



## Pipeline Network Analysis Services

Fluid flow simulation in complex pipeline systems and networks.

BHR Group has been active in the analysis of steady state and dynamic events in fluid systems for over 40 years and was a pioneer in the development and use of software packages that support the engineer. That expertise was commercialised and the resulting FLOWMASTER7<sup>®</sup> program has become a world-wide best seller in the quality end of the surge analysis market. We still use the latest version of FLOWMASTER7<sup>®</sup> but also other software such as WANDA 3<sup>®</sup> when appropriate. But no matter how good the package, it is the experience that counts when you need a fast and high quality service. At BHR Group we have that expert ability.

### We can analyse:

- Single phase liquid flows
- multi-phase flows
- hydraulic fluid systems
- pneumatic flow systems
- complex control systems

### Recent applications include:

- Firefighting systems
- Water injection lines
- Pipelines
- Dock fluid loading arms
- Power station cooling water systems
- Treated water and sewage pumping mains
- Hydraulic systems

### Simulation options include:

- Pump(s) start-up and shut-down
- Unscheduled pump trips
- Valve closure (scheduled and unscheduled)
- Emergency shut-down conditions
- Priming
- 'what if' scenarios
- sensitivity analysis

### Industries covered:

- Water
- Petrochemical
- Power
- Automotive
- Oil and gas





## Our services to clients include:

- consultancy
- trouble shooting
- system design and audit
- failure investigation
- cost/benefit analysis
- assessment of unit performance
- identification of specific equipment suppliers

## The Engineering Analysis Team

The team comprises multi-skilled staff backed up by a highly experienced project leader who QAs all the pipeline analysis output of the team.

## The Analysis Tools

BHR Group uses Flowmaster7<sup>®</sup> and WANDA 3<sup>®</sup>.

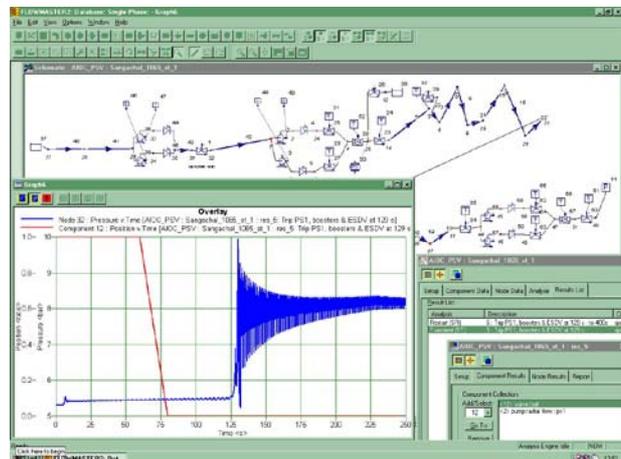
The breadth of expertise available across the company allows studies to be extended to encompass the predicted mechanical and process performance of individual components and sub-systems. If required, we can also undertake physical model studies of components or sub-systems to investigate their characteristics prior to computer modelling.

FLOWMASTER7<sup>®</sup> can model transient and steady state conditions in compressible and incompressible flow systems. Its database contains a comprehensive library of pipeline components and performance curves to solve many types of fluid flow problems.

Additional performance curves can be added to customise the components and simulate commercially-available hardware. If none of the supplied components is suitable for a particular application, the software has a facility to allow new components to be written.

FLOWMASTER7<sup>®</sup> can also be used alongside other commercially-available software such as MATLAB<sup>®</sup> and a number of CFD packages including FLUENT<sup>®</sup> to perform true co-simulations. This is a cost-effective method of modelling where parts of the network can be treated as one-dimensional but other parts require a different approach.

WANDA 3<sup>®</sup> has been developed by WL Delft Hydraulics and offers similar features to FLOWMASTER7<sup>®</sup> and is particular strong in modelling operations where pipes are only part full. It also has a strong control capability. This allows integration of the analysis of the mechanical, electrical and process engineering aspects of a system. WANDA 3<sup>®</sup> is often used with very large water distribution systems.



Contact us for more information or visit our website [www.bhrgroup.com](http://www.bhrgroup.com)

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