Mining Technology Group Newsletter

Summer 2024

Chairman's Chat

Welcome again to the latest edition of the Mining Technology Group (MTG) newsletter in 2024. It's a bumper edition with lots of information and news about people, places and participation. My first duty is to warmly welcome Martha Needs as a new member of the MTG leadership team. Martha has expressed a desire to learn and get involved at the same time, including liaison as our IOM3 Early Career Representative. You can read more about Martha on page 4. This development followed our previous calls for volunteers to join the team and I hope to bring you more news of success on that front in the coming months. I also extend many congratulations from myself and the rest of the team to our two colleagues Alan Auld and Bill Tinsley, who this year are the deserving winners of IOM3 awards. I hope they both enjoy the IOM3 Awards Day in December.

Next is more exciting news about the MTG 2025 conference 'Advances in Mining Technology and Mineral Supply' to be held at IET Austin Court, Birmingham on 19-20 March 2025. The event web page is live and call for abstracts is well and truly open (launched on 13 May by IOM3). Check inside on pages 2 and 9 for details about the conference and abstract submissions, noting the **deadline of 31 July 2024**. As I express on a later page, we really need and appreciate your support to become presenters/authors, or encourage others to do so, and thereby help make this exciting conference happen.

You might recall from the Spring edition MTG has access to a serialised article about the significant and influential contribution of the Dowty Mining company. Part 1 commenced with an historical introduction to early health and safety in mines and the push for improvement. Part 2, in this newsletter, describes the growth of Dowty from its origins as an aircraft component manufacturer into the development of supports for underground mines and closes with an account of the man responsible for such success, Sir George Dowty. We remain very grateful to the Sir George Dowty Memorial Committee for granting permission to reproduce this fascinating series.

Back (and welcome) again for this edition, Mine Tech Services (MTS) provides another great example and case study of their innovation in mining technology, this time using bespoke software to deliver data-driven haulage optimisation in operating mines. Our now well-established 'Mining Education Matters' section includes a comprehensive update on the Degree Apprenticeship and future of UK mining engineering education through the eyes of Prof. Patrick Foster, Head of Camborne School of Mines (CSM) and MTG leadership team member. The hot news is that on 29 June 2024 Exeter University and CSM officially announced the return of the undergraduate Mining Engineering degree. Daniel Smith of the University of Leicester also makes a welcome return to showcase plans for a workshop for the recently launched Training and Research Group for Energy Transition Mineral Resources (TARGET).

Aside from all this activity we must also share some sad news of the passing of two eminent IOM3 members, Don Spenceley and Albert Tuke. The newsletter contains their abridged obituaries with links to the full versions on the IOM3 website. Our sincere condolences to their families and friends.

Finally, we have updates on the imminent GMPA annual summit and IOM3 Future Challenges for Mining seminar, plus news about 'Falls of Ground' and PERC, its recent AGM and new reporting template. Our more regular mining news and IOM3 affiliated local society events also feature, along with more great progress from our Ground Engineering Subgroup, which is planning more activities for 2024. If you want to be in touch about the newsletter, drop me a line through our dedicated email address mtg@iom3.org.

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Stop Press

New MTG Leadership Team member

Martha Needs, geotechnical engineer at Knight Piesold, became a new member of the MTG Leadership Team with effect from June 2024. See page 4 for more details.

MTG 2025: Advances in Mining Technology & Mineral Supply - call for abstracts is still open!

The MTG 2025 conference will be held at IET Austin Court, Birmingham, 19-20 March 2025. See p.9.

Call for abstracts deadline is 31 July 2024.

TARGET mineral resources meeting

Mineral resources & TARGET workshop, see p.12 for details.
Event Timing: 15-16 July 2024
Event Address: College Court, Leicester https://collegecourt.co.uk/
Contact the organiser at djs40@le.ac.uk

CSM to restart undergraduate degree in Mining Engineering

Officially announced on 29 June 2024 at the CSM Alumni Australia Gala Dinner by Exeter University Vice Chancellor, Lisa Roberts accompanied by Prof. Patrick Foster, Head of Camborne School of Mines (CSM).

Upcoming events

IOM3 Future Challenges for Mining Seminar 10 July 2024

IOM3 will host the seminar at 297 Euston Road, London NW1 3AD 5pm – 8pm 10 July 2024. A panel of four industry experts in their fields will consider the major questions and challenges facing mining over the next decade or so. See p.14 for details and visit the IOM3 website to book a free ticket.

ABMEC Conference 2024

This two-day conference will be held at the DoubleTree by Hilton Oxford Belfry, Thame, Oxford, UK. Start Date: 27 November 2024. More details can be found on the ABMEC website.

Mines and Money @ Resourcing Tomorrow 2024

This conference, claimed to be 'Europe's largest mining event', is to again encompass three themes, Resourcing Tomorrow, Technology and Innovation and Mines and Money, 3 to 5 December 2024 at The Business Design Centre, London, UK.

Editorial team

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Newsletter contents

News and Views

MTG Leadership

New MTG Leadership Team member - Martha Needs

We are delighted to welcome Martha Needs as a new member of the MTG leadership team. Martha has expressed a desire to learn and get involved at the same time, including liaison as our IOM3 Early Career Representative.

Martha's bio:

Source: M Needs

Martha Needs is a Geotechnical Engineer, GISTM* Specialist and Project Manager who has worked with Knight Piésold since her graduation from Camborne School of Mines six years ago. During that time, Martha has worked on over 100 projects across 6 continents; including tailings storage facility designs, dam safety auditing, ground investigation planning, geotechnical analysis and project coordination of feasibility studies aligned to NI43-101. Through this work she has travelled globally, representing Knight Piésold on mine sites and at industry conferences.

Martha specialised in the GISTM after its issue in August 2020 and has audited over 20 facilities to the Standard, including major mining companies and ICMM members who lead GISTM conformance for the industry.

Martha is a passionate advocate, spreading the importance of safe Tailings Storage Facility design, management and governance. She speaks at seminars with organisations such as the Department of Business and Trade, the Brazilian Association of Soil Mechanics and Geotechnical Engineering and the West African Institute of Mining, Metallurgy & Petroleum. She also presented at the Knight Piésold Tailings Forum in South Africa, won the MinSouth division of the 2022 IOM3 Young Persons' Lecture Competition, and was a guest lecturer for the UCL MSc Global Management of Natural Resources course in 2023.

* *Global Industry Standard on Tailings Management*

MTG members to receive IOM3 awards

Source: A Auld

The MTG is also delighted to announce that two of its longstanding members, who are also on the leadership team, are the winners of IOM3 awards.

Dr Alan Auld has won the Thornton Medal for being the best speaker at an IOM3 event. He won this award for his presentation entitled 'The Historical Importance of Artificial Ground Freezing (AGF) in Deep Mine Development', which he delivered when co-Chair of the International Symposium on Ground Freezing (London, October 2023).

Source: MIMinE

Bill Tinsley has won the Sir Andrew Bryan Medal, awarded for significant contribution to the Institute through an Affiliated Local Society and/or to the IOM3 Local Affairs Committee over a sustained period of time. Bill has made such a contribution to both the Midland Institute of Mining Engineers and the IOM3 Local Affairs Committee.

Many congratulations to Alan and Bill for their fully-deserved IOM3 awards, which they will receive at the 2024 IOM3 Awards Day on 5 December 2024.

KWK Mysłowice-Wesoła incident

Three workers died and ten workers were injured after a spontaneous high-energy rock mass shock on 14 May at a level of 865 m in the Mysłowice-Wesoła mine, part of Polska Grupa Górnicza SA.
During production operations on longwall 03A in Seam 510, there was a shock with an energy of $7x10^6$ J. The impact of the shock was the deformation of the arches and the uplift of the floor of the excavation.
Rescue teams from the mine station in Wesoła and specialist teams from the Central Mining Rescue Station in Bytom were dispatched to the rescue operation. Other operations of the Mysłowice-Wesoła mine was not interrupted, and the shock did not cause significant damage to other areas of the underground operations.

Source: A N Birtles

Update on Woodhouse Colliery, Whitehaven

On 19 April 2024, the High Court confirmed that the rolled up three-day court hearing will be held between 16 to 18 July 2024. This hearing is a result of a challenge by two parties against the Government's approval of planning in December 2022, following on from the Planning Inquiry in September 2021. West Cumbria Mining (WCM) continues to focus on preparatory works prior to commencement of real construction activity, no later than early 2025. This information (published at the end of April) was taken directly from the WCM website, where more information can be found.
The future of the site might yet be influenced by the UK General Election results on 4 July 2024. See this media article for a flavour of the potential reactions from constituency candidate MPs. It will also be interesting to observe the effects of the Supreme Court judgment dated 20 June 2024 on the extent of downstream emissions from fossil fuel projects to be included in environmental impact assessments.

GMG Sudbury Forum: Building the Mines of the Future

The Global Mining Guidelines Group (GMG) held a two day forum in Sudbury, Canada on 18 to 19 June 2024.
Themes included:

- The deployment and use of AI, simulation, and other applications of data
- Decarbonization, energy management and emissions reduction
- Operational best practices
- Workforce of the future
- Autonomous mining
- Safety
- Rethinking mine design
- Cybersecurity and de-risking operations

It was described by GMG as a highly interactive forum on sharing knowledge with workshops, open discussions, interactive panels and presentations. Learn more about the forum here.
Great minds think alike (see MTG 2025 Conference article on page 9)?

IOM3 Allied Member Rates for IMPC 2024, Washington, D.C.

The Society for Mining, Metallurgy & Exploration (SME) have agreed to support the Advances in Mining Technology & Mineral Supply conference. As an IOM3 member, you can enjoy a range of benefits, including discounts on industry-related activities due to our extensive and close relationships with other institutions and organisations. We are pleased to announce that member registration rates are available for IOM3 members at the XXXI International Mineral Processing Congress (IMPC) in Washington, D.C., from 29 September – 3 October 2024.
Hosted by SME, IMPC 2024 promises to be an informative and valuable event. To receive the allied member registration rates, please select IOM3 as the allied society to which you belong and use the code **IMPCUS24** during the final stage of checkout.
For full event details, and to book your place, please visit the IMPC website for allied societies.

The contribution of Dowty to the world of mining

John Whitaker

This will be a regular feature for the Newsletters this year. John Whitaker[1] has kindly written an article outlining the history of the Dowty company, and their innovative approach to mining. He has included two additional articles from persons active in the industry at the time of the development of these innovations, which will be included in the final article. MTG is grateful to Martin Robins, Chairman of the Sir George Dowty Memorial Committee, for permission to publish the article. Continuing from the Spring 2024 newsletter, part two is featured in this edition.

Introduction of Dowty Hydraulic Props

We now turn to consider Dowty's engineering leap from 'flying in the sky' to 'burrowing underground'. Following the outbreak of World War II, Dowty was engaged in manufacturing hydraulic undercarriages for the Royal Air Force (RAF), and in turn relied on coal supplies to generate the electricity they needed to produce the undercarriage. Robert Hunt's memoirs (he later became Sir Robert Hunt and succeeded Sir George Dowty as Group Chairman) provide the background to Dowty's move into mining:

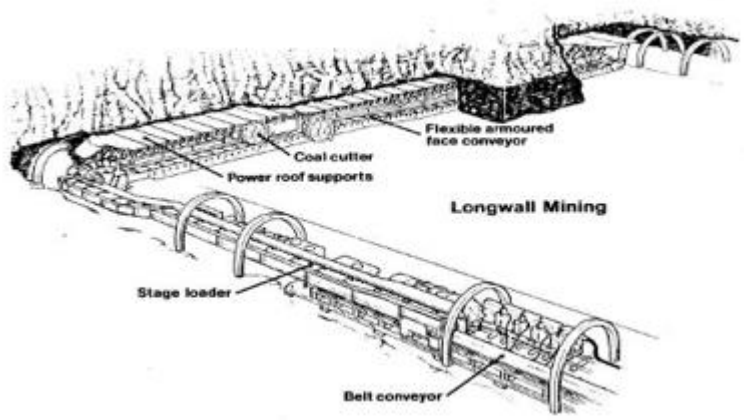

Figure 1 - Layout of a Longwall Coal Face with Modern Powered Roof Supports

"One of our senior employees had a close friend who was a coal mine owner in Nottingham, named Mr Lancaster. He was staying in Cheltenham for a weekend with his friend, who showed him round the company. On seeing and discussing the Lancaster aircraft landing gear, which had of course, hydraulic struts, he had a flash of brilliance and said, *'if only you could make those struts to descend slowly with about 10-ton end loads, we could probably use them instead of the wooden props, which have always been used in mines and are left to rot away as the coal face moves forward.'"* This was the most fortuitous statement ever made as far as the Dowty Company was concerned.

As an inventive engineer and prompted by this encounter, Sir George Dowty soon saw how his aircraft landing gear could with some adjustments be used to support the roof of a coal mine. So, in 1945 he formed the Dowty Mining Equipment company and began his pit prop design work. The first Dowty Standard hydraulic pit props were introduced to Hardwick Colliery, Derbyshire, where two years performance and endurance testing was undertaken. The hydraulic prop quickly became widely used and later a new design was introduced called the Dowty Duke Prop with high speed setting and withdrawal as special features. By 1957, the one millionth Dowty Pit Prop had been delivered and they were being used in mines all over the world, with the U.S. and China being particularly keen buyers. Dowty hydraulic props on the coal face supporting steel 'H' beams is shown in **Figure 1.** Removing a Dowty prop from the waste edge behind a longwall face is illustrated in **Figure 2.** The waste or goaf is allowed to collapse. After thousands of years of wooden pit props, Sir George Dowty pit props were very much the new 'kid on the block'. As with most new technology, Dowty Props were not readily accepted by miners. In fact, at one colliery the miners went on strike when they were first introduced. The problems being, Dowty props were heavier and more technical than wooden props but crucially they were also silent. For years miners had relied on the creaking sounds wooden props make, which constantly informed them of movements in the roof. Understandably, miners initially missed their

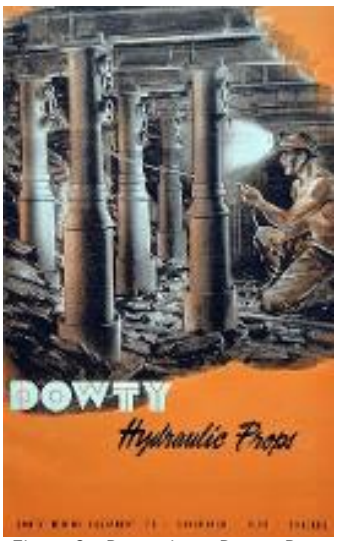

Figure 2 – Removing a Dowty Prop

trusted wooden pit props. Once the Dowty Props were better understood and trusted, miners again went on strike but this time, to have the Dowty Props reinstated after they had been removed from a mine for maintenance!

Development of Dowty Roofmaster Hydraulic Powered Supports

Figure 3 – Dowty Roofmasters in a 48" Coal Seam

Following soon in the footsteps of Dowty Props, came Dowty Roofmaster Powered Supports. **Figure 3** shows Dowty Roofmasters supporting the roof in a 48" (1.2m) thick coal seam. The Roofmaster was a hydraulic powered roof support system housed in mobile steel boxes, which could be connected to the armoured chain face conveyor, which was mounted with a mechanical cutter-loader machine. Such mechanisation at the coal face greatly improved safety and also increased production.

Not far from the Dowty Cheltenham's headquarters in nearby Worcester, was a company already producing high quality belt and chain conveyors, called MECO (Mining Engineering Company). So, rather than "reinventing the wheel" Dowty acquired Meco and integrated its business with its own hydraulic roof props business. The Dowty Roofmaster was soon transforming coal production and, above all, miner safety at the coal face. The Meco business proved to be the perfect match Sir George Dowty envisioned it would be, bringing together on the coal face hydraulic roof props, chain conveyors and coal cutting equipment, as well as belt conveyors, which conveyed the coal to a mine entrance.

Meco were well-advanced in the development of both belt and chain conveyor systems and were deploying the highly productive AB Meco-Moore Cutter Loader as illustrated in **Figure 4**. This merging of products reduced, possibly by years the time it took for Dowty to widely introduce its Roofmaster powered support system into mining. It was also extremely fortuitous that Meco's owners, the Higgins family were lovely friendly people, with whom George Dowty became great friends. This friendship had a beneficial effect on both workforces, who quickly became compatible and began working cooperatively together in harmony.

Dowty brought vital qualities needed in any company wanting to be successful. This was a culture of initiative, ambitious drive, coupled with a 'can do' mentality, which probably wasn't so strong in Meco at the time. Meco soon caught on and became world leaders in all types of conveyors and cutter loaders, with Dowty being a world leader in individual hydraulic props, Dowty Roofmasters and aircraft undercarriages.

Figure 4 – A.B. Meco-Moore Cutter Loader (High Type)

The Dowty Roofmaster made further contributions to miner safety as it provided immediate support of newly exposed sections of roof, using wide, massive roof beams, which provided great protection to the face workers, eliminated the need for 'waste edge' manual labour and reduced the exposure to obvious risks. During the 1920's, when Britain's coal industry was at its height, around 1.2 million men were employed underground. Approximately 2,000 men died every year. Today far fewer men are employed in the industry and thankfully deaths are so rare, that a single death now makes national news.

Viscount Adrian Buckmaster, who was Managing Director of Dowty Mining and also a main Dowty Board Director, is quoted as saying: "I do not remember any fatal accident associated with our longwall equipment during my time in the coal industry. In fact, accidents of any sort on the face were very rare,

and were normally things like trapped fingers or toes suffered during repair work."
Lord Shinwell the Labour Minister of Fuel and Power 1946-47 is quoted in Hansard as saying during the severe winter coal shortages and referring to the new coal face cutter, (Dowty Roofmaster) - "I have sleepless nights imagining what wonders this invention will bring to mining." Understandable, as Lord Shinwell was being given a hard time over the coal shortages and the main energy source at the time. Initially coal faces in Britain yielded around 500 tons per shift. Today productivity has risen in some cases in America to nearly 1 million tons per month!

Sir George Dowty

Figure 5 – Sir George Dowty 1901-1975

Minimising accidents proved to be an incentive for Sir George Dowty's inventive genius (see **Figure 5**). He was also a man who valued Christian principals having been brought up in a family where his father was a minister of a nearby church. George kept a biblical quotation on his desk and at his passing, it was by his bed. Christian motivations always made him consider his fellow workers, and their safety and well-being remained in his thinking, as is evident from two of his many major engineering feats. Firstly, his robust undercarriages used in most Second World War RAF bombers and fighter planes, and which were hailed by the flying men as being trustworthy and totally reliable. They certainly saved lives, particularly when landing back at base with battle weary pilots and crews, often in damaged and therefore unstable planes. The undercarriages were built to a massive margin of tolerance as well as to new engineering designs, which meant they didn't fail under extreme and sudden loads.
Secondly the life preserving Dowty Roofmaster and Pit Props again conceived and engineered to the same high standards of invention and manufacture. Unquestionably they've been instrumental in ensuring death and injury is the exception rather than the norm, in mines across the world today. Just two of Sir George Dowty's innumerable inventions, created during his lifetime.
Sir George Dowty's company first grew through new applications for hydraulics and then by producing motorcycle forks, prime support systems, pit props and later hydraulic control systems. Other notable developments followed from 1950 to 1967.
What an extraordinary man Sir George Dowty was. An outstanding British citizen, a genius inventor, engineer and businessman. His inventions continue to benefit society today and will continue to do so into the future, particularly through millions of safe airliner landings, safer mining conditions and higher productivity. Perhaps his greatest achievement is all the miners, pilots and travellers who daily return safely home to their families. What a magnificent record to have! Now it's time his nation recognised him as a giant amongst the giants!

Figure 6 – Sir George Dowty statue

Recognition of Achievement

Sir George eschewed the limelight and he was not self-serving. His inventions saved lives on a monumental scale and he made a significant contribution to the winning of the Second World War. Nearly fifty years after his passing two statues have recently (May 2024) been erected in his memory - one in a private location and one for public recognition (**Figure 6**). Solomon the wise observed that diligence in business brought reward- "Do you see a man who excels in his work? He will stand before kings; He will not stand before unknown men". A booklet has been developed recording the unveiling of one of the statues and is a tribute to one of England's finest sons. "He was a man, take him for all in all, I shall not look upon his like again" (Hamlet, Act I, Scene II).

MTG 2025 Conference

Advances in Mining Technology & Mineral Supply

Colin Comberbach

MTG 2025 will be a mining conference with a difference. It will explore advances in technology, including artificial intelligence, at every step of the mining lifecycle and examine their interactions with strategic mineral supply to meet future demands for downstream materials.

Source: IOM3

In the previous newsletter the MTG announced the date and venue:
IET Austin Court, Birmingham, 19-20 March 2025.
The web pages for the event have since 'gone live' and can be accessed by clicking on the above image. Those pages contain various information tabs:

- **Overview** (reasons to attend, conference themes)
- **Venue**
- **Promotional opportunities** (sponsorship and trade exhibitor packages)
- **Call for papers**
- **Registration fees**
- **Background & Aims**
- **Call for abstracts is open - deadline 31 July 2024**

The MTG Is pleased to announce the call for abstracts as the next pivotal stage. Prospective authors are invited to submit abstracts of up to 300 words for consideration for the programme using the online form provided by IOM3. Abstracts must provide sufficient information for a fair assessment and should be written in English. Preference will be given to papers with a clear focus on mining technology under any of the listed themes. They can be from mining technology research, practical/applied or policy backgrounds.

Artificial Intelligence Training or Demonstration Sessions
We are still striving to make Artificial Intelligence one of the central themes of the conference and have made good progress with one or two organisations willing to provide Artificial Intelligence training sessions or demonstrations related to mining technology. Please let us know if you would like to join this educational opportunity by clicking on the 'Get in touch' button on the overview web page.

Conference Technology Themes:

- UK Mineral Supply for Mining Developments
- Mine Design, Mine Access & Mining Operations
- Use of Data & 3D Modelling
- Mine Safety
- Artificial Intelligence Applications in Mining
- Technology Applications in UK Mining Projects (Case Studies)
- Mine Exploration & Development
- Mine Surveying, Monitoring & Management
- Mineral Processing & Metallurgy
- Mine Rehabilitation & After uses
- Extended Reality (Virtual, Augmented & Mixed)
- Downstream Materials from Mined Products

Please do not delay with abstract submissions, either your own or via encouraging your contacts to do so. We need and will really appreciate your support to help make this exciting conference happen.

Mining Education Matters

Pat Foster

The Mining Degree Apprenticeship: The future of mining engineering education in the UK

Introduction

In August 2020, during the Covid19 pandemic, the University of Exeter decided to stop the undergraduate degree in Mining Engineering offered by the Camborne School of Mines (CSM). This was the last such course in the UK following closures since 2000 of similar courses at Leeds University, Nottingham University and the Royal School of Mines in London. A low number of applicants was cited as the reason, a trend that was just not limited to the UK, but has been noticed in many other countries. Faced with a lack of students and degree level qualifications, the UK mining industry, through the Mining Association of the UK (MAUK) made the decision to pursue the development of a Level 6 Degree Apprenticeship (DA). A DA is a new type of programme promoted by the UK Government and offered by some universities. Like other apprenticeships, these programmes are developed by employers, universities, and professional bodies working in partnership and combine working at a mine with studying part-time at a university.

DAs develop knowledge, skills and behaviours (KSBs) required for a specific job role and combine this with academic learning at the appropriate level. Degrees offered as part of the apprenticeship are aligned to the qualification descriptors and relevant subject benchmarks.

The Development of the Degree Apprentice Specification

To develop such an apprenticeship a detailed specification has to be developed by industry and approved by the Institute of Apprenticeships & Technical Education and then signed off by the relevant Minister. This specification consists of an "Occupational Standard" and an "End Point Assessment (EPA) Plan".

An Occupational Standard is a short and concise document that describes the KSB's needed for someone to be competent in the occupation's duties. The EPA plan details the independent assessment that apprentices must take after their formal education & training. This will confirm whether they have achieved the KSB's needed to undertake the occupational standard's duties and therefore pass the qualification. This EPA is integrated into a degree course, and upon successful completion, the apprentice receives both a degree and a Level 6 qualification.

A small working group made up from members from MAUK, CSM and HM Inspectorate of Mines, developed the specification which was approved and signed off by the Minister in October (IoATE, 2022). The Group identified 28 knowledge requirements, 20 skills requirements and 8 behaviours.

The Development of the Programme Structure & Syllabus

Anticipating the successful approval of this specification, CSM started to create a programme and syllabus built around the duties and KSB's. In creating this programme consideration was not only taken by the knowledge and experience of staff, but also from looking at other institutions and courses as well as best practice (such as Society of Mining Professors, 2019). In addition, an Industry Advisory Board was formed to seek guidance and provide industry insight on the revitalised curriculum and to assess the level of potential interest in the proposed degree-level blended learning programme an online survey was conducted. This gave encouraging results suggesting that there is significant interest from industry in the programme and structure, not just from within the UK but also from overseas.

It was decided to run the course over 4 years and the degree-level blended learning curriculum provides engineering fundamentals in year 1, key mining skills in year 2, mine design skills in year 3 and core business and leadership skills in year 4.

When not formally studying the apprentices are undertaking their normal employment roles whilst at the same time collating evidence on a continual basis of how they are putting the KSB's into practice in their jobs. Overall the course consists of approximately six hours a week of remote learning, up to four weeks of on-site activity per year and the implementation of skills and behaviours in the workplace. The site investigation element is one of the unique aspects of the programme, in essence using UK mines as

classrooms whereby all the apprentices meet up undertaking their assessments through vocational activity at the most appropriate operations for that activity.

The First Year

The first cohort of 14 students (pictured at Aberpergym Colliery in Wales) from across the UK resource sector started the programme in September 2023. They have a range of experience: from mine surveyor, rockbolt coordinator, shift supervisors to production and mine managers.

Source: P Foster

Their two week residential in Cornwall in April 2024 consisted of face to face teaching of engineering principles for their "Engineering Fundamentals" module, engineering labs, visits to local mines and quarries and team building exercises. The apprentices have started their "Mine Challenge Project" which is looking at the logistics of reopening a small fluorspar mine in one of the UK's national parks. There will be bi-yearly meetings with employers and an academic mentor has been employed to visit the apprentices every couple of months.

Source: Pat Foster

The course has been heavily promoted and was even mentioned in the UK Governments critical metals strategy. During a visit to CSM by HRH the Princess Royal, she officially 'launched' the course (photograph shows Her Royal Highness with the University of Exeter's Vice Chancellor and the CSM student president). We are currently accepting applications for September 2024 entry which will open up the model to potential overseas applicants who are working at mine sites internationally.

Conclusion

This new programme has been a success, judging by the level of interest shown and in feedback so far from apprentices and their employers. By being future leaders within the resource industry, these apprentices can play a major role in the delivery, direction and stewardship of a more responsible extraction of natural resources. Although introduced to provide a short-term alternative to a full-time undergraduate degree, DA presents a new and exciting alterative mode of delivery that has clear benefits to those studying. Whilst the first cohort has consisted of experienced mine operatives, some employers are recruiting school leavers with a view to registering them on the next intake. CSM is now looking to restart its full-time degree within the next 18 months giving opportunities to those interested in the subject who are just leaving school or not working at mines. The long-term success of all this depends on industry, academia and professional institutions working together to better promote our industry to young people. With the energy transition our industry has never been so important and we have a 'once in a generational' opportunity to remould and change the perceptions of mining for the better within society and amongst young people to show the range of opportunities and subjects (not just engineering) to encourage them to join us.

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TARGET Centre Initiative

Daniel Smith

Centre to train Mineral Resources specialists


Source: A Birtles

Dr Dan Smith is in the process of organising a workshop to bring together colleagues from academia, industry, government and the research funding agencies. This is partly an event to flesh out some of the planned activities in the TARGET centre for doctoral training, but also a great opportunity for us to take a collective look at wider research and training opportunities. The ambitions for the workshop are:

- Outline training needs for early career researchers and professionals, looking at the diversity of potential career pathway represented in the attendees
- Plan out training in TARGET and capacity for delivering CPD - both from academic and industrial partners
- Identify key areas of research that could be tackled through PhD projects, and developing the next wave of TARGET studentships
- Identify strategic areas of research that could be developed longer term, as either academic- or industry-led projects.

These aims all need discussion, and a wide range of voices, the emphasis of the meeting will be on networking and communication rather than PowerPoints (but there may have to be a few presentations to facilitate introductions).
A provisional booking has been made for meeting rooms, catering and accommodation at Leicester's College Court facility. Depending on interest and number of attendees, catering and overnight accommodation can be arranged.
Any sponsorship towards the event would be greatly appreciated.
It is planned to hold the event on 15-16 July. Please save the date in your diaries. Start and finish times will be confirmed when the number of attendees has been confirmed. It is expected that the sessions will to start at 11am on the first day and finish by 3pm on the second day.
Please complete the attendance form if you wish to attend some or all of the meetings/ sessions.

Data-Driven Haulage Optimisation

Jonny Witter (MTS)

Software application transforms mine efficiency

When an operation struggles to meet production targets, the initial reaction can be to purchase more equipment or adjust the mine plan without fully understanding the reasons why production targets are not being met. One of the key areas where tonnes are needlessly lost is on haul roads. Poorly performing haul roads, either through inadequate initial design, execution of design or maintenance - or a mixture of all three, is often an overlooked area.

Mine Tech Services (MTS) deploys Haul Road Explorer (HRE), an analytics-driven solution that aims to optimise mining operations by addressing this issue. Performing this analysis using conventional methods would take days, whereas automation makes it possible in minutes, meaning teams can focus on taking action and making improvements. By leveraging the vast amounts of data produced by modern mining equipment, detailed analysis can be undertaken of haul road performance, identifying bottlenecks, and areas in need of repair, and quantifying the expected impact on production.

To make it as simple to use as possible, the software utilises geo visualisations to present the processed and curated data. This visual representation enables mining operations to prioritise maintenance and upgrades, resulting in enhanced operational efficiency and increased productivity.

Key benefits:

Identification of underperforming areas: pinpoints specific areas of haul roads causing delays and inefficiencies, allowing for targeted improvements.

Prioritisation of repairs: quantifies the potential gains in productivity associated with specific repairs, to help prioritise maintenance efforts to maximise their impact.

Data-driven decision-making: analysis is based on real-world data from mining equipment, providing a more accurate and objective picture of haul road performance than traditional methods.

Case study

A gold mine with a frequently changing road network, spread over a large area struggled to prioritise and coordinate their road maintenance activities. One of the key areas of focus was a busy intersection.

Challenge:

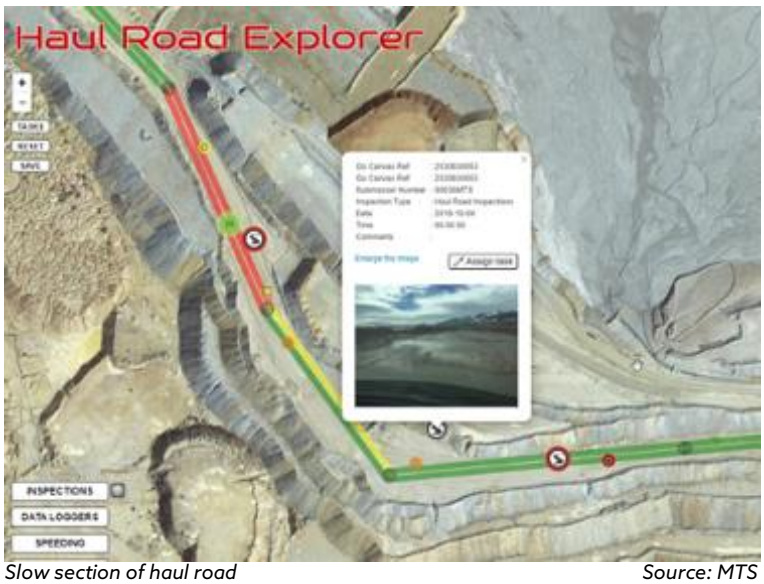
Underperforming Intersection: A major intersection was operating significantly below capacity, resulting in an estimated production loss of 8,400 tons per week.

Unclear Root Cause: Despite the intersection's design being in place for over six months, the underlying causes of the bottleneck remained unidentified.

Investigation:

Visual Inspection: Road surfaces appeared to be in good condition within the HRE system.

No Obvious Culprits: No specific operators or trucks were consistently experiencing issues at the intersection.



Slow section of haul road *Source: MTS*

Distraction Data: Fatigue monitoring data integrated into the software revealed a high frequency of distraction events (~60%) occurring within this particular intersection.

Root Cause Analysis:
Obstructed Visibility: One berm was excessively high, severely limiting operator sightlines.
Ambiguous Right-of-Way: Lack of clear signage led to confusion among operators regarding right-of-way rules.
Hesitant Manoeuvres: The combination of poor visibility and unclear right-of-way led operators to cautiously "creep" into the intersection, triggering distraction alerts.
Implemented Solutions:
Improved Visibility: The obstructing berm was lowered to enhance operator sightlines.
Clear Signage: Right-of-way signage was installed to eliminate ambiguity and guide traffic flow.
Results:
Production Boost: Intersection throughput increased by 6,000 tonnes per week due to improved traffic flow.
Safety Enhancement: A 48% reduction in distraction events was observed, contributing to a safer operating environment.
Conclusion:
In conclusion, by identifying and addressing the root causes of inefficiencies in haul roads, HRE has proven to be a valuable tool in optimising mining operations and improving overall productivity.
More information can be found here: haulroadexplorer.com.

Slow intersection *Source: MTS*

GMPA

MTG Leadership

Programme

Our friends from the Global Mining Professionals Alliance (GMPA) are in London in July for the annual summit of the GMPA. On the afternoon of Tuesday 9 July, the plan is to discuss developments in minerals reporting, and on Wednesday 10 July, between 5pm and 8pm, at the Future Challenges for Mining event, a panel of four industry specialists will consider the major questions and challenges facing mining over the next decade or so. The event will be opened by Christine Blackmore CEnv CSci FIMMM, Senior Vice-President, IOM3. More information can be found on the IOM3 website. Speakers include:

- Duncan Wanblad CEng FIMMM, Group Chief Executive, Anglo American
- Barbara Dischinger, Director, International Women in Mining
- Rohitesh Dhawan, President & CEO, ICMM
- Tanya Chikanza, Non-executive Director, RSSB

Access to the SAIMM Journal

IOM3 members have free access to the Journal of The Southern African Institute of Mining and Metallurgy (SAIMM). IOM3 members regularly feed back on the value of technical information for career and personal development. The Journal focuses on the minerals industry. Subscription to this free service is via the SAIMM website. A name and email address is required. Members can unsubscribe at any time. This benefit is offered as part of the IOM3 GMPA membership.

Obituaries

IOM3

Dr G D Spenceley MBE FIMMM

Source: IOM3

We are sad to announce the passing of Dr G D Spenceley MBE FIMMM.
Don Spenceley was born on the family farm near Penistone in Yorkshire. He wanted to be a farmer, but his father wanted him to go to university. He became a junior mathematician at BISRA (The British Iron and Steel Research Association, pre nationalisation) in 1951, whilst pursuing an external degree from London University. He held several senior positions within British Steel.
He was an inventor on 23 published patents relating to process developments in the steel industry.
He was awarded the Sir Robert Hadfield Medal by the Institute of Materials in 1987 and the MBE in the 1988 New Year's Honours list.
In 2019 Don was awarded an Outstanding Contribution Award by the Institute of Materials, Minerals and Mining.
Don was a long-time member of the Cleveland Institution of Engineers, being President in 1994, a Trustee in the 2000's, and continuing as a Council Member right up until his death. He joined the Institute of Metals (forerunner to the IOM3) in 1983, and became a Fellow in 2010.
A more detailed obituary is on the IOM3 website.

Albert William Tuke OBE CEng HonFIMMM

Source: IOM3

Albert Tuke was born on at Rawmarsh, Rotherham, into a family connected with mining since the early 19th century. He entered the coal mining industry in 1947 in the former National Coal Board's North East Division, No. 3 Area. He held several managerial posts at many collieries in the Yorkshire regions, and in 1985 he became Director of the new enlarged North Yorkshire Area, comprising the merged Barnsley and North Yorkshire areas, the latter including the Selby Coalfield. He continued in this position until his retirement from British Coal in 1990, having received the OBE in the 1986 New Year Honours and the Institution's Douglas Hay Medal in 1989.
In 1983-84 Albert was President of the Midland Institute of Mining Engineers of which he was a long-time member. He was also Chairman of the Yorkshire Coal Industry Social Welfare Organisation for many years. He was elected Vice-President of the Institution of Mining Engineers for 1992-93 and became its President for the year 1993-94. He remained a member of the Council for many years and was Chairman of its Legislation Committee.
Albert Tuke was recognised for his contributions to the UK coal mining industry. He was a strong supporter of the Institution of Mining Engineers, joining as a student in 1955 and becoming its President in 1993.
A more detailed obituary is on the IOM3 website.

Elimination of Falls of Ground Fatalities Action Plan

MPAS

This article has been adapted from correspondence sent by the Mines Professional Associations' Secretariat (MPAS), an 'umbrella' professional body encompassing many of the mining managers' and mine engineers' associations in South Africa. More details are available on the Minerals Council website and newsletter.

The Minerals Council, in associations with sponsors affiliated to MPAS, hosted the annual Fall of Ground (FoG) Action Plan Day of Learning on 5 April 2024 at the Emperors Palace Conference Centre in Johannesburg, South Africa.

This year diverse strategies to tackle FoG fatalities, featuring ground-breaking solutions like exoskeletons, drilling guides, illumination, and permanent hanging wall support in stopes were explored. The action-filled Falls of Ground Action Plan (FOGAP) Day of Learning packed a punch as the mining industry was challenged to deliver the next step change to eliminate fatalities from falls of ground incidents.

The day was attended by more than 230 people which was made up of delegates and exhibitors. There were at least 196 online participants online, giving an audience in excess of 400 persons! The in-person delegates represented a diverse cross-section of the mining industry. This was also reflected in the presenters on the programme.

The event was staged around a boxing ring in which presenters and panellists delivered their messages in the fight against FoG related fatalities and injuries through the adoption of leading practices and technologies. There was little doubt that these interventions are making a difference to the lives of underground crews and their families. FoG was for decades one of the leading agencies of fatalities in South African mining. The unrelenting focus on addressing falls of ground has delivered the step change in the industry's quest for Zero Harm. The number of FoG- related fatalities has reduced by 94% to 15 last year from 239 in 1994. The industry reported a record low of 6 FoG fatalities in 2022, an indication that the FOGAP and earlier interventions are working. The reduction in FoG fatalities and the 91% decline in transport and mining (TMM) deaths to 8 from 87 thirty years ago, have contributed significantly to fatalities falling by 88% to 55 last year from 484 in 1994. While the reduction is commendable and to be applauded, there is more work to be done to achieve Zero Harm and the conference heard about the interventions that are delivering and which were encouraged to be adopted across the underground mining sector. Bolted netting and permanent mesh installations, illumination of working areas, and in-stope drilling guides were the key topics of presentations and the subjects of informative on-site displays by vendors supplying the sector.

Source: MPAS

The keynote address by Mzila Mthenjane, CEO of the Minerals Council South Africa, set the scene for the day. While the mining industry had made significant reductions in fatalities since 2009 (see graph), halving the number of deaths in a five-year and seven-year period, the challenge was now to eliminate FoG fatalities, he said.

Ground Engineering Subgroup (GES) Activities

Emily Wood

Overview

The IOM3 Ground Engineering Subgroup (a subgroup of the Mining Technology Group) is for the broad ground engineering community including site and laboratory technicians, geotechnical engineers, engineering geologists, geo-environmental engineers and many other ground engineering professionals. Ground engineering is defined as 'an understanding of geological structures, materials and processes, combined with the systematic application of investigative, scientific and engineering techniques to produce practical solutions to ground related issues for the benefit of society'. Some examples of these are provided on the GES web page.
The GES committee is confident that with our collective efforts and determination, we will make 2024 a successful and fulfilling year for GES. Please continue to 'spread the word'. If you wish to hear more or get involved please contact:

- David Waring (Chair) david.waring@uk.bp.com
- Iain McKechnie (Vice Chair) iain.mckechnie@bam.com
- Emily Wood (Secretary) emily.wood@bam.com

Joint Evening Lecture

GES & EGGS Joint Evening Lecture - The Role of Ground Engineering in the Energy Transition
Angus MacGregor discusses pumped storage hydro-power schemes and Patrick Cox deep focuses on borehole projects linking to geothermal and energy sector. The lecture is to be held on 23 October 2024 from 6.30pm-8.00pm at Burlington House Piccadilly, London W1J 0BG. For tickets and more information please contact GES secretary emily.wood@bam.com.

Volunteers' Week 3-9 June 2024

Source: IOM3

IOM3 Leadership

In light of Volunteers' Week, the IOM3 staff extended their heartfelt thanks for the dedication and hard work undertaken by the IOM3 Active Supporters and Volunteers. The commitment and tireless efforts make a significant impact on IOM3 and the community, and the IOM3 staff deeply appreciate everything undertaken for IOM3.
To mark Volunteers' Week, on behalf of the Trustees, employees and members of IOM3, IOM3 thanked all the Active Supporters and Volunteers for the efforts undertaken over the last twelve months. It said the commitment and know-how of the Active Supporters and Volunteers have helped IOM3 "navigate" the challenges of the post pandemic new world, and to continue evolving IOM3 to meet the needs of members during the transition to a low-carbon, resilient and resource-efficient society.

2024 Member Survey

IOM3 Leadership

The fourth IOM3 all-member survey aims to help us understand what is important to our members. It focuses on the IOM3 membership offer, including publications, training, events and qualification support, the external policy work that IOM3 does and the value its networks and communities provide. The survey can be accessed when logging into the IOM3 website, or from the email sent to all members on 1 June. There are 44 questions, and should take in the region of ten minutes to complete.

PERC News

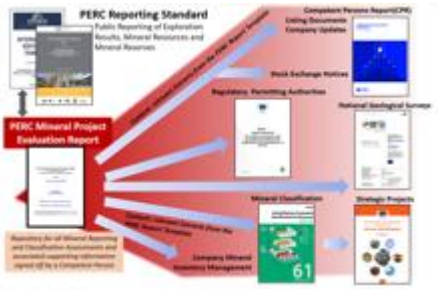
Andy Birtles

PERC AGM

The Pan European Reserves and Resources Reporting Committee (PERC) Annual General Meeting (AGM) was held as a hybrid event in June, with the participation of some 30 persons from the six Participating Organisations.

PERC Mineral Project Report Evaluation Template

The PERC Mineral Project Evaluation Report Template (MPER Template) provides a framework to assist Competent Persons (CPs) in the compilation of data, information, interpretations, assessments and conclusions relevant to Exploration Results, Mineral Resources and Mineral Reserves throughout a Mineral Project's life cycle from early exploration through advanced mineral development to extraction operation. The template is focused on assisting CPs in compiling such information in a manner that conforms with the requirements and recommendations outlined in the PERC Reporting Standard. Specific linkages with Table 1 in the PERC Reporting Standard are provided to facilitate compliance with its requirements.



Source: PERC

The Template allows CPs to prepare a Mineral Project Evaluation Report that is the foundation document from which appropriate extracts form the basis for different types of reports as indicated schematically in the image and listed below. The Template can be downloaded as both .pdf and .docx versions.

PERC Sub-committees

PERC has several sub-committees addressing various aspects of promoting PERC, the PERC Standard and other PERC initiatives to the minerals industry across Europe, including the United Kingdom. The sub-committees are:

- Standard Update Sub-Committee, considering improvements and amendments to the PERC Standard.
- Finance Sub-Committee, addressing means of interaction with the financial institutions and bourses.
- Training Sub-Committee, addressing the training and courses to be given to the minerals reporting practitioners across Europe.
- Communications Sub-Committee, developing means of presenting PERC and the PERC Standards and other initiatives via the website and social media sites.

Further information can be obtained from the PERC website, or from the IOM3/ PERC representatives.

PERC Mineral Reporting Definitions

PERC has been working on an Integrated Approach to Public Reporting and Non-Public Reporting under the PERC Reporting Standard. This has been developed because of the variety of approaches in naming convention and assorted terminology associated with Mineralised Material within Mineral Deposits, from the Conceptual Target selection stage through to the declaration of a Mineral Reserve in a Public Report. These independent approaches can lead to unintentional gaps and misrepresentations of the assessment of the Mineralised Material present in the various Mineral Exploration Projects, Mineral Development Projects and Extraction Operations. The publication of the MPER template has now resulted in the development of "standard" definitions. This will shortly be published on the PERC website.

Affiliated Local Societies' news and events

MTG Leadership

The following events have taken place or are currently planned for 2024. Additional information relating to Affiliated Local Societies can also be accessed from the IOM3 website.

WIMM

Meetings are generally held on the first Monday of the month at the William Smith Building of Keele University, usually commencing at 7:00 pm. The meetings/ lectures can also be attended using the Zoom application. Additional information can be accessed from the IOM3 website.

MinSouth

Source: MinSouth

The incoming president of MinSouth is Mark Davis, MSc CGeol and EurGeol. Mark is a geologist of over 38 years' experience in multiple commodities and countries. He has worked in 29 countries, including based in five and educated in two. Mark's wide experience to commodities ranging from industrial materials through to precious platinum & diamonds. Presently, Mark is a consultant and Board Advisor. Mark is a STEM Ambassador & Distinguished Toast Master. Meetings are generally held on the second Thursday of the month at various venues, usually commencing at 7:00 pm. Registration prior to the event is required. Additional information can be accessed at minsouth.org.uk/.
Planned events for the remainder of 2024 are as follows:

- 10 October 2024 at the IOM3 London office.
- 14 November 2024 at the Counting House.
- 12 December 2024 online.

MIMinE

Meetings are generally held on the second Thursday of the month at one of the Mines Rescue Stations at Knottingley or Mansfield, with video conference facilities for those who cannot attend in person at the MRSs at Rhondda and Fife, usually commencing at 4:00 pm. Additional information can be accessed at www.themime.org.uk/events/

11 October 2024	AGM, Dinner and Presidential Address	Mount Pleasant, Doncaster

NEIMME

Meetings are generally held on the second Thursday of the month at Neville Hall in Newcastle upon Tyne, with video conference facilities available for those who cannot attend, commencing at 6:00 pm. Additional information can be accessed at mininginstitute.org.uk/.

MIS

Meetings are generally held on the second Tuesday of the month, with video conference facilities for those who cannot attend available, commencing at 7:00 pm. Additional information can be accessed on the IOM3 website.

CorIE

Meetings are generally held at the Chapel Lecture Theatre, Penryn Campus, Penryn, Cornwall, with video conference facilities for those who cannot attend available, commencing at 6:00 pm. Additional information can be accessed on the IOM3 website.