www.imqs.ie

Linked in
Irish Mining and Quarrying Society (IMQS)

Twitter: @IMQS_IE

IMQS

IRISH MINING & QUARRYING SOCIETY

ANNUAL REVIEW 2025

kemek

BLAST EXPERTISE

Clonagh, Enfield, Co. Kildare. A83 DY62. Republic of Ireland
P: +353 (0) 46 9541086 **E:** info@kemekltd.com

PO Box 100, Carrickfergus, Co. Antrim. BT38 0BN. Northern Ireland.
P: +44 (0) 28 93351444 **E:** info@kemekltd.com

Contents

4SM (NI) Ltd is part of the North West News Group NWNG.

IMQS ANNUAL REVIEW 2024

Published by: 4SM NI Ltd, The Old Coach House, 12 Main Street, Hillsborough BT26 6AE
Tel: **028 9268 8888** Fax: **028 9268 8866**
Email: **info@4squaremedia.net**

THE TEAM

Golda Burrows IMQS Publication Manager
Martin Elliman General Manager
Joel Byers Production Manager
Brenda Kerr Accounts Administration
Helen Beggs Chief Operating Officer

Notes from the Editors 2025

We are pleased to present the 2025 edition of the IMQS Annual Review, published at a time of renewed attention to Ireland's strategic role in the global raw materials landscape. This year's theme, Unlocking Ireland's Investment Potential, speaks to both the opportunities and responsibilities facing our sector as national and European priorities converge around secure, sustainable and transparent supply chains.

Complementing this theme are contributions from Shanoon Resources, which covers the reopening of the Galmoy zinc / lead mine and from Dalradian and Galantas covering projects in Northern Ireland. Further progress is evident form the improved rankings for Ireland by the Fraser Institute Mining Survey for 2024.

The Republic of Ireland now ranks 1st out of 82 on the Policy Perception Index, a composite index that measures the effects of government policy on attitudes toward exploration investment (ranked 15th in 2023). **Ireland ranks 19th out of 82 in the Investment Attractiveness Index** which combines the Mineral Potential Index, which rates regions based on their geologic attractiveness, and the Policy Perception Index. Ireland also scored well for Quality of Geological Databases; less so for Uncertainty on Environmental Regulations. Northern Ireland had less than 10 respondents to the Survey; it scored 10th on Policy and 30th on Attractiveness but scores well on Infrastructure and Databases.

The importance of **Critical Raw Materials** (CRMs) is recognised in government policy as outlined in the article from the Geoscience Policy Division of the Department of Climate, Environment and Energy in this Review and in Minister Darragh O'Brien's Foreword.

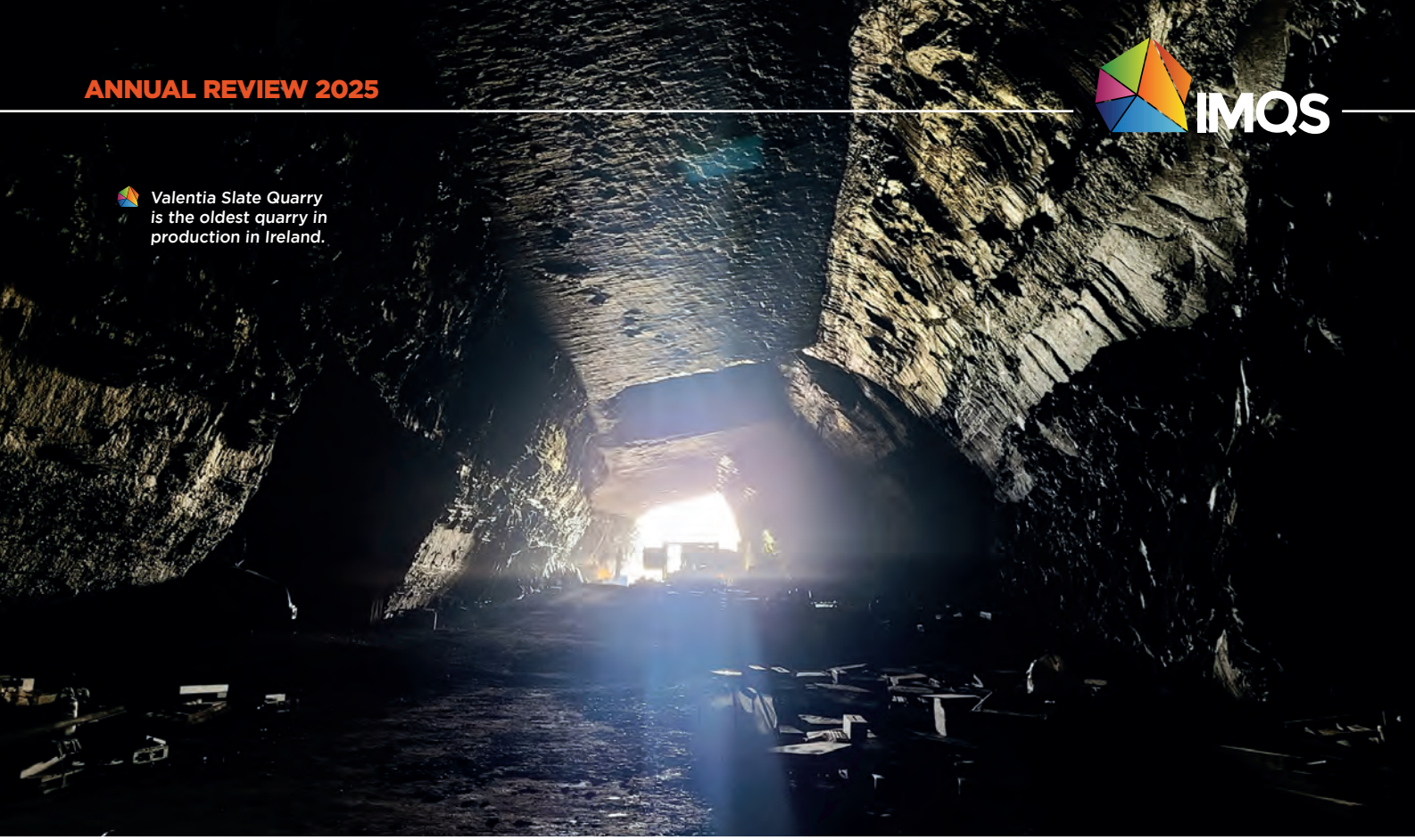
Secure supplies of aggregates are an essential underpinning for meeting Ireland's housing and infrastructure deficits which are addressed in the revised National Development Plan issued in July. The National Planning Framework published earlier in the year recognises the importance of aggregates and construction materials. Planning consents are running behind in meeting the demand for aggregates, estimated to total c. 1 billion tonnes by 2040.

Our **Industry Leaders** feature highlights two individuals whose careers reflect the depth and diversity of leadership within the sector. **Dr John Teeling** is profiled for his long-standing and distinguished contribution to the minerals industry in Ireland and beyond, particularly as a pioneer of exploration ventures and founder of multiple resource companies. We also celebrate a historic milestone at Boliden Tara Mines with **Michelle Bennett** becoming the first female General Manager in the operation's 50-year history, a significant and inspiring achievement for the industry.

Industry organisations depend on one another for support and knowledge exchange, and this year's IMQS Review once again reflects that spirit of collaboration through contributions from leading associations including the European Federation of Explosives Engineers (EFEE), the Irish Association for Economic Geology (IAEG), the Irish Concrete Federation (ICF), the Institute of Geologists of Ireland (IGI), the Institute of Quarrying (IQ), the Irish Mine Rescue Committee (IMRC) and the Mineral Products Association Northern Ireland (MPANI). Each of these partners has provided engaging updates on their activities over the past year.

A range of industry professionals have also provided fascinating feature papers, highlighting case studies and showcasing projects and key industry developments; they include articles on Creagh Concrete, Gyproc (Saint-Gobain), Irish Cement, McHale, Roadstone, Sandvik and Coshla Quarries.

There is a feature on **"Cobalt - The Superhero Metal",** which is considered a 'critical mineral' by the EU due to its growing demand in lithium-ion batteries for electric vehicles. **This year's Review also includes a contribution from Professor Paul Dunlop,** whose recent research, funded by the Department of Housing, Local Government and Heritage and the Geological Survey Ireland (GSI), **confirmed that pyrrhotite**



Valentia Slate Quarry is the oldest quarry in production in Ireland.

oxidation causing internal sulfate attack (ISA), not mica, is the cause of concrete failure in the Donegal block crisis. This finding fundamentally reframes the understanding of the issue and has important implications for diagnosis and remediation efforts, as well as aggregate testing for sulfide minerals that are harmful for concrete.

We are also pleased to include updates from last year's **IMQS Bursary recipients,** Eamonn Grennan, retired geologist, and Chuanyang Peng, PhD Candidate, University College Cork (UCC), who reflect on how they have made use of the award in their ongoing studies. Of particular note is the interesting contribution by Eamonn exploring The Positive Aspects of Metals and Minerals in Human Health and Wellbeing, an engaging piece that highlights the broader relevance of our industry beyond economic and technical domains.

We are also pleased to feature informative updates from Geoscience Ireland (GI), iCRAG, Geological Survey Ireland (GSI) and PDAC, each offering valuable insights into current policy, international engagement, national programme delivery and research innovation.

We pay tribute to Professor Richard Conroy in the Obituary section of this year's IMQS Annual Review, recognising the pivotal role he played in shaping Ireland's exploration and mining landscape. A noted medical academic in earlier life, he was an entrepreneur to the very end. Richard built a vision of Ireland as a world leader in mineral development, a vision he pursued with unwavering dedication throughout his distinguished career. As founder and chairman of Conroy Gold and Natural Resources, he was instrumental in the discovery and development of the Galmoy mine and in advancing gold exploration in Ireland, laying the groundwork for future investment and discovery. Thank you to Richard's family for allowing us to share the details of his remarkable life and contributions. May he rest in peace.

We encourage our members to forward details of individuals they wish to commemorate in future editions of the Review, as we continue to honour those who have helped shape our community and our industry.

As always, we extend our sincere thanks to our advertisers for their continued support of the Irish Mining and Quarrying Society, to all our feature writers and regular contributors, and to our publisher, 4 Square Media. This publication would not be possible without their ongoing commitment and collaboration.

Our theme of Unlocking Ireland's Investment Potential will underlie the Seminar (register here) on 19th September in Mullingar, to be delivered jointly by the IAEG and the IMQS; we look forward to seeing you there.

We hope you enjoy the IMQS Annual Review 2025 and invite you to consider contributing an article to next year's edition. And don't forget to check out the details of this year's IMQS Colouring Competition towards the end of this publication, with a fantastic selection of popular LEGO prizes to be won!

THE EDITORIAL TEAM

DR AOIFE BRADY | SEAN FINLAY | BRENDAN MORRIS | RONAN GRIFFIN | NICOLA NIXON | SIOBHÁN TINNELLY | RUAIRI O CONNOR

Message from the President

Firstly, it is an honor to be elected as the President of the IMQS, and I look forward to representing the Society during my tenure. I would like to thank our members for giving me this opportunity and my employer, Kemek, for its on-going support while carrying out the role. I live in the west of Ireland and have worked for Kemek for over twenty years.

A major aspect of my role in Kemek, as Area Manager for the West of Ireland, is building customer relationships. I am fortunate that a number of these relationships are with current IMQS members and I hope to build further relationships with our members across the entire island of Ireland in the coming years.

I would like to congratulate our outgoing President, Alan Dolan of New Boliden, on a very successful term. Alan has now taken up the role of Hon. Secretary. Dr Aoife Brady of iCRAG has been elected Vice-President and Liam O'Shea of Pat O'Donnell & Company will serve as Treasurer. Oisin O'Connor of iCRAG will take on the role of IMQS Executive Secretary. I am also pleased to welcome Martin Collins of Coshla Quarries to the Council. At the same time, long-standing council members Keith McGrath of McGraths Limestone (Cong) Ltd. and Mike Lowther of LKAB have stepped down. I would like to thank them both for their dedication to the Society and wish them well for the future.

The Irish Mining and Quarrying Society is a small voluntary, membership-funded, non-profit-making organisation which was founded in 1958 to provide a focal point for all those working in the extractive industry in Ireland. At a time when the world is becoming ever more divided, the IMQS believes in building relationships and fostering unity with our members in the communities in which they live and work. I firmly believe that the IMQS is just as relevant today as it has been over the past 67 years. Our goal is to complement the work of other societies and associations and to collaborate with them in ways that best serve our members.

A upcoming example of this is the IMQS-IAEG Joint Conference on 'Ireland's Natural Resources: Signs of Revival and Change' where presentations will cover topics, such as, prospects, opportunities, legislation, health and safety, mining and quarrying. In 2025, we are fortunate to have a strong membership base, after all, without our members, the IMQS would not exist. Early in my tenure, we came together as a council and agreed that the future of the society must centre on our members and their needs. In keeping with this, the IMQS has set the following objectives:

- To unite and encourage communication between persons, companies and organisations involved in the Extraction Industry in Ireland.
- To establish contact and to co-operate fully with other organisations connected with or interested in the natural resource industries of Ireland.
- To foster the discovery, development, processing and marketing of the mineral and other geological natural resources of Ireland in an environmentally compatible manner.
- To encourage and assist scientific and technological research and education in connection with the natural resource industries of Ireland.
- To maintain a high standard of conduct, to combat unfair practices and to encourage efficiency in those industries.

We feel that communication is a vitally important objective for the IMQS; facilitating conversations and collaboration between our members can go a long way towards unlocking investment potential. This is an all-Ireland society representing the Extractive Industry on the Island of Ireland and our plan, as a council, is to expand our membership, focusing on areas that have faltered over time.

This does not mean we will overlook our current members; rather, by reconnecting with past members, particularly in regions of Ireland and sectors where our membership is low, we believe we can strengthen the society and unlock investment opportunities that benefit all our members. With this in mind, I call on anyone that is reading this message to contact the IMQS on info@imqs.ie if you would like to reconnect or get involved.

Finally, I would like to thank all who have contributed articles and advertisements to make this another successful publication. I would also like to complement the IMQS Editorial Committee and Four Square Media for the excellent work and cooperation while compiling and publishing this review.

IMQS

BY RUAIRI O CONNOR
President,
Irish Mining & Quarrying Society

Activities of the Society 2024-2025

The following are the main activities of the society in 2024/2025.

Details of all IMQS activities can be found at www.imqs.ie. I would like to take this opportunity to thank you, our members, for your patronage.

The society cannot exist without your continued support.

Annual Review 2024 & 2025

The Annual Review 2024 as well as reviews from previous years can be viewed and downloaded here.

Representations

The IMQS has many members who actively promote the society in various groups and events including;

- European Federation of Explosives Engineers (EFEE)
- Prospectors and Developers Association of Canada (PDAC)
- Geoscience Ireland
- Geo-Driller Apprenticeship
- Quarry Skills Certification Scheme meetings (QSCS)
- Quarry Safety Partnership (QSP)
- Minerals Information Working Group (MIWG)
- Department of Climate, Energy and the Environment (DCEE)
- Northern Ireland Planning Authority
- Mineral Products Association Northern Ireland (MPANI)
- Institute of Quarrying Northern Ireland (IOQNI)
- Irish Concrete Federation (ICF)
- ABMEC Conference and Exhibition
- Financial Times Mining Summit

IMQS Seminars

IAEG and IMQS will hold a joint Conference – 'Ireland's Natural Resources: Signs of Revival and Change' on Friday 19th September at the Mullingar Park Hotel, Co. Westmeath. The Conference is a half-day event, running from 10 am to 1 pm, with lunch at 1 pm.

GeoDrilling

In 2024, seven apprentices completed the GeoDrilling Course at Southeast Technological University (SETU), formerly Carlow IT. See the IMQS website for the article on the course and award recipients.

Annual Field Trip

The Annual Field took place on May 30th 2025. The venue was to the oldest producing quarry in Ireland, Valentia Slate Co. Kerry (valentiaslate.com).

Annual Dinner Dance 2024 & 2025

The 2024 IMQS Annual Dinner Dance took place at Farnham Estate Spa and Golf Resort on November 9th 2024.

In 2025, the event will be held at the Hudson Bay Spa Hotel, Athlone, Co. Roscommon, on the 15th November.

Institute of Quarrying Northern Ireland - Stone Crushers Ball

The Annual Institute of Quarrying (Northern Ireland) Stone Crushers Ball took place in the Europa Hotel, Belfast on the 8th of November 2024.

Tech Talks 2024

Acoustics and Noise Control – James Cousins of Wave Dynamics

Energy Management & Renewable Integration – Kevin O'Donovan

Innovation In Deep Mine Shaft Sinking Performance at– Neil webster and Stuart Walker, Woodsmith Mine, UK

'Dewatering & Shaft Refurbishment at South Crofty Tin Mine in Cornwall' – Steve Tarrant, Mine Manager, Cornish metals

Goal Zero program, Continuous Improvements & Innovations – Paul Maher, Kilsaran

Bursary 2025

Since 1958, the Irish Mining and Quarrying Society (IMQS) has supported those working in the extractive industry in Ireland. 2024 was the inaugural year of our bursary. Two individuals availed of this assistance in 2025.

We would like to continue this support in 2025 by offering financial assistance to individuals studying to gain a qualification, or, a working individual improving their knowledge in a subject related to the Mining, Quarrying or the Extractives Industries.

LinkedIn

Our LinkedIn page is extremely popular and has over 2,500 followers. Subscribe to the page for up to date industry related articles and news.

BY ALAN DOLAN
Honorary Secretary
Irish Mining & Quarrying Society

Paying your subscription could not be easier.
Just log onto www.imqs.ie and click 'Becoming a member'.

Foreword by Minister Darragh O'Brien, Minister for Climate, Energy and the Environment

Ireland's resources are more important than ever

To achieve a sustainable, low-carbon, resource-efficient economy by 2050 requires policies and actions which minimise unsustainable resource use and environmental degradation, while promoting environmental awareness and environmentally sustainable behaviours.

It's my department's ambition, with its new identity as the Department of Climate, Energy and the Environment, to develop and implement policies and measures which drive economic and social progress but which also improve and safeguard our natural environment for the future. For the extractive sector, the government's aim is to ensure that Ireland's resources are utilised and developed in a way that is responsible, productive and sustainable for future generations.

Ireland looks forward to transformational investment in its infrastructure through delivery of the National Development Plan. This will be facilitated not only by the largest ever capital investment programme in the State and planning system reform, but also the materials needed to build: aggregates, industrial minerals, base metals and critical raw minerals.

The suitability of aggregates for their end use has been a significant issue across Ireland over the past decades. In my tenure as Minister for Housing, I provided funding to ensure that the best scientific research and data was available to assess the quality of aggregates for construction materials. Geological Survey Ireland will work closely with my former department to ensure that the necessary expertise is available to support the responsible production of suitable raw materials. These resources not only provide us with the literal building blocks of Ireland's future, but they also add value to the economy, provide skilled jobs and contribute to European market competitiveness given our close connections to the Single Market.

The EU Critical Raw Materials Act, which aims to secure sustainable supplies of critical and strategic raw materials (SRMs) for the European energy transition and economy, will specifically facilitate the development of projects that produce SRMs. It has the potential to be a game-changer in the financing and permitting of extraction, processing and recycling projects which result in the production of SRMs for the European market. The first call for Strategic Project designations resulted in 47 projects across Europe and I look forward to seeing how project development in Ireland can contribute to CRMA objectives as well as supporting Ireland's own development.

We need to look after our natural resources. Once we have made the effort of extracting them from the ground, making them into a product or separating them from waste; we must not let them fall into the waste stream. The circular economy intends to make maximum use of the resources we already have in circulation. The second Whole of Government Circular Economy Strategy is currently being finalised. It will provide for incentives that will create a level playing field for circular economy actors, practices and products, and leverage public procurement to create a market for circular products and practices. As construction and demolition waste continues to be Ireland's fastest growing waste stream, accounting for over half of the total waste currently being generated, the Government plans to publish a Circularity Roadmap for the construction sector later in 2025. The EU will be placing further emphasis on the Circular Economy with its upcoming Circular Economy Act, which Ireland will be closely engaged with from negotiation stage.

As we know, Ireland has a rich history of mining and the commensurate expertise and know-how. Some historic mines have a wealth of minerals left in extractive waste. I would like to see these sites cleaned up to best possible standards, while recovering any remaining critical raw materials from existing waste. Information on these sites to be produced by Geological Survey Ireland will move these sites towards fulfilling circularity, environment and community objectives and will de-risk them as an investment option for the private sector.

I am also keen to see Ireland's long history of successful mineral exploration maintained and to this end the data from Geological Survey Ireland, particularly from the Tellus programme, can help to inform the efforts of the private sector. My Department is also supporting research in this area in collaboration with the Research Ireland Centre for Applied Geoscience (iCRAG). The intentions of the state in this area have been strongly signalled too by the recent establishment and activities of the new Irish Minerals Fund, supported by a cornerstone commitment from the Ireland Strategic Investment Fund, and I am glad to see them working closely with my Department in promotion and support of the sector.

These initiatives, coupled with an expected increase from the private sector in the level of minerals development and extractive activities across a number of locations, are set to provide sustainable economic benefits to Ireland for years to come.

An Roinn Aeráide, Fuinnimh agus Comhshaoil
Department of Climate, Energy and the Environment

DARRAGH O'BRIEN
Minister for Climate, Energy and the Environment

Pat O'Donnell & Co.

OVER 50 YEARS OF MOVING IRELAND

Each solution we supply from **Volvo Construction Equipment**, including the ground-breaking **Electric models**; **Volvo Penta** engines; **Sennebogen** material handlers; and **Kohler** engines comes with a nationwide team of qualified service engineers, a next-day parts delivery system and an all-island branch network.

SALES

SERVICE

SERVICE AVAILABLE 364 DAYS OF THE YEAR

24/7 ORDER ONLINE

ORDER ONLINE24/7: PATODONNELL.COM

Dublin - Head Office	Cork	Galway	Portadown
California Heights Chapelizod D20 YH76 **t:+353 1 616 1000**	Sallybrook, Glanmire Co.Cork T45 H778 **t:+353 21 482 1288**	Carnmore West Oranmore, Co.Galway H91 FWF6 **t:+353 91 790 722**	Seagoe Industrial Area Portadown, Co. Armagh BT63 5QE **t: +44 28 38 337 222**

Ensuring safety and excellence in quarry blasting

The Institute of Quarrying is the professional membership body for the quarrying and surface mining industry and has a global footprint. It has a history of working closely with educational institutions and the development of qualifications and training.

During 2022, Ben Williams, IQ President and EPC-UK Managing Director, had a vison to create a 'Surface Mining Explosives Diploma'. This followed on from a successful rewrite of the IQ Explosives in Quarrying Handbook, which was a project between IQ and EPC UK.

The seed for the explosive's qualification was sown during Hillhead 2022 and development of course content followed on. Chris Rowan, ex. Senior Programme Leader at the Centre for Mineral Products, from the University of Derby was instrumental in this work. He is the course Programme Leader and tutor.

The qualification was developed within a tripartite partnership between the University of Derby, EPC UK and IQ. The mechanics of delivery was again a first for the Institute. Delivery and administration is through IQ's Moodle platform, tutorials and assessment by EPC UK and validation / quality control via the University.

Although the Diploma is operated remotely from the Centre for Mineral Products at Derby, it is still an integral part of the Higher Education suite of minerals industry qualifications offered at the University.The first cohorts commenced in 2024, and it is hoped to license the course to a University in Spain soon, opening a market in Latin America.

SAFELY MANAGING QUARRY BLASTS AND EXPLOSIVES

Effective blast management involves meticulous planning, precise calculations, and adherence to strict safety protocols.

Blasting Diploma Team.

If not, poorly managed blasts can result in misfires, excessive ground vibrations, and fly rock incidents, all of which pose significant safety hazards.

The use of advanced blasting technologies, such as electronic initiation systems and predictive modelling software, play a crucial role in enhancing precision and reducing risks.

Additionally, ongoing training and competency assessments ensure that professionals stay updated on the latest safety procedures and regulatory requirements. A strong safety culture, reinforced through education and best practices, is essential in minimising hazards and achieving operational excellence.

ENVIRONMENTAL CONSIDERATIONS OF A BLAST

When it comes to detonations, explosives release gases, including carbon monoxide and nitrogen oxides, which can be harmful if not properly ventilated. Due to the environmental impacts a blast can have, surface mining operations are subject to strict environmental regulations, necessitating measures to minimise noise pollution, water contamination, and habitat destruction.

WHY KNOWLEDGE ON EXPLOSIVES IS IMPORTANT

Working with explosives in surface mining and quarrying can be inherently hazardous, requiring rigorous safety measures and expert knowledge to mitigate risks. Without these measures, accidental detonations could occur from mishandling, improper storage, or faulty detonation systems, endangering lives and equipment.

Poor blast design can result in fly rock and airborne debris, posing risks to workers and nearby communities. Excessive vibrations from blasts can additionally cause structural weaknesses in surrounding geological formations, leading to unintended collapses or environmental concerns.

THE ROLE OF A SURFACE MINING EXPLOSIVES ENGINEER

A Surface Mining Explosives Engineer plays a critical role in ensuring the safe and efficient use of explosives in quarrying and mining operations. These professionals are responsible for designing and implementing controlled blasts that maximise resource extraction while minimising environmental impact and safety risks.

Their duties include selecting appropriate explosives, calculating blast patterns, overseeing drilling and detonation processes, and ensuring strict adherence to safety and regulatory standards. Explosives engineers also work closely with geologists, surveyors, and site managers to optimise operations and improve productivity. Given the hazardous nature of their work, ongoing professional development and certification are crucial to maintaining high standards of safety and technical expertise in the industry.

Accredited training programmes, such as the Diploma in Surface Mining Explosives Engineering, equip professionals with the latest knowledge, skills, and best practices to safely and effectively manage these risks.

PROGRAMME OVERVIEW

The Diploma in Surface Mining Explosives Engineering provides the necessary training to prepare industry professionals with the skills and knowledge required to conduct safe and efficient blasting operations.

The programme is structured into three key modules, each designed to equip students with comprehensive knowledge and practical skills in surface mining explosives engineering.

Geology, Surveying, and Drilling Operations: covering an in-depth exploration of rock properties and the geological factors affecting mining operations; comprehensive training on advanced surveying tools and software, emphasising blast-related applications; and a detailed study of various drilling methods, equipment selection, setup procedures, and their downstream benefits, combined with a focus on business ethics in drilling and blasting operations.

Explosives and Blasting Operations: covering the history and types of explosives and their classification; the properties and characteristics of

Carrying out second person check of connection.

explosives that influence explosive performance; insights into different detonators and initiation systems, their uses and patterns; the core principles of designing effective blasts; and detailed procedures and safety measures for conducting shot firing operations.

Safety, Health, Environment and Sustainability: covering legislation and best practice governing health, safety and environmental practices; training and competence: ensuring the highest standards of training to effectively manage misfires, flyrock, and other operational hazards environmental considerations to address air quality, vibration, noise and dust management; and sustainable practices to promote long-term environmental stewardship.

James Thorne, CEO of IQ, said, "The diploma is a significant and important development for the explosives industry. We are proud to be part of this tripartite collaboration and its resulting implementation via our trusted partners at EPC-UK and the University of Derby. Education is critical to personal professional development, and we are proud to add this to our portfolio of opportunities for our members."

Each module has two equal assessment components: coursework and a time constrained open-book end assessment. Both assessments are completed online to facilitate distance learning. Learners also receive a copy of IQ's Explosives in Quarrying textbook to supplement their studies. This textbook has recently been updated and is available to purchase from the IQ online shop.

EXPERT-LED TRAINING BY INDUSTRY SPECIALISTS

This diploma is the product of collaboration between leading experts in explosives engineering, each bringing extensive knowledge and industry experience. The programme has been developed and delivered by Dr. Geoff Adderley MIQ, Blasting Technology Development Manager at EPC-UK; Julian Smallshaw FIQ, Head of Education and Standards at the Institute of Quarrying; Chris Rowan FIQ, Education Consultant with EPC-UK; and Dan Richards MIQ, Senior Explosives Engineer at EPC-UK.

Their combined expertise ensures that the qualification delivers real-world value, equipping professionals with the knowledge, technical skills, and leadership abilities necessary to excel in the explosives and quarrying industries.

WHO COULD BENEFIT?

- Operational Managers, Assistant Managers, and Supervisors: Those with significant industry experience but limited formal qualifications seeking to enhance their competence.
- Graduate Employees: Individuals with degrees in related fields such as mining engineering or geology, looking to specialise in explosives.
- Industry Suppliers/Manufacturers Employees: Professionals seeking to deepen their sector knowledge to better serve industry clients.
- Consultants: Those aiming to broaden their understanding of the mineral products environment to improve their service offerings.
- Entry-Level Individuals: School leavers with English and/or Maths GCSEs seeking a career in the commercial explosives sector.
- Ex-Military Personnel: Veterans transitioning into civilian roles within the explosives industry.

Eligibility criteria:

- Employment Affiliation: Learners must be employed or have an affiliation with an employer.
- Nomination and Review: Learners should be nominated following a review or discussion with their line manager or recruitment manager.
- Capability and Competence: Learners identified by their organisations as capable of succeeding in the program.

ADVANCE YOUR CAREER TODAY

If you are ready to take your career to the next level and gain a globally recognised qualification in explosives engineering, this diploma is your perfect opportunity.

Enrol today and become a leader in the future of explosives engineering by visiting https://www.quarrying.org/explosives

Sources: https://www.quarrying.org/iq-news/blasting-down-co2 - The Institute of Quarrying

IQ The Institute of Quarrying

BY JULIAN SMALLSHAW
IQ Head of Education and Standards

QME
MINING & TUNNELLING

PROVIDING COMPLETE MINING & TUNNELLING SERVICES, EQUIPMENT SALES & RENTAL SOLUTIONS WORLDWIDE

- UNDERGROUND MINE DEVELOPMENT CONTRACTING SERVICES
- FULL DRILL AND BLASTING SERVICES
- UNDERGROUND CONSTRUCTION AND SHOTCRETING SERVICES
- NEW AND USED UNDERGROUND MINING AND TUNNELLING EQUIPMENT SALES AND RENTAL
- EQUIPMENT AND COMPONENT REBUILD AND REPAIRS

QME
MINING & TUNNELLING

QME LIMITED
Coolfore Road, Navan,
Co Meath, Ireland C15 KXY3
Tel: **+353 (0)46 9073709**
Email: **info@qme.ie**
www.qme.ie

ESSENTIAL AGGREGATES – An Evidence-Based Assessment to Inform Ireland's Planning Policy

It gives me great pleasure to contribute to this edition of the Irish Mining and Quarrying Society (IMQS) Annual Review, a publication which is highly regarded throughout the Irish mining and quarrying industries and beyond. I would like to thank Dr Aoife Brady, Chair, IMQS Annual Review Editorial Committee, for her invitation to update readers on some of the industry priorities being addressed by the Irish Concrete Federation (ICF) at this time.

Unlike previous years, I will focus on the single issue of access to raw materials which has been identified by the ICF council as a key challenge facing our industry, the economy and society in general.

At the time of writing, the ICF has just published a new report which highlights some of the critical challenges facing Ireland's future supply of essential aggregates, such as crushed stone, sand and gravel, upon which the delivery of ambitious national programmes, including 'Housing for All', the National Development Plan and 'Project Ireland 2040', are highly dependent.

Titled "ESSENTIAL AGGREGATES – An Evidence-Based Assessment to Inform Ireland's Planning Policy", this report provides the most comprehensive analysis to date of Ireland's aggregate supply pipeline and was commissioned by ICF and undertaken by RPS Consulting.

As readers of this publication will be aware, aggregates, such as sand, gravel and crushed rock are vital raw materials for the construction of essential development, such as, homes, schools, hospitals and energy, water and transport infrastructure. ICF estimates that Ireland will require approximately one billion tonnes of aggregates between now and 2040 to meet societal demand.

However, the report reveals that new planning authorisations for the continued extraction of aggregates are failing to keep pace with annual consumption, and planning decisions for the extraction of these raw materials are now taking over four times longer than the statutory requirement.

Derry McKeown, Kilsaran Concrete, Gerry Farrell, CEO of the Irish Concrete Federation and David McKeown, Kilsaran Concrete at the launch of Essential Aggregates – An Evidence-Based Assessment to Inform Ireland's Planning Policy.

Ireland has natural reserves of high-quality aggregates, which are essential raw materials for Ireland's future infrastructure requirements. Yet, current planning decision timelines, and a lack of a coordinated policy on the long-term sustainable supply of aggregates, will threaten Ireland's ability to meet future demand for housing and infrastructure projects.

The 'Essential Aggregates' report has found that on average, only 61% of annual consumption of aggregates is currently being replenished by means of new planning authorisations. At current levels of authorisation, that will fall to 52% over the 2025 – 2040 period as demand for aggregates increases due to Ireland's growing population.

The report also found that quarry planning decisions in 2024 took over four times longer than the statutory timeframe for such decisions. There is a statutory objective for planning applications to local authorities that are appealed to An Coimisiún Pleanála to be

decided on within 30 weeks. However, quarry development applications from 2017 up to 2024, were delayed in the planning system for 91 weeks on average. In 2024 alone, decision making timeframes had increased to 129 weeks.

Add in one year for the detailed pre-planning work required and the considerable expense involved, this unacceptable and costly delay can cause great uncertainty within the supply chain at individual enterprise level, impacting on investments in plant, machinery and people.

ICF is calling very clearly on the Government to act and make a National Policy Statement, which explicitly recognises the national strategic importance of Ireland's reserves of aggregates for the country's future development.

In addition, there must be greater alignment between national policy objectives and regional and local planning strategy for the supply of aggregates. This will ensure that these raw materials, which are a finite resource and whose geographical location is fixed, are extracted in a sustainable and regulated manner compatible with the protection of the environment, heritage and quality of life of residents.

There is also a need for enhanced resources for local planning authorities and the newly established An Coimisiún Pleanála for training and education on aggregate extraction. In this context, **ICF welcomes the recent publication of the highly informative and valuable "OPRCase Study Paper CSP07 - Quarriesand the Local Authority DevelopmentPlan by the Office of the Planning Regulator",** which acknowledges that quarries and the extractive industry provide valuable sources of raw materials and are critical to the construction industry and infrastructure development and maintenance. The publication also concluded that changes in planning and environmental policies and expected growth in construction demand suggest a need for a more strategic approach to the extractive industry sector and development plan policies.

ICF looks forward to working collaboratively with all stakeholders on the issues raised in both reports, which are outlined in this article, to proactively plan to safeguard Ireland's future supply of essential aggregates.

In conclusion, I would like to congratulate the IMQS on producing their Annual Review and to wish all readers a safe and prosperous remainder of 2025.

BY GERRY FARRELL

Chief Executive, Irish Concrete Federation

An overview of activities by the Institute of Geologists of Ireland (IGI) 2024-2025

The Institute of Geologists of Ireland (IGI) was established in 1999 with the mission of promoting and advancing geoscience and its professional application in all disciplines, especially the geosciences and to facilitate the exchange of information and ideas throughout the existing community.

The IGI is a registered charity and not a lobbying organisation and its members are required to uphold, develop and maintain the highest professional standards in the practise of their profession. To this end, all members must undertake CPD recording for approval on an annual basis.

Professional membership of the IGI is open to all practising geoscientists who meet the required standards of qualification and experience. Professional members are intitled to use the Professional Geologist (PGeo) title as well as the European Geologist (EurGeol) title as IGI are a National Licencing Body with the European Federation of Geologists (EFG). The IGI maintain a number of specialist registers of competent persons including:

- Qualified persons in respect of carrying out geological aspects of works related to pyrite described in 398-1 and EN13242 including SR21.
- Geoscientists/competent persons: Regulated and Unregulated Waste Disposal/Contaminated Land Assessments following the EPA Code of Practice.

The IGI also maintains a number of Mutual Recognition Agreements (MRAs) with professional bodies in other jurisdictions. These agreements allow professional members from the professional bodies to practice as geoscientists in the other's jurisdiction provided the conditions of the MRAs are met. For information on how to apply to the IGI, please visit www.igi.ie.

The mining and quarrying sectors have always been very well represented within our membership, with 25% of our members stating 'Mining Geology and Exploration' as their main area of expertise at application stage. Many more of our members are involved in mining through associated fields such as hydrogeology, geochemistry, education, environmental assessment or regulation. The IGI recognise and support the work of IMQS in the responsible development of the minerals industry in Ireland in line with best practice.

IGI ACTIVITIES 2024 - 2025

During the course of 2024-2026, the IGI board continued to hold meeting and events online, following a hybrid model. The IGI endeavours to continue to develop, promote and advance geoscience in all disciplines through facilitating information exchange.

Initiatives, such as the IGI's Early Career Network and Mentoring Scheme, have huge potential to enable the community to support each other and continue to develop the profession. Early Career members have added a great deal to a number of committees and working groups in recent years and we hope this trend continues into the future.

The membership has grown in 2024 and 2025; fifteen candidates were approved for Professional Membership with twenty-one approved for Membership-in-Training. This brings our total membership to 415.

MINERALS INFORMATION WORKING GROUP

The Minerals Information Working Group (MIWG) remains the largest working group within the IGI and we are grateful to have the support of a number of IMQS members who actively contribute to the working group. The IGI as head of the IGN were requested to nominate five members for the Department of Climate, Energy and the Environment Advisory Group on Mineral Exploration and Mining. The group began its work in 2022 and includes members representing the Environmental, Economic and Social Pillars. The inclusion of the IGI and IGN is testament to the relevance of the organisations and the valuable science-based contributions our members can impart to such important groups.

This year, the MIWG's focus was on contributing to awareness of minerals in society and keeping up to date with developments within the minerals industry. The MIWG contributed to two letters by the IGI to the new Ministers O'Brien of DECC (ROI) and Archibald of DfE (NI) both of whom have responsibility for natural resources and energy. The letters introduced the IGI and briefly explained the roles of professional geoscientists in their departments. The MIWG letters included paragraphs explaining the significance of their topics and referenced the IGI factsheets. The MIWG also contributed to an IGI submission to the DECC consultation on their upcoming 2025-2028 Statement of Strategy.

Future activities planned include outreach to other Irish professional organisations to offer information on minerals related topics, such as Critical Minerals.

COURSES AND WEBINARS

The IGI continued to deliver a series of events in 2024-2025, both online and in-person courses. We have aimed to provide regular CPD opportunities throughout the year and, so far, have delivered:

- Contaminated Land Training Series - concluding webinar and a Field-based practical session held in November 2024 which was attended by 20 delegates.
- Webinar on Primacy Effects in Environmental Attitudes in Mineral Exploration attended by approximately 40 people.
- Soil and Rock Logging Course in conjunction with Equipe Group and Causeway Geotech in June 2025.

The IGI Board and committee members also received Inclusive Leadership training from the Irish Centre for Diversity (ICFD) and following additional work by the IGI EDI committee, IGI was awarded a Bronze Level "Investors in Diversity" certification.

GOVERNANCE

The IGI is a member of Charities Institute Ireland (CII). The CII's mission is to provide leadership in the sector by empowering charities to maximise their impact, particularly through best practice in governance, finance and sustainable fundraising management. The CII provides valuable resources and training and all board members are required to undertake the Certificate in Best Practice for charity trustees. Further information can be found on their website https://www.charitiesinstituteireland.ie/.

The IGI has continued to improve on written procedures and policies and this year has updated the following documents:

- Minerals Information Working Group Terms of Reference
- IGI Awards Procedures (update underway)

REPRESENTATION

This year, the IGI maintained its public profile on a number of fronts, in line with the 2019-2024 strategy. We responded to a number of issues concerning geoscience in Ireland throughout the year via public consultations or direct representations:

- EPA Consultations on Draft Regulations to reform the End-Of-Waste decision-making process
- DECC Statement of Strategy Response

The IGI normally participates in key geoscience events each year as a sponsor and exhibitor. The IGI provided sponsorship for:

- iGEO2024 (Irish Geoscience Early Researchers Symposium) event in Galway in October 2024.
- 2025 Joint Mineral Deposits Study Group (MDSG) and Volcanic and Magmatic Studies Group (VMSG) Conference in Trinity College Dublin in January 2025.
- IGRM (Irish Geological Researchers Meeting) in Trinity College Dublin in February/March 2025.

Dr Siobhán Power, incoming IGI President, receiving the IGI Presidential Medal from Eoin Wyse, outgoing IGI President at the IGI AGM on 24th June 2025.

The IGI continues to facilitate collaboration in the geoscience community, through hosting the Irish Geoscience Network meeting which was held in March 2025. The IGI wishes to thank all participants who have given up their time during the year to make sure that the geoscience community in Ireland is connected and working together.

There is an intent to reconvene the Heads of Geoscience Group (or HoGGs) going forward, which was previously an informal quarterly meeting to examine and address the current topics impacting our sector.

The IGI continues to be involved at a high level in the European Federation of Geologists (EFG). Members attended the last number of council meetings, including the recent Spring Council meeting in Naples, Italy, and have joined a number of key working groups with the EFG.

CONCLUSION AND IGI PRESIDENT HANDOVER

It has been an honour to serve as IGI President these last two years and on the IGI Board for the last eight years, previously as Secretary and Vice-President.

The success of the IGI can be attributed to the combined efforts of our board members, our membership, the executive secretary and our numerous stakeholders. The enthusiasm, generosity, dedication and hard work of all of these parties, who all contribute to the IGI community is, as always, awe-inspiring.

The IGI acknowledges the continued support of our sponsoring bodies, the Irish Mining & Quarrying Society (IMQS), Geophysical Association of Ireland (GAI), Geotechnical Society of Ireland (GSI), Irish Association for Economic Geology (IAEG) and the International Association of Hydrogeologists (Irish Group, IAH).

IGI WELCOMES NEW PRESIDENT

IGI held its AGM on 24th June 2025 as a hybrid meeting at 63 Merrion Square and online.

At the AGM, EurGeol Dr Siobhán Power PGeo was elected the 14th President of IGI. Siobhán has been an IGI Board member since 2020 and previously served as IGI Treasurer and IGI Vice President. She also sits on the Education Working Group.

Siobhán is currently employed as a Senior Geologist at the Geological Survey Ireland.

Siobhán is looking forward to continuing the existing work of IGI and working with the current Board to further the profile of geosciences in Ireland and Europe.

BY EOIN WYSE
EurGeol PGeo,
outgoing IGI President

Dalradian's Managing Director (MD), Brian Kelly, and Health and Safety Manager, Anthony Moran, underground at Curraghinalt.

Dalradian's MD provides update on Tyrone Project

Throughout 2024 our focus was, and remains, on completing the planning process on our application to build a world-class underground mine in Tyrone while continuing to uphold our responsibilities to the environment, local communities, and good governance.

Our project, which focuses on the extraction of gold, silver, and copper has been making its way through the Northern Ireland planning system for the last seven years.

In January, we began a long-awaited public inquiry hearing. However, after three days in, the hearing was suspended due to administrative errors by the Department of Infrastructure. We are hopeful we will have a new schedule for the hearing soon.

This year, we've also seen some important developments that set the tone for where Northern Ireland is heading – most notably, the release of the new Programme for Government. It's encouraging to see a strong focus on sustainable growth, community well-being, and responsible resource use. At Dalradian, we see those priorities reflected in our own approach and can contribute to that bigger picture.

The UK Government has identified 'growth' as its leading priority. Over its 20-25 year life span the project will add £7 billion to Northern Ireland's economy. The mine, located west of the Bann, would be one of the largest ever American foreign direct investments in Northern Ireland, creating over 1,000 jobs, including around 350 directly with our company, in roles like mining operations, engineering, environmental management, technology, and community engagement. It would generate a c.£1 billion local supply chain with 650 additional jobs supported through the wider economy. So far, we've worked with over 540 suppliers across Northern Ireland. We're committed to offering well-paid jobs with good career prospects, encouraging skills development, and fostering an inclusive, supportive workplace.

Across the globe, there's growing recognition of how critical minerals are to building a more sustainable and technologically advanced future. From electric vehicles to renewable

energy systems, to smartphones and medical equipment, minerals are essential. Northern Ireland has the potential to contribute to this global shift – by developing its own resources responsibly, safely, and in a way that delivers real and lasting benefits to the people who live here.

Over the life of the mine, we aim to produce 15,000 tonnes of copper, 3.5 million ounces of gold, and 1.7 million ounces of silver – materials that are essential for industries like renewable energy and green technology. The Curraghinalt deposit also contains other critical minerals such as tellurium, antimony, bismuth, molybdenum, and cobalt.

Whilst it is disappointing that the planning process has become so protracted, our team on the ground hasn't stood still. We've maintained an excellent health and safety record, reaching four years with no lost time incidents, and stepped up our efforts on carbon reduction. We've been actively exploring ways to reduce emissions across every part of our operations – from energy efficiency to low-carbon technologies. Our tree nursery is progressing and will provide a proportion of the total saplings required to fulfil the tree planting plan at the future mine site. We have also transitioned our fleet of diesel fuelled jeeps to run on HVO, reducing our current emissions and assisting us in researching fuel alternatives for the operating mine.

Personally, this year also marks 10 years at Dalradian. Throughout that time, I've worked alongside a dedicated team

We have welcomed approximately 1,800 visitors to our project, including community and school groups. Recently, 14 students from The King's School, Canterbury – the oldest continuously run school in the world, founded in 597 AD – had a hands-on experience of geology in our core shed.

to advance our vision for a modern, underground mining project grounded in innovation, sustainability, and community engagement. From early exploration to detailed planning and environmental stewardship, every milestone has been driven by our shared commitment to doing things the right way. It's been rewarding to witness the progress we've made – not only in terms of technical achievements, but also in building strong local relationships and preparing to deliver long-term benefits for the region.

Looking ahead, we're hopeful. The Curraghinalt project has the potential to be truly transformative – bringing skilled jobs, investment, and a boost to the local economy in Tyrone and across Northern Ireland. It's a chance to show how responsible development can deliver lasting value while protecting the things that matter most.

DALRADIAN

BY BRIAN KELLY
Dalradian
Managing Director

MPANI Regional Director's Report

As I looked back on the last year and listed the local, national and global events that have affected our lives I was really taken aback by just how many things have happened and indeed have not changed in terms of the challenges facing all of us.

Sarcastically though, I could say one thing that hasn't changed here in Northern Ireland is the ability of our local politicians to make difficult decisions. The huge challenges of the health service, education, revenue raising to deliver essential services, water and road infrastructure maintenance and construction, and, of course, the planning system, mean that the need for collective action by industry has never been more important.

Despite the global turmoil and uncertainty that has been created by the return of Donald Trump, it is something to be very proud of, the way in which many of our MPANI members and other NI businesses continue to build their businesses across the UK and beyond. The rationalisation of our industry here in NI is gathering momentum as access to permitted mineral resources become increasingly important. It is something that MPANI continues to highlight both at the Department of Infrastructure and Local Council level. Our call for **Planning Reform** and, in particular, the establishment of a central shared service for minerals planning is, in my view, gaining traction among senior planners.

The **health, safety and well-being** of our members' employees will always be our top priority, and this year will again see us sustain and develop the excellent working relationship we have with the HSENI. The collaborative and compliance supporting advisory approach we have developed, over the past decade or more has definitely produced positive results and can be surely held up as an example of how a regulator can work positively with an Industry.

This past year saw significant progress on the **decarbonisation and energy efficiency** journey. The Industrial Decarbonisation NI (IDNI) project, of which MPANI are partners, is offering great opportunities for members to come together both in local industry clusters and as an NI-wide mineral products "community of shared interest" (COSI) to collaborate on energy efficiency measures and investing in low/zero carbon infrastructure and fuels.

In the links below, you can read the high-level objectives and focus areas for the Association and our hard-working Committees for the year ahead. Through the work of our committees, we have built many important relationships across government, with other business organisations and NGOs.
We will continue to build and enhance those working relationships going forward so that we not only protect our members' businesses but the whole NI economy and the futures of our employees.

As we look forward positively to the rest of 2025 and the next few years, and hope for a steady and sustainable recovery and growth, I would recommend that you take time to look at **our objectives and focus areas for 2025** so you get an appreciation of the work that MPANI has ahead. You can view these using the links below:

MPANI_focus_areas_and_objectives_for_2025.pdf

Concrete Development Group

Health & Safety Committee

Highway Maintenance and Construction Group

Planning and Environmental Committee

The 'triple' transition **of decarbonisation, diversity and digitisation** is well underway in our industry. I firmly believe we have a vehicle in NI to take a collaborative approach to reducing energy costs, decarbonising and helping productivity level. That vehicle is IDNI.

Funded by Innovate UK, key partners include Manufacturing NI, Mineral Products Association NI, AMIC/QUB, Ulster University/Smart Manufacturing Data Hub, and a GB consortium that successfully delivered the UKRI-funded RePowering the Black Country project. Invest NI has also secured support from all 11 councils, DfE, DAERA, DfI, SONI, NI Chambers and all major NI utility companies.

IDNI has developed a free-to-use Productivity Emissions Tool (PET), which has been adopted by 103 NI high energy intensive businesses to date, helping them establish their Scope 1 and 2 emissions, plus benchmarking productivity against GB counterpart organisations, using ONS comparisons.

IDNI has identified nine industrial clusters of high-energy users, across six of the 11 council regions and a Mineral Products Sectoral grouping of more dispersed businesses, titled Community of Shared Interest (MPANI-COSI). Additionally, IDNI is advancing a mapping initiative to enhance visibility of NI's industrial sectors, linking these with infrastructure and renewable asset generation by integrating input from electricity and renewable datasets. Invest NI is also engaging gas and water utilities in this effort to enhance strategic planning, investment and policy delivery for decarbonisation.

By taking a customer-first perspective, IDNI has identified three distinct levels at which industrial decarbonisation methodology needs to be pursued:

1. individual firm carbon reduction interventions

2. clustering of neighbouring companies to enhance shared energy infrastructure and waste streams
3. improved infrastructure planning, industry information sharing and development for the whole of Northern Ireland.

While Innovate UK funding has now stopped, hopes are high that following the UK Government's Comprehensive Spending Review in June new funding streams will become available to take forward the already excellent collaborative work and cluster development that has gone on over the past 12 months. Certainly, we in MPANI will want to develop the Toomebridge Mineral Products Cluster and the wider NI Mineral Products Community of Shared Interest (COSI). Already we are advising, directing and informing members about the benefits of understanding and utilising half hour electricity meters, the use of smart meters and sensors in the manufacturing process, the technology around developing digital twins and how it can be applied in the quarry and mineral products sector. Recently, funding has been made available through the Belfast Region City deal to develop and install new 5G /6G infrastructure. This 5G innovation funding scheme came out last week and I immediately thought it would be of interest to our MPANI Members in the Belfast City Region. As you are no doubt aware, our industry's digital and automation journey will be totally dependent on the availability of high performance 5G and 6G on our sites, located mainly in rural areas. The IDNI Portal can be viewed at IDNI| Home.

What is heartening now, is to see and hear of the work going on within our sector. The work continues with Queens University, AFBI, Agriad and our Cement Members on exploring the **potential use of Biochar in cement** with a number of trials taking place already showing positive results. The **Biomethane Gas potential** is huge across NI and, in particular, for our industry

for heating or transport purposes.

Our MPANI Membership remains strong and very supportive and my thanks again goes to our **Executive Committee**, ably led by Chairman, Paddy Mohan, Vice Chair, Willie Doherty and immediate past Chair, Paul Brogan, all of whom helped set the direction and focus for me and our hard working sub-committees. We also say thank you to all of our sub-committee members who give up their time to work for the greater good of the Industry.

Our **Health and Safety Committee** was again proactive throughout the year and HSENI feedback on industry engagement and improving standards was again good to hear. MPANI supported and helped coordinate the Driving Out Danger, Machinery Guarding Safe Isolation initiatives with HSENI. MPANI and HSENI again wrote the School Principles in NI seeking support for the Cold Water Safety message and warning of the dangers of trespassing in active and disused quarries.

MPANI, Department for Infrastructure Roads and the Police Service of Northern Ireland continue to run a number of social media campaigns on road worker safety. MPANI worked with South West and Northern Regional Colleges to promote apprenticeships in our Industry. In partnership with CITBNI and People First, we held another 'L4 Site Supervisors Course with Highway Maintenance Focus'. MPANI, in partnership with CITB and Concrete Society, held two "Back to Basics with Concrete" courses for construction site supervisors based on MPA Best Practice Booklet.

Our **Women in Minerals** Group continues to promote our industry to young women and girls. We will shortly be launching our new "Women in Minerals" video and social media clips. A huge thank you goes to all the ladies who gave of their time to speak on camera about their careers in the minerals sector and why they would recommend it to others.

MPANI also responded to seven Consultations during 2024 on behalf of Members.

MPANI continue to play a key role on several Industry Bodies:

- All Party Group on Construction
- CBI Infrastructure Group
- CBI Economic Strategy Group
- CBI Energy Group
- NI Business Brexit Working Group
- UK Minerals Group and
- Consultative Committee for the Geological Survey NI.

Finally, may I wish IMQS and all its members well over the coming months and we look forward to sustaining our valued and important relationship through what are challenging times for everyone on this island.

Best wishes and Stay Safe

INDUSTRY LEADER
John Teeling

Over recent years, the IMQS Annual Review has profiled some outstanding contributors to the sector. This year the Review features Dr John Teeling, the founder of numerous natural resources exploration and development ventures at the forefront of the sector in Ireland and internationally.

A native of Clontarf, Dublin, John graduated from University of Dublin (UCD) in 1966 with a Bachelor of Commerce and with a Master's in Economics the following year. He became a Lecturer in Business Administration in UCD in 1968, a position he held until 1988. His academic career included a Master's in Business Administration from Wharton School of Finance in 1969 and a Doctor of Business Administration from Harvard Business School in 1975.

While lecturing in UCD, John speculated extensively in the Stock Exchange, acquiring and disposing of stakes in several companies, e.g., Dublin Gas, Seafield and Glen Abbey. In 1969, he became an advisor to Tara Exploration Ltd., a Northgate Group company instrumental in the creation of the modern mining sector in Ireland with the discovery and development of three mines - Tynagh in Co Galway, Gortdrum in Co Tipperary and Tara Mines in Co Meath. Northgate also had interests in Canada and Australia.

This exposure to the natural resources sector, together with his experience in strategic investing, spurred John on to create c.16 public companies, which have been involved in developing projects in Ireland, Africa and South America. Skilful financial engineering was at the forefront in dealing with the risks, rewards and setbacks of the natural resources business.

Companies in which John has been involved in as a Director and/or Founder include Conroy Petroleum, which developed the Galmoy mine in Kilkenny, and Kenmare Resources, which operates a world class titanium mine in Mozambique. He was also Director of Minco which was earlier involved in the discovery of the Pallas Green zinc lead deposits in Co Limerick and had an interest in the Curraghinalt gold discovery in Co Tyrone.


John Teeling.

Overseas ventures which John led included African Gold, Persian Gold, African Diamonds, Pan Andean, Swala Resources and Clontarf Energy. While many of these entities have been sold on, some have gone on to be successful producers, making the difficult transition from exploration to production.

John's boundless energy and enthusiasm for new projects and new horizons has attracted a loyal cohort of largely satisfied investors over many years, described by him as "F&F"- Friends and Family. However, the appetite for speculative resources stocks has dramatically decreased; risk capital from London and Canadian markets has dried up and F&F has moved on too. When it comes to discoveries, small agile start-ups tend to outclass larger mining focussed companies; their absence represents a problem for the future.

In a diversion form natural resources, John started the first independent whisky distillery in Ireland in 1987, which was sold to Jim Beam/Suntory in 2012. The Teeling family now own the Great North Distillery based in Dundalk Co. Louth, which sells to over 50% of Irish whiskey brands. John's other current interests include listed companies, Botswana Diamonds, Arkle Resources and Petrel Resources.

John Teeling has been a dynamo of creativity and a visionary for his investors and for the natural resources sector. His other passions, apart from his family, are cricket and rugby at Clontarf RFC.

GEOSCIENCE IRELAND
Exploring Developing Sustaining

BY SEAN FINLAY
Director,
Geoscience Ireland

CREAGH

Address: Blackpark Road, Toomebridge, BT41 3SL
Phone: (028) 7965 0500 **Email:** info@creaghconcrete.com
Website: www.creaghconcrete.com

Industrial Ground Floors

Experience the excellence of Creagh's Industrial Ground Floors Package.

• Residential • Energy • Industrial • Agricultural • Infrastructure • Multi storey car parks

We offer a comprehensive design and build solution tailored to all industrial flooring needs. Our dedicated in-house installation team possesses the expertise and proficiency required for laying concrete flooring in diverse commercial and industrial environments.

Creagh manufacture premium quality pre-mix concrete and screed at five production facilities based at Toomebridge, Dunloy, Draperstown, Derryadd and Tandragee.

We also offer: Blocks - Stone - Sand - Bagged Products
www.creaghconcrete.com

Services

- In-situ concrete for both internal and external ground floors
- Ground beam installation
- Installation of Spantherm insulated flooring in office areas
- Prestressed mezzanine floors for office spaces
- Dock leveller installation
- Construction of car parks
- Precast concrete Rapidcore stairs and lift shafts

DID YOU KNOW ?

Our flooring solutions adhere rigorously to industry standards, compliant with both the TR34 and EN15620 benchmarks, ensuring uncompromising quality and regulatory adherence.

- ✓ Check out our full product range at creaghconcrete.com
- ✓ Email enquiries to info@creaghconcrete.com
- ✓ Check our LinkedIn for our latest news from Creagh

CALL US NOW
(028) 796 50500

Resource Development for Business Growth

Creagh Concrete Products Ltd

Creagh Concrete Products Ltd., based in Toomebridge Co.Antrim is owned by the McKeague family. Creagh is a recognised leader in the concrete industry. The company is at the forefront of concrete technology, specialising in factory-engineered modular building solutions.

Creagh operate across several production sites in Ireland and GB with land-based sand quarries, ready mixed concrete plants and precast concrete fabrication. The company has built a strong market presence in GB and across the island of Ireland.

AGGREGATE SUPPLY

Surety of quality aggregate supply is a vital component of Creagh's drive for growth and innovation in its chosen markets. As a demonstration of this commitment, Creagh completed a strategic acquisition in June 2024.

ACQUISITION

The company acquired the North Armagh based Norman Emerson Group. This provided increased Ready Mixed Concrete production capacity (additional two wet batching plants at Lurgan and Tandragee), a prepack automated aggregate packing facility and a sand drying kiln. Strategically, the acquisition provided a license to extract and process sand from Lough Neagh at Ardmore, on the southern shores of the Lough. Creagh Director, William Doherty, led the acquisition process and championed the integration, rationalisation and assimilation of the Emerson operation into the Creagh corporation.

Creagh's Ardmore sand classification and processing site - southern shore, Lough Neagh.

LOUGH NEAGH SAND

Creagh, along with four other license holders, has permission to extract and process sand from the bed of Lough Neagh. The permission is strictly regulated by conditions. Lough Neagh is a designated Ramsar site (International designation), an Area of Special Scientific Interest (National Designation) and a Special Protection Area (European designation). The company takes its environmental responsibilities seriously - to operate in such an environmentally sensitive location requires commitment and focus.

Creagh's Philomena Barge in transit from Derry Docks to its destination on Lough Neagh.

Philomena off loading at Ardmore Quay.

Creagh's Bayshore dredger on Lough Neagh.

Philomena Barge bringing home a load of Lough Neagh sand.

PLANNING PERMISSION IN AN ENVIRONMENTALLY PROTECTED SITE

Planning permission was achieved through a substantive investment in research to demonstrate 'no harm' to the designations of Lough Neagh, via a comprehensive Environmental Impact Assessment and a Habitats Regulation Assessment. Extraction is controlled within a 'geofenced' electronically managed permitted zone. Sand dredgers are fitted with vessel satellite electronic trackers with a live feed to the regulator to demonstrate compliance.

Landing sites are regulated via a Section 76 land agreement. Permission is continuously monitored by the Department for Infrastructure. The Lough Neagh permission is likely 'the most heavily regulated of its type' in the UK and Ireland.

Importantly, several recent strategic Lough Neagh stakeholder consultations (Government sponsored 'Future search Lough Neagh') demonstrate that stakeholders believe that 'the Lough Neagh Industry is part of the character of Lough Neagh. It has been there for a century in one form or another'. It is accepted that a regulated sand extraction industry does not undermine the protective designations and that it provides jobs that support local communities. It is an important component of the economy, providing essential materials for construction, sports pitches and various commercial sectors.

Creagh are part of the Lough Neagh Sand Traders Ltd. – a joint venture company devised in 2015 to ensure the sector manages its operations in a collegiate coordinated manner. Creagh's William Doherty is a Director on the company board. Such a vehicle encourages a cooperative response to ensure compliance across the sector. Lough Neagh Sand Traders is actively involved and provides a Director to the Board of the Lough Neagh Partnership – a stakeholder management body focused on protecting, developing and enhancing the Lough and the communities that live around it.

INVESTMENT IN LOUGH NEAGH SAND PRODUCTION

One year on from acquisition in June 2024, the Norman Emerson Group has been assimilated into the Creagh company. In April 2025, Creagh commissioned a replacement barge, christened the Philomena, in honour of the McKeague's mother, Philomena McKeague.

TRANSFORMING A CARGO BARGE TO A LOUGH NEAGH DREDGER

The replacement barge was sourced in Holland where it had operated as a bulk material transporter on the impressive canal network spread across Northern Europe. It was brought to Derry docks, lifted onto the quayside and temporarily placed in a nearby storage yard awaiting clearance for shipment to Lough Neagh by road.

Creagh engineers began the process of transforming the cargo barge into a sand dredger. The barge was shifted on low loaders to Toome, lifted into Lough Neagh and made its onward journey to Ardmore on the south shore of the Lough for final fitting.

TEAM EFFORT

James McKeague has recently taken the reigns as Managing Director of Creagh Concrete Ltd. Seamus, Gerard and Paddy McKeague agreed the appointment as part of a strategic succession process. A succession plan designed to secure the next generation of McKeagues within the company, preserving the family ethos while providing fresh energy to maintain the business's momentum.

According to Managing Director, James McKeague - 'I see the integration of the Lough Neagh Operation into the Creagh business model as a strategic milestone for the company. We inherited a team of experienced managers and engineers. One year on, I can say with confidence that the Lough Neagh operation has been successfully integrated into the Creagh business. Collectively, our people are aligned to provide the momentum and drive to carry Creagh Concrete forward.

Surety of supply for aggregate materials is vital to deliver excellence in our upstream, value added, concrete engineered, customer solutions offering.'

CREAGH

BY CONOR JORDAN

Geoscience Ireland (GI)

The GI Network delivered a strong performance in 2024. Compared to 2023, job numbers increased by 210 (+5%) while turnover increased by almost 8% to €1,330M. As anticipated in last year's Review, a buoyant Irish economy, resumption of operations at Tara Mines and strong international business were favourable factors for 2024. Some job losses were noted in offshore wind with most other sectors remaining buoyant. GI members main concerns remain centred on access to skills and rising costs. There are also concerns arising from global trade disruptions and the impact of cuts in overseas aid budgets in the USA and the UK.

Innovation remains at the core of GI members work. Recent examples include Priority Group's provision of training in Laos and Canada for its advanced Zero Trip drilling technology, Mincon's sea trials for offshore wind foundations, and FLI's research with TCD on using ash from power stations in concrete.

In the **Minerals Sector**, GI member **AURUM** nears completion of its contract for the TELLUS project in Ireland, while **LTMS** is undertaking an audit for Arcelor Mittal of its iron ore mines globally. **QME** and **Priority** continue with projects in Portugal and Sweden. **Water Services** design and delivery projects are underway by **EGIS (JB Barry) and Nicholas O Dwyer** in Africa and the Gulf, with large marine infrastructure projects **by AYESA - Byrne Looby** in KSA and the UAE. **Renewable Energy** projects are a central part of GI members portfolios, with onshore and offshore wind and solar projects in the UK, Poland, the Far East and the USA. **Venterra-GDGEO** continues to have a key role in policy and technology development and presented at Global Offshore Wind in London. **SLR Consulting** is providing design services for a pumped storage scheme at part of the now closed Silvermines complex in Co Tipperary.

A notable **Infrastructure** project was the Dunkettle Interchange in Cork where **Fehily Timoney received Awards for Project of the Year from ACEI and Ground Engineering.** Ground Engineering **Awards also went to ARUP, while TOBIN was awarded Environmental Project of the Year.**

GI continues to represent its members in national and international arenas. GI members attending and/or exhibiting at PDAC 2025 in March included **iCRAG, Geological Survey Ireland (GSI), Priority Group, SLR, AURUM and QME.** A refreshed and inclusive Ireland Booth at PDAC was commissioned and included iCRAG, GI and the Irish Minerals Fund, alongside GSI and the Geoscience Policy Division of the Department of Environment Climate and Communications (now renamed Dept. of Climate Energy and Environment-DCEE). Enterprise Ireland and Ireland's Consul General in Toronto also visited the Convention.

Enterprise Ireland, the Department of Finance and the Department of Foreign Affairs and Trade hosted a Seminar in Dublin for the European Bank for Reconstruction and Development (EBRD). GI members SLR, Nicholas O Dwyer, Intersocial and GI Panel Member, Billy Moore, contributed to a Panel discussion.

During the year, **GI collaborated with Consulting Ireland in developing contacts in Zambia, Ukraine and in Hungary. GI also signed an MoU with the Association of Consulting Engineers of Ireland (ACEI).** GI also enjoyed a nomination of a candidate for the **elections to Seanad Eireann** on the Industrial and Commercial Panel. The GI candidate, Kate Feeney, polled well, finishing 12th in a field of 27 in a contest for nine seats.

GI continued its commitment to the DCEE Minerals Advisory Group, the Heads of Geoscience and Irish Geoscience Network Forums operated by the Institute of Geologists of Ireland, and to several Chambers of Commerce including Canada, Britain and France.

Unfortunately, and despite the reopening of Tara Mines during 2024, the Geo Drilling Apprenticeship in South East Technological University (SETU) remains suspended due to a lack of numbers. Over 30 candidates have successfully completed the course since its inception in 2020. GI continues to investigate alternative ways of reactivating the course.

Despite a process dating from 2021, Policy for Cluster Development in Ireland remains poorly developed, with Seminars, a Report from Grant Thornton and another Report awaited from TCI. The absence of a coherent policy hinders the development of a cluster ecosystem, which is central to successful innovation and sustainable economic growth in many other countries. With some fanfare, Enterprise Ireland and Inter Trade Ireland announced a TCI Seminar in Dublin scheduled for October 2025. Perhaps the long-awaited TCI Report will emerge at that event.

Sean Finlay, my fellow Director in GI has taken over as President of the Irish Academy of Engineering (IAE). Recent IAE evidence-based commentary and policy documents include the Infrastructure 2025-2040 and Energy Policy. IAE has engaged with the Infrastructure Accelerated Delivery Unit of the Department of Public Expenditure and with Minister Jack Chambers of that Department. Sean was also a speaker at this year's McGill Summer School in July. **Joe Mongan,** a Member of GI's Panel of Experts continues to provide valuable back up to the Cluster. GI also welcomed Ghana-based **Minerex Drilling** as a new member in 2025.

GEOSCIENCE IRELAND
Exploring Developing Sustaining

BY DERMOT DUFF
Director Geoscience Ireland

Quarryplan

www.quarryplan.co.uk

Trust in experience

Quarryplan have provided specialist planning and property advice to the minerals, waste management and renewable energy sectors for over 20 years, delivering a full range of services for the preparation of successful planning applications.

Quarryplan provide commercially driven advice you can trust, so you can concentrate on your business.

- Planning
- Environmental Impact Assessment
- Estates management
- Due Diligence
- Expert Witness
- Land Surveying
- Renewables

Northern Ireland
t. +44 (0) 2844 832904
e. info@quarryplan.co.uk

England
t. +44 (0) 1934 713741
e. info@quarryplan.co.uk

RICS®

RTPI
Chartered Town Planner

Unlocking the regional mineralisation potential west of the Galantas mining

The Galantas Gold mine, 5km west of Omagh, sits within Dalradian metasediments of the Caledonian Orogenic belt. The gold-bearing vein swarm comprises 17 named vein structures within ~6km2.

The Kearney vein has been subject to open pit and underground mining in recent years, and the structural geology of this, and other nearby veins, shows great potential for resource expansion.

Historical work, supported by more recent exploration results, identified a number of high priority targets to the west of the mine site. Induced Polarisation (IP) and resistivity geophysical surveys have been completed over two of these areas. The effectiveness of the IP method for defining mineralisation targets in this terrain was tested by the Company in 2021 when it ran an orientation survey over the known Elkins vein. An apparent resistivity IP anomaly aligned north-south coinciding with known mineralisation (Galantas Release, December 1, 2021). North trending faults are a prime exploration target as these are the structures that host mineralisation on the mine site.

The Elkins, Pigeon Top and Cornavarrow targets, shown in Figure 1, are situated along 6 km strike. The target areas sit largely within a competent lithology, the 'Cavanacaw Member', north of a thrust fault. The structural setting is therefore similar to that at the mine site. The brittle nature of the 'Cavancaw Member' makes it the favoured host rock, because of its rheology it would have broken apart more cleanly under stress, creating potentially larger cavities for mineral rich fluids to penetrate.

An IP survey over Pigeon Top was completed in 2021. This identified a strong north-south trending resistor over 500m, coinciding with base-of-till gold anomalies. The cluster of historic geochemical results yielded up to 13.5 g/t gold. According to BRG Ltd., the anomalies most likely represent fault structures in the bedrock. Technical literature on other occurrences indicate that high resistivity can be caused by pore water and strong wall-rock alteration, both of which are observed underground in the wall rocks of the Joshua and Kearney veins. It is, therefore, most likely that high residual resistivity anomalies represent fault zones which potentially host the gold veins at Cavanacaw (Galantas Release, December 1, 2021).

In 2024, Galantas commissioned an IP survey grid over the Cornavarrow target (Figure 2). The area was explored by RioFinex in the late 1980's. Gold and base metal anomalies were recorded for float rock and stream sediments at that time; significantly, a small vein exposure was also identified, the 'Cornavarrow Burn East Showing' (Figure 2). ACA Howe (2003) published 1.15 g/t Au, 4.2 g/t Ag and 1366 g/t Pb over 1.5m vein width and commented that 'what is visible at Cornavarrow Burn East Showing could be the edge of higher-grade mineralisation which is not exposed' (ACA Howe, 2003).

Subsequent exploration by Galantas geologists recorded 3.5 g/t Au for a chipped sample of outcrop. The apparent resistivity model highlighted a 900m northerly trending resistor, 100m west of the in situ vein mineralisation, which is open to the north. BRG Ltd. commented that the Cornavarrow resistor may represent a zone of increased silicification within the mapped psammites. Galantas geologists noted silicification associated with gold veins at Cavanacaw (Galantas Release, March 6, 2024).

Both IP surveys successfully identified north-south trending resistors, hypothesised to represent fault structures, future exploration will test for mineralisation. Galantas Gold is excited by the positive results of their geochemical and geophysical surveys and the potential for increasing the extent of the known vein swarm.

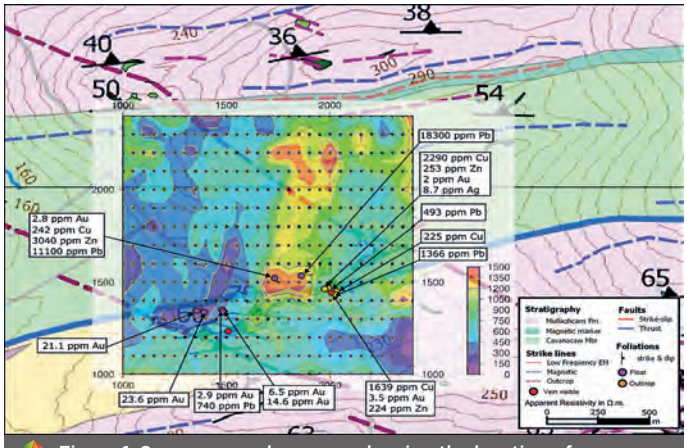


Figure 1: Summary geology map showing the location of key targets referenced herein. New geophysical results over Cornavarrow shown in inset and Figure 2.

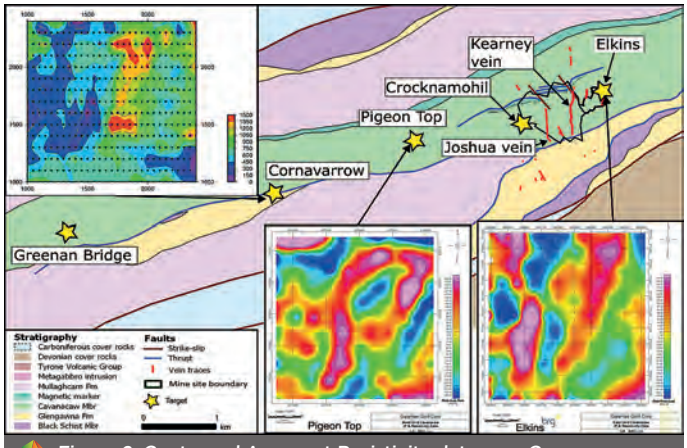


Figure 2: Contoured Apparent Resistivity data over Cornavarrow target. Black dots show grid measurement points. Key historic exploration data shown for reference.


ANYONE
CAN LISTEN
BUT NOT
EVERYONE CAN
UNDERSTAND
Across Ireland, our experts are well-versed in businesses like yours, so they won't just listen to your plans, they'll understand them.
closecommercialfinance.ie
Close Brothers
Commercial Finance

Not Mica: From Micaceous Myths to Sulfide Science

Thousands of homes across Ireland have suffered severe structural damage, with deep cracks and crumbling blocks. What began in Donegal and Mayo has become a national crisis, with defective concrete now reported in at least 14 counties.

Following earlier pyrite-related issues around Dublin, this raises serious concerns about aggregate quality, concrete manufacturing, and regulatory oversight in Ireland. A 2017 government report blamed the damage in Donegal on an unproven theory that muscovite mica caused freeze–thaw deterioration (McCarthy et al., 2017).

However, from 2020, as Donegal homeowners applied for remediation grants from a government grant scheme that required petrographic testing, it became clear that high mica content often coincided with elevated levels of reactive iron sulfides, particularly pyrrhotite. This cast doubt on the 2017 conclusions and underscored the need for rigorous scientific investigation in Donegal.

FROM MICA TO PYRRHOTITE - A SHIFT IN BLAME

Research lead by Empa and Ulster University published in Cement and Concrete Research (Leemann et al., 2023), was the first scientific peer reviewed investigation into the crisis. It found that all affected Donegal homes used micaceous phyllite aggregates that contained both mica and importantly pyrrhotite ($Fe_{1-x}S$).

Through petrographic, microstructural and chemical analysis, the study confirmed that pyrrhotite oxidation causing internal sulfate attack (ISA) was the cause of concrete failure, not mica.

Sulfate ions released during oxidation were reacting with cement hydrates forming ettringite, thaumasite and gypsum, which lead to expansion and strength loss. They also reported that sulfur levels in the aggregates significantly exceeded the 0.1% limit set by EU and Irish standards for concrete manufacturers (EN 12620 & SR16).

The paper received the 2023 Le Chatelier Award and marked a key step in establishing the scientific basis for concrete failure in Donegal.

Professor Paul Dunlop (Ulster University) with Professor Benoit Fournier and Professor Josée Duchesne (Laval University) inspecting a defective concrete home in Inishowen Co. Donegal showing the advanced stages of internal sulfate attack.

GOVERNMENT FUNDED RESEARCH

In June 2023, an international research consortium of leading concrete and geological scientists lead by Ulster University received €500k from the Department of Housing, Local Government and Heritage and the Geological Survey Ireland (GSI) to conduct further research into the damage mechanism of defective concrete in Donegal, and inform revisions to the NSAI standard for testing and remediating defective concrete homes known, as I.S.465.

RSK and Petrolab UK were concurrently funded to work separately on parallel research questions to the Ulster University consortium. All laboratories reached agreed research outcomes independently confirming the causes of failure without sharing data or results during the project lifetime. The reports are available for download from GSI (see weblink below).

The research concludes that:

- The cause of failure is pyrrhotite oxidation triggering ISA.
- Total sulfur levels in the aggregates within defective concrete breach EN12620 and SR16 for pyrrhotite.
- High mica content in the aggregate increases the micro-porosity of the cement paste, raising its permeability and facilitates moisture ingress, oxygen access and sulfate diffusion; all of which accelerate ISA progression.
- Mica does not cause freeze–thaw degradation.

- Defective blocks display persistent high moisture content, indicating that wetting–drying cycles are not occurring and is excluded as a deterioration factor.
- The severity of ISA varies with exposure conditions and concrete quality, however, retention of any element showing signs of ISA poses a significant risk and homes undergoing ISA must be demolished.
- Foundation concrete with pyrrhotite is at risk of ISA and therefore must be tested within I.S.465 to assess this risk.

KNOW YOUR ROCK. KNOW YOUR RISKS

The crisis shows that structural durability does not begin in the lab, but at the quarry face where geological knowledge and testing is required to screen out structurally dangerous materials before it is too late. Detailed knowledge of the raw material is the first step in ensuring that all quarry products are fit for purpose and methods that properly detect pyrrhotite occurrences in quarries are critical. Understanding when a geologist needs to look more closely to characterise sulfides will be key to reducing the risks going forward.

REBUILDING TRUST THROUGH BETTER PRACTICE

Ultimately, prevention may require more than simply blind compliance with standards and demands a shift in mindset towards one of scientific due diligence. As of writing (Q3 2025) it is essential that the forthcoming revision of SR 16 meaningfully addresses some of the previous shortcomings in providing guidance to the sector as to how to more rigorously assess aggregate quality.

To avoid repeating past failures, several suggestions are obvious and easy to implement:

- More robust testing protocols in high-risk geological zones to provide reassurance to potential customers;
- Better training for quarry operators and geologists conducting quarry assessment on sulfide-bearing rock types, particularly pyrrhotite;
- Revised national and European standards to provide better guidance for manufacturers and producers;
- Independent regulatory oversight.

Since research has now confirmed the cause of concrete failure, it is important that industry learns from this to ensure it never happens again.

REFERENCES

Leemann, A., Lothenbach, B., Münch, B., Campbell, T. and Dunlop, P. (2023) The "mica crisis" in Donegal, Ireland – a case of internal sulfate attack? Cement and Concrete Research Vol 168. DOI: https://doi.org/10.1016/j.cemconres.2023.107149

McCarthy, D., Kane, N., Lee, F., Blaney, D. (2017) Report of the Expert Panel on Concrete Blocks, Department of Housing, Local Government and Heritage, 2017. https:// www.gov.ie/en/publication/0218f-report-of-the-expert-panel-on-concrete-blocks/.

https://www.gsi.ie/en-ie/events-and-news/news/Pages/Aggregates-Research-Findings.aspx

Ulster University

PROFESSOR PAUL DUNLOP
Research Director for Geography and Environmental Sciences, Ulster University
e: p.dunlop@ulster.ac.uk

Minerals at Geological Survey Ireland (GSI)

The Minerals programme is continuing its collaborations with European partners across a wide range of raw materials projects, where significant attention is now being given to the provisions of the Critical Raw Materials (CRMs) Act and the mandated National Exploration Programmes.

Geological Survey Ireland currently chair the EuroGeoSurveys' Expert Group on Exploration and are developing this forum as a vehicle to share knowledge and expertise to ensure that the European exploration and mining industry is supported by high quality baseline and precompetitive data.

A one day event to bridge the gaps between surveys and industry is planned for November 17th at Raw Materials Week 2025 in Brussels, where the focus will be on lifting the barriers to entry for exploration companies alongside narrowing the funding gap between discovery and development.

The Geological Survey Ireland's national geophysical and geochemical surveying programme continues its push for national coverage in 2025. The end of summer 2024 saw the final soil samples collected; these are currently working their way through the laboratory preparation and analytical chain with final data for all samples expected to be released in the next 24 months.

New geochemical soil analytical data has recently been published for SE Ireland along with urban geochemical data from Dublin. All data and maps can be accessed from the GSI website here.

2025 also saw the final two airborne geophysical survey blocks over counties Kerry and Clare by Sander Geophysics Ltd. take flight. The results from these surveys will allow us to release new data and merged geophysical maps for the entire country. Both the geochemical and geophysical data are continuing to be used to support geological mapping, mineral exploration and other GSI projects.

The minerals programme is also participating in projects under the geological service for Europe programme of EuroGeoSurveys (GSEU), including data compilation on CRMs, Rare Earth Elements (REEs) and a review of Caledonide Geology and mineral potential. Geological Survey Ireland is also now engaged with Historic Mine Sites, with monitoring programmes underway at Avoca and Silvermines, and plans for remediation being developed with the relevant local authorities. The minerals programme also attended PDAC, the world's largest mining conference, in Toronto in 2025 with DECE colleagues and plan to do so again in 2026, supporting both the Irish stand and a broader European Union (EU) presence.

In the aggregates space, the GSI is assembling a team in partnership with the Department of Housing to improve the knowledge of the quarrying and aggregates industry in Ireland, focusing on developing a live database of production facilities and ascertaining where the high quality aggregates required for societal development can be sourced over the next decades.

2025 also saw the delivery of several research projects focused on deleterious materials in aggregates, including a significant volume of work on aggregates in Donegal and an evaluation of the available total sulfur testing methodologies within the European standards. More details are available on the www.gsi.ie website.

Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

Department for the Economy
www.economy-ni.gov.uk

An Roinn Geilleagair

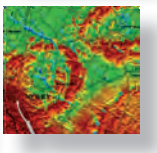
GSNI Geological Survey of Northern Ireland
www.bgs.ac.uk/gsni

Natural Resources in Northern Ireland

Find the information and data you need at the Geological Survey of Northern Ireland





Data and Services

GSNI collects, interprets and provides geological data, research and advice to central and local government, industry, academia, NGOs, schools and the public. GSNI maintains extensive digital databases and paper archives that are accessible online and through our enquiry service.

The data held by GSNI include:

- Modern and historical geological maps including 1:10k vector map data
- Borehole and site reports
- Tellus geochemical and geophysical datasets
- Exploration data and open-file reports
- Historic mines database
- Groundwater data repository
- Rock thermal properties database
- Reservoir quality data
- Geothermal prospectivity reports
- Seismic reflection data
- Gravity data
- Magnetotelluric data
- Downhole geophysical data
- Borehole temperature data
- Core, rock and thin section collections

Access GSNI data:

- **GSNI GeoIndex at bgs.ac.uk/gsni**
- **gsni-data.bgs.ac.uk**
- **opendatani.gov.uk**
- **spatialni.gov.uk**

@GeoSurveyNI

7th Floor, Adelaide House, 39-49 Adelaide Street, Belfast, Co. Down, BT2 8FD
Tel: +44 (0) 28 9038 8462
E-mail: gsni@economy-ni.gov.uk
www2.bgs.ac.uk/gsni

Unlocking Ireland's Investment Potential

Investment shortfall in mineral exploration is a critical factor in Unlocking Investment Potential in Ireland's minerals sector.

Europe's mine production rates have been in decline since 2000, decreasing by 35.6% in the last 22 years. This is at a time when production is soaring on other continents, particularly in Oceania and Asia. A key factor driving this trend is the fact that Europe's exploration budget is very low, only accounting for 2-3% of the global exploration budget between 2010 and 2022, along with other factors including high operating costs, varying regulatory environments and public acceptance issues. The result is that Europe heavily relies on imports of minerals and is dependent on value chains that are often tied to a small number of countries which can be associated with environmental, social, governance and economic risks.

Efforts to increase funding for exploration remain challenging for public and private funders, due to the high risk profile associated with exploration projects. The funding of exploration remains a barrier to the practical stepping-up of activity at upstream value chain stages for minerals.

Despite Ireland being highly regarded as a favourable mineral investment destination for its political stability, advanced infrastructure, skilled workforce, high quality data, and modern policy and regulation, **the number of prospecting licences currently held in Ireland has been declining for the past four years to the lowest number since 1965.** Currently, 219 exploration licences are held by 32 exploration companies, with 86 licences being surrendered in the last year.

While interest in certain commodities is relatively buoyant due to expected massive demand increases (lithium), Ireland's main commodity zinc currently suffers from low prices due to an excess of supply over demand which is projected to continue through 2025. This mirrors trends overall globally.

The EU Critical Raw Materials Act (CRMA) seeks to de-risk the investment environment for exploration through facilitating access to high quality geological data. Article 19 provides for a National Exploration Programme for critical raw materials, while Article 27 obliges Member States to characterise their extractive waste for CRM content. Both provisions will result in a significant increase in the openly available information on critical raw material occurrences in Ireland.

A variety of minerals are of exploration interest in Ireland, some of which are Strategic Raw Materials (lithium, copper, rare earth elements, platinum group elements, tungsten, gallium, germanium) and Critical Raw Materials (baryte, beryllium, niobium, feldspar, tantalum), in both primary and extractive waste settings. The Strategic Project provisions of the CRMA are intended to assist bringing projects producing these materials into development.

In Ireland, the recent establishment of the Irish Minerals Fund, supported by a cornerstone commitment from the Ireland Strategic Investment Fund, is a positive development for the sector. The Fund is focussing initially on environmentally responsible projects with proven mineral deposits and where zinc is the primary product. Investment portfolio development and due diligence on prospective projects are currently underway. Looking to the future, pending initial returns, the Fund may widen its focus to other commodities and earlier stage exploration projects.

The Geoscience Policy Division will continue to engage with the Irish Minerals Fund and the European Commission on the CRMA to support their implementation in Ireland.

An Roinn Aeráide, Fuinnimh agus Comhshaoil
Department of Climate, Energy and the Environment

GEOSCIENCE POLICY DIVISION, DEPARTMENT OF CLIMATE, ENERGY AND THE ENVIRONMENT

McHALE
Plant Sales Limited

Unit 525 Greenogue Business Park Rathcoole, Co. Dublin
P: +353 (0)1-4018540

Birdhill, Co. Tipperary
P: +353 (0)61-379112

Email: sales@mchaleplant.com **Web:** www.mchaleplantsales.com

McHale Plant Sales

From its foundation in 1958, the objectives set by the Irish Mining and Quarrying Society, namely, to provide a focal point for all those working in the extractive industry in Ireland, underline the farsightedness of those who could foresee the benefits it could bring.

Mindful that, at one point in Ireland's recent history, the cumulative volume of lead/zinc concentrate produced by mines at Lisheen in Co. Tipperary, Galmoy in Co. Kilkenny, and from the mine still working at Navan in Co. Meath was sufficient to rank Ireland amongst the world's top-10 lead/zinc producers.

That such a distinguished achievement might replicate itself at a future point in time is a thought that cannot be discarded. Quite the opposite.

Extensive gold discoveries along the Cavan-Monaghan-Armagh border (where a JORC-compliant gold resource in excess of 500,000 ounces has already been judged to exist there), the likelihood that these three border counties will become dotted with a 'necklace' of quarry-like mines is a reality that is poised somewhere on the scale between 'possibly' and 'probably' with the odds pointing towards the latter.

Also worth watching is the search for diamonds currently underway in Co. Fermanagh, a prospect driven by the belief that where the famed Brookeborough Diamond, now on display at the Ulster Museum, was discovered, others are likely to be found. Awaiting further exploration in Fermanagh, too, is the confirmed presence of nickel, copper, and Platinum-Group Elements, as outlined in a report by an internationally recognised expert in the field.

While these 'plays' have yet to morph into working mines, it is to be expected that some amongst them will become mineable in time.

On the quarrying, aggregates, civil works and concrete manufacturing fronts, moves by Governments to improve infrastructure, alongside burgeoning developments in housing and construction, have led to contractors gearing-up for the business such developments will likely bring.

One company whose fingers are constantly on the pulse of such developments is plant and machinery distributors, McHale Plant Sales of Birdhill and Rathcoole.

As distributors of Komatsu heavy plant

The first units from the Metso EC range an LT400 Jaw and an LT350 Cone working together.

The new Aggregate Spec WA500 wheel loader from Komatsu released earlier this year.

and equipment in Ireland, and of Finnish-made Metso crushers in Ireland and UK, McHale Plant Sales is, to some extent, a true barometer of change whose sales provide a real-life pointer to the health of economies on these islands.

In Ireland, two major Komatsu deals can be interpreted in that context: one was a massive purchase by Wills Brothers of Foxford, and the other a 'hugely significant' fleet upgrade by Roadstone.

Following their appointment as lead contractor on a major 34km €450M upgrade of the N5 carriageway that links Dublin to Mayo, Wills Bros augmented its extensive equipment portfolio with investment in an additional number of Komatsu-branded machines, which include a mix of dozers, excavators, and articulated dump trucks.

Praised for their 'diligent oversight' in the upkeep and upgrading of equipment, Roadstone added to their Komatsu and Metso fleets with a range of wheel loaders, excavators, and rigid dump trucks plus Metso Lokotrack jaw and cone crushers.

Contrary to the sense of economic gloom that often emerges from UK news bulleting, reports and analysis produced by industry bodies point to a vastly improving scene. Particularly uplifting is the focus being placed on sustainability and the march towards net-zero, most evident in the innovative use of substances and materials that reduce or replace carbon emitting content.

Since being appointed Metso Lokotrack distributors on-the-ground in England, Scotland and Wales, McHale Plant Sales has installed crushers in quarries dotted across all three territories.

With the 'topping out' of its recruitment programme now completed, the company is now operating 'on all cylinders' from its headquarters in Tamworth and Scottish base in Edinburgh.

Now under the leadership of UK company director, Morgan Grant, an experienced crushing professional as well-known to the quarry and aggregates community as the Metso name itself, it can be expected that McHale Plant Sales will soon have significantly reduced the 'long way to Tipperary' that the well-known song once suggested it was.

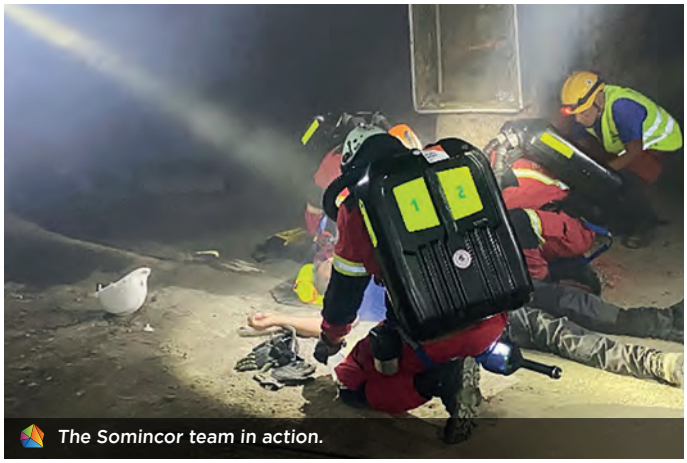
McHale plant sales became the first Global distributor to reach Gold Level partner for Metso products.

McHALE
Plant Sales Limited

Irish Mine Rescue Committee (IMRC) 2024-2025

Tending to the injured operator of the teleporter.


The historic site of Villanueva del Río y Minas coal mine, north of Seville.


The Somincor team in action.

OVERVIEW 2024 – 2025

August 2024: First employees return to work at Boliden Tara Mines.

October 2024: Iberian Mine Rescue Competition in Seville.

October 2024: Mutual training session hosted by ISME at Kilroot.

March 2025: Annual meeting of the Irish Mine Rescue Committee (IMRC).

IBERIAN MINE RESCUE COMPETITION – 14th AND 15th OCTOBER 2024

The 4th Edition of The Iberian Mine Rescue Trophy was held in Seville on 14th and 15th October 2024. The competition was organised by Armando Pereira and Joaquim Pereira, very experienced mine rescue personnel who have had strong connections with the IMRC for many years. There were three Spanish teams and one Portuguese team. No teams from Ireland participated on this occasion; however, the IMRC was represented by Mike Lowther as one of the competition judges.

MUTUAL TRAINING AT KILROOT MINE ISME – 30th OCTOBER 2024

Another excellent mutual training exercise was hosted by ISME at Kilroot Mine on 30th October 2024 with participation from all member mines. The exercise was carried out in conjunction with UK Mines Rescue. The complex exercise involved two teams comprised of mixed personnel from the participating mines.

They responded to a simulated mine emergency where a teleporter had collided with a sidewall causing a partial roof collapse. There were three casualties in the simulated emergency: one with head injuries, another one who was pinned under a steel frame, and one with burns. The captains of the teams were Phil Maxwell and Leigh McNeill, both from ISME.

Brian Robinson, Mines Rescue Officer from UK Mines Rescue, organiser of the exercise on behalf of ISME, concluded: "Everyone performed admirably under the planned taxing conditions, and I believe everyone benefited in many ways from the exercise.

It was quite deliberately designed as a two-stage operation, with effectively an irrespirable atmosphere and a respirable atmosphere capability. In one hour and 20 minutes, the teams performed tasks that would have undoubtedly saved lives in a real situation".

IMRC MEETING #23

The 23rd meeting of the IMRC took place on Friday 28th March 2025, on Teams. In attendance were Irish Salt Mining & Exploration Co. (ISME), Dalradian, Galantas, Gyproc, Boliden Tara Mines (BTM), the Health and Safety Authority and the Health and Safety Executive Northern Ireland.

All members confirmed that training and equipment maintenance is ongoing as per legislative requirements. Following on from last year, it was agreed mutual training would remain the focus, no mine rescue competition would take place this year.


The team from ICL entering the old adit.


Preparing to lift a steel frame with compressed air lifting bags to extricate a casualty.

Communicating with a person in a Refuge Chamber, through the 'port-hole'.

The team from Sandfire-Matsa get their pre-test briefing at the MMH Exhibition Centre.

GOING FORWARD

Plans are underway for mutual training sessions to be hosted by ISME and Gyproc. ISME ran their session on Wednesday 25th June, and Gyproc plan to hold their session in October. A subcommittee will be set up later in the year to review and update all published IMRC documents. After twenty years of coordinating mine rescue activities between operating mines on the island of Ireland, the IMRC looks forward to continuing this important work.

Irish Mine Rescue Committee

BY
MIKE LOWTHER Chair IMRC
AOIFE TALLON Secretary IMRC
ANTHONY MORAN IMRC

The team from Insersa negotiating an obstacle in the fitness and first-aid test, held at the MMH (Mining and Minerals Hall) Exhibition Centre in central Seville.

The team from Somincor been led by the judges to the start of the Search and Rescue exercise.

The mine rescue team at Tara entering the famous old portal on a training exercise.

SUSTAINABLE CONSTRUCTION SOLUTIONS

Concrete | Stone | Blocks
Paving | Walling | Roof Tiles
Decorative Stone

Available Nationwide

roadstone
A CRH COMPANY

www.roadstone.ie

Roadstone Leads Ireland's First 3D Construction Printed Social Housing Project

In a groundbreaking advancement for the Irish construction industry, Roadstone has successfully delivered Ireland's first 3D Construction Printed (3DCP) social housing project.

Located in Dundalk, County Louth, the project marks a significant milestone in the adoption of sustainable and efficient building technologies.

REVOLUTIONARY CONSTRUCTION TECHNOLOGY

3D Construction Printing is an innovative method that uses large-scale 3D printers to construct buildings layer by layer.

This technique allows for the precise deposition of construction materials - primarily concrete - based on detailed digital models, significantly improving speed and reducing waste in the construction process.

COLLABORATION

This pioneering project was made possible through a partnership between Roadstone, Harcourt Technologies Ltd (HTL.tech), Louth County Council, and B&C Contractors Ltd. Together, the team constructed three two-storey, three-bedroom terraced homes, each spanning 110m².

The homes were built using advanced 3DCP methods, forming the superstructure through the sequential layering of a specially designed concrete mix.

SPECIALIST CONCRETE FOR 3D PRINTING

Roadstone played a pivotal role by developing a unique Ready-Mix Concrete (RMC) tailored specifically for 3D printing applications. Compliant with EN206 standards, this mix was critical to the structural success of the project.

EN 206 is the European standard that sets strict requirements for the production, performance, and durability of concrete. Roadstone's bespoke 3D printing mix meets these standards, ensuring it performs just as reliably as traditional concrete in terms of strength, safety, and long-term resilience.

SPEED OF CONSTRUCTION

The 3D printing of the homes' superstructures was completed in just 12 days, with the full on-site construction phase - including setup and disassembly - finalised within only 18 working days. This represents a remarkable reduction in time compared to traditional construction methods.

NATIONAL RECOGNITION

In recognition of its innovative approach, the project was honoured with the 'Standards Innovation Award' by the National Standards Authority of Ireland (NSAI).

The award highlights the project's adherence to the I.S. EN ISO/ASTM 52939:2023 Additive Construction standard, ensuring safety, quality, and regulatory compliance in this emerging construction method.

roadstone
A CRH COMPANY

RICHIE McCARTHY
Head of Marketing and Communications

Roadstone's N52 Low-Carbon Asphalt Trial Garners CRH President's Award for Sustainability

Roadstone has been honoured with the prestigious CRH President's Award for Sustainability for its low-carbon asphalt trial on the N52 in County Meath. This accolade recognises the company's innovative approach to reducing CO_2 emissions in road construction without compromising performance.

The N52 project aimed to demonstrate that sustainable asphalt production and installation methods could meet stringent performance standards.

Key innovations included:

- Utilising 70% reclaimed asphalt (RAP)
- Implementing warm mix technology
- Incorporating bio-binders
- Employing hydrotreated vegetable oil (HVO) in all plant and machinery
- Using intelligent compaction technology to enhance efficiency

These measures collectively achieved significant reductions in embodied CO_2 emissions while maintaining high durability and functionality under heavy traffic conditions.

The success of the trial was attributed to close collaboration among key stakeholders, including Transport Infrastructure Ireland (TII) and Meath County Council. Their joint efforts ensured the development and implementation of asphalt mixtures that met specified requirements for durability and functionality.

The CRH President's Award for Sustainability, underscores the company's commitment to innovation and environmental stewardship in the construction industry.

Building on the success of the N52 trial, Roadstone will further explore the use of ultra-high RAP content and bio-binders in asphalt mixtures. The company will also continue to collaborate with stakeholders to address legislative and regulatory challenges in developing sustainable road construction solutions.

For more information on Roadstone's sustainability initiatives, visit Roadstone Sustainability.

QRS Leads Collaborative Effort at Quarry Site

QRS (Quarry & Recycling Solutions) was invited to tender proposals for a new crushing and screening plant at a quarry. Meticulously designed, the new plant was commissioned after an extensive on-site scheme of works.

Plant & Civil Engineer talked to Mark Fekkes, from QRS Ltd who is the Terex MPS Area Sales Manager for Ireland and Scotland. The Terex MPS and Terex Ecotech Range of products compliment the other products which are part of QRS Ltd distribution portfolio.

The quarry produces aggregates that are part of the raw material chain for a concrete product asphalt manufacturing facility nearby.

The contract was to design, install and commission a new, fixed crushing and screening plant at the quarry and, in the process, convert operations from mobile to static plant and move the power source from diesel to main electric.

INVESTMENT FOR FUTURE GROWTH

Mark Fekkes outlined the rationale behind the Investment. “The client views the quarry as one of its investment centres for business development”, explained Mark.

Inverness is one of Europe’s fastest-growing cities, both in population and economic growth. Manufacturing and services have expanded to meet the needs of the offshore oil industry. Other sectors, including processing, agriculture, forestry, and electronics engineering are also showing strong growth. However, the expansion of offshore wind farming is likely to boost economic growth even more.

Scotland is currently home to many offshore wind farms in various stages of development, some in operation, some under construction and others that are still in the planning pipeline.

The client wanted a plant that was fit for the expansion it is planning for. It was also important that the plant would deliver cost-effective operating performance and meet the group's wider sustainability objectives. There is wide industry awareness of the need to move away from fossil fuels and the increase in oil prices across the board following the outbreak of war in Ukraine, combined with wider inflationary pressures, that have impacted on many businesses. The government action to ban red diesel for manufacturing adds another incentive to move away from diesel power where possible.

All of those factors influenced the client's decision to move away from mobile plant and install a static plant that would be mains electric power.

UTILISING HOME-GROWN TALENT

QRS was appointed the main contractor for every aspect of the job except the civil engineering element. The QRS brief was to design, install, commission and hand over a turnkey plant. This meant QRS was responsible for detailing the process, design and layout of the plant, including all the structural steel, electrical and dust suppression requirements and, of course, managing health and safety for the nine-month build on-site.

With such a wealth of expertise and ability relating to quarry plant and operations within Northern Ireland, it was not surprising that QRS called on trusted colleagues locally to build its subcontractor team.

Mark Fekkes outlined the team that QRS assembled for the project. "QRS supplied the Terex MPS equipment for the plant, which included two cone crushers and three screen boxes, two 2-deck and one 3-deck, as well as the final aggregate bins.

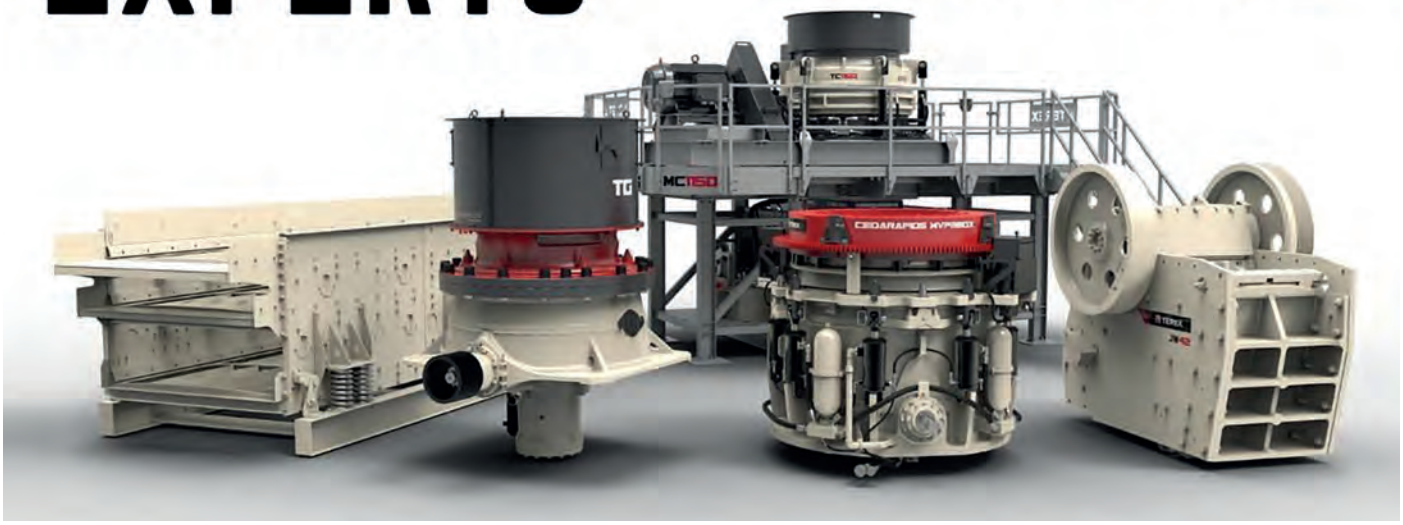
"To support the installation, we put together a very strong team. PM Engineering in Ballygawley supplied all the structural steel and conveyor systems for the plant. The feeders for the plant were supplied by another local team, Bruce Engineering. The electrical equipment came from Axon Power and Control in Dungannon and the dust suppression was subcontracted to Cyril Jordan."

Last, but far from least, David Johnston from Jabez Safety Solutions did a superb job handling the health and safety and CDM regulations.

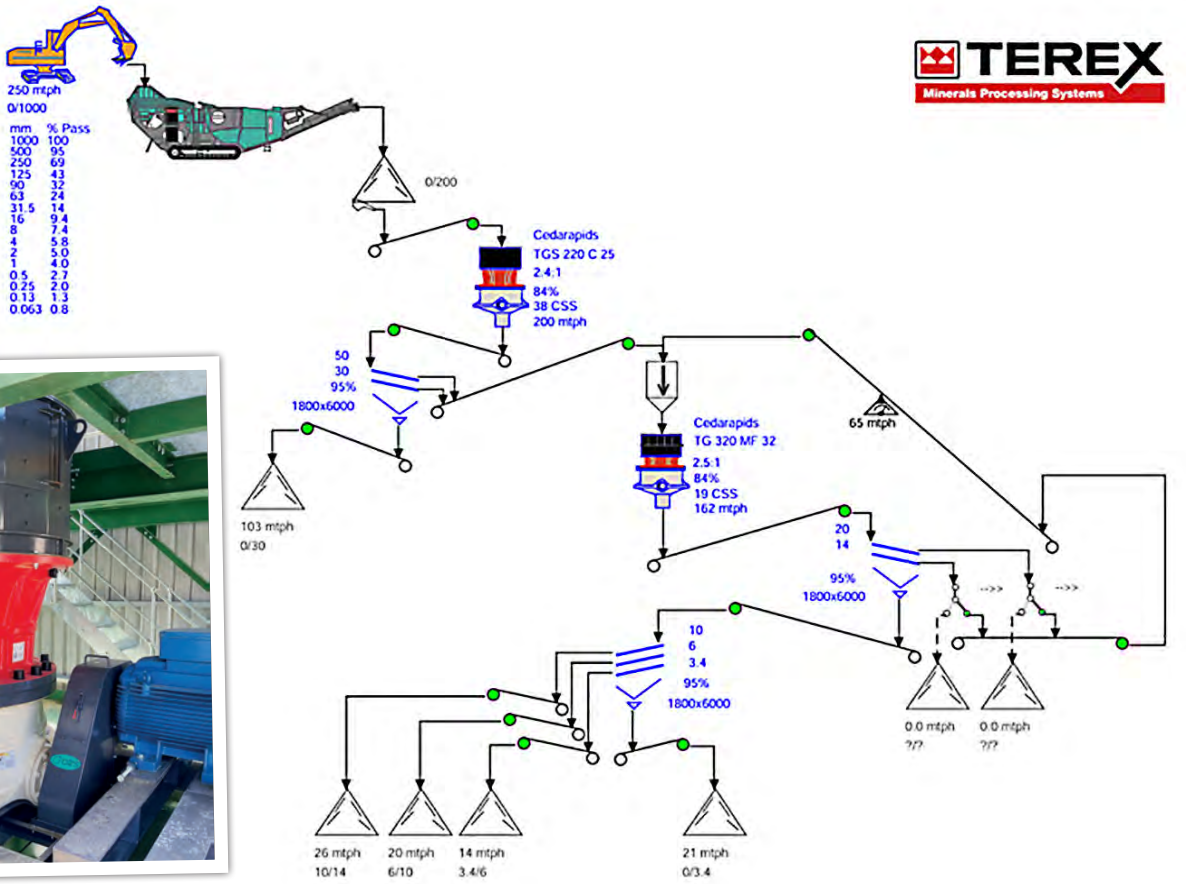
TEREX MPS EQUIPMENT AT THE FOREFRONT

Combining partnered excellence with QRS capabilities and Terex MPS products has produced a turnkey aggregate plant with an output capacity of 200 tonnes per hour. The plant's main focus was to produce high quality 10 and 14mm products.

The Terex Cedarapids TGS 220 cone crusher was the ideal choice for the large feed secondary crusher, processing materials from 275mm feed down to produce a minus 55mm product. The TGS cone can accept a larger feed size compared to all other types of cones in the same power rating, and the steep angled head design accounts for an increased throughput in capacity and the ability to sustain a good



TURN KEY PLANTS



wear profile throughout the crushers liner life which helps to maintain a consistent product from the crusher.

For the final crushing operation, QRS installed the Terex Cedarapids TG 320 cone crusher, which delivers the best cost-per-tonne cubicle product by selecting the optimum crushing cavity and eccentric throw to suit requirements. From a course secondary right through to fine quaternary, the TGS and TG series cone crushers consistently meet with all performance expectations.

For the screening operations, QRS installed three Terex MPS screens from the Simplicity SM series. The first screen is set up to be the scalping screen which is to produce a blinding material for stock and a 12x60mm feed for the TG 320 final crusher. Then the output is diverted to one of the two final screens, one for coarser fractions and other for finer fractions.

Mark commented, "Simply put, the Terex MPS Simplicity screens are high-quality and cost-effective inclined two bearing screen which delivered the customer products to their pre-set specifications. These screeners can be used across a broad spectrum of applications, yet they are flexible and can be customised to specific output requirements."

TEAMWORK FOR A SUCCESSFUL PROJECT

Most projects face some unexpected challenges, but the completion of the quarry aggregates plant remained virtually problem-free. Mark said: "The pre-planning and design were the keys to success in delivering this project and because everything was planned and scoped in advance, there were no unknowns creating issues during the construction phase.

"While the foundations were being put in place by Torbet Plant Hire, we worked to install all the manholes and cables for power and water. What was unique about this site was how hard the rock on the quarry floor was. To overcome that, the client lay blinding to a depth of one metre to facilitate quicker and easier installation of the ducting for water and mains cables. This effectively negated the need for blasting and cutting through rock.

"After that and throughout the whole installation and commissioning project there were only a few problems to overcome, as could be expected with a project of this magnitude. The company is an excellent client to work with and all our suppliers worked to a high standard.

The relationships between client, contractor and sub-contractors were facilitated by monthly meetings (in addition to regular ongoing contact and collaboration). This allowed any potential issues to be identified across the team early enough to modify approaches so that those problems never arose."

Mark continued: "The client was very considerate and diligent. A health and safety area was cordoned off and they also supplied a welfare hut, where all workers signed into and off the site.

"Before project commencement, a full and detailed health and safety RAMS was completed, with every individual worker's documentation and certification details so that only appropriately qualified workers could operate the various machinery and equipment. This rigorous approach to ensuring safety on-site was supervised by David Johnston of Jabez Safety Solutions."

In short, meticulous planning, coordination and attention to detail, combined with a strong inter-disciplinary team ethos, made for the successful completion of the quarry project.

EFEE (European Federation of Explosives Engineers)

EFEE was founded in 1988 and has 26 National Associations. Its purpose is to provide a European forum for professionals working in the field of commercial explosives. The IMQS represents Ireland as a National Association at EFEE council meetings.

In Europe, there is no minimum training standard to be a Shotfirer/ Blast Designer. Each country has its own training requirement and standards, which makes working in more than one European country difficult and quite often prohibitive. To remedy this, EFEE created the Pan-European Competence Certificate for Shotfirers (PECCS). This project facilitates the transfer of shotfiring and blast design skills within European member states.

Lead by IMQS member Nathan Rouse, EFEE have updated the educational material of this course and will re-launch it in late 2025. Updates can be found here.

EFEE 13TH WORLD CONFERENCE

The EFEE World Conference on Explosives and Blasting has become a prominent global forum for discussions on explosives and blasting.

The 13th EFEE World Conference on Explosives and Blasting will be held in the ICE Kraków Congress Centre, Kraków, Poland, from the 20th to 23rd September 2025.

The conference will include:

- Diverse technical presentations and posters covering:
  - Blast Vibration and Seismology
  - Blasting Work Experiences
  - Demolition Blasting
  - Drill and Blast Design Methods and Modelling
  - Explosive Detection for Security
  - Health and Safety in Drilling and Blasting
  - Innovation and Technical Development
  - New Applications and Training
  - Sustainability and Environmental Topics in Drilling and Blasting
- 1500 m² industry exhibition covering explosives, consultants, suppliers and manufacturers. Click here for the latest list of exhibitors
- Welcome Reception
- Stara Zajezdnia Krakow Networking Dinner
- Emerging Professionals Reception aboard the Aquarius Restaurant
- SPIS Pre-Conference Technical Workshop on the 'Use of explosives in demolition works'
- Post-Conference Technical Excursion to GIG's Experimental Mine, BARBARA, and NITROERG

The event attracts explosives users, manufacturers, drilling equipment suppliers, as well as researchers and professionals from the construction and mining industries.

Early bird conference registration is live; more information can be found on the **EFEE website**.

EFEE

BY MATHIAS JERN
President EFEE


Ruairi O Connor, Aidan Forde and Ciaran McCreanor.


A unique venue.

IMQS Fieldtrip

The annual IMQS fieldtrip took place on Friday the 30th May 2025 to Valentia Slate in Co. Kerry. Valentia Slate Quarry is the oldest quarry in production in Ireland and the most westerly quarry in Europe.

First opened in 1816, it is the oldest business in Kerry and one of the oldest manufacturing businesses in Ireland.

The field trip provided a wonderful opportunity to experience a historic and unique enterprise within the Irish extractive industry, with Valentia Slate being only the second Irish stone to receive the prestigious 'Heritage Stone' designation from the International Union of Geological Sciences (IUGS).

On behalf of our members, the IMQS would like to sincerely thank Aidan Forde and the staff of Valentia Slate for accommodating our fieldtrip and for been so generous with their time during the trip.

Valentia Slate provide bespoke solutions for their customers' needs. These include:

- Use of Valentia Slate's unique aesthetic qualities and strength in high profile architectural projects


Fantini Chain Saw Model GU70RXC.

- An urban realm or public amenity garden or landscaping project using a proven and much-loved natural stone
- A unique personalised memorial for your loved one such as a headstone or bench
- A project in interior design where the appeal of the tactile appeal and patina of Valentia Slate is desirable
- A permanent sign or monolith that commemorates an event and will last for hundreds of years
- An art project that uses an easily worked and high quality natural stone.

It was a highly informative and thoroughly enjoyable trip, with our members even having the opportunity to visit the on-site whiskey maturing facility. Aidan and his team are genuinely passionate about Valentia Slate. It's a spectacular location, well worth a return IMQS fieldtrip in the future.

BY RUAIRI O CONNOR
President,
Irish Mining &
Quarrying Society


Wires F101 Cutting Machine rough cutting paving Slabs.


Slate Paving Slabs.

Sandvik Ireland Portlaoise

Underground Mining, Parts & Services, Rock Tools, Surface Drills

Supporting our Irish customer base in both the surface and underground extractive industries since 1997. With a high emphasis on Environment Health and Safety and a large range of quality products, parts and services, our customer support continues from our Portlaoise facility, where we strive to deliver tomorrow's needs, today.

Portlaoise office Tel: +353 (057) 866 4538

Brian Carroll- Underground Equipment Sales Manager & Operations Manager UK & Ireland Tel:+353870517195 brian.carroll@sandvik.com
Chris Murray- Surface Drilling Equipment & Rock Tools Sales Manager
Tel:+44 7515198233 chris.murray@sandvik.com
Oliver Boland- Service Operations Manager UK & Ireland
Tel:+353860289323 oliver.boland@sandvik.com
Gerry Quinlan- Parts & Service Administration System/Support
Tel:+353877696627 gerard.guinlan@sandvik.com

Unit C, Zone 5, Clonminam Business Park
Portlaoise, Co Laois, Ireland R32 EP03

Why Ground Support Matters – and How Sandvik are Leading the Way

In July 2021, Sandvik completed its acquisition of DSI Underground, a global leader in ground support and reinforcement solutions for underground mining and tunnelling.

The deal brought DSI's extensive product range, including bolts, mesh, and injection chemicals, under the Sandvik Mining and Rock Solutions umbrella. DSI Underground now operates as its own division (Ground Support) within Sandvik. This move significantly strengthened Sandvik's position in the ground support market, enhancing its ability to offer comprehensive, safety-focused solutions to our customers.

When it comes to mining, tunnelling, or even big infrastructure projects like highways or dams, one thing that often gets overlooked, but is absolutely critical, is ground support. It's basically the stuff that keeps everything from collapsing around you. And when you're working underground or cutting into the side of a mountain, that's not something you want to take lightly.

That's where Sandvik Ground Support comes in - where we have been in the game for a long time (DSI Underground) and have built a solid reputation for making some of the best ground support products out there. Whether deep underground or working on a steep slope above ground, Ground Support have got the solutions that help keep things stable and safe.

SO, WHAT IS GROUND SUPPORT ANYWAY?

Ground support is all about making sure the rock or soil around a tunnel, mine, or excavation doesn't move or fall in. It's a mix of bolts, mesh, cables, grouts, and sometimes even high-tech monitoring systems. The goal is to reinforce the ground, so it stays put, keeping workers safe and operations running smoothly.

In underground mining, for example, you're constantly dealing with pressure from the rock around you. Without proper support, you risk collapses, injuries, and major delays. On the surface, it's about preventing landslides or erosion, especially in places like open-pit mines or road cuttings.

WHAT SANDVIK BRINGS TO THE TABLE

Sandvik has a full lineup of ground support gear, and it's all designed to handle tough conditions. Here's a quick breakdown:

- **Bolts and Cables:** These are the bread and butter of ground support. Sandvik's versions are strong, reliable, and built to last - even in wet or corrosive environments. From solid, friction, cable, cuttable and hollow core bolts, as well as bolt accessories, Sandvik have a broad range of products to cover all needs here.
- **Mesh Systems:** These help hold loose rock in place and spread out the load. The welded, chain or fibre reinforced polymer mesh products are useful in areas where the rock is fractured or unstable.
- **Grouts and Chemicals:** Sometimes you need to fill cracks or stop water from seeping in. Sandvik's injection and resin foam grouts are fast-acting and super strong, which helps lock everything in place, as well as our mineral and resin products.
- **Monitoring Tech:** This is where things get higher tech. Sandvik offer the xCell Cyclops convergence system product that tracks ground movement in real time. That means you can spot problems before they become disasters.
- **Geotechnical Instruments and technical support:** These tools help you measure stress, pressure and movement in the rock. It's all about staying one step ahead. Forepoling, drainage systems, ventilation systems, ground anchors, steel ribbing, technical support and on site consultation are only a part of the broad range of products and services supplied by Sandvik Ground Support.

WHERE YOU'LL SEE THIS IN ACTION

Sandvik's ground support products are used all over the world in all kinds of projects:

- **Underground Mines:** These places are deep, dark, and dangerous. Sandvik's gear helps keep tunnels and shafts from caving in, so miners can work safely.
- **Tunnels:** Whether it's for trains, roads, or utilities, tunnels need serious support. Sandvik's systems help manage the pressure and keep everything stable.
- **Open-Pit Mines and Quarries:** On the surface, it's all about slope stability. Sandvik's products help prevent rock falls and landslides, which protects both people and equipment.
- **Civil Infrastructure:** Think highways, railways, and dams. Anywhere you're cutting into the earth or building on unstable ground, you need solid support. Sandvik's solutions are flexible enough to handle all kinds of terrain.

WHY IT ALL MATTERS

At the end of the day, ground support isn't just about safety, it's also about efficiency and sustainability. If you can keep your site stable, you avoid delays, reduce maintenance and extend the life of your infrastructure. Plus, with Sandvik's focus on innovation and digital tools, you're not just reacting to problem, you're preventing them.

They're also making strides in sustainability. Our products are designed to last longer and reduce environmental impact, which is a big deal in today's world.

FINAL THOUGHTS

Whether its mining, tunnelling, or any kind of heavy infrastructure, ground support should be high on the priority list. And if reliability and high-performance solutions are important, Sandvik Ground Support products are definitely worth a consideration. Sandvik have the experience, the tech, and the tools to help our customers get the job done safely and efficiently.

SANDVIK IRELAND

Supporting our Irish customer base in both the surface and underground extractive industries since 1996, with technical support and operating from our midlands workshops over the past 27 years, since 1997.

With a high emphasis on Environment Health and Safety, a product range of quality products, parts and services and an exceptionally skilled workforce, our customer support continues today from our Portlaoise facility, where we strive to deliver tomorrow's needs, today in Ireland and around Europe.

SANDVIK

BY BRIAN CARROLL

OPERATIONS MANAGER UK & IRELAND – SALES TERRITORY CEU & UK/IRELAND

IMQS Bursary Winner Progress Report

Over the past year, the IMQS Bursary has provided invaluable support for my ongoing research into the development of a high-sensitivity gravity sensor based on Superconducting Quantum Interference Device (SQUID) technology.

This gravimeter is designed for detecting subtle subsurface density variations and holds significant potential in mineral exploration, mine cavity detection, and underground resource mapping.

Specifically, the IMQS bursary contributed to the following key milestones in the past year:

I completed the design of the SQUID-based gravimeter and used part of the IMQS bursary to purchase essential components and tools for prototype development.

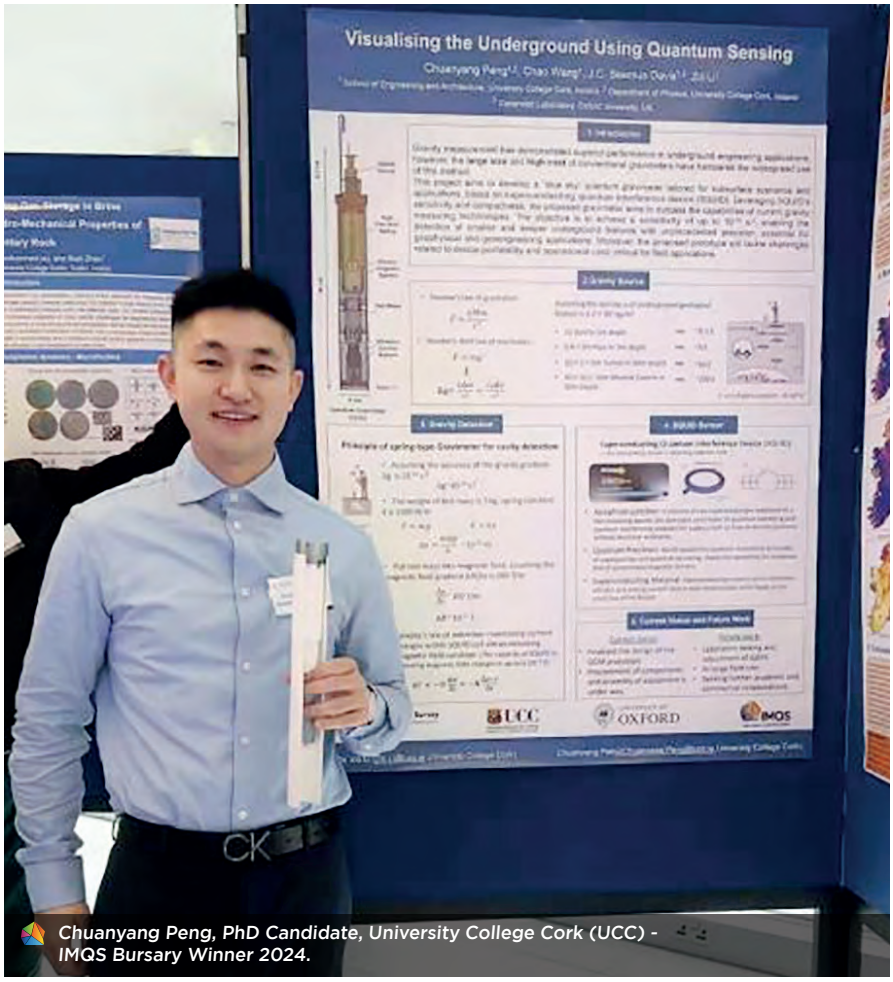
In November 2024, I attended the Geological Survey Ireland (GSI) Annual Conference and presented a poster introducing the objectives and progress of my project. The bursary helped cover the costs associated with this event.

In May 2025, I published a peer-reviewed article in the Tunnelling and Underground Space Technology (TUST) journal, titled:

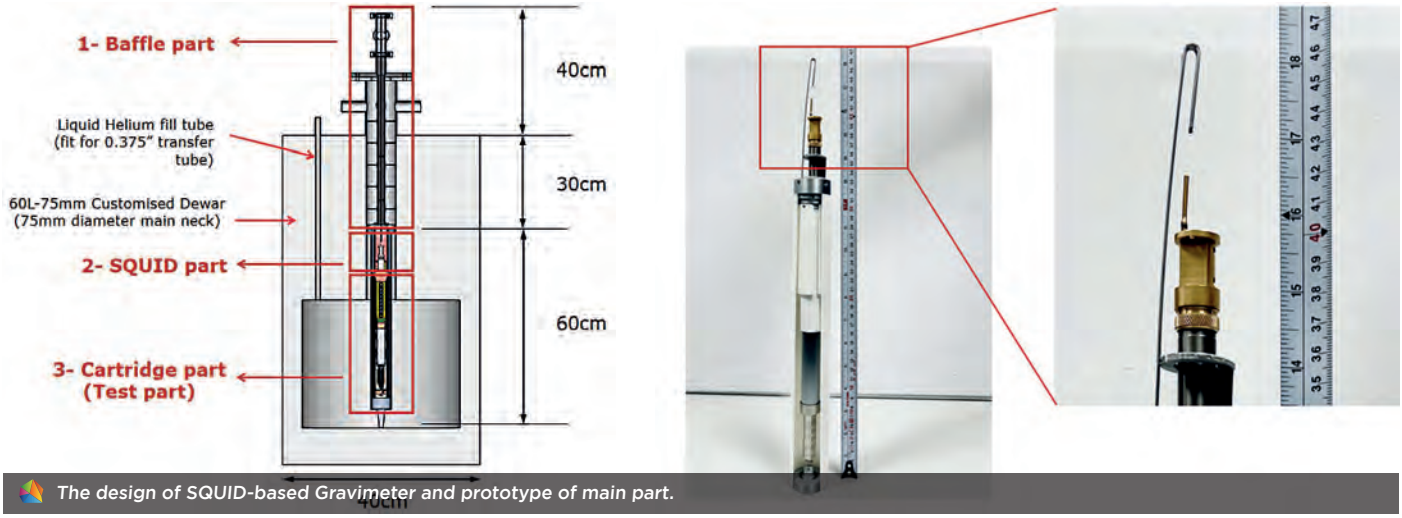
Peng, Chuanyang, Chao Wang, and Zili Li. "Review of geophysical data acquisition methods for underground feature detection and future trends." Tunnelling and Underground Space Technology 163 (2025): 106731.

In this paper, I acknowledged the financial support from IMQS.

I am sincerely grateful to the Irish Mining and Quarrying Society for their support. The bursary provided not only vital financial assistance but also valuable encouragement, enabling meaningful progress in both the technical and academic aspects of my work.



Chuanyang Peng, PhD Candidate, University College Cork (UCC) - IMQS Bursary Winner 2024.



The design of SQUID-based Gravimeter and prototype of main part.

BRINGING STRUCTURE TO LIFE

Irish Cement
A CRH COMPANY

www.irishcement.ie

Chemistry from Rocks: Assembling the Critical Minerals inside Cement Clinker

Inside every modern cement factory lies a process of remarkable complexity and precision - where natural rock from local quarries is transformed through carefully controlled chemical and thermal reactions into clinker and then into cement.

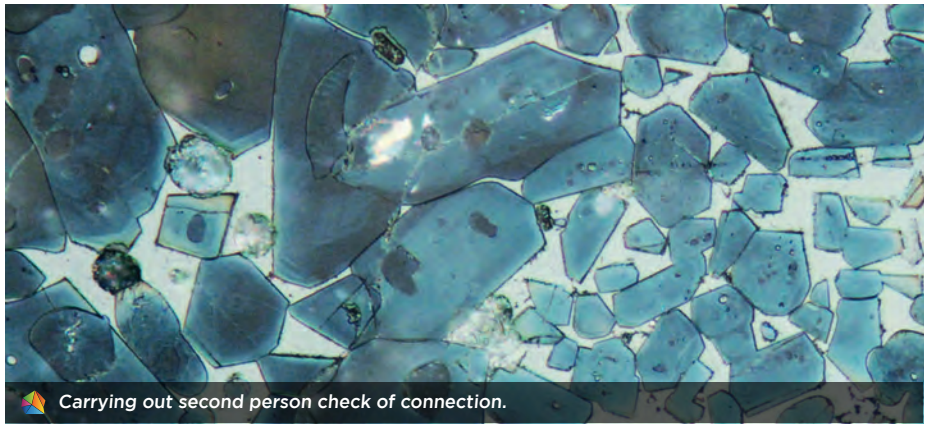
The process essentially rearranges the chemical elements from local rocks into four core minerals: Alite (Ca_3SiO_5), Belite (Ca_2SiO_4), Tricalcium Aluminate ($Ca_3Al_2O_6$) and Tetracalcium Aluminoferrite ($Ca_4Al_2Fe_2O_{10}$). These are the essential components of good quality cement clinker, the intermediate product in Portland cement production, responsible for the performance of the cement in the concrete.

THE ROCK BECOMES THE RAW MATERIAL

The journey begins with the selection, blending and crushing of raw materials - primarily limestone, clay, and minor corrective additions such, as bauxite and iron ore, into a fine powder with the consistency of flour. Four key elements: Calcium, Silicon, Aluminium and Iron are the fundamental building blocks required for these cement clinker minerals. Stable oxides of these elements exist naturally inside the rock and the chemical composition of the rocks are rigorously analysed to determine the proportion of these key elements. Our two factories in Limerick and Platin employ automated blending and homogenising systems to turn the rock into a 'raw meal', a precise blend of powdered raw materials with precise ratios of the key inputs. We also use online analysers to monitor and maintain these ratios within narrow tolerances, ensuring consistency and quality for clinker formation.

The fine raw meal powder must achieve specific chemical moduli:

- **Lime Saturation Factor (LSF)** governs the amount of free lime and the potential for alite formation.
- **Silica Modulus (SM)** and **Alumina Modulus (AM)** balance the proportions of silica, alumina, and iron oxide, influencing the formation of belite, aluminate, and ferrite phases.



Carrying out second person check of connection.

THE CEMENT KILN: THERMAL TRANSFORMATION

The raw meal is fed into our cement kilns, which are massive, slowly rotating steel cylinders lined with refractory brick heated to temperatures of **1450°C**. It might be helpful to consider the raw materials moving through a series of thermal zones, each facilitating specific reactions, and each getting successively hotter:

1. **Preheating and Calcination (600–900°C):** Here, limestone decomposes into calcium oxide (CaO) and carbon dioxide (CO_2). This endothermic reaction is the first major transformation and sets the stage for clinker mineral formation. The removal of CO_2 at this stage gives rise to our 'process emissions'.
2. **Clinkering Zone (1250–1450°C):** As the temperature rises, partial melting occurs. This liquid phase is essential for the diffusion of ions and the formation of the key clinker minerals:
   - **Belite (Ca_2SiO_4)** forms first at lower temperatures.
   - **Alite (Ca_3SiO_5)** forms at peak temperatures through the reaction of belite with additional CaO.
   - **Tricalcium Aluminate ($Ca_3Al_2O_6$)** and **Tetracalcium Aluminoferrite ($Ca_4Al_2Fe_2O_{10}$)** form from the interaction of CaO with alumina and iron oxide, respectively.

The mineralogy of the final clinker is highly sensitive to kiln temperature, residence time, and the chemical composition of the melt.

In addition, the shape, intensity and performance of the 2,000°C flame inside the kiln is critical to the production of high-quality clinker.

RAPID COOLING: LOCKING IN PERFORMANCE

Upon exiting the kiln, the clinker must be cooled rapidly, typically using air quenching systems, to preserve the high-temperature mineral phases, particularly alite, which requires rapid cooling. This cooling process influences the microstructure of the clinker, affecting grindability and reactivity and ultimately determines the performance of the cement.

We have two different cooling technologies in the two factories, planetary coolers in Limerick and a grate cooler in Platin. The clinker is milled onsite and is the main ingredient in our final cement products.

QUALITY CONTROL AND MINERAL ANALYSIS

Samples are taken at every stage of the process and pneumatically conveyed back to our two autolabs, which operate around-the-clock, for analysis using a range of technologies including:

X-ray diffraction (XRD)
reveals the crystal structure and quantifies the materials.

X-ray fluorescence (XRF)
reveals the elemental composition of the materials.

These tools allow fine-tuning of the process in real time, ensuring consistent clinker quality and ultimate cement performance in the concrete mix.

CLINKER MINERALOGY

In cement chemistry, the four main mineral components, Alite, Belite, Tricalcium Aluminate and Tetracalcium Aluminoferrite, each play distinct roles in the performance of the cement and ultimately the concrete. These have always been the essential 'workhorses' in cement and they spring into life when the cement powder is hydrated.

While in the early history of making cement, the production of these four fundamental minerals involved 'trial and error', modern cement manufacturing has refined the production process to maximise their occurrence in the optimal ratios in the final clinker. From raw material selection, preparation and homogenisation to sampling and analysis, today we ensure at each stage of the process the correct ingredients are available to allow for the assembly of these essential minerals.

Today, we have experience and technology to assist. In the future, we will also have AI tools to further optimise our process and find opportunities to evolve the extraction of the essential chemistry from the rocks.

Carrying out second person check of connection.

CONCLUSION

The formation of cement clinker is a triumph of large-scale industrial chemistry and process engineering. From the precise blend of naturally occurring raw materials to the controlled combustion inside the kiln, every step is designed to produce a mineralogical composition that delivers strength, durability, and workability to the concrete.

Consistent cement performance is vitally important for our customers. That performance is achieved by producing cements with a balanced blend of the four key active clinker minerals. As Irish Cement innovates and invests in further decarbonisation programmes, increasing our use of alternative fuels, phasing down fossil fuels, finding more circular economy opportunities and sourcing secondary cementitious materials, clinker mineralogy will continue to be in focus.

Irish Cement
A CRH COMPANY

BY BRIAN GILMORE
Communications Manager

CLINKER MINERAL	CHEMICAL FORMULA	CONTRIBUTION TO CEMENT PERFORMANCE
Alite	(Ca_3SiO_5)	- Rapid hydration and high reactivity - Significant contribution to early strength development
Belite	(Ca_2SiO_4)	- Slower hydration compared to alite - Contributes to long-term strength and durability
Tricalcium Aluminate	$(Ca_3Al_2O_6)$	- Highly reactive with water - Contributes to early strength but can cause heat release and potential cracking - Reacts with gypsum to form ettringite, which affects setting time and sulphate resistance
Calcium Aluminoferrite	$(Ca_4Al_2Fe_2O_{10})$	- Less reactive compared to other clinker minerals - Contributes to the overall strength development and colour of cement - Provides some resistance to chemical attack, particularly sulphate resistance

Unlocking Investment Potential in the Raw Materials Sector: A Focus on Estonia

Having spent time working at the TalTech Mining School in Tallinn, Estonia, I have had the opportunity to observe firsthand the country's evolving landscape in the raw materials sector. What I've seen is a nation quietly but confidently positioning itself at the forefront of Europe's sustainable resource strategies.

From deep research collaborations to bold infrastructure projects and a strong regulatory framework, Estonia offers a compelling blend of innovation, stability, and opportunity. Last year, I provided an account of the similarities between Ireland and Estonia, as two small countries on the extremities of Europe, standing tall and proud within the European Union. This article explores the country's growing potential as a key investment destination in the European raw materials arena.

ACCESS TO RAW MATERIALS

In the rapidly evolving global economy, raw materials are fundamental to industrial advancement, technological progress, and the green transition. As countries pursue ambitious climate targets and scale up digital infrastructure, the demand for critical raw materials, such as rare earth elements, lithium, cobalt, and nickel, has surged dramatically.

These materials are indispensable for renewable energy systems, electric vehicles, semiconductors, and next-generation technologies. Consequently, access to raw materials has become not only a matter of economic opportunity but also one of geopolitical importance.

With global supply chains becoming increasingly fragile due to geopolitical tensions, trade disruptions,

Fig. 2. Estonia's Mining Museum records the history of Estonian mining, which began on an industrial scale in 1916. Photo by author.

and environmental constraints, investors are now prioritising stable jurisdictions that combine innovation, sustainability, and transparency.

Estonia, a small but technologically advanced country in Northern Europe, is emerging as a compelling investment destination in the raw materials sector. Long recognised for its digital leadership, Estonia is now making strides in responsible resource development and innovation-led mineral exploration.

GLOBAL INVESTMENT DYNAMICS

The investment landscape for raw materials is shaped by several interlinked global trends. The ongoing green energy transition is perhaps the most powerful driver, as wind turbines, solar panels, electric mobility, and energy storage systems all depend on critical minerals. Likewise, technological innovation such as high-performance batteries requires a steady supply of speciality materials.

In parallel, there is an accelerating push to localise and diversify supply chains. This movement is motivated by the desire to reduce over-reliance on single sources, improve strategic autonomy, and mitigate risks associated with geopolitical instability as outlined in the EU's Critical Raw Materials Act. In this context, the European Union's regulatory and market environment is becoming increasingly attractive for investors focused on environmental, social, and governance (ESG) standards. Estonia, as an EU and NATO member with robust institutions, legal predictability, and policy alignment with the European Green Deal, offers an ideal platform for investment in sustainable raw materials development.

ESTONIA'S STRATEGIC EDGE

Estonia presents a unique combination of resource endowment, innovation, and geopolitical stability. The country is home to one of the largest commercially exploited oil shale reserves in the world, which has historically played a central role in domestic energy production.

While Estonia plans to phase out oil shale-based power generation by 2035, it intends to retain and modernise its chemical processing sector to extract higher-value products in a cleaner and more sustainable way.

In addition to oil shale, Estonia has abundant industrial mineral resources, including high-quality limestone, dolomite, clay, and sand, which support its construction and manufacturing sectors. Estonia also holds significant untapped potential in phosphorite, a key source of phosphorus essential for fertilizers. While historically sensitive due to environmental concerns, renewed interest in sustainable extraction methods has sparked discussions on responsibly exploring these strategic reserves.

Fig. 1. Oil shale being dumped into the crusher. Ida-Viru, Eastern Estonia. Photo by author.

Peat is another important resource, with Estonia ranking among Europe's leading producers. The country's peatlands, which cover around 22% of its land area, are increasingly seen not only as energy or horticultural inputs but also as valuable carbon sinks. Rewetted or restored peatlands contribute significantly to carbon capture and biodiversity enhancement, making them central to Estonia's bioeconomy and climate strategies. Efforts are underway to shift the peat sector toward sustainable alternatives, including renewable biomass, and to integrate these landscapes into broader environmental management systems. Sound familiar?

Estonia's strategic geographical position at the intersection of Western Europe, Scandinavia, and Eastern markets is a key advantage. Serving as a northern gateway, the country boasts a well-developed transport infrastructure, featuring deep-water ports and efficient road and rail networks. Central to this connectivity is Rail Baltica, a transformative high-speed rail project linking Estonia, Latvia, and Lithuania to the wider European network, extending all the way to Warsaw, Poland. Scheduled for completion by 2030, Rail Baltica will significantly enhance regional passenger and freight transport, fostering sustainable and deeper economic integration across the Baltic region and Central Europe.

Perhaps Estonia's most distinctive advantage lies in its digital infrastructure and innovation ecosystem. Estonia's e-Residency program allows non-residents to establish and manage EU-based companies entirely online. This system, coupled with streamlined digital services and a zero-tax policy on reinvested profits, makes Estonia one of the most business-friendly environments in Europe. Furthermore, the government actively supports innovation in cleantech, raw materials, and advanced

manufacturing through policy incentives and funding mechanisms.

Environmental leadership is another hallmark of Estonia's development model. The country adheres to strict EU environmental standards and is integrating circular economy principles into its mining and resource industries. These efforts include encouraging sustainable extraction, promoting recycling, particularly in waste construction materials and investing in research to reduce waste and enhance material efficiency.

ESTONIA'S ROLE IN HORIZON EUROPE

Estonia's innovation potential in the raw materials sector is exemplified by its participation in major EU-funded research initiatives under the Horizon Europe framework.

A flagship example is the DEXPLORE (Deep Exploration) project, which addresses the declining rate of economically viable ore deposit discoveries in Europe. This project seeks to revolutionise mineral exploration by employing cutting-edge technologies such as UAV-assisted mineral detection, advanced Earth observation, and novel deep geophysical techniques.

Two prominent Estonian institutions, Tallinn University of Technology (TalTech) and the Estonian Geological Society, are key contributors to the DEXPLORE initiative. TalTech brings extensive expertise in geology, geophysics, and digital modelling, developing new tools for deep-earth imaging and integrating geospatial data into accessible decision-making platforms.

The Estonian Geological Society plays a crucial role in stakeholder communication, ensuring that local communities, researchers, and policymakers are effectively engaged throughout the project lifecycle. Their involvement underscores Estonia's capacity to contribute to high-level scientific research and to lead in the adoption of environmentally responsible exploration techniques.

Estonia is also an active partner in the REMHub (Rare Earth and Magnets Hub for a Resilient Europe) project, a Horizon Europe initiative coordinated by Finland's CLIC Innovation Oy. REMHub unites 25 partners across Europe, including TalTech and the Irish-registered Institute for Methods Innovation (IMI). The project aims to strengthen the EU's resilience in rare earth element (REE) supply chains by developing innovative technologies for REE exploration, recycling, and substitution.

REMHub focuses on circular design for electric machines, establishing safe and sustainable design principles, and advancing recovery methods from industrial waste. TalTech contributes expertise in materials science and recovery technologies, while partner IMI provides a variety of research and communications options. Together, these partners reinforce Europe's collaborative approach to sustainable raw materials innovation.

INNOVATIVE ENERGY STORAGE IN PALDISKI

In Paldiski, Estonia, a company investing in the region is developing cutting-edge energy projects that complement its raw materials ambitions. The Zero Terrain Paldiski initiative is an innovative pumped hydro energy storage (PHES) facility utilising underground caverns to store and release energy as needed.

This approach provides grid stability, supports renewable integration, and minimises environmental impact by developing underground spaces. Ten underground reservoirs are planned, requiring the construction of multiple access points through challenging geological layers, first penetrating 200 metres of sedimentary rock, followed by hard bedrock, reaching depths of up to 750 metres in total.

OIL SHALE TRANSITION AND SUSTAINABILITY

Estonia's strategy to phase out oil shale use for electricity generation by 2035 and entirely by 2040 is a central part of its climate commitments under the EU Recovery and Resilience Plan. Despite short-term increases in oil shale use due to energy security concerns following the war in Ukraine, the long-term direction remains clear.

The focus is shifting toward using oil shale for chemical production and investing in cleaner technologies to reduce the environmental footprint of extraction and processing. This transition not only aligns with EU emissions targets but also opens new investment opportunities in value-added processing and materials innovation.

EMERGING INVESTMENT OPPORTUNITIES

Estonia's evolving raw materials sector offers diverse and high-impact investment opportunities. These include early-stage participation in exploration projects for critical minerals, investments in renewable energy materials and sustainable construction inputs, and ventures into circular economy businesses that focus on material recovery, industrial symbiosis, and resource efficiency. Eco-friendly alternatives to peat, biomass-based energy solutions, and cleaner technologies for mineral processing also present promising avenues for investment.

However, potential investors should remain mindful of several important considerations. Estonia's adherence to strict EU environmental regulations demands robust planning and long-term sustainability strategies. Building trust with local communities through early stakeholder engagement is essential.

Additionally, while Estonia is geopolitically stable and securely anchored within the EU and NATO, its proximity to Russia means that regional security dynamics must be carefully monitored.

FUTURE OUTLOOK

Estonia is actively positioning itself as a hub for sustainable raw materials exploration and innovation in Northern Europe. This vision is grounded in three key pillars: the development of next-generation exploration technologies through projects like DEXPLORE; responsible resource management in line with the European Green Deal; and the integration of processing, recycling, and materials innovation within a coherent value chain.

Through targeted policy support, international research collaboration, and a strong digital and innovation ecosystem, Estonia offers a unique platform for building the future of sustainable industry. As the global economy pivots toward resilient and responsible sourcing of critical resources, Estonia is not just responding to these trends, it is helping to define them.

CONCLUSION

The global transition toward a green and digital economy is fundamentally reshaping the raw materials sector. In this shifting landscape, Estonia stands out as a stable, innovative, and environmentally responsible investment destination.

With a strong resource base, digital infrastructure, EU alignment, and active participation in leading research initiatives like DEXPLORE and REMHub, Estonia offers forward-thinking investors an opportunity to unlock long-term value while contributing to a more sustainable industrial future.

TAL TECH

BY TONY HAND

Sustainable Mining Project Manager, Division of Mining and Mineral Technology, Department of Geology, Tallinn University of Technology – TalTech, Estonia.

Ireland's new stand at PDAC 2025: highlighting opportunities in its mineral sector and promoting investment potential.

Prospectors & Developers Association of Canada

Ireland impresses at PDAC 2025

The Prospectors and Developers Association of Canada Convention, PDAC 2025, the world's largest meeting of mining and minerals industry professionals, saw a revitalised Ireland presence with a newly designed Stand hosting key stakeholders. Led by the Government of Ireland's Department of Climate, Energy and the Environment (DCEE), the Ireland Stand includes the Geological Survey Ireland, iCRAG, Geoscience Ireland and for the first time, the Irish Minerals Fund backed by the Irish Strategic Investment Fund.

PDAC 2025 drew 27,353 participants to Toronto and beyond its more than 1,100 exhibits featuring government representatives, corporate leaders, and technical specialists from around the world, served as a vital platform for dialogue among industry stakeholders, policymakers, and officials. The event showcased technologies driving a safer, more efficient and sustainable mining sector.

Key themes included the growing use of AI and machine learning for faster, more accurate exploration; advanced drilling techniques that lower costs and reduce environmental footprints; and automation and robotics enhancing safety, particularly in underground operations.

Sustainability was a major focus, with innovations like hybrid-electric haul trucks and renewable-powered systems aimed at cutting emissions. Securing critical minerals for the energy transition remained a top priority, alongside strong industry collaboration to accelerate these advancements.

Irish companies which exhibited at PDAC this year included Aurum Exploration, Mincon Priority Drilling, QME, SLR and WSP.

Ireland's presence at PDAC, led by the Geoscience Policy Section of DCEE, is an essential component of ensuring that Ireland remains a welcome destination for the minerals sector.

PDAC PROSPECTORS & DEVELOPERS ASSOCIATION OF CANADA

BY DR AOIFE BRADY
Chief Operations Officer, iCRAG

Cobalt
The Superhero Metal

Cobalt is a chemical element, with a symbol Co and atomic number 27. Similar to nickel, cobalt is found in the Earth's crust only in a chemically combined form, except for small deposits found in alloys of natural meteoric iron. Cobalt is magnetic and has a hard lustrous blueish grey appearance, with a density of 8.8g/cm³ (at 200C) and a hardness of 5 on the Moh's scale.

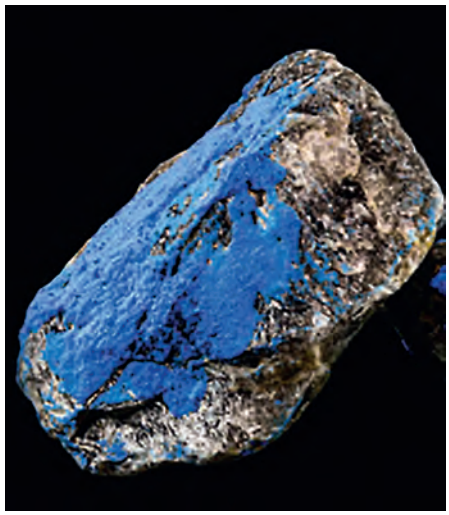
The word cobalt comes from the German "Kobolds" which means goblin or troublemaker. It was so called because it was very difficult to smelt without oxidising, and smelting would release the associated arsenic vapours which would lead to problematic processing conditions for the workers. The Kobolds were blamed and the name stuck.

Cobalt compounds are known to have been used for the beautiful colouring and pigment properties in ancient Persia, Tang dynasty and Egypt sculptors dating back as far as 2500 BC. Swedish chemist Georg Brandt (1694–1768) is credited with discovering cobalt c.1735, showing it to be a previously unknown element and he showed that compounds of cobalt metal were the source of the blue colour in glass. Up until the beginning of the 20th century cobalt had only been exploited for its beautiful colour.

However, cobalt is not just a pretty face, it is one of only 3 ferromagnetic 'transition elements' along with iron and nickel. These transition elements can donate electrons from both their outer shell and the shell just beneath it and this adaptability results in them forming a wide variety of chemical compounds. Cobalt compounds have been used for centuries to add a deep blue colour to objects such as glass beads, ceramics and glazes. However, they did not call it cobalt, because people thought bismuth, one of the nine known metals at that time, was responsible for the beautiful blue colour.

As a metal it is hard and tough, has a very high melting point and also remains magnetic to the highest temperature of all the magnetic elements.

When cobalt is combined with other metals its strength allows a range of super alloys to be created. In particular, cobalt's very high melting point and mechanical strength at high temperatures has seen its extensive use in what is termed 'superalloys', which are alloys that retain mechanical strength at high temperatures. Because of its impressive properties cobalt is an important component in wear resistant and corrosive resistant alloys.



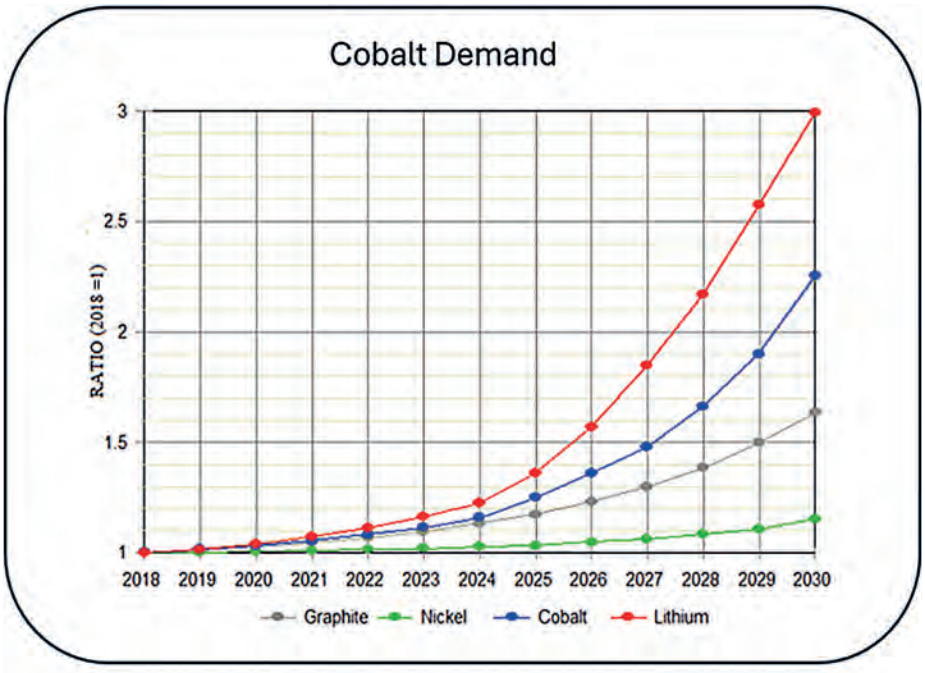
Cobalt alloys and coatings are commonly seen in drills, saws, aircraft turbines and prosthetic bone replacements. Because it is magnetic and mechanically hard up to very high temperatures, it is also used in high-speed motors and turbo machinery. More recently cobalt has become a major component lithium-ion batteries, magnetic particles for recording and storage of information in magnetic tapes and hard drives.

While cobalt brings pleasure for its array of beautiful colours, it is also ultra strong, hard and magnetic. Cobalt is never alone; it is found associated with different metals in their ore and has its best mechanical properties when combined up with others.

COBALT AS A CRITICAL RAW MATERIAL

In 2008 the European Union identified 14 critical raw materials. Critical raw materials are those which display a

particularly high risk of supply shortage in the following 10 years and which are particularly important for the value chain. Cobalt was included in this list highlighting its importance. Cobalt use in the manufacture of EV batteries indicates a continued trend upwards in 2025, with demand expected to increase for many years into the future. The graph below shows cobalt in blue with a significant rise in anticipated demand from 2018 to 2025 and from now until 2030.



GEOLOGY

Cobalt is found in globally in magmatic (20%), lateritic (15%) and stratiform sedimentary (60%) deposits, generally bound with other minerals. Mafic and ultra mafic deposits can produce cobalt as a byproduct of other ore materials, such as in the Bushveld Complex of South Africa. It is found in highest concentrations when incorporated into minerals (pentlandite and linnaeite) as magma or lava cools to form igneous rocks such as dunite, serpentinite, and basalt.

These are known as magmatic Nickel-Cobalt sulphide deposits. Cobalt is also found in stratiform sediment-hosted Copper-Cobalt deposits in siliciclastic or carbonate rocks, such as in the Democratic Republic of Congo (DRC). A third area is when cobalt is found in lateritic deposits that may form as ultramafic rock weathers into regolith rich in nickel and cobalt.

COBALT PRODUCTION

In 2022, 185,000 tonnes of cobalt were produced globally. The Democratic Republic of Congo is the largest global producer of cobalt, accounting for 70% of world production and 130,000 tonnes of product in 2022. Indonesia with its rapidly growing nickel industry recently became the world's second-largest producer of cobalt, accounting for 5% of global production, at 10,000 tonnes in 2022. Cobalt is mined mostly as a by-product of copper or nickel mining, with the exception of artisanal mining in Congo and relatively minor primary production in Morocco.

Most of the cobalt from DRC is shipped to China where it is processed. China is the top producer of refined cobalt, processing approximately 77% of all refined cobalt in 2022 and China is also the top consumer of cobalt, with most of it being used in battery manufacturing. DRC has ambitions to develop its own refinery in due course.

Artisanal mining represents 10-20% of the DRC's copper and cobalt production, but artisanal miners in the DRC continue to be exposed to numerous health and safety risks, which could be reduced with a more ambitious government policy, better information and training. Further problems are associated with the reported extensive use of child labour to mine cobalt in DRC.

European deposits producing cobalt are primarily located in Finland and Sweden.

COBALT RESERVES AND RESOURCES

A mineral resource is defined as a non-renewable source within the Earth's crust that contains metals and can be extracted through mining processes. Reserves are the portion of Resources


Bushveld Deposit in South Africa.


Artisanal Cobalt Mining in DCR.


Mechanised Cobalt Mining in DCR.

that can be realistically and economically mined based on location, quantity, grade, geological characteristics, and any other relevant factor.

In 2022, world reserves of cobalt were estimated to be approximately 8.3 million tonnes. The Democratic Republic of Congo has the largest known reserves of cobalt, making up 48% of the world total.

In 2022, cobalt terrestrial resources were estimated to be approximately 25 million tonnes, and global ocean resources were estimated to be 120 million tonnes. The terrestrial resources are found mostly in sediment-hosted stratiform copper deposits in the Democratic Republic of Congo, with lesser amounts in similar mineral deposits in Zambia.

However, there are significant quantities of cobalt as a secondary or tertiary mineral in nickel-bearing laterites in Australia, Indonesia, the Philippines, and Cuba and in magmatic nickel-copper sulphide deposits in Canada, Australia, the United States, and Russia.

Cobalt resources have also been identified in polymetallic nodules on the sea floor.

COBALT PRICE

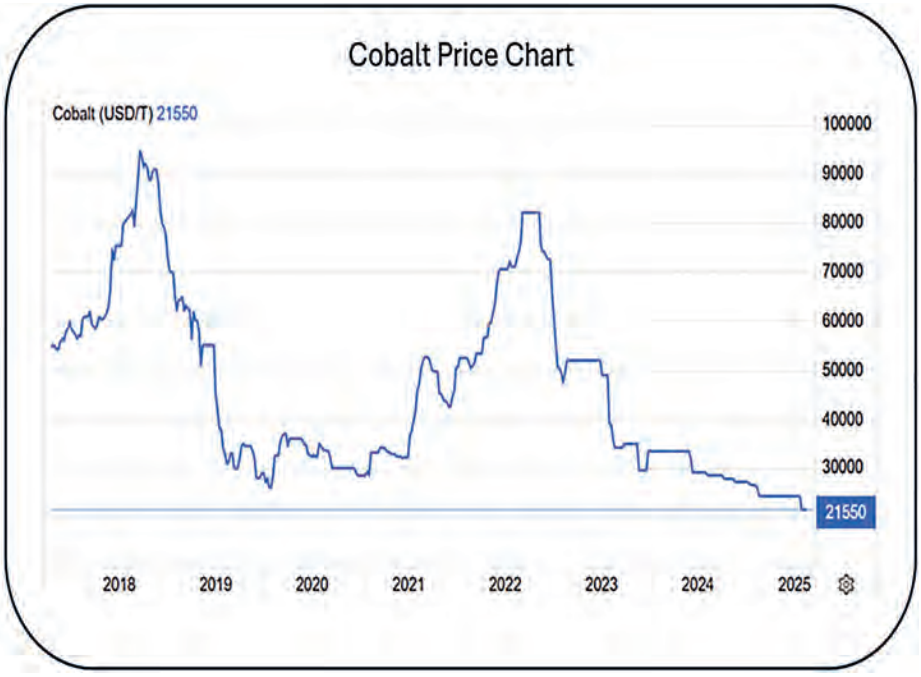
As of February 2025, cobalt prices have plummeted to their lowest level since 2016 as an increase in supply has flooded the market. The price is February 2025 is $21,550 per tonne, compared to the highest level ever in 2018 at $95,250 per tonne.

Current figures suggest a significant rise in cobalt demand in the next five years but a price increase may not follow, depending on other factors such as battery chemistry with less cobalt and the level of supply, which is currently very high. The chart below shows the price from the peak in 2018 to the current price with significant variation in between.

USES OF COBALT

Cobalt is primarily used as a component in lithium-ion batteries for electric vehicles and it's demand is growing. Cobalt is also used extensively in the manufacture of magnetic, wear resistant and high strength alloys.

Examples of this use are in the aerospace industry and for wind turbines. The compounds of cobalt are used to colour glass, ceramics, inks and paints.



INTERESTING FACTS ABOUT COBALT

Some interesting facts about cobalt are noted below.

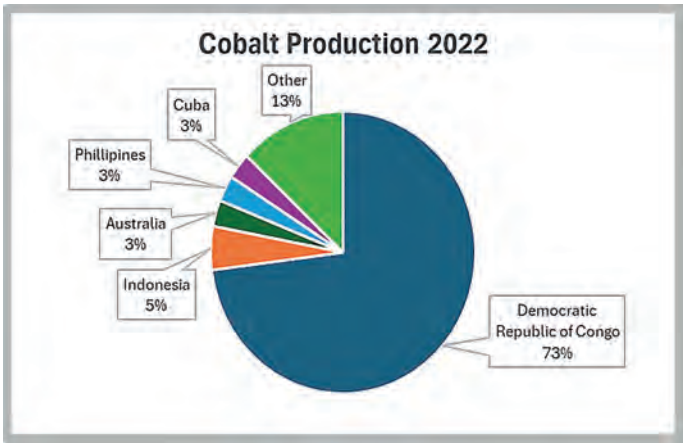
- Cobalt is s superhero metal as it helps to make other metals stronger when alloyed.
- The word Cobalt is derived from the German term Kobald, meaning goblin or evil spirit.
- Cobalt is 1 of 3 naturally magnetic metals – the others are iron and nickel.
- Cobalt is the first metal discovered since prehistoric times.
- Cobalt is the first metal with a recorded discoverer.
- Cobalt in the form of vitamin B12 is required by animals and humans.

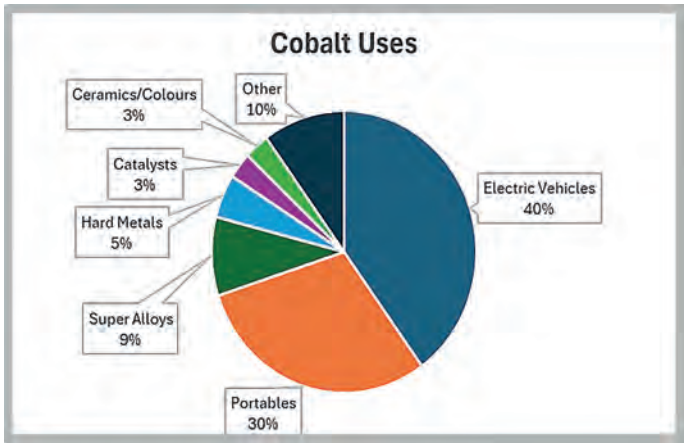
In summary, cobalt is a newly identified metal which has been used for centuries for its colour characteristics but is now considered to be a 'critical mineral' due to its demand for use in lithium-ion batteries for electric vehicles. It has both a beautiful colour and is considered to be a superhero metal due to its unique properties.

BRENDAN MORRIS

is the Managing Director of LTMS Limited and COO of Galantas Gold. Brendan is a Chartered Mining Engineer and has been engaged in the mining and quarrying industries, globally, since 1979.

Brendan is a Past President of the IMQS.





COSHLA QUARRIES LTD.

CE certification on all products

- Aggregates EN 13242
- Blocks EN 771
- Concrete EN 206

Fully certified concrete, blocks & stone

- Low carbon concrete
- Keenest prices, professional service
- All material to NRA specifications
- All products NSAI approved

nsai
ISO 9001:2000 QUALITY

Coshla Quarries Ltd.
Cashla,
Athenry,
Co Galway

Tel: 091 389 020 **Email: info@coshlaquarries.ie**

ICMA Quality & Safety Control Approved
Irish Concrete Federation Set for life
Construction Industry Federation
IMQS
low carbon concrete

Coshla Quarries

In the 18 years since it was founded in 2007, Coshla Quarries has established itself as an industry leader, with an impressive reputation for the quality of its products and service and for the dedication it applies to improving those offerings year on year.

The limestone quarry covers about 70 acres near Athenry in County Galway. It's located just above the M6 motorway, which to the west becomes the N6 dual carriageway into Galway city and to the east intersects the M17/ M18 from Tuam down to Gort.

Coshla supplied materials for all these major road projects, which have boosted local and national connectivity and economic development in the west.

PROJECTS AND PEOPLE

Alongside infrastructural projects, Coshla also supply to civic and commercial construction across Galway city and county, including the University Hospital, Bonham Quay, the Garda Headquarters (HQ), the Dean Hotel, Galway Wind Park, and Medtronic and Boston Scientific. We've worked on multiple educational campuses, including the Presentation College, Athenry – a state-of-the-art facility across 10,000m^2 encompassing classrooms, specialist rooms, and a variety of outdoor spaces.

Coshla Quarries has built strong relationships with all the main contractors in Galway. Current projects include Ceannt Station in collaboration with BAM Ireland, and Queen Street student accommodation with Monami Construction. John Sisk & Son commissioned the landmark Bonham Quay project on the Docks, to which Coshla have supplied large amounts of blocks, concrete, and stone. JJ Rhatigan commissioned the Dean Hotel and Garda HQ works. On the smaller end of the scale, Coshla supply to house builds, factories, farms, and renovations.

A portfolio so diverse in size and type requires a steady supply of high-quality materials and a committed team of experts to manufacture and handle them. Coshla Quarries directly employs 12 skilled, experienced workers, and subcontracts the crushing and 90% of deliveries. A busy day might have work for an additional 40 people. Our approach to subcontracting is strategic: it's simply more efficient, allowing each team member to stay dedicated to their core expertise.

PRODUCTS

Coshla Quarries provides a wide range of high-quality concrete, stone, blocks, and aggregates. Every block carries the CE mark and is manufactured on site, and every product leaving the quarry is certified by the National Standards Authority of Ireland (NSAI).

Everything we make is environmentally sustainable, which is a priority for us. We now manufacture low-carbon concrete blocks using Ground Granulated

Blastfurnace Slag (GGBS) supplied by Ecocem, which is both eco-friendly and very durable. This is part of our continual effort to future-proof the business.

A SECURE FUTURE

During a brief downturn a few years ago, we undertook a strategic review of our operations. There's always room to improve in critical areas, like product quality, production, service, and safety. Coshla Quarries have always aimed for the highest standards of products and customer service; we regularly review operations and are always exploring potential new revenue streams.

We recently became an agent for UltraCem, a liquid floor screed made by RTU in Antrim, which is proving popular in residential and other builds. We were also granted a 20-year extension in planning permission from An Bord Pleanála, which helps secure the foreseeable future of the quarry. We can now also use a larger area, greatly expanding our capacity. We already operate two concrete-batching plants on site, which ensures that production is reliable. Investments in upgrades are already paying off.

We've been rewarded by a lot of repeat business based on previous work and the relationships we have built. Since every customer has their own needs and specifications, it's important to be flexible and provide them with whatever niche product or bespoke solution they might want.

Even though cement prices continue to rise, stone, blocks, and concrete remain the cheapest parts of a build, which is ironic because they're really the most important parts. We never lose sight of that importance, so we focus on maximising the quality of everything we do.

BY MARTIN COLLIN
General Manager, Coshla Quarries

Irish Association for Economic Geology (IAEG)

The IAEG annually organises a lecture series, conference and short courses aimed at industry professionals, academia and students. Its membership consists of geoscientists working in Ireland and internationally.

2024 PROGRAMME

Event	Date	Location	Title
Lecture Series	26th March	Virtual via GoogleMeet	**GeoMetallurgical Block Modelling-** Making the most of your data to maximize project economics
Annual Conference	14-15th September	Radisson Blu Hotel, Sligo	**Securing Resources: CRMs in Europe**
Student Logging Course	19th October	Lisheen Core Store, County Tipperary	**Student Logging Course –** led by Miller O'Prey
Lecture Series	22nd October	Virtual via GoogleMeet	**Shaping the Future of Raw Materials: ESG Values across the sector**
AGM and talk	27th November	Virtual via GoogleMeet	**AGM – Bart Jaworski (Group Eleven Resources)** "New High-Grade Zn-Pb-Ag-(Ge) Discovery in Ireland"

The Annual Conference in 2024 focussed on securing critical resources in Europe. The two minerals particularly highlighted with most potential for mining in Ireland are Lithium and Copper.

The topic for the Annual Conference, which was held on 15-16th May, was "Copper: The Green Metal". The conference was well attended with over 70 delegates.

The David Hall Mineral Exploration Fund, established in 2024, has to date secured over €15,000 in funding. In 2024, bursaries of €3,000 each were awarded to Caroline Grant and Joseph Donoghue, both of whom subsequently presented their projects in 2025. Further awards are scheduled for later in 2025.

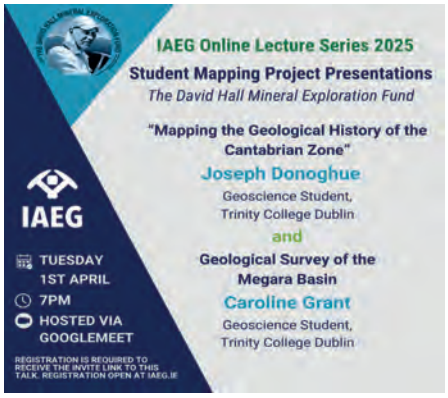
The Student Logging Course was successfully run again in October last and is now being planned as an annual event. To this end, the IAEG has agreed to help with the annual running costs of the Lisheen Core Store.

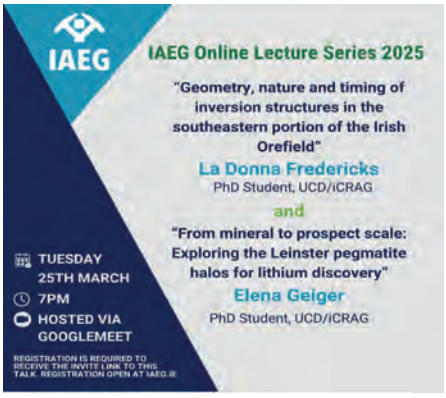
A joint IAEG/IMQS seminar is planned for 19th September 2025 in The Park Hotel, Mullingar. The final speaker list is currently being compiled, but will include talks from Joe Burke and also from Shanoon on their Galmoy project.

All updates to the planned programmes will be notified to members and on the IAEG website.

IAEG

BY GRAHAM REID
Treasurer IAEG





ASHBOURNE TRUCK CENTRE

JOSEPH MOONEY

FAYMONVILLE

TRAILERS TO THE MAX

authorised
Tipper Specialiast of

SCHMITZ CARGOBULL

Ashbourne Truck Centre, Ballymadun, Ashbourne, Co. Meath, Ireland
Tel: 00353 18350573 Josef: 0035387 255 66 77 Sarah J: 0035386 255 66 77

2025 Schmitz 8.2m tipping trailer, out door, electric cover, front lift axle, galvanised chassis, auto dump valve, in stock.

2025 MAX Trailer 3 axle low bed, extendable, running height of 375mm, pendal axles, in stock available now.

MAX Trailer, 2 axle draw bar low loader, 7m bed, option for alu side boards (removable), spring loaded aluminium ramps, payload up to 16tons. In stock available now, also available in 3 axle version with payload up to 25tons

2025 Schmitz 9.6m bulker, aluminium, 55 cubic yard, in stock available immediately

www.ashbournetruckcentre.com

The Positive Aspects of Metals and Minerals in Human Health and Wellbeing

Eamonn was awarded a bursary from the IMQS in 2024 for work related to a study highlighting the inter-relationships between geology and human health. This article is a brief overview of most important elements included in the study.

The study is focused on the many beneficial effects of metals, trace elements and minerals, which have been identified as being essential for good health, as well as being essential for diagnostic procedures and for certain treatments. Over the course of a life-time in minerals exploration and mining, the author has identified more than 30 'substances', mainly metals, trace elements and minerals which are in daily use in respect of human health. The primary objective is to heighten public awareness in a positive manner of the importance of geology in human health.

There are many day-to-day examples of the use of metals in everyday life within the health service but their use is not identified as such, e.g., zinc in blood clotting and lithium in mental health disorders, the use of barium meals for lower abdomen X-rays, the use of lead shielding to protect the radiographers, (one never hears about this when people are objecting to lead mining), the use of gypsum for plaster casts, the use of titanium in hip replacements and gold in joints, and the importance of tungsten in scalpels.

Then there are the lesser known aspects of trace elements, for example, cobalt in the production of B12 and the manifold number of supplements now available across the counter in Pharmacies. Then we have the extensive use of aluminium for wheel-chairs, walking aids and foil for trauma victims and the use of natural zeolites in washing powders.

Examples on the adverse side include selenium deficiency and nail growth, excess iron and hemochromatosis, and radon and lung cancer. These and others have already been well-covered in the literature and will not be covered in this study. Generally speaking, when mining is publicly mentioned it is inevitably in the context of a disaster, be it a physical one, such as a rock collapse under-ground, or a dam burst or a pollution incident.

However, this study seeks to bring to the medical authorities, such as the HSE and the medical personnel, an awareness of the importance of metals in human health.

In addition, on the more general side of things, is the ever-increasing use of high-tech equipment based on modern electronic systems, which require the use of CRMs (Critical Raw Materials), principally Rare Earth Elements and trace elements, such as gallium, germanium, indium and silicon.

The study will also contain a commentary on nomenclature. The most obvious word requiring clarification is "minerals" and the difference between the geological definition and the medical description of the term. This also applies to the physio-chemical definition of "elements" and the para-medical uses of the word.

There will also be a short explanatory section on modern economic-geology terms, such as "Critical Raw Materials," "Industrial Minerals" and "Specialty Metals," as well as "Essential Elements" and a modern commonly used series of terms using "Rare Earths." There will also be a short section on the various metals and minerals that are produced in Ireland and the potential for producing more.

Initially, it was proposed to review 12 identified materials, but later the author substituted two of them and in the past two weeks, two others have been replaced by two different ones for reasons which will be explained below.

1. KAOLIN

Kaolin is a rock containing the mineral kaolinite, (a full chemical description will be included in the Bursary Final Report). Kaolinite is usually described as an "Industrial Mineral."

It has been used in the ceramic industry in China for many centuries. Indeed, its name is derived from a hill in China and the term "Fine China" is also derived from there.

In the recent past it has been identified as a very effective blood coagulant. It is now a primary target for further research for inclusion in the final report.

2. TITANIUM

Titanium, chemical symbol, Ti, has oscillated between inclusion and exclusion in this study. However, its absence in springs to correct scoliosis in the recent HIQA report has ensured its inclusion herein. There will be a fuller critique of the failures related to the metalliferous content associated with the implantation of springs into children with severe scoliosis under the CHI system. The principal focus will be on the metals involved, with a subsidiary examination of what went wrong in respect of the metal content of the springs and the possibility of zinc plating.

Implanted materials, especially those intended to be retained for long periods, are designed to be biologically inert, or near biologically inert. For a product to meet this standard, it must have no, or only minimal, adverse effects when it comes in contact with the human body. Titanium is a common material in a variety of orthopaedic implants because it is biologically inert, proven safe for implantation and not prone to corrosion (HIQA, 2024).

Whilst there are a wide variety of stainless steel metal types available, the alloy (a blend of metals) in the stainless steel determines its properties. The upcoming report will comment that the components of this (other)

system are manufactured from titanium alloy, pure titanium, stainless steel and cobalt chromium-molybdenum alloy.

3. LEAD

Lead has chemical symbol, Pb, which derives from the Latin term plumbum, and from which the terms such as plumber and plumb-line are derived. There is a public perception that anything to do with lead is bad, toxic and deadly. Whilst this is partially true, historically, it has many positives. It has been involved in many aspects of social and economic progress. The Romans developed a system of lead pipes for water distribution. The plumb-line, derived from lead, is essential for constructing vertical walls.

Lead was also used as weights in fishing and due to its malleability, it is important for roof flashing. Additionally, lead was a significant constituent in paint. Furthermore, it is used in leaded glass, both in Church windows and glass ornaments, and finally, because of its softness many of our fore-fathers learned to write by using an Peann Luaidh, the good old lead pencil.

Within the context of this study, the principal interest to this author is the fact that during the past century its use was developed as a protection against radiation; thus, lead is one of the cornerstones of protection for the operators of equipment, principally radiographers and oncology nurses involved in the use of ionising radiation for diagnostics in X-Rays and for treatment as in cancers.

4. GYPSUM

Gypsum, chemical formula $CaSO_4.2(H_20)$ is a well-known industrial mineral and has been mined in the Kingscourt area since the mid-1930s. Indeed, one of the founding members of the company was a local doctor. Production has been dominated by the manufacturing of plaster and plasterboard, but because of its initial use in Paris as a plaster-cast for broken bones, it is best known as Plaster of Paris. It is, therefore, absolutely essential in orthopaedic surgery.

5. LITHIUM

Lithium, chemical symbol Li, is an alkali element, closely related to sodium and potassium.

Mental Health problems are growing at an alarming rate, particularly in the areas of substance abuse, depression and personality disorders. The use of Lithium revolves around electrical transmissions in the brain, which are usually facilitated by the lone electron in the outer shell of the sodium atom, but when it slows down it can cause sluggishness in the brain. The lithium atom being smaller, also has just one electron in its outer orbit, acts more speedily and helps to maintain control. Lithium enriched tablets have become one of the major treatments for bipolar disorder and major depression. It has side effects, but it is not addictive.

From an Irish perspective, lithium is probably the most interesting element within this study, because its use as a cure for mental instability goes back centuries. Tobar na nGeallt nó Gleann na nGeallt, translates as Well and the Valley of the Mad. People from across Ireland once travelled to the Dingle Peninsula to drink the water, which we now know to be lithium-enriched, in the hope of being cured of their madness.

6. MAGNESIUM

Magnesium, chemical symbol, Mg. How many of the readers remember the Blue Bottle containing Milk of Magnesia? As childhood medicines go, it wasn't bad, just a bit dry, but until recently I had no idea what it was for. Magnesium plays an important role in maintaining good health, particularly in relation to bone strength, cardiovascular function, and the relief of upset stomach, indigestion, and constipation. It wasn't on my original list but after reading an extensive description of it in one of my research journals, I decided to include it and there are, in fact, good Irish reasons for doing so.

Magnesium metal is on the EU's Critical Raw Materials list and magnesite, $MgCO_3$ was formerly listed as well. En passant, the principal feature of magnesite is its high melting point, hence its extensive use in cement and other high temperature kilns. Historically, we had a large magnesite production plant owned by Quigley Magnesite in Dungarvan during the 1970s, which sourced its raw materials, dolomite rock, from Bennetsbridge, County Kilkenny. And as some readers may be aware, there is a Talc-Magnesite deposit just outside of Westport.

7. BARIUM

Closely related to lead is barium, chemical symbol, Ba, which has been substituted for lead in many paints. The sole source of barium is the mineral Barytes, $BaSO_4$, better known to some of us as Barite. The principal use of barytes, unprocessed except for grinding to a particular particle size, is as the "mud" in well-drilling for oil and gas exploration. It serves to cool the drill bit and acts as a suppressant to help prevent blowouts. From the late 1950s to the mid-1990s, Ireland was one of the world's major producers of barytes; it was in the Top 10 every year.

The chemical uses, though accounting for only a small proportion, have existed for many years and necessitate the liberation of the barium from the sulphate. Some of you no doubt have had a barium meal, which is used as a diagnostic tool for identifying ailments within the lower abdomen. I remember the first time I had to drink it; the first mouthful of creamy white thickish liquid was fine, but finishing it was quite difficult. I thought that its use had been discontinued, but recently it has come back into fashion.

8. ACTINIUM 225

Another element that was not on my original list, but which will be reviewed, is actinium-225, which is a decay product of radium 226. We have all heard of radium treatment, but it may be superseded by actinium 225. Actinium-225 has a half-life of 10 days and decays by alpha emission. The decay properties are favourable for usage in targeted alpha therapy. Clinical trials have demonstrated the applicability of radiopharmaceuticals containing actinium-225 to treat various forms of cancer. It focuses on a marker molecule attached to the cancer cell and destroys it. It doesn't cure cancer, but it stops it.

Our interest in actinium-225 arises from its connection to phosphate fertiliser production. Phosphate fertiliser is produced by mixing phosphate rock with sulphuric acid, however, there are two problems with this: for every tonne of fertiliser produced, five tonnes of waste are generated, and this waste contains radium. A German company has patented a method of extracting the radium and capturing its decay product, actinium-225.

9. ALUMINIUM

Next, we have ambulatory equipment, much of which is made from aluminium, which has the chemical symbol, Al. More recently titanium and carbon fibre have become important alloys. We have had shiny aluminium wheel-chairs for years, then walking aids were developed, known to many as Zimmer frames. Even the humble hawthorn stick has been partially replaced by an aluminium one, and of course canes for the visually impaired have been with us for years.

10. TUNGSTEN

The chemical symbol for Tungsten is W and is derived from its most commonly occurring mineral wolframite [Fe,Mn (WO_4)]. Similar to the lead bearing sulphide and galena, wolframite was known to the Romans for its quality in the hardening of steel. The use of tungsten in the hardening of steel for cutting purposes, such as scalpels, continues to this day.

EAMONN GRENNAN
Retired Geologist

Saint-Gobain Mining (Ireland) Ltd 2025 Update

An Bord Pleanála Grants Planning Approval to Gyproc for Quarry in Magheracloone

Gyproc, Ireland's only domestic manufacturer of plaster and plasterboard products, welcomes An Bord Pleanála's decision to grant planning permission for the development of a new open cast gypsum quarry in Magheracloone, County Monaghan.

This decision marks an important milestone in securing the long-term supply of gypsum, a critical raw material for Ireland's construction sector, while supporting the continuity of local operations and employment in the Kingscourt and Magheracloone area.

This approval follows a detailed three-year planning process, shaped by ongoing engagement with local residents, community organisations, and elected representatives. Gyproc has operated in the area for nearly 90 years and remains committed to maintaining its long-standing relationships and open dialogue with the local community.

Speaking on the planning approval, Kieran Holohan - Managing Director of Saint-Gobain, Ireland said:

"We welcome this planning approval as an important step forward for our operations in Monaghan and the wider Irish construction sector. It reflects the outcome of an extensive planning process and continued engagement with the local community.

This development represents the continuation of existing mining activity in the area, carried out under strict environmental and regulatory oversight. All elements of the development have been carefully assessed to ensure compliance with statutory standards relating to water, air, vibration, and noise. These will be closely monitored by Gyproc and subject to ongoing oversight by the relevant authorities.

We're grateful for the feedback we've received to date and look forward to maintaining this rapport as the development progresses."

The development includes the creation of a new open cast quarry, construction of a tunnel beneath the R179 main road connecting Kingscourt and Carrickmacross, refurbishment of the existing processing plant, and improvements to the quarry's entrance and surrounding infrastructure.

Construction on the new project will begin with the tunnel works, followed by landscaping and site development. Mining activity is expected to begin approximately one year after the start of construction. The tendering of this work and detailed scheduling will begin now.

As part of the global Saint-Gobain group, Gyproc's investment in this new facility reflects its long-term commitment to Ireland. The project will support local employment and contribute to the sustainability of the company's operations, while ensuring Ireland's continued access to domestically produced gypsum.

SAINT-GOBAIN

BY BENSON PLUNKETT
Mine Manager, Drummond Mine, Knocknacran Open Cast Mine

The proposed new Knocknacran West Open Cast Mine site.

Tara Mines

In April 2025, Michelle Bennett became the first female to take the reigns as General Manager (GM) of Boliden Tara Mines, marking a significant milestone in the mine's 50-year history.

Michelle is focused on the importance of cohesive teamwork to deliver the mission for Boliden Tara, which is to provide the concentrate needed to deliver metals for the future in a safe, responsible and efficient manner. Michelle wishes to recognise the contribution of all those who have laid a solid foundation at Tara since its inception as an exploration project back in 1953.

Today, under her leadership, the mine is focused on enhancing production of the current life of mine and exploring the potential around a new mineralisation called Tara Deep, which could extend the mine's life significantly if proven successful.

Michelle is local to the area and joined Tara in early 2022. It has been a challenging couple of years and during early 2023 a perfect storm of factors significantly impacted the financial viability of the operation. These factors included low zinc prices, significant energy costs following the onset of the war in the Ukraine, inflation that drove increases in the cost base and internal operational challenges.

After a temporary closure of around 12 months starting in July 2023, the mine is back up and running, and continuing to increase production. New ways of working agreed with employees have bedded in well and the business is on a positive trajectory and with further progress still to be made. A key focus for Michelle and her management colleagues is to build a solid platform for the future of Tara.

This includes continuing with exploration work on Tara Deep, a prospect that currently has an inferred resource of 27mt. Substantial work is ongoing to establish more clarity on the scope of the deposit, with a view to proving its commercial viability and, where this is proved, bringing it on stream as soon as possible.

Tara Deep has the potential to substantially extend the life of mine, and in tandem with this exploration work is also continuing on the existing mine to identify new deposits where possible. When Tara first started production in 1977, no-one expected it to still be in operation over 45 years later, which supports the proven track record of increasing the life of mine at Tara.

Michelle Bennett Tara Mines General Manager.

Because of Tara, Ireland produces more zinc by land area than any other country in the world. Tara remains the largest zinc mine in Europe and as such is well placed to support Ireland and Europe's transition to the circular economy and net zero. Zinc is a particularly important transition metal, with a wide range of applications in renewable and sustainable technologies ranging from wind turbines and solar panels to electric car batteries and protective coatings that extend a car's lifespan.

As a native of the Navan area who grew up close to the mine, Tara's new GM is deeply aware of its importance to the local community. The deposit was first discovered in 1970, with production commencing in 1977. From then until now, thousands of employees, stakeholders and the local community have become part of the story of Tara.

Today it is owned by the Swedish group Boliden, who purchased the mine in 2004. Boliden's purpose is to provide the metals essential to improve society for generations to come. Tara and its management share this purpose, not only through the delivery of zinc but also through their efforts to build a solid platform for the future of the operation. Michelle looks forward to working together with the people of Tara for the benefit of all employees and the local community.

NEW BOLIDEN
Tara Mines

ANDREZA REZENDE
Communications,
Boliden Tara Mines

iCRAG Update 2025

The past year has been a pivotal one for iCRAG, the Research Ireland Centre for Applied Geosciences. Hosted at University College Dublin (UCD), the Centre brings together over 150 researchers from ten Irish third-level institutions, working at the intersection of raw materials, energy, environment, climate and society.

A major leadership transition shaped the year. In March 2025, Professor Sarah A. Gleeson (Figure 1) was announced as Research Ireland Professor at University College Dublin, new Director of iCRAG, and as Full Professor in Sustainability Geoscience supported by the Higher Education Authority (HEA) Senior Academic Leadership Initiative (SALI) within the UCD School of Earth Sciences. Professor Gleeson brings a strong track record in ore deposit geochemistry, having previously led the Geofluids Research Group at GFZ Potsdam and the University of Potsdam.

Sarah succeeds Professor Murray Hitzman, who retired from his role as Director in early 2025. Professor Hitzman was celebrated at '*MurrayFest*,' a dedicated symposium held in his honour at UCD in December 2024 (Figure 2). As well as celebrating Murray's career, conference attendees identified several action items for new directions for national and international economic geology research. Murray remains involved in iCRAG as a Principal Investigator and currently serves as Chair of the UNESCO International Geoscience Programme Council.

Figure 1. Prof. Sarah Gleeson pictured at the iCRAG stand at the Prospectors & Developers Association of Canada (PDAC) international convention in Toronto, Canada.

Figure 2. Attendees at the 'MurrayFest' Conference held in December 2024 in UCD.

iCRAG continues to be a global leader in applied geoscience, particularly in the study of sedimentary basin-hosted mineral deposits and critical raw materials. Notable outputs this year include the conclusion of the EU-funded VECTOR project. iCRAG is a partner in VECTOR, a three-year, €7.5M project, funded under the European Union's Horizon Europe and the UK's Research and Innovation funding programmes. VECTOR seeks to develop human-centred solutions for a socially acceptable, responsible, and sustainable supply of critical raw materials in Europe and thus contribute to achieving the Green Deal.

A highlight was the production of the documentary 100 Perceptions: Raw Materials (Figure 3), filmed at the Natural History Museum (NHM) London, in which 100 volunteers from across society explored their understanding of raw materials and where they believe they should be sourced. The project also developed innovative education and public engagement tools including a critical raw materials board game and an online game currently in development, supporting engagement with mineral supply challenges in informal education settings.

Last summer, **iCRAG co-organised the third edition of the ReSToRE (Researching Social Theories, Resources, and Environment) international summer school** which brought together 45 early-career participants and eight expert mentors, representing 17 developing and 12 developed countries (Figure 4). The summer school, held under the theme of **"Transitions: Society, Wind and Water"**, aimed to encourage interdisciplinary and global discussion on how to reconcile different views about Earth's resources. Real-world challenges were presented by representatives from the Electricity Supply Board (ESB), Shanoon Resources, Kildare County Council, and Sligo County Council. These challenges served as focal points for interdisciplinary group work, encouraging participants to propose actionable responses to

sustainability, land-use, and community concerns related to Earth resource use. The programme continues to exemplify iCRAG's commitment to supporting the next generation of Earth and social scientists equipped to address the complexities of the just transition.

The Centre also continues to publish widely. iCRAG structural and geochemistry researchers presented new models for sediment-hosted copper systems at major international conferences, including Society of Economic Geologists (SEG) Namibia and PDAC Toronto. At the IAEG Annual Conference in Monaghan, themed "Copper: The Green Metal," iCRAG presented on copper systems in Ireland, Kazakhstan, Germany, and the Central African Copperbelt. Dr Pat Meere, Dr Koen Torremans, Dr Simon Jones, and Prof. Sarah Gleeson were among the featured contributors. The conference highlighted iCRAG's strength in basin-scale modelling of copper deposits across global tectonic settings.

Geochemistry researchers continue to refine tools for exploration. A growing body of work led by Prof. David Chew (TCD), together with collaborators across iCRAG, applies high-dimensional trace element data and machine learning to apatite minerals. Their work demonstrates the potential of apatite as a vector mineral for identifying mineralisation in weathered terrains and sedimentary basins, advancing exploration models for critical raw materials in Ireland and beyond.

Figure 3. Vector documentary 100 Perceptions: Raw Materials, filmed at the Natural History Museum London.

The "Characterising Earth Materials using Multi-Sensor Core Logger Analysis" (Earth SCAn) project led by Prof. Peter Haughton, Dr Mark Coughlan, Dr Aline Melo and Dr Koen Torremans secured funding under Research Ireland's National Research Infrastructure call and is co-funded by UCD and the Geological Survey Ireland (GSI). It will allow for the advanced characterisation of Earth materials (e.g., rock, soil and sediment), providing critical data for interdisciplinary research into climate change, engineering, energy, critical raw materials exploration, archaeology, food security, ecosystem services, groundwater, and geohazards.

Ongoing advancements in energy transition research at the Centre are bolstered by newly funded projects. iCRAG researchers, Dr Kara English, Prof. John Walsh, Dr Koen Torremans, Dr Tom Manzocchi, Dr Pablo Rodriguez Salgado, Dr Duygu Kiyan and Dr Vincent Roche are all participants on the GEMINI project.

GEMINI - Geothermal Energy Momentum on the Island of Ireland,

Figure 4. Participants from the ReSToRE Summer School, Dublin, July 2024.

is a participants geothermal energy demonstration project aiming to reduce greenhouse gas emissions associated with heating and cooling.

The project, led by Codema, Dublin's Energy Agency, and funded by the PEACEPLUS programme, with endorsement from Ireland's Department of Climate, Energy and the Environment and Northern Ireland's Department for the Economy, represents the island of Ireland's largest ever investment in geothermal energy, totalling €20M. iCRAG researchers will assess the nature of the rocks at geothermal demonstrator sites, the movement of fluids and the impact of the heat resource that can be extracted and used in buildings.

The GeoStorIE project, led by iCRAG researchers Dr Kara English, Prof. Peter Haughton, Dr Conrad Childs, Dr Pablo Rodriguez Salgado, Prof John Walsh, and Dr Tom Manzocchi, received funding from the Sustainable Energy Authority of Ireland (SEAI) National Energy RD&D Funding Programme and the GSI. GeoSTorIE is a three-year assessment of Ireland's offshore sites for carbon capture and storage (CCS) and hydrogen storage. Ireland's offshore basins contain deep porous reservoirs that could serve as key storage sites for CO_2 and hydrogen (H_2), contributing to Ireland's low-carbon energy transition.

The Centre marked its tenth anniversary with iCRAG@10, a national showcase event held at UCD (Figure 5). Under the theme "Evolving for a Changing World," the programme included keynote talks, lightning sessions, and panels exploring topics ranging from critical minerals to coastal resilience. It also served as a celebration of iCRAG's research impact and strategic direction for the future.

Internationally, iCRAG continues to contribute across major forums. Centre researchers presented at EGU in Vienna, the Atlantic Meridional Overturning Circulation (AMOC) conference in Dublin, and Roundup in Vancouver. At the European Association of Geoscientists and Engineer (EAGE) Annual Conference 2025 in Toulouse, Dr Kara English presented her 'Best of Geoenergy' paper, showcasing iCRAG's leadership in geoenergy research and its potential in Triassic sandstone reservoirs. Additionally, iCRAG PhD researcher Victória Susin was awarded Best Student Paper by the SEG (Society of Exploration Geophysicists) for her presentation at the 2024 International Meeting for Applied Geoscience and Energy (IMAGE).

Her winning paper, co-authored with Dr Aline Melo, Dr Koen Torremans, Prof. Murray Hitzman, and Dr Mark Holdstock, focused on subsurface characterisation of the NW Limerick Syncline in the Irish Zn-Pb Orefield - earning international recognition from the SEG, AAPG (American Association of Petroleum Geologists), and SEPM (Society for Sedimentary Geology).

Figure 5. Celebrating 10 years of iCRAG at the iCRAG@10 Conference, O'Reilly Hall, UCD.

Looking ahead, iCRAG's Education and Public Engagement (EPE) Programme is entering an exciting new phase. The Centre was recently awarded €234,000 in Discover Programme funding from Research Ireland to significantly expand its national 'Get into Geoscience' initiative.

This funding will support a wide range of activities, including an expanded Transition Year research programme reaching 500 students annually, dedicated teacher training for Leaving Certificate Geography and the new Climate Action and Sustainable Development subject (delivered in collaboration with Geological Survey Ireland), and the development of a new online Career Paths Portal. In addition, a tailored suite of classroom resources will be created to support teaching of Climate Action and Sustainable Development.

These initiatives, supported this year by teacher interns through the STInt (STEM Teacher Internship) Programme, will further embed geoscience within the national education landscape.

Beyond formal education initiatives, iCRAG is actively involved in a variety of creative, non-traditional, public engagement events that take geoscience to new and sometimes unexpected audiences. For example, Dance of the Carbon Cycles, led by Prof. Laurence Gill from Trinity College Dublin uses folk dance to spark conversations about public attitudes to climate change.

Meanwhile, We Built This City on Rock and Coal takes a comedic approach to climate issues, with iCRAG researchers stepping into the spotlight as performers. These innovative formats help raise the visibility of geoscience in public life and ensure it plays a meaningful role in national conversations.

iCRAG
SFI RESEARCH CENTRE IN APPLIED GEOSCIENCES

Emer Caslin
iCRAG Business Development Manager
emer.caslin@icrag-centre.org

Dr Eloise Rogers
iCRAG Research Impact Manager
eloise.rogers@icrag-centre.org

Dr Aoife Brady
iCRAG COO
aoife.brady@icrag-centre.org

Health and Safety Authority Geotechnical Campaign in Quarries in 2025

The Health and Safety Authority (HSA) in Ireland works to deliver healthy and safe working lives and contribute to productive enterprises.

Part of their mandate regarding quarries is to:

1. Regulate the safety, health and welfare of people at work and those affected by work activities;
2. Influence improvement in the safety, health, and welfare of people at work and those affected by work activities.

Geotechnical structures and their management represent one of the primary safety risks in quarry environments. In 2025, as part of a series of safety campaigns for quarries, the HSA has implemented a geotechnical/geotechnics campaign.

Geotechnics is the branch of engineering concerned with the study and modification of soils and rock. It uses the principles of soil mechanics and rock mechanics to solve engineering problems.

The campaign has four main objectives:

1. To gather information on the industry's understanding of the geotechnical aspects in relation to the quarry regulations;
2. To see how industry uses Geotechnics on a daily basis (i.e., Assessments and Procedures);
3. To gather information on competency in relation to geotechnics;
4. To establish if the industry engages geotechnical experts and, if so, are their recommendations followed.

Structural geology in a quarry.

The main topics that are aligned with the campaign are as follows:

DEVELOPMENT PLANS FOR THE QUARRY

Every quarry should have a written development plan for the extraction of the quarry and must ensure that it has been effectively put in place. Updating the plan as the quarry progresses is important to ensure that the plan is an effective 'working plan'. The development plan should show how the extraction of the benches progress, including bench heights, ground conditions, etc.

Some areas that should be considered as significant hazards are:

- Benches greater than 20m (which require a geotechnical report),
- Faces with an overall height of more than 30m, with a slope of steeper than 1:1 (450).

Quarry operators must be aware of any hazards present on working faces due to geology or environmental conditions that may impact people both inside and outside the quarry.

Tips and Lagoons

Quarries should have tips and lagoons designed to an engineering standard. The standard should include details of management of material properties, geological engineering, extraction sequencing and environmental conditions. The quarry operator must ensure that the tips and lagoons are constructed and maintained to the design standard, and this may include maintaining plans, sections, carrying out inspections, preserving records, and ongoing reviews of the management and status of the standard.

Tips and stockpiles exhibiting any of the following attributes may be considered significant hazards:

- Greater than 20m high;
- Area of greater than 10,000m^2;
- Slope greater than 1:12 or 8% (the average gradient of the ground

Excavator loading a truck.

on which the tip is located).

Lagoons with any of the following attributes may be considered significant hazards:

- Volume of greater than 10,000m3;
- Land level greater than 4m below the lagoon and within 50m from the edge.

RISK ASSESSMENTS AND SAFE OPERATING PROCEDURES

All excavations, tips and lagoons should have appropriate risk assessments in place. When the hazards are identified and controls included, a risk rating should be applied. The risk assessment should then act as a precursor for the development of safe operating procedures.

Typically, a quarry should have safe operating procedures in place for the following activities (not an exhaustive list):

- Depth/Height/Slope
- Ground conditions
- Slopes and construction standards
- Local environment
- Excavation methods
- Operation of machinery
- Inspection regime

APPRAISALS BY A COMPETENT PERSON

Appraisals are required to identify hazards and their associated risks in quarries. The key points for carrying out appraisals at a quarry include the following:

- Have appraisals been carried out on a regular basis?
- Are they carried out by a competent person?
- Have the risks been rated (e.g., mild, medium or significant)?

If the appraisals identify any significant hazards that cannot be remedied immediately, then a geotechnical assessment is required. The list below shows some examples of significant hazards:

1. A tip in a wholly, or mainly, solid state and not in solution or suspension (i.e., not likely to flow if not contained); and -
   - the area of the land covered exceeds 10,000m^2, or
   - the height of the tip exceeds 20m, or
   - the average gradient of the land covered by the tip exceeds 1 in 12;

or

2. A lagoon containing any liquid or material wholly, or mainly, in solution or suspension (likely to flow if not contained); and -
   - the contents of any lagoon are more than 4m above the level of the land, which is within 50m of its perimeter, or
   - the contents of the lagoon exceed 10,000m^3, or

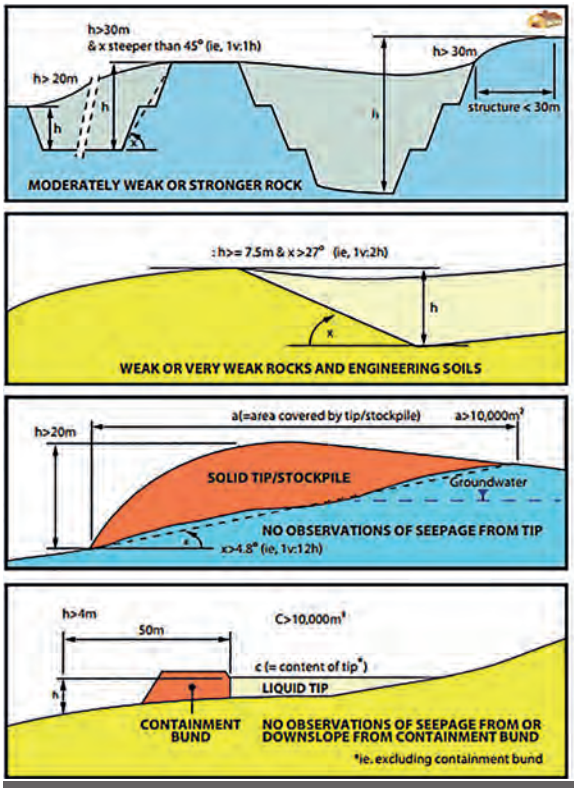


Figure 43: Criteria for significant hazards.

Material	Slope Geometry	Gradient	Angle
Moderately weak rocks or stronger rocks	1v:1h	100%	45°
Some Weak /very weak rocks or engineering soils	1v:2h	50%	27°
Tip base	1v:12h	8.3%	4.8°

Criteria for Significant Hazards.

- irrespective of the size of the tip/ lagoon, the side-slopes or slopes of the containment bund or other factors, for example, the geology, changes in hydrology or groundwater, location or proximity to an excavation, mean that there is a significant hazard or potential significant hazard as previously detailed.

The diagram below shows some of the potential significand hazards associated with face height, tips and lagoons.

GEOTECHNICAL ASSESSMENT REPORT

A geotechnical assessment report must be prepared for each quarry where the face height to be worked exceeds 20m, or where there is a potential for significant hazards. The report should cover the following topics:

- Site Survey
- Site Investigation
- Plans and Sections
- Assumptions before Analysis
- Analysis Findings
- Design arising from Analysis
- Recommendations

The recommendations from the geotechnical assessment should then be built into the development plan and the risk assessment process. A geotechnical question set is shown in Figure 1.

CAMPAIGN RESULTS

The campaign was successfully completed with 142 inspections conducted. There were 16 Improvement Notices, and one Prohibition Notice served.

SUMMARY

The 2025 campaign by the HSA shows the requirement for the following at each quarry:

1. Effectively managed written development plans for each quarry;
2. Appraisal of hazards and associated risks by a 'competent' person;
3. Development of risk assessments and safe operating procedures;
4. Geotechnical assessment and report, when required.

With effective implementation and management of the activities above, quarries can reduce the risk of fatalities, serious injury, damage to property/ equipment and environmental impact.

Images and data are courtesy of the Health and Safety Authority (HSA).

BRENDAN MORRIS

is the Managing Director of LTMS Limited and COO of Galantas Gold. Brendan is a Chartered Mining Engineer and has been engaged in the mining and quarrying industries, globally, since 1979.

Brendan is a Past President of the IMQS.

Shanoon Resources Limited Project to reopen the Galmoy Mine

June 2025

The Galmoy Mine is an underground zinc, lead, and silver mining and ore processing project that was developed in the mid 1990's by Arcon International Resources. The project was taken over by Lundin Mining in the mid 2000's.

The mine closed in 2009, following a downturn in the zinc market, but was reopened on a small-scale mining only basis, when ore was trucked to the nearby Lisheen mine for processing. The underground operation was closed by Lundin Mining in 2012.

Shanoon Resources Limited (SRL) was established in 2016 by a senior ex-Lisheen management team who recognised the economic potential of the unmined resources at Galmoy, as well as the potential to identify additional resources within the mine footprint. Financial backing was secured and prospecting licences were acquired in 2017.

Subsequent exploration drilling confirmed an economical mineable reserve remaining at Galmoy and this paved the way for planning permission applications to Kilkenny and Laois County Councils, which have now been achieved. An Integrated Pollution Control Licence (IPCL) has been obtained from the Environmental Protection Agency (EPA) and a Mining Licence application is currently being assessed by the Geoscience Regulation Office (GSRO). It was necessary for SRL to demonstrate that mining could recommence and that there would be no negative impact on the environment or local communities. Both County Councils and the EPA have issued permissions with conditions that ensure that there will be no impact.

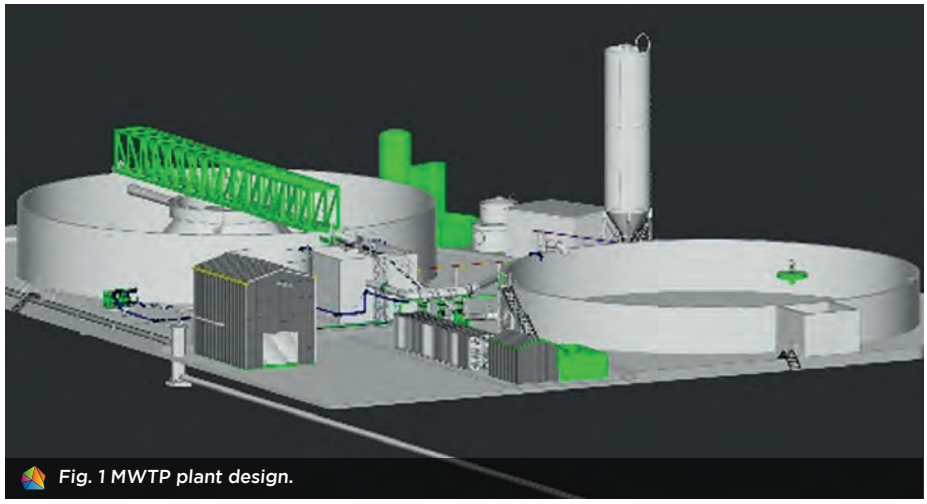


Fig. 1 MWTP plant design.

The project is now fully funded and development work commenced in April 2025. Much of the infrastructure that was used previously at Galmoy Mine remains in place; on surface there is the administration building, workshops, substation, ponds and water discharge pipe. Underground primary development is in place, for example, the mine decline and ventilation shafts. SRL will remove ca. 15,000 tonnes of soils and rock that filled the portal and decline to facilitate renewed access into the mine workings. The fill from the ventilation shafts will also be removed. All removed material will be stockpiled on site for later reuse in closing the mine when the project is completed.

The mine will be dewatered by a combination of in-mine dewatering

Fig. 2 MWTP clarifier tank ground works.

Fig. 3 Typical crushing plant to be used on surface.

Fig. 4 Example of the ore sorter to be used.

Fig. 5 Typical covered truck to be used to transport ore.

using sumps/pump stations located in the main decline and access drives, and if necessary, pumping from ventilation shafts or surface dewatering wells.

A new high density sludge water treatment plant is being built to treat all water that will be removed from the mine during development and operation. Because there is ca. 20 years of monitoring data, SRL was able to design a plant with full confidence in both the volume and chemistry of the water that will be intercepted, and as such, the plant is a bespoke design to ensure that compliance will be achieved and there will be no impact on the receiving river (River Goul). Above is an isometric drawing of the plant design and an image of the initial groundworks for the reactor clarifier tank.

The mine production is targeted at 300kt of ore per year with a mine life of seven years, however, SRL is confident that additional ore discoveries will extend this. The ore to be mined at Galmoy will not be processed on site but will be exported as an ore.

It will be trucked to surface, where it will be crushed and screened. To minimise the transport cost and produce a more saleable product, the ore will be improved using an XRF based ore-sorting technology. Extensive test work on Galmoy ores indicates that it is possible to remove some 45% of the uneconomic ore and rock, including dolomite, limestone and pyrite, from the ore stream. The resultant improved ore will have a combined Zn-Pb grade of ca. 20%. The rejected material will be used as backfill in the mine to facilitate ore extraction and provide geotechnical support to protect against subsidence. Backfill will be a combination of cemented rock fill and paste backfill produced in the onsite backfill plant.

The final product, the improved ore, will be trucked to the port of Bellview in Waterford from where it will be transported by ship to Galmoy's customer in mainland Europe.

Ireland has a rich history in mining and at one time in the mid 2000's was producing over 3% of global zinc supply. With the closure of Lisheen and Galmoy mines, Ireland's standing in the zinc market is not what it once was, but it does, however, have the most prospective ground in the world for zinc and is ranked first in the world for zinc discovered per km^2. The reopening of Galmoy is a major boost for the mining sector in Ireland and is indeed a boost for the European mining sector.

Over recent decades, Europe has allowed its mining industry to fall into decline and has become over reliant on imports from outside of the jurisdiction. Europe is the only jurisdiction to show a fall in metal production in the last 20 years. Metal imported is double the metal produced within Europe. The lack of a sufficient quantity of indigenous raw material supply for Europe is a threat to economic growth. Newly mined metals are also fundamental to Europe achieving a zero-carbon footprint. Wind turbines, solar farms and electric vehicles (to name but three) all require metal that recycling alone can't provide.

This lack of indigenous metal mining is a risk that has been recognised by the European Commission. In 2015, the European Parliament passed resolution 2014/2211(INI) on developing a sustainable European industry of base metals. Ireland must play its part, where possible, to ensure there is a sustainable base metal industry in Europe and SRL's reopening will be part of that contribution.

At the time of writing this paper, dewatering is scheduled to begin at the end of 2025, with the underground workings being accessible from Q1 2026 onwards, from which time rehabilitation and new underground development will pave the way for the commencement of mineral extraction and the next chapter in the history of mining in Ireland.

Fig. 6 Customised loader in Belleview Port.

SHANOON RESOURCES
MINING & EXPLORATION

BY STEPHEN WHESTON
SHE Manager Shanoon Resources Ltd.

OBITUARY

Professor Richard Conroy

(1933 – 2024)

Professor Richard Conroy died on the 14th October 2024. He leaves a rich legacy in several fields over the course of his long and very productive life, and the natural resource sector is fortunate to have benefited from his energy and passion. He was born in Birmingham in 1933. His family moved back to Ireland when he was five, prior the death of his father who was a Professor of Spanish.

Professor Richard Conroy

Richard was a gentleman, an entrepreneur, businessman and politician who was deeply devoted to his daughters Deirdre (Dee) and Sorca. He was a complex and highly intelligent man contributing his deep knowledge, experience and expertise to a wide range of disciplines.

It is difficult to comprehend all the fields Richard was successful in. He qualified as a medical doctor and completed his PhD on his pioneering work on circadian rhythms. In 1969, he became Professor of Physiology at his Alma Mater, the Royal College of Surgeons in Ireland. One of the youngest ever professional appointments in the British Isles, a post he held until his retirement in 1998.

Richard was a Founder Fellow of the Faculty of Occupational Medicine and an eundem Fellow of the Royal College of Physicians of Ireland. Richard was also Chairman of Tallaght Hospital Board, which led to the successful building and commissioning of the institution, both under budget and on time.

A proud Irishman, he was an active Fianna Fáil politician who served as a Senator from 1977 to 1981 and from 1989 to 1993, and was, at various times, involved in the Irish Government as Spokesman in the Upper House on Industry and Commerce, Foreign Affairs, and Northern Ireland. He was also prominent in local government, serving as a member of Dublin County Council for Ballybrack (1991 – 1994) and Dún Laoighaire – Rathdown County Council 1994 – 1999 where he became "Cathaoirleach" (Chairman).

Representing Ireland, he served as a member of the Executive Council of the Trilateral Commission and Chairman of the Trilateral Commission (Irish Group), which is a non-governmental organisation established to foster

closer cooperation between Western Europe, Japan and North America, a position he held until his death.

Importantly for us in the natural resource sector, he was a successful discoverer of mines and champion of the Irish natural resource sector.

Richard commenced his activities in the natural resource sector with the establishment of Trans-International Oil Exploration Ltd. in 1975, which subsequently merged with Aran Energy and was later acquired by Statoil in 1979. In 1980, he set up Conroy Petroleum and Natural Resources, which discovered the Galmoy zinc and lead deposit in 1986.

The discovery of the Galmoy deposit in 1986 was critical for the revival of the mineral industry in Ireland (being the first commercial discovery since the Navan mine, 1970). The adjacent Lisheen deposit was discovered along trend in 1990. Richard brought Galmoy from a greenfield discovery through feasibility studies and the permitting process.

The Galmoy mine provided over 200 jobs to the local area with 300 additional jobs in the wider economy. The mine also paid €65M in royalties, taxes and rates. Richard ensured that there was a comprehensive plan in place for the remediation of the mine site and tailings facility, and that necessary funding was in place when the mine closed. This meant that the remediation could be carried out in an environmentally responsible manner. This approach to mine closure was the first of its kind in Ireland, with the tailings facility designed to facilitate progressive rehabilitation to a dry end point, incorporating a wetland to manage water runoff.

Lundin Mining conducted the implementation of the closure plan, the owners of the mine at the time, and it won the "International Green Apple Award for Environmental Best Practice" in 2016. The tailings facility has improved the biodiversity within the Galmoy area and has attracted species, such as, the little ringed plover and glossy ibis. This delighted Richard who was an accomplished ornithologist.

Richard had experienced success in gold exploration prior to setting up Conroy Diamonds and Gold through the Stoneboy consortium that discovered the Pogo gold deposit in Alaska, which is itself now in production as a world class gold mine. The establishment of Conroy Diamonds and Gold was inspired by Richard's knowledge as a young man of a gold discovery made down an old antimony mine in 1956 at Clontibret in County Monaghan.

Richard also had knowledge of Finland, particularly regarding the story of the discovery of a diamond found in till in Finland and with this, in conjunction with his awareness of the significant diamond deposits discovered over the border in Russia, he led Conroy Diamonds and Gold to conduct diamond exploration programme in Finland. In fact, Conroy Diamonds and Gold was one of the first foreign companies granted an exploration licences in Finland after they opened to foreign investment. Subsequently, Conroy Diamonds and Gold has evolved into Conroy Gold and Natural Resources, and Karelian Diamond Resources.

Conroy Gold and Natural Resources has developed from that initial knowledge of gold in an old antimony mine, through Richard's and the Board's guidance, including his daughter Dr Sorca Conroy, into defining a 517Koz Au JORC Resource at Clontibret, which is open in all directions.

Richard's inquisitive mind led to the exploration of the region, resulting in the discovery of two district scale gold trends (Orlock and Skullmartin) which have a combined surface gold anomalism of 90km. This systematic exploration approach recently led to the discovery of visible 123.0 g/t Au (native) gold in outcrop. Richard was passionate about the Longford-Down Massif and he fervently believed that Ireland was an emerging gold province with significant potential for economic scale ore bodies.

Through Richard's leadership and direction, Karelian Diamond Resources has blossomed from the idea of diamonds in Finland into the discovery of a new emerging kimberlite province within the Kuhmo region of Finland. In this region, the company has discovered the Riihivaara kimberlite and also established the Seitaperä kimberlite pipe as the largest (6.9Ha) kimberlite in Finland. In addition, the company has discovered a green diamond in till and identified a series of significant regional kimberlitic indicator mineral anomalies in the Kuhmo region.

The company has also acquired the Lahtojoki diamond deposit, which is at an advanced stage of being granted a mining permit to proceed with development. A key feature of the Lahtojoki diamond deposit, highlighted by Richard, has been the significant percentage of coloured (pink) diamonds and that it would become the first diamond mine in the EU.

Richard was intrigued by the story of the discovery in 1816 of a diamond in Fermanagh known as "the Brookeborough Diamond". With this discovery, and the knowledge from the mid-1990s of kimberlite indicator minerals in the area, Richard felt further investigation by Karelian was warranted, particularly in conjunction with the TELLUS airborne geophysical data. Diamond exploration can sometimes lead to the discovery of nickel-copper-Platinum Group Elements (PGE) deposits, with the world-class nickel find at Voisey's Bay in Canada being a classic example.

In Fermanagh, the company's exploration programme has led to an exciting new development: an exploration programme targeting nickel, copper and platinum group metals, following positive results from a stream sampling programme. A detailed technical review has since highlighted the potential for the discovery of a major nickel (Ni), copper (Cu) and PGE deposit within Karelian's licences in Northern Ireland.

Richard's vision had always been the discovery of world class deposits that can be proven as economic through development into mines. This has been demonstrated by Galmoy and Pogo and is currently being shown in the development of Clontibret, Lahtojoki and the Fermanagh Ni-Cu-PGE project.

Richard had an amazing eye for detail, together with a natural inquisitive mind that had the ability to look at things just slightly differently. He would also say that "a little bit of luck" was also necessary; though by the number of successes he saw, we suspect that Richard definitely made his own luck.

Richard's support and promotion of the Irish exploration and mining industry was legendary and unremitting. He travelled to Toronto and exhibited at the Prospectors and Developers Association of Canada (PDAC) Convention promoting not only his own company, but also the attractiveness of Ireland as a destination for inward investment.

He was a steadfast supporter of the Irish mining community, attended all of their major events, and provided sponsorship for numerous activities. He leaves a rich and enduring legacy.

Ní bheidh a leithéid arís ann, ar dheis Dé go raibh a anam dilis.

KEVIN MCNULTY
Senior Geologist at Conroy Gold and Natural Resources

HAPPY COLOURING

Colouring pages for children of all ages - great fun and creative.

HOW TO ENTER

Name: .....

Address: .....

.....

Email: .....

Please send your entry to
IRISH MINING & QUARRYING SOCIETY,
27 UPPER PEMBROKE ST, DUBLIN 2, IRELAND, D02 X361

*Terms and conditions apply.

Competition Closing Date: 19th January 2026

THE WINNERS OF THE 2024 ANNUAL REVIEW COLOURING COMPETITION

1ST PRIZE - **JADE JONES**
(NAVAN, CO. MEATH)

2ND PRIZE -**SORCHA KIERAN**
(NAVAN ROAD, DUBLIN)

3RD PRIZE - **MATEO BIRSAN**
(ST. ANNE'S LORETO N.S., CO. MEATH)

UNDER 5 – **OISIN & OLIVIA DILLON**
(TULLAMORE, CO. OFFALY

LEGO CITY 60367
PASSENGER AIRPLANE SET

LEGO DISNEY
PIXAR 43217
UP HOUSE SET

LEGO TECHNIC 42165
MERCEDES-AMG F1 W14
E PERFORMANCE X

LEGO MARVEL
10794 SPIDEY
AND HIS
AMAZING
FRIENDS
TEAM - SPIDEY
WEB SPINNER
HEADQUARTERS
SET

Twitter: @IMQS_IE LinkedIn: Irish Mining and Quarrying Society (IMQS)

PLANT & CIVIL engineer

IRELAND'S CONSTRUCTION, QUARRY & RECYCLING MAGAZINE

www.plantandcivilengineer.com

GIVING OUR CLIENTS A WHOLE NEW BRANDING EXPERIENCE..

Engaging constantly with the Plant, Construction, Quarrying and Recycling industries we are able to give our clients a whole new branding experience.

We are the leading magazine of its kind in Ireland, focusing on all major issues relating to the industry.

Published 6 times a year in association with MPANI and CIHT it has been enjoyed by the business community in Ireland for over two decades.

GET IN TOUCH

Martin Elliman
Business Development Manager
07985 887171
martin@4squaremedia.net

4SM (NI) Ltd is part of the North West News Group

NWNG.

MEMBERSHIP APPLICATION FORM

Irish Mining & Quarrying Society, 27 Upper Pembroke Street, Dublin 2, Ireland, D02 X361
Web: **www.imqs.ie** Email: **info@imqs.ie** Tel: **089 49 27942**

PERSONAL Details (PLEASE USE BLOCK CAPITALS THROUGHOUT)

Surname: ..... Forename(s): .....
Home Address: .....
.....
Telephone Number: .....
Mobile: .....
Home E-Mail Address: .....

EMPLOYER Details (PLEASE USE BLOCK CAPITALS THROUGHOUT)

Employer: .....
Address: .....
.....
Telephone Number: ..... Mobile: .....
Work E-Mail Address: .....

Correspondence Address (please tick both location to be sent to & by what means Home ❑ Work ❑ E-Mail (preferred by IMQS) ❑ Post ❑

Please state association with the Mining or Quarrying Industry: .....
Proposed by: .....(Existing IMQS Member)

Note: Should the candidate be unable to obtain a proposer who is a member of the IMQS, the application will be assessed by the Council of the IMQS and membership is subject to the approval of the Council. Please send to address above enclosing payment of €50 (ordinary membership). (Membership fees are payable in January each year and are valid for that calendar year).

ADVERTISERS INDEX

IMQS Golf & Dinner Dance 2024

IMQS Dinner Dance, Farnham Estate Spa & Golf Resort, Cavan, Saturday 9th November 2024.

The full selection of photos from the IMQS 2024 Dinner Dance are available for viewing on our website.

c&k fitzpatrick
Conveyor Belt House,
Castlewarden,
Straffan,
Co. Kildare.

Ph: 01 - 4589374/ 4588327
Fax : 01 - 4580475

Web: www.ckf.ie
Email: info@ckf.ie

CKf
Over 50 yrs. in Rubber

■ Dunlop Conveyor Belting ■ On-Site Vulcanizing ■ Flexco Belt Fasteners ■ Gurtec conveyor rollers ■ Belt Cleaners
■ Drum Lagging ■ On-Site Conveyor Maintenance ■ Rubber & PU Screening Media ■ Wear Protection