

Intermodal Transport as a Part of a Supply Chain

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The purpose of this paper is to present intermodal transport as a part of the companies' supply chain in which rail transport is not a necessity but a value added element. The European Commission stated in its current "White Paper" as follows: "Railway is sometimes seen, particularly as far as freight transport is concerned, as an unattractive means of transport. However, certain examples of some Member States have shown that railway can offer high quality transport services". In fact, rail freight transport has undergone a large transformation in recent years. A growing number of shippers and forwarders have discovered rail transport as an economically viable and environmentally friendly alternative to road transport for the movement of cargoes.

Keywords: transport, intermodal transport, supply chain.

1. INTERMODAL TRANSPORT - AN EFFECTIVE METHOD OF GOODS HAULAGE

Intermodal transport belongs to complex transport processes in which cargo is transferred by means of transport utilised in different transport branches¹. Additionally, cargo is transported within a single ITU (Intermodal Transport Unit), e.g. a container, swap body, semi-trailer, etc., within the entire route using means of transport belonging to different transport branches. The means of transport used for transferring cargo may include:

- road vehicles,
- rail vehicles,
- ships,
- river barges.

In Poland, all transport branches may be used for intermodal transport activities. However, in practice, inland shipping is hardly ever used for intermodal transport purposes. The most common solution combines sea transport with rail and road transport. The authors of this paper intend to focus

on rail transport, for which new possibilities appear, resulting from the growing number of cargoes transported in containers. Simultaneously, in recent years, rail transport has become more competitive and customer-oriented thanks to opening the market, intensifying competition and, as a result, increasing the variety of available offerings. Thus rail transport stands a considerable chance of dynamic development in the future in conjunction with the increase in the transport size and efficiency.

Properly developed line infrastructure (railways) and spot infrastructure (container terminals) constitute inseparable elements of intermodal transport. This must include railways ensuring highest technical parameters and a network of container terminals which facilitate reloading of an intermodal transport unit among means of transport used. During the last 7 years, the number of container terminals located in Poland has increased by over 60%. See the figure below for locations of 33 existing container terminals which facilitate reloading intermodal transport units.

¹Pojęcie transportu kombinowanego, Mindur L., in: Współczesne technologie transportowe, red. Mindur L., Politechnika Radomska, Warszawa, 2002, page 233

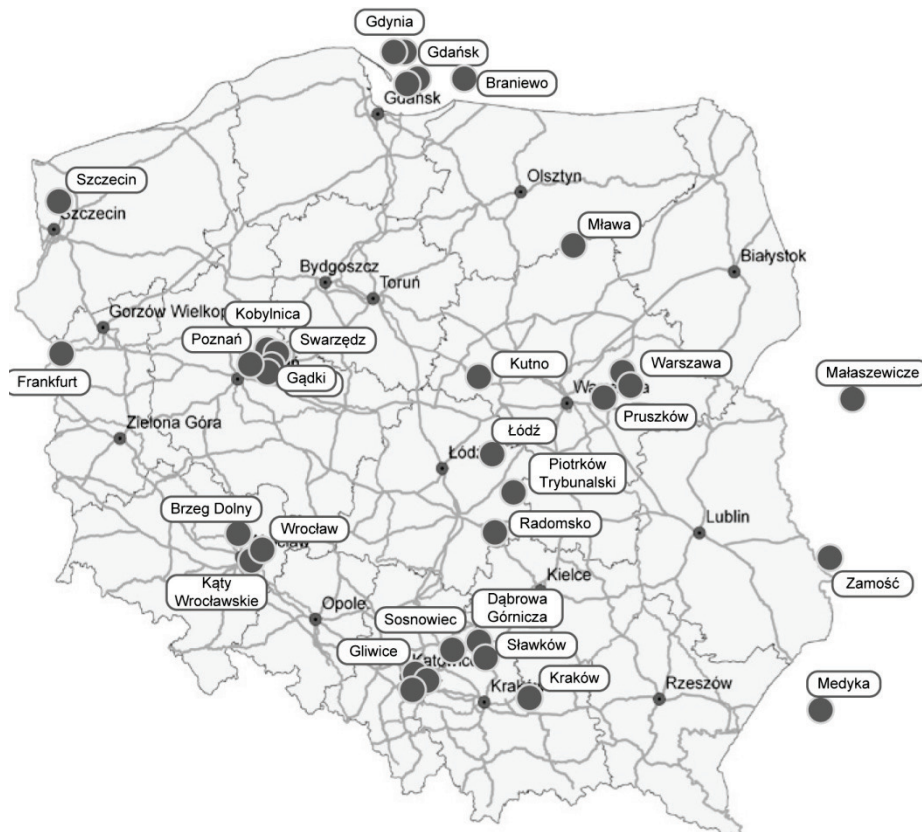


Fig. 1. Network of existing container terminals in Poland

Source: Hajdul M., 2010 Hajdul. M., 2012, Transport intermodalny. W: Logistyka w Polsce, report 2011, edited by Fechner I., Szyszka G, ILiM, Poznań, p. 95

In March 2011, the European Commission published the "White Paper" on transport. This document entitled „Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system” has a strategic character. The White Paper presents the assessment of the transport policy regarding recent years and results of research regarding long-term challenges. It also makes it possible to identify the objectives to be achieved in the next 40 years (by 2050) and defines detailed framework conditions for activities in the area of the transport policy in the next 10 years.

The future development of rail transport and infrastructure plays a significant role in this strategy as it puts the transport policy into a broader perspective which comes down to the attempt to answer the following questions:

- How can we support market growth and development with simultaneous more effective utilization of resources?
- How will the transport system develop in conjunction with the decrease in dependency on oil?

- How can these two requirements be met, i.e. securing the demand on fuel and climate changes?

The international community came to the conclusion in Cancún² that the temperature rise resulting from climate changes must be limited to 2°C. By 2050, industrialised countries are obliged to limit their greenhouse gases emissions by 80 - 95% in comparison with the base year, i.e. 1990. Simultaneously, the Council of Europe has confirmed the defined goal, i.e. the necessary reduction of emissions from the European transport sector amounts to at least 60%.

In order to reduce the emissions resulting from transport activities by 60% in the context of the growing demand on mobility, the White Paper defines applicable criteria regarding both the transport policy and progress assessment. According to these criteria, by 2030, approx. 30% of long-distance vehicular cargo transport (section length exceeding 300 km) should be replaced by rail transport. By 2050, the White Paper

² United Nations Climate Change Conference in Cancun, December 2010

recommends that even over 50% of all long-distance vehicular transport be replaced by other means of transport, in particular by rail transport. In comparison with 2005, this percentage of rail transport activities will have been almost doubled (+87%). Naturally, it constitutes both an enormous opportunity and challenge for rail transport. The rail transport sector must be prepared to service approx. 360 billion tonne-kilometres more than presently. This requires supporting multimodal and unit transport solutions, integrating inland water routes with the transport system and providing a system for promoting innovative pro-ecological solutions in the cargo transport area.

One of the methods aimed at achieving the above-mentioned ambitious goals regarding increasing the share of rail transport in the overall transport activities is the presentation of the selected best practices detailing successful implementations of pro-ecological transport projects. Among other, the above is achieved by the FLAVIA project (supported by the European Commission) aimed at optimisation of the intermodal cargo transport logistics between Central and South-Eastern Europe and reinforcement of the impact exerted by environmentally friendly means of transport, i.e. rail transport and inland shipping. This enables us to limit vehicular road traffic and, as a result, streamline regional and international transport activities.

The term **FLAVIA** stands for **F**reight and **L**ogistics **A**dvancement in Central/South-East Europe – **V**alidation of trade and transport processes, **I**mplementation of improvement actions, **A**pplication of co-coordinated structures. The FLAVIA European Union project contributes to the improvement of logistics in Central and South-Eastern Europe. Thanks to validating transport and commercial structures/processes, the project presents assumptions for improving and consolidating cooperation structures. The project is implemented by 14 partners from 7 European countries, i.e. Poland, Czech Republic, Slovakia, Hungary, Romania, Austria and Germany.

An important objective of FLAVIA is to present examples of best practices, i.e. successful projects regarding utilisation of rail transport, which includes showing methods of effective, economical and resource-efficient integration of rail transport with other logistics processes. The project collects success stories of enterprises which, during the last few years, have shifted their transport processes from road to rail transport. See

below for two examples of such best practices (Castorama Polska Sp. z o. o. and Can-Pack S.A.). The collected examples of shifting cargos from roads to rails describe motives and decision-making processes from the point of view of a loader and freight-forwarder, i.e. parties taking decisions regarding an applicable means of transport selection. They constitute evidence confirming effective, economical and resource-friendly inclusion of rail transport into the logistics chain.

2. CASE STUDY – CASTORAMA POLSKA SP. Z O.O.

Castorama is Poland's largest DIY hypermarket chain offering DIY, construction, redecoration, home arrangement and gardening products. The company goes back to 1967 when Christian Dubois established the first supermarket in Englos (close to Lille) in France. Rapid development of these shops in France enabled the company to dynamically expand into foreign markets. The company entered the Polish market in 1994 when Castorama Polska was established. Its goal was to develop company's business in Poland. This resulted in immediate action as the first shop was opened in Warsaw in 1997. The supermarkets have been dynamically developing since then and, so far, 67 commercial units have been opened including 60 locations called Castorama and 7 locations operating under the Brico Depot name.

At first, containers filled with goods for Castorama Polska were transported from Gdynia and Gdańsk to the warehousing centre located in Gądko near Poznań only via roads. However, utilisation of a single mode of transport became less and less effective. There were several reasons for this fact. Firstly, the expenditures for road transport increased steadily. This was connected with skyrocketing diesel fuel prices and the introduction of the electronic toll collection system within the national roads system on 1st July 2011. It must be added that, with time, the network of roads included in this system will expand, which may result in further increase in prices for services provided by means of this mode of transport. Another reason consisted in dynamic increase in the volume of the transported cargo stream and rising frequency of heavy containers transport, which required utilising special semi-trailers of considerably limited accessibility and high costs. All the above factors resulted in the fact that the possibility of using rail transport to deliver

particularly heavy goods was taken into account. While taking this decision, the environmental protection aspects were also taken into account as they are clearly defined in the policy of the Castorama's capital group (Kingfisher), i.e. the company should constantly care about environmental protection. The first attempt to use rail transport to deliver cargos from sea ports was successful and, at the end of August 2011, the first train loaded with containers filled with goods for Castorama was sent.

The pattern of transporting containers by means of trains from Gdynia or Gdańsk ports to the Gądko warehousing centre is as follows: containers loaded on flatbeds are formed in a draft of cars and transported from ports to the container terminal in Kobylnica near Poznań, which belongs to Cargosped Sp. z o.o. The distance is over 300 km and the whole trip takes approx. 12 hours. In the terminal, the containers are loaded on semi-trailers and transported to the warehouse in Gądko located approx. 30 km away from Kobylnica. However, due to the fact that Cargosped opens a new container terminal in Gądko, soon the distance covered by means of road transport within the final section of the route will be reduced to 2 km.



Fig 2. Unloading containers
Source: Castorama Polska Sp. z o.o.

Since the end of August until December 2011 Castorama transported 297 containers in total, by means of trains. See the table below for a detailed list of transported containers

Table 1. Number of transported containers
Source: Castorama Polska Sp. z o.o.

Item No.	Container type	Quantity
1	20'	236
2	40'	33
3	40' HC (high cube)	28
Total		297

It must be added here that in 2011 the ratio of utilisation of rail transport in relation to road transport was 30:70, however, the company is planning to increase the share of rail transport. Currently, the share of intermodal transport is at the level above 90%.

As of today, Castorama Polska Sp. z o.o. considers the decision connected with employing rail transport to deliver cargo containers as a favourable one. Most of all, the transport costs have been lowered and the company has confirmed that its actions taken for environmental protection are not just a green washing slogan but a natural element of its business activity.

3. CASE STUDY – CAN-PACK S.A.

Can-Pack S.A. has production facilities all over the world and is one of the leading players on the global market for metal packaging, e.g.:

- two-piece aluminium beverage cans with easy-open aluminium ends for beer and soft drinks,
- round steel food cans and shaped cans for vegetable and meat products,
- steel bottle closures (crown corks) for use with beverage and mineral-water bottles made of glass,
- easy-open steel ends for use with steel cans for meat and fruit/vegetable products.

At the onset, the metal beverage cans were transported from the plant located in Brzesko, between Cracow and Tarnów, to the Gdynia port by means of road transport. The cans loaded to containers on the Can-Pack S.A. premises in Brzesko travelled approx. 700 km throughout the whole country on Polish roads to be delivered to the Gdynia port, from which they were forwarded by ships. However, road transport became less and less effective, i.e. as a result of increasing difficulties in obtaining access to lorries adjusted to transporting cargo containers. Additionally, the prices for road carriers' services have increased

rapidly during the last few years. Due to the above, an attempt to deliver cargos by means of rail transport has been made. In practice, this solution appeared to be a good move and, as a result, it has been successfully implemented since 1 March 2011 when the first train carrying containers loaded with metal beverage cans was sent to the Gdynia port.



Fig. 3. Loading cans to containers
Source: Can-Pack Sp. z o.o.

The replacement of road transport with rail transport has influenced the transformation of product distribution organisation in Can-Pack S.A. Presently, the cargo is loaded to containers already located on rail cars directly at the siding situated within Can-Pack S.A. premises. This eliminates the necessity to transport containers by road to a container terminal, which results in considerable savings, both in terms of money and time. Next, the containers are transported by rail from Brzesko directly to the Gdynia port and shipped through the Baltic Sea to a Finnish ordering party.

It must be added here that the fact of shifting from road transport to rail transport has significantly contributed to streamlining the warehouse operation as the process of providing rail cars for loading is planned in such a manner that it does not interfere with the process of loading lorries. This solution enables the company to optimally and effectively utilise the resources stored in distribution warehouses.

Another important reason for shifting the goods distribution from road transport to rail transport is environmental protection treated as a priority by Can-Pack S.A.. The evidence for this is the fact that the company maintained the costly railway siding within the plant premises even though rail transport was used to a limited extent.

Each week, Can-Pack S.A. ships approx. 30 containers by means of 45' rail transport from Brzesko to Gdynia. However, in this case providing the weight of shipped goods in tonnes is not a reliable method as the transported goods (aluminium cans) are very light. Thus it must be mentioned that a 45' container ships approx. 3 tonnes of cargo.

It is also worth highlighting that Can-Pack S.A. has not borne any costs connected with shifting from road transport to rail transport. The reason for this is obvious, i.e. the company uses its own rail siding located within its premises.

With hindsight, company's representatives consider the above-mentioned decision as a favourable one, which results from several reasons:

- the problem with the temporary shortages of lorries adjusted to transporting containers has been solved,
- the operation of the warehouse has been considerably streamlined,
- thanks to shifting the modes of transport, the company achieved savings estimated at the level of 15%.

4. CONCLUSION

The European Commission stated in its current "White Paper" as follows: "Railway is sometimes seen, particularly as far as freight transport is concerned, as an unattractive means of transport. However, certain examples of some companies have shown that railway can offer high quality transport services". In fact, the rail freight transport has undergone a large transformation in recent years. A growing number of forwarders have discovered rail transport as an economically viable and environmentally friendly alternative to road transport

for the movement of cargoes. Rail transport is used for whole routes of the cargo carriage as well as for its fragments within the framework of a multimodal transport chain.

The most common reasons for which entrepreneurs started using rail transport include:

- higher profitability of the transport chain resulting from inclusion of rail transport as opposed to systems in which cargoes are transported exclusively by roads;
- better transport chain planning and integration with company's logistics processes;

- reliability of rail transport and more independence from transport problems on roads (e.g. congestion);
- environmental protection and reduction of greenhouse gases emissions resulting from road transport.

Particularly the final argument has gained major significance for loaders and freight-forwarders: rail transport offers significant advantages as regards the climate and

environment in relation to road transport, e.g. higher energy efficiency and lower CO₂ emissions in comparison to road transport.

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