



HR Wallingford  
*Working with water*

## Engineering hydraulics

Specialist advice for cost-effective designs



## Engineering hydraulics

HR Wallingford has world leading expertise in engineering hydraulics. Our specialists in the fields of river engineering and drainage use a range of methods to assess and optimise hydraulic structures, from desk assessments and CFD studies through to large scale physical models.

Many of our staff are internationally recognised experts who have been involved in the development of guidelines and design formulae adopted throughout the world. Our consultancy services are underpinned by a programme of applied research, allowing HR Wallingford to deliver leading-edge solutions to our clients.



### Hydraulic structures

We carry out free-standing scale model studies as well as computational fluid dynamics (CFD) modelling and desk-based analysis of complex and non-standard structures such as large pumping stations, curved or gated weirs, water intakes, drop structures, outfalls, spillways, bridge piers and gauging and flow control structures. These are used to:

- > Improve design concepts or check existing design or constructional flows
- > Provide three-dimensional understanding of structure, flow and ground interaction
- > Determine rating curves (flow rate versus head curves)
- > Optimise operating gate rules
- > Assess efficacy of energy dissipation measures
- > Evaluate erosion potential and design protection of bed and banks
- > Develop guidance for standards and best practice manuals

### Flow metering devices

Our 25 m long by 2.4 m wide general purpose flume includes a volumetric flow measuring system accurate to  $\pm 0.2$  per cent. This provides the highest level of accuracy for calibration and certification of flow metering devices and for hydrometric studies.

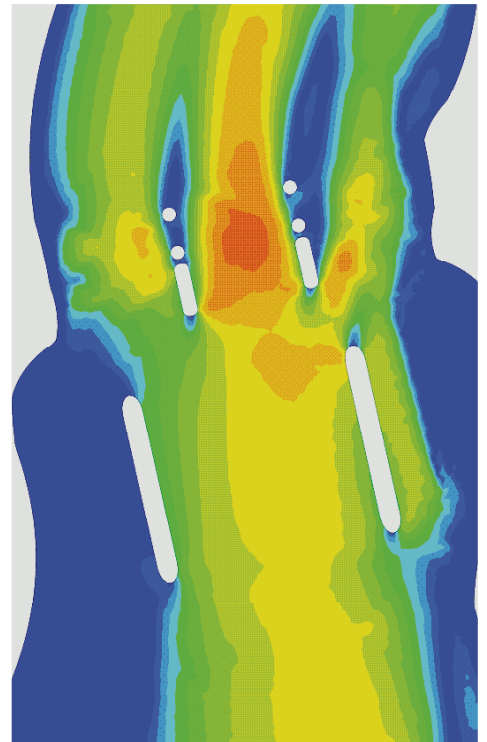
### Roof drainage

We provide specialist advice (technical advice, test witnessing and auditing) on conventional and siphonic roof drainage and undertake expert witness work.

### Unusual studies

We apply a range of techniques to tackle unusual hydraulic problems, from analytical studies to physical modelling and CFD. Examples include the rainwater drainage of the Maitreya Buddha, India, studied in a physical model and the catastrophic failure of storage tanks using a combination of physical and CFD modelling

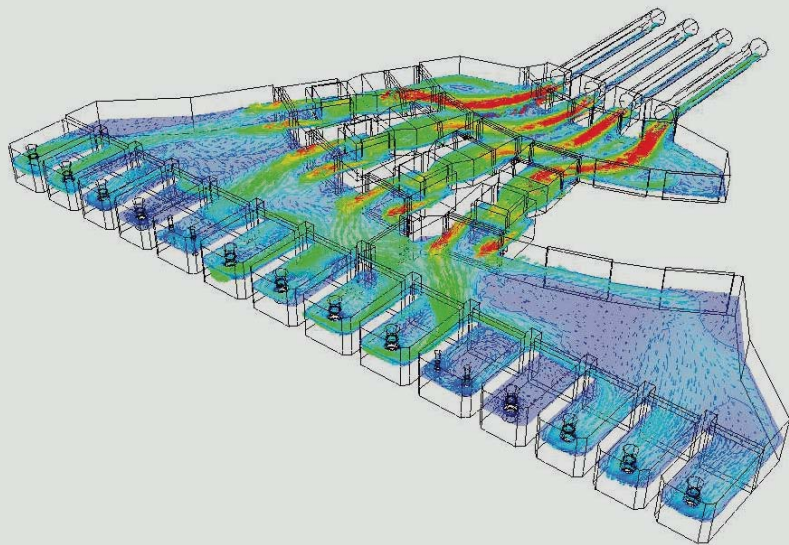




## Research

We have produced a range of standards and design guidance for the engineering community.

- > Stability of rock protection in fluvial and estuary environments
- > Drainage of pavements (e.g. airports)
- > Pipeline hydraulics, namely design for avoidance of air problems
- > Highway drainage
- > Roof drainage
- > Flood resilience of constructions and flood damage repair





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HR Wallingford is an independent engineering and environmental hydraulics organisation. We deliver practical solutions to the complex water-related challenges faced by our international clients. A dynamic research programme underpins all that we do and keeps us at the leading edge. Our unique mix of know-how, assets and facilities includes state of the art physical modelling laboratories, a full range of numerical modelling tools and, above all, enthusiastic people with world-renowned skills and expertise.

