

Efficiency Improvement of Road Haulage Using Long Vehicle Combinations

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Abstract

Latvia has successfully met the EU requirements in road transportation and introduced in legislation main conditions regarding to technical parameters of road transport vehicles. Legislative acts of EU determine that Member States may allow circulation in their territory of vehicles or vehicle combinations for national transportation of goods, which are not in conformity with the some characteristics of Council Directives. There are two Member States fully allowing circulation in their territory of extra long vehicle combinations. This situation causes some misunderstanding for Latvian haulers. There are several pullbacks for introduction modular combinations in Latvia. Specific conditions are preconditions for research of opportunities to start use long vehicle combinations in Latvia. It is important to recognise the positive role that the vehicle modular combinations can play in a sustainable transport policy in Latvia and others Member States.

KEY WORDS: *legislative acts, long vehicle combinations, European Modular System, research, haulage.*

1. Introduction

With becoming a member state of the European Union, opportunities for Latvian road haulers to use the advantages of a free road transport service market of the European Union have broadened but several legislative constraints have come into force as well. Road haulage is an international business. It's important to facilitate similar conditions for all participants of market. Some differences in legislation of states of EU and opportunities to improve situation in road haulage market will be described below.

The White Paper on European Union Transport Policy announced that road transport would grow with 38% rather than 50% between 1998 and 2010. The measures were directed at revitalizing alternative modes of transport to road and to internalize external costs, especially in road transport. There is need to find out better solutions of technical characteristics of vehicles and haulage management.

2. Legislation

Latvia has successfully met the EU requirements in road transportation and introduced in legislation main conditions regarding to technical parameters of road transport vehicles. All terms of legislative acts in Latvia are practically identical to EU laws. Weights and dimensions of vehicles and vehicles combinations of road transport are in conformity with the Council Directive 96/53/EC of July 25th 1996 and Directive 2002/7/EC of 18th February 2002 of European Parliament.

Legislative acts of EU determine that Member States may allow circulation in their territory of vehicles or vehicle combinations for national transportation of goods, which are not in conformity with some characteristics of Council Directives. Special provisions of length of vehicle combination are given to the transport operators which are carried out in a Member State's territory by specialized vehicles or specialized vehicle combinations in circumstances in which they are not normally carried out by vehicles from other Member States or to operators in a Member State's territory by such combinations of vehicles as to achieve at least the loading length authorized in that Member State – using the modular combination of road vehicles. In some countries long vehicle combination systems/concepts are called European Modular Systems (EMS).

Despite various benefits of the longer vehicle combinations, perceived public opinion about road safety combined with worries over the increased road damage, bought out the Council of European Union in opposition to the introduction of long combinations of vehicles. Finland and Sweden stuck to their arguments and now vehicle combinations at 25.25 metres are permitted by the EC. This approval has lead into trials in the Netherlands where authorities are testing the modular vehicle combinations since 2000. Expected finish of research is summer of 2006. In the UK some haulers are working on 25.25 metres long trucks. Germany, Denmark and Belgium as well as neighbouring states of Latvia are very interested in the introduction of the European Modular System of vehicles. Wider introduction of modular vehicle combinations in Europe is supported by several trucks and trailers manufactures.

3. What it is vehicle modular combination?

The vehicle modular combination/concept or European Modular System (EMS) is based on CEN standardised 7.82 metre long unit load carrier, dolly and 13.6 metre long semi trailer. By coupling semi-trailer combination (16.5 metres) with 7.82 metres two central axle trailer can be done another modular vehicle combination. The maximum length of these combinations of modules is 25.25 metres. All cargo units in the EMS are well adapted for rail transport in combined transport either as single vehicles or as separate load carrier units. Vehicle modular combinations are built on existing vehicles and load carriers available in large quantities on the European continent.

In general all Member States are allowed to apply the modular concept. There are two Member States fully allowing circulation in their territory of extra long vehicle combinations. These are neighbouring countries of Latvia – Finland and Sweden. Legislative acts of these states allow moving of vehicle combinations up to 25.25 metres long with no special permits in territory of specific state. Today, apart from Sweden and Finland, the Netherlands, have also started an experiment with long truck combinations on state roads. Denmark and Norway are also considering allowing its use.

According to requirements of EU in Sweden and Finland modular combination of road vehicles was introduced. In most cases modular combination is based on unit loads, which have weight and dimensions in compliance with the EU Directives. According to the legislative acts Member States can allow to circulate in their territory if the transport operations carried out by vehicles modular combinations are not significantly affecting international competition in the transport sector. Although the legislative acts of EU determine that extra long vehicle combinations can be used only in territory of specific state, Sweden and Finland are neighbouring countries both allowed using of long vehicle combinations. As a result haulers from these countries can take international trips to another state. Finland has border with Russia, which is not a Member State of EU. Haulers from Finland are making international trips to Russia with long vehicle combinations. This really affects international competition in the transport sector. This situation causes some misunderstanding for Latvian haulers. To equalise business opportunities for Latvian haulers it is useful to consider if Latvia can introduce similar legislative conditions in state legislative acts. At now there isn't opportunity to use long vehicle combinations in Latvia.

4. Specified situation of Latvia

It is predictable, that listed above long size vehicle combinations are considerably gainful and can contribute to the target of reduction of noise, road wear and pollution emitted by heavy vehicles. The positive influence on road safety can be achieved with reduction of total number of vehicles. Studies on the use of the modular combinations in Sweden, Finland and the Netherlands, have shown that it results in substantial reductions of vehicle kilometres and fuel consumption, thereby decreasing congestions, greenhouse gas emissions, road wear and transport costs, without compromising road safety.

There are several pullbacks for introduction modular combinations in Latvia. Most part of them are legislative. There is not possibility to drive a road train with more than one trailer like for modular combinations. In Latvia dollies are registered like trailers. There is need to change regulations for drivers certification. This is not only legislative problem. There must be developed specialized training course program and examination criteria.

Road infrastructure in Latvia is built in consideration of existing length of vehicle combinations. It is possible that there is no chance to drive through some specific places of larger swept circle. In legislation of Sweden it is determined that the combined vehicle must be able to turn within a swept circle where the inner radius is 2.0 metres (in Latvia 5.3 metres) and the outer radius is 12.5 metres. To introduce EMS in Latvia there is need to change legislative acts.

Existing research studies are made presuming that total weight of modular vehicle combination is 60 tonnes as allowed in Sweden and Finland. Due to the soil (ground) specifications and road design (especially technical condition of bridges) there is no possibility to use vehicle combinations of that weight on all roads of Latvia. Although advantages of using long vehicle combinations can be achieved without any increase in road wear, as the maximum axle loads allowed are the same to normal road train, there isn't an agreement in negotiations with administrative bodies to increase total weight of modular vehicle combinations in the territory of Latvia.

5. Research of opportunities to use long vehicle combinations in Latvia

Specific conditions listed above are preconditions for research of opportunities to start use long vehicle combinations in Latvia. The main objectives for research are:

- To find out effects of introduction of 25.25 metres long and 40 tonnes weight vehicle combinations with no special permits on roads of Latvia.
- To study cargo flows what could be transported by vehicle combinations with increased total length in inland and international haulage. To determine possible types and volume of cargos, that could be transported by introduced long vehicle combinations.
- To demonstrate and to confirm the possible benefits from an efficient cargo and vehicle modular systems and extra long vehicle combinations with allowed total weight in Latvia. The research has to show economical influence on Latvian haulage market if similar vehicles will be or would not be allowed in Latvia and/or in

neighbouring countries. Influence on generated haulage costs, air pollution, fuel consumption, noise, road wear and road safety of using long vehicle combinations must be researched.

There has been developed a model based on MS Excel workbook. This tool allows making economical and financial analysis of road haulage projects. Comparative economical analysis of some international and inland freight traffic and passenger transport projects is made for testing the electronic data workbook. The developed spreadsheet would be used for research after all required data would be collected.

At this moment it is not allowed to drive 60 tonnes weight road trains in Latvia. There is need to find out if it is economically gainful to use 25.25 metres long modular vehicle combinations with total weight only 40 (or 44 tonnes). Calculations were made to clarify the difference in cargo weight between normal road train and long vehicle combination, both total weight 40 tonnes. To keep with the law there must be on average by 18.7% lighter cargo transported with combined vehicle combination. At the same time the axle weights of modular system vehicles are less than axle weight of normal European road train.

Intensive literature study was made in several directions. Information was analyzed about cargo packing in trailers and load compartments of trucks and possibilities of optimisation of cargo place. Separate study of literature is made to understand the management of supply chain systems. There has done survey of technical information on long vehicle combinations and environment problems caused by road transport. Papers of similar research results were reviewed.

Road infrastructure, especially streets, parking places, warehouses compounds, etc., in Latvia is designed with small tolerances to turning circles. Based on commercial computer software there was made research to find out solutions for better turning criteria of the modular vehicle combinations. The turning circle of long vehicle combinations could be decreased to normal vehicle parameters within rear steering axles for trucks, trailers and semi-trailers.

Significant advantage concerning environmental aspects, road wear and road safety can be expected results of research. If it would be possible to clear the legislative hurdle and in legal way to use long road vehicle combinations for light goods without any special permits, there would be chance to improve economical efficiency of Latvian road haulers. For transportation of cargo there can be used less number of trucks and road trains per amount of goods shipped. That means fewer vehicles on the road, reduction of fuel consumption, cost savings, less generated noise, diminished road wear and increased road safety.

6. Conclusion

The positive experience with long vehicle combinations in several Member States has shown that allowing the use of modular vehicle combinations is opportunity simultaneously to decrease congestions, greenhouse gas emissions, road wear and transport costs without compromising road safety. It is accordingly believed that an increase in maximum vehicle length would significantly improve transport efficiency for the whole Europe. It is clarified that cargos transported by EMS vehicle combination with total weight 40 tonnes must be on average by 18.7% lighter than transported by existing road trains with regular length. There is need to find out how relevant and grounded is to allow total weight 40 or 44 tonnes of modular vehicle combinations in Latvia. It is important to recognise the positive role that the vehicle modular combinations can play in a sustainable transport policy in Latvia and others Member States.

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References

1. White Paper – European transport policy for 2010: Time to Decide. – Luxemburg: Office for Official Publications of the European Communities, L-2985, 2001. – 119 pp.
2. Council Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorized dimensions in national and international traffic and the maximum authorized weights in international traffic. Official Journal L 235, 17/09/1996 P. 0059 - 0075
3. Directive 2002/7/EC of the European Parliament and of the Council of 18 February 2002 amending Council Directive 96/53/EC laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic. Official Journal L 67/47, 9.3.2002.
4. **Backman H., Hordstrom R.** Improved Performance of European Long Haulage Transport. – Stockholm: TFK – Institutet for transportforskning, 2002. – 34 p.
5. **Koskinen O.** Carbon Dioxide Emissions of Transport and Means to reduce them. – Helsinki: Quarterly Newsletter of the Finnish Highway Transportation Technology Transfer Center, VOL.7/No.1/April, 1999.
6. **Hetting C.** Long Trucks save Money and the Environment. – Sodertalje, Stockholm: Trucks manufacture's SCANIA magazine "Scania World", No.1, 2005.
7. Legal Loading. Weights and dimension limits for heavy vehicles. – Borlange, Sweden: The Swedish National Road Administration, Public Transport & Commercial Traffic Division, 1999. – 19 p.