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## VALIDATION OF COMBINED TRANSPORT QUALITY CRITERIA

### ABSTRACT

With the globalization of market the production process and the life-cycle of the products have shortened by increasing the expectations of industry for "just-in-time" logistic solutions. At the same time the competition on the global markets has increased the number of "players" and the objectives of purchase and distribution chains. The objective is to develop the frame for optimal integration of different transport modes thus facilitating maximally efficient and cost-effective usage of the transport system through user-oriented "door-to-door" transport and to stimulate by this service the competition among transport operators.

### KEY WORDS

combined transport, quality criteria, intermodality, development measures

### 1. INTRODUCTION

Intermodality represents the essence of the Common Transport Policy and the task is to combine all provisions brought by the Committee for every individual transport mode. The development of efficient logistic solutions not only of the road transport with all the external costs is considered efficient European prospects to avoid unsustainable immobility. Intermodality can be defined as the door-to-door transport by using minimally two different transport modes in an integrated form. Intermodality is the quality indicator of transport mode integration. According to the Committee the economic basis for intermodality is that those transport modes that show desirable economic and organizational individual characteristics, can be integrated into the door-to-door transport process in order to improve the efficiency of the overall transport system.

### 2. PROBLEMS OF USING COMBINED TRANSPORT

In theory this might be considered ideal, but in practice the combined transport is still accompanied by certain problems that need to be solved. The requirements of the industrial market are changing, including also the intermodality requirements.

In order to achieve the objectives of the combined transport development it is necessary to harmonize the integration among the transport modes, infrastructure, hardware (cargo units, vehicles, telecommunications), operations and services as well as the regulative.

Table 1 shows the status of international combined transport in 2002 studied on 18 European corridors. The total transport amounted to 4,741, 653 TEU or 54.4 million tonnes, out of which 44.1 million tonnes (81%) were transported unaccompanied, and 10.4 million tonnes in accompanied status<sup>1</sup>.

**Table 1 - International combined transport 2002/2015**

Form	TEU (millions)		Net tonne (million tonnes)		
	2002	2015	2002	2015	2015/2002
unaccompanied	3.48	8.70	44.10	103.60	+135%
accompanied	1.26	1.50	10.40	12.40	+19%
Total	4.74	10.20	54.50	116.00	+113%

The data on international accompanied transport in 2002 include the results of all the 17 existing "rolling highways"<sup>2</sup>. There were 547,000 trucks transported, out of which 1/3 used the services in corridor Brenner, and 20% at Tauern. The total volume of unaccompanied transport was about 3.5 million TEU. The market research showed the following:

- in 2002, 40 companies provided services of unaccompanied transport at the above mentioned corridors. There were 49% out of the total that were assigned to intermodal operators joined in UIRR, 19% Intercontainer-Interfrigo (ICF), and 32% to other operators. Whereas fifteen years ago the intermodal services were provided only by UIRR companies and ICF.
- in 2002, 60% of total European unaccompanied CT were performed in land transport and 40% in water transport. Between CEEC and EU countries the container transport on inland waterways amounted to 80% of the total volume, whereas land transport amounted to 20%.

### 3. ANALYSIS OF CORRIDORS

According to the data of CT on 18 European corridors<sup>3</sup> the transport will increase from 54.5 million tonnes (2002) by +113% to 116.0 million tonnes in 2015. It has to be taken into consideration that the development of accompanied transport is still rather risky since it still depends on individual political regulations, e. g. it is mostly used in Alpine countries, especially in Switzerland and Austria.

Such indicators of poor increase in accompanied transport are based on the expectations that the previous conditions will radically change. Also the support for "rolling highway" services as well as restrictions for road transport will be reduced or even completely eliminated. On the other hand, more better-quality controls of road vehicles and tolls will be introduced.

Unlike accompanied CT, unaccompanied CT in the following years will mark high market increase up to as much as 9 million TEU (average annual increase of 6.8%). The following data were obtained by the following analysis:

- according to the annual increase of the international CT 2015/2002 on land. It is assumed that the increase of CT would be above the increase in road traffic in the majority of countries due to the improvement in railway and intermodal transport, such as the improvement of quality, efficiency, and interoperability. Also, due to the increased controls of road vehicles and charging for the usage of road infrastructure.
- according to estimate of specific conditions of cargo corridors regardless of whether they promote combined transport or not (through transport policies, topography, etc.). The data about transport influence of EU enlargement have been also taken into consideration.
- significant increase of CT has been facilitated on the "mature" CT market of western Europe owing to the volume of the breakthrough on the new mar-

kets, and the robust characteristic of the service as compared to the economic recession.

The policy of combined transport depends on four main factors, free approach to the European railway network, measures for promoting combined transport, stimulating of competition in the railway sector and more uniform prices of all transport forms.

Railway traffic is passing through a difficult period in EU countries. The liberalization process represents a necessary reform of the railways of EU and future members.

One of the main objectives of EU is the creation of a unique market and provision of free services. Although the liberalization of railway market started by the Directive 91/440 the results are somewhat positive. In spite of directives, the separation of infrastructure from transport and the free network access, one railway company is still dominating in every European country.

In practice, the inherent features of combined transport have proven competitive according to their nature, since they combine significant flexibility of approach achieved by HGV (freight vehicles) with the efficiency that results from bundling (bulk freight) of transport on long distances. In order to efficiently consolidate and develop the position of combined transport on the market, various players will have to think from now on, in a more "European" way, and act in accordance with the regulations of market economy. The advantages regarding combined transport system will not come fully to the fore until the competition between the combined road-rail transport and pure road transport becomes the object of comparative conditions. Apart from different technical characteristics of freight vehicles (HGV) and railways, which affect their relative freedom of mobility at the European level (in case of railways, the differences in tracks and the energy supply method and signalisation systems are the greatest barrier to free access to the European railways market.

One of the main objectives of EU is the creation of a unique market and a freedom of services. Because of the fact that the railway market is organized as a national company, the result is a fall in the share on the market and therefore gradual liberalization is necessary to activate the market. Although liberalization of the European railways has already started, the expected results failed to be achieved until now. All the past experience has shown that minimal requirements defined by the directive on the separation of infrastructure and transport in purely administrative parts is not sufficient. Only full institutional separation into two independent companies can guarantee equal conditions for all the railway companies.

Air transport and the European sector of telecommunications give an overview of the success, that de-

regulation and liberalization may result in successful opening of the market. According to their example only free access to the network for all the qualified candidates represents the key for liberalization and revitalization of the railway cargo transport in Europe.

If the railway companies are to keep their share on the cargo-transport market, they have to develop from the national transport companies into the companies at the European level of action. Similarly to road transport and free travelling along the European motorways, the railway companies should also be able to dispatch a full train along the European railway lines using the national railway line networks.

Efficient protection of private companies currently active on the railway market is one of the essential conditions of liberalization. In order to improve the liberalisation process and the competition of the railway transport process, the EU Council of the Ministers of Transport has adopted a number of measures.

**Table 2 - Measures of combined transport development**

Measure	Content
Revision of directive 91/440	<ul style="list-style-type: none"> <li>- defining of the Trans-European railway freight network (TERFN), including ports and terminals</li> <li>- creation of independent institutions for regulating the network access where infrastructure and transport have not been separated yet</li> </ul>
Revision of directive 95/18	- free access to TERFN for all railway companies registered in EU
Directive 98/480 (revised directive 95/19)	<ul style="list-style-type: none"> <li>- regulations on routes and access price</li> <li>- access to national network</li> </ul>
Proposal for the Directive on interoperability COM 99/617	- acceptance of technical specifications on renovation, extension, and new constructions in the field of infrastructure and rolling stock
„Working paper“ on bottlenecks on railway network	- Elimination of bottlenecks on the Trans-European network (TEN-T)

The main objective of the CT operator in case of flagrantly poor quality is to change the company providing railway services, and still keep the slots (right of transport). High railway infrastructure costs represent a great drawback of the railway cargo transport compared to other transport modes. The costs of using the infrastructure can be as high as 50% of the total transport costs. In the future, this balance can be corrected only by a balanced system of infrastructure costs for all the transport modes. The determining of a fair price requires also considering of external costs.

Another condition for creating equal possibilities for railway transport is the reduction of technical barriers. Only interoperability will allow the railway transport to use its advantages in international transport. The international task of EU is to assist the states and companies that will abandon their individual systems and replace them by the international one. Since the accessibility of the railway infrastructure depends on good connectivity within the chain, the elimination of bottlenecks and the expansion of the capacities of the railway infrastructure have to be the main points of transport policy development.

The European Commission should exert greater “pressure” on the member countries to move towards liberalization, e. g. by subsidies invested in infrastructure.

#### 4. DEFINING INCENTIVE MEASURES FOR COMBINED TRANSPORT

##### 1 - EXEMPTION FROM ROAD TAXES

In accordance with the European Directive, road vehicles primarily related with the first and last axle to the combined transport operations have to be completely or partially exempted from the road taxes. Additionally, these vehicles operate only on shorter distances.

##### 2 - EXEMPTION FROM TRAFFIC RESTRICTIONS

Railway transport may operate also on weekends and holidays whereas road transport is banned during those periods. In order to make best use of the advantages of rail transport, road vehicles that are used on relatively short relations have no transport bans on weekends and on state holidays.

##### 3 - INCREASE OF THE ALLOWED VEHICLE MASS

The aim of this measure is to compensate for the drawbacks of the combined transport. Because of the most often used intermodal exchange cases, road vehicles included in combined transport have often greater mass than the others. Logistic companies that define the routes of heavy cargo transport will decide to use combined transport only if they can load as much payload as in case of using only road transport.

Regarding transport demand towards the port hinterland, it is already possible today to carry 40 feet containers by a vehicle of gross mass of 44 tonnes along the road up and down the railway transport, even in the countries in which the maximum allowed mass is mainly 40 tonnes.

The increase in mass in all the cargo units that are used in unaccompanied transport (20' containers, exchangeable truck cases, and semi-trailers<sup>4</sup>), would be logical and would contribute to the development of combined transport).

Unfortunately, the proposal for modifying the Directive 92/106 which would determine the maximum segment of road transport of 20% of the total distance for combined transport has not been accepted yet. Therefore, the decision on combined transport does not depend on geographical conditions of the transport terminals, but rather on the possibilities of making decisions for the terminals by determining which services of rail transport best meet the logistic requirements. The current rule that requires usage of the "closest adequate terminal" for transfer to railway is closer to reality and therefore needs to be maintained.

When subsidies are used for the improvement of business or for investments, which has been currently arranged by Regulation 1107/70, care should be taken not to assign them completely to railway companies, but rather, in the spirit of liberalization, directly to users or operators. Subsidizing investments in the transport units such as exchangeable cases and semi-trailers that can be loaded / trans-loaded by cranes, could also assist the carriage and logistic companies to purchase adequate equipment for intermodal transport. For instance, one of the best measures for stimulating combined transport is the 28t limit at HGV in Switzerland. Significant difference from the allowed mass in the neighbouring countries had great influence over the recent years on the stimulation of using combined transport of a high share of cargo transport passing through the Alps. Because of the environmental and natural surroundings, Switzerland has retained this limit for a number of years. Due to the pressure from the EU, Switzerland accepted the limit of up to 40 tonnes. However, if liberalization of the Trans-Alpine road transport is not accompanied by the similar liberalization of rail transport and allocation of external costs to every transport mode, even with the current level of transit costs, there are indications of decline in the Trans-Alpian rail transport which represents the major share of combined transport in Europe.

#### 4 - LIBERALIZATION OF ROAD AND RAILWAY TRANSPORT

The aim of liberalization of road transport is the usage of the conditions of the same type across Europe. Liberalization of railways needs to be considered as equally important and essential because of the environmental reasons as well.

## 5. CONCLUSION

Determining the quality of CT services is possible when clear objectives are set in order to improve the existing level of quality. The set objectives represent the qualitative criteria that serve as guidelines in carrying out actions, and also as a type of benchmarking for the company.

The research has provided the following conclusions, main barriers in the development of combined transport include the following: lack of incentive (subsidies), lack of information, infrastructure and technical problems, poor perception of the combined transport, the responsibility and documentation. The possible solutions of these barriers are: founding of intermodal promotion centres, developing intermodal web pages, awarding the best, competence assessment system (benchmarking) and certification, harmonization of technical systems, standardization of documentation, infrastructure improvement, harmonization of the tax charging system and the development of intermodal cargo units.

The mentioned approaches represent the main steps in implementing the intermodal transport as summarized parts of the European transport policy.

By founding intermodal promotion centres the future operators of combined transport are informed about the concept and the idea of intermodality, promotion of Short Sea Shipping, transport on inland waterways and railways in order to improve the perception about these three transport forms. The foundation of promotional intermodal centres should be accompanied by the creation of web pages on intermodality, both at the European level and at the Croatian level. The information offered on web pages need to contain general information as well as detailed information on services for the already active ones in the combined transport desiring details, for instance, about the new lines in combined transport. The introduction of annual prizes serves to raise the awareness and motivation of the operators in providing the best possible services. Besides, the high-competence companies in the field of combined transport should have the possibility of obtaining the certificate (e. g. ISO 9000) as evidence of the quality of service.

The problem of the lack of qualification (competence) of the labour is tackled by means of technical training, life-long education and higher education.

Infrastructural improvements are especially needed in the railway sector, since combined transport is very much connected with railway transport. There is a need for the introduction of additional cargo lines or the reconstruction of the existing ones that are often used for cargo transport and do not satisfy the necessary capacity in the increase of the number of services, which would be in favour of better performances and shorter carriage times.

In order to solve the problem of lack of motivation for using the combined transport which is mentioned by the forwarders, a combination of several approaches is needed. The conditions of using the road infrastructure need to be harmonized so that all the European countries need to implement the tax charge system for truck transport.

The main focus in intermodal cargo units is on the ISO container. Standardized by International Standardisation Organisation (ISO) it still does not fully comply with the European intermodal transport. Therefore, further standardization is necessary, by adapting and improving so as to be suitable for intermodal loading devices and accepting Euro-pallets. In this way the intermodal transport process would be simplified by being able to perform the transloading between different transport modes using the same equipment.

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## SAŽETAK

### PROCJENA KRITERIJA KVALITETE KOMBINIRANOG TRANSPORTA

Globalizacijom tržišta proizvodni proces i životni ciklus proizvoda skratili su se povećavajući očekivanja industrije za "just in time" logističkim rješenjima. U isto vrijeme, natjecanjem na globalnim tržištima povećao se broj "igrača" i ciljevi nabavnih i distribucijskih lanaca. Cilj je razviti okvir za optimalnu integraciju različitih transportnih oblika tako da se omogući što efikasnije i troškovno efektivno korištenje transportnog sustava kroz korisničku orijentaciju prijevoza "od vrata do vrata" i kroz tu uslugu poticati natjecanje između transportnih operatera.

### KLJUČNE RIJEČI

kombinirani transport, kriteriji kvalitete, intermodalnost, mjere razvoja

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4. Combined unaccompanied transport: transport of containers, exchangeable truck cases and semi-trailers at the terminal between road vehicles and wagons. In accompanied transport - known as "rolling road or motorway", the whole vehicle is loaded on wagons accompanied by the drivers.

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