Freight Rail Usage: Quality and Methodology Report

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Introduction

This is a report on the quality of the Freight Rail Usage statistical release and data portal tables. It helps users to understand the quality of our statistics, and also ensures ORR is compliant with principle 4 of the Code of Practice for Official Statistics[1].

The quality report covers the following areas:

- **Methodology** – detail on the various data sources and methodology used to compile the statistics;

- **Historic background** – a background to each statistic and details of changes throughout the time series;

- **Relevance of the data** – the users of the statistics, and our engagement;

- **Accuracy and reliability** – the accuracy of each statistic;

- **Timeliness and punctuality** – our timescales for the production, quality assurance and publication of each statistic;

- **Accessibility and clarity** – the format of our statistics and where they can be found;

- **Coherence and comparability** – comparisons to similar statistics published elsewhere.

Freight usage data are supplied by Network Rail, freight operating companies, Department for Transport (DfT) and Department of Energy and Climate Change (DECC). Freight usage data is measured using four metrics, which are covered in detail in the methodology section below.

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[1] Principle 4: Sound methods and assured quality. Statistical methods should be consistent with scientific principles and internationally recognised best practices, and be fully documented. Quality should be monitored and assured taking account of internationally agreed practices. The Code of Practice can be accessed here http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html

Methodology

Quarterly and periodic data

The rail industry reports data on a periodic basis rather than the more recognised reporting cycles such as monthly or quarterly. A period is normally a 28-day, or four weekly, period for business reporting purposes (Sunday to Saturday) and there are 13 periods in a financial year. The length of a period may differ at the end of the financial year, 31 March, and the beginning of the financial year, 1 April, to ensure that a break is made at 31 March.

Some quarterly datasets, such as quarterly Public performance measure and Freight performance measure, require apportionment of these data.

The standard method for apportionment is based on the number of days within the period that fall into the relevant quarter. For example, the dates in period 4 cover both Q1 and Q2. When the quarterly data are calculated for 2018-19, 7/28 of the data are assigned to Q1 (covering 24 June to 30 June) and 21/28 of the data are assigned to Q2 (covering 1 July to 21 July).

The breakdown of the calculations used for 2018-19 are as follows:

Quarter	Calculation
2018-19 Quarter 1	Period 1 + Period 2 + Period 3 + 7/28 of Period 4
2018-19 Quarter 2	21/28 of Period 4 + Period 5 + Period 6 + 15/28 of Period 7
2018-19 Quarter 3	13/28 of Period 7 + Period 8 + Period 9 + 23/28 of Period 10
2018-19 Quarter 4	5/28 of Period 10 + Period 11 + Period 12 + Period 13

Freight moved

■ **Freight moved** – the amount of freight which is moved on the railway, taking into account the weight of the load and the distance carried. Freight moved is measured in net tonne kilometres (NTKm) and takes into account the net weight of the goods carried and the distance carried.

Freight moved data are supplied by Network Rail at the end of each railway period. The data includes a breakdown of total freight moved by commodity and operator. ORR publishes the following commodity groups within our quarterly release; Coal, Metals, Construction, Oil and Petroleum, International, Domestic Intermodal and Other which include domestic automotive, domestic waste, enterprise, general merchandise, mail and premium logistics, royal mail, and bio mass.

Freight lifted

■ **Freight lifted** – mass of goods (tonnes) carried on the rail network, excluding the weight of the locomotives and wagons. Unlike the freight moved measure it takes no account of the distance travelled.

Freight lifted data are provided by the four major freight operating companies; DB Cargo UK, Freightliner Ltd, Direct Rail Services (DRS) and GB Railfreight. Based on freight moved data, these four companies account for around 99% of all freight movements on the rail network.

As the data comes from four different operators, there is little consistency between the commodity groupings that are supplied. Therefore, freight lifted data cannot be published at the same level of disaggregation as freight moved. The published commodities for freight lifted are Coal and Other which include metals, construction, oil & petroleum, infrastructure, domestic intermodal and international.

Both freight moved and lifted data are subject to changes with regards to freight operators entering/leaving the freight market. They cannot be published at operator level because the data are commercially sensitive.

Freight delay minutes per 100 train kilometres

In [Control Period 5](#), covering 1 April 2014 to 31 March 2019, freight delay minutes data changed from being a regulated target to a measure of whether Network Rail is likely to miss a regulated target. It remains based on the Network Rail caused delay minutes. Delay minutes are a useful diagnostic measure underpinning the punctuality of freight train services. In CP5 there are no regulatory targets for maximum levels of delays minutes.

■ **Freight delay minutes per 100 train kilometres**– the number of delay minutes to freight operators caused by Network Rail normalised by train kilometres. The measure is calculated from the total delay experienced by all GB freight operators divided by their train mileage. The dataset is provisional as delay data can be revised as part of the delay attribution process.

Delay minutes data are captured on Network Rail's TRUST system (a nested acronym standing for Train Running System on TOPS (Total Operation Processing System). There are four key component parts to TRUST:

- the train schedule for each individual train planned to operate on a given day (the 'plan');

- the actual arrival and departure time at all calling points and passing time at other key locations (the 'reality');

- the cause of train delays and reliability events (full or part cancellation, diversion and failure to stop) (the 'reason');

- the organisation and manager responsible for incidents, delays and reliability events (the 'owner').

By comparing the time at which a train actually arrives at, departs from or passes a recording point with that shown in the train schedule, TRUST is able to calculate the 'lateness' at that particular point. By comparing two successive recordings of 'lateness,' TRUST identifies any delay minutes that a train has incurred. This is measured against the working timetable.

The lateness at a given recording point is the aggregate of all the individual delay minutes from origin to the recording point less any time made up e.g. by shortened station dwell times or time allowances for pathing (waiting time) not needed.

Any occurrence resulting in delay minutes within a TRUST section above 3 minutes generates a TRUST alert. Either a new incident must be created and given a reason code and attributed to a responsible owner – Network Rail (Network Rail-on-FOC) or freight operator (FOC-on-FOC and FOC-on-self) – or the delay may be added to an existing incident.

TRUST allows incidents to be allocated to around 200 cause codes and a very wide range of responsible managers. The initial attribution is made by Network Rail but if it is against a freight operator then the operator can refine the cause code and responsible manager code. Disputes by freight operators regarding delay minutes are minimal. This is largely due to freight operators having more flexibility when running services, having the option to minimise or reschedule freight trains during times of disruption. Furthermore, freight trains can operate during the night or outside of peak passenger travel times, allowing them to avoid periods of disruption. For freight operator caused delays, there are 7 freight specific cause codes. The overwhelming majority of attribution details are finalised within eight days of an incident occurring.

In broad terms around half of delay is identified by the TRUST system although the proportion may be rather lower, especially on relatively self-contained and high-performing routes. Delays of less than three minutes do not generate TRUST alerts and are not generally identified or attributed although this may occur if they are identified as part of the investigation of other incidents.

There are two types of delays – primary and reactionary. A primary delay is where the train is directly and immediately affected by an incident. Reactionary delays refer to delays occurring on another TRUST section having been transferred from elsewhere by other trains or by earlier stages of a train's schedule, e.g. late start from a yard/depot following incomplete goods.

Delays to train journeys experienced by freight companies are broken down into Network Rail attributed delays (Network Rail on FOC) and those attributed to freight operators (FOC-on-FOC or FOC-on-self). Those attributable to Network Rail typically relate to infrastructure, timetabling and operation of the network, and also include external events impacting the network where Network Rail's role is to control or mitigate impacts. Those attributable to train or freight operators typically

relate to train operations, station operations, fleet reliability, problems with train crew resources or external causes affecting trains.

For further information on delay minutes please refer to section 2 of the Delay Attribution Guide at: http://www.delayattributionboard.co.uk/documents/dag_pdac/Delay%20Attribution%20Principles%20and%20Rules%20June%202017.pdf

Freight train kilometres by operator

- **Freight train kilometres**– the actual mileage in kilometres operated by FOCs on Network Rail Infrastructure.

The data is sourced from Network Rail's Track Access Billing System (TABS) and covers only the mileages charged through TABS.

Not all freight operators have been in operation throughout the time-series, therefore total year on year comparison should be treated with caution.

Also worth noting that competition between freight operators means we would expect a greater level of variation in mileage from year to year than in the passenger market.

Freight train kilometres by operator data cover FOCs on Network Rail infrastructure and were included for the first time in the 2015-16 Q4 statistical release.

Freight market indicators

Freight market indicators are based on 3 areas:

1. **Number of freight train movements on the network**

Each freight train movement is designated into a chargeable or non-chargeable category. Non-chargeable can include empty trains to/from a depot, operators moving equipment to and from site

for Network Rail engineering work and train schedules not planned (i.e. last minute). The data published on the portal only includes chargeable freight train movements.

The number of freight train movements are provided annually by Network Rail and are broken down by operator. The data are not published at operator level as they are commercially sensitive.

2. Impact on road haulage:

- Rail freight lorry kilometres equivalent – equivalent distance that road vehicles would need to have travelled to move the amounts of freight carried on rail, which is affected more by volume than by weight;

- Avoided lorry journeys – the equivalent number of road vehicle trips necessary to move the freight.

DfT supplies the goods moved, goods lifted and loaded vehicle kilometres for Great Britain registered HGVs. The data is annual and by commodity type.

The average load for each commodity type is calculated and using the rail freight moved data, the equivalent number of lorry kilometres that would be required to transport rail freight by lorries is derived.

Similarly, the rail freight lifted data is used to calculate the equivalent number of road vehicle journeys necessary to move the freight.

3. Rail market share

This includes rail's share of both surface-based heavy freight transport (i.e. rail plus HGVs) and the overall Great Britain freight sector (water transport). This gives the market share for rail freight in terms of tonnes lifted and tonne kilometres moved. These figures illustrate the relative importance of rail.

Data for freight moved and freight lifted for HGVs are supplied to us by DfT (Road and Water) and are provided on a calendar year basis. The data for other modes of transport previously supplied by DfT is no longer available. The published table now covers freight lifted and freight moved by road (HGVs) and water. The published data refer to the most recent datasets available for all modes

of transport which can mean the data are published up to two years after the reference year. This is due to the unavailability of data from other sources.

Pipeline and estimates of light goods vehicles were removed in 2016 due to data being unavailable, therefore they have been excluded from the annual totals and the calculations of market share.

Delay minutes

ORR publishes delay minutes showing Network Rail caused, TOC caused, TOC-on-TOC delays at an aggregate and operator level in the statistics that accompany the release of the Network Rail Monitor (Network Rail Outputs/Indicators - Key Statistics). These cover England and Wales: http://dataportal.orr.gov.uk/displayreport/report/html/b8d6d91a-72b3-4a22-8656-54ceb23e6f68, Scotland: http://dataportal.orr.gov.uk/displayreport/report/html/89ea5935-2a30-408b-a41c-7610116649f2, and by operator & delay grouping: http://dataportal.orr.gov.uk/displayreport/html/html/995298b0-a609-4e00-bf65-7f9d183f9422.

Network Rail attributed delays and freight delays data are also available in the Annual Return and historical record of Network Rail stewardship on the Network Rail website at: http://www.networkrail.co.uk/publications/Annual-return/

Historical background

Regulatory targets

As a regulator we assess Network Rail's success through regulatory targets, which are set out in our determination document issued every five years[2]. We publically report on Network Rail's progress in delivering the outputs.

Normalised freight delay minutes data is a key performance measure but changed from being a regulated target to a measure of whether Network Rail is likely to miss a regulated target at the start of CP5. There are no regulatory targets for freight moved, freight lifted and rail market share.

Freight moved

In February 1996, British Rail's (BR) bulk freight operations were sold to North and South Railways - subsequently called English, Welsh and Scottish Railway (EWS). In 2007, EWS was bought by Deutsche Bahn and in January 2009 was re-named DB Schenker (now DB Cargo UK).

Below is the grouping of freight commodities used in the statistical release, together with a brief description of each freight commodity:

Stat release Group	Commodity Name	Commodity Description
Coal	Coal ESI	Power Station coal
Coal	Coal Other	Non Power Station coal
Construction	Construction Materials	Aggregates for building, roads as well as concrete and cement products
Domestic Intermodal	Domestic Intermodal	Intermodal traffic not destined through or to Channel Tunnel (Goods transported by two or more modes of transport e.g. Freight Train and HGV within the UK)
Infrastructure	Engineering Haulage	Non Chargeable traffic moved for Network Rail
International	European Automotive	Automotive traffic destined through or to Channel Tunnel
International	European Conventional	General traffic destined to or through the Channel Tunnel
International	European Intermodal	Intermodal traffic destined through or to Channel Tunnel
Metals	Iron Ore	Raw material not finished product
Metals	Steel	Finished Product

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[2] The current determination covers 2014-15 to 2018-19

Oil and Petroleum	Petroleum	All petroleum products including bitumen etc
Other	Biomass	Product to be used in Bio-Fuel production
Other	Chemicals	All chemical products
Other	Domestic Automotive	Automotive traffic not destined through or to Channel Tunnel
Other	Domestic Waste	Domestic Waste in containers etc for landfill or incineration
Other	Enterprise	DB Schenker Enterprise traffic based on SG 4068
Other	General Merchandise	General goods moved in variety of wagons, white goods etc
Other	Industrial Minerals	Limestone for FGD (flue-gas desulfurization), steel etc
Other	Mail and Premium Logistics	Parcels and Mail (Not Royal Mail)
Other	Other	MOD (ministry of defence) etc
Other	Royal Mail	Post on Royal Mail Contract

Relevance

The degree to which the statistical product meets the user needs in both coverage and content.

Freight usage data provides a useful barometer of economic activity and is closely linked to other industries such as manufacturing and imports/exports.

We publish delay minutes on the data portal as statistics included with the Network Rail Monitor, it is a useful diagnostic indicator, focusing on the causes of disruption and how performance can be improved.

More detailed information on users of ORR statistics and meeting the needs of users is available on our user engagement webpage.

Accuracy and reliability

The proximity between an estimate and the unknown true value.

Freight moved and freight lifted

Freight moved data excludes some possession trains used during engineering works and the weight of locomotives and wagons. The freight moved data are accurate to the nearest tonne kilometre and include all freight operators.

Freight lifted data excludes the weight of locomotives and wagons. The freight lifted data only covers the four largest freight operating companies due to the unavailability of data from other smaller operators. Based on Network Rail freight moved statistics which covers all operators, these four companies account for around 99% of the freight moved market so the value for freight lifted is underestimated by a very small margin.

Freight lifted and freight moved data cannot be provided by a single source due to concerns over the quality and accuracy of the data.

Delay minutes

Delay minutes data are subject to change after the resolution of incident disputes between train/freight operating companies and Network Rail over who is responsible for the delay and the affected operators. Based on this, delay minutes can be re-attributed between Network Rail and train/fright operating companies.

ORR receive revised delay minutes data following each railway period and as such the freight delay minutes data presented on the data portal is based on the most recently receive quality assured data. Each time the dataset on the portal is updated, following receipt of revised delay minutes data, there will be minor revisions. Therefore the data on the data portal may differ to the figures quoted in the latest statistical release. The figures and chart in the statistical release will be consistent with the dataset on the data portal at the time of publication.

Data validation, estimates, and coverage

ORR receives freight usage data from Network Rail, the freight operating companies, and DfT. The data are supplied electronically and stored in a secure data warehouse maintained by ORR. The

data supplied is subject to an extensive quality assurance process, including a suite of validation checks to ensure the data meets the required specification and is in line with previous trends. Any arising issues are flagged up with the data suppliers who must confirm the anomalies or correct the data and re-submit.

Explanations from the data providers regarding data anomalies are included within our commentary to clarify the data and trends.

These data are then prepared for publication. The process includes quality assuring the tables and charts produced and providing supporting commentary regarding the key trends, methodology and quality measures. These reports are subject to peer review.

The final stage of the quality assurance process is a sign off by the statistics Head of Profession confirming the data and outputs meet the quality standards and are fit for publication.

Independent reporter's assessment of accuracy and reliability of data

Arup (in partnership with Winder Phillips Associates) was appointed as independent reporter by ORR and Network Rail in 2009 to review Network Rail's data and provide us with assurance of the accuracy and reliability of their information.

The delay minute data received a high confidence grade of A3 for freight delay minutes in 2011-12.

For further details about the reliability and accuracy confidence grades or assessment, please visit our [website](#).

Timeliness and punctuality

Timeliness refers to the time gap between publication and the reference period. Punctuality refers to the gap between planned and actual publication dates.

Periodic freight moved by commodity type, the number of freight train movements and the distance covered by freight trains data are typically available on the ORR data portal within 20 days of the period ending. Quarterly freight moved and freight lifted data, are on average, published 75 days after the quarter ends. Annual rail market share data are typically published 67 days after the year ends.

As part of our licence agreement with Network Rail they are required to provide the freight moved, freight delay minutes and train mileage data to us within 21 working days. We have automated various processes involved in the production of these statistics, reducing the overall time and burden involved in publishing these statistics.

Furthermore, we have memorandums of understanding (MoUs) with Network Rail and DfT detailing the scope and timeliness of each dataset supplied. This ensures consistent and timely data are received each period. The MoUs are reviewed on an annual basis.

There are currently no MoU's with the freight operators but they typically provide the freight data around 5 weeks from the period ending.

Freight delay minutes

ORR receive revised delay minutes data following the end of each railway period and as such the freight delay minutes data presented on the data portal is based on the most recently receive quality assured data. This will ensure that the data presented on the data portal is the most up to dataset for the previously published quarter. Each time the dataset on the portal is updated, following receipt of revised delay minutes data, there will be minor revisions. Therefore the data on the data portal may differ to the figures quoted in the latest statistical release. The figures and chart in the statistical release will be consistent with the dataset on the data portal at the time of publication.

More detailed information on timeliness and effectiveness of the statistical output is available on our user engagement webpage.

Accessibility and clarity

Accessibility is the ease with which users are able to access the data, also reflecting the format in which the data are available and the availability of supporting information. Clarity refers to the quality and sufficiency of the metadata, illustrations and accompanying advice.

All data tables can be accessed on the Data Portal free of charge.

The freight delays per 100 train kilometres data are published within the Network Rail Monitor Key Statistics on the portal.

The following data are also available by period on the data portal:

- freight moved by commodity type – table 13.26
- number of freight train movements - table 13.10

We also publish freight (gross tonne) miles by freight operator on the data portal.

It is Network Rail's duty to maintain, renew and enhance the network whilst at the same time providing an operational railway. This requires good possession planning to reduce any disruption to the network. We use the possession disruption indices for passenger and freight (PDI-P and PDI-F) as the principal measures to indicate this.

The procedures and policy used to ensure sound confidentiality, security and transparent practices.

ORR is fully compliant with the Statistics and Registration Service Act 2008 and principle 4 of the Code of Practice for Official Statistics.

ORR wants the rail industry to be more open and transparent. We have established a transparency programme to drive our ambitious vision for the industry, and govern a number of projects to support our aims and objectives.

Future transparency projects include improving the data portal as a means of disseminating data and encouraging the industry to publish more disaggregated delay minutes data by cause.

More information is available on our user engagement webpage.

Coherence and comparability

Coherence is the degree to which data that are derived from different sources or methods, but refer to the same topic, are similar. Comparability is the degree to which data can be compared over time and domain.

The normalised freight delays data are based on data from Network Rail's TRUST (train running system on total operations processing system (TOPS)). This system records trains running compared with working timetables. This data are processed through Network Rail's systems to produce freight delay minutes data.

The freight delay minutes data are also subject to change because of the potential for re-attribution of delay minutes. The initial attribution is made by Network Rail but if it is against a train or freight operator then the operator can refine the cause code and responsible manager code or dispute responsibility for the delay. The overwhelming majority of attribution details are finalised within eight days of an incident occurring.

Freight moved statistics differs from freight lifted statistics. Freight lifted takes into account the weight of the load, whereas freight moved takes into account both the weight of the load and distance travelled.

The latest freight lifted data should always be treated as provisional as the ORR can receive updated data from the freight operating companies. Similarly, the latest periodic data for the other rail freight data should always be treated as provisional as they can be subject to updates from the different data sources.

The freight moved and freight lifted figures for the rail market share report are in calendar year format. This may differ from Official Statistics published by ORR on freight moved and freight lifted data which are published in financial years. The reason for publishing in calendar years is so rail freight can be consistent with other modes.

Comparability to European data

All member states are required to submit freight data to Eurostat under Regulation 91/2003 and these include comparable measures of freight moved and freight lifted statistics at both a quarterly and annual level. Quarterly data are supplied to Eurostat three months after the end of each quarter, whilst detailed annual data including breakdowns by commodity type are provided five months after the end of each calendar year. These statistics can be accessed via the Eurostat

Statistical Database at: http://ec.europa.eu/eurostat/data/database. Eurostat also uses the standard goods classification, NST (2007), which differ from those used in statistical release freight moved and freight lifted statistics. The NST (2007) classification can be accessed at:

http://ec.europa.eu/eurostat/web/transport/data/database

Length of Comparable Time Series

Measure	Time Series	Data Portal Table
Active Time Series		

Freight moved
     Quarterly
     Annual
	1998-99 Q1
	1982-83
		Table 13.7

Freight lifted
     Quarterly
     Annual
	1996-97 Q1
	1982-83
		Table 13.6

Freight delay minutes per 100 train kilometres	2007-08 Q1 2007-08	Table 13.5
Freight train kilometres by operator	2010-11 Q1 2010-11	Table 13.25

Freight market indicators (Annual):
 	
     Number of freight train movements
 	
     Impact on rail haulage
 	
     Rail market share
	
	2003-04
	
	2004-05
	
	1998
		
		Table 13.10
		
		Table 13.8
		
		Table 13.12