The Tuticorin Coal Terminals

Features of an Unloading Facility for TNEB's Power Plants

B.V. Sambashivan, India

In Tuticorin, India, Tamil Nandu Electricity Board operates a five-units coal fired power plant, that receive coal via rail and sea route. Although shore-mounted continuous unloading systems were also considered during the development of the terminals, geared vessels with mounted grab unloaders made the race.

Tamil Nadu Electricity Board have installed five Units of 210 MW capacity since the 1970s in Tuticorin which is on the Tamil Nadu coast. The first three units came up around the early 1980s and the units no. 4 and 5 were installed in mid 1990s. All the five units receive coal from Talchar and other mines in the state of Orrisa in India. Coal movement from the mines to the power station is through rail and sea route. Two coal terminals are installed for the purpose.

Old Tuticorin Port

Old Tuticorin Port is situated on the East Cost of India about 540 kilometres South West of Madras. Located in the Gulf of Mannar with Sri Lanka on the South East and the large land mass of India on the West. Tuticorin Port is well sheltered from the fury of storms and cyclonic winds. It is strategically located very close to the major international sea routes. This port is a port in operation since 1848 and is essentially a cargo port.

Power Plant Terminals

When Tamil Nandu Electricity Board (TNEB) planned the first three Units in the mid 1970s, the coal was to be sourced from Bengal Behar mines from where the coal was to be moved through sea and rail route. The old Tuticorin port was not found suitable to handle the traffic and hence TNEB decided to develop a coal terminal near the power plant site. The work of development of the coal terminal was done by the Port Trust of India.

In the early 1980s, TNEB decided to expand the power station by adding two more units. Hence a second terminal was also to be developed. The power plant development was in two stages and so the port development was also in two stages. In the first stage a terminal with an average throughput of about 3 million tonnes of coal per year was constructed in the mid 1970s and the second terminal also of similar throughput was constructed in the mid 1990s to cater for the final two units which were installed in the second stage of development.

Both the berths are located close to the power plant which is about 5 kilometres away from the terminals. The old port is far away and transportation inside Tuticorin would have been difficult.

Two coal terminals at the Tuticorin Port receive the coal for TNEB's power plant.

Features of Terminals

Two break waters (north and south) have been erected to still the waters and enable the free navigation of ships with a suitable turning circle. The draft available is about 10 to 15 metres and ships of 35 000 to 50 000 dwt capacity can call at these terminals. The unloading berths are 235 metres long and 15.5 metres wide.

Both the berths have single berthing facility. Mooring dolphins with an inter connecting cat walk have been constructed on either side of the berths. The unloading berths are located about 200 metres apart. Each berth has an average throughput of 3 million tonnes per year.

The time required for anchoring, de-anchoring and other delays is considered as 12 hours, 2 hours for miscellaneous delays, 300 days in a year for unloading leaving 65 days for overhauling of the vessels and to allow for disruptions during inclemental whether and 60 per cent berth occupancy. Ships will call at the terminals at regular intervals without bunching of ships.

The conveyors which transport the coal to the power plant are routed through the sea for most part of the distance.

Picture: Tuticorin Port Trust

The total distance of between the terminals and the power plant is covered conveyors, each having a length of maximum 1000 metres.

Coal Unloading System

When the initial studies were carried out, a number of solutions have been investigated, including such as unloading by means of shore mounted unloaders or unloading through geared vessels. The shore mounted unloaders considered included both continuous type and intermittent. However since domestic coal had to be unloaded, large size lumps and stones present in the 'as received' coal prevented adoption of continuous berth mounted unloaders. Hence it was decided to adopt intermittent unloaders of the grab bucket type.

Next, it had to be decided, whether the grab bucket unloaders should be berth-mounted or installed on geared vessels. At the end, geared vessels were adopted to optimise the cost during both stages of development. However, TNEB settled for unloading through geared vessels fitted with seven (five working plus two stand-by) grab bucket cranes which will give an aggregate free digging rate of 2000 tonnes per hour. The cranes in the ship will unload into seven (five working plus two stand-by) travelling hoppers mounted on the unloading berths below which the berth conveyor is installed.

Evacuation from Berths

Each berth has a dedicated coal conveying system of 2000 tonnes per hour capacity having a belt width of 1800 millimetres. Each of the two streams will act as stand-by to each other. Adequate stream interconnections have been provided.

The total distance of 5 kilometres between the terminals and the power plant is covered by a number of conveyors, each having a length of maximum 1000 metres. The conveyors are routed through the sea for most part of the route. Each conveyor structure is designed as a marine structure. The conveyors are supported on concrete decks to enable carrying out routine maintenance. In between junction towers also are constructed inside the sea.

The dust control system consists of plain water spray system. Water for the same is being supplied from the power plant. Adequate fire protection systems are in place to take care of fires. ■

Contact

Tata Consulting Engineers

73/1, St Marks Road,
Bangalore 560001, Karnataka, India
Tel.: + 91 (80) 662 260 00
Fax: + 91 (80) 222 748 73
E-Mail: bvsambashivan@tce.co.in