

Water Research Laboratory Spillway flume

WRL's spillway facility is a unique open channel flow facility allowing continuous uncontrolled and gated spillway experiments with large flow rates. Large flow rates and high Reynolds numbers are needed to limit scale effects and to provide reliable design guidelines for prototype scale hydraulic structures.

The spillway facility is used for fundamental research of complex high-velocity free-surface flows as well as for applied research of hydraulic structure designs. Complex flows, novel hydraulic structures and channel boundaries often require physical modelling as it is the only reliable method for investigation and design.

WRL is leading the way in combining large scale physical facilities, state-of-the-art instrumentation and hydraulic expertise to advance the fundamental understanding of high-velocity free-surface flows and to provide practical design guidelines for the water engineering profession. Due to limitations in numerical modelling of complex flow phenomena, physical modelling remains the most reliable method to test concept and detailed design of hydraulic structures.

Flume specifications

- 0.8 m wide × 9 m long × 0.5 m deep
- Tilting flume enabling wide range of spillway slopes
- Connected to WRL's recirculation facility enabling continuous flow rates of up to 400 l/s
- Transparent walls and base allowing detailed flow observations from all sides
- Modular structure allowing for downstream energy dissipaters
- Large header tank (4.5 m long × 2 m wide × 2.8 m high) for calm inflow conditions
- Modular structure of header tank allows uncontrolled and gated spillway flows

Typical investigations

- Design optimisation of spillways and stilling basins
- Energy dissipation performances of hydraulic structures
- High-velocity free-surface flows
- Three dimensional air-water flows
- Re-aeration and air-water mass transfer processes
- Flow resistance and flow structure interactions

