## C-13: A hydrodynamic model for the western coast of Sri Lanka

P P Gunaratna[1], P Justesen[2], D S Abeysirigunawardena[1],
R M R P Ranaweera[1]
(*[1]Lanka Hydraulic Institute Ltd., John Rodrigo Mawatha, Katubedda, Moratuwa, [2]Danish Hydraulic Institute, Horsholm, Denmark*)

A hydrodynamic model spanning most of the western coast of Sri Lanka was developed. MIKE 21, 2 dimensional mathematical modelling system developed at the Danish Hydraulic Institute, was used for this purpose. The model was initially calibrated to simulate tidal flows. This required establishing appropriate boundary conditions, through a detailed ascertainment of tidal wave propagation pattern in the Indian Ocean. The calibrated tidal model was further tuned to reproduce wind driven hydrodynamnic events.

The usefulness of this model is the fact that it could be used as the primary basis in establishing hydrodynamics at any locality within it. For this purpose, it was necessary to step down through a set of sub models of increasing grid resolution. At a small grid resolution, it was possible to introduce the wave driven littoral currents through the insertion of wave radiation stress fields generated by wave modules within MIKE 21.

The hydrodynamic model was successfully applied to simulate localised phenomena at a number of locations within the western coast. In a particular application north of Colombo, currents generated due to waves overtopping a nearshore reef were reproduced by introducing artificial set of sources and sinks on either side of the reef. The accuracy of model computations could be further improved by refining its boundary conditions through the usage of additional tidal data. Furthermore, the availability of simultaneous current and wind data will be extremely useful in improving model simulation of wind induced events.