A brief history of transport infrastructure in South Africa up to the end of the 20th century

Chapter 5: Ports and Pipelines

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HARBOUR INFRASTRUCTURE

Chapter 2 of this series described the early days of the development of port infrastructure in South Africa up to the Second World War, which ended in 1945. At the end of the war the primary South African harbours were Durban, Cape Town, Port Elizabeth, East London and Walvis Bay. During the preceding 50 or more years they all had their entrances made navigable for the large ocean-going vessels operating at the time, and for the next fifty or so years enjoyed regular improvements in infrastructure, both on the seaward and landward sides, in an attempt to keep pace with developments and size increases in ocean-going vessels, as well as increased trade, embracing *inter alia* an improved and new method of conveying general freight, namely containerisation.

Apart from this continuing upgrading of the major national ports in the country, a new port was developed at Richards Bay, the fishing harbour at Saldanha was increased in size to accommodate vessels conveying iron ore from the Sishen mines to overseas markets, as well as metal concentrates, and towards the end of the 20th century the construction of a new deep-water port at Ngqura (Coega) in the Eastern Cape, adjacent to Port Elizabeth, was completed.

Policy regarding which harbours should be developed, however, does not appear to have been well thought out. It seems that during the past 50 or so years, the harbour authorities have merely attempted to match infrastructure at all South African harbours, with demand, rather than analysing the overall logistical approach to the handling of imports and exports. The Moving South Africa (MSA) Strategic Transport Study has suggested a "hub and spoke" approach to the development of port facilities in the country. The proposal envisages two deep-water hub ports for the country, one east-facing and one west-facing, with coastal "feeder shipping" serving the remaining ports. This suggestion, however, seems to be in limbo.

RICHARDS BAY

For many decades during the earlier part of the 20th century thought had been given to the possibility of a new harbour, north of Durban, to service the hinterland. The first recorded investigation into the concept was carried out in 1902 when CW Methven, then harbour engineer in Durban, examined the suitability of Richards Bay for this purpose. Various other studies were carried out until 1965, when a final decision was

taken to develop Richards Bay as a deep-water harbour. This was seen as a long-term project. However, with the decision in 1970 to export more than 100 million tons of coal from the then Eastern Transvaal coalfields to Japan, the project assumed a high priority.

This harbour was designed as a bulk deep-water export harbour by a consortium of six international firms, one of which had played an important role in the building of a new harbour at Rotterdam in Holland. Work started on the site in 1972 and by August 1973 five suction dredgers were operating in the lagoon. Work proceeded in accordance with a programme that embraced completion of two export coal berths on the north side of the harbour by 1977. The cost of this first stage development was estimated at some R150 million at the time. The port now has five privately operated berths, as well as the largest single coal terminal in the world. Its entrance is 22 metres in width and berth depth varies from 12.8 to 19.0 metres.

SALDANHA

Situated on the west coast of Africa, 60 nautical miles north of Cape Town, the port of Saldanha is the deepest and largest port in southern Africa, originally constructed during the early 1970s to facilitate the export of iron ore. Bulk crude oil and break-bulk terminals were subsequently added to the facilities in the port.

The port serves the iron ore mines (some 860 km northeast of Saldanha), base metal mines, an adjacent heavy minerals smelter, and the crude storage facility near the port. Port facilities consist of a 990 m long jetty with two iron berths and one crude oil berth. In addition, a 250 m general cargo quay facilitates break-bulk cargo handling.

The depth of the navigation channel seawards of the jetty is 23 metres, whilst there is also a turning basin seaward of the jetty with a diameter of 580 metres and a depth of 232 metres. The width of the main entrance channel at its narrowest point is approximately 400 metres. An unfortunate characteristic of this harbour, however, is that weather and sea conditions often create excessive surging.

NGQURA (COEGA)

After several years of discussion, government finally resolved to commence with the construction of a new deep-water port at Ngqura (Coega) near Port Elizabeth. Construction of this facility commenced early in the new millennium and in 2004 the basin of the new port was opened to the sea.

The new port, which forms the key element of the Coega Industrial Development Zone, is designed to serve as deep-water port on South Africa's south-eastern coast, with the hope that it will serve as a container hub with feeder services operating to other ports.

This new port was planned to initially have five berths, two for container ships of up to 4 500 TEU (ton equivalent units) capacity, two dry bulk berths, and one wet bulk (tanker) berth.

It was hoped that the port would also attract an aluminium smelter to the area. However, consideration needs to be given to the hostile coastline and dangerous approaches for large vessels into the harbour before assessing its acceptance for commercial shipping. As was the case in Richards Bay, the final draught could only be ascertained on completion of the harbour.

DURBAN

In the early days the development of Durban as a thriving city and industrial centre was closely linked to the development of the port of Durban. The development of the port, on the other hand, was closely linked to solving the problem of the infamous barrier to the harbour – the sand bar at its entrance.

Whilst Durban was the last of the early port cities to be linked to the industrial heartland of the country, it is at the turn of the century by far the most important port in the country for the import and export of goods (excluding coal and iron ore).

At the start of the mid-fifties the port of Durban was comfortably accepting the largest ocean-going vessels plying their trade with this country and possessed the corresponding landside facilities to handle the freight and passenger traffic demand. Sheds were added after the Second World War and construction of the large Ocean Terminal Building was commenced in 1957 and completed in 1962. This building, however, turned out to be a white elephant because of the ending of the era of mail ships, within a relatively short time after the construction of the terminal, and the rapid growth in air transport for passenger traffic. The building was converted into the headquarters of the National Ports Authority in Durban.

With the growth in freight traffic, work commenced in 1965 on the conversion of Salisbury and Farewell Islands, as well as the area embracing the mangrove swamps, into a new deep-water general cargo pier. Within a decade work was also begun on constructing what remained of the mangrove swamps into a container terminal to meet the demand for a more efficient form of cargo handling. This work was completed in 1977, and since

then the eight container berths have played an increasing role in maintaining Durban's position as the principal port of South Africa. At the end of the century the terminal handled 1.5 million TEUs – about 65% of the country's total.

The challenges set by container handling and increasing vessel sizes, as well as growth in traffic, have set the scene for the next phase in the development of infrastructure in the port, due for completion within the early years of the 21st century. Unfortunately the landside facilities for road and rail transport have not kept pace with the growth in traffic, often leading to severe congestion or delays in the port. A particular problem is the looming inability of the two-track railway line alongside the Victoria Embankment to handle the large motor car export traffic volumes and the consequent major road traffic disruption if this freight were to be conveyed by road along the Victoria Embankment. The National Ports Authority, in conjunction with the other relevant authorities, is addressing these problems. Proposals are also being discussed for increasing the capacity of the port, as well as increasing the draught at some of the current deep-water berths, which are becoming progressively shallower. These investigations also include a new "dug out" harbour incorporating land currently occupied by the Durban International Airport.

SOUTH AFRICA'S OTHER PORTS

Development at the other major ports in the country, Cape Town, Port Elizabeth and East London, have paralleled that in Durban during the past 50 or so years, albeit on a lesser scale. In Cape Town a large container terminal has also been constructed. It is, however, possible that Port Elizabeth harbour will suffer a significant reduction in importance with the construction of the new port under construction at Ngqura.

Unfortunately it has not been possible to access information for these three ports to the same depth as that for Durban, and possible sources would be welcomed.

In addition, there are two inland "ports" or rather "port facilities", namely the container terminals at Pretcor in Pretoria and at City Deep in Johannesburg. These two facilities opened in 1990 and 1977 respectively, operating as custom enfranchised inland terminals for the import and export of containers.

PIPELINE INFRASTRUCTURE

Pipeline infrastructure for the conveyance of petroleum products, of approximately 3 000 km in length at the turn of the century, was first introduced into South Africa during the mid-sixties by the then South African Railways & Harbours Administration (SAR&H). In terms of the Bill, which had its first reading in Parliament in 1963, the agency was required, "wherever practicable, to place the pipeline at least 1.5 metres below the surface of the ground and to leave the site on which any work has been carried out, as nearly as possible, in the condition it was before."

The two primary reasons for the provision of pipelines for the transport of these products were that rail could not handle the demand at that stage (the conveyance of goods

by roads was strictly regulated), and secondly, the conversion at the time of the Natref inland refinery from a coal to a crude oil base. Back in the early 1960s, with South Africa's economy expanding rapidly and the oil industry forecasting an annual 12% growth in the demand for petroleum products, it became evident that the rail link from Lourenço Marques (now Maputo) in Mozambique and from Durban would soon be unable to meet the demands of imports and exports. After considering various alternatives, the government of the day decided to lay a pipeline from Durban to the Reef to convey the petroleum products, thereby relieving the pressure on the rail system. The government recognised not only the strategic importance of this project, but also the economic necessity of transporting fuel by pipeline.

This first pipeline was originally planned by industry, but was later constructed, operated and financed by government. The 12-inch (300 mm) diameter pipeline, with a capacity of 430 cubic metres per hour, was constructed at a cost of approximately R20 million (at the time) and was routed from Durban via Pietermaritzburg, Ladysmith, Bethlehem, Kroonstad, Sasolburg, and Alberton to Pretoria. At each of these points depots for the "drawing off" of products were constructed.

The original pipeline, which was to transport both crude oil and multi-petroleum products, was not very successful in its operation, and this fact, combined with the government's desire at the time to stockpile crude oil against a possible oil boycott of South Africa, led to the decision by the SAR&H to construct a second and primarily crude oil pipeline to transport crude oil, landed at the coast to both the inland Natref refinery at Sasolburg, and also to storage in disused underground mines. This eighteen-inch (450 mm) diameter pipeline was routed from Durban to Empangeni (with a spur to Richards Bay), over the Drakensberg at Kwaggas Nek to the Natref refinery at Sasolburg, and on to Kendal and Ogies for storage of the crude oil in underground mines.

The pipeline was commissioned in 1969 and operated very successfully, incorporating state-of-the-art technology with remote control operation. A great deal of crude oil was eventually stored underground; its construction cost was of the order of R50 million in 1970 rand values. The spur to Richards Bay was based on the supposition at the time that the Richards Bay harbour was also to be used to berth crude oil tankers. The pricing regime was such that the refinery was charged for transportation by the pipeline at coastal prices.

The next phase in the development of pipeline infrastructure was dictated by the need for a distribution network for petroleum products. To accomplish this, the existing 12-inch (300 mm) pipeline was extended to provide a distribution network to places such as Klerksdorp, Potchefstroom and Langlaagte.

This third pipeline, however, became almost redundant at an early stage of its life, because of the opening of the new oil-from-coal plants at Secunda, Sasol I and II.

During 1995 Petronet, in line with its vision to be the national gas transporter of choice in southern Africa, decided to reconfigure and convert sections of the existing network to allow for the transportation of methane-rich gas (MRG) from Secunda to KwaZulu-Natal, with possible link-up to, amongst others, Pande gas from Mozambique in the future. Over the past 30 years many modifications have been made to the existing system, which now consists of three lines, one for fuel (refined products), one for crude oil, and another for gas, which run from Secunda to the coast. A dedicated 150 mm diameter line transports aviation fuel, Avtur, from the Natref refinery at Coalbrook to the Johannesburg International Airport (now OR Tambo).

This aspect brings home the fact that it is possible to address one of the supposed disadvantages of pipeline infrastructure, namely its inflexibility to adapt to changing circumstances. Whilst it generally has low operating costs, with a high development cost, it does not generally easily adapt to changes in distribution or supply patterns. However, for well-defined and uniform flow volumes it can be very successful and for many years has been the prime financial performer in the Transnet stable of companies.

The pricing regime, or tariff issue, for pipelines in South Africa has regularly come to the fore in respect of competition with the rail and road modes, and has been the subject of much debate.

The history of Petronet is entwined in a "tariff-tangle", with Petronet continually endeavouring to justify the tariffs charged. Shortly after the first project was launched the tariff vs cross-subsidisation controversy began. This debate has continued for a few decades with the rail and road modes of transport complaining about "unfair competition". Since 1987 pipeline tariffs have been calculated and fixed independently to that of rail and are about 25% below that of rail, on routes where both modes of transport operate.

At the turn of the century approximately 16 billion litres of petroleum products are transported annually via the Petronet pipelines. ◻

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