# Hoppers, silos and dischargers:
# Ensuring safe, reliable and efficient operation

Seminar, Tuesday 22nd September 2026, Institution of Mechanical Engineers, London

## Summary of presentations and presenters

**"An overview of bulk storage and discharge systems - some of the pitfalls to avoid"**

**Dr. Eddie McGee, Managing Director, AJAX Equipment Limited**

Optimising the performance of a silo storage system requires care beyond superficial geometrical and economical choices. Too often, bulk solids installations underperform due to lack of awareness and incorrect matching of the equipment with the material properties and the operational needs of the plant. Eddie's presentation will provide an overview which emphasises the critical upfront decision making, testing and selection processes needed to secure reliable flow and other operational benefits of bulk storage and discharge systems.

Eddie McGee has over 35 years' experience in bulk solids handling and processing across a wide range of industries, including chemical, pharmaceutical, nuclear, food, energy and waste. His know how combines academic research and practical engineering, and he has spent a career applying this knowledge to real-world engineering challenges, with the specification, design, and delivery of bespoke solids handling equipment, including screw feeders, conveyors, mixers, elevators, hoppers, and associated handling systems. He is a member of the Institution of Mechanical Engineers' Bulk Materials Handling Committee and a member of the European Federation of Chemical Engineering Working Party on Mechanics of Particulate Solids and the Solids Handling and Processing Association's Technical Committee.
His focus is on turning fundamental science, experience, and teamwork into reliable, long-term solutions that work in practice, not just in theory.

**"Tilbury Cement Works: Reshaping cement supply through production resilience, optimised logistics and product innovation"**

**Tim Fry CEng MICE MIMMM**
**Project Manager, Holcim UK**

Holcim is a leading partner for sustainable construction with net sales of CHF 15.7billion in 2025, creating value across the built environment from infrastructure and industry to buildings. With more than 45,000 people across Europe, Latin America and Asia, Middle East & Africa, Holcim is driven by our purpose to build progress for people and the planet with sustainability and innovation at the core of everything we do.

Global demand for low carbon and circular construction materials is increasing, particularly in the UK. Located at the Port of Tilbury, the new cement works combines deep water marine access with large scale storage, automated logistics and a modular grinding and blending system. Initial operations commenced in May 2026 and, once fully operational, the facility will allow Holcim UK to serve its customers across the South of England 24/7 with conventional, low carbon and circular cementitious products, from six loading heads and five weighbridges.

This development strengthens Holcim's national network by placing high volume processing capacity directly at the point of demand, reducing reliance on long distance inland transport and improving supply resilience. Tim will outline how this ambition was realised at Tilbury by detailing how storage solutions and equipment were selected to optimise operating efficiency and flexibility.

Tim has over 27 years' experience in the infrastructure, materials handling, mineral extraction and mineral processing industries with a proven record of successfully leading multi-disciplinary teams to deliver the permitting, engineering, procurement, construction and commissioning of complex UK and international projects in challenging environments.

His broad Project Management experience acting as the Client, Engineer, Principal Designer and Principal Contractor has provided him with a detailed understanding of key project drivers and risks to deliver practical, cost effective and environmentally sensitive solutions whilst ensuring safety, financial and schedule performance.

**“The Hidden Personality of Powders:**
**Material Characteristics, Flow Properties & Process Performance”**

**Dr. Vivek Garg**
**Senior Consultant, The Wolfson Centre**

Bulk solids can be unpredictable, and their behaviour often determines the success or failure of a handling process. Vivek’s presentation explores the importance of understanding material characteristics and flow properties, including particle size, shape, density, moisture, cohesion, compressibility, wall friction, permeability, and segregation tendency. It explains how these properties influence flow in silos, hoppers, feeders, conveyors, and other process equipment.

By connecting material testing with practical industrial challenges, the presentation highlights how effective characterisation can prevent flow stoppages, improve process reliability, reduce operational risks, and support better equipment design. The key message is simple: to control material flow, you must first understand the material.

Vivek Garg is a Senior Consultant Engineer and Applied Engineering Research Specialist at The Wolfson Centre for Bulk Solids Handling Technology, University of Greenwich, with a background in Mechanical Engineering and specialist expertise in bulk solids handling technology. His work focuses on material characterisation, powder and bulk solids flow behaviour, equipment design, and troubleshooting industrial handling processes. He has contributed to research, consultancy, and industry-focused projects across areas including powder flow, storage, conveying, segregation, permeability, and material handling challenges. Vivek combines experimental investigation with practical engineering insight to support safer, more reliable, and efficient solids handling systems.

**“Silos: Choosing the right one”**

**Steven Dance CEng MIMechE**
**Principal Engineer, Barton Fabrications Ltd**

Steven’s presentation will discuss how to make a wise choice when buying silos from an economic, sustainable, environmental point of view, and how to avoid buying the wrong equipment with problem areas.

Steven Dance is Principal Engineer at Barton Fabrications, a Bristol-based manufacturer specialising in the design and production of industrial silos. With hands-on expertise across the full engineering lifecycle, Steven leads technical delivery on projects ranging from bespoke fabrication to complex installations. He combines practical engineering knowledge with a commitment to quality and safety, ensuring every solution meets the demands of the industries Barton Fabrications serves.

**"Interfacing feeders with silos – don't screw it up!"**

**Dr. Eddie McGee**
**Managing Director, AJAX Equipment Limited**

To optimise the economic and performance aspects of a silo system, the specification of the feeder or discharger requires integral consideration with the silo geometry and the full range of operating and processing requirements. The silo form must first be decided to suit the nature of the material stored and operational requirements and the feeder design must work in sympathy with these as an integral process.

Eddie's presentation will focus on various forms of screw feeder based on measured bulk solids flow properties, hopper flow regimes, production needs and any relevant site restraints. Design techniques will be shown especially suited to securing the flow benefits of large hopper outlets and to offer the best flow promotion forms.

Additionally, retrofit options to cure discharge or silo geometry flow reliability shortfalls of existing installations will be shown.

Eddie's biography is on the first page.

**"Intelligent use of Active Flow Assistance to Stimulate Flow in Silos & Hoppers"**

**John Pethullis CEng MIMechE**
**Southdowne Solutions Ltd**

**Prof. Mike Bradley**
**Wolfson Centre for Bulk Solids Handling**

There is probably more money made out of selling bolt-on vibrators as an aftermarket fix for hoppers that have flow problems than there is from building silos. But there are much more intelligent ways of incorporating both vibration and aeration in a design from the outset, as an alternative to relying on gravity alone. Large, flat bottom silos that give great storage volume within the available height, can be designed to be discharged by either vibration or aeration, depending on the material. Likewise where there is a flow problem with an existing silo, the application of an approach supported by an understanding of the material properties, is more likely to deliver a successful solution than simply buying a device and bolting it on. Similarly there are limitations of material properties and circumstances that indicate these approaches are not advisable. This paper will explore these issues based on practical experience.

**John Pethullis**

Over 40 years' experience in Bulk Materials Handling working for Portasilo, Shepherd Group and Clyde Bergemann in technical leadership roles. In 2016 he established Southdowne Solutions Ltd to provide engineering consultancy for Bulk Materials Handling projects, from concept to commissioning. John is former chairman of IMechE Bulk Materials Handling committee. In 2015, he was awarded SHAPA's Individual award "Chiefly for his management of the extensive contract to install biomass handling facilities at Drax Power Station".

**Mike Bradley**

Director of The Wolfson Centre for Bulk Solids Handling Technology at The University of Greenwich, and Chairman of the Solids Handling and Processing Association. He started his career in solids handling with extensive research in pneumatic conveying, but over the years his interest has encompassed a lot of work on hoppers and silos, including the design of many new vessels for challenging materials and troubleshooting of vessels suffering from problems with discharge, segregation etc.

**“The structural safety of silos – Lessons learnt from failure”**

**Martin Armstrong CEng MIMechE**
**Armstrong Engineering & Design Ltd**

Martin’s presentation will introduce the types of silo failures seen in the field, identify typical methods of structural analysis, and highlight a number of best practices for the design of key structural elements.

Martin Armstrong is a Chartered Engineer who specialises in the structural design of storage silos through his consultancy business AED. Prior to offering consultancy services, Martin gained extensive experience in the design of storage silos and bulk handling systems during his 27 year tenure at Portasilo Ltd, where he held senior technical positions.

**“Explosion protection for silos storing bulk goods with combustible dusts”**

**Jim Vingerhoets**
**Explosion Safety Consultant, Fike Corporation**

Jim’s presentation will discuss explosion hazards and risks associated with the storage of bulk goods with combustible dusts in silos. More specifically:

- Under which conditions a dust explosion inside a storage silo can occur
- Potential devastating effects of dust explosion
- Regulatory ATEX/DSEAR requirements for Zoning, Ignition Risk Assessment and Prevention Measures.
- Examples of risk assessments, including prevention against electrical ignition sources e.g. from sensors, mechanical ignition sources e.g. from feeders, and ignition sources arising from the bulk product itself e.g. electrostatic charging and exothermic reactions.
- Explosion mitigation measures: passive explosion protection and active explosion protection using explosion detection and control.
- Ex-Marking of protected silos.

Jim Vingerhoets has been with Fike since 2007 and is currently an Explosion Safety Consultant for Fike Europe BV. Based in Fike’s European office in Herentals, Belgium, Jim is an active working member of the European Standardisation Committee CEN TC 305 WG3. He has coordinated multiple research activities and equipment qualification tests at several international test sites and lectures regularly on the subject of dust explosion protection

**"Ensuring a positive Outcome"**

**Russell Davies CEng MIMechE**
**Consultant, SHAPA Vice Chair**

Russell's presentation will cover:

- Project Planning
- Ensuring tender documents are encompassing yet realistic
- Setting realistic timeframes
- Risk Management
- Mass produced vs bespoke equipment
- Total cost of ownership
- Crystal Ball thinking

Russell Davies is a Chartered Engineer, who has worked in the Bulk Material Handling sector for over 25 yrs. His career started at NEU Engineering and progressed through Reimelt in USA and UK. He ran his own automated ingredient handling business before moving into consulting in 2018. His current company – System Solutions – offers on-site inspection and trouble-shooting services, together with advice on new plant design and system retrofits. He has sat on the board of SHAPA for 12 yrs and currently holds the position of Vice Chair.