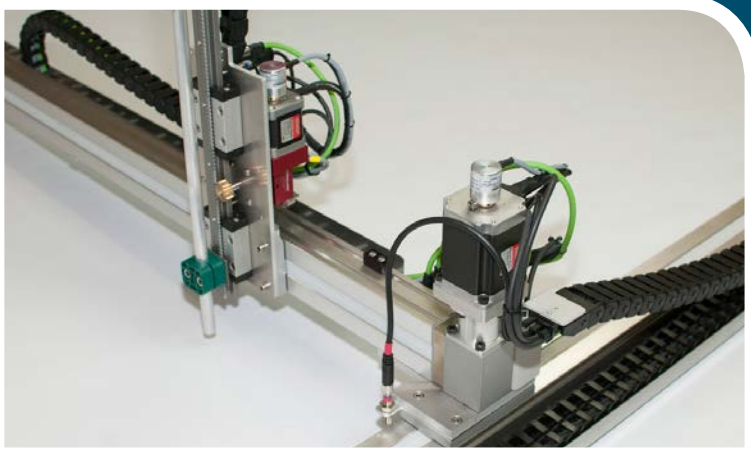
HR Wallingford
Working with water

Laboratory instrumentation and software

Bed profiling system



Key features

- Utilises our traverse system to position the profiler in a 2D or 3D environment
- Operates both with and without water present
- Choice of laser or touch-sensitive probes
- Accuracy of ± 0.5 mm vertically and horizontally
- Positive non-slip drives
- Data stored in ASCII format
- Easy to install

The bed profiling system is the result of much development work by HR Wallingford to meet the exacting requirements of hydraulic modellers and to ensure a high degree of reliability. The system is used to assess the effect flowing water has on mobile sediment beds. It is available with a choice of probes to suit a wide range of applications.

The profiler carriage and support beam

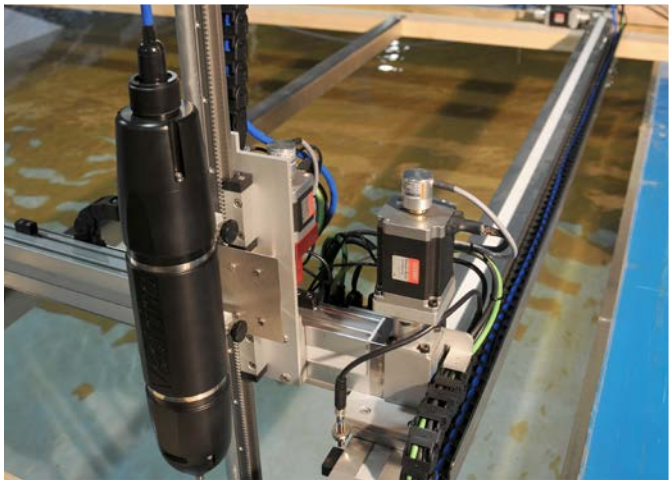
The probes for the profiler are attached to HR Wallingford's proven instrument traverse system which ensures accurate positioning. The traverse is available in a variety of beam lengths between 1 m and 6 m. The overall travel for each axis is 0.2 m less than the beam length. The vertical (z) axis comes as a standard length of 1 m.

The x-axis beam generally requires supporting every 2 m along its length, this is usually achieved by attaching the beam along the top of the flume wall or basin floor. The y-axis is provided with additional stiffening for lengths ≥ 2 m.

The traverse system contains the motors for both the horizontal and vertical drives together with all the associated data acquisition hardware.

Touch-sensitive probe

The touch sensitive probe has a proximity switch which allows it to detect the bed with the minimum of contact pressure. The probe is periodically lowered down on to the bed with a user defined frequency, the encoder in the profiler then determines the bed height z axis. The carriage is stationary while the probe is moving up or down. This probe is particularly suitable for profiling through the air/water interface.



Laser probe

The laser probe has a low-powered, Class 2 visible red, laser distance sensor mounted inside a waterproof housing. The sensor is attached and is driven vertically up and down by a motor in the profiler carriage. When in operation, the laser signal is used to drive the probe up and down to maintain a constant height above the bed as the carriage traverses across the beam. The position of the probe is measured by encoders on the motor shafts, this is used to determine the bed height.

Control of the profiler

The profiler is controlled from a Windows PC and connected using a crossover Ethernet cable (supplied). All controls are easily operated through a single display screen, which allows the user to set parameters such as start point and step size, and allows a file name to be allocated to the data being collected. It also allows the vertical and horizontal readings to be zeroed, to enable the user to set datum points. A graph of the data is displayed as the profile is recorded and the profile can be stopped by the user at any time.

The profiler automatically detects the type of probe that has been connected and displays this to the user. A radio remote control is supplied that allows the probe to be moved vertically and horizontally. This is especially useful when setting up datum points or when checking the route of the profiler whilst the user is working close to the model. The carriage is fitted with limit switches to prevent horizontal movement if the carriage reaches the end of the beam. The blocks that operate the limit switches can be fitted at any point on the beam to protect areas of the model that the user does not wish to profile.

Specifications

Max beam spans	6 m (x-axis) 6 m (y-axis)
Horizontal travel	Beam length less 200 mm (to allow for carriage and end stops)
Horizontal velocity	Up to 50 mm/s
Vertical velocity	Up to 25 mm/s
Horizontal resolution	± 0.5 mm
Vertical resolution	± 0.5 mm
Touch probe: bed contact pressure	10 g over 20 mm diameter *
Laser probe: maintained height above bed	80 mm
Vertical travel	1 m
Power supply	220 or 110 V AC
Standard cable length	25 m *

* other diameters and lengths are available

The profiler software will run on any PC or Laptop (running MS Windows 7) using a standard Ethernet Network Port.