

Winter 2024/25

Chairman's Chat



Another year is well and truly underway and I am pleased to introduce another edition of The Mining Technology Group (MTG) newsletter. We start with a brief end of year review of MTG activities in 2024, and a similar report from our very active Ground Engineering Subgroup appears in later pages. These align with new objectives for all groups governed by the IOM3 Technology Communities Board.

Unfortunately, we have some sad news about the passing of Frances Perry ProfGrad IMMM, a former member of the IOM3 team and a highly respected supporter of the MTG for all the good work she put into its activities. MTG condolences have been sent to her family.

Last year presented a changing business environment for the UK mining sector. However, an air of optimism is apparent, with several mine development projects having secured new funding from private investors and the National

Wealth Fund from HM Treasury. It is good to see such support, which will be crucial if the UK is to successfully, and rightly, commence domestic production in the global race for energy metals and minerals. This was boosted by the expansion of the UK list of critical minerals from 26 to 34 in number, [announced](#) last November.

The MTG is involved in several areas this year to help build on that optimism. First, we welcome into office and congratulate the new IOM3 President for 2025-26. This is a great personal achievement by Christine Blackmore CEnv CSci FIMMM, and the ultimate professional accolade from which all IOM3 members can take inspiration, none more so than those in minerals and mining.

Next, an update on the MTG 2025 conference 'Advances in Mining Technology and Mineral Supply' in Birmingham on 19-20 March 2025. Opportunities for AI demo sessions are still open, otherwise virtually all sponsorship (including all five Gold) and exhibitor packages are sold out. All we need now is wider participation; please secure your place via the [website](#) and spread the word to your contacts.

In addition, the MTG aims to implement new team roles designed to improve communication with members and build closer ties with AusIMM, in addition to our normal activities. The MTG will be judges for the IOM3 Mann Redmayne Medal A award; closing date for [nominations](#) is 28 February 2025.

There is also an international flavour with articles about mineral sands mining in Ukraine and Africa, global metal demand and pricing and details of a titanium webinar in April. The latter stems from the collaboration with the [IOM3 Non-ferrous and Light Metals Group](#), as reported in the last newsletter.

This edition includes the last part of a serialised article about Sir George Dowty and the Dowty Mining company. We remain very grateful to the Memorial Committee for permission to reproduce his story.

Our regular 'Mining Education Matters' section reproduces Part 1 of an IOM3 article about mining sector skills, featuring MTG leadership team members Andrew Fulton CEng FIMMM, President of the Mining Association of the UK, and Prof Patrick Foster FIMMM, Head of Camborne School of Mines.

The newsletter rounds up with an extended article about PERC activities and a collation of IOM3 affiliated local society events.

Finally, my usual invitation to get in touch if you need more information, through our dedicated email address mtg@iom3.org.

Stop Press

MTG podcast

The MTG recently devised and recorded '[IOM3 investigates.....mining technology, people and progress](#)', hosted by IOM3 Journals Relationship Manager Tia Byer. IOM3 President Christine Blackmore CEnv CSci FIMMM, MTG Chair Colin Comberbach CEng CEnv MIMMM, and MAUK President Andrew Fulton CEng FIMMM, discuss the global value of mining, its career opportunities and some challenges faced by the industry. They also preview the forthcoming MTG conference being organised on its behalf by the IOM3 Events team - worth a listen, especially if you intend to [register](#).

MTG 2025: Advances in Mining Technology & Mineral Supply

Registration is still open!



Source – IOM3

The [MTG 2025 conference](#) will be held at IET Austin Court, Birmingham, 19-20 March 2025. See p.7.



Source – IOM3

MAUK & Minerals Matter Industry Ambassador Coordinator

The Mining Association of the UK (MAUK) in partnership with Minerals Matter has a job opportunity for a dedicated mining sector Industry Ambassador Coordinator. See the Minerals Matter [website](#) for details.

Upcoming events

IOM3 Presidential Address 2025

20 February 2025, 1.30pm – 3pm, London.

Christine Blackmore CEnv CSci FIMMM will present her priorities for presidency during her term in office (2025–2026). Attendance is free and can be booked on the [IOM3 website](#).

IOM3 Titanium Circular Production Webinar

2 April 2025, 12pm – 1.30pm

Featuring 'African Titanium Mining' presentation by MTG's very own Andy Birtles. See p.13 for details.

Free registration on the [IOM3 website](#).

IOM3 - M3P3 - Materials, Minerals & Mining for People, Places, Planet

11-12 November 2025, Millennium Point, Birmingham

Get ready for M3P3! The new, flagship IOM3 event, where our community unites to drive sustainable transformation and celebrate innovation in an engaging, collaborative atmosphere. #WeAreIOM3

Find out more and participate on the [IOM3 website](#).



Source – IOM3

IOM3 contacts

A question often asked is where to find a list of IOM3 Management and Staff and their contact details. Their roles and contact details are on the [IOM3 website](#).

Editorial team

Colin Comberbach, Andy Birtles, Darron Dixon

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

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Leadership Team updates

Colin Comberbach

That was 2024

Last year was another busy one for the MTG, with the leadership team providing content, support and advice to help keep the Group relevant and active. MTG was confirmed through IOM3 membership preferences as being in the top three groups across the whole institute. Some highlights of 2024:

Team news

- As part of an ongoing succession plan three new members joined the leadership team in summer; our most significant and positive influx in recent years.
- All have new MTG roles, Martha Needs as IOM3 Student and Early Career representative and, alongside Richard Shellam, MTG webmaster duties, whilst Rob Thomas is AusIMM coordinator.
- Our annual in-person leadership team and 2025 conference planning meeting took place at the venue, Austin Court in Birmingham. Several other team virtual meetings were held online.

Knowledge Dissemination

- A series of MTG newsletters was published, with advancements in content and new contributors.
- MTG recorded a podcast '[IOM3 Investigates... mining technology, people and progress](#)'.
- Cross-community collaboration with the IOM3 Non-ferrous and Light Metals Group on its cleaner future roadmap, in relation to prevalent mining standards and upstream extraction aspects.

Education, Training & Professional Development:

- A number of MTG team members sat on the UK Mining Education Forum (UKMEF) to help develop mining education, including a written response to the UK Curriculum and Assessment Review.
- Alan Auld (Thornton Medal) and Bill Tinsley (Sir Andrew Bryan Medal) deservedly won IOM3 awards.

Influence & Policy

- Several MTG members served as trustees, council members or active volunteers of the six IOM3 Affiliated Local Societies with significant mining interests.
- One or more members sat on the AusIMM UK committee, Mining Association of the UK (MAUK), UK Mining Education Forum (UKMEF), and Pan-European Reserves and Resources Committee (PERC).
- In December the MTG provided a written response to the IOM3 call for input to the consultation on The Consolidated Mining Standard Initiative (CMSI).

Ground Engineering Subgroup (GES)

- The MTG and the GES developed strong reciprocal support for each other throughout the year, with the Subgroup enjoying another year of strong growth since its inception in 2021. See update on p.17.

2025 – the year ahead

The first quarter of 2025 will be mainly consumed in making the MTG conference (see p.7) a success whilst giving support to Christine Blackmore as she takes up office as IOM3 President (see below).

Member opinion - how would you like the MTG to develop?

One question frequently pondered over by the leadership team is the opinions of MTG-affiliated IOM3 members about the way we represent them and their interests. Whilst we have received some good feedback from individuals, it would be beneficial to hear from more people. This is important in terms of value for members and to the team itself as it has to prepare for the future. The MTG is one of the three largest technical communities within IOM3, so there are plenty of voices out there.

You might want to say or ask something about joining the team, the newsletter, events, publications, careers, education, member networks, affiliated local society connections, to name but a few areas.

The team is happy to hear your views - though please be realistic and remember we are all volunteers!

We can be contacted through our dedicated email address mtg@iom3.org.

Congratulations to the new IOM3 President



Source IOM3

The IOM3 Mining Technology Group (MTG) sends many congratulations to Christine Blackmore CEnv CSci FIMMM on taking up the esteemed office of President of the Institute of Materials, Minerals & Mining (IOM3), with effect from 1 January 2025. She started along this road four years ago, first as Vice President 2021-22 and then Senior Vice President 2023-24.

This is a huge personal achievement and culminates from a 25-year career as a geo-environmentalist and environmental auditor in the international mining and metallurgical industry in tandem with more than thirty years of membership and volunteering service for IOM3 and affiliated local societies. Christine served as Honorary Secretary and President of the Western Institute of Mining & Minerals and was the immediate past Chair of the IOM3 Mining Technology Group (formerly known, under her tenure, as the IOM3 Mining Technology Division). Having made considerable contributions and achieved notable successes in these roles, she is a worthy recipient of this ultimate

professional accolade - President, IOM3!

Best wishes for your two-year term, Christine; be sure to enjoy every moment. Best wishes also to Dr Kate Thornton CEng CSci FIMMM who ended her term as President in 2024 and will be conducting the Presidential handover to Christine at the Presidential Address on 20 February 2025. Attendance is free and can be booked on the [IOM3 website](#).

Read the IOM3 news article about Christine becoming President on the [IOM3 website](#).

IOM3 obituary - Frances Perry ProfGrad IMMM 1955-2025



Source IOM3

Frances Perry (nee Olver) is fondly remembered by members and the IOM3 team as our Information Advisor for minerals and mining, her knowledge and anecdotes will be sorely missed.

It was with a sense of sadness and loss, that IOM3 learnt the news of the death of Frances on 8 January 2025 following a short battle with cancer. In life, Frances was a dynamo, collecting information as she moved between the London and Grantham offices with armfuls of paper, journals and books. You never quite knew what might appear from her rucksack of wonders.

At IOM3, Frances provided technical information on minerals and mining. She had an encyclopaedic knowledge of our collections, reeling off references and stack numbers in a flash when asked where something might be. Frances studied at Cambridge, and later trained as a geologist which she described as meaning she could 'tell you all about how the Earth cooks up mineral deposits - think Bake-Off writ large.'

She initially found her niche at the Institution of Mining and Metallurgy (IMM) library, and Frances always spoke fondly of colleagues from that time and described a chaotic but thriving library with frequent international visitors. When IMM merged with the Institute of Materials Frances moved too and expanded her knowledge base to incorporate some non-earth-based materials.

Frances loved to garden, share knowledge and help people, the IOM3 Mining Technology Group benefitted hugely from her support as did her local church and the array of friends she amassed.

Frances is survived by her husband Brian and three children Helen, Anna and Alan.

The above [obituary](#) is courtesy of IOM3 and the family of Frances Perry.

Many of the IOM3 Mining Technology Group (MTG) leadership team, past and present, have fond memories and high regard for Frances's work with IOM3 and particularly as a valued contributor to the activities of the Group in its former guise of the Mining Technology Division. She is sadly missed and still remembered by many friends in the Group. Our sincere condolences to her family.

News and views

MTG Leadership

New coal mining licences will be banned

The UK is to become one of the first countries in the world to ban new coal mines. Further evidence of the UK's global climate leadership to tackle 'biggest global polluter'. Licensing of new coal mines is set to be restricted as the government commits to bringing in legislation which will prohibit new coal mining projects.

The government in November 2024 confirmed it will introduce the new legislation as soon as possible.

Britain became the first major economy to stop burning coal for power in October last year, with the closure of the country's last coal-fired power station at Ratcliffe on Soar, following 50 years of service. It means coal has gone from generating around 40% of the UK's electricity supply in 2012 to 0%.

Coal Authority becomes Mining Remediation Authority

The Coal Authority has changed its name to the Mining Remediation Authority. This better reflects the organisation's 'round the clock' role to manage the effects of historical mining in England, Scotland and Wales and its work to seek low-carbon opportunities from our mining heritage for the future. The change has been approved by the Department for Energy Security and Net Zero.

The Coal Authority celebrated 30 years of frontline delivery on the 31 October 2024 and the statutory responsibilities of the Mining Remediation Authority will not change as it continues to have primary responsibilities for managing the coal assets and legacy as defined in the Coal Industry Act 1994, including public safety and subsidence and informing safe development and growth across Great Britain.

Ukraine mineral sands

United Mining and Chemical Company (UMCC) was established by the government of Ukraine in 2014 to manage and operate Vilnohorsk Mining and Metallurgical Plant and Irshansk Mining and Processing Plant. UMCC is one of the world's largest producers of titanium, mining and processing ores into sands and concentrates, and is the only mineral sands operation in mainland Europe. More than 90% of the titanium ore it manufactures is used in paints, while it also supplies to industries like glass, ceramics and refractory.

Ukraine said it accepted an offer for a state-run titanium producer in a rare wartime privatisation deal as the government grapples with mounting pressure on the wartime budget. Cemin Ukraine, a NEQSOL Holding division, was the only participant in the auction. NEQSOL Holding is a global investment group managing diverse businesses across eleven countries from headquarters in Amsterdam, Baku and Kyiv.

With the acquisition of the United Mining and Chemical Company, NEQSOL Holding continues to implement strategic international business expansion. UMCC is one of the world's largest producers of titanium raw materials, which are of great importance and application in various strategic industries. Upon completion, this deal will strengthen the Holding's position in the international business arena.

The Disused Mine and Quarry Tips (Wales) Bill

On 9 December 2024 the Welsh Government introduced [The Disused Mine and Quarry Tips \(Wales\) Bill](#). Described as the first of its type in the UK, it proposes to establish a Disused Tips Authority for Wales to manage disused coal and non-coal tips in Wales.

MTG 2025 conference update

Colin Comberbach

Advances in Mining Technology & Mineral Supply

IET Austin Court, Birmingham, 19-20 March 2025

Come and explore advances in technology, including AI, at every step of the mining lifecycle and examine their interactions with strategic mineral supply to meet future demands for downstream materials.



Source: IOM3

Registration

REGISTRATIONS ARE STILL BEING ACCEPTED!

Everything is in place for a great conference - come and join us via the image link above or via the [IOM3 website](#).

Programme

[Two-day programme](#) of presentations, keynote panel session, networking and knowledge sharing.

Sponsors & exhibitors

MTG is extremely grateful for the huge support of sponsors and exhibitors - spaces are nearly all sold out. **For Artificial Intelligence demonstrations or remaining promotional opportunities**, please visit the IOM3 [website](#).

Gold Sponsors



Dinner Sponsor



Lanyard Sponsor



Event Supporters



Exhibitors

Transmin Metallurgical Consultants • Maelgwyn Mineral Services Limited • Zeiss • Mining One Consultants • SLR Consulting Limited • GEARS • Cornish Metals • Maptek • Bam Ritchies • Land and Minerals Consulting Limited

Venue

Austin Court is centrally located and offers a fine blend of historic architecture and contemporary facilities, with a professional but intimate ambience. It promises a positive experience for attendees at the conference. See for yourself by making a virtual 'visit' to the venue via the 3D tour on the [IET website](#).



Source: BCC via IOM3

Conference Dinner

MTG is pleased to confirm the conference evening dinner will be held on 19 March 2025 at the iconic, Grade II listed Birmingham Council House, a short walk from Austin Court.

Continuous Professional Development

The conference has been approved for Continuous Professional Development accreditation.



Source – IOM3

Dowty Winter 2024 Newsletter

Sir George Dowty Memorial Committee

The following is reproduced with kind permission from Martin Robins, Chairman of the Sir George Dowty Memorial Society.

Sir George Dowty Statue

The most significant event during 2024 by the Sir George Dowty Memorial Committee (SGDMC) was the unveiling of a bronze statue of SGD- which is now widely accepted as the finest statue erected in this country during 2024. A paper is shortly to be released detailing how the statue has been received.

Events

The SGDMC organised two events of note- a Dowty Organ Recital at Pershore Abbey and a Dowty Prayer Book service at St Mary's in Stockleigh English, Devon. Both events received considerable publicity with the BBC attending the latter event.

Related publications

Numerous papers were issued - some of which were serialised in national publications.

Soon to be issued

Throughout his life SGD kept a pocket diary and these are now being edited by his last secretary who served him from 1970 until his passing in 1975. Early in 2025 a booklet will be issued reflecting the editing. SGD was passionate concerning education and training- the Dowty Apprentice Scheme was readily accepted to be amongst the finest in the land- and the SGDMC have been fortunate to have the Introduction to booklet written by an eminent educationalist from the city of Worcester- where SGD was educated and served his own apprenticeship. SGD was always proud of his Worcestershire roots - his chairmanship of the Worcestershire County Cricket Club in the championship winning years of 1964 and 1965 brought immense joy.

2025 calendar

A calendar has been released showing the statue of SGD reviewing famous cars- one shows him looking approvingly at Field Marshall Bernard Law Montgomery of Alamein 's vehicle that he used in his North African campaign. The calendar has been circulated world-wide to much acclaim.

2025 activity

The SGDMC have a full schedule events programme planned for 2025 including the unveiling of a second statue. There is a full diary of lectures to learned bodies and more publications concerning one of the world's most accomplished engineers who made no attempt to promote himself but is now receiving the attention he so richly deserves.

As Solomon the Wise wrote-

'Do you see a man who excels in his work? He will stand before kings; He will not stand before unknown men'.



Source Martin Robins - www.dowtyheritage.org.uk/

Will there be a metals shortage?

Laurence Morris CEng FIMMM

Mining impacts the cost of metals

Some call it the Great Acceleration: since the 1800s, population growth, urbanisation, energy consumption, and most human endeavours, including metal mining, have expanded exponentially. Following the Second World War, globalisation, trade agreements, and China's rapid industrialisation have further accelerated demand for most metals. We can see the trend in copper, iron ore and lithium production.

Copper production, 1900 to 2023

Based on mined, rather than refined, production. Measured in tonnes.



Data source: USGS - Mineral Commodity Summaries (2024); USGS - Historical Statistics for Mineral and Material Commodities (2023); BGS - World Mineral Statistics (2023)

Iron ore (crude ore) production, 1904 to 2023

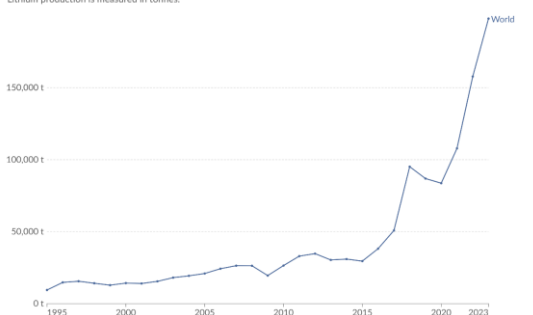
Based on mined, rather than refined, production. Measured in tonnes.



Data source: USGS - Mineral Commodity Summaries (2024); USGS - Historical Statistics for Mineral and Material Commodities (2023) CC BY

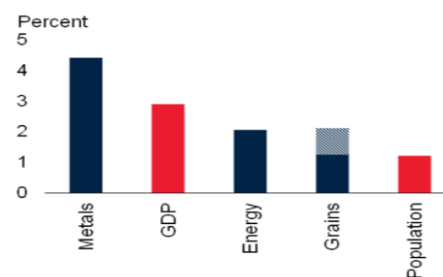
Lithium production, 1995 to 2023

Lithium production is measured in tonnes.



Data source: Energy Institute - Statistical Review of World Energy (2024) OurWorldInData.org/fossil-fuels | CC BY

B. Commodity demand growth, 1997-2017



Metal production from ourworldindata.com, Commodity demand growth from Queensland University

In the past decade, metal demand has surged faster than other economic indicators, including population and GDP per capita. The primary drivers of metal demand are population growth, urbanisation, and industrialisation in the developing world. For instance, China's urban population grew threefold, from 20% in 1980 to over 60% by 2020, marked by the expansion of major cities like Beijing, Shanghai, and Shenzhen. China now accounts for half of global steel and copper consumption (World Bank, 2021). Similar demand trends are emerging in India, Southeast Asia, Latin America and Africa.

It is a paradox that the global shift towards environmental sustainability has increased the demand for certain metals. Meeting the 2030 Net Zero targets requires renewable energy infrastructure, electric vehicles (EVs), and sustainable technologies, all of which need substantial metal and mineral inputs.

Copper, lithium, and rare earth elements are crucial in solar and wind energy systems. A single wind turbine can consume up to 4.7 tonnes of copper, along with aluminium and steel, while photovoltaic (PV) solar panels require silicon, silver, and aluminium (International Renewable Energy Agency, 2021). Tesla estimates that each EV requires approximately 45 kg of nickel, 14 kg of cobalt, and lithium and copper (Tesla, 2022). While recycling plays an increasing role in meeting demand, some metals such as rare earth elements, are difficult to recycle due to their integration into complex alloys that require intensive processing.

Mining faces a contradiction: rising metal demand meets declining ore quality and quantity, resulting in higher strip ratios (the ratio of waste to ore mined). As ore grades decline, more material must be mined and processed to produce a finished product. Take copper, for example. While the demand for copper is expected to rise by about 50% over the next decade (International Copper Association, 2022), the discovery of new copper ore bodies has slowed significantly. Most major deposits were found in the 20th century, with current discoveries largely located in remote or geologically complex areas, requiring costly underground mining and developing new technologies. Whereas in the early 20th century, copper grades were as high as 10%, they have now declined to about 0.5% or lower and are often mixed with sulphides and other materials that are hard and expensive to process.



Source A N Birtles

Other metals have seen similar declines. Zinc grades have halved over the last 20 years, and gold grades are as low as 0.5%, compared to over 10% earlier last century. Silver, nickel, and platinum grades are also significantly lower. The mining industry has faced global criticism for its environmental and social practices. Although many companies have since adopted environmental and corporate social responsibility (CSR) programmes, often of their own volition or in response to regulatory and public pressure, the industry still grapples with a legacy of environmental damage and social discontent. Such issues can lead to protests, slowing or halting mining projects that can reduce the number of developable ore bodies.



Source A N Birtles

The worst fate that can befall is the cancellation of a fully operating mine, as has happened to First Quantum's Cobre Panama mine, a world-class copper mine accounting for about 1.5% of global copper production. But other impacts can greatly increase costs, such as delays in project approvals, permitting, stricter regulation, reduced access to land, reputational damage, public negativity and investor concerns. Smaller companies may struggle to absorb these setbacks.

The combination of increased demand and reduced supply might be a bonanza for some well-placed and large mining companies, but it will mean increased metal prices. For instance, the price of copper in the year 2000 was USD 1,800 per tonne, with forecasts for 2030 ranging from USD 9,900 to USD 13,200

per tonne. As copper along with other metals plays a critical role in sustainable energy infrastructure, price increases will raise the cost of achieving Net Zero targets and make consumer goods and services more expensive.

Mining Education Matters

Critical period for mining skills (Part 1)

Alex Brinded

This is the first part of an article written by Alex Brinded, reproduced from Materials World in January 2025. The full article is accessible on the [IOM3 website](#).

Rejuvenating mining education in the UK

The revival of the undergraduate Mining Engineering degree at the UK's Camborne School of Mines and its launch of a Degree Apprenticeship are headtorches of light against a gloomy backdrop of reported dwindling recruits to the industry worldwide. Indeed, the new apprenticeship course even garnered a mention in the UK Government's Critical Minerals Strategy in 2022.

To support the government's strategy, IOM3 consulted 50 key stakeholders to assess the skills landscape further. The talent gap: critical skills for critical materials report confirmed a lack of access to skilled workers as a significant and growing risk facing the sector and the UK economy.

Enrolment in relevant education and training is decreasing in the UK and countries like Australia and the US, with some courses being cancelled, as seen at Camborne and elsewhere.

And so, the report shares how the future talent pipeline is unlikely to meet the demand for skilled individuals across the value chain to, in turn, fulfil the booming demand for minerals and metals amid the green transition.

The UK Mining Education Forum launched in 2022 to develop mining education nationally. It found the UK needs more than 60 new mining engineering and minerals processing graduates every year to sustain the domestic mining sector, and at the time there had been no new undergraduates since 2019.

But there is now some light at the end of the tunnel. The growing interest and attention from government on critical minerals and materials for the energy transition is an opportunity to relight enthusiasm for mining and its role in society.

Professor Patrick Foster FIMMM, Head of Camborne School of Mines and Professor in Mine Safety, certainly feels the time is ripe for a comeback in the public discourse.

Renewed appetite

In 2023, Camborne School of Mines celebrated its 135th anniversary since its inception in 1888 and also marked 30 years at the University of Exeter. Her Royal Highness the Princess Royal opened the school's new Degree Apprenticeship to mark the occasion. The four-year course offers part-time study alongside employment at a mine.

This was an important development after the undergraduate course in Mining Engineering was stopped due to a low number of applicants. It was the last in a line of similar course closures since 2000 – with Leeds and Nottingham universities and the Royal School of Mines in London all halting their own similar programmes.

In response, the UK mining industry, through the

Mining Association of the UK (MAUK), decided to develop a Level 6 Degree Apprenticeship.

And, after a five-year hiatus, Camborne School of Mines will also be welcoming its first cohort of undergraduate full-time Mining Engineering students in 2025. The degree forms part of the University's Engineering 2030 Strategy to increase the portfolio of engineering programmes at undergraduate and postgraduate level.



Source A N Birtles

It follows a distinguished pedigree of achievement by previous cohorts. Foster says Camborne graduates have one of the highest employability rates at the University of Exeter. 'All those students get a job relevant to their degree, be it geology or mining engineering.'

Most of them go overseas, such as Sub-Saharan Africa, Canada and East Asia, with the majority ending up in Western Australia over the last 10-12 years.

A cohort of alumni there organised a gala dinner in June at Perth's Optus Stadium, at which Vice Chancellor Lisa Roberts announced the undergraduate course's reinstatement, much to their surprise.

With 16 participants at the first open day, Foster is really pleased with the interest, as formal promotion has yet to start. It will be the only UK institution to currently offer Mining Engineering for undergraduates.

So, where did the renewed appetite for this course come from? 'The biggest change is the critical metals push. That's really been the catalyst. I've been at Camborne 20 years and not seen anything like it before,' says Foster. He praises the Vice Chancellor, who understands the potential of critical metals for research and education. 'I think we are well equipped to do both,' says Foster.

Galvanising the industry

Foster also acknowledges the efforts of Andrew Fulton CEng FIMMM, President of MAUK, as instrumental in developing the apprenticeship after the undergraduate degree stopped in August 2020.

The school had already been talking to the Mines Qualifications Committee – which comprises members from UK mining companies – about the possibility before the COVID-19 pandemic.

The undergraduate degree faltering galvanised consensus. 'We were thrown this bone of an apprenticeship degree just after COVID and initially it was just a pipe dream.'

Fulton adds, 'The shock cessation in the undergraduate course [was] a call to arms to replace or bridge the gap between no mining education in the UK and a future form of tertiary mining education.'

Initially, it would have offered a vocational route to upskill existing employees, bridging middle to senior

management and helping them achieve a mining qualification to demonstrate competence. Previously, the only way to move to senior management was through tertiary education, which is not always accessible to those who have spent 10-15 years in the industry and might have come straight from school.

The UK Government's Apprenticeship Levy provided a route for a degree apprenticeship to develop industry leaders from both early-career recruits and existing employees.

'This was an ideal opportunity to bring the sector together around a common need...and we delivered through the collaboration and efforts of the operators,' describes Fulton.

The mining industry drew experience from its existing emergency response scheme, where emergency mining teams support or stage rescues at other mines, by applying the same 'mutual aid' principle to education.

A MAUK declaration now lists education and competency in mines as a common need and benefit, with no barriers to common education schemes, meaning students can access different mines to learn.

Fulton says this scheme works as the UK industry is unique, with 12 different minerals being excavated across only 28 underground mines, creating limited direct competition.

'The [apprenticeship] cohort will go to a UK operation that demonstrates a certain issue, challenge, or piece of excellence so that all learners will learn from it simultaneously, disregarding whether it's a potash gypsum or a salt mine, whether it's British Gypsum, Anglo American or Energy Coal, it doesn't matter,' notes Fulton.

The second part of this will be presented in the Spring 2025 Newsletter.



Source A N Birtles

Titanium circular production webinar

IOM3

This webinar, organised by the Non-Ferrous & Light Metals Group, will explore innovative approaches to titanium production, emphasising sustainable and circular methodologies. Attendees will gain insights into cutting-edge manufacturing technologies, novel powder production methods, and mining perspectives.

Register for free on the IOM3 [website](#).

What to expect

- Expert presentations from leading figures in titanium research and industry
- Case studies showcasing advancements in titanium production
- Q&As to foster interactive dialogue
- Hosted on Zoom
- The session will be recorded and all registrants will receive a link to watch on-demand.

Agenda overview

A preliminary agenda is presented below. See the IOM3 website for further developments and updates.

12:00 Start of Webinar

12:00 Welcome

Dr Cheryll Pitt CEng FIMMM, Chair of the IOM3 Non-Ferrous & Light Metals Group

Dr Matthew Thomas CEng FIMMM, Chief Engineer, The MTC

12:05 Solid-State Transformative Manufacturing Technologies for Titanium

Prof Brad Wynne MIMMM, Director, The Advanced Forming Research Centre, The University of Strathclyde
In this presentation two key elements are explored –

1. near-net shape manufacturing techniques such as flow and shear forming and
2. the digitisation of forging and forming.

From a sustainability standpoint, both near-net manufacturing and a digital-twin of the microstructure during forging and press performance will enable the supply chain to “do more with less” material by providing higher confidence in location-specific properties or utilising the press more efficiently (i.e., using less energy) to achieve the property goals of the design.

12:30 Novel and Emerging Routes for Titanium Powder Production

Dr Ian Mellor MIMMM, Managing Director, Metalysis Ltd

As the adoption of components fabricated via titanium powder metallurgy (PM) techniques becomes more prevalent, and projected to increase at a substantial rate, there is a necessity to increase titanium powder production capacity from the current annual level. A well-documented barrier restricting implementation, is the inherently high cost and environmental footprint associated with the feedstock. The scope of this presentation is to provide an insight of both established and novel methods of titanium powder production, to satisfy this growing demand.

12:55 African Titanium Mining

Andrew Birtles CEng FIMMM, Director, ANB Mining Ltd

Assessment of the global production of Titanium, and how southern and eastern African mining operations contribute to the global picture.

Some highlights of this presentation are presented later in this newsletter.

13:20 Closing

Dr Cheryll Pitt CEng FIMMM, Chair of the IOM3 Non-Ferrous & Light Metals Group

13:30 Close of event



Source IOM3

Mineral sands in Africa

Andy Birtles CEng FIMMM

The presentation addresses the mining of heavy mineral sands in southern and eastern Africa.

This is not comprehensive research, but hopefully will give the reader some idea of the mining and issues of regulation and environmental and social issues.

Sources of titanium

Some key characteristics about titanium:

- It is the ninth most common element on the planet.
- It is found in both oxide and silicate minerals.
- The earth's crust is 90% silicate with titanium present in concentrations of between 0 and 1%.
- Even Sir Paul McCartney sang about it, from the 1975 album, Venus and Mars!

Titanium is contained in ores, usually sand deposits (hence the term "heavy mineral sands"), which contain between 5 and 25% mineral.

The following ores have the highest concentrations and are the world's primary commercial titanium oxides

- Ilmenite (FeTiO_3) (much more abundant than rutile)
- Rutile (TiO_2) (from the Latin rutilus meaning red)

By products include

- Zircon (ZrSiO_4)
- Leucoxene



Source A Birtles

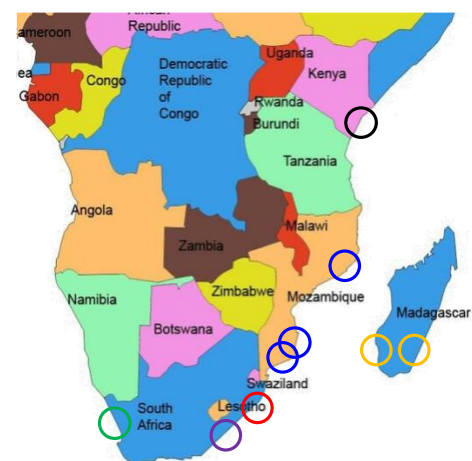
Global resources and mining

Concentrating on ilmenite and rutile, the countries with the most reserves are China, Australia and India. It is reported that current 'reserves' are in the region of 750Mt of TiO_2 content.

Production of ilmenite and rutile has a familiar feel at the "top of the charts", China, as a single country, produces some 3.1Mt per year of TiO_2 content. The continent of Africa produces some 3.4Mt per year. Total global production was 9.2Mt.

Focussing on southern and eastern Africa (90% of Africa's production), the map and table indicate the key current and future operations.

South Africa east coast (north)	Richards Bay Minerals
	Hillendale (closed)
	Fairbreeze
South Africa east coast (south)	Xolobeni (project)
South Africa west coast	Tormin (suspended)
	Namakwa Sands
Kenya	Kwale (closing?)
Mozambique	Moma
	Corridor Sands (project)
	Mutamba (project)
	Marao (project)
	Marucca (project)
	Linhuane (project)
Madagascar	Mandena
	Toliara (project)



Source A Birtles

Mining and concentrating

Mining methods include dredge mining and hydraulic mining where the deposits are near the sea. Dry mining is usually undertaken using traditional truck and shovel methods. The 'wet' mining processes are illustrated in the images on this page. The general mining approach is to "liquidise" the sand, and pump the slurry into the concentrator plant. The hydraulic mining process allows the slurry to form into a collection pond and is then pumped to the concentrator (right).

In the dredge option, the sand is mined in a slurry form, although hydraulic monitors are still required for loosening 'hung up' sand at the mining face. In this case the concentrator is floating behind the dredging operations (below).



Kwale Operation, Kenya
Copyright: Base Resources

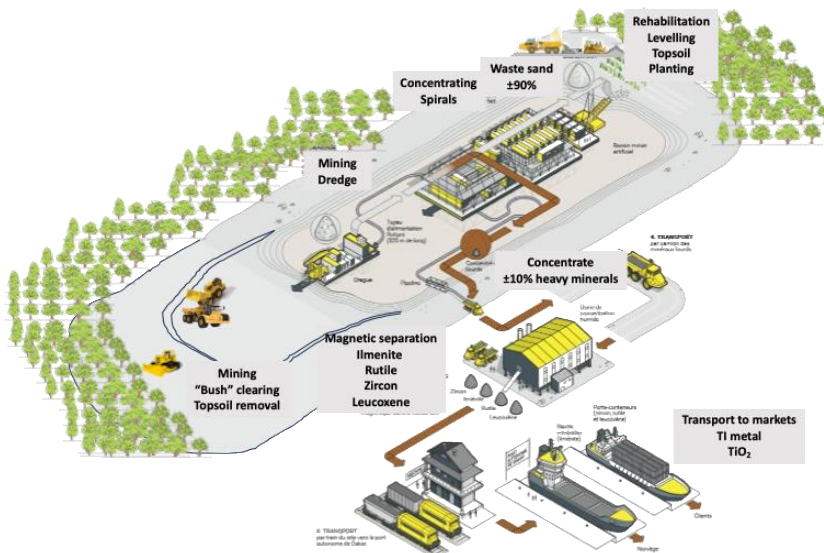
The concentrator separates the sand from the 'heavy minerals' using spirals, where the lighter material (sand) is pumped to the back of the 'mining pond' to continue the rehabilitation of the 'mined out' areas, and the heavier fraction (the 'heavy minerals') is then stockpiled for further separation using a magnetic or electrostatic separation process. The final products include

- Ilmenite
- Rutile
- Zircon
- Leucoxene
- Monazite



Copyright: Kenmare Resources plc

A typical mining process for a dredge operation is indicated in the figure below. Thus it can be seen that this type of mining is relatively simple, and like strip mining, allows rehabilitation and revegetation to be readily undertaken. Many of the mining operators in Africa are headquartered overseas and therefore operate according to modern mining practices in terms of environmental responsibility and high standards regarding social and community interaction. Local communities are directly involved in growing the revegetation plant, and developing the revegetated land into sustainable crop yielding capability (if appropriate).



Source A Birtles after Eramet

Refining and smelting

The ilmenite and rutile are subjected to a reduction process (the Kroll process) to yield titanium metal, and concentrated compounds are subjected to smelting and then subject to further chemical process to yield TiO_2 , which is used in many common household items.

PERC news

Andy Birtles CEng FIMMM

PERC AGM

On 25 November 2024, the PERC Executive held one of its bi-annual meetings with the PERC Trustees to present past and future activities. The following issues were discussed:

Update on PERC members, officers and committees

Ed Sides will be stepping down as Chairperson at the PERC AGM in April. Antonio Maldonado, the current Secretary, has indicated that he is willing to take up the role of Chairperson with continued support from the Deputy Chair Andy Birtles CEng FIMMM. The position of Secretary position then becomes vacant. If any members would be interested in taking on this role, please contact Ed or Antonio to find out more.

Report on the 2024 CRIRSCO AGM

A summary report on the 2024 CRIRSCO AGM for PERC Members is available on the [PERC website](#).

Standard Update committee activities

Thanks are due to David Dingemans the coordinator of the committee, with assistance from Alastair Moyes and others, for their continued work on the preparation and review of several documents. In particular, work is nearing completion on a final draft of a companion document to the [PERC Mineral Project Evaluation Report Template](#) which will provide a framework of definitions and associated procedural guidance to an integrated approach for both Public Reporting and Non-Public reporting. Another aspect to be considered during 2025 is the nature and timing of the next update of the PERC Reporting Standard. It is likely that the update of the JORC Code will be completed during 2025, and we may wish to consider adopting some of the changes that are introduced in it.

Communications committee activities

Andy Birtles has continued as coordinator of this committee but is keen to identify someone willing to take on the role in the future. PERC have improved the dissemination of news about PERC and CRIRSCO events to our network, with the PERC website serving as a central hub for news and public documents. The first edition of the [newsletter](#) was being released at the end of last year.

Training activities

Alastair Moyes has taken over as coordinator of this committee and is currently working on preparing a training brochure and schedule of courses for 2025 to assist in promoting our training offerings. PERC has available several PowerPoint presentations covering different topics which can be presented individual, or as a package. The following are envisaged for 2025:

In person courses

- 24 February 2025, Madrid, Spain (venue and date to be confirmed)– in Spanish
- 27-28 February 2025, Minerals Reporting (PERC, CRIRSCO, UNFC etc), UK venue to be decided
- 25 April 2025 – Karlsruhe, Germany, one-day course prior to the PERC AGM
- 12 September 2025 – Meggen, Germany, one-day in person course on UNFC & PERC
- 6 November 2025, Zaragoza, Spain: proposed one-day workshop on professional geology
- Other training in cooperation with the PERC member organisations

Online courses

- The possibility of having regular online courses is being considered.
- Other training in cooperation with the PERC member organisations

Finance and Regulatory committee activities

Ed Sides is interim coordinator of this committee. Progress on the previously agreed action items has not moved on as quickly as anticipated and this committee needs to be re-energised during 2025.

2025 PERC AGM and associated training course

This year's PERC AGM will be held in Karlsruhe, Germany where it will be hosted by the Karlsruhe Institute of Technology. The dates and schedule have been agreed, subject to confirmation of some of the details. The AGM and associated activities will be held over the period of 23 April to 27 April 2025.

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.

The Ground Engineering Subgroup would like to take this opportunity to reflect on our achievements in 2024 and reflecting on the opportunities and our goals for 2025.

Summary of 2024:

- The GES strengthened its partnership with the MTG, with Chairs of both groups attending each other's meetings
- Efforts to broaden collaboration within IOM3 have begun, including initial discussions with the Energy Transition Group
- The GES responded to the Institute's request to ensure diverse representation on the external Future Works education initiative for the 'Geoscience Strategic Alliance'
- Committee members contributed technical articles to Materials World magazine, showcasing their expertise and raising awareness of ground engineering topics
- A committee member from Hong Kong contributed papers for the Advances in Mining Technology & Mineral Supply conference scheduled for 19–20 March 2025 in Birmingham
- GES's first webinar on [pumped storage hydropower](#), which achieved remarkable reach and engagement, 190 Registrants, 99 participants at its peak, and over 350 on-demand downloads post-event
- The GES partnered with the Breaking Ground podcast team through GE Magazine to produce a podcast introducing the Ground Engineering Sub-group and the broader role of IOM3 www.geplus.co.uk/podcast

Looking ahead to 2025

- The Ground Engineering Sub-group looks forward to building on these achievements in 2025, with a focus on fostering innovation, collaboration, and knowledge-sharing across the sector.
- We are looking forward to bringing further opportunities to host webinars and author articles for Materials World, if you would like to contribute or have ideas for a topic please get in touch.
- We have an upcoming in-person/ online webinar event on 12 March, joint meeting at Burlington House. More details are to follow.

Contacts

With our collective efforts and determination, we are striving to make 2025 a successful and fulfilling year. 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

Affiliated Local Societies' news and events

MTG Leadership

The following events have taken place or are currently planned for 2024/25. Additional information relating to Affiliated Local Societies can also be accessed from the [IOM3 website](#).

CorIE

Meetings are generally held at the Chapel Lecture Theatre, Penryn Campus, Penryn, Cornwall, commencing at 6:00 pm. Additional information can be accessed on the [IOM3 website](#) or from secretary@thecornishinstituteofengineers.com

23 January 2025	The Mine Water Heat Resource in Cornwall
6 February 2025	The Importance of Backfill
27 February 2025	Don Dixon Memorial Lecture; The development in farm energy methane
13 March 2025	Ecton – A British mine at the forefront of technology for three thousand years
24 April 2025	A YEAR ON - South Crofty Mine: dewatering and water treatment

MIMinE

Meetings are generally held on the second Thursday of the month at Knottingley or Mansfield Mines Rescue Stations, 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 on the [website](#). **Please check for venue details prior to attendance.**

13 February 2025	The Renaissance of Pumped Storage Hydro – our readiness for creating underground spaces for energy generation
13 March 2025	Mine Ventilation – the good, the bad and the ugly
Events at other venues:	
11 October 2024	AGM, Dinner and Presidential Address - Mount Pleasant, Doncaster
14 November 2024	Drill and Blast Techniques at the Woodsmith Mine Shaft Sinking Project - Woodsmith Mine
9 January 2025	Various Applications of Drilling Technology - MS Teams
11 April 2025	ANNUAL SAFETY SEMINAR 2025 - Crowne Plaza, Sheffield
8 May 2025	Mine and Mill operations at Boliden Tara Mines - MS Teams

MIS

Meetings are generally held on the second Tuesday of the month, with video conference facilities for those who cannot attend available, commencing at 19:00 GMT. Additional information can be accessed on the [IOM3 website](#).

MinSouth

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 on the [website](#) and [Events page](#).

9 January 2025	Integrating Prospectivity Mineral Systems, Machine Learning and Sterilisation/Enhancement from Previous Exploration - the Counting House & virtual
13 February 2025	BTS - MinSouth Annual Lecture (TBC) - The Institution of Civil Engineers
13 March 2025	Young Persons' Lecture Competition MinSouth Heat - Royal School of Mines
10 April 2025	Women in Mining UK – MinSouth Joint Lecture (TBC)
8 May 2025	Prestige Lecture by Roland Chavasse, Secretary General of the International Lithium Association (ILiA) - IOM3 London Office, 297 Euston Road
12 June 2025	2025 MinSouth Quiz: Test Your Knowledge! - Doggett's Coat and Badge, London

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 18:00 GMT. Additional information can be accessed on the [website](#).

Our colleagues at the North East Coast Joint Branch NECJB of IMarEST and RINA welcome all NEIMME members to their events in 2024-25. Their events programme is available on the [NEIMME website](#).

Please contact office@mininginstitute.org.uk stating an interest in getting involved with:

- Arranging professional training events
- Helping to run NEIMME's lecture series and lecture recordings
- Judging the institute's prizes
- Writing or editing NEIMME's publications and quarterly newsletter
- History and science fair volunteers

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](#).

3 February 2025	Energy Efficiency Within Crushing and Reclaiming Product Development
3 March 2025	African Titanium Mining - Mining and Associated Environmental Issues
31 March 2025	'Heavy Rare Earth Elements...'