

## Smoothing ship turnarounds

**Terminal inadequacies, port constraints and charterer preferences are preventing the sophisticated cargo-handling capabilities of modern chemical tankers from being fully used. The resultant slow port turnarounds entail additional costs for the entire chemical industry**

Few would dispute the fact that modern chemical parcel tankers have cargo-handling capabilities far in excess of those possessed by the bulk liquid storage terminals that serve them. The latest generation of ships has the ability to carry upwards of 50 different cargoes in a fully segregated manner on each voyage; to load and/or discharge up to 14 cargoes simultaneously; and to route cargo vapours generated during cargo transfer operations through as many as six separate lines.

Because no terminal is equipped to match that capability, no terminal is able to get the best out of what these ships have to offer. In fact, the majority of terminals fall well short of the capabilities of chemical tankers, with the result that significant amounts of ship time are wasted in ports.

Parcel tanker owners also point out that restrictive harbour regulations and poor logistics planning in many of the major petrochemical hub ports similarly serve to compromise the ability of their ships. If these ship/shore interface inefficiencies could be minimised, say the owners, improved product flows would result, to the benefit of all those in the logistics chain, not least charterers.

### Shipboard capabilities

"Our Innovation-class of ten 37,500 dwt deepsea chemical parcel tankers, built during the latter half of the 1990s, has the ability to handle up to 1,000 tonnes per hour (tph), involving as many as 14 cargoes simultaneously," states Reg Lee, CEO of the Stolt-Nielsen Transportation Group. "Thus, for a theoretical 48-hour port visit to Houston or Rotterdam, say, one of our ships could discharge 28,000 tonnes of cargo and load 20,000 tonnes.

"Ten years ago, when we were designing these ships, Stolt had a vision of such 48-hour port turnarounds, complete with high cargo-handling rates, simultaneous loading and discharge and only minimal hindrance from cargo surveyors. Over the past decade major investments have been made in the ships and their backup systems with the aim of improving the efficiency of moving ships in and out of ports. Unfortunately, as far as port turnarounds are concerned, reality has turned out to be far different from the theory."

### Single berth concept

As well as providing ships with impressive cargo-handling attributes, shipowners looked to the concept of single berths as the other essential ingredient for improved port turnaround times. In single berth operations the shipowner cooperates with charterers and terminal operators to consolidate all cargo handling at one chemical tanker jetty within the hub port. Again, however, the theory of a single berth has not been achieved in practice, not least due to the difficulties in aligning the priorities of the three principal players.

Although chemical traffic through the major ports has increased by well over 50 per cent over the past decade, very few new berths have been built. Also, not many terminals are equipped to handle coastal tankers, barges and rail tank cars at the same time as products are being pumped between deepsea tankers and shore tanks. Because of the lack of pipeline access to all docks and inadequate numbers of crossover lines between docks, parcel tankers usually have to be moved between several berths at the same terminal.

It is also still necessary to visit a number of different storage terminals within the hub port because shippers are reluctant to consolidate their products at a single terminal location. Charterers still look to achieve savings in storage costs by scattering their products amongst a number of installations.

Aside from the commercial and technical stumbling blocks to single berths, parcel carrier turnarounds in port can also be slowed by waiting for petroleum product tankers to clear berths serving both oil and chemical storage tanks and the despatch of cargo samples to offsite laboratories for testing.

### **Theory and practice**

Stolt has analysed the recent performance of its ships at the two principal chemical tanker hubs worldwide - Rotterdam and the Texas Gulf ports. Chemical tankers visiting Rotterdam achieve 244 tph while in the Texas Gulf only 105 tph is possible, primarily due to the congestion in Houston. Obviously, both figures fall well short of the 1,000 tph originally envisaged for the Innovation-class ships.

Of the two hubs, Rotterdam can handle ships more quickly but even here the current average port turnaround time for a Stolt tanker is 206 hours, and rarely can more than three or four grades of cargo be handled at a time.

"In the Texas Gulf ports our current average delay per berth visit is 12.9 hours versus 6.1 hours in 1990," continues Reg Lee. "Our total annual cost of Texas Gulf ship calls is approximately \$49.5m. This figure includes 725 days of delay."

### **In-house terminals**

Stolt-Nielsen is not alone amongst parcel carrier operators in experiencing low levels of port turnaround efficiency. Odfjell built its Baytank terminal on a greenfield site near the mouth of the Houston Ship Channel in the 1980s to consolidate as much Houston cargo as possible at a single facility. While Baytank has been successful in this role over the past decade, Odfjell ships are often required to call at a number of other terminals further up the Houston Ship Channel on their visits to the port.

The use of in-house terminals is helping shipowners to achieve greater port efficiencies. The Odfjell strategy, for example, is to have storage facilities at the major chemical distribution centres to interface with its global Odfjell ChemLog shipping operations. The company also owns the largest storage terminal in Rotterdam and holds a stake in facilities in Singapore, China (two terminals) and Korea.

Odfjell's presence in Korea involves a 55 per cent shareholding in the Onsan Tank Terminal (OTT) which entered into service this past April. The company has earmarked OTT as a petrochemical distribution and transshipment hub for North East Asia.

The Odfjell terminal in Rotterdam is the former Vopak Botlek installation, acquired in 2000. The facility boasts 300 storage tanks totalling 1,520,000 cu m, making it the largest bulk liquids tank farm in Europe. It is also a terminal that requires upgrading in order to optimise the supply chain opportunities offered by modern parcel tankers.

"We have launched a \$200m, 10-year investment programme aimed at improving the cargo-handling potential of our terminal," reports Zeger van Asch van Wijck, CEO of Odfjell Botlek BV in Rotterdam. "Amongst other things, we will provide more piggyback, stainless steel lines and increased pump rates. In addition, we will add at least one new ship jetty to the four ship and 11 barge jetties already in place."

### **Stolt in the Gulf**

Stolt also controls, either wholly or partly, several strategically located storage terminals worldwide. The portfolio includes the Stolthaven terminal on the Houston Ship Channel but that facility handles only part of the ship operator's extensive US Gulf traffic volume. Also, it is situated well up the Ship Channel and subject to the

same infrastructure restrictions as those faced by the many bulk liquid terminals situated along this busy Texas waterway.

Following the example of Odfjell with its Baytank terminal at the mouth of the Houston Ship Channel, Stolt has recently built its own new terminal at a greenfield site well-positioned to handle US Gulf Coast imports and exports. The new terminal is in Braithwaite, Louisiana on the Lower Mississippi River at a congestion-free location which is also well-served by rail, road and barge connections.

"Although Braithwaite, Louisiana will help improve the overall port turnaround performance of our ships in the US Gulf, the global movement of chemicals will continue to rely, in the main, on independent terminal operators and independent shipowners," explains Reg Lee. "It is important that we work together, along with the terminals, port service organisations and our customers to weed out the bottlenecks."

### **The role of ports**

Port rivalry also has a role to play in advancing the cause of smoother, more rapid chemical tanker turnarounds. For example, the intense competition between Antwerp and Rotterdam for bulk chemical traffic is spurring a review of controls and systems in Rotterdam, the world's leading chemical port with an annual traffic of 25 million tonnes of chemical products.

Electronic data interchange has been identified as one way in which chemical logistics in the port can be further improved, most notably with the new PortInfo. The system is being tested to study how berth availability at Rotterdam's eight bulk liquids terminals can best be matched with the cargo discharge and loading requirements of individual ships.

In addition, a recent review of the Rotterdam Port Authority (RPA) regulatory controls for chemical tankers has shown that a number of unnecessary restrictions are in place, and that there is a lack of incentives to invest in quality operations. As a result, RPA has launched an initiative to encourage the use of new technologies in order to achieve a better balance between operational procedures and operational capabilities at the ship/shore interface. Backing up this initiative, the promulgation of updated port regulations is under consideration.

### **Turnaround time**

The cost of operating a chemical tanker is in the order of \$1,000 per hour. Although shipowners carry most of the upfront costs incurred as a result of delays caused by ship/shore interface inefficiencies, there is a growing realisation that these inefficiencies carry hidden costs and increase the price of transportation across the board.

The new awareness is at last being translated into action. At one level, individual logistics service providers are improving in-house efficiencies through strategic terminal investments. However, the most important improvements will only come as a result of industry-wide cooperation on a number of fronts.