

## MORMUGAO PORT, GOA

### Background

Mormugao Port is situated on the west coast of India at the entrance of Zuari estuary in Goa state. A breakwater of 525 m length and a mole of 270 m length were completed in 1930 and a total of seven berths were in operation till 1960s. The maximum draft of the vessels that could be accommodated at the berths was limited to 8.5 m. With the opportunities for large scale export of Iron ore it was considered necessary to develop the Port for big size ore carriers of 60,000 DWT size.

### Studies Conducted

More than 80 studies were conducted since 1970 to cover the following aspects,

- Under stage-1 development in 1970s, it was proposed to dredge a 4km long approach channel to (-) 13.7 m; and construction of additional berths for iron ore export, oil berth, and a barge basin. An additional breakwater of 1000 m was proposed to provide wave protection to these berths. The CWPRS was approached to suggest suitable layout for Stage-1 development from the considerations of wave tranquility, flow conditions and siltation.
- Physical wave model (G.S.-1/100) was used to study wave tranquility conditions under the predominant incident wave conditions. Physical tidal model and mathematical models were utilized for studying hydrodynamic conditions, assessing the quantity of maintenance dredging, and location of disposal grounds.
- The challenges for the Stage-1 development were: ensuring adequate wave tranquility at the proposed berths as the port is exposed to direct waves from the Arabian Sea; assessment of the annual maintenance dredging against a capital dredging; identification of suitable locations of disposal grounds for capital as well as maintenance dredging under reversing tidal flow with prevailing wave climate.



Satellite Image Of Mormugao Port Region

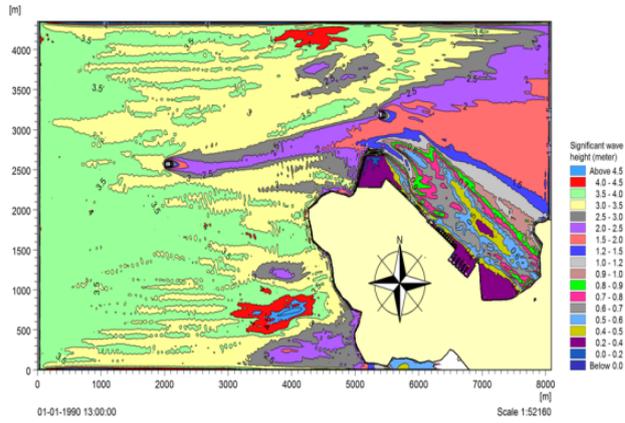


View Of Mormugao Port Wave Model

### Outcome and Benefits

- With the help of hydraulic studies at CWPRS, the ore, oil and barge basin were laid out in such a way that there was no need for additional breakwater for obtaining necessary wave tranquility at berths.
- The berths were laid along the existing water front and reclamation areas were created for storage of material and operation and, consequently, the hill cutting was avoided.
- The annual maintenance dredging was correctly assessed.





Survey records show that all disposed material is transported to the deep sea in the north and no accumulation of the same is observed.

CWPRS studies affected big savings in the project cost and eliminated recurring expenditure.

**Numerical Model results : Wave height distribution**

