FLUID FLOW

Accutech’s FluidFlow Training Course is divided into three main units with a supplementary Unit 4 for Fixed Fire Protection Design. The units are:

UNIT 1  General use of the software focussing on incompressible (liquid) flow with optional compressible (gas) flow.

UNIT 2  Refresher on the principles of fluid mechanics and specifically how FluidFlow incorporates these principles.

UNIT 3  Slurry module.

UNIT 4  Fixed Fire Protection Design

Training can be delivered over one, two or three days.

The one-day course is directed at engineers who are very familiar with pumping and pipe flow design and covers a restricted part of Units 1 and 2. Compressible flow is excluded and only a limited number of hands-on design examples are performed.

The two-day course comprises Unit 1 and can also include aspects of both compressible flow and slurry/non-Newtonian flow if required (and as time allows) but focuses on incompressible Newtonian flow with lots of design examples. It is directed towards recent graduates or engineers new to fluid flow simulation software.

The third day of the three day course focuses on non-Newtonian/non-settling slurries (Bingham plastics, power law, etc) and settling slurries (a Newtonian carrier fluid – usually water – with suspended solids).

To properly cover Units 1 and 2, two days of training are recommended; for Units 1-3, three days are required.

For the Slurry unit alone, one day is required but this assumes attendees are very familiar both the pipe flow design in general and FluidFlow in particular.

Unit 1 General

During the progress of Unit 1 attendees will become familiar with the screen layout and the menus and keystrokes necessary to drive FluidFlow. Emphasis is on liquid (incompressible) flow. By the end of the unit attendees will be able to develop their own models of pipe flow systems. Preliminary design exercises give attendees hands-on experience in entering data into the database, use of the Data Palette and constructing a flowsheet schematic of a pipe system. Various models will be developed to illustrate the use of line equipment such as pumps, control valves, orifice plates, heat exchangers etc. Examples of heat change and combining fluids within pipe networks will be presented. Reporting and graphing capabilities will be covered as will the export to Excel capability.

Unit 2: Refresher

Unit 2 includes a revision of the fluid mechanics’ principles used in the software - conservation of mass, energy and momentum - with calculation examples. Topics include: how fluid physical properties influence results; Bernoulli and Darcy equations; calculation of friction factor; Reynolds number; Moody diagram; various methods of determining fittings’ losses (the so-called ‘minor’ losses); multiple pump systems; NPSH; compressible flow.

Unit 3: Slurry

The Slurry unit covers both non-Newtonian/non-settling and settling (particulate) slurries. Data entry into the non-Newtonian liquids dataset and the solids dataset is covered together with several design examples. Topics include: Power Law, Bingham Plastic and Hershel Bulkley fluids; the Durand, Wilson/Addie/Clift and the 4-Component model approach to settling slurries; settling velocities; horizontal and inclined pipes, etc.
FLUID FLOW

Unit 4: Fixed Fire Protection Design

The Fixed Fire Protection Design unit applies FluidFlow to spray/sprinkler, deluge and hydrant ringmain systems. We can offer an abridged version of Unit 1 plus Unit 4 as a one-day course.

Custom written training manuals are provided in electronic format for each attendee to print, and temporary licenses of the software are provided. A hardcopy manual is required for each attendee.

The training course is presented by Graeme Ashford, CEng of Accutech 2000 Pty Ltd. Graeme has a Masters Degree in Civil Engineering Hydraulics, a University of London Teaching Certificate and has over 30 years of experience of training in, and supporting, fluid flow software.

Course times and charges (ex GST)

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Charge</th>
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</thead>
<tbody>
<tr>
<td>ONE-DAY</td>
<td>One 8-hour session</td>
<td>$5,500.00</td>
</tr>
<tr>
<td>TWO-DAY</td>
<td>Two 7-hour sessions</td>
<td>$8,750.00</td>
</tr>
<tr>
<td>THREE-DAY</td>
<td>Three 6.5-hour sessions</td>
<td>$10,500.00</td>
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Preferred maximum number of attendees per course: 8-10.

A fully-functional temporary licence of the software is provided for each attendee and each attendee must have his/her own computer. A digital projector and whiteboard are required.

Other Costs

For courses outside the Perth/Kwinana metropolitan areas the following applies:

- Car travel from Perth to nearby regional areas charged at $2.00 per km.

For travel interstate, to regional WA and internationally the following charges apply:

- Travel costs eg flights, car hire – at cost. (International flights over 6 hours are business class).
- Travel time (non-training days) charged at $250.00 per day or part day.
- Per diem, meals, accommodation, taxis - $300.00 per night.

Notes

1. We have presented this training course to Bateman Engineering, Bechtel, BHP Billiton, Hatch, Lycopodium, Iluka, Queensland Alumina, RioTinto, SNC Lavalin, WorleyParsons and many others.

2. Australian Goods and Service Tax (GST) is additional to the above prices where the training taking place and/or is paid for within Australia. Prices are in Australian dollars.