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IMPROVED PERFORMANCE OF EUROPEAN LONG HAULAGE TRANSPORT (EXTRA)

Rolf Nordström TFK - Transport Research Institute, Box 12667, SE-112 93 Stockholm, Sweden
Haide Backman TFK - Transport Research Institute, Box 12667, SE-112 93 Stockholm, Sweden
Anders Lundqvist Swedish National Road Administration, SE-78187 Borlänge, Sweden

ABSTRACT

The TFK project EXTRA with participants from Sweden, Finland, Denmark, Switzerland and the Netherlands started in March 2001 and will be finished in June 2002. By use of authentic freight information collected during a three-month period from hauliers operating on the European continent the advantage of an extended modular heavy vehicle system will be demonstrated. The reduced number of road trains which is needed for the same transport volume will be calculated showing the potential in savings of vehicle kilometres, fuel consumption, CO2 emissions and cost etc. Other identifiable positive effects such as decreased traffic density and road wear as well as improved traffic safety are also expected.

In 1997 Sweden and Finland, by exception from the EU Council Directive 96/53/EC, was permitted to retain longer lengths and 60 tonnes maximum weight for vehicles in national traffic. To avoid unfair competition the exception required that the maximum lengths should be extended to contain either a truck or trailer or a semi-trailer combination with an attached trailer unit according the EU Directive. This way foreign road trains can be extended with an available extra trailer for additional capacity when entering Sweden and Finland. Theoretically the loading capacity of a semi-trailer combination may be increased by about 60 % consisting of 51 m^3 and 16 tonnes. The extra loading capacity for a truck and trailer combination is about 40 % consisting of 37 m^3 and 11 tonnes. The system is based on modules consisting of the CEN standardised 7.82-metre long unit load carrier and the 13.6-metre long semi-trailer being the longest single vehicle allowed in EU and largely used. The units are well adapted for rail transport in combined transport either as single vehicle units or as separate load carrier units. The system is built on existing vehicles and load carriers available in large quantities on the European continent.

1 INTRODUCTION

The EXTRA project, initiated by Swedish and Finnish industry, has been carried out to support the improvement of the road transport system in Europe. The economic, environmental and safety benefits of extended heavy vehicle combinations has been studied and indicated by use of authentic transport information. The following organisations and their representatives have contributed to the accomplishment of the project financially and/or by the provision of expertise and data services. Financial support has also been received from the Swedish Agency for Innovation Systems (VINNOVA).

Börje Jönssons Åkeri AB
Confederation of Swedish Enterprise
Dansk Transport og Logistik, DTL
Finnish Forest Industries Federation/Confederation of Finish Industry
FOCWA
IKEA AB
IRU, International Road Transport Union
NEA Transport Research and Training
Reining Transport bv
Rockwool Group
SCANIA AB
Swedish Forest Industries Federation
Swedish National Road Administration
Swedish Road Haulage Association
TFK - Transport Research Institute
VBG Produkter AB
Volvo Truck Corporation
Vos Logistics

Mr Aad van den Engel at NEA Transport Research and Training has performed trip data collection, processing and simulations in the Netherlands on partnership and consultant basis.

1.1 Background

The maximum weight and dimensions that are allowed for certain vehicles in national and international traffic were prescribed in the EU Council Directive 96/53/EC of May 25th 1996. By exception Sweden and Finland was permitted to retain the longer lengths and the maximum weight of 60 tonnes for vehicles operating in national traffic. This exception was given on the condition that the lawful maximum length for road trains consisting of modules applicable in international traffic was extended to 25.25 metre. Foreign hauliers this way are enabled to extend their road trains with an available extra trailer for additional capacity at the border to Sweden or Finland.

Articulated vehicles, usually called semi-trailers, are dominating in international traffic within the EU. Their regular loading capacity, of about 85 m^3 and 26 tonnes is provided by a 13.6 metre long semi-trailer. Also road trains, consisting of a truck and trailer, are used. The most common combination in Sweden and in other northern countries is truck and trailer combinations on the contrary. They have trailers with different lengths and axle configurations in combination with a load carrying motor vehicle. In recent years a relatively short trailer for this combination, built like a cart with a centre "axle" in the form of a bogie, has become customary on the continent (stiff draw bar trailers). The loading capacity of the truck and trailer combination is dependent on the type of trailer used and the length of the draw bar between the cargo units. In general the maximum loading capacity for a road train is 40 tonnes in weight. The maximum loading capacity in volume is approximately 96 m^3.

The modular system practised in Sweden and Finland since 1997 is based on the CEN standardised 7.82-metre long unit load carrier and the 13.6-metre long semi-trailer being the longest single vehicle allowed in EU. The maximum length of this combination of "modules" is 25.25 metre. All cargo units in the system are well adapted for rail transport in combined transport either as single vehicles or as separate load carrier units. It is built on existing vehicles and load carriers available in large quantities on the European continent. Discussions about a possible adoption of this system for the entire Europe has been held in the EU Commission.

1.2 Objective

The objective is to demonstrate and by example confirm the possible benefits from an efficient and environmentally adapted cargo and vehicle modular system for heavy vehicle combinations on the European continent.

2 THE METHOD

Information about fully loaded vehicles (FTL) performing direct shipments on selected continental freight corridors during a fixed period of time in regular heavy vehicle combinations should be translated into cargo loads on 25.25 metre vehicle modules combinations. The less numerous vehicles needed for the same transportation would thus show the saving potential in vehicle driving distance, fuel consumption, CO_2-emissions and costs. Other positive effects expected was for instance less traffic congestion and road wear as well as improved traffic safety.

2.1 Preparation

A more detailed project planning should be carried out including appointment of data providing sources and selection of adequate transport routes (corridors) on the continent for the data acquisition.

Appointment of data providing sources and selection of adequate transport routes would be based on compiled information from a number of plausible international road transport routes. Information such as origin and destination, number of trips, freight volume (ton), transport distance (both short and long distances) and type of commodities would be listed for each route.

2.2 Specification and limitations

Requested data elements from goods flows on selected transport routes should be specified and data processing formats developed. Depending on the quality of the available freight bill information (CMRs) some data would be

transformed into standard values for further use. The data transformation should be made with factors decided by the project management group. The package volume, for instance, should be based on the specific density for the current goods if available. As the extended vehicle combination is composed of existing modules, the variation due to package dimensions would be only marginal. By use of internal or national registering numbers the type of vehicle used could be determined.

The following factors and vehicle configurations should be analysed:

Factors to be analysed with quantitative methods:
Energy (kWh, kg, litre)
Environment (CO_2-emissions)
Transport cost

Factors to be analysed mainly with qualitative methods:
Road space (road classification)
Road wear (number of equivalent 10-ton axles)
Road traffic safety (number of vehicles and drivers on the road)

Vehicle configurations to be included in the analysis:
Load lengths:
13.6 m
7.82 m + 13.6 m
13.6 m + 7.82 m
7.82 m + 7.82 m
Vehicle weight: max 60 ton
Vehicle length: max 25.25 m

2.3 Data collection and processing

During the determined investigation period transport information data should be gathered from the selected data provider's freight registers. Based on the calculated factors decided by the project management group the data processing should then be performed.

For data simulation also official national statistics of goods flows on other similar routes in different European countries on the continent should be collected and prepared.

2.4 Simulation and scenarios

The vehicle systems presently used and the alternative extended vehicle combinations should be compared for the same transport operation in data simulation showing how many less shipments would have been needed by use of the alternative modular vehicle combination. In scenarios based on official statistics of goods flows shipped in long haul transports on the continent the full advantage would be focused by extrapolation. Data simulations by use of regional and national data would thus show the gains in road space and the environmental advantages of road trains with extended loading areas in the European road transport system.

REFERENCES

TFK, MR 85E, 1994-02 Consequences arising from adaptation of vehicle weights and dimensions to EU regulations - revision in relation to the EU Commission's proposal for directive set out in the document COM (93) 679'final - SYN 486 by Rolf Nordström and Anders Lindkvist

NEA, 940084/51204, Consequences of Harmonising the Maximum Vehicle Weight within the European Union, Rijswijk, July 1994

TABLES & FIGURES

Table 1- Overview project work plan

PREPARATION	March 2001 - April 2001
SPECIFICATIONS	April 2001 - June 2001
DATA COLLECTION/PROCESSING	June 2001 - December 2001
SIMULATION	December 2001 - April 2002
ANALYSIS	February 2002 - April 2002
REPORT	December 2001 - May 2002
NOFOMA/7th Int. Symp.	June 13th - 20th

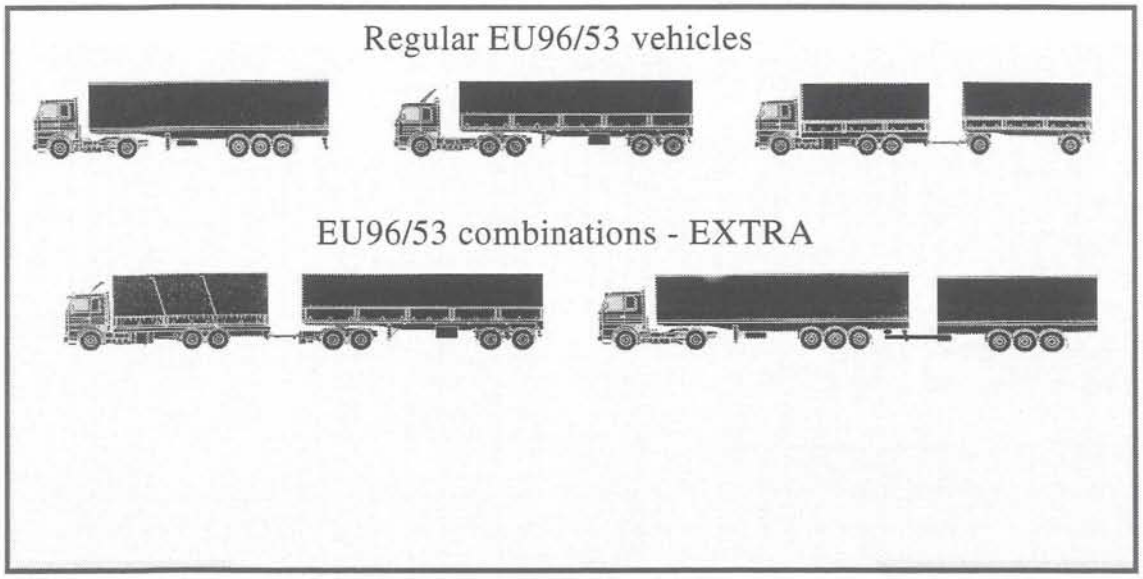

Figure 1 - The same amount of cargo loaded on EXTRA combinations