UNDERSTANDING THE TOTAL COST OF OWNERSHIP

Programme and Course Tutors

Understanding the Total Cost of Ownership

Programme

DAY ONE: Nature of the Problem
Tuesday 23 November: 13:00 – 17:00 GMT

Day One Course Leader's Introduction
Professor Mike Bradley BSc Hons, PhD, Director, The Wolfson Centre for Bulk Solids Handling Technology, University of Greenwich and Chairman, SHAPA

The Hall of Shame – *examples of projects that have gone off the rails to greater or lesser degree*
Many troubleshooting projects, both large and small, arrive at the door of The Wolfson Centre, invariably having a history which has landed them in trouble. A number of examples will be examined to show how the well-intentioned ignorance of engineers, designers and project managers have led to severe difficulties.
Professor Mike Bradley

Quantifying how high the risk is – *a review of the Rand Report findings*
This report analysed cost over-runs and performance shortfalls on 40 new process plants. It showed that plants operating with bulk solids feedstocks have a very bad track record, and exposed the reasons. The findings will be reviewed, including the lessons to be learned about the need to apply more attention to the solids flow and handling aspects of plant design and procurement.
Professor Mike Bradley

Understanding why technical risk is so high with bulk solids handling projects
To contain technical risk, project managers and engineers need to understand what the risks are and why they arise. With Bulk Solids Handling not being taught as a subject during the education of most engineers, in general they are unaware of the dangers, let alone how to control them. This session will use case studies of problematic projects to expose the matter and show to spot and control potential sources of technical risk, including:

- Unexpected materials behaviour
- Unforeseen difficulties arising from the operating context
- Lack of clarity in user expectations
- Whose responsibility it is to manage the risk
- Laying-off of risk down the project chain
- "Value Engineering"
- Changing source and quality of feedstock supply

Professor Mike Bradley

Break

Know your enemy – *materials for design and for controlling technical risk*
Reliable discharge of bulk solids can be a big challenge especially when material characteristics change. This session will introduce the audience to:

- Material characterisation
- Importance of material characterisation
- Effect of change in material characteristics on flow behaviour and hence the equipment design

Dr Baldeep Kaur, BSc, MSc, PhD, Research Fellow, The Wolfson Centre for Bulk Solids Handling Technology, University of Greenwich

Discussion groups – *delegates break into groups under the supervision of the course tutors to discuss how well they now understand the problems*

- Report back
- Analyse and gather lessons learned
- Actions to take away

Close of day one

DAY TWO: Learning the Lessons and Applying Best Practice
Wednesday 24 November 2021: 13:00 – 17:00 GMT

Day Two Course Leader's Introduction
Ian Birkinshaw MSc, General Secretary, Solids Handling & Processing Association (SHAPA)

Practical approach to design to accommodate material characteristics
Solids handling is one of the largest and most common processes in many industries though it is often impeded by problems that arise in the storage and handling of bulk solids. This session will provide guidance for the effective handling of bulk solids.

- Some of the problems that are often encountered – arching, ratholing, etc
- Characterisation needs for storage, flow and handling including flow property tests
- Design of hoppers for reliable discharge – mass flow
- Interfacing of feeders for enhancing flow, focusing on screw feeders
- Offer some retrofit options where performance is poor
- CASE STUDIES solving real plant operating problems

Dr Eddie McGee

The virtue of the bespoke suit over *prêt-à-porter*
Standard off-the-shelf equipment may be more readily available and initially cheaper but think carefully before buying. There are hidden costs associated with the integration and performance that may be compromised, and the results may not be quite as expected. Bespoke equipment may offer a more cost-effective solution that provides better performance.

- Off the shelf is not designed for your purpose
- The importance of quality
- Spending time and money on good design is time and money well spent

Peter Slee-Smith CEng, MiMechE, DSEAR Business Manager, Dodman Ltd and SHAPA Technical Committee

A project management approach is not enough – *understanding the true cost of a solids handling system to a business*

Without a thorough understanding of the true cost of a solids handling system to a business, a project management approach is not enough. One of the primary constraints of the process which will be identified in the project documentation and created at the beginning, will be the budget. Without a full understanding of the true costs the budget figure cannot be accurately set.

- Down-time
- Energy
- Maintenance
- Manning
- Purchase price
- The problems with competitive tendering and turnkey projects.

Charles Williams, Director, Promtek and Chairman, Technical Committee, SHAPA and Dr Eddie McGee

Break

CASE STUDIES: Risk management in solids handling projects – *examples of good practice in bulk handling project procurement and some projects that managed significant risks effectively*

- New handling system design for Imerys Minerals – *the world's largest producer of white mineral*
- Clay substitution project
- Drax Ecostore

Professor Mike Bradley

Discussion groups – *delegates break into groups under the supervision of the course tutors to discuss how well they currently apply best practice, what they can improve for the future and the difficulties to be overcome*

- Report back
- Analyse and gather lessons learned
- Actions to take away

Course Leaders' Conclusions

Professor Mike Bradley and Ian Birkinshaw

Close of day two

Course Tutors

Ian Birkinshaw MSc, General Secretary, Solids Handling & Processing Association (SHAPA)

Ian started working in the field of bulk solids handling over 40 years ago with the Shepherd Group and transferred within the group to Portasilo initially starting as a Commissioning Engineer and held many roles within the business including Sales Manager and finally Operations Director.

Ian retired from Portasilo in 2014 and took on the role of General Secretary of SHAPA where for more than 40 years, over 100 member companies have combined to be the UKs leading specialist association for the Solids handling and processing Industry.

Professor Mike Bradley BSc Hons, PhD, Professor of Bulk and Particulate Technologies, The University of Greenwich; Director, The Wolfson Centre for Bulk Solids Handling Technology; Chairman, Solids Handling & Processing Association (SHAPA) and ABTO Members' Advisory Panel

After doing an apprenticeship with BAE Systems, Mike took a first degree at Thames Polytechnic and then worked in the Flight Automation Research Laboratory at BAE.

He returned to Thames Polytechnic to do a PhD in Design Methods for Pneumatic Conveying Systems. After his PhD Mike failed to reach escape velocity from The Wolfson Centre, becoming first a consultant, then Manager and finally Director in 2000. He was elevated to the status of Professor in 2006.

Mike also has a small business in property, and co-founded WorkSafe Design, a company developing advanced PPE for infectious disease protection. In his spare time Mike is a competition dancer, and has qualified to compete in national events on more than one occasion in both ballroom and Latin American disciplines.

Dr Baldeep Kaur, BSc, MSc, PhD, Research Fellow, The Wolfson Centre for Bulk Solids Handling Technology, University of Greenwich

Baldeep holds a PhD degree in Applied Physics with application in 2-phase gas solid flow from India's top-ranked institution.

She joined The Wolfson Centre for Bulk Solids Handling Technology as an Associate Consultant Engineer in 2017. Since then, Baldeep has worked on numerous industrial constancy projects involving material characterisation, flow property measurement, pneumatic conveying and system design.

Eddie McGee, Managing Director, Ajax Equipment Ltd

Eddie is an experienced Managing Director with three decades in engineering providing solutions for many, varied solids handling projects in chemical, pharmaceutical, nuclear, waste, food, confectionery and other industries.

Routinely involved in the detailed specification, design and supply of bespoke screw feeders, conveyors, elevators, mixers and lump breakers, as well as ancillary items such as hoppers, intermediate bulk containers etc. Eddie is a Member (and Past Chairman) of the Institution of Mechanical Engineers Bulk Materials Handling Committee, the European Federation of Chemical Engineering Working Party on Mechanics of Particulate Solids and the Solids Handling and Processing Association's Technical Committee.

He has a PhD from Glasgow Caledonian University for his work on characterisation and flow behaviour in hoppers and screw feeders and in 2008 he was presented with the IMechE Bulk Materials Award for Innovation. Eddie has authored papers for conferences and seminars in UK, Germany, Italy, Norway and the USA.

Peter Slee-Smith CEng, MiMechE, DSEAR Business Manager, Dodman Ltd and SHAPA Technical Committee

Peter is a chartered engineer with entrepreneurial flair, with 30 years of experience managing successful large engineering businesses together with starting many businesses from scratch. He has held many board positions ranging from operations, engineering, technical and managing director.

Peter has worked in many consulting roles, developing large teams of multi-disciplined engineers, including project portfolios of over 30 million pounds. He was responsible for setting up manufacturing operations and joint ventures in China, India, and the Czech Republic.

Previously Peter was responsible for standard products suitable for mass customisation and design automation. Now he works in a specialist sector preventing dust explosions in food processing plants, using bespoke equipment.

Charles Williams, Director, Promtek and Chairman, Technical Committee, SHAPA

Graduating from the University of Manchester in 2001 with a 2:1 MEng (Hons) in Electronic Engineering, with a year well spent at the Technische Universität Berlin, Germany, Charles spent two years backpacking around the world before returning to the UK to take up a software engineering position at Renishaw plc.

Four years later he became an English language teaching assistant for schools on the subtropical island of Amami Oshima, Japan, with the prestigious JET Programme, before finally joining the management team at Promtek, his family's 40 year old ingredients handling systems engineering firm.

Since then Charles has specified, implemented and supported projects, working with a variety of equipment suppliers and stakeholders at a wide range of factories in the UK, Europe, North America and Africa and more recently opened a full subsidiary in Cape Town to support the client base in southern Africa.