is not empty
				J0327	Weight of Goods must be positive for laden journeys	E	The goods weight is positive when type of journey is laden (!= 4) and goods weight is not empty and goods weight <= 0
				J0328	Weight exceeds Journey Load Capacity	W	Goods weight must be <= LOAD_CAPACITY * 1.5 when type of journey is laden (!= 4) and goods weight is not empty
				J0380	Weight of goods must be nil for road tractors	W	Goods weight must be 0 when axle configuration = 499 (road tractor)
10	A2.5	Distance travelled: actual distance excluding the distance covered by the goods road motor vehicle while being transported by another means of transport	Num 4	J0340	Distance travelled must be positive	E	
				J0341	Too Long Journey Distance travelled	W	Flags any journeys > 3 000 (unusual value)
11	A2.6	Tonne-kilometres carried out during the journey	Num 8	J0343	Tonne-kilometres must be equal to zero for unladen journeys	E	This check is done only if field is present
				J0345	Incorrect Tonne-kilometres for single transport operations	W	Control that the Tkm travelled is “goods weight * km travelled / 10” when type of journey is = 1 (single transport)
				J0346	Incorrect Tonne-kilometres for several transport operations	W	Control that the Tkm travelled is less than or equal to “good weight * km travelled / 10” when type of journey is not single transport(!= 1)
							For id_journey_type = ‘2’
							WHEN nb_tkm_travel > CEIL ((goods_weight+0.5) * (nb_km_travel+0.5)/10)
							For id_journey_type = ‘3’
							WHEN nb_tkm_travel < TRUNC(0.5*((goods_weight-0.5)*(nb_km_travel-0.5)/20)) AND nb_tkm_travel > CEIL(1.2*((goods_weight+0.5)*(nb_km_travel+0.5)/20))

N°	ID	Description	Format ([1])	Error Code	Error Message	Error Type ([2])	Details
12	A2.7	Countries crossed in transit (not more than 5)	Text 10	J0366	Country crossed in transit must be different than Place of loading or Place of unloading	W	Control that country crossed in transit is different than place of loading/unloading
				J0367	Country crossed in transit already reported in this journey	W	Control that Country crossed in transit already reported in this journey
13	A2.10	Code degree of loading of vehicle (in terms of maximum volume of space used during the journey)	Text 1	J0355	Degree of Loading must be equal to 0 for unladen transport	E	Control that the load degree is equal to 0 when presents and journey type is unladen (= 4)
				J0356	Degree of Loading cannot be null if the goods weight is positive	E	Control that the load degree is different from 0 when presents and good weight is positive
14	A3.2	Weight of goods	Num. 4	G0421	High weight of goods	W	Flags values > 300 (=30t) if goods weight is not empty
				G0436	Too high weight of goods	W	Control that the goods weight is less than or equal to 1000 (100t) and goods weight is not empty
15	A3.7	Distance travelled: actual distance excluding the distance covered by the goods road motor vehicle while being transported by another means of transport	Num. 4	G0434	Distance travelled must be positive	E	Zero distances are not accepted
				G0435	Very Long Journey Distance travelled	W	Flags very long journeys (> 3 000 km)

([1]) Format = Type of field (Text, Num) followed by Maximum length.
([2]) E = Error (Record is rejected), W = Warning (Record can be accepted, with some automatic corrections as indicated).

TABLE 12.3

GSAST validation rules

N°	ID	Description	Format ([1])	Error Code	Error Message	Error Type ([2])	Details
1	Rcount	Code Reporting Country	Text 2	L0068	Journey record with no corresponding key in Vehicle file	E	Vehicle key = Rcount + Year Quarter + QuestN
2	Year	Year of the Data Set	Text 4	L0068	Journey record with no corresponding key in Vehicle file	E	Vehicle key = Rcount + Year Quarter + QuestN
3	Quarter	Quarter of the Data Set	Text 2	L0068	Journey record with no corresponding key in Vehicle file	E	Vehicle key = Rcount + Year Quarter + QuestN
4	QuestN	Questionnaire Number	Text 9	L0068	Journey record with no corresponding key in Vehicle file	E	Vehicle key = Rcount + Year Quarter + QuestN
5	A2link	Number of linked A2 records	Num 5	L0056	Vehicle number of linked journey records <> Real number of linked Journey records	E	
6	A1.8.1	Total vehicle-kilometres during the survey period–loaded	Num 5	L0051	Journeys or Goods linked records exist while total km travelled are not provided or zero	E	If kilometres are null or zero in a vehicle record, there must not be any associated journey or goods record
				L0052	No Journeys and Goods linked records found while total km travelled loaded are provided	E	If kilometres loaded are provided in a vehicle record, there must be some associated journey and goods record
				L0053	Vehicle total loaded travelled km must = sum of loaded travelled km of the linked journey records	W	
7	A1.8.2	Total vehicle-kilometres during the survey period – empty (including road tractor journeys without semi-trailer)	Num 4	L0051	Journeys or Goods linked records exist while total km travelled are not provided or zero	E	If kilometres are null or zero in a vehicle record, there must not be any associated journey or goods record
				L0054	Vehicle total empty travelled km must > or = sum of empty travelled km of the linked journey records	W	Controls that NB_KM_EMPTY >= SUM of NB_KM_ TRAVEL of Journey variable where journey_type = '4' (unladen)

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
8	A2.1	Code Type of Journey	Text 1	L0062	For laden Journeys, there must be at least one linked Goods record	E	Control that for laden journeys (journey type <> 4) there are linked records between journey and good tables
				L0061	Goods records for empty journeys found	W	Control that for unladen journeys (journey = 4) there are no linked records between journey and good tables
9	A2.2	Weight of goods	Num 4	L0063	For one-stop journeys, the sum of the linked Goods weight must = Journey goods weight	W	
				L0069	For one-stop journeys, calculated linked goods tkm different from linked journey tkm	W	Control that for one stop journeys where journey type = 1 the Nb of Tkm travelled should be included in the closed interval delimited by TRUNC(SUM((goods_ weight-0.5)*(nb_km_travel-0.5)/10)) and ROUND(SUM((goods_weight+0.5)*(nb_km_ travel+0.5)/10))
				L0065	For several-stop journeys, calculated linked goods tkm different from linked journey tkm	W	Control that for several stop journeys (journey type=2) the Nb of Tkm travelled should be included in the closed interval delimited by: TRUNC (SUM((goods_ weight-0.5)*(nb_km_travelled-0.5)/10)) for Lower Limit, and CEIL (SUM((goods_weight+0.5)*(nb_km_ travelled+0.5)/10)) for Upper Limit

N°	ID	Description	Format (1)	Error Code	Error Message	Error Type (2)	Details
10	A2.5	Distance travelled: actual distance excluding the distance covered by the goods road motor vehicle while being transported by another means of transport	Num 4	L0053	Vehicle total loaded travelled km must = sum of loaded travelled km of the linked journey records	W	This check is done only if journey type is other than 4 (Unladen)
				L0054	Vehicle total empty travelled km must be > or = sum of empty travelled km of the linked journey records	W	Control that NB_KM_EMPTY >= SUM of NB_KM_TRAVEL of Journey variable where journey_type = '4' (unladen)
				L0064	For one-stop journeys, each of the linked Goods distance travelled must = Journey distance travelled	W	Control that for one stop journeys (journey type = 1) the Nb of km travelled = Nb of km travelled in good table
11	A2.6	Tonne-kilometres carried out during the journey	Num 8	L0069	For one-stop journeys, calculated tkm from linked goods records are different from journey tkm	W	Control that for one stop journeys journey type = 1 the Nb of Tkm travelled should be included in the closed interval delimited by TRUNC(SUM((goods_weight-0.5)*(nb_km_travel-0.5)/10)) ROUND(SUM((goods_weight+0.5)*(nb_km_travel+0.5)/10))
				L0065	For several-stop journeys, calculated linked goods tkm different from linked journey tkm	W	Control that for several stop journeys (journey type=2) the Nb of Tkm travelled should be included in the closed interval delimited by: TRUNC (SUM((goods_weight-0.5)*(nb_km_travelled-0.5)/10)) for Lower Limit, and CEIL (SUM((goods_weight+0.5)*(nb_km_travelled+0.5)/10)) for Upper Limit
12	A3link	Number of linked A3 records	Num 8	L0067	Journey number of linked Goods records <> Real number of linked Goods records	E	Control that there are linked records in GOOD variable when nb_linked_A3 field is provided

(1) Format = Type of field (Text, Num) followed by Maximum length.
(2) E = Error (Record is rejected), W = Warning (Record can be accepted, with some automatic corrections as indicated).

12.2 Delete bad records

During the validation process, a series of checks are carried out on each record within the data sets sent by Member States. Some checks generate errors, while others generate warnings.

A Vehicle hierarchy is made up of a vehicle record, its associated journey records and for each journey record, its associated goods records. If within a particular hierarchy, there are one or more vehicle, journey or goods records that have an error, then all records that belong to that hierarchy are deleted. This means that only the vehicle hierarchies that are completely free of errors will be integrated into the production database, through the Correct and Aggregate steps.

12.3 Make corrections to data

After the incorrect vehicle hierarchies have been deleted, a correction can be applied on the Dangerous goods, if the codes provided are not the agreed ones: for the codes between 41 and 62, insert a full stop if it is missing (example "41" -> "4.1").

13 Aggregation of data and Supplementary tables

13.1 Aggregation of data

The vehicle, journey and goods records stored in GSAST have to be aggregated to produce tables with data for dissemination. This chapter provides a brief outline of the process.

After the received data have been validated, they are integrated into the production database that is used for reporting and dissemination. This aggregation process consists in creating indicators tables named ROAD_T_INDICATORS_&year from the vehicle, journey and goods records. One indicators table is generated by year to assist the calculation of precision standards of the data.

For each indicators table, there are three types of calculation for variable fields:

- Aggregations
  - SUM, for variables Goods_weight, Tonne_kilometres travelled, Kilometres travelled
  - COUNT for number of journeys, number of vehicles
- Unit conversion:
  - From 100 kg to tonnes
  - From tonne-kilometres to 1 000 tonne-kilometres
- Recalculation of the number of tonne-kilometres at the goods level according to journey type:
  - For "single transport operation" journeys or "several transport operations" journeys, it is the product of kilometres by the weight
  - For "collection or distribution" journeys, it is half the product of kilometres by the weight.
  - For "unladen" journeys it is equal to zero.

Conditions used for joining two tables:

- Vehicle table and Journey table:
  - VEHICLE.Id_Quest_Number = JOURNEY.Id_Quest_Number
- Journey table and Goods table:
  - JOURNEY.Id_Quest_Number = GOODS.Id_Quest_Number
  - AND JOURNEY.Id_Journey_Seq = GOODS.Id_Journey_Seq

13.2 Discrepancies between datasets A2 and A3

Since 1999, dissemination tables providing a breakdown by group of goods are on European level derived from basic **goods transport operations** (goods related information/dataset A3) whereas figures in dissemination tables without a breakdown by group of goods are derived from **journey related information** (dataset A2). This may lead to differences between the sum of quarterly figures (tonnes, vkm, tkm) in one table (e.g. goods related data) and the corresponding annual figure in another table for the same variable.

Member States may use different approaches to calculate tonne-kilometres on journey level (based on weights and distances of transported goods). Therefore, depending on the base dataset chosen, the European figures for tonne-kilometres might differ from Member States' corresponding national statistics.

The unit "movements" mentioned in the Annex of the dissemination regulation refers to "Basic transport operations" (BTO) when based on goods related information, whereas it refers to "Journeys" (JRNY) when based on journey related information.

13.2.1 Two different datasets as source of data

Discrepancies in the aggregates are visible when comparing dissemination tables derived from journey data on one hand and goods data on the other hand. For example, data reported in table "Summary of annual road freight transport by type of operation and type of transport (road_go_ta_tott)" are derived from journey-dataset A2 whereas data reported in table "Annual road freight transport, by type of goods and type of transport (road_go_ta_tg)" are derived from goods-dataset A3.

On European level, the definition of national or international transport is generally based on the journey information (dataset A2) and not on the basic transport operation (goods dataset A3).

Eurostat defines national or international transport always on the basis of the journey-related information on place of loading and place of unloading reported in the A2 files. This approach favours traffic flows rather than goods flows and provides also information on empty journeys. On a European level, traffic flows provide a good picture of the real kilometre performance.

Case 1–Dissemination tables without type of goods

Tonnes and tonne-kilometres are computed directly by the reporting countries and collected in the journey-dataset A2.

Data are then summed-up at national level to calculate the aggregates for these dissemination tables:

$T = \sum (T(A2))$

$TKM = \sum (TKM(A2))$

Case 2–Dissemination tables with data by type of goods

These tables show aggregates derived from goods-dataset A3.

Tonnes are summed-up from tonnes collected in A3: $T = \sum (T(A3))$

Tonne-kilometres are calculated by multiplying weight and distance collected for each type of goods:

$TKM = \sum (T(A3)*KM(A3))$

If the journey has five or more stops: $TKM = 0.5 * \sum (TKM(A3))$

13.2.2 Discrepancies between data derived from datasets A2 and A3

Data aggregated from datasets A2 and A3 are the same if

$\sum (T(A3)) = \sum (T(A2))$ and $\sum (T(A3)*KM(A3)) = \sum (TKM(A2))$

However, discrepancies happen in the following cases.

Rounding differences

Since data are derived from two different sources according to the case of dissemination tables, aggregates at national level may therefore slightly differ for random errors, due to the aggregation of micro-data. This can explain differences very small in relative terms, when, for example, the difference between the figures in two dissemination tables represents less than 0.1%.

Multi-stop journeys (journey-type 2)

The structure of multi-stop journeys makes data reporting more complex, due to several operations of loading and unloading performed during the same journey. Most of countries use one of the following two methods to report multi-stop journeys: reporting by consignments and reporting by consecutive stops ("vertical stages", see chapters 11 and 17).

When reporting data by vertical stages, each good-related dataset reports weight and distance recorded for the vehicle at a single stop. Data related to loaded goods are therefore not available separately for each good. In this case, the journey related weight is the maximum weight recorded among all stops during the journey, instead of the sum of all loaded goods: $T(A2) = \text{Max } T(A3)$

Therefore, when using the latter method, the aggregation of data gives different results, depending on the dataset chosen: summing up weight recorded at each stop (goods-dataset A3) gives a result different from the maximum weight recorded (journey-dataset A2).

This means that total tonnes reported at national level may differ according to the case of dissemination tables: $T(A2) = \text{Max } T(A3) \neq \sum (T(A3))$

The extent of the discrepancy on the national total depends on the relative share of multi-stop journeys.

Collection and delivery journeys (journey-type 3)

Journeys with five or more stops are particularly complex. Countries use several types of reporting methods. Among them, there is the "simplified method" for computing tonne-kilometres:

$TKM = 0.5 * \sum (TKM(A3))$

However, for each country applying a method other than the simplified one, the tonne-kilometres recorded in A2 differ from tonne-kilometres computed in the table based on A3 datasets.

The extent of the discrepancy on the national total depends on the relative share of journeys with five or more stops.

13.2.3 Examples of reporting methods

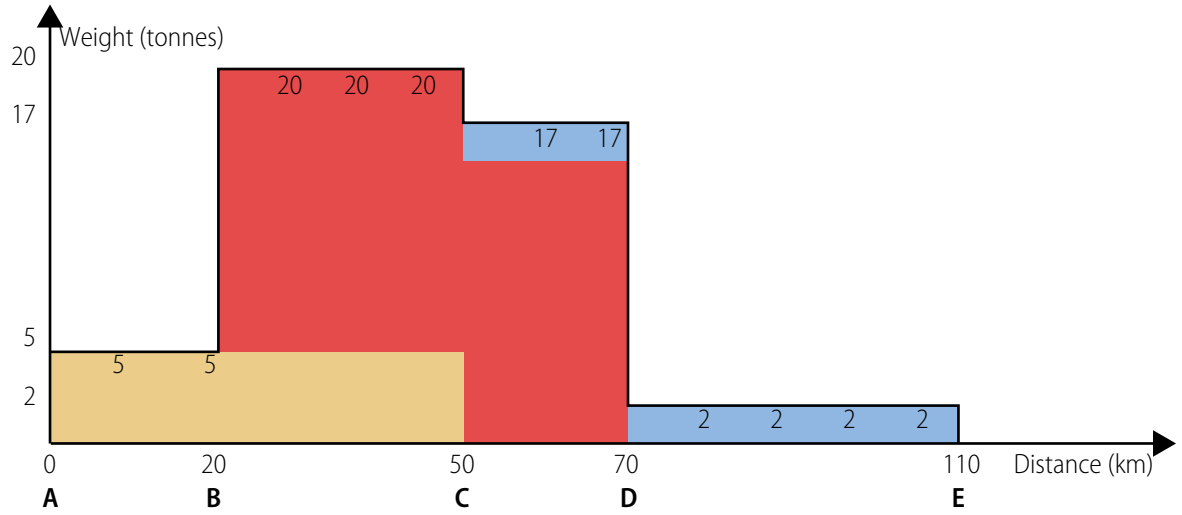
The following example shows data referring to a multi-stop journey reported in the journey-dataset and in the linked goods-related datasets, according to the three methods.

Goods operations made during the journey:

- 5t goods loaded at 0 km
- 15t goods loaded at 20 km
- 5t goods unloaded and 2t loaded at 50 km
- 15t goods unloaded at 70 km
- 2t goods unloaded at 110 km.

The picture below represents the journey graphically.

The starting point is A, the point at 20 km B, the point at 50 km C, the point at 70 km D and the point at 110 km E:



The total distance driven during the journey is 110 km while the total weight of loaded goods is 22 tonnes.

Reporting by consignments

Information on transport is reported describing each goods consignment:

		Weight (tonnes)	Distance (km)	Performance (tkm)([1])
Goods-related dataset	A-C	5	50	250
	B-D	15	50	750
	C-E	2	60	120
Journey-related dataset	Total	Sum: 22/(22)	Sum: 160/(110)	Sum: 1120

([1]) TKM are computed at goods level in order to calculate the tkm performed in the journey as the sum of tkm computed for each good. However, tkm are not reported in goods-related dataset.

Reporting by vertical stages

Information on transport is reported describing the journey made by the vehicle, i.e., describing each part (stage) of the journey:

		Weight (tonnes)	Distance (km)	Performance (tkm)([1])
Goods-related dataset	A-B	5	20	100
	B-C	20	30	600
	C-D	17	20	340
	D-E	2	40	80
Journey-related dataset	Total	Sum: 20/(22)	Sum: 110/(110)	Sum: 1120

([1]) TKM are computed for each stage in order to calculate the tkm performance in the journey as the sum of tkm computed for each part of the journey. However, tkm are not reported in goods-related dataset.

Simplified reporting

When data are not available neither for each part of the journey nor by consignments, only information on the total weight loaded and the total distance travelled are reported. The journey-related dataset is linked with one good-related dataset

only and data reported are the same in both datasets. The performance of freight transport (TKM) is computed multiplying the total weight loaded by the total distance travelled, corrected by a coefficient (in general 0.5):

		Weight (tonnes)	Distance (km)	Performance (tkm)([1])
Goods-related dataset	A-B	22	110	
Journey-related dataset	Total	Sum: 22/(22)	Sum: 110/(110)	Tonnes * km * 0.5: 1210/(1120)

([1]) TKM are computed for each stage in order to calculate the tkm performance in the journey as the sum of tkm computed for each part of the journey. However, tkm are not reported in goods-related dataset.

13.3 Supplementary tables

This section sets out the proposals made by Eurostat on the provision of the supplementary tables. At the Working Group on Road Transport Statistics held in Luxembourg on 10-11 May 1999, Member States agreed to provide a set of supplementary tables–A, B, C, D and E. Eurostat's proposal to cancel the collection of supplementary tables A, C, D and E was adopted at the Working Group on Road Transport Statistics held in Luxembourg on 10 October 2012.

For each quarter with the first submission of data files, Member States should report supplementary information according to table B1 or B2 (set out below). Eurostat uses this information to investigate precision measure and response rates in order to assess the levels of these measures that Member States have been able to achieve in providing data according to the Regulation (see also chapter 9.6.1.). Table B1 should be used where the vehicle is the primary sampling unit in a country and table B2 for cases where the primary sampling unit is not the vehicle (such as, transport operators or business enterprises).

Any changes to the supplementary information previously supplied for a quarter should be submitted with the revised data files.

The procedure of supplying the required information in table B

At its meeting on 12 February 2004, the Statistical Programme Committee approved Commission Regulation (EC) No 642/2004 on precision requirements for data collected according to Council Regulation (EC) No 1172/98 on statistical returns in respect of the carriage of goods by road, available in the Annexes of the Manual.

Article 3 of this Commission Regulation covers the information to be provided each quarter to permit the calculation of sample size, response rates and register quality rates. This information is to be provided in a table B, the format of which is presented under section 11.2.1, while the SDMX structure is provided under section 11.2.2.

The following points may be of help to ensure that comparable information is obtained from all countries.

Submission. The B-tables should be submitted electronically.

Number of strata. Some countries use a very detailed stratified sample. Eurostat can accept table Bs giving the information for all strata. However, if it is more convenient to a country to reduce the number of strata shown in a table B by aggregating some strata, this is acceptable provided a reasonable number of strata are shown. Where a country proposes to reduce the number of strata, contact should be made with the Transport Statistics Unit of Eurostat to agree the number of strata to be shown in table B.

Non-respondents. It is important to identify in separate rows the number of non-respondents (row 3 of table B) and the number of cases where the sample register information was wrong and the response could not be used (row 4 of table B). Guidance is included in the table Bs of which records to be included in each of the rows of the table.

Active vehicles claimed to be not working in survey period. The number of such vehicles should be shown in row 6 of table B1 (or row 7 of table B2). These vehicles should not be included in row 5 of table B1 (or row 6 of table B2). A1 records for such vehicles should NOT be sent to Eurostat.

Check sums. Ensure that the check sum for table B1 (B1.2 = B1.3 + B1.4 + B1.5 + B1.6) or table B2 (B2.1 = B2.2 + B2.3 + B2.4) is performed and satisfied before submitting the table, otherwise the tables will be rejected by the validation system.

14 Validation of aggregated data

14.1 Time series analysis of aggregated data

Time series analysis consists of the comparison of aggregated data collected over time periods. If the comparison leads to significant variations between the time periods considered, the data can be considered as suspicious, and Member States should be notified. Three different types of analysis can be envisaged, checking the growth rate of the road data between the following time periods:

- Variation of yearly data for two consecutive years.
- Variation of quarterly data (same quarter) for two consecutive years.
- Variation of quarterly data between the four quarters of a given year.

Thresholds have been determined above which the variation in the compared time series can be considered suspicious.

If the data are relatively dispersed, it is preferable to divide the data in several classes and to define a threshold for each class. Therefore, the statistic, which is able to define such thresholds, is the quartile. The data are divided in 4 classes with equal frequencies. The 3rd quartile is the value such that 75% of the relevant population is below that value. This 3rd quartile is then recommended to be the threshold to detect abnormal variations in the data from one time period to another. The thresholds thus depend on the particular data that is being considered.

For each class, the absolute variation between two time periods (|(V2-V1)| / V1) is calculated for all the values in this class. The 3rd quartile for the absolute variation obtained in this class is then the threshold above which absolute variation is considered as suspicious.

The threshold is generally higher for the classes with low absolute values, because for these values, even a small difference in absolute value can generate an important absolute variation.

This time series analysis concerns the road freight transport performed in national, international and total transport. The aggregated figures for tonnes and tonne-kilometres performed at country level published in Eurostat's free dissemination database are taken into account.

15 Dissemination of data by Eurostat

15.1 Commission Regulation on the dissemination of road freight statistics

According to Article 6 of Regulation (EU) No 70/2012 (see Annexes of this Manual), provisions must be adopted to govern the dissemination of statistics of the transport of goods by road, including the possible structure and contents of the results to be disseminated. At the Working Group on Road Transport Statistics held in Luxembourg in July 2002, Member States supported the final draft Commission Regulation on dissemination.

The Commission Regulation (EC) No 6/2003 was adopted on 30 December 2002 and has been amended by Commission Regulation (EU) No 202/2010 on 10 March 2010. Both Regulations are included in the Annexes of this Manual.

It should be noted that these Regulations specify the framework for data dissemination. Eurostat will decide which tables would be provided on a routine basis to users, via Eurostat's free dissemination database and other electronic dissemination methods, and which tables would be delivered in response to requests from users. This flexibility is needed due to the large number of possible tables that could be derived from Regulation (EU) No 70/2012.

15.2 Treatment of confidentiality in data dissemination

Article 3 of the dissemination Regulation (EU) No 6/2003 specifies that:

Article 3

1. Dissemination of tables to users other than the national authorities of Member States shall be subject to the general condition that each cell shall be based on at least 10 vehicle records depending on the variable tabulated. Where a cell is based on fewer than 10 vehicle records, it shall be aggregated with other cells, or replaced with a suitable flag. Tables referred to under point A of the annex (tables equivalent to those specified in Council Directives 78/546 and 89/462) may be excluded from this rule.
2. Tables including aggregated values based on less than 10 vehicle records may be supplied to national authorities responsible for European Union transport statistics in Member States, on condition that the national authorities apply the condition set out of paragraph 1 of this Article to any tables disseminated to other users.

On first inspection such a procedure appears fairly straightforward. However, a closer look indicates there are a number of serious problems in applying a system of disclosure control. The problem with concealing values for cells that could be shown, but for the need to prevent inadvertent disclosure is that some of the concealed information may be essential to the understanding of the message being presented in the table.

This manual has already noted the problems that might be encountered when implementing these rules (see chapter 8.3). If the value for one cell has to be concealed then, to avoid disclosure, the value of another cell in the same row (and also of another cell in the same column) has to be omitted. To ensure non-disclosure every row (and column) where the value for one cell has to be concealed must have at least two cells where values are concealed. There is the added problem that it does not always make sense to combine adjacent rows or columns. Concealed cells might be easily identified by cross checking with totals or other tables referring to the same subject but using a different structure.

Sometimes the value of a cell is concealed by adding the figure to an adjacent cell. The information for the combined cells is published across the two cell boundaries. This practice has the same problems discussed in the previous paragraph.

Considering the data collected under Regulation (EU) No 70/2012, it has to be noted however that the figures proposed for dissemination are never the real sample figures (individual vehicle records) but national estimates (extrapolated values). All information on tonnes, tonne-kilometres and vehicle-kilometres is based on the multiplication of the sample information with the weighting factors, provided by Member States that are used to gross up the sample results to national estimates. From this point of view, it might be questionable if such a strict confidentiality rule, as proposed above, is appropriate or not.

Confidentiality of the individual sampling units (vehicles) is furthermore guaranteed as the individual data records transmitted to Eurostat are rendered anonymous so that it is not possible to identify individual companies via the statistical unit used (vehicles).

There is however also a further aspect linked to the application of minimum numbers of sampling units for the calculation of national estimates: the reliability of the estimates. Estimates are of course less reliable if they are based on only a few sampling records.

Considering the results that are achieved by using the strict definition of confidentiality (less than 10 vehicle records not to be published) and further to consultations with Member States, Eurostat has proposed the following rules:

1. For Eurostat's free dissemination database tables based on the previous Directives it is accepted that, for reasons of continuity of time series, some estimates included in the cells might be based on less than 10 records and publish the updates.
2. For all further dissemination tables, when the aggregation is based on less than 10 records, the data will not be published, instead the 'u' flag (unreliable data) will be used. The totals in these tables will provide the real sums (including also the cells marked with the 'u' flags).

15.3 Tables for dissemination

The list of statistical tables whose dissemination are permitted by the dissemination Regulations is given below.

15.3.1 Tables from Council Directives 78/546 and 89/462

In order to maintain the continuity of existing series, tables that are already available in Eurostat's free dissemination database may be disseminated.

15.3.2 Main tables

The following set of tables, and subsets of these tables, may be disseminated.

Table	"Description (Note 1)"	Reference period	"Units (Note 2)"	Notes
B1	Summary of activity by type of operation and type of transport	Year, quarter	1 000 tonne Million tonne-km Vehicle-km	Note 3

Table	"Description (Note 1)"	Reference period	"Units (Note 2)"	Notes
B2	Transport, by type of operation	Year, quarter	1 000 t	Note 3
			Million tonne-km	
B3	Transport, by type of goods	Year	1 000 t	
			Million tonne-km	
B4.1	International transport, by country of loading and unloading (total of all reporting countries)	Year	1 000 t	
			Million tonne-km	
B4.2	As for table B4.1, but with additional breakdown by type of goods	Year	1 000 t	
			Million tonne-km	
B4.3	International transport, by country of loading and unloading (with breakdown by reporting country)	Year	1 000 t	
			Million tonne-km	
B4.4	As for table B4.3, but with additional breakdown by type of goods	Year	1 000 t	
			Million tonne-km	
B5.1	Transport, by region of loading	Year	1 000 t	
			Million tonne-km	
			Movements	
B5.2	Transport, by region of unloading	Year	1 000 t	
			Million tonne-km	
			Movements	
B6.1	Transport, by distance class	Year	1 000 t	
			Million tonne-km	
			Million vehicle-km	
			Movements	
B6.2	As for table B6.1, but with additional breakdown by type of goods	Year	1 000 t	
			Million tonne-km	
			Million vehicle-km	
			Movements	
B7	Transport, by axle configuration	Year	Million tonne-km	
			Movements	
B8	Transport, by age of vehicle	Year	Million tonne-km	
			Movements	
B9	Transport, by maximum permissible weight of vehicle	Year	Million tonne-km	
			Million vehicle-km	
			Movements	
B10	Transport, by load capacity of vehicle	Year	Million tonne-km	
			Million vehicle-km	
			Movements	

Table	"Description (Note 1)"	Reference period	"Units (Note 2)"	Notes
B11	Transport, by NACE branch	Year	Million tonne-km	
			Million vehicle-km	
			Movements	
B12	Vehicle movements, laden and empty	Year	Million vehicle-km	
			Movements	
B13.1	Transit vehicle movements, by transit country, by loaded/empty and by maximum permissible weight of vehicle (total of all reporting countries)	Year, quarter	1 000 t	
			Movements	
B13.2	Transit vehicle movements, by transit country (with breakdown by reporting country)	Year	1 000 t	
			Movements	
B14	Transport of dangerous goods, by type of dangerous goods	Year	Million tonne-km	
			Million vehicle-km	
			Movements	
B15	Transport, by type of cargo	Year	Million tonne-km	
			Million vehicle-km	
			Movements	

Note 1: Except where otherwise stated, the tables include a breakdown by reporting country.

Note 2: The following measures are calculated internally for all tables:

- 1000 t
- Mio tonne-km
- Mio vehicle-km (laden, empty)
- Movements (laden, empty)
- Number of vehicle records used to calculate the table cell

This column indicates the measures that will normally be offered to users. Other measures and units may be disseminated, if requested by users.

According to users' needs, the tables may be based on journey related variables (information from A2 data sets) or on goods related operations (information from A3 data sets) (see Regulation (EU) No 70/2012). Movements would therefore be labelled either as number of journeys or as number of basic transport operations. Transit movements would be labelled as such.

Note 3: Type of operation is broken down as follows:

- National journey: places of loading and unloading both in reporting country
- International journey: places of loading or unloading, or both, in countries other than the reporting country (= sum of the 4 following categories)
- Outward (goods loaded in reporting country): journey starts in reporting country, ends elsewhere
- Inward (goods unloaded in reporting country): journey starts elsewhere, ends in reporting country
- Cross-trade: journey between two countries other than the reporting country
- Cabotage: journey between places within a country other than the reporting country.

Data by loading or unloading region are published at NUTS-3 level.

For national transport, loading and unloading places are published at NUTS-2 level.

For international transport, loading and unloading places are published at NUTS-1 level.

15.3.3 Tables on cabotage

In order to provide information on cabotage equivalent to that available under Regulation (EC) No 1072/2009, the following set of tables, and subsets of these tables, may be disseminated:

Table	Description	Period	Unit
C1	Cabotage performed by hauliers from each reporting country, by reporting country	Year	1000 tonnes
			Million tonne-km
C2	Cabotage performed by hauliers from all reporting countries, by country in which cabotage takes place	Year	1000 tonnes
			Million tonne-km
C3	Cabotage by reporting country x country in which cabotage takes place	Year	1000 tonnes
			Million tonne-km

15.3.4 Tables for national authorities of Member States

In order to enable the national authorities of Member States other than the reporting country to compile complete statistics on road transport operations on their national territory, the following aggregated data files may be supplied to national authorities:

Table	Description	Period	Aggregated on dimensions (Note)	Units [1]
D1.1	Transport operations at country level (laden journeys)	Year	Reporting country	Tonnes
			Country of loading	Tonne-km
			Country of unloading	Vehicle-km
			Type of goods	Movements
			Type of transport	Number of vehicle records
			Age class	
			Distance class	
			Axle configuration	
D1.2	Transport of dangerous goods at country level (laden journeys)	Year	Reporting country	Tonnes
			Country of loading	Tonne-km
			Country of unloading	Vehicle-km
			Dangerous goods	Movements
			Type of transport	Number of vehicle records
D2	Transport operations at national level (empty journeys)	Year	Reporting country	Vehicle-km
			Country of origin	Movements
			Country of destination	Number of vehicle records
			Type of transport	
			Age class	
			Distance class	

Table	Description	Period	Aggregated on dimensions (Note)	Units ([1])
D3.1	Transport operations at regional level (laden journeys)	Year	Reporting country	Tonnes
			Region of loading	Tonne-km
			Region of unloading	Vehicle-km
			Axle configuration	Movements
			Type of cargo	Number of vehicle records
			Age class	
D3.2	Transport operations at regional level (laden journeys)	Year	Reporting country	Tonnes
			Region of loading	Tonne-km
			Type of goods	Vehicle-km
			Axle configuration	Movements
			Age class	Number of vehicle records
D3.3	Transport operations at regional level (laden journeys)	Year	Reporting country	Tonnes
			Region of unloading	Tonne-km
			Type of goods	Vehicle-km
			Axle configuration	Movements
			Age class	Number of vehicle records
D4	Transport operations at regional level (empty journeys)	Year	Reporting country	Vehicle-km
			Region of origin	Movements
			Region of destination	Number of vehicle records
			Axle configuration	
			Age class	
D5	Transit transport (laden and empty journeys)	Year	Transit country	Tonnes
			Reporting country	Movements
			Laden/empty	Number of vehicle records
			Region of origin	
			Region of destination	

([1]) Movements may refer either to number of journeys or to number of basis transport operations.

Note: For D-tables, the following classifications will be used:

- Type of transport: own account/hire or reward
- Age class: three classes
- Distance class: four classes
- Region: NUTS-3
- Axle configuration: aggregated to vehicle types (lorry, articulated vehicle and road train).

According to user needs the dimensions and units referred to in tables for national authorities of Member States may include additional variables covered by the data collection according to Regulation (EU) No 70/2012 subject to the agreement of Member States.

Following the introduction of new D-tables by Commission Regulation (EU) No 202/2010, changes were introduced in the method used to generate the D-tables. The new method used to compile the D-tables generated a break for the variable 'Number of vehicle records'. It has to be noted that the main use of this variable is to determine if the confidentiality rule must be applied (number of vehicle records is below 10), and this is done with the micro-data available in GSAST for the 'Number of vehicle records' and not on the figures obtained for this variable in the D-tables.

16 Anonymisation of data

16.1 Background information

Eurostat compiles various data collected by Member States. For some data collections, data received by Eurostat are already in tabular form, for the others they are in the form of micro-data, i.e. sets of records containing information on individual respondents. Micro-data can be divided into business micro-data (from enterprises) and social micro-data (from individuals or households).

At the EU level, Commission Regulation (EU) No 557/2013 defines the rules of access to confidential data for scientific purposes.

16.2 Carriage of goods by road

According to the provisions of Regulation (EC) No 202/2010 amending Regulation (EC) No 6/2003 concerning the dissemination of statistics on the carriage of goods by road, researchers and the scientific community in general should have access for scientific purposes to the data transmitted to the Commission (Eurostat) under Regulation (EU) No 70/2012, according to the principle laid down in Regulation (EC) No 223/2009 of the European Parliament and of the Council on European Statistics.

The User Manual on anonymisation of road freight micro-data explains the method selected to anonymise road freight micro-data and how this method was applied on the different variables. It aims to help the user for a correct use and interpretation of anonymised RC data.

This User Manual "Anonymised Road Carriage (RC) micro-data" is available on Eurostat website.

List of abbreviations

CCT	Common Customs Tariff
CIRCABC	Communication & Information Resource Centre Administrator (a collaborative workspace with partners of the European institutions)
CN	Combined Nomenclature
CONVAL	CONtent VALidation of datasets transmitted via EDAMIS – it performs a content validation of statistical datasets following the SDMX Information Model for a given data flow
CPA	Statistical Classification of Products by Activity
CSTE	Commodity Classification for Statistics of Transport in Europe
DSD	Data Structure Definition
DTP	Desktop publishing
EC	European Commission
ECMT	Economic Conference of Ministers of Transport
EDAMIS	Electronic Data files Administration and Management Information System
EEA	European Economic Area
EFTA	European Free Trade Association (Norway, Switzerland, Iceland, Liechtenstein)
EU	European Union
FAQ	Frequently asked questions
GDP	Gross domestic product
GSAST	General Statistical Analysis Systems for Transport
HS	Harmonised System
ILSE	Index of Locations for Statistics in Europe
ISO	International Organization for Standardization
IWG	Intersecretariat Working Group
LAN	Local Area Networks
NACE Rev.2	Statistical Classification of Economic Activities in the European Union (Nomenclature statistique des Activités économiques dans l'Union Européenne)
NIMEXE	Nomenclature of Goods for the External Trade Statistics of the Community and Statistics of Trade between Member States
NST	Standard Goods Classification for Transport Statistics (Nomenclature uniforme des marchandises pour les Statistiques de Transport)

NUTS	Nomenclature of Territorial Units for Statistics (Nomenclature des Unités Territoriales Statistiques)
PHARE	Action plan for coordinated aid to Poland and Hungary (subsequently extended to the remainder of the Central and East European countries)
SDMX	Statistical Data and Metadata eXchange
SDMX-ML	XML format for the exchange of SDMX-structured data and metadata
SDMX-CSV	CSV format for the exchange of SDMX-structured data and metadata
STRUVAL	STRucture VALidation of statistical datasets transmitted via EDAMIS (replacing EVE – EDAMIS Validation Engine), following the SDMX Information Model for a given data flow.
UNECE	United Nations Economic Commission for Europe

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- COMMISSION REGULATION (EC) No 6/2003 of 30 December 2002 concerning the dissemination of statistics on the carriage of goods by road.
- COMMISSION REGULATION (EC) No 642/2004 of 6 April 2004 on precision requirements for data collected in accordance with Council Regulation (EC) No 1172/ 98 on statistical returns in respect of the carriage of goods by road.
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- REGULATION (EC) No 399/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 amending Council Regulation (EC) No 1172/98 on statistical returns in respect of the carriage of goods by road, as regards the implementing powers conferred on the Commission.
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- COMMISSION REGULATION (EU) No 520/2010 of 16 June 2010 amending Regulation (EC) No 831/2002 concerning access to confidential data for scientific purposes as regards the available surveys and statistical data sources.
- NACE Rev 2 – Regulation (EC) No 1893/2006 of the European Parliament and of the Council establishing the statistical classification of economic activities NACE revision 2 and amending Council regulation (EEC) No 3037/90 as well as certain EC Regulations on specific statistical domains.
- NST 2007 – Commission Regulation (EC) No 1304/2007 amending Council Directive 95/64/EC, Council Regulation (EC) No 1172/98, Regulations (EC) No 91/2003 and (EC) No 1365/2006 of the European Parliament and of the Council with respect to the establishment of NST 2007 as the unique classification for transported goods in certain transport modes.
- CPA 2008–Regulation (EC) No 451/2008 of the European Parliament and of the Council of 23 April 2008 establishing a new statistical classification of products by activity (CPA) and repealing Council Regulation (EEC) No 3696/93.

- NUTS 2013 – Commission Regulation (EU) No 1319/2013 of 9 December 2013 amending annexes to Regulation (EC) No 1059/2003 of the European Parliament and of the Council on the establishment of a common classification of territorial units for statistics (NUTS)
- *Glossary for Transport Statistics*, Document prepared by the Intersecretariat Working Group on transport statistics EUROSTAT, ECMT, UNECE, Fourth edition.

Many road transport statistics documents are available on Eurostat's web site 'CIRCABC', at https://circabc.europa.eu

For all information on classification and nomenclatures, see Eurostat's Classification Server, at https://ec.europa.eu/eurostat/web/metadata/classifications.

Legal acts for road freight transport statistics

Regulation for road freight transport statistics

REGULATION (EU) No 70/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 January 2012 on statistical returns in respect of the carriage of goods by road (recast)

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447860857749&uri=CELEX:32012R0070

COMMISSION REGULATION (EC) No 2691/1999 of 17 December 1999 on rules for implementing Council Regulation (EC) No 1172/98 on statistical returns in respect of the carriage of goods by road

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447860988737&uri=CELEX:31999R2691

COMMISSION REGULATION (EC) No 2163/2001 of 7 November 2001 concerning the technical arrangements for data transmission for statistics on the carriage of goods by road

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861041475&uri=CELEX:32001R2163

COMMISSION REGULATION (EC) No 6/2003 of 30 December 2002 concerning the dissemination of statistics on the carriage of goods by road

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861166752&uri=CELEX:32003R0006

COMMISSION REGULATION (EC) No 642/2004 of 6 April 2004 on precision requirements for data collected in accordance with Council Regulation (EC) No 1172/ 98 on statistical returns in respect of the carriage of goods by road

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861228431&uri=CELEX:32004R0642

COMMISSION REGULATION (EC) No 833/2007 of 16 July 2007 ending the transitional period provided for in Council Regulation (EC) No 1172/98 on statistical returns in respect of the carriage of goods by road

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861269149&uri=CELEX:32007R0833

COMMISSION REGULATION (EU) No 202/2010 of 10 March 2010 amending Regulation (EC) No 6/2003 concerning the dissemination of statistics on the carriage of goods by road

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861325294&uri=CELEX:32010R0202

Legal acts for classifications used in road freight statistics

REGULATION (EC) No 1893/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the statistical classification of economic activities NACE revision 2 and amending Council regulation (EEC) No 3037/90 as well as certain EC Regulations on specific statistical domains

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861518671&uri=CELEX:32006R1893

COMMISSION REGULATION (EC) No 1304/2007 amending Council Directive 95/64/EC, Council Regulation (EC) No 1172/98, Regulations (EC) No 91/2003 and (EC) No 1365/2006 of the European Parliament and of the Council with respect to the establishment of NST 2007 as the unique classification for transported goods in certain transport modes

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861566585&uri=CELEX:32007R1304

COMMISSION REGULATION (EU) No 1319/2013 of 9 December 2013 amending annexes to Regulation (EC) No 1059/2003 of the European Parliament and of the Council on the establishment of a common classification of territorial units for statistics (NUTS)

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861615034&uri=CELEX:32013R1319

Other

COMMISSION REGULATION (EU) No 520/2010 of 16 June 2010 amending Regulation (EC) No 831/2002 concerning access to confidential data for scientific purposes as regards the available surveys and statistical data sources

http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1447861652915&uri=CELEX:32010R0520

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Road freight transport methodology

The present document describes the methods used by Member States, candidate and EFTA countries in their surveys on road freight transport statistics. Part I describes national methodologies for data collection. This information is based on the national reference metadata produced by the reporting countries. Data in these national metadata refer to the first quarter of 2023. Part II includes summary tables, with the basic information on sampling, response rate, register quality and precision of results of the surveys. Data on the registers used to draw the sample and the sampling methodology are relevant for the surveys conducted in the first quarter of 2023, while the main characteristics given for each country refer to the years 2022 and 2023, according to data availability.

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