

# ROAD FREIGHT TRANSPORT

## METHODOLOGY

(Last updated in June 2009)

### 1. Purpose of the survey

The survey for the road freight transport is of big importance in the transport statistics. The aim is to provide comparable information about the carriage of goods by road by means of goods road transport vehicles that are registered in the country. The quarterly data from the survey are very important for the transport policy of the Republic Bulgaria and the European Union. The survey is conducted according requirements of EU Directive 1172/98, in cooperation with the Ministry of internal affairs.

### 2. Information sources and object of the survey

1. Object of the survey are road transport vehicles – lorries; special vehicles, which carry goods according to their function such as flour-carrier, cement-carrier and etc., and road tractors with Bulgarian registration. Transport vehicles, which are properties of Ministry of National Defence and Ministry of Internal Affairs, as well as transport vehicles with gross weight up to 6 tones, are excluded from the survey.

2. The population of the vehicles, on which is based the survey, is obtained from the Register of motor vehicles of the Ministry of Internal Affairs, Traffic Police Office. From the register are extracted the necessary data, namely: registration number of the vehicle; make; model; regional statistical office (RSO); type of transport; year of first registration and vehicle gross weight. Since 2007 the Register of motor vehicles is regularly updated by the information received by the respondents.

3. Reporting units of the survey are owners and leaseholders of lorries and road tractors, which carry goods for reward or on own account no matter if the vehicles are state owned or private. The survey covers 52 weeks in a year. Equal number of vehicles, which are different, is observed each week and is randomly sampled with proportional stratification.

### 3. Variables of the survey

The survey is conducted via questionnaire, which includes the following groups of variables:

1. Vehicle-related variables – except of the variables mentioned before, which are included in the database, the following additional data is collected during the survey: name and address of the owner and load capacity of the vehicle during the surveyed week; axle number and type of vehicle body. If the transport vehicle is articulated vehicle (road tractor with semi-trailer) or lorry with trailer, data about gross weight, load capacity and axle configuration of articulated vehicle is obtained during the survey.

Data about the total annual average kilometers of the transport vehicle or about the kilometers covered after the date of obtaining, if less than one year, is collected in order to compile derivative variables – total kilometres and total fuel consumption. Further more, data about fuel consumption (in liters) during surveyed period, fuel kind and type of transport (hire or own account) is

provided. An information concerning changes in the sampled transport vehicles is obtained (sell, hire, scrapped, stop of movement).

2. Vehicle owner-related data – a BULSTAT code is filled in if the owner is an economic unit.

3. Journey-related data – data about number of days during surveyed week when transport vehicle has carried goods; number of non-working days due to the following six reasons: repair, lack of driver, driver is in annual leave, lack of work, holidays or other reason.

Journey-related data is filled into two separate tables according to the number of stops of the transport vehicle for loading and unloading. More detailed data is filled into about journeys consisting of 1 to 4 stops for loading/unloading, including international journeys. Data relates to separate stages of each journey in order to calculate automatically tonne-kilometers, which is the most important variable about the work of the vehicle. The following data is collected also: place of loading and place of unloading (itinerary), type of goods carried, including dangerous goods, kilometres travelled when the vehicle is loaded and is not loaded, and quantity of carried goods. Since 2007 intermodal transport is included.

4. Goods-related variables – type of goods defined by reference to the questionnaire and coded according to the National Goods Nomenclature for Transport (NGNT). It is fully harmonized with Goods Classification for Transport Statistics NST/R, which is applied by Member-states of EU.

#### 4. Coverage, model and sample size

Population, from which samples during the year are obtained, comprises of three types of transport vehicles coded as 2, 3 and 4. The numbers correspond to lorries, special vehicles and road tractors. Since 2007 the survey is conducted by disproportionate sampling – optimal allocation.

The sampling for the first quarter of each year is based on two main indicators which are in the Register of motor vehicles, namely:

First: sampling by gross weight and type of vehicles, expressed in kilograms

Group 1 – lorries and special vehicles with gross weight up to 7499 kg

Group 2 – lorries and special vehicles with gross weight over 7500 and up to 14999 kg

Group 3 – lorries and special vehicles with gross weight over 14500 and up to 16999 kg

Group 4 – lorries and special vehicles with gross weight over 17000 and up to 24999 kg

Group 5 – lorries and special vehicles with gross weight over 25000 and more

Group 6 – road tractors irrespective of the vehicles gross weight.

The size and the optimal allocation of the annual sample by the all six groups is calculated on the base of the population, samples, tonnes carried and tonkilometres performed trough the previous year using the formula:

$$n_i = [(N_i * s_i) / (\sum N_i * s_i)] * n$$

Where:

$N_i$  - number of units in the population

$s_i$  - standard deviation

The size of quarter samples, total and by groups is one fourth of the annual sample and it is the same for the whole year.

Second: sampling by the 28 regions of the country

Every quarter the appropriate number of vehicles is extracted from the Register for each of the six groups, proportionally distributed by the 28 regions of the country. Thus a quarter sample is obtained which consists 168 strata.

2. Equal number of vehicles is surveyed each week. It is not allowed one and the same vehicle to be surveyed twice during the year.

3. Each quarter NSI sends to the RSOs weekly samples with names and addresses of the vehicle owners, to fill in the questionnaires, as well as the schedule of the survey.

4. The sample size for the next reporting year is based on calculations about the response rate of the current year and on the quality assessment of the results by the six groups.

5. Extrapolation of the results from the sample is done by the formula:

$$WF_{\text{strata } 1} = (N_1 \times 13) / (s_1' + s_1'')$$

$N_1$  – number of vehicles in strata 1 of the population;

$s_1'$  - number of active vehicles + vehicles non-active during the survey week;

$s_1''$  - includes status 13-scrapped, 14-withdrawn from operation, 17-out of scope и 18-unusable

At the end of each reporting year the sample error is calculated. It is necessary to calculate error for each stratum separately in order to obtain the total error of the sample. The latter is presented in percentages. This is done in respect of the tonnes carried and the tonne-kilometers.

Formula for estimating  $i^{\text{th}}$  variable error in each stratum is the following:

$$e_i = \frac{s_i}{\sqrt{n_i}} * \sqrt{1 - \frac{n_i}{N_i}} * \frac{1.96}{\bar{i}_i} * 100$$

Where:

$s_i$  – Standard deviation;

$N_i$  – Population (total set of units);

$n_i$  – Sample size;

$\bar{i}_i$  – Sample mean for  $i^{\text{th}}$  variable;

1.96 – coefficient for confidence level of 95%.

Formula for estimating standard deviation by strata is the following:

$$s_i = \sqrt{\frac{1}{n_i - 1} \sum_{j=1}^{n_i} (x_j - \bar{x})^2} = \sqrt{\frac{\sum x_j^2 - n_i * \bar{x}^2}{n_i - 1}}$$

Formula for estimating total error of the sample is the following:

$$e = \frac{\sqrt{ss}}{N} * \frac{1.96}{\bar{x}} * 100$$

Where:

ss – Sum of squares of the standard deviation;

N – Population (total set of units);

$\bar{x}$  – Sample mean of the variable.

## 5. Used classifications and nomenclatures

1. National Goods Nomenclature for Transport (NGNT);

2. Goods Classification for Transport Statistics NST/R;
3. Nomenclature of Names and Codes of the Countries, according which places of loading and places of unloading for international journeys are coded;
4. Classification of dangerous goods.

## **6. Dissemination policy**

NSI disseminates quarterly information on road freight transport 4 months after the reference period. The information is published in the NSI internet site and contains aggregated data for type of transport and type of carriages. Annual data from the survey is published in the Statistical yearbook.