

Trial on Longer Trucks in Germany

01.01.2012 to 31.12.2016

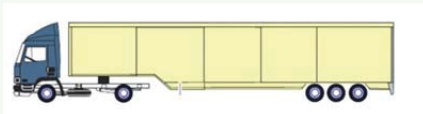


Dr.-Ing. Marco Irzik
Bundesanstalt für Straßenwesen

Permitted Longer Trucks

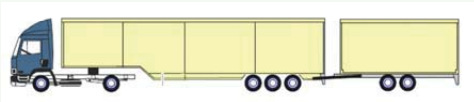
Type

1



17.80 m

2



3



up to 25.25 m

4



5



up to 24,00 m

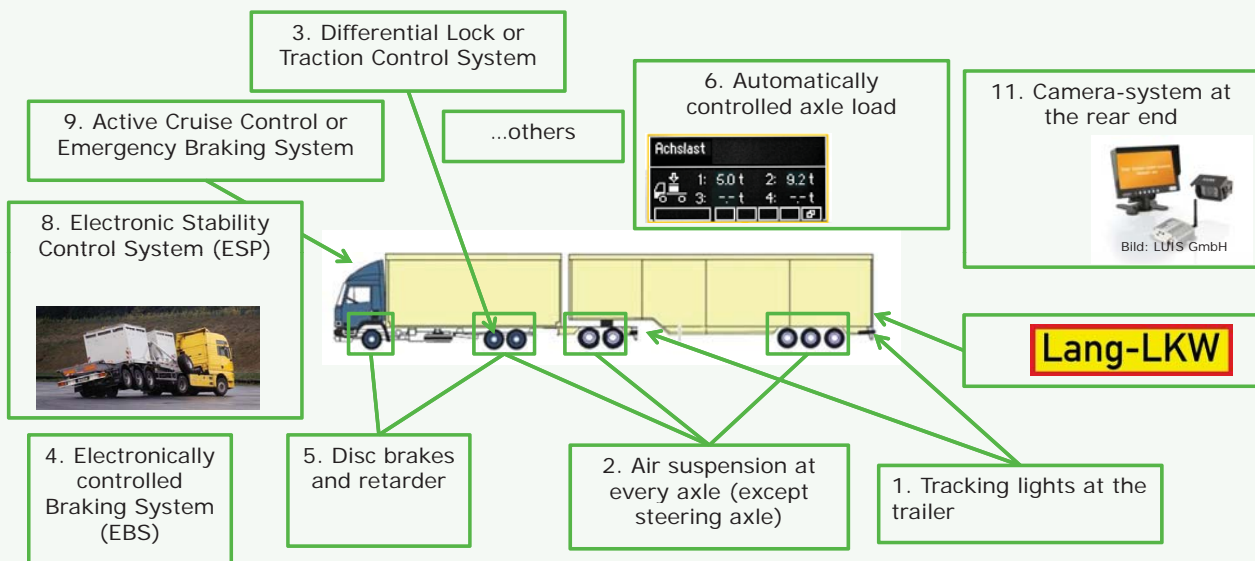
Max 40 t (44t) GVW

Note: Number of axles may be lower in reality than shown in the pictures.

Legal Basis: Exception-Regulation

- Regulation of exceptions from road traffic legislation for Longer Trucks (LKWÜberStVAusnV)
- Duration: 5 years = 01.01.2012 – 31.12.2016
- Including exceptions, terms and conditions regarding
 - trucks,
 - drivers and
 - permitted roads.
- Prohibited, e.g.
 - Prohibited is the transport of (labelled) dangerous goods, fluids in big tanks, living animals or swinging loads from the box ceilings.
 - Overtaking is forbidden for the drivers of the Longer Trucks, except vehicles with less than 25 km/h.
- Obligatory: participation at the scientific evaluation

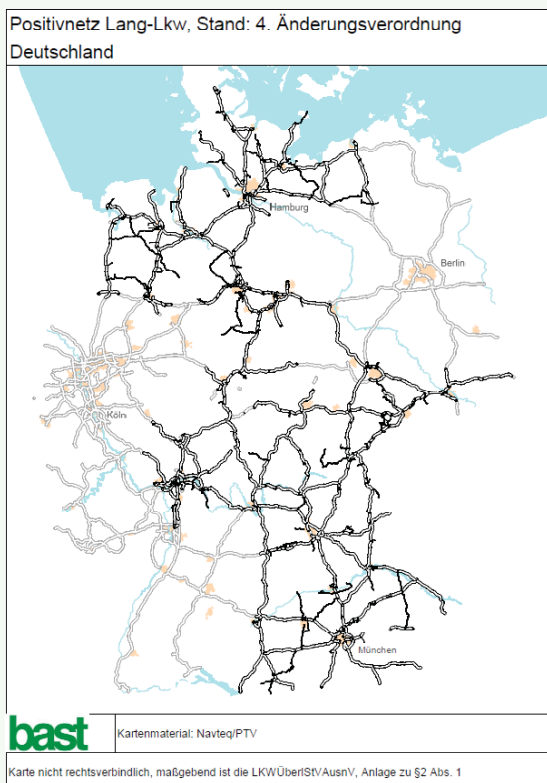
LKWÜberStVAusnV § 5 – Technical requirements



Lots of technical requirements. Partly with implementation alternatives.

LKWÜberStVAusnV § 11 – Driver requirements

- The drivers of the Longer Trucks may have a truck driver license for at least five years ...
- ... and five years truck driving experience.
- A driver training on the Longer Truck of at least two hours is required, too.

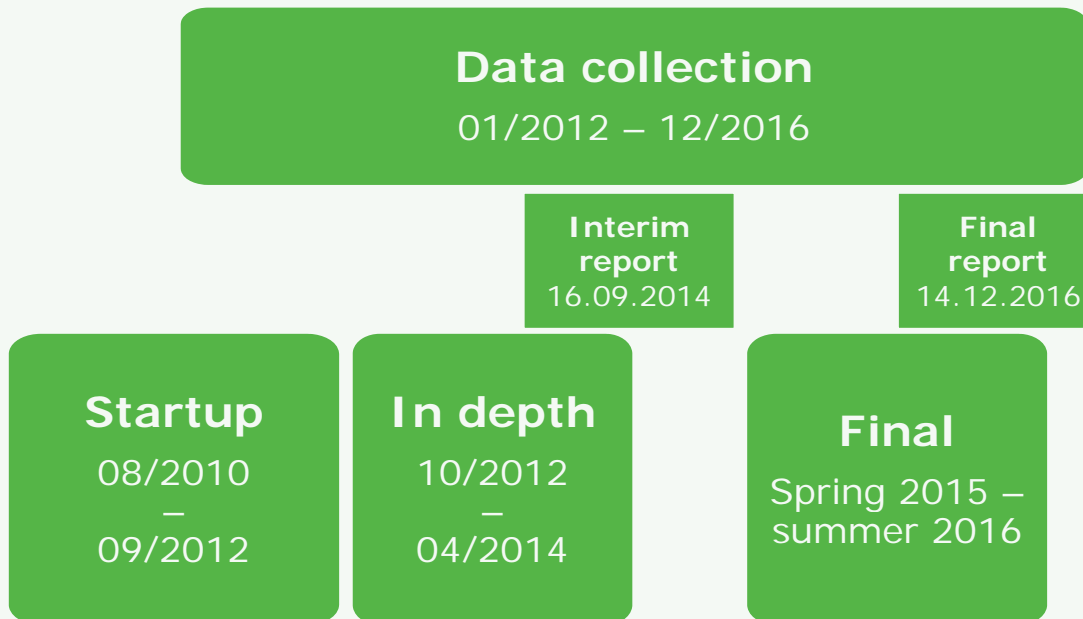


LKWÜberStVAusnV § 2 – Permitted road network

- All permitted roads which were provided by the participating Federal States are listed as a 'positive network'.
- Exception: extended semi-trailer (Type 1, L=17.80 m)
 - All public roads in some Federal States; only on 'positive network' in other Federal States
- 7. Exception-Regulation from 27.12.2016
 - about 11,600 km permitted roads
 - thereof nearly 70% motorways



Different evaluation phases



Research projects (n=22)

(vgl. www.bast.de - Feldversuch Lang-Lkw - Wissenschaftliches Untersuchungsprogramm)

- Effects of Transport Demand (2: Basic Evaluation & Forecast)
- Impact on Vehicle Safety and Environment (3: vehicle safety e.g. braking or driving dynamics; noise emission)
- Impact on Loading of Road Construction (2)
- Effects on Safety Equipment & Fire Protection Design of Road Tunnels
- Impact on Vehicle Restraint Systems (3: concrete / steel; impact on bridges & operating conditions)
- Influence on Traffic Flow on Motorways
- Effects on Traffic Safety at Entrances on Motorways
- Trafficability (4: on motorways / especially on rest areas; at single level rural / urban junctions)
- Effects on Traffic Safety and Traffic Flow at Work Sites
- Effects of Overtaking and Clearing on Traffic Safety and Traffic Flow (2)
- Longer Trucks: Accompanying Scientific Research of Psychological Aspects (2)



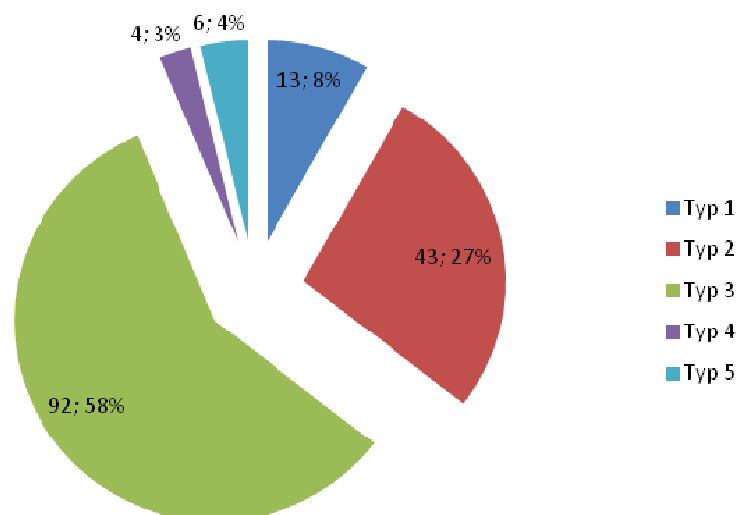
Documentation

- All findings of the scientific evaluation are published under <http://www.bast.de/DE/Verkehrstechnik/Fachthemen/v1-lang-lkw/v1-lang-lkw.html>
 - Especially the final report (just in German language),
 - a short report (an English version will be available soon)
 - but also all single reports about the different research projects
 - and many other information.



Some statistics

Distribution of the various types of Longer Trucks



N = 158



Some more statistics

- The average trip length per Longer Truck trip was around 240 km, with the values ranging from just over 10 km to almost 800 km per trip.
- More than 91 % of the trips were between warehouses and/or production sites as shuttle services or as the main leg.
- The spectrum of the goods carried by the Longer Trucks ranges from parts for the automotive industry through domestic appliances (white goods), air cargo, clothing and food to packaging material.
 - In general, just very light goods with high volume.



Accident statistics

- During the 5-year field trial period the police reported about 13 accidents involving Longer Trucks.
- There was just 1 personal injury accident (U,P) and 4 serious damage-only accidents (U, SS). All other were just slightly damage-only accidents (U,LS).
- Looking at the official accident statistics (just U,P & U,SS): At every second accident involving conventional trucks the truck was the main cause. With respect to the 5 U,PSS with Longer Trucks this was never the case.
 - Although the data basis is small, the analysis of the accident situation in the field trial does not suggest that the deployment of Longer Trucks could have any adverse impact on road safety.



Findings

- **Positive effects** (*)

Within the scope of the field trial, it was determined that,

- if Type 2 to 4 longer trucks are deployed, 2 trips by Longer Trucks replace on average somewhat more than 3 trips by conventional trucks.
 - Transport efficiency (tons & volume): + 15-25 %
 - Environmental impact (fuel consumption): - 15-25 %
- if a Type 1 longer truck is deployed, 1 trip by the extended semi-trailer replaces on average 1.07 trips by standard articulated vehicles.

(* under the certain conditions of the field trial & as a vital prerequisite: high or optimal usage of load capacity)



Findings

- **Market potential & Impact on transport demand**

- Observed,
- estimated from empirical surveys and
- calculated on the basis of the empirical findings (for 2030).

- **Estimated market potential**

- With regard to the whole German road network (theoretically):

max. 2-9 % of all truck trips respectively

max. 3-7 % of all veh-km

could be substituted by Longer Trucks



Findings

- **Model-based transport demand for 2014 respectively 2030 (calculated on the basis of the empirical findings)**
 - As a result of the established regulatory framework (for instance operation on an approved network), only a small proportion of the ‘estimated potential’ will be exploited.
 - This means that, in the modelled maximum scenario for **2030**, there would be a forecast annual mileage of around **100 million vehicle kilometers** for Type 2 to 5 Longer Trucks.



Findings

- **Modal Shift**
 - Not observed in the field trial.
 - Due to kind of goods and structure of logistics very unlikely.
 - Also, just marginal intermodal shifts from the railways and inland waterways (0.1 and 0.3 permille respectively) due to the results of the transport modelling.



Findings

- **Impact on transport demand**

- Thus, on the whole, there is a positive impact on transport demand with regard to a reduction in the number vehicle kilometres actually driven and accordingly also in levels of climate change gases and air pollutants.
- However, it should be noted that possible rebound effects cannot be derived empirically and thus could not be seriously taken into account in case such effects did occur.



Findings

- **No consequences** (*)

- Stress for bridges and higher collision energy (equal GVW)
- Vehicle technology (by and large)
- Load of the road pavements
- No deterioration of the substance of pavement surface (e.g. primary rutting)
- No breakthrough at H4b-safety barriers (concrete & steel)
- (By and large) No problems regarding traffic flow and road safety on motorways and road work zones
- Overtaking and clearance time at junctions
- Psychological impacts regarding the drivers of longer trucks

(* under the certain conditions of the field trial)



Findings

- **Other findings regarding infrastructure^(*)**
 - An increase in fire size in **tunnels** (as a result of the higher volume of Longer Trucks) must be just taken into account, if more than 10 % of all heavy goods vehicle traffic would be operated by Longer Trucks.
 - If so, this issue can be countered by taking compensatory measures (for instance improved ventilation system).
 - Longer trucks up to 25.25 m (and especially Type 2) do not completely fit into the emergency bays in tunnels (40 m instead 60 m outside a tunnel).
 - However, the fact that these tunnels are monitored around the clock and that additional measures are taken to reduce the extent of incidents guarantees a level of safety for tunnel users that complies with the regulations.

^(*) under the certain conditions of the field trial



Findings

- **Other findings regarding infrastructure^(*)**
 - It should be discussed whether it would be advisable to raise the containment level when constructing a new or renewing an existing **safety barrier**. This could reduce the risk of vehicles crashing through the safety barrier on the central reservation for both conventional and Longer Trucks.
 - The danger of heavy goods vehicles falling off bridges – both conventional and Longer Trucks – can be reduced by the degree to which bridges are equipped with safety barriers of the highest containment level in accordance with actual regulations (possibly supplemented by a requirement regarding the minimum height of the safety barriers).

^(*) under the certain conditions of the field trial



Findings

- **Other findings regarding infrastructure^(*)**
 - Trucks longer than 21 m (Type 2-5) are too long for the standard angle **parking slots at rest areas.**
 - In addition, because of the parking angle, all Longer Trucks have problems entering their own parking slot without sweeping or driving over adjacent parking slots.
 - Simply remarking would entail a loss of parking capacity, even if the deployment of Longer Trucks theoretically reduces the number of trips.
 - However, parking at private truck stops may represent a possible option for Longer Trucks.

^(*) under the certain conditions of the field trial



Findings

- **Other findings regarding infrastructure^(*)**
 - In addition, due to their routes and trip distances the amount of parking space required by Longer Trucks would appear to be low compared with conventional trucks.
 - Moreover, if there is an increase in the amount of parking slots required by Longer Trucks in the future, there are various approaches for improving the parking situation of longer trucks at rest areas.
 - In the event that none of the options identified is suitable for use in a specific locality, there is ultimately the option of not including the facility in the permitted network.

^(*) under the certain conditions of the field trial



Findings

- **Other findings regarding infrastructure^(*)**
 - Different findings, likewise depending on the type of Longer Trucks, regarding **at-grade junctions and roundabouts**.
 - In general, the tractrix curves of Longer Trucks are compatible with the junction geometry, which is in line with the actual design guidelines (with a few restrictions regarding Type 2).
 - However, in practical marginal areas around the junctions were repeatedly used, because the spaces for manoeuvre normally provided in addition to the tractrix curves are no longer available.
 - Thus, compensatory measures (e.g. open grid paving or pavement on the shoulders) would be necessary (especially, if Type 1 is to exploit its forecast market potential).

^(*) under the certain conditions of the field trial



Summary

- **Any difficulties regarding infrastructure**
 - Could be more or less solved by adopting the infrastructure
 - Due to number of Longer Trucks expected: Difficulties seem to be acceptable or at least manageable
- **All in all:** It can be stated, that significant problems did not emerge in the field trial. Measured against the multiplicity of issues that were considered, the number of potential risks identified is low.



What's going on?

- Since 01.01.2017 regular operation of Longer Trucks of Type 3, 4 and 5 on the permitted road network.
- 'Overtime' of 1 year for Type 2 respectively 7 years for Type 1.
 - Some additional tests with Type 2 regarding EVSC until summer 2017.
 - Reporting of accidents or difficulties in manoeuvrability of Type 1 Longer Trucks to BASt by the operators and police.
 - Probably, investigations about the market potential and possible impact on transport demand of Type 1.



Thank you for your attention!

For more details see www.bast.de.

For any further question:

Bundesanstalt für Straßenwesen

Dr.-Ing. Marco Irzik

Tel: +49 (0)2204 / 43 – 575

mailto: langlkw@bast.de