Flood Modelling: International Accuracy Benchmark Project

In the light of worsening climate change predictions, the management of river, urban and coastal flood hazards has become an increasing concern to the international engineering community. This has led the International Association for Hydro-Environmental Engineering and Research (IAHR) to set up a new Flood Risk Management Technical Committee (FRM TC), based at the University of Iowa, USA.

Many flood simulation models are now competing to provide a basis for engineering design, but they produce quite different results, even when identical sets of field observations are used as input data. So after a flood disaster, how can forensic studies determine whether engineering designers have used valid or invalid models?

Much of the difficulty stems from a lack of consensus on how channel resistance should be described, and how widely used model parameters such as the Manning n and Darcy-Weisbach f should be determined uniquely from field observations of full scale recorded floods. Existing benchmark comparisons have tried to avoid this problem by restricting model comparisons to the use of specified arbitrary uncalibrated roughness coefficients. However observed flood behaviour cannot be guaranteed to match the response of a given model using *any* combination of parameter settings unless the validity of that model has first been established. Otherwise accurate calibration will be impossible.

Accordingly the FRM TC have announced an initiative "Creation of a benchmark dataset for development of flood models", led by Alastair Barnett, Director of HYDRA Software Ltd, New Zealand. Dr Barnett has now provided Benchmark A2, a sample observed flood dataset, with a demonstration of separate forensic validation and calibration stages of model application. The TC is now looking internationally for other volunteers to contribute field studies of flood events with sufficient intensity of observations to support comparable accuracy benchmarking over a wider range of model conditions.

Suggested types of event required:

1. Coastal storm surge into urban areas
2. Tsunami inundation
3. Flood hazards through a hydropower or water supply reservoir
4. Dambreak wave modelling
5. Flood routing management through stormwater systems
6. Control gate operations and application of flood rules
7. Laboratory model studies, including large scales up to 1:1

Proposed forthcoming activities for contributors:

- Critically review the draft sample Benchmark A2
- Assess the validity, calibration and accuracy of some existing models against Benchmark A2
- Agree on the necessary steps for creation of an FRM TC benchmark data depository
- Volunteer a comparable Benchmark dataset for similar review by the wider group