**On the right tracks**

**Sustainable transport needs to see rail become more competitive and BASF is on the case**

The city of Dusseldorf once again hosted the annual meeting of the European Chemical Transport Association (ECTA) in November. Among the presentations was fascinating insight into BASF’s physical logistics strategy, encapsulated in its Rail 4.0 project. Dr Thorsten Bieker, vice president rail & site services at BASF, outlined how the chemical giant is putting sustainability at the heart of its logistics processes.

Dr Bieker began by outlining those global mega-trends that ultimately will have an impact on numerous industries and, crucially, their supply chain and logistics operations. By 2050, some 9 billion people will live on earth, while by 2025, 67 percent of the world’s population will live in cities by 2025. These factors raise questions about guaranteeing food and water supply for everyone.

Add to the 1.2 billion cars which people will be driving on earth by 2020, and the concomitant need to reduce emissions and fuel consumption, and then it becomes clear that sustainable chemistry has a big role to play in securing a sustainable planet, he hypothesised.

**Back to basics**

To illustrate what BASF is attempting against this global background, Dr Bieker gave a case study of BASF’s Ludwigshafen chemical facility. In 2014, transport volumes inbound and outbound at this giant plant amounted to 14.9 million tonnes. Situated next to the River Rhine it is not surprising that barge movements accounted for the largest part – 40 percent, equivalent to 20 vessels a day. Road movements accounted for 33 percent (2,836 trucks a day), with rail taking up the remaining 27 percent (397 rail cars a day).

On top of this, 6.2 million tonnes of internal transport volumes were shipped around different parts of the plant, mostly by rail.

He then looked at the pros and cons of three different transport equipment types - classic rail tanks, intermodal tank containers and road tankers.

The standard rail tank has the advantages of low labour costs per tonne carried and low filling costs. It also has good public acceptance in terms of CO2 emissions per tonne/km. However, it is less appreciated by the public for its noise pollution.

The same is true, of course, for the tank container when carried on a train. But as well as the advantage of low labour costs, the tank container is more flexible in transport scheduling and time to delivery. And it has the same advantages as the road tanker when it comes to first and last mile costs, and cost of mobile equipment per tonne. But it loses some of these advantages by having relatively high filling costs.

Thus, the challenge for BASF is to leverage the potential benefits of the tank container while making it even more competitive. A key stage in this process is the development of the 45ft tank container, built by Van Hool, which BASF introduced last year (see Bulk Distributor July-August 2015).

**With 63cbm capacity and a maximum allowable weight of 75 tonnes, the 45ft tank has a loading capacity double that of a conventional tank container and comparable to that of a rail tank car. It uses the same techniques as 20ft and 30ft units. The 45ft tank containers can be used for rail transport, inland waterways and (when empty) also for road transport. Furthermore, they can be put into container depots for storage. They are also equipped with modern insulation techniques and heating systems. The new tank has a higher loading capacity in relation to its own weight compared to the rail tank wagon. Thanks to its properties of being removable from the container wagon and stackable, the 45ft tank also need less infrastructure and offers more flexibility for loading and unloading. A significant part of total transport costs in conventional rail tank transport can be saved during the movement between loading site and rail terminal as well as between the terminal and discharge site. The removable tank offers the advantages of needing fewer wagons for a given shipment. In addition, cleaning and repair can be carried out faster.

On top of these logistical advantages, further cost savings are possible in comparison to rail tanks. The annual mileage of a rail tank amounts to nearly 25,000 km, whereas that of a container wagon is 180,000 km.**

**A new container yard**

A concept being contemplated by BASF is a brand new storage area at Ludwigshafen with a capacity of 1,600 TEU. The 45ft tanks could be stacked five high using modern intermodal yard cranes. But this bulk rail port concept, which could be functional by 2025, aims to bring conventional rail and intermodal production systems together. It also has the additional benefit of allowing container interchange with river barges, which is not possible with conventional rail tank cars.

That leaves automation of first & last mile carriage to eliminate truck transports as an issue to be addressed. Dr Bieker saw this as an opportunity for conventional rail to enhance its competitive advantages and to shift even greater volumes to rail.

A concept for an automated guided vehicle (AGV) is being examined. Existing AGVs found in some maritime container terminals, for example, are not currently suitable for the new 45ft tanks because they do not have sufficient axles to spread the weight and are too high to allow access to, say, tank valves. But a new design prototype could be ready in 2017.

**Low noise**

And to complete the process, the chemical company is looking at ways of reducing the noise of the wagons to help make rail transport more publicly acceptable. The wagons are usually noisier than the locomotive so if new materials and design ideas can be applied to the wagons this would be a big step in overall noise reduction.

Already, since July 2015 all the wagons running on the BASF-operated Ludwigshafen-Steeden block train have been retrofitted with LL composite brake blocks. These ‘low noise, low friction’ brakes ensure smooth wheel tracks leading to a 10dB reduction in the noise caused by passing trains, which is perceived as a halving of overall noise.

And all BASF rail wagons will be equipped with quieter brakes by 2018, two years earlier than European rail sector target.

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