C-10: Rehabilitating a dying delta: use of mathematical models to predict river stability

Ranjit Galappatti
(Lanka Hydraulic Institute)

The South West Region of Bangladesh is a deltaic region which is fed mainly by overflows on the Right Bank of the river Ganges. The area to the north of the Sunderban forest, a large area of land has been reclaimed for agriculture and settlement in the 1960s. The consequent disruption of the tidal regime which coincided with the reduction of upstream inflows has resulted in massive drainage congestion from the 1980s. Many studies that have been carried out prove conclusively that the reduction of tidal volume has given rise to accelerated siltation. There have been many solutions proposed but no consensus was reached because tools were not available to evaluate the impacts.

It was possible to use the South West Region Model, developed at the Surface Water Modelling Centre to investigate the pre-poldering scenarios as well as the changes in flow regime which would result from the various rehabilitation scenarios proposed. Extensive field work and research was carried out to understand all the phenomena at work. Although modelling tools were available which could describe the cohesive sediment mechanics in these channels, it was not practical to apply such a detailed model to the entire region. Instead, one semi-empirical channel stability parameter based on the hydrodynamic model was developed for judging the consequence of any intervention.

The paper describes how the main development proposals were modelled and then evaluated as a part of the EIA in 1997 and how the most environmentally friendly option turned out to be the most economical.