



Statistics on combined goods transport 2016-19: Survey report

1. Introduction

Combined goods transport (CT) involves different modes of transport (road, rail, water), during which the goods themselves are not offloaded and reloaded but only the intermodal transport units in which they are transported (e.g. containers). The principle is that the majority of the journey is covered by rail or ship (main leg) and that the pre-carriage and onward carriage by road is as short as possible.

The rail part of the transport chain distinguishes between unaccompanied combined transport (UCT) and the rolling motorway (Rola). With UCT, containers, swap bodies and semi-trailers are transported by rail. In the case of Rola, entire lorries are loaded onto the rail.

Over the last few decades, intermodal transport has gained increasing importance. It is a key part of transport policy in Switzerland, as the Article on the Protection of the Alps in the Federal Constitution requires that transalpine transit traffic should be by rail.

Some data on combined transport were already available, for example in the Federal Statistical Office's statistics on public transport, in the Federal Office of Transport's surveys on transalpine goods transport and in the Rhine shipping statistics from the Port of Switzerland. The survey on combined transport of goods will complement this information. As the survey on combined goods transport differs in methodology from the other surveys, the results sometimes differ slightly (see chapter 4).

The results are intended for all interested parties and are available for various applications in the fields of transport policy, spatial planning, market research, etc. It should however be noted that the data are relatively strongly aggregated to ensure data protection. In addition, the available data do not yet allow for the representation of intermodal transport chains.

2. Survey procedure

The collection of data on combined goods transport is based on the recommendations of the statistical service of the European Union (Eurostat), which in turn are based on the CT statistics of Germany's Federal Statistical Office (Destatis). The basic features of the so-called "German Approach" were adopted and adapted to the specific conditions in Switzerland where required. The principle of this method is based on the use of existing (statistical) data per mode of transport - additional direct surveys are generally not used. This also helps to minimise the administrative burden on businesses. The CT data per mode of transport alone provide valuable information. Ideally, the mode-specific data can also be used to obtain information on intermodal transport chains.

2.1 Mode of transport: Rail

The CIS-Infra system from SBB Infrastructure is evaluated for rail transport. This includes an

operational overview of goods transport in Switzerland (domestic and international traffic), including detailed data on the transport of intermodal transport units on the standard gauge network in Switzerland, including individual connections from/to service points on metre-gauge networks. The information is available in two data sets: a wagon file and a container file. The wagon file contains one entry per wagon and consignment, which is primarily used to determine the start and destination of the consignment in relation to rail. The container file contains one entry per intermodal transport unit (containers, swap bodies, semi-trailers or lorries) with information on the weight of the goods. The records are linked by the wagon number and the date contained in both files.

2.2 Mode of transport: Road

For road transport, data are used from the road freight transport statistics. Annual survey data are available for domestic heavy goods vehicles¹.

2.3 Mode of transport: Water

For the water mode of transport, the data on container transshipments from the Rhine shipping statistics of the Port of Switzerland in Basel are evaluated. The number of containers, TEUs² and the volumes transported in containers are based on information provided by the transshipment companies.

3. Data processing

The data from the sources described in Chapter 2 have to be processed in order to be used for the statistics on combined goods transport (CT statistics). This process involves, for example, supplementing missing values, correcting implausible figures or calculating new variables and parameters using the basic data.

3.1 Mode of transport: Rail

SBB Infrastructure's CIS-Infra system is primarily for operational purposes and was not specifically designed for statistical applications. Accordingly, data preparation for the CT statistics is very important.

The data records of the container files are linked to the entries in the wagon file via the key variables wagon number and consignment date. The following conditions are observed:

1. Several containers can be linked to one and the same entry in the wagon file (several containers on the same wagon)
2. A container cannot be assigned to different entries in the wagon file (a container cannot be on several wagons at the same time)
3. The consignment date in the wagon file and in the container file may differ by up to 3 days (including the turn of the year). The connection with the smallest date difference between both files is maintained.
4. Links with entries in the wagon file where information on the source and/or destination is given according to the list of services are maintained as a priority compared with those where the source and/or destination is unknown or implausible.

Most containers can be linked to an entry from the wagon file using this method. For the years 2016-2019, about 99.9% of the containers could be allocated to one wagon each; only in 2017 was this figure slightly lower at 99.74%, probably due to the exceptional operational situation resulting from the long-lasting line interruption at Rastatt. The unassigned container data are no longer considered in further data processing.

¹ Further information can be found at www.gte.bfs.admin.ch

² Twenty-foot Equivalent Unit (measure for a standard container of 20 feet length)

The data in the container file on the container weight (tare), the weight of the load (net) and the gross weight (tare + net) are sometimes incomplete or implausible. Based on a complex decision tree, the weight specifications are supplemented or adjusted using an automated process. However, it can be assumed that even after adjustment, the weight information does not always correspond to the reality. In particular, it is also possible that in certain cases effectively loaded containers are shown as empty or vice versa.

The CIS-Infra contains data on transport that does not pass through Swiss territory. Such transport must be identified and excluded in the CT statistics in order to comply with the territoriality principle. Potential cases are identified on the basis of source-destination relations and, with the help of railway experts, it is decided whether or not the transport in question was routed via Swiss territory.

The means of transport (domestic, import, export, transit) is derived from the information in the wagon file on the place of departure and destination of the consignments. This information should be considered reliable. For a few Swiss freight stations near the border, foreign station numbers also exist in CIS-Infra. These are assigned to Switzerland so that the means of transport is determined correctly.

The rolling motorway (Rola) is identified by the "Artcode" information field with the value 4 in CIS-Infra and by the booking number (debiocode with the value 7057) also contained in the data records. Entries with debiocode 7057 are further restricted - only entries with a railway wagon of the type "car wagon" will be allocated to Rola. In addition, all routes that do not concern Basel-Lugano / Lugano-Basel³ or Freiburg i. Br.-Novara / Novara-Freiburg i. Br. are excluded as incorrect bookings or special operational cases.

3.2 Mode of transport: Road

The transport of containers and swap bodies in combined transport is identified in the data from the road freight transport statistics using a multi-stage procedure:

1. The characteristic "Type of cargo" must have the specification "large container/swap body".
2. The product group "stone and earth" is excluded. This excludes the transport of bulk goods used in the construction sector in large troughs, which is only rarely transported by rail.
3. The road onward carriage must begin in the same postcode and on the same date (+ 1 day tolerance) as a container which according to CIS-Infra has arrived by rail. The road pre-carriage journey must end in the same postcode and on the same date (- 1 day tolerance) as a container which according to CIS-Infra has been sent by rail.

A similar procedure is used to transfer semi-trailers to rail:

1. The vehicle must be a semi-trailer.
2. The road onward carriage must begin in the same postcode and on the same date (+ 1 day tolerance) as an intermodal transport unit which according to CIS-Infra has arrived at a terminal suitable for semi-trailer transshipment. The road pre-carriage journey must end in the same postcode and on the same date (- 1 day tolerance) as an intermodal transport unit which according to CIS-Infra has been sent in a terminal suitable for semi-trailer transshipment.
3. A trailer event (coupling or uncoupling) must be available in the heavy vehicle charge (HVC) data for the road tractor concerned on the corresponding date.

For some cities, not only the exact postcode of the terminal location is allowed, but also the generalised postcode (e.g. 4000 instead of 4057). This reflects the fact that the questionnaire

³ This connection was discontinued at the end of 2018.

of the goods transport survey sometimes includes generalised postcodes. For Basel, this also takes into account the pre- and onward carriage up to inland shipping.

3.3 Mode of transport: Water

The data on the number of containers and TEUs handled are taken directly from the statistics published by the Port of Switzerland. The data on net tonnes are calculated from an aggregated data set provided by the Port of Switzerland.

4. Differentiation and particularities

When interpreting the results, it is essential to be aware of the specifics and limitations of statistics. The following explanations should help to avoid any misinterpretation.

4.1 Mode of transport: Rail

- The use of SBB Infrastructure's CIS-Infra system as a data source for the CT statistics means that the railway undertakings do not have any administrative outlay. However, it should be noted that CIS-Infra is primarily for operational purposes and was not specifically designed for statistical applications. Accordingly, certain delimitation difficulties, inaccuracies or gaps in the data must be accepted. Although the data are processed for statistical purposes (see chapter 3.1), it is not possible to completely clarify all points. Nevertheless, the quality of the rail data in the CT statistics can be described as good.
- CIS-Infra includes all national and international transportation of intermodal transport units (containers, swap bodies, ACTS containers, semi-trailers or trucks) on the Swiss standard gauge network including individual connections from/to service points on metre-gauge networks. Any CT transportation that takes place exclusively on a narrow-gauge network (e.g. Rhaetian Railway) is not included. However, such traffic is negligible in volume.
- CIS-Infra also includes the transportation of intermodal transport units from/to private connection lines⁴. These cannot be filtered out in the context of statistical data preparation. Accordingly, some consignments are also included in the CT statistics which, although transported in intermodal transport units, have not changed the mode of transport and are therefore not considered as combined transport according to the introductory definition. According to railway experts, their proportion is small.
- There are no characteristics in the CIS-Infra data sets that would allow direct identification of semi-trailers. An estimate would be possible based on auxiliary variables (e.g. tare weights) and assumptions. However, due to differences from other sources, semi-trailers are not shown separately for the time being. For most questions, a distinction between accompanied combined transport (Rola) and unaccompanied combined transport (containers, swap bodies, semi-trailers) is sufficient.
- The contents of the containers (types of goods) are in most cases unknown to the railway companies and are only non-specifically recorded in CIS-Infra (e.g. "grouped goods" or "undeclared container contents"). Accordingly, no data on product groups are published.
- Based on the available data sources, it is currently not possible to calculate transport distances and thus transport performance in (net) tonne-kilometres.
- Due to different survey methods and delimitations, there are some differences

⁴ Tracks, including associated installations, which provide access to a building or a site and are used exclusively for the transport of goods, but which, according to Article 62 of the Railways Act of 20 December 1957 (EBG), are neither part of the infrastructure nor the railways. Sidings are mainly found at larger factories, industrial operations, logistical centres, transport facilities and military bases (sources: Goods Carriage Ordinance (SR 742.411), Wikipedia).

between the results of the CT statistics and other statistics. Differences compared with the FSO's statistics on public transport (OeV statistics) are firstly due to the fact that in the OeV statistics only the railway undertakings (RUs) with an annual transport performance of over 500 million tonne-kilometres have to provide data on intermodal transport. Another reason may be the different survey methodology: In the OeV statistics, the individual RUs are responsible for the delivery of data concerning them and they use the data available internally. In contrast, the use of the central data source CIS-Infra ensures that the activities of all railway undertakings (RUs) are recorded and depicted equally and that no double counting or omissions are possible if the consignment runs are split between different RUs.

4.2 Mode of transport: Road

- The surveys on goods transport by road are not specifically designed to cover intermodal transport. On the one hand, CT must be identified in the data on the basis of assumptions (see Chapter 3.2), which leads to a certain level of imprecision. For example, it may happen that container transportation is identified as CT in the data, although in reality the container has not changed mode of transport. On the other hand, the sample size in relation to CT transport is relatively small, which means that the results are less statistically reliable. In concrete terms, the goods transport survey records about 1000 CT transportations per year, which corresponds to one percent of all declared transportations.
- Data on domestic heavy goods vehicles are available annually (goods transport survey). Data on foreign heavy goods vehicles are only available every 5 years (survey on cross-border goods transport). Unlike for domestic vehicles, it is not possible to identify whether a semi-trailer has been coupled or uncoupled on the basis of the HVC data. Therefore, CT cannot be determined for the foreign vehicles. Light utility vehicles are not included and their contribution to combined transport is negligible.
- In accordance with international regulations, surveys on goods transport by road do not take into account the dead weight of loaded containers (containers and swap bodies) when they are transported. When transporting empty containers, however, their weight must be indicated, as the container itself is the transported goods. With regard to intermodal goods transport, however, the weight of goods transported in containers is of primary interest. The weight of empty containers is therefore not taken into account. Thus the methodology also corresponds to that of the FSO's OeV statistics (part of intermodal goods transport) and to the rail and water transport modes within the CT statistics.
- Mileage (vehicle-kilometres) refers to the vehicle and for methodological reasons cannot be evaluated according to characteristics relating to transport. Accordingly, it is not possible to calculate this parameter for combined road transport.
- Although an analysis by product group would theoretically be possible, this is not done for the following two reasons: First, as mentioned above, the sample size for combined road transport is relatively small. The resulting limited statistical reliability does not allow a breakdown by type of goods. Secondly, the publication by type of goods could lead to misinterpretations, e.g. if the freight structure of the road CT based on a small sample were transferred to other modes of transport such as rail. Within the German Approach framework, it is therefore recommended to refrain from publication by product groups in the case of unequal data availability between the transport modes.

4.3 Mode of transport: Water

- The data refer to the Port of Switzerland in Basel, consisting of the three ports of Basel-Kleinhüningen, Birsfelden and Muttenz Au.
- No information is available on the port of departure in the case of receipt at the Port of Switzerland in Basel or the port of destination in the case of dispatch in Basel.

4.4 Final remarks

- According to the German Approach, airfreight is not part of the CT statistics. The transport of goods by air has a negligible role in terms of volume (as opposed to monetary value). Moreover, when changing modes of transport, it is normally the goods themselves that are offloaded and reloaded and not only the surrounding container, which contradicts the definition of intermodal or combined transport.