

# How Multimodal Transport Change International Transportation Market: A Case Study from Bremerhaven

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**Abstract:** Bremerhaven is one of the 20 most important ports in the world and the 2nd in Germany. International multimodal transport is a new international container transport method. It is through two means of transport like land shipping, vessel shipping and air shipping to complete the coherent transport of goods in international instead of the single mode transport. Nowadays, providing high quality international multimodal transport services has become an important means to improve shipping company's competitiveness. The idea of this paper is to provide information to the reader, first from a broad perspective by analysing some global details to finally provide a detailed information and analysis of the multimodal transport in Bremerhaven.

**Key words:** Multimodal transport, International transportation, Bremerhaven

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## 1. Multimodal transport

### 1.1 Definition of multimodal transport

Multimodal transport refers to a transport system usually operated by one carrier with more than one mode of transport under the control or ownership of one operator. It involves the use of more than one means of transport such as a combination of truck, railcar, airplane or ship in succession to each other <sup>[1]</sup>. The United Nations Multimodal Convention defines multimodal transport as follows: the carriage of goods by at least two different modes of transport based on a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country.

### 1.2 Advantages of multimodal transport

First, multimodal transport, which is planned and coordinated as a single operation, minimizes the loss of time and the risk of loss, pilferage, and damage to cargo at trans-shipment points. The multimodal transport operator maintains his own communication links and coordinates interchange and onward carriage smoothly at trans-shipment points. Second, the faster transit of goods made possible under multimodal transport reduces the disadvantages of distance from markets and the tying-up of capital. In an era of Globalization, the distance between origin or source materials and consumer is increasing thanks to the development of multimodal transport. Third, the burden of issuing multiple documentation and other formalities connected with each segmented of the transport chain is reduced to a minimum. The savings in costs resulting from these advantages are usually reflected in the through freight rates charged by the multimodal transport operator and in the cost of cargo insurance. Fourth, the consignor must deal with only the multimodal transport operator in all matters relating to the transportation of his goods, including the settlement of claims for loss of goods, damage to them, or delays in delivery at destination. Fifth, the inherent advantages of multimodal transport system will help to reduce the cost of exports and improve their competitive position in the international market <sup>[1]</sup>.

### 1.1 Forms of multimodal transport operations

Currently, different types of multimodal transport operations involving different combinations are taking place, such as: Land-Sea-Land, Road/Air/Road, Sea/Air/Sea, Rail/road/inland waterways/sea, Ro-Ro (Roll-on/Roll-off).

## 2. World wide maritime transport

### 2.1 Bremerhaven port

Bremerhaven port strong position is based on the movements of different cargos from Germany to the world, moving from 8.759 thousand tonnes in 1997 to 25.095 TT in 2010. This represents a 27% of total maritime outwards from Germany. The increasing importance of Bremerhaven port in total inwards up to 20.849 TT in 2010 with an increase of 265% since 1997. Bremerhaven as part of the Bremen Ports, is well known worldwide for being one of the biggest, most important and efficient ports in the world. Handling almost all kind of cargos from automobiles and containers, bulk cargo and dangerous to special request project cargo. Table 1 and Table 2 shows that “Large container” cargo is the strongest activity at the Port representing a 90% of the total outwards and 94% of total inwards.

**Table 1. Different cargos from Bremerhaven – Outwards**

	2006	2007	2008	2009	2010
Liquid Bulk	15	11	19	24	13
Dry Bulk	0	8	:	6	:
Large Container	19.133	20.795	23.194	21.057	22.582
Ro-Ro, mobile self-propelled units	1.714	1.854	2.017	1.321	15
Ro-Ro, mobile non-self-propelled units	44	69	124	104	107
Other Cargo	520	447	507	345	2.377
<b>TOTAL OUTWARD</b>	<b>21.426</b>	<b>23.184</b>	<b>25.861</b>	<b>22.857</b>	<b>25.094</b>

**Table 2. Different cargos from Bremerhaven – Inwards**

	2006	2007	2008	2009	2010
Liquid Bulk	470	374	384	201	173
Dry Bulk	87	63	58	68	83
Large Container	16.601	17.969	20.542	18.489	19.530
Ro-Ro, mobile self-propelled units	997	1.192	1.257	593	15
Ro-Ro, mobile non-self-propelled units	16	20	27	27	29
Other Cargo	755	815	826	466	1.019
<b>TOTAL INWARDS</b>	<b>18.926</b>	<b>20.433</b>	<b>23.094</b>	<b>19.844</b>	<b>20.849</b>

Bremerhaven is one of the world’s leading container ports. The approx. five-kilometre-long quay has sufficient water depths for seagoing vessels and 14 berths that can accommodate the largest container vessels in the world. Excellent hinterland connections enable convenient onward transport to all key European regions.

### 2.2 Bremerhaven port facilities

Bremerhaven as part of the Bremen Ports, is well known worldwide for being one of the biggest, most important, and efficient ports in the world. Handling almost all kind of cargos from automobiles and containers, bulk cargo and dangerous to special request project cargo.

#### 2.2.1 Container terminal

A multi-user terminal for a wide number of shipping companies, with a full range of services such as container depot, repair and maintenance, container transport by rail, road, and inland waterway, as well as special services for frozen cargo containers. Its water depth is 12.6-15m and its Quay length is 4.930 meters, with 14 berths for mega-container vessels. With approximately 3 million m2 of outdoor operating area and 30.000 m2 of covered storage area. It also includes 8.000 m2 of refrigerated area. With the longest continuous riverside quay in the world, Bremerhaven

Container Terminal is able to receive the world's largest container vessels with almost 400 metres long which can carry more than 14.000 TEU.

#### 2.2.2 Automobile terminal

Bremerhaven gradually evolved from an export terminal to a world-class automobile hub. In peak years, more than two million vehicles cross the quays here. Bremerhaven is meanwhile one of the largest automotive hubs in the world. The Auto Terminal has enough operating and storage area for 120 000 cars, incl. covered storage for 45 000". Apart from automobiles, Bremerhaven port deals with "high and heavy" cargo, such as trucks, buses, construction machinery and cranes, yachts etc. The Bremerhaven automobile terminal provides other services. First, they deal with exports and imports, but Bremerhaven is not always the final destinations, so it works also as a transshipment point. The automobiles are unloaded and then taken by smaller feeder vessels which transport them to other ports not accessible by large container ships. Other services provided include quality control, repair and maintenance of vehicles before being loaded. Bremerhaven is also responsible for the customization of vehicles, such as installing satellite navigation systems, air conditioning, leather seats, designer wheel rims or spoilers, which are installed in Bremerhaven, also final assembly of special series vehicles. All these services help companies to outsource to focus on their core competences and reduce costs.

#### 2.2.3 Fruit terminal and cold store

The two dedicated fruit terminals at Kaiserhafen Columbuskaje in Bremerhaven provide Germany and other European countries with a reliable supply of fruit and vegetables from overseas. Every year, more than 250.000 tonnes of temperature-controlled goods are loaded and discharged at these facilities. It includes fish products, poultry, meat, fruit and vegetables. The fruit terminal has a total are of 94.000 m<sup>2</sup> which 13.000 m<sup>2</sup> are for covered storage. Has 600m of Way length and up to 11.3m of water depth. With a wide variety of facilities consisting of:

- 5 berths with water depths of up to 11.3m
- Climate-controlled storage for 20.000 pallets.
- 90 reefer container hook-ups
- Covered and outdoor storage areas
- Shore cranes
- Container gantry crane
- 4 elevators, linked to a palletising system.

All together final throughput in 2010 was 25.000 tonnes.

#### 2.2.4 Fischereihafen terminal

Bremerhaven is one of the most important points in Germany's fish industry. It was once the largest Fishing port on the continent, with its roughly 480-hectare becoming a multifunctional site. It is now home for a diversity of business sectors, such as biotechnology, offshore wind energy and the food industry. Frozen storage capacities include 162.000 m<sup>3</sup> for commercial services and 336.00 m<sup>3</sup> for operational activities. A quay length of 7.000 m and up to 8.1m of water depth.

### **3.Inbounds and outbounds**

#### 3.1 Rail to sea.

The inland transport is also of critical importance in terms of ensuring the competitiveness of a port. Bremerhaven has an efficient port railway covering a network of more than 200 kilometres; Bremerhaven also have good rail connections to the main commercial centres in Germany and the rest of Europe. More than 50 % of Bremen's freight is transported inland by rail and for long-distance container transport, the figure is two thirds <sup>[2]</sup>.

The Advantage of railway transport including three characteristics. First are high frequencies. There are more than 12,000 quick connections every year and more than 240 departures a week from all the Europe inland to Bremerhaven. Second is extensive areas covered. Port Railway transport system links 15,000 locations in the most important business

centres in Germany, Austria, Eastern Europe, and Switzerland to the Bremerhaven. Third is fast. An efficient network makes system transports possible in 12 to 36 hours.

The railway transport from Hungary is offered by EGIM international. They link to Hungary capital six times a week and the transit time is 27 hours. The non-stop utilization of the same locomotive from the German seaports to Budapest BILK eliminates the time-consuming need to change engines at the respective national borders<sup>[3]</sup>. In order to reduce the empty containers, load rate, they will change the running lines timely to adjust the cargo volume change. The cargo from Bremerhaven to Budapest is more than the cargo from Budapest to Germany because of the low export of Hungary. So, the return trains must load empty cargo. But because of the developed machinery industry, the export container in Munich is more than imports of container, so Munich needs more empty containers. So, the Hungary Express line northwards from Budapest to southern Germany likes Munich to balance the empty containers problem in a flexible way.

The railway transport regular service from Czech Republic/ the Slovak Republic/ Romania and Slovenia is offered by EUROGATE Intermodal. They link the major south-eastern Europe industrial centres quickly, efficiently and in an eco-friendly via the most direct route available<sup>[3]</sup>. The new railway transport regular service from Poland to Bremerhaven is offered by DB Schenker Rail. The new production concept accelerates the container transports. The new railway transport regular service from Austria and Switzerland to Bremerhaven is offered by Albatros Express belong to TFG Transfracht. It links the most significant commercial centres in Germany, Austria and Switzerland to Bremerhaven with direct trains. The Albatros Express links Austria to Bremerhaven six times a week via terminals in Vienna, Linz and Salzburg. This regular transport service for the Austrian market ensures good network coverage for business centres in Upper Austria, Lower Austria and the state of Salzburg. The Albatros Express links Switzerland to Bremerhaven overnight via terminal Basel, Frenkendorf and Rekingen/Zurich. Short transport times, a direct link without any lorry detours to the seaports, departures on Sundays and public holidays and not being dependent on low and high Rhine River water levels are the main benefits of the TFG train system for the Swiss market.

Automotive transport main use rail transport offered by BLG. BLG Auto Rail currently operates 500 in-company railway wagons. They transport automotive cars from Wolfsburg of Volkswagen, Bremen of Mercedes Benz and so on<sup>[4]</sup>.

### 3.2 Road to sea

As a distribution tool for short to medium distances, Lorries is a flexible means of transport. Road transport is therefore the second main pillar of inland transport from Bremen's ports.

### 3.3 Inland waterways to sea

Bremen also offers two links to the network of inland waterways throughout Germany and Europe. The first heads west along the Weser estuary, River Hunte, coastal canal and Dortmund-Ems Canal to the Rhine before linking up with an entire network of canals throughout central Europe. The other runs south along the Middle Weser to the Mittelland Canal. The port of Bremerhaven needs the Middle Weser to be a highly efficient waterway, particularly in terms of enabling environmentally friendly, combined inland container transport by river boat. The measures required for this, along with the expansion of the Middle Weser and the locks at Dörverden and Minden, are set out in the current federal transport plans.

## 4. Other multimodal transport methods

### 4.1 Drop and pull transport

Drop and pull transport service refers to the tractor according to a predetermined operation plan, drop the container trailers and put the other container trailers to run. Drop and pull transport has many advantages as follows.

On the one hand, it can reduce operating costs. Drop and Pull transport recommend the tractors and trailers to be configured with the ratio of 1:3, which can reduce the number of the tractor and driver to save the tractor purchase costs, labour costs, management fees and operating costs. Another hand, it can reduce the cost of warehousing. It enhances the flow of goods and saves the cost of goods warehousing. In Drop and Pull transport, the tractor and trailer

can freedom to separation which can reduce the waiting time for cargo handling, accelerate the tractor turnover, and improve the efficiency of tractor. The technical characteristics of the tractor and trailer separation can effectively reduce energy consumption. The transportation of the goods of the same weight, the semi-trailer's fuel consumption is only about half of the ordinary truck. On the other hand, it can reduce empty vehicle and invalid transport and reduce energy consumption and emissions. For example, according to one tractor configured three trailers to calculate the operating costs will be reduced by more than 30%, which reduce energy consumption by 33 %.

#### 4.2 Rail piggyback transport

Piggyback transport is a multimodal transport between road and rail. There have two methods for piggyback transport. One is freight track or container directly on the train wagon to transport and take off from the wagon on the destination. Another is that the Drop and pull transport. The cargo is loaded in the trailer and trailer transport to the train station. At the train station, the trailer was shipped on the train's flatbed box that trailer and trailer separation. At the destination station, then use the trailer hauling the trailer to the consignee's warehouse.

## 5. Conclusion

New economies are emerging. Companies must adapt and provide extra services to compete and succeed. Bremerhaven port is a good example of Quality services and facilities, long term contract and relationship, Reliability, and a great spot for companies to access new markets.

Bremerhaven port provides a wide variety of services that provide extra value to its location. Bremerhaven is more than just a port, is a perfect multimodal transport system. It connects Germany and Europe to the World.

International multimodal transport is an intermodal form of organization to optimize the effectiveness of the overall transport of goods. Usually, different modes of transport organically together constitute a continuous and comprehensive integration of transport of goods. Through once consignment, once billing, one document, once insurance by the transport section, the carrier completed the entire transport of the goods. Letting full transport of goods is arranged as a single transport process. Because international multimodal transports advantage, more and more companies choose International multimodal to transport their goods.

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