Mining Technology Group
I·M3

Mining Technology Group Newsletter

Winter 2022

Chairman's Chat — Colin Comberbach

Source: IOM3

Welcome to the final MTG newsletter of 2022, another year this decade that has been rather tumultuous, not least because the UK and Commonwealth sadly lost its Sovereign and IOM3 its Royal Patron of the previous 70 years, Queen Elizabeth II. Since the restructure in April, the MTG and other IOM3 technical communities have had to spend time absorbing IOM3 governance and policy changes; being new to the Chair in this period I hope that next year will be one where we can concentrate more on MTG activities and objectives. With this in mind I invite all MTG members and readers to get involved and bring advances in mining technology to the attention of the MTG Leadership Team and submit content for the newsletter or Materials World. This can easily be initiated by using the contact details in my final paragraph. The technology trends article in the Mining Education Matters feature illustrates the importance of receiving member feedback, similarly the article on mining engineering provision outside the UK. Also in this edition, we have a selection of news, views and heritage (with an educational link) from the mining sector and a number of local society updates, including one from the new President of MIMinE, Lee Rawson. We have included an opinion piece on the UK mining scene, to which readers are welcome to respond. The final page comprises a few international reminders about the upmost importance of safety in mining, the consequences of getting it wrong and the continuing need for improvements. With a happier note to close 2022, on behalf of the MTG Leadership Team I say thank you for your support and wish all our readers a Merry Christmas and all the best for the New Year, 2023.

Your suggestions are always welcome, so please visit linkedin.com/in/coldcomb where you can find out more about my background and post me a message. Alternatively, please send an email marked for the attention of the IOM3 MTG to our IOM3 support contact David Arthur (david.arthur@iom3.org).

Stop Press

See MTG webpage for latest articles:

https://www.iom3.org/group/mining-technology-group.html'

West Cumbria Mining - Woodhouse Colliery

Underground metallurgical coal mine approved by Secretary of State on 7th December– full decision, click here

Upcoming Events:

11th International Symposium on Ground Freezing, London, 10–12 October 2023. See https://www.iom3.org/events-awards/11th-international-symposium-on-ground-freezing.html for more details

MTG Leadership Team Meeting

The latest MTG leadership meeting was held on Thursday 1 December 2022.

MIS/ MTG Evening Meeting 14th December 2022

Martin Downing and Dave Greenwell will be giving a presentation "Mine Shaft Access – A New Approach".

Hybrid event - further details on pp.7-8

Contents

Editorial Team

Colin Comberbach, Rod Stace, Andy Birtles

IOM3 contact - David Arthur (david.arthur@iom3.org).

News and Views from the Mining Sector MTG Leadership

Net Zero Review

With many thanks to the Leadership Team of the MTG (and others), the IOM3 response to the net-zero review call for evidence was compiled and sent in early November. This has been published on the IOM3 website (https://www.iom3.org/uploads/assets/274fe536-06aa-4321-a28ee4f8e53df9d3/Net-Zero-Strategy-Sector-Summary.pdf). The efforts and insight have been invaluable and helped develop an informed response to this call in an extremely short timeframe. IOM3 will continue engaging with this conversation and taking steps to represent members in important policy discussions. As a wide range of quality contributions was received, the IOM3 will be looking to make the most of this by reusing the input in other ways, for example in Materials World.

Jagersfontein tailings dam failure

Source: Grobler du Preez/Shutterstock

A dam holding liquid mine waste from a tailings reprocessing operation near the historic Jagersfontein diamond mine in Free State Province of South Africa burst on 11th September 2022, releasing a flood of mine slurry that swept away houses and cars, killed one person and injured many more.

This failure again highlights the need for binding global regulations of facilities used to store mining waste. There are several useful documents relating to tailings dam management including the Global Industry Standard on Tailings Management and the SME's Tailings Management Handbook: A Life-Cycle Approach. See also https://www.iom3.org/resource/conveners-of-the-global-industry-standard-on-tailings-management-statement-on-jagersfontein.html

Fracking

Hydraulic fracturing, or fracking, is a technique for recovering gas and oil from shale rock. It involves drilling into the earth and directing a high-pressure mixture of water, sand and chemicals to release the gas. The injection of fluid at high pressure into the rock can cause earth tremors. Seismic events of this scale are considered minor and are rarely felt by people. The ban on fracking in England will be reinstated, new Prime Minister Rishi Sunak has said. It reverses a decision by his predecessor Liz Truss.

Ground Freezing Conference

Following a 16-year hiatus, the 11th International Symposium on Ground Freezing (ISGF) will return to London, UK for the first time since 1988 to present the latest research, innovations and concerns as well as challenges and opportunities in the fields of Artificial Ground Freezing (AGF), as well as the mechanics of Frozen Earth. This will be held on 10–12 October 2023. The call for papers has now closed, having been oversubscribed threefold! More information can be sourced from https://www.iom3.org/events-awards/11th-international-symposium-on-ground-freezing.html.

West Cumbria Mining

The day before the extended decision deadline was due to expire, on the 7th December 2022, Michael Gove (Secretary of State for Levelling Up, Housing & Communities) confirmed his agreement with the planning inquiry inspector's recommendation and approved the Woodhouse Colliery development to produce metallurgical coal for use in the steel making industry. See Stop Press (p.1) for decision link.

Commodity Prices

A perusal of various indices and commodity prices since 1982 shows a rapid growth in the early 2000s, a general levelling off up until about 2016, and then an even more rapid increase from about 2020. The latest indications are a slight reduction by about 10% since June, but there are no indications that this will continue. This indicates why mining projects are still required to be developed.

Source: MTG

Mining Education Matters — Colin Comberbach

UKMEF Forecast

Source: UKMEF

In its July 2022 report[1] the UK Mining Education Forum (UKMEF) estimated that at least 48 mining engineering and 18 mineral processing graduates are required per year to sustain the UK mining industry. This is against the backdrop of projected major increases in mining of critical minerals and essential metals required to support the energy sources transition currently underway. In these times the UK has a responsibility to develop its own resources of critical minerals and essential metals. The growth in mine exploration and developments by several companies in England, Scotland, Wales and Northern Ireland is a testament to this trend. The UKMEF report states that of 1,237 mining and mineral processing engineers registered with the Engineering Council, 80% are over the age of 50. Furthermore, it adds, Camborne School of Mines (CSM) at the University of Exeter is the only remaining UK university with the relevant teaching capability in underground mining engineering and mineral processing. Unfortunately, the pausing of CSM undergraduate courses in such subjects in 2020 has only exacerbated the emerging shortage of qualified people for the mining industry. CMS and UKMEF member organisation The Mining Association of the United Kingdom (MAUK) have developed a Mining Management Degree Apprenticeship (MMDA), with places for 15 students due to commence in 2023. However, more needs to be done to meet the needs of mining equipment manufacturers, mineral processors and mining services such as consulting and finance.

The UKMEF is a group of professionals from industry, trade associations, professional bodies and academia. Several senior members of the Mining Technology Group (MTG), Advisory Council and the Executive Board of IOM3 are registered members of the UKMEF. The MTG is asking all members of IOM3 with a mining interest to engage with the need for progress in UK mining education, raise its awareness in government and public circles and encourage prospective students to take up a career in mining. This cause is not just about mining, either, because with mining education and training comes a raft of transferable skills that will benefit the industries of the future – just as they did in the past and still do today.

Further details about the mining education issues and ways to help overcome them can be found in the UKMEF report and national press release about the skills shortage, both available online at https://www.ukmef.org.uk/.

[1] UK Mining Education Forum - The Mining Sector's Strategic Need for UK Mining Engineering and Mineral Processing Graduates, 10 July 2022.

Technology Trends in IOM3 Membership

As Chair of MTG, I recently proposed that the IOM3 Advisory Council should consider the technologies that ought to be focused on in order to attract new entrants to the respective professions in IOM3. At the September Council meeting, partially in response to this request, Ian Bowbrick, IOM3 Director of Membership & Professional Standards produced an interesting review of technologies used by new IOM3 members at MIMMM grade. The most significant trend is towards the adoption of Industry 4.0 technologies such as artificial intelligence, autonomous vehicles, smart technologies and the use of block chains. Whilst the review is not specific to mining, it is hugely relevant to the sector, which has already seen the development of remote mining of operations (such as at Rio Tinto) and 3-D printing in manufacturing. The MTG aims to more widely feature the use of such technologies in mining and is seeking contributions from IOM3 members, who can not only write mining-related content based on relevant knowledge and experience but also act as peer reviewers at IOM3 membership level. Interested members can get in touch with me at linkedin.com/in/coldcomb.

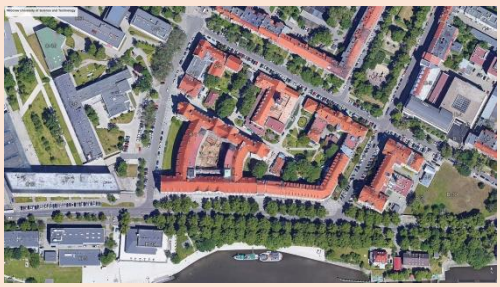
New Head Appointed at Camborne School of Mines

Many congratulations and best wishes for success to MTG Leadership Team member Dr Patrick Foster, who was recently promoted to become Head of Camborne School of Mines, University of Exeter.

Mining Engineering Provision Darron Dixon-Hardy

Mining Related Engineering Providers outside the UK

In the 1980s there were around six Universities and Polytechnics offering traditional undergraduate degree courses related to mining, mineral and quarry engineering in the UK plus several colleges offering various certificates and diplomas. Since then, all have closed apart from the Camborne School of Mines (CSM). A decision was made by the University of Exeter to pause undergraduate recruitment to CSM which means at the moment there is no UK provision for mining education at undergraduate level although several courses covering gas, petroleum, engineering geology etc are available at both undergraduate and postgraduate levels.



Wroclaw University of Science & Technology
Source: Google Earth view @ 51°06'28.09"N 17°03'45.27"E

The Mining Association of the UK (MAUK) and the Association of British Mining Equipment Companies (ABMEC) have been involved in several initiatives to support mining education in the UK. Two of which are, firstly, the development, submission and approval of a Degree Apprentice program for Mine Management and Mining Engineering, which will see its first cohort of students starting at CSM in September 2023 and, secondly, the formation of the UKMEF (see p.3).

In this short article I'll be taking a brief look at what mining related engineering provision is available in Finland, Poland and Turkey, three countries that I used to take students on mining tours to, when the University of Leeds offered courses in mining, minerals and quarrying.

Finland has a diverse mining industry with extensive natural resources including lead, copper, iron ore, zinc, chromite, nickel, gold, silver and limestone. The Lapland University of Applied Sciences in Rovaniemi, just South of the Arctic Circle, runs summer schools on mining in the Arctic and a bachelor's degree in engineering studies covering various topics including mining technology, introduction to the extractive industry, mining legislation and occupational safety, and mine design, all delivered in Finnish. Education in English is provided by the University of Oulu where students initially study for a bachelors in Process Engineering then continue to a 2 year MSc in Mineral Resources and Sustainable Mining (Mining Engineering and Mineral Processing). Oulo also participates in the Erasmus Mundus joint MSc in Sustainable Mineral and Metal Processing Engineering, a program delivered by Oulu, Montanuniversität Leoben, Austria, University of Zagreb, Croatia and the Universidad Tecnica Federico Santa Maria, Chile.

The Federation of European Mineral Programs offers two year MSc courses referred to as European, Mining, Minerals and Environmental programs (EMMEP) with partner institutions, Aalto University (the merged University of Art and Design Helsinki and the Helsinki University of Technology), RWTH Aachen University, Germany, Delft University of Technology, Netherlands and Montanuniversität Leoben, Austria to deliver the European Mining Course (EMC). This was established in 1996 with the Royal School of Mines at Imperial College as one of the founding universities at that time offering a Masters in Mining Engineering and Mineral Engineering.

Poland has extensive resources of hard and brown coal, rock salt, sulphur, construction minerals plus lesser deposits of copper, zinc and lead. Poland continues to offer several, varied programs related to mining engineering with students studying first and second cycles. The first cycle is largely equivalent to the UK undergraduate or bachelor degree while the second cycle corresponds to postgraduate or master's level studies. The Wroclaw University of Science & Technology offers a 5 year Mining and Geology Masters fully taught in English plus other programmes in geodesy and cartography, and geoinformatics. AGH University of Science and Technology, Krakow, offers a first cycle of mining engineering related topics, then allows students to select second cycle specialist studies from surface mining, underground mining, processing of mineral raw materials, mining engineering and mining geomechanics and underground construction. Lastly, the Silesian University of Technology, Gliwice, Faculty of Mining, Safety Engineering and Industrial Automation offers a Masters in Geoengineering and the Exploitation of Raw Materials covering opencast mining, underground mining, geology or engineering machinery and industrial robotics.

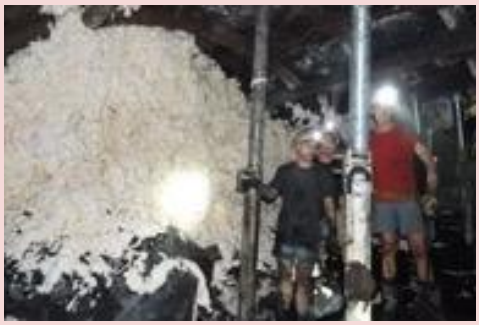
Turkey has a diverse mining industry with deposits of copper, zinc, nickel, tin, chrome, magnesium, gold, coal and boron. It is considered to be the largest producer of gold in Europe and has the largest reserves of boron in the world. It has almost 20 universities with mining departments and compared to the UK has an unusual system of student recruitment. The departments are allocated a certain number of students to take each year. In 2021 and 22 the total number of allocated places was 455 but actual numbers recruited were 363 in 2021 and 353 in 2022. Out of all the universities only 5 recruit the full number of students according to the quota. They are Istanbul Technical University, Istanbul University, Middle East Technical University, Hacettepe University, both in Ankara, and Dokuz Eylùl University in Izmir. Some universities, for example, Dumlupinar University in Kütahya have not received any allocations for Turkish students for the past 5 years. Instead, they recruit international students from Africa and the Middle East and offer MSc programs. This would certainly be in interesting situation for a university department to be in in the UK, broadly the same situation that CSM finds itself in now.

Globally there is a strong demand for mining graduates but one of the difficulties that needs to be addressed is how attractive a career in the extractive industries is to a 17 year old applying to university. Except for Turkey which attracts large numbers of students every year, most European countries have seen a decline in the number of courses available and student recruitment. Finally, it's worth taking a moment to reflect that of the 11 European mineral and mining universities listed in the QS World University rankings, none of which is in Finland, Poland or Turkey, the best is the Camborne School of Mines.

Where have we been? MTG Members

Poland

The Polish coal mining industry is facing several challenges, particularly from pressures to phase out the industry altogether. The mines are heavily regulated, and the mining areas are classified according to the Zagrożenia Naturalne (Natural Hazards), which require detailed plans and risk mitigation measures, and which are closely monitored. Three of the key hazards are methane, rockbursts and spontaneous combustion. There have been several incidents recently involving the ignition of methane, outbursts of gas and rock caused by a rockburst and faces being sealed due to incidences of spontaneous combustion. Interestingly, many of the longwall faces sealed off after a spontaneous event will be recovered after pumping quantities of nitrogen and carbon dioxide gas to "inertise" the area.



Spon. comb. control Source: MTG Member

South Africa

One of our members has recently been involved in undertaking risk insurance surveys for two of the larger coal mining houses in South Africa. These are all based around the city of Witbank/ eMalahleni, and supply coal to the local power stations and for the export market, transporting the coal through the Richards Bay Coal Terminal on the northeast coast. Many of the mines have implemented world class standards to mitigate risk and improve safety standards and can be considered world leaders in many of the systems and processes being used.

Stonedusting standard. Source: MTG Member

Local Society News Various Contributors

MIMinE (Lee Rawson)

The MIMinE is holding its 16th Safety Seminar, with technical papers of relevance to mining and mineral extraction on 21 April 2023. This annual event attracts a diverse audience which includes senior personnel, procurement managers, trade unionists, students and apprentices. The event also features company exhibition stands and ample opportunities for delegates to network during break times. Members of the MTG Leadership Team will be in attendance and would welcome meeting anyone who requires information on MTG activities. More details can be found at https://www.themime.org.uk/wp-content/uploads/2017/02/2023-04-21-SS-Flyer4.pdf.

Source: MIMinE

Below is a list of meeting dates for the remainder of this year and for the next year:

- 8 December 2022 – Wayne Hose of Pinssar (DFEE continuous monitoring – in the real world)
- 12 January 2023 – Paul Knowles of Komatsu Mining Corp (Longwall mining – roof supports)
- 9 February 2023 – Daniel Sharpe of Komatsu (The evolutionary development of Armoured Face Conveyors)
- 9 March 2023 – Graham Vodden of Amco Giffen (ICL Boulby infrastructure refurbishment)
- 21 April 2023 – Annual Safety Seminar in Sheffield (Safely Managing the Challenge of Change)
- 11 May 2023 – Ryan Alexander of Fuchs (Lubrication and equipment reliability)

See the article below introducing the new President of the MIMinE.

NEIMME (Colin Comberbach)

The North of England Institute of Mining and Mechanical Engineers held its 170th Anniversary & The Newcastle Mining Department Alumni Society Annual Reunion Dinner on 29th October 2022. IOM3 helped to mark the occasion with Chief Executive Colin Church, President Neil Glover and Vice President Christine Blackmore in attendance. The celebrations took place in the historic surroundings of Neville Hall, Newcastle, accompanied by the wonderful Ashington Colliery Brass Band.

Source: NEIMME

WIMM (Wyn Griffith)

WIMM have published their latest list of meetings and presentations, venue Keele University:

- 5th December 2022: Mark Hudson – Geoterra Ltd, Laser Scanning Technology
- 7th February 2023: Dave Greenwell/Alun Jenkins - SES Ltd, Alternative Shaft Access at a North Wales Shaft site
- 7th March 2023: Stuart Hoult – MRST (Mines Rescue and Training Ltd) How the Mines Rescue Service have moved into a new era
- 25th April 2023: To be confirmed

MinSouth (Chris Hallet)

"MinSouth" is the branding name of the London and Southern Counties Minerals Industries Institute, which became an Affiliated Local Society of IOM3 in October 2004. This followed a series of mergers over the years. We were formerly a regional group of the Institution of Mining and Metallurgy in the South of England, and our President's badge of office comes from a previous merger with the Southern Counties Institute of Mining Engineers which was inaugurated in 1958.

MinSouth generally holds its meetings on the second Thursday of the month at 6pm at different locations in London: The Counting House, 50 Cornhill, EC3, a Fullers Pub in the City, the facilities at IOM3 HQ at 297 Euston Road, NW1 and The Royal School of Mines Building of Imperial College in SW7.

Source: MinSouth

Our talks throughout the year cover topics ranging from exploration, mining, extraction and processing, through to the environmental and social governance aspects of the industry and include joint meetings with the British Tunnelling Society (BTS) and Women In Mining UK.

Following the impact of COVID when we were limited to on-line meetings, we now aim to run all of our talks as "hybrid". This has resulted in an increase in overall attendance and a broader reach of both audience and speakers – the advantage of our UK time zone has given us the opportunity to have live speakers from as far away as Vancouver and attendees from as far away as Saudi Arabia. The on-line capability has also enabled us to offer lunchtime "Snap" meetings inviting companies to present their latest developments in technology.

Our particular highlights of the year are our Prestige Lecture, in which we aim to invite a Senior Executive or CEO of a Mining Company to present and our Christmas Mining Quiz every December attracting teams from companies, members and students alike.

Do visit our website, https://minsouth.org.uk, which includes information on future meetings through our Events page, and Video Recordings of our past meetings; also a section on Educational Resources which provides school children and young people of all ages with an insight into our industry.

Source: MinSouth

MIS (David Seath)

The Mining Institute of Scotland (the 'Institute') has developed a full programme of events for 2022/23 that we feel reflects many of the interests of our members. A member survey held over the summer identified that members wanted both physical and online meetings. Technical Meetings are held from September to May and industrial visits during the summer. The Programme had its first industrial visit to the Port of Aberdeen's South Harbour when the tour party was able to view the construction of the new harbour. An article was published in the quarterly Newsletter which is available on our website. Our second industrial visit was to the NESS Energy from Waste Project in Aberdeen. The EfW plant will process non-recyclable waste from the three Council areas, and will produce both electricity for the national grid and heat for a district heating network

Source: MIS

A Student Seminar was held in October at the University of St Andrews, when the audience listened to a group of grant-funded student members describing their trip to Stjernøya, Norway where they investigated the possibility of finding rare earth elements on the island. At this event, 13 students joined IOM3.

Technical presentation meetings have been held in October and November. In October, a physical meeting was held in St Andrews and a hybrid meeting held online with physical venues in Glasgow and Edinburgh. The November technical meeting featured a presentation on corrosion monitoring in the oil & gas sector. On this occasion, the physical venues were in Aberdeen and Edinburgh with online access available.

Plans have been put in place to hold a local society heat of YPLC 2023, with the competition being hosted by the University of St Andrews.

All Institute events are open to visitors and details published on our website at: www.iom3.org/mining-institute-scotland where further information on the Institute can be found.

December's Presentation - Joint meeting with IOM3 MTG

On 14 December 2022 Martin Downing and Dave Greenwell will be giving a presentation "Mine Shaft Access – A New Approach". Hybrid meeting, registration required, see MIS web site for details.

Source: MIS

The Milwr Tunnel is a 16km long tunnel that drains an extensive area of former lead mines in North Wales now used as a strategic water supply. Wardell Armstrong have worked with SES over the last 10 years to inspect and maintain the tunnel. Due to the length of the tunnel and the significant flow of water through it, the opening up and re-commissioning of two abandoned mine shafts has been necessary to provide access to the points along the tunnel.

The presenters will describe some of the work that has been carried out to rehabilitate the shafts, in particular, describing the most recent inspection at Caeau Shaft that involved mobile cranes to safely access the 200m deep shaft. The project showed how this approach can be utilised for occasional entry into other abandoned mine shafts, rather than requiring the setup of conventional winding systems.

The Midland Institute of Mining Engineers — Lee Rawson

The Midland Institute of Mining Engineers is steeped in history & tradition from its inauguration in 1857. The institute had been formed following several methane ignitions & explosions in the Barnsley coalfield with its objective "The more general diffusion of Practical and Scientific Knowledge on the Working and Ventilation of Coal Mines". I am Lee Rawson and on the 7th of October 2022 the Midlands Institute of Mining Engineers CIO (MIMinE) held its 2022 Annual General Meeting & Annual Dinner, where I was proudly appointed as the new president for 2022 to 2023. I was presented the Presidential Badge of Office by Stewart Bullock the outgoing president, the medal itself carries history as it was donated by an anonymous donor in 1938. As the incoming President it was my responsibility to deliver a presidential address prior to dinner, following in the footsteps of our first president J.T.Woodhouse delivering his inaugural address in 1958 & all the presidents who have since proceeded him.

Source: MIMinE

My presidential address was entitled "Digging our way out of a Climate Crisis". The paper was intended to be thought provoking by looking at how mining is critical not only to our modern lifestyles but also to achieve the Net Zero roadmap. The drive to net zero requires extensive amounts of resources most of which are mined. Our industry is set for a boom driven by demand for metals & minerals such as copper & lithium. The mining industry has a strong future but will need to evolve to be more sustainable. My intention was also to encourage young engineers to enter & remain in the industry, with so many opportunities globally for mining engineers.

With over 80 mining professionals in attendance, it was great to see the mining fraternity is going strong in the UK and also with a wide cross section of generations including young engineers in attendance it looks promising for the future of our industry. It is a great event for networking with other industry professionals with attendees from Anglo, British Gypsum, ICL & Komatsu to name a few of the companies who are supporters of MIMinE.

Source: MIMinE

There were also attendees from other institutes including Neil Glover the president of the IOM3, Kate Thornton and Christine Blackmore vice presidents of the IOM3 and Colin Comberbach Chair of Mining Technology Group IOM3; Steve Martin of the North of England Institute of Mining Engineers, Wyn Griffith president of the Western Institute of Mining and Minerals; Kevin Sabin president of ABMEC and Jane Isaacs Director General of ABMEC.

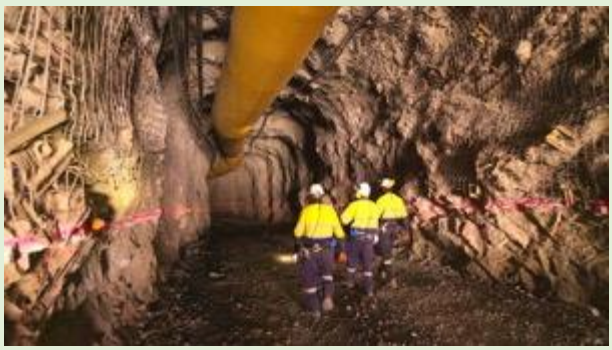
If anyone is interested in learning more about mining, technology & our industry or are in the industry and would like to join, please add the Midlands Institute of Mining Engineers as your local society. We have an active calendar of events with six guest speakers through the year who deliver technical papers on varying subjects which hopefully you will find interesting & aid your professional development. We also hold an annual Safety Seminar in Sheffield which next year will be on the 21st April 2023. For more details, please visit our webpage (themime.org.uk).

Opinion Article

Laurence Morris

The renaissance in mining metals in Britain – is it feasible?

Despite years of neglect and mine closures, Britain needs to again expand its mining industry, to develop critical minerals deposits, according to HM Government (HMG 2022) – but not coal and gas, which are to remain in the ground.



Source: Shahir Chundra, Wikimedia Commons

Green technology is an insatiable user of critical minerals such as cobalt, tin, and tungsten. Every mobile phone contains at least twenty critical minerals, including tellurium and rare earths. Electric cars are dependent on lithium for batteries. Each wind turbine uses enormous amounts of iron, aluminium, copper, and aggregates as well as a whole suite of minerals.

Green technology would falter and die without a steady diet of critical - and not so critical - minerals. Net zero-carbon is stimulating demand for minerals, which will be intensified by further economic growth in the Global South.

The first step is meeting British demand for more minerals is exploring for mineral resources within our country. An efflorescence of interest in British mining (see box) is already taking place, encouraged by a favourable headwind from local authorities who need the jobs and the tax revenue, and many authorities are willing to approve and permit.

However, several problems must be overcome which could yet stifle the renaissance in the UK mining industry. Some issues are structural and cannot be avoided, others are regulatory and need urgent government assistance and a change in attitude.

In summary:

1. Ore bodies will likely be either large low grade ore deposits or small high-grade deposits
2. There is a lack of supporting industry
3. There is a lack of trained and professional people
4. The industry suffers from NIMBYs and erratic UK government policy
5. Mining is inelastic: it cannot rapidly respond to rising demand

For brevity and to keep the paper to a reasonable length, I discuss only the first and the last two points in more detail. The last coal mine (Kellingley) was closed in 2015 and most of the original equipment manufacturers and suppliers drifted abroad; although Caterpillar and JCB maintain large depots in Staffordshire to supply construction and quarrying. The last mining school, Camborne School of Mines, closed its mining engineering degree courses a few years ago.

The Phoenicians came trading for metals 2,000 years ago, and since then many known high-grade metals have been worked out. However, some low-grade resources remain and there is potential for smaller high-grade deposits in Ireland, Wales and Scotland. Tungsten West´s Hemerdon deposit in Devon in a large low-grade resource having a tungsten oxide grade (WO3) of 0.17 percent (measured, indicated, inferred). By comparison, China works WO3 grades of 0.12 to 0.2 percent and its richest ore grade is nearly two percent, and Tungsten West´s grades are favourably within the same range. However, China also extracts precious metals from the same deposits and is not under the same strict environmental limits as Hemerdon. Alba Minerals is exploring two small high grade gold deposits in Wales but has a diversified portfolio of properties in Ireland and Greenland. Dalradian Gold is exploring a promising gold deposit in Ireland.

Some companies involved in British minerals exploration and mining:

Aberdeen Minerals
Alba Mineral Resources plc
Anglesey Mining plc
Anglo American plc
British Gypsum
British Lithium Ltd
Cleveland Potash Limited
Cornish Metals Inc
Cornish Lithium Ltd
Dalradian Gold
Imerys
Scotgold Resources
Tungsten West plc

New companies are being formed hence the list is not comprehensive.

Source: MTG

In the past, the United Kingdom governments' policy towards mining have been unpredictable. The government recently put a hold on West Cumbria's new coal mine near Whitehaven, after the Climate Change Committee advised that steelmaking should not use coal beyond 2035 if the UK wants to meet its climate targets (BBC, 10 Aug 2022).

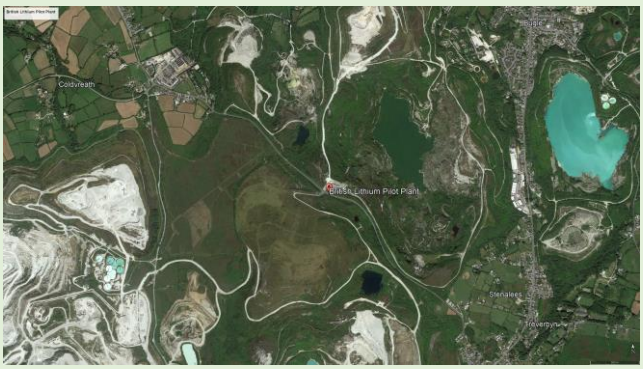
Source: Lodge House Opencast Mine, northern section: aerial 2014 by Chris, CC BY-SA 2.0 <https://creativecommons.org/licenses/by-sa/2.0>, via Wikimedia Commons

Uncertain government policy may be explained by a sharp debate among environmentalists between those wanting green economic growth and those concerned with the unacceptable rise in carbon dioxide emissions and environmental degradation that mining will bring. A schism runs through the heart of government between the ´Growthers´ and the ´Degrowthers´, which on the one hand is a commitment to economic growth and mitigation of the environmental consequences, and on the other that the environmental costs of economic growth are too high given the urgency of the climate change emergency. The debate will continue to influence government policy towards many issues besides mining.

Mines that will best succeed in the UK are underground mines, and most of the juniors on the list above are contemplating underground mining. This is far less intrusive on the landscape, makes less noise and dust, and does not attract the attention of NIMBYs (not in my back yard) in the same way as highly visible open pits do. Residents want the peace of the countryside or the suburb, and do not want the value of their properties to fall, and in most countries, open pits are remote from population centres.

The Hemerdon open pit mine is within a few miles of Plympton and Plymouth and is under tight environmental limits which means their assets are not worked effectively; they must stop mining and processing during the night. The economics of their low grade and 2:1 (minimum) strip ratio strongly suggest continuous bulk mining with large scale equipment, the norm for most world open pits. The mine is also at the mercy of energy cost increases: it suspended operations indefinitely because of high fuel and raw material costs (BBC, 21 April 2022). It went into receivership once before in 2018.

The government's actions send a mixed message to the financial markets. Even if the government announces a long-term strategy in favour of mining, no entrepreneur or investor can be sure whether a future administration, whether Tory or Labour, will change its policies in the next five years. Mines can take between 15 and 25 years from conception to full production, and even longer to raise sources of capital.



St Austell granite area operations,

Source: Google Earth view @ 50°23'03.59" N 4°48'31.41" W

Once a deposit is located, it may take years to obtain planning permission to explore, and longer still to build a mine. Also there is no guarantee of success. The documentation needed is costly and requires expert advice to pull together: the social licence to operate, environmental impact statements, feasibility studies and the like (and taking account of sustainability and climate change mitigation). In addition, they need to prepare against inevitable attacks from influential NGOs which often have government funding and support.

The other smaller UK mines are well away from major population centres and plan on mining underground. Local authorities seem well disposed towards them, and their chances of success are high, providing they find sufficient economic reserves. However, working against them are escalating high energy and raw materials costs, prolonged opposition from environmentalists, and uncertain government support – which the latter hinges on who wins between the Growthers and the Degrowthers. The Growthers are currently in control, but as shown the recent abrupt changes in government, this could change - and there is a general election in two years' time.

HMG (2022). Resilience for the future: the UKs critical minerals strategy, OGL: 47.

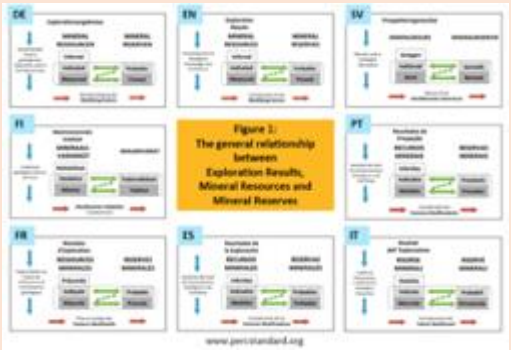
PERC News

Andy Birtles

PERC

Source: percstandard.org.

PERC, the Pan-European Reserves and Resources Reporting Committee, has recently had a few changes in their Executive Committee. There may also be a space for an IOM3 representative, who has a geological and resource reporting background. Anyone interested should contact Ian Bowbrick at the IOM3.



Source: percstandard.org.

Anyone wanting to find out more about PERC should access the newly revised PERC Standard website (https://percstandard.org/contact/), contacting any of the members of the PERC executive team (https://percstandard.org/governance/#executive) or through the contacts found in this newsletter.

GMPA News

Andy Birtles

The Global Mineral Professionals Alliance is collaboration between peak member associations for minerals professionals around the world, taking a leadership role in the pursuit and continuing development of best practice professionalism in the minerals industries.

Established in 2011, the GMPA encourages the exchange of knowledge and technology, promotes technical and professional excellence, delivers programmes for education and professional development, and provides an international forum for knowledge sharing, business networking, and public information.

GMPA members are the Australasian Institute of Mining and Metallurgy (AusIMM), Canadian Institute of Mining, Metallurgy and Petroleum (CIM), Institute of Materials, Minerals and Mining (IOM3), Instituto de Ingenieros de Minas de Chile (IIMCh), Instituto de Ingenieros de Minas del Peru (IIMP), Southern African Institute of Mining and Metallurgy (SAIMM), Society for Mining, Metallurgy & Exploration (SME), and West African Institute of Mining, Metallurgy and Petroleum (WAIMM).

ICMM News

Bob Siddall

Climate and COP27

Mining and metals are critical to tackling the climate emergency. A year on from the announcement of our own climate commitment, to achieve net zero Scope 1 and 2 greenhouse gas emissions by 2050 or sooner, ICMM joined Heads of State, ministers and negotiators, climate activists, civil society representatives and business leaders to share learnings and update on what actions our industry can (and is) taking in support of global efforts to urgently reduce emissions and build resilience.

ICMM

Source: icmm.com.

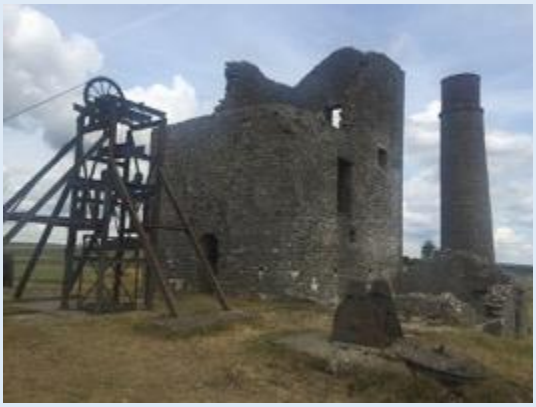
The theme of COP27 was 'delivering for people and planet'. This is at the heart of ICMM's Mining Principles – and of efforts to enable a just transition to a low carbon economy. The deployment of low-carbon technologies relies heavily on minerals. This makes the mining sector critical in the fight against climate change. One event at COP27, hosted by the Government of the Democratic Republic of the Congo, in partnership with ICMM, the Extractive Industries Transparency Initiative (EITI) and Natural Resource Governance Institute (NRGI), explored why good resource governance and collaboration matter for a just transition.

Further information can be found on the ICMM website: https://www.icmm.com/

Mining Heritage Rod Stace

Magpie Lead Mine, Derbyshire

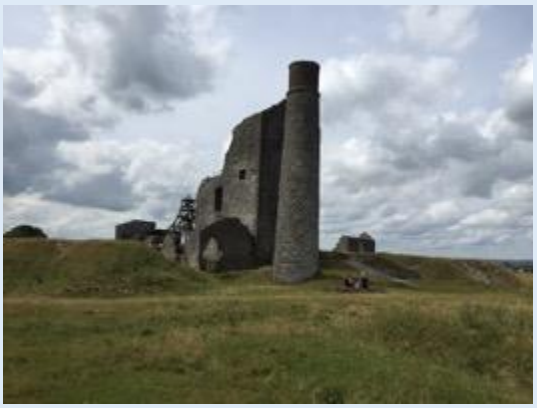
The Peak District National Park, whilst being a major tourist destination, also has a history of mineral working going back over hundreds of years. Nowadays mineral extraction largely focuses on stone quarrying around the edges of the Park, but within the Park boundaries can be found many relics of a once substantial lead mining industry. Walkers within the Park's hills and dales can find widespread surface evidence of this deep mining, especially derelict buildings, old shaft entries, drainage soughs and waste tips, the latter mostly now greened over.



Magpie Mine Surface Buildings, Source: Rod Stace

For the visitor wanting to know more about this historic mining activity, the first stop should be the Peak District Lead Mining Museum in the centre of Matlock Bath. This museum is managed by the Peak District Mines Historical Society. The Society not only runs the museum, but also arranges a programme of visits to sites of historical mining interest in the National Park including some more challenging underground adventures for experienced cavers and those adventurers with appropriate insurance.

Among the best preserved sites the Society administers is the Magpie mine. This mine site lies near to the village of Sheldon, some 3 miles west of Bakewell. It consists of the remains of pumping engine houses, chimneys, steel headgear, an explosives store and a modern interpretation of a horse gin, as well as the Agent's House which the Society now uses as a Field Centre for events. Interpretation of the site is made simple by the information boards placed around it. Visitor access is free of charge as this site sits at the junction of several public rights of way. However, vehicular access is restricted so getting there involves some walking. The Ordnance Survey Grid Ref is SK173682



Magpie Mine Surface Buildings, Source: Rod Stace

There are several old shaft entries at the site, all of which are safely sealed by metal grids. The original Main Shaft was sunk to a total depth of 222m but is said to be flooded to a depth of 50m. It is claimed that mining at this site commenced in 1682 as a series of separate smaller operations working different veins. The information boards tell of friction between the rival mining groups leading to sabotage, casualties and a "Curse" over the site. The mine was consolidated into one mine site in 1840 and worked intermittently thereafter. The Magpie mine was the last working lead mine in this part of Derbyshire, not closing until the 1950's.

Slowly nature is reclaiming this site, making it a home for some interesting flora and fauna. It is a great place to include on your Derbyshire walk and perhaps pause for look round.

Not far from Magpie Mine is the National Stone Centre near Wirksworth. This is another local museum and tourist attraction dedicated to the geology of the district and the stone quarrying activities in Derbyshire. According to the web, this has now been taken over by the Institute of Quarrying and there are exciting plans for the site to be redeveloped to house a re-sited Peak District Lead Mining Museum in a new building.

Links:-

Peak District Mines Historical Society (https://pdmhs.co.uk/)

https://peakdistrictleadminingmuseum.co.uk/

http://www.nationalstonecentre.org.uk/

Markham Colliery Disaster MTG

On Monday 30th July 1973 a terrible disaster happened when the cage carrying the miners to go underground into the pit failed to stop. It was the start of the day shift and by 6.20am 105 miners had already been lowered into the pit. Then, the overlap rope cage carrying 15 men on the top deck and 14 men on the lower deck began its descent. Sparks were seen coming from the brake cylinder by the engine winder who then slammed on the emergency stop button. Nothing happened and the cage crashed down to the bottom of the pit some 1,329 feet below ground. The ascending cage crashed through the winding house roof. 13 men died at the scene and another 5 men died later in hospital. The other 11 men in the cage and one rescue worker were very seriously injured and taken to hospital at Chesterfield.

Walking Together Mining Memorial

Source: Google Earth view @ 53°14'30.26" N 1°19'38.53" W

[Information sourced from: https://markhamstorymine.org/memorial/the-disasters/].

Next year will be the 50th anniversary of the disaster, and MTG are looking to assist in developing some form of commemoration. Any thoughts and contributions would be welcome.

Vaal Reefs Tragedy MTG

A mining accident at Vaal Reefs, a mine near the town of Orkney, in what was then the Orange Free State province of South Africa, on 10th May 1995 resulted in the death of 104 miners when a locomotive fell into a lift shaft at the edge of 56 level (1,676 m below surface), landing on the cage and causing it to plunge 460 m to the bottom of the shaft (2,300 m below surface). It is the worst elevator disaster in human history.

Vaal Reefs Mine aerial Source: Google Earth

Image @2022 Maxar Technologies and @2022 Airbus

The tragedy spurred a concerted effort by mining stakeholders for revisions in legislation and the adoption of a holistic approach to mine health and safety. The Vaal Reefs accident was instructive in the drafting of new legislation and presaged the promulgation of the Mine Health and Safety Act 29 of 1996, which was viewed as revolutionary at its time, given the reliance it put on tripartite structures: employers, government and unions. After the tragedy, Anglo American Corporation, Vaal Reefs Exploration and Mining, and the National Union of Mineworkers created the Vaal Reefs Disaster Trust with the primary objective of providing assistance and support to the 431 dependants of the employees who had died.

Amasra Coal Mine Incident MTG

The death of 41 miners in an underground explosion in northern Turkey on 14th October 2022 has reopened the debate over mine safety in that country. The blast at the state-run Amasra coal mine in the Black Sea province of Bartin has revived memories of Turkey's worst mining disaster in 2014, when 301 miners were killed in a fire at Eynez coal mine in Soma, western Turkey. The tragedy in Amasra was believed to have been caused by an explosion of methane some 350 meters below surface. Investigations are ongoing and it will be some time before the official report will be made available.

Source: Official/Shutterstock