Slurry Handling Course
Pumping and Pipeline Design
(2 day course)

The challenges of handling solid/liquid mixtures such as suspensions, dispersions, slurries and pastes are commonplace throughout industry. Such handling operations include in-plant transfers in pipelines, and feeding and discharge to and from agitated storage vessels. These processes provide cost-effective, economic and efficient methods of transporting products with the minimum of maintenance and low environmental impact. An understanding of how to optimise handling techniques; how different industries have solved complex problems; troubleshooting - all demand an understanding of the techniques required and the deployment of different engineering solutions.

Whether you deploy the technique through in-plant chemical processing, across mining, oil or construction applications, or the secure transportation of effluent and waste products, this training course will be focussing upon aspects critical to the effective operation of your processes.

What past delegates have said about our course

“A comprehensive overview of aspects of slurry handling”
Washington Group International

“Gained tools for design and sizing of slurry / solids handling equipment.”
Dow Chemical

“A great course with lots of relevant information”
Hatch Associates

“Good overview of slurry handling systems, and the course notes are a good resource for information”
Sellafield Ltd

Find out more at:

Organised by BHR Group
EXPERTS IN FLUID ENGINEERING
Dr. Neil J. Alderman

Dr. Alderman obtained his PhD in Chemical Engineering in 1986 from University of Bath before joining Cambridge University’s Department of Chemical Engineering to carry out postdoctoral research. Before joining BHR Group, he worked at Schlumberger Cambridge Research, Warren Spring Laboratory, AEA Technology and Aspen Technology. His work has included research in rheology and cross-flow filtration of oil-well drilling fluids, filtration and de-watering of sewage and industrial sludges, rheo-optic characterisation of thermotropic liquid crystal polymers, electrochemical mass transfer applications and fouling of heat transfer equipment. At BHR Group, he provides pilot-plant and lab-based consultancy and research services and lectures on slurry courses. He has published over 200 papers and reports including four ESDU data items on rheological measurement of non-Newtonian slurries and a book chapter in ‘Rheology’.

Dr. Nigel I. Heywood

Dr. Heywood is a chartered chemical engineer and Fellow of the Institution of Chemical Engineers with a first class honours in chemical engineering, an MSc with Distinction in Advanced Chemical Engineering, an Executive MBA and DIC from Imperial College, and a PhD from University of Wales. He researched multiphase pipeflow at Toronto University, Canada and has worked at Warren Spring Laboratory, AEA Technology, and Aspen Technology before joining BHR Group. At BHR Group, he provides consultancy, research and training. He has written over 200 articles and reports and co-edited a book on “Slurry Handling: Design of Solid-Liquid Systems”.

Mr. Phivos Ioannou

Mr Ioannou obtained his M.Eng in Mechanical Engineering in 2005 from UMIST and his MSc in Computational Modelling for Aeronautics, Flow management and Fluid-structure interaction in 2006 from Imperial College, London. Since 2007, he has been carrying out research on adaptive mesh refinement on high resolution schemes for his PhD in Aerospace Sciences from Cranfield University. He is also currently employed by BHR Group as an engineering consultant working in the area of modelling and simulation. He was responsible for the development of the Sludge Rheology database, the System Losses Tool for non-Newtonian fluids in pipeflow and the Digester Sludge Mixing Design Guide Tool for the WWM consortium. More recently, he has been providing consultancy in various slurry handling projects.
Course Outline

Slurry Handling Course: Pumping and Pipeline Design
9th – 10th April 2014

Laboratory Measurement of Slurry Properties
Measurement of the flow curve and the effect of viscosity, and other physical properties such as concentration, density, particle size distribution and settling rates.

Pipeline Design for “Non-Settling” Slurries
Estimation of frictional pressure drop/flow rate relationships for pipeline flow in laminar, transitional and turbulent flow of Newtonian and non-Newtonian slurries.

Pipeline Design for Settling Slurries
Calculation of pressure drop/flow rate relationships and deposition velocity for settling slurries in horizontal pipes, covering both existing empirical correlations and the two-layer model approach. Also, approaches to vertical pipeflow.

Frictional Pressure Losses in Fittings
Calculation of frictional pressure losses for a wide variety of pipe fittings. Including elbows, bends, tees, sharp/gradual expansions and contractions, and some valve types. The estimation of losses apply to both Newtonian and non-Newtonian slurries, in either laminar or turbulent flow.

Slurry and Paste Pump Types
A wide variety of pump types are reviewed.

Slurry Pump Selection and Sizing
Various methods for selecting a generic pump type based on the key slurry properties and operating parameters, and methods for derating pumps for Newtonian slurries and settling slurries.

Slurry Valve Types
Review of generic types of slurry valves with their operating ranges, advantages and limitations. Guidelines for valve selection.

Pipe Clearing Methods and Systems
Several alternative methods, including pigging can be used to clean pipework, recover valuable product, minimise effluent streams and switch cleanly from one product to another.

Wear in Slurry Transfer Systems
Wear mechanisms, and testing for wear and minimising wear by the correct selection of materials and operating conditions.

Slurry Storage Vessel Design and Operation
An overview of the various theories of slurry tank and agitator design and the designs that result.
Course Arrangements

The Course will take place at BHR Group in Cranfield. Delegates are responsible for booking their own accommodation. Accommodation is normally available at Mitchell Hall and the Cranfield Management Development Centre on the Cranfield University Campus in Bedfordshire. More information can be found:

Mitchell Hall:
(http://www.mitchellhall.info/?page_id=9)

Cranfield Management Development Centre:
(http://www.cmdc.info/accomodation.aspx)

Course Fee

The fee for the 2-day course is £895.00 + VAT. For the third and further delegates from the same organisation, a 50% discount is available. Early Bird offer runs until the 21st of February, 2014. Course fee must be paid in full before the course commences.

Payment options:

• Use your credit card and book on-line now.
• All cheques must be payable to VirtualPIE Limited.
• Bank transfers should be paid to our account at:

Barclays Bank
Coventry Fletcham Highway Branch
Bank sort code: 20-23-55
Coventry, UK, CV4 9EJ

Account number: 33034771
513 Fletchamstead Highway
IBAN: GB30 BARC 2023 5533 0347 71
SWIFT BIC: BARCGB22

Credit card payment details should be entered on the online reservation form by completing the appropriate boxes. Please quote SH0414 and name of delegate and company on all transactions.

Cancellations

Cancellations made up to 21 days prior to the course date will be subject to a £100 administration fee. NO REFUNDS will be given for cancellations made less than 21 days prior to the course. Replacement candidates are welcome at any time.
Technical enquiries
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Customised Courses
Tailored courses, chosen to meet your specific requirements, are available from our lecturers at our premises, or at your premises or at any venue worldwide. Please see the website for the full list of topics we offer, and contact us to discuss the detailed content you might require.

About BHR Group
Founded over 65 years ago, BHR Group is an independent contract research, development and consultancy company. Dealing in all aspects of engineering with fluids, BHR Group is recognised, in particular, as the world leading authority on mixing processes. The Group runs a number of client in-house courses on fluid engineering topics. For more details, contact Joyce Raymond, Course Organiser on: +44 (0)7785 621692

www.bhrconferences.com