

PROJECT DESCRIPTION

Coldwater was part of a team that designed the large research flume, the fourth largest facility of its kind in the world, at the Institut national de la recherche scientifique Eau Terre Environnement Research Centre (INRS-ETE). The large size allows experiments to be conducted at scales as big as 1:1.

PROJECT APPROACH

Coldwater's work centred on three tasks:

- design of the current re-circulation system;
- design of the sediment trap, and;
- design of the wave-absorbing beaches.

CLIENT

INRS-ETE
Quebec, QC

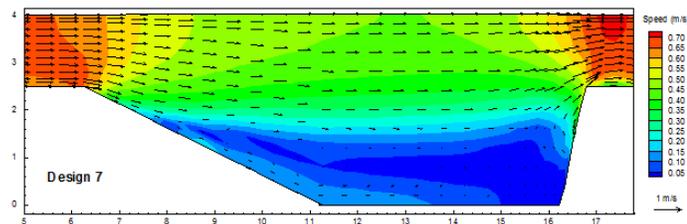
LOCATION

Quebec, QC

DATE

2011-2012

The current re-circulation system involves a large conduit parallel to the flume and connected to both ends. The system's bi-directional water circulation system is powered by a Rolls-Royce bow thruster and can produce a 5 m³/s discharge. The system also employs a large stilling basin, vented flow ducts to diffuse the flow in an even fashion and a sediment sump to trap sediments before the conduit entrance. Coldwater used a combined modelling approach to study the design of the sediment trap for the proposed wave-current flume. The approach used the three-dimensional free-surface SSIIM model to predict the flow field and Coldwater's Particle Transport Model (PTM) to model sediment transport within that flow field. Multiple simulations with various sump designs and sediment transport conditions were studied in order to develop an optimized design. Coldwater also developed an expanded metal wave absorber design for the new flume based on the National Research Council's progressive porosity beaches. The design involved expanded metal sheeting held vertically in an array of steel framing which is, in turn, bolted to the flume walls.



Three-dimensional flow modelling was used to optimize the design of the flume's sediment sump.