

FACILITIES AND EQUIPMENTS

The Research Station is bestowed with more than adequate land space and Water Circulation System to meet the infrastructure needs for physical modelling and other laboratory development. A large fleet of trained manpower and active guidance and support from Government of India has helped in the progressive development of the CWPRS. The existing facilities in the coastal group include:

- **Random Sea Wave Flume and Diffraction Basin**

A New random wave flume 90 m long x 2 m wide and 1.5 m deep has been commissioned recently to cope up with the increasing number of projects as well as for basic research in the area of hydraulic stability of marine structures. Other flume 120 m long x 4 m wide and 2 m deep is available with a 12 m x 10 m diffraction basin. It is a computer controlled system capable of generating random waves upto 0.6 m height with frequencies varying from 0.3 to 3.0 Hz. The facility is used for testing of marine structures such as breakwaters, seawalls, jetties, platforms, pipelines, intake and outfall structures etc.



Random Sea Wave Flume

- **Regular Wave Flumes**

A set of three regular wave flumes having dimensions 40 m x 0.7 m x 1.2 m (depth), 50 m x 1.22 m x 1.8 m (depth) and 75 m x 3.0 m x 2.0 m (depth) are available in the Coastal Hydraulic Structures division for designing breakwater cross sections.



Regular Sea Wave Flume

- **Multipurpose Wave Basin Hangar**



A Multipurpose Wave Basin Hangar of size 60 m x 75 m has been developed equipped with Random Sea Wave Generation (RSWG) and multichannel Data Acquisition System (DAS). The operation of this facility is SCADA based and is used to study wave tranquillity conditions for design of Port layouts and fishing harbours. The time and cost of physical wave model studies taken up with this facility are comparable with that of mathematical model studies.



Multipurpose Wave Basin Hangar

- **Multipurpose Tidal Basin Hangar**

Multipurpose Tidal Basin Hangar of size 50 m x 70 m with computerized Automatic Tide generating (ATG) system to study the flow conditions for port development schemes under the effects of tides and river discharges is under construction and will be commissioned shortly.

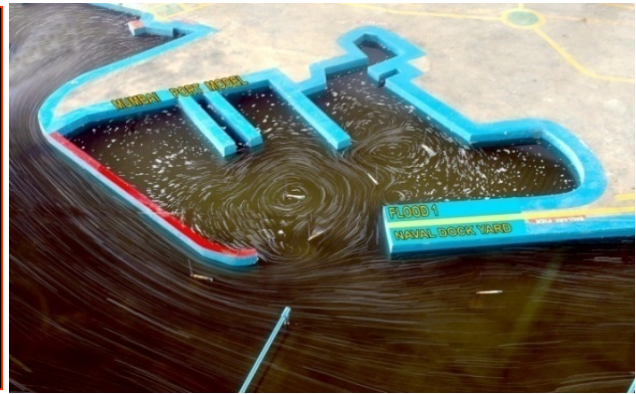
- **Thermal Basin Hangar**

Thermal Tidal Basin Hangar of size 30 m x 40 m to study the design of intake and outfalls in coastal environment for thermal and nuclear power projects is under construction and will be commissioned shortly.

- **Physical Models for Major/ Minor Ports**

At present dedicated 12 physical tidal models and 20 physical wave models and six wave cum tidal models are being maintained for specific Major/ Minor ports wherein layouts of port structures, wave tranquillity in the harbours, problems of littoral drifts and coastal sediment movement etc. could readily be studied under controlled environment using sophisticated measuring equipments connected to the computer for online data acquisition and analysis. Most of these physical model trays have been provided with hangars with random wave generators and automatic tide generating systems.





Mumbai Port Tidal Model

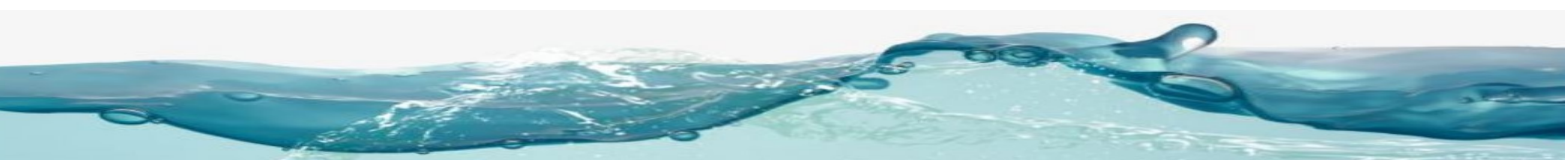


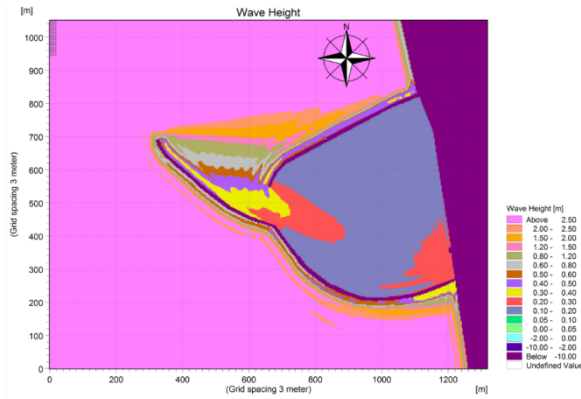
Mormugao Wave Model

- **Mathematical Models**

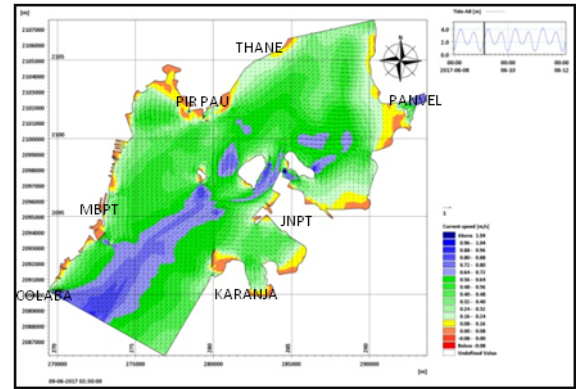
A suite of mathematical models to address various aspects related to coastal hydrodynamics, sediment transport, advection-dispersion problems of thermal circulation, pollution transport are available. The established mathematical models like MIKE-21 HD, MIKE-21 SW/BW, MIKE-21 MT/ST, MIKE-3, TELEMAC, LITPACK, EVA, MIKE -21 MA, MIKE-21 OS are being used to provide solutions to specific projects of port development and power plants for wave tranquillity, hydrodynamics, sedimentation, littoral distribution, extreme wave analysis, mooring and navigation and oil spill are available.

Mathematical models “NAVIGA” and “VERMO” developed at CWPRS are available for optimisation of channel layout and dimensions and MORMOT for ship motions and mooring line and fender forces on a ship at berth.

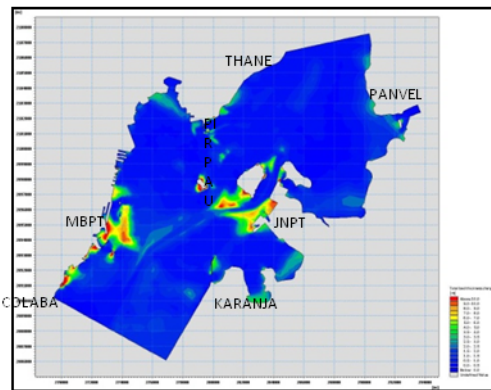




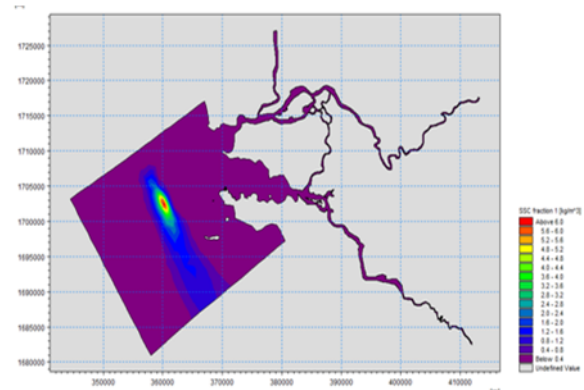
Wave Tranquility



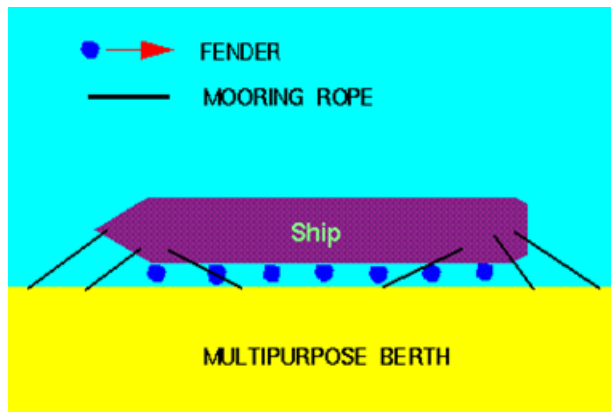
Hydrodynamics



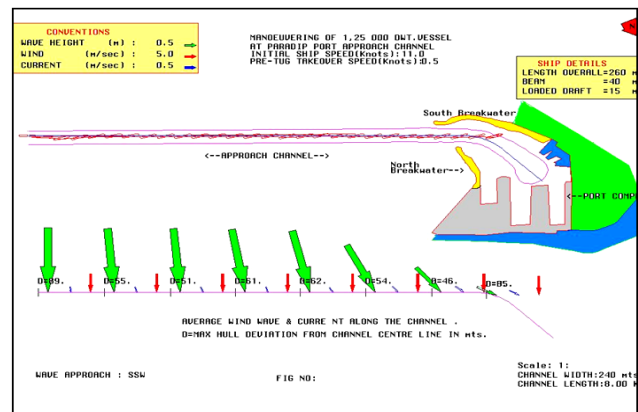
Sedimentation



Plume Movement



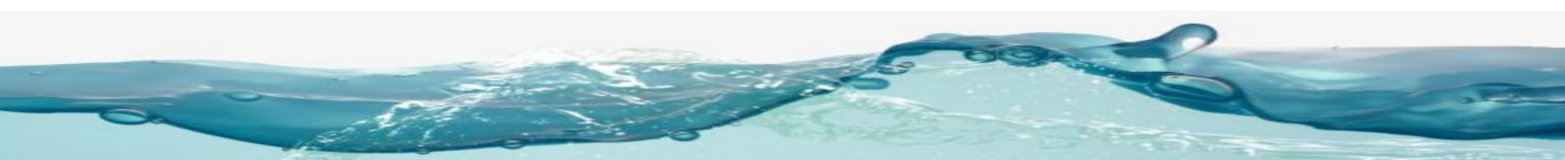
Mooring



Navigation

Field Equipments

Sophisticated field equipments such as Dutch Wave Rider Buoys, Telemetered Type Wave Height Recorder, Insitu Tide Gauges, Propeller type and Electromagnetic type Currentmeters, Salinity-Depth-Temperature unit, Bottle Samplers, Grab Samplers as well as survey and inspection equipments like Mini Ranger, Distomat, Acoustic Release System, Underwater CCTV system etc. are available at CWPRS.





Echo-sounders, Wave cum Tide Gauges Current meters



Wave Rider Buoys installation



Current meters installation



Radioactive tracer studies

- **Remote Sensing Applications Laboratory**

The remote sensing laboratory at CWPRS is used for the assessment of shoreline changes by analyzing the satellite images. The facilities include; Silicon Graphics Unix based Workstations Octane (One) & O2 (Three) and A0 size Colour Scanner, Satellite Imageries, Softwares EASI/PACE, GEOMATICA and Arc GIS.





Central Water and Power Research Station, Pune

Remote Sensing Laboratory

Satellite Imagery of Mumbai - JNPT

