ISSN 1648-4142 print / ISSN 1648-3480 online TRANSPORT
www.transport.vgtu.lt

TRANSPORT – 2007, Vol XXII, No 2, 118–121

STUDY OF POSSIBILITIES TO ESTABLISH REGIONAL TRANSPORT TERMINAL IN KAUNAS

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Received 18 December 2006; accepted 1 February 2007

Abstract. The article describes the creation of regional transport terminals and their usage as a tool to control material flows in the distribution channels. In the first part of the article the authors analyze the role of intermodal transport terminal within international business system, legal aspects of Lithuanian and EU regulations as well as the laws of Lithuanian transport regional transport terminal establishment in Kaunas. The evaluation of alternative locations for establishment of terminal in Kaunas region is presented.

Keywords: transport, terminal, cargo, flows, profit.

1. Introduction

Overground transport policy of the EU is oriented towards a more effective employment of railways to reduce traffic load on arterial networks. Joint operation of road and railway transport that is integrated into a uniform transportation system turns to be a sound alternative for cargo handling, ensuring flexible customer services and preventing traffic congestion on roads.

2. The role of intermodal transport terminal within international business system

Regional transport terminal (further – TT) originates from the need to reorganize distribution of wide-nomenclature production within the logistic chain. TT obviates the manufacturers' need for warehousing and sorting out flows of goods into transportation batches – wagonloads, motor or container cargoes. TT is being established to enable faster delivery of cargoes to their customers (consignees) and shortened stocking and storage periods. Regional transport terminals are essential elements of regional logistics system.

Freight carriage primarily to TT and then, having accumulated a consignment, delivered to customers, is expedient in case it results in shorter shipment duration along the whole logistics chain and warrants freight delivery on-time by employing all modes of transport in use.

However, participation of TT in servicing logistics channels asks for additional expenses related to cargo handling and formation of consignment batches. Naturally, establishment of TT requires significant investments, and their maintenance requires additional operational costs.

Creation of regional transport terminals and their usage as a tool to control material flows distribution is quite an issue which asks to consider the following tasks:

- deciding whether TT involvement is necessary for servicing material flows, on purpose to deliver them "on-time";
- deciding whether TT participation in the distribution channel is economically purposive regardless of its comparatively high operational costs;
- identifying the optimal shipment batch, accumulated at TT;
- deciding whether the existing volumes of material flows are economically well-founded, proving the necessity to establish TT in the distribution channel.

As for the first task, the impact of interaction among the subjects of the transportation market should be considered. To ensure cargo delivery under the contracted timing and price rates it is essential to establish befitting organizational rapport between carriers and their customers. Mathematical expression of the TT functioning for servicing material flows may be as follows:

$$T_T - T_P \geq \Delta t\,,$$

where T_T and T_P stand for consignment delivery according to transit variant in regard to accumulated freight volume, TT involved; Δt – effect, which results in faster delivery of cargo, TT participating in the proc-

ess of the material flow servicing (decided by the user of the carriage service).

Solution of this task requires consideration for the following preconditions:

- cargoes from a forwarder's point of departure are delivered to TT by motor vehicles, and in case of transit – by railway;
- consignment from a forwarder's warehouse is delivered to a destination point, delivery time indicated for each separate batch q by a consignor, the volume of which is considered to be constant;
- duration of technological operations related to cargo shipment from a forwarder's warehouse and from TT does not depend on its volume.

It is also important to assess expenses related to providing logistic services for customers:

- outage of a vehicle due to loading and unloading at TT;
- accumulation of one full loading of consignment batch (storage), subject to transit variant, TT involved;
- execution of technological operations during delivery and dispatch of one transit batch at regional transport terminal;
- stevedoring operations of one transit batch at TT.

For a cargo consignee j service rendered by TT proves to be economically reasonable in case the difference in price rates is lower or at least equal to the total of expenditure as a result of reduced duration of cargo accumulation (storage) at a consignor's warehouse ΔC_{Hj}, and in the case a consignee achieves an extra effect on sale or production due to faster transportation or delivery "on-time" ΔC_{Dj}:

$$\Delta C_{Tj} \le \Delta C_{Hj} + \Delta C_{Dj} .$$

For a consignee j dimension ΔC_{Tj} means direct remuneration for carriage, primary and conclusive cargo processing operations and stevedoring works:

$$\Delta C_{Tj} = \left(\Delta C_{pj} - \Delta C_{Tj}\right) p_j ,$$

when C_{pj} and ΔC_{Tj} stand for a carriage of cargo unit, subject to the choice for TT involvement or use of a transit variant; p_j – volume of cargo flows, that j is forwarding to a destination place.

Economy on account of shortened period of cargo storage:

$$\Delta C_{Hj} = q .$$

Extra effect, which is obtained by a consignee through sales on the market:

$$\Delta C_{Dj} = C_{Ej} \Delta t_j .$$

Thus it is possible to decide whether for a customer j involvement of TT services proves to be economically well-founded:

$$\left(C_{Pj} - C_{Tj}\right) p_j \le q ,$$

where C_{H1} and C_{H2} stand for one-time storage expenditure, when using transit variant and TT service.

3. Legal aspects of regional transport terminal establishment in Kaunas

In accordance with Lithuanian transport and transit development strategy "National Transport and Transit Development Program" of 2002, approved by the Government of the Republic of Lithuania, the Government prioritizes the development of Crete international road and railway transport corridors I and IX.

Theoretical and field studies allow to state that strengthening the role of Lithuania as an important transit state requires implementation of new types of services rendered in the heart of the country for both cargo forwarders and its consignees as well as for carriers. Our Government's Resolution of 11 November 1999 No 1273 approved of the special plan to lay the railway route along the Lithuanian / Polish frontier – Marijampolė – Kaunas (0.0–85.1 km) [1].

The European railway route in Kaunas region will create linkage for combining Russian and European railway lines (corridors I and IX), as well as Via Baltica motorway (transport corridor I).

While analysing advantages and disadvantages of Kaunas City as a place for establishing a regional intermodal transport terminal, one more specific and very important aspect of the city should be emphasized. Namely, the city with road and railway transport lines is also linked to an inland waterway route of international significance E41 Kaunas – Klaipėda. Since inland waterway transport is characteristic of minor pollution and high volume cargo carriage capacities, being a cheaper and therefore competitive mode of transport as compared to road and railway, it needs to be developed in order to capacitate reload of increasing cargo flows from other modes of transport (road transport in particular). In 2006 Lithuanian Inland Waterways Authority ordered a feasibility study "Complex arrangement of inland waterway along the Nemunas River and Curonian Lagoon Klaipėda – Kaunas for cargo and passenger shipping", the conclusions of which give short, middle and long term perspectives for cargo carriage flows showing that a modernized international inland waterway E-41 along the Nemunas and the Curonian Lagoon, its waterway depth being increased and ports/jetties being constructed/renovated, will be effectively employed. Transportation along the waterway E-41 will make it still more advantageous when increasing its depth. Therefore investments into its modernization would be highly recommended. Conditions for integration of the waterway E-41 into the Klaipėda State Seaport are favourable and do not require any particular legal, administrative or economic instruments. To ensure effective and competitive development of inland waterways transport building a cargo port in Kaunas is crucial, the potential place for its establishment being in Marvele.

Hence, theoretically and strategically Kaunas is an ideal place for establishing an intermodal regional transport terminal in here.

Review of Lithuanian and EU regulations as well as the laws of Lithuanian transport allow concluding the following:

- establishment of intermodal transport terminal in Kaunas unquestionably meets the guidelines of the EU Communication „Intermodality and Intermodal Cargo Transport of May 1997“, since the terminal is intended to effectively use the potential of the transport corridors I and IX, and enables involvement of joint road, railway and inland waterways transport service as well as suggests optimal cargo handling and the place for rendering distribution service;
- establishment of Intermodal transport terminal and public logistics centre in Kaunas at the end of the intersection of corridors I and IX would make an essential part of TINA (Transport Infrastructure Needs Assessment) process.

Institutional structure of intermodal transport terminal in Kaunas must reflect relevant (current and perspective) legal and administrative conditions of Lithuania. Based on the analysis of legal ground and international experience, organisational structure of Kaunas regional transport terminal should be moulded considering the following guidelines:

- state-owned land for Kaunas regional transport terminal centre has to be given by lease to the Partnership responsible for the development of the terminal;
- warehouses, distribution and other facilities must be built on the land allotted (rented) for the terminal;
- development and management of regional transport terminal in Kaunas will be duplicated tasks, and therefore they have to be pursued by the partnership for terminal development and management, consisting of business partners;
- partnership for regional transport terminal management will have Steering Board and Executive Committee involved, the members of which will contribute by “know-how” and skills.

4. Establishment of regional transport terminal – public logistics centre in Kaunas City

Activities of regional transport terminal with further development into public logistics centre in Kaunas (referred to as Operator) is a new type of transport and logistics service in Lithuania. The terminal will be responsible for handling loading items (wagons, containers, trailers, semi-trailers, etc.) and freight management in-between two railway systems, railways, roads and inland waterways transport as well as for temporary storage of loaded and empty carriage items and goods. Goods will be sorted out into container shipments, pallets, general cargoes (in sacks, boxes, etc.) and timber. Augmenting carriage volumes and growing demands for logistics services may stimulate development of the terminal into new generation public logistics centres (freight villages) [2–4].

Minimum area primarily required to transport terminal in Kaunas is 50–60 ha of land with a possibility to enlarge it as the logistics centre in the future up to 150–200 hectares. The centre will enable providing the following services:

During the first stage of its development:

- organization of intermodal shipments;
- organization of cargo carriage by roads;
- organization of cargo carriage by European and Russian railway tracks.

During the second stage of development:

- storage and handling of warehoused goods;
- value added services (for instance, packaging and marking of goods);
- customs warehouse terminal;
- warehouses for long-term storage of cargoes;
- cargo distribution centre;
- parking of transport vehicles;
- transport administration services;
- customs and payment procedures;
- legal service;
- insurance service;
- telecommunication service.

Generally, establishment and maintenance of regional transport terminal – public logistics centre in Kaunas will enable:

- to reduce traffic intensity on roads by increasing capacities of loading facilities (for instance, by arranging freight accumulation and distribution at cargo handling centres), and by transferring part of cargoes onto railway and inland waterways transport;
- to develop strong intermodal ties and joint activities by combining positive aspects of road, railway and inland waterways transport, for international carriage in particular;
- to positively affect safety of traffic and cargo transportation;
- to create a better integrated system of transportation and telemathics (ensuring close links between cargo and information flows), as well as railway, road and inland waterways transport systems.

Centre development is an essential tool for effective reorganization of productive activities in the area.

To achieve high reorganization results in a given area and seeking to centralize transport and service functions, it is necessary to select adequate locations, sufficient in operators and cargoes.

Rendering of general services has to be customer oriented both inside and outside of the terminal, and these types of services must have proper access. Offices of companies and operators must be well-equipped with modern communication systems for performing cargo control.

5. Analysis of alternative locations for establishment of terminal

Three alternative places were chosen and assessed:

- ***territory near the settlement Mauručiai;***
- ***territory in the area of Palemonas Railway Station;***
- ***territory alongside the settlement Neveronys.***

All the chosen places were assessed according to these main characteristics:

- location in regard to Kaunas City;
- size of the proposed territory;
- distance from residential areas;
- topography, current purpose of land and surface drainage;
- structure of services;
- long-term development opportunities of the area;
- physical and developmental issues with regard to Kaunas City / Region;
- distance from Via Baltica (corridor I);
- distance from the existing Russian and European railway tracks.

Other important factors influencing selection of the location:

- present use of land;
- possible impact on people, natural resources, cultural inheritance;
- distance from environmentally vulnerable places;
- infrastructure (approach roads, water reservoirs, sewerage, gas, electricity).

Territory near the settlement Mauručiai. Distance to Kaunas – 10 km. No buildings, surface of the land is flat. The land is owned by individuals. Good possibilities for linkage with Russian and European rail track lines, which are / will be near the road Via Baltica (1.5 km). Automatic track-changing mechanism (equipment) must be installed at the intersection of European and Russian rail tracks to allow and ensure smooth traffic of wagons, without stopping or reloading, along transport corridors I, IXD, IXB. Minimal investment into infrastructure and mechanisms is required. Technical infrastructure is missing, but there is enough space (200 ha) for further development of the Intermodal Terminal into the Logistics Centre. Current land is mainly used for farming.

Territory in the area of Palemonas Railway Station. The territory is close to Kaunas City. It is densely built up with old soviet factory constructions and warehouses that currently belong to individuals. Prices of warehouses set by private owners (2 500 Lt/m^2) exceed the ones of offices in the centre of Vilnius City. The existing limitations for European rail tracks do not allow crossing of railways on the same level in the stretches Vilnius – Kybartai and Kaunas – Jonava. There is no possibility to build viaducts in Palemonas. No possibility to make linkage with Russian and European rail tracks that are/will be not far away. Palemonas Station has no space for cargo reloading. Establishment of intermodal terminal and building of the European rail track from Mauručiai to Palemonas would cost the same as to build European railway lines from Poland boarder to Mauručiai.

Territory alongside the settlement Neveronys. Alongside Neveronys settlement the site of 60 ha for public logistics centre is available. There is a possibility to build a railway stretch from the railway Kaunas-Jonava as well as a 2 km long motor road from the highway Vilnius – Klaipėda to approach "railway to railway" reloading terminal. Building the European railway from Mauručiai to Neveronys is technically complicated and costly. Current land is mainly used for farming. Distance from Kaunas – 15 km.

To assess the three above mentioned places the same layout scheme (plan) for public logistics centre of the same composition throughout all the analysed locations was used. However, individual planning of separate places is different as regards their compliance with specific circumstances and necessary investments.

6. Conclusions

1. Establishment of regional transport terminal will enable to develop firm intermodal links and activities by combining positive aspects of road, railway and inland waterways transport, and to reduce intensive road traffic in transport corridor I as well as by increasing exploitation of loading capacities of different transport implements and relocating part of cargo onto railway and inland waterways transport.

2. Having evaluated technical, economical and organizational-political factors and circumstances it is possible to state that the territory near Mauručiai settlement is cheaper and better-suited for establishing intermodal transport terminal compared to other locations under survey. Although the alternative of Palemonas Railway Station for many of its advantages and attractive aspects should not be rejected. The present multi-criteria analysis shows that both potential places are more or less equivalent as alternatives.

References

1. *State News* (*Valstybės žinios*), No 97-2806, 1999.
2. ŠAKALYS, A.; PALŠAITIS, R. Development of intermodal transport in new European Union states. *Transport*, 2006, Vol XXI, No 2, p. 148–153.
3. PALŠAITIS, R.; BAZARAS, D.; LABANAUSKAS, G. The comparative analysis of Lithuanian and Latvian transit transport. *Transport*, 2004, Vol XIX, No 1, p. 9–14.
4. BURKOVSKIS, R.; PALŠAITIS, R. Interaction of the Klaipėda sea port and railway transport. *Transport*, 2002, Vol XVII, No 2, p. 71–75.