


Rotterdam, continuously investing to accommodate changing chemical supply chains



Direct vessel-to-vessel transfers, as with these barges, are key to efficient transport to the inland waterway network across Europe

It is a time of dramatic change in the global chemical supply chain. Large capital investments in new capacity for the high-volume commodity petrochemicals are concentrated around the U.S. Gulf Coast, the Middle East, and Asia. At the same time the major chemical clusters of Europe are adapting and specializing. All of this development depends upon an efficient and effective worldwide transportation and distribution network. The port of Rotterdam, the largest refining and chemical cluster and the largest container port in Europe, is the core of that global chemical supply chain.

Cargo flows are already changing, that is clear. At the same time, supply chains are becoming more specialized. Both liquid and dry chemicals that for ages have moved in drums or packages or by tanker are now being shipped in different ways, some in larger units, some in smaller, depending on what is most efficient or best suits the buyer. Amid all the customization, safety and environmental protection remain the highest priority.

Rotterdam is Europe's most competitive port and chemical cluster. That large and varied production complex has direct access to the sea with no locks. In the other direction there is direct access to waterways, rail and road network to the European hinterland. To support it all there is a full array of storage, transport, logistics, engineering, and environmental services.

Growth is as much adaptation as it is expansion, says Yvonne van der Laan, vice president industry and bulk cargo. "The chemical industry in Europe is here to stay. That is the important message. The world

is changing rapidly and it is our focus to help the European and global chemical industry – and their supply chain - become more efficient and sustainable."

Fast, Reliable, and Safe

Rotterdam sets the standard for smooth handling flows and therefore for a reliable supply chain that complies with the very highest safety standards. Since 2011 the port's infrastructure has been rated as #1 in the world by the World Economic Forum. In contrast to some other ports, the total berth capacity, including lay-by berths, prevents vessels from having to go back off shore to wait. That eliminates unnecessary traffic.

Coordinating chemical shipments is a challenge for all ports. With direct maritime access the port of Rotterdam has a natural advantage in efficiency for moving vessels in and out. Rotterdam, however, is not resting on this natural advantage. The challenges that come with handling of parcel tankers are specific. Loading and unloading at multiple producers and terminals as well as stop overs for cleaning and resupply ask for a lot of coordination. The new system called Port Call Optimization collects and shares dynamic data for all these port calls to improve scheduling. Next to that it collects and shares static data such as time and tides to allow traders and marine operators to load vessels based on actual reliable depth and restrictions.

"The goal is to reduce every vessel's time in the port even more," says van der Laan "To get them in and out as quickly and efficiently as possible."

Rotterdam: strength of extensive and integrated petrochemical cluster combined with global container hub



The Port Call Optimization trials are underway through the end of the year in collaboration with chemical customers of the port and their terminals. Cloud-based user interfaces, including dashboards, and prediction algorithms have already been completed.

It might seem that a big effort to improve efficiency can only go so far, and that there is only limited competition among ports. After all, a chemical plant can't be moved to a different port if the service is better. But van der Laan maintains that "there are actually a lot of footloose products. We can attract new and expanded production to our port, but we can also attract shipments from elsewhere to move through here because it is the most efficient route to their final destination."

Intermodal Efficiency

One of the key performance indicators for a port is its ability to transfer its cargo smoothly to and from the hinterland. With the most extensive short-sea and hinterland connections — through barge, rail, pipeline and road to and from on the hinterland network has led to a second-to-none position for the port of Rotterdam being Europe's largest multi-modal hub. These modes are capable of smooth export and import for the more than 460 million tons of cargo that were transhipped through Rotterdam in 2016.

Van der Laan notes that 52% of all freight arrives or leaves the port by barges, largely through the Rhine River corridor connecting many of the largest European chemical clusters.

Heavy investments were recently made in a dedicated freight railway line into Germany, the Betuweroute, which is being further extended in Germany to have other major European corridors connected. In addition the widened A15 highway throughout the port area ensures a congestion-free connection to the Dutch and European highway network.

A more than 1-billion Euro investment is coming up for a new tunnel creating an extra connection between the north and south side of the port guaranteeing even more flexibility. In addition Europe's #3

airfreight hub, Schiphol, is within a one hour drive. Altogether it is ensured that chemical freight flows smoothly from end to end.

Efficiency on the waterside is of course also key for the performance of a port. With a total quay length of 76.3 km, and more than 100 jetties there is ample space for the handling of about 30,000 sea-going vessels and 105,000 inland vessels each year. Still the Port of Rotterdam has recently been investing heavily in extra dolphins and buoys, creating mooring points that allow ships or barges to transfer directly to other vessels. Lightering can be a big advantage to make the supply chain more efficient.

With infrastructure network and connections on a high-quality level, efficient use is just as important. In that, information exchange, digitization, and adequate processes are crucial.

Port of Rotterdam strongly focuses on an accelerated development of digitization. This spring the on-line orientation tool Navigate was launched. It provides a complete overview of the most efficient routes via Rotterdam by deepsea, shortsea, rail or barge. It includes transit time, empty depot locations, and logistics companies to partner up with. With 'Rotterdam Logistics Lab', the Port of Rotterdam creates an ecosystem where data can be exchanged real-time via pilot projects together with market partners, so called 'coalition of the willing.'

Flexibility and Choice

"We believe in the strength of our extensive and integrated petrochemical cluster combined with our global container hub" explains Van der Laan. "The presence of a large number of production facilities, independent tank terminals, container handling storage & services and warehousing, offers advantages of scale, choice and cost."

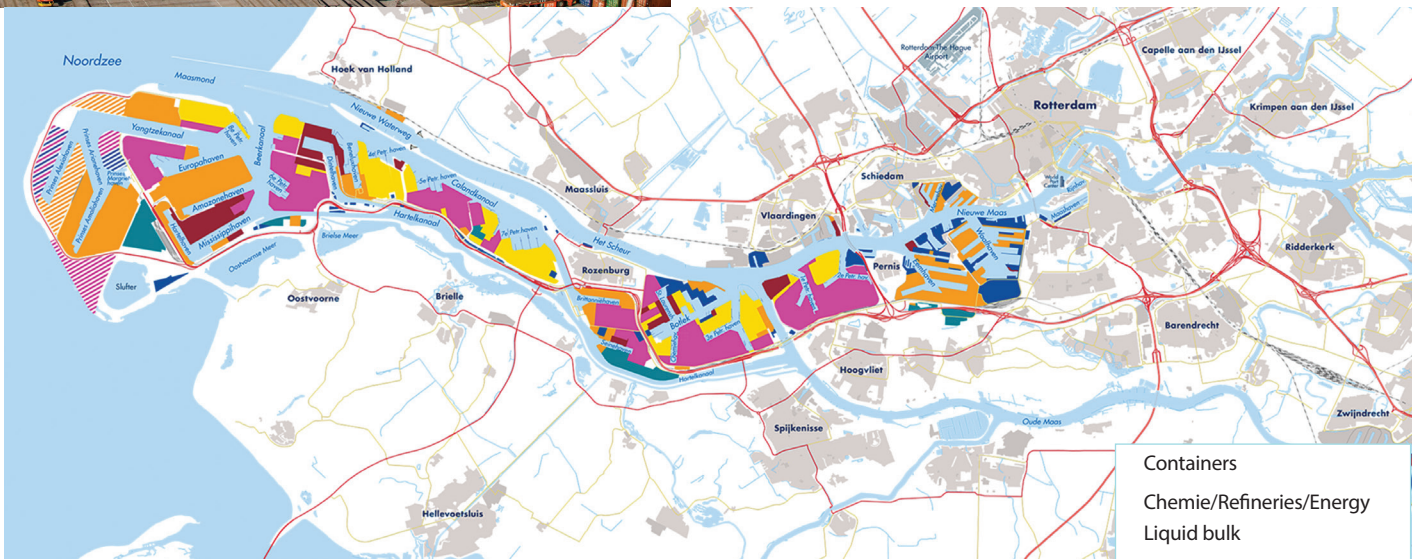
There are 122 different industrial sites in the port of Rotterdam creating a massive oil and petrochemical cluster. The historical basis for this cluster is the position of Rotterdam being Europe's all-time refining



Yvonne van der Laan, vice president industry and bulk cargo.

Given most extensive shortsea and hinterland network all destinations on arm's length.

Rotterdam has long been the largest refining center, and the largest container port in Europe. That synergy offers advantages of scale, choice and cost.



hub that over decades grew to an extensive and complex petrochemical industry extending to specialty and performance chemicals. About 50% of the total 460 million transshipments in the port are liquid goods generated by this large industrial cluster. This means ample capacity for handling and distribution must be available at competitive pricing. The large array of industrial service providers give clients wide-ranging options and flexibility, allowing them to profit from cost benefits and high levels of efficiency.

An example of how is dealt with the changing needs of the chemical industry supply chain can be found in the way terminal operators at the port have been investing and expanding. "Mostly that new capacity has been in smaller and often stainless steel tanks to capture more of the intermediate and specialty flows," says van der Laan. "That is something that may not be so visible with most attention on the big tanks for the refining and petrochemical segments."

More Land, More Options

The Port of Rotterdam owns all the land at the port, and leases it to tenant producers and service companies. That means all operations are commercial, not governmental. History proves that Port of Rotterdam is prepared to invest heavily in new land if necessary for commercial development. In the 1970's the first land reclaimed from the sea called Maasvlakte 1 became available. Recently the first operations on new reclaimed land from a second project, Maasvlakte 2, started. Initial operations on this 2nd Maasvlakte are the two most-advanced, fully automated container terminals worldwide. They are situated at berths with a draft of 19 meters making these the only European terminals that can handle the latest generation container vessels carrying up to 21,000 twenty-foot equivalent units (TEU).

"That was just in time," says van der Laan "Now that we see volumes strongly increasing after the financial crisis; in the first half

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Intermodal tank containers are a growth sector for Rotterdam: they are about 1% of the world container fleet but about 5% of container traffic in Rotterdam.



Barge loading at a liquid jetty in the port.

of 2017 we increased our market share in European container business from 29% to 30.9%."

Rotterdam's unrestricted nautical access directly to the sea make it the preferred European port for deep-sea liner services. "We are often the first port of call or the last port of call in northwest Europe because those big vessels can arrive or depart fully laden, saving a few days sailing time for import or export," van der Laan explains.

Despite already being the largest container port in Europe, the capacity of the container port has significantly increased, and will be an essential cog in the polymer chemical supply chain. The major commodity polymers are an important box-container cargo. The vast majority of global trade in polymers is in 25-kg bags stacked on pallets and loaded into box containers. About 623,000 TEU containing polymers were imported into Europe in 2016, according to data from the Seabury Group. That represents an average annual growth of 5.5% from 2000. Plans are underway to complement this growth with a new polymer storage and handling facility at the Maasvlakte complex. The Rotterdam Polymer Hub will be close to the deep-sea container terminals.

Within the overall chemical container market, the tank-container segment has about 400,000 units in commerce worldwide, which is about 1.2% of the overall container fleet. With an average growth of

11.4% per year from 2007 to 2015 tank containers now account for 5.1% of total container business in the port of Rotterdam, proving the increasing importance of an efficient container port for the chemical industry. "We expect our tank container volume to double in the next 10 years," says van der Laan. "It is an area of concentration for us."

While tankers and terminals tend to get much of the attention in the chemical supply chain, it is the humble warehouse that is at the center of much that is new and exciting in logistics. There are about half a million square meters of warehouse development going on in and around the port of Rotterdam. Of that, two fifths are being developed primarily for chemicals, including specialized facilities for dangerous goods.

The big new warehouse space will allow both producers and service companies in the port to pursue larger-scale supply-chain efficiencies, including services like blending, packaging, labeling and distribution. In addition to the present warehouse development the Port of Rotterdam is developing a new distribution park of more than 100 hectares.

Optimal Business Climate

In Rotterdam 175,000 highly-qualified professionals are ready to tackle every conceivable job. Room for growth is being provided by Port of Rotterdam, supported by an extensive network of service providers in the wider port area. There are clear and transparent agreements with official authorities and tax benefits such as deferred VAT payment and low corporate tax. "These conditions clearly contribute to a very positive and well perceived business climate for the port area," says van der Laan. "We know that the cooperation within the cluster between commercial businesses and governmental bodies really can make a difference."

One example is the MultiCore pipeline system, in operation since 2005. Vopak and Port of Rotterdam invested in a bundle of pipelines throughout the port area, making integration between companies by pipeline possible without their capital investment. In addition to getting access to the safest mode of transport, the option to outsource pipeline transportation meant companies did not have to invest in their own pipelines.

The current focus on energy efficiency within the industry opens up new forms of cooperation in pipelines. Many parties within the Rotterdam cluster work together to enhance systems for steam integration between production companies. There is also heat exchange from industry to urban areas and greenhouses. Pipelines again are crucial infrastructures to make this happen enabling energy cost dilution.

This type of cooperation is also happening for containers. Presently Port of Rotterdam cooperates with all container terminals to optimize the exchange of containers between the different terminals in the port area, guaranteeing efficient logistics between the maritime and hinterland modes. This ranges from agreements with Dutch Customs for fewer administrative procedures to a port rail shuttle connecting all terminals and for the longer term a dedicated closed transport system: Container Exchange Route.

In Short

It would seem that one port cannot be both closest to the sea and closest to the hinterland, but Rotterdam is. The natural location is next to deep water, and the extensive infrastructure make it the fastest route among producers and markets throughout Europe. Close cooperation among the port, industry, and services ensure that Rotterdam will retain its place as the premier chemical manufacturing, transportation, and logistics hub in Europe.