Containers in Inland Waterway Transport

A Europan Success Story

By Christoph Seidelmann, Vice-President, BIC

Barge transport of containers increases

Inland waterway transport has become a major player in the intermodal mix, especially when carrying containers between sea ports and their hinterland. After slow start in the 1980s, a sharp increase in the 1990s, a major crisis in 2003, the barges have today a considerable share in port hinterland transport. Barge transport from and to Rotterdam tripled between 1990 and 2005: 1990 Rotterdam counted 925 000 containers moved by barge, in 2005 the number has increased to 2 880 000. Antwerpen recorded some 2 500 000 containers carried by barge.

The river Rhine has always been the backbone of barge traffic in Europe, and it continued its role with containers. The Roman troops in the 1st century A.D. already shipped their wine supply on the Rhine. The real boom followed in 1880/1900 when hard coal was carried down the river, and iron ore upstream.

When the container transport started in the European North ports in 1966, nobody considered barge transport as a realistic mode for hinterland transport. European container hinterland carriage started by road transport, and in the 1970s rail developed some market share, mainly in the German ports of Hamburg and Bremen/ Bremerhaven.

It started in the 1980s

The real start was in the 1980s, when the forwarding company Kieserling opened a private port in Ginsheim-Gustavsburg where the river Main flows into the Rhine. They got contracts for carriage of containerised supply consigments of the US Armed Forces in Central Europe. The containers were carried from Rotterdam by barge to Ginsheim-Gustavsburg and the carried by truck into the army depots.

Container transport in the Rhine showed, soon, its advantages: Transport on the Rhine is free of all infrastructure charges, only the port charges have to be paid. Logistics analyses said that barge transport is too slow for container movements under time pressure. But shippers in the Rhine valley understood how to overcome this: Most consignments are not so much under pressure, and they can be carried by inland waterway. And those containers that are packed and sent under time pressure can go truck in 10 hours to Rotterdam or Antwerpen and easily meet the same ship.

Railway was not a realistic alternative. Border crossing by rail transport was, in these days, a complicated and time consuming operation. In addition, the Netherlands rail network is over the day very busy in passenger transport. Freight trains are given secondary priority, and in the end transit time of inland waterway transport between the West German industry region in the Rhine valley and the Netherlands port was not much greater than operation by rail.

Inland waterway had another advantage: The barges could directly call in the container terminals of the sea port on the waterside, while rail transport would have incurred another intermodal transfer from rail to road vehicle in the port region to make the last mile to the sea side.

Barge transport beats road transport

In consequence, the market share of rail in hinterland transport of Rotterdam and Antwerpen was rather small: In the year 2000 rail had a market share of 10 % in Antwerpen and of 13 % in Rotterdam. The main competitor of inland waterway transport war truck transport over the road, and for the first time in modern transport history inland waterway took away market shares from road transport.

But this success had its dark side: Normally a barge going downstream has some 140 to 400 TEU capacity and carries a mix of containers for various terminals in the port area. So, the barge has to go from terminal to terminal to unload a part of its containers. This is normally done by shore-side gantry cranes that are mainly installed to serve deep sea ships. This service has, of course, priority and when a barge comes in to unload some 30 containers, the barge crew may have to wait considerable time for an available crane. This is a random game: You never know how long you will have to wait for crane operation. In the end, a paramount issue of container transport, the planning and action as a full in time operation, suffers. The barges cannot keep their planned schedule, and the barge operators have possibly to hire reserve capacity to keep schedule in case of serious delays. This adds to the costs of operation.

Rhine water level

Another irregularity is created by the water level: If the Rhine has high water, the barges cannot be loaded fully with 4 tiers because they can no longer underpass the bridges over the river. If the Rhine has shallow water, the barges cannot be loaded fully because of the limited draught. This again adds to the planning and operation problems in capacity use.

These problems aggravated, and the summer 2003 gave the final blow to the growth rate of barge transport in Central Europe: This summer was extraordinarily hot and dry, the water level of the

Rhine was extreme low, and the inland waterway operators had no chance to carry all hinterland container traffic they had acquired. They had to hire costly truck transport, or they transferred the containers to rail. But only inland waterway terminals that had a railway siding on their ground could offer efficient rail transport.

The Duisburg success

This was a decisive push forward for the inland waterway port of Duisburg. Duisburg is since more than 100 years the biggest inland waterway port in Central Europe, and the Port Authority has consequently invested in logistic facilities for container traffic. The Rhine downstream of Duisburg has normally little problems with the water level. So, many operators could bring their containers to Duisburg for on-going barge transport. Another feature was a sort of hub function: Duisburg, because of its large transfer volume in containers, could concentrate containers going to a specific sea port terminal. And if a barge arrives in a sea port terminal and has not some 30 containers, but 280 containers for this terminal on board, it will be much more likely efficiently and timely served. The success story of Duisburg is remarkable: In 1990 the terminals of Duisburg transferred 110 000 TEU. 20 years later, in 2010, the totals transfer was 2 253 000 containers, and Duisburg gained the position as biggest inland terminal place in Europe.

The lesson learned in the problematic year 2003 was clear: Most inland waterway terminals in the Rhine valley installed or improved now their rail access. This had a double advantage: The terminals could offer, even in periods of limited barge capacity because of high or low water levels, efficient transport between the sea ports at the mouth of the Rhine either by barge of by rail-car.

Another advantage was that these terminals now could offer rail links to the German sea ports Bremerhaven and Hamburg. These ports cannot be served by inland waterway connection out of the Rhine valley. Now the inland terminals could offer full service to the container operator: Just bring your container into the terminal stack and decide which containers go to Hamburg and which containers go to Rotterdam. The terminal can offer efficient connections to both port sides: The German North Sea ports will be served by rail connection, and Antwerpen, Zeebrugge, Rotterdam and Amsterdam can be served by barge. An if a client for whatever reasons decides to go by rail to Rotterdam, this can be easily organised.

So, Central European inland waterway has realised the basics of successful container logistics: Reliability, flexibility, low cost transport and intermodality. The success story will continue.

Volumes of Containers in Inland Waterway Transport

Container Transport on inland waterway barges booms in Europe. Backbone of this traffic are the main rivers of Europe, Rhine and Danube. Some recent figures: