



IQM

INSTITUTE OF QUARRYING MALAYSIA

Newsletter



FOR MEMBERS CIRCULATION ONLY
Jul - Dec 2025 KDN NO: PP8487/06/2013(032604)

MESSAGE FROM THE EDITOR

Celebrating 35 Years of Excellence

The year 2025 marks a momentous milestone for the Institute of Quarrying Malaysia (IQM) as we proudly commemorate our **35th anniversary**. In celebration of this significant achievement, IQM has curated a series of impactful programs and events to reflect on our journey, celebrate our accomplishments, and chart a visionary course for the future.

One of the key highlights this year is the official approval of the “OSH COORDINATOR” course by the Department of Occupational Safety and Health (DOSH) in May 2025. This recognition affirms IQM’s capacity to conduct courses certified by the Human Resources Development Fund (HRD Corp) Malaysia. The five-day course, which incorporates modules from the Quarry Manager Certificate, fulfils a mandatory requirement for organizations with more than five full-time employees to appoint an OSH Coordinator.

In November 2024, IQM also organized the highly successful Professional ESG Certification Course, which received an overwhelming response from professionals in the quarrying and mining industries. Due to its popularity, two additional sessions are scheduled to be held in Sarawak and at IQM Puchong in August 2025.

From January to June 2025, IQM delivered a lineup of professional development programs:

1. 14-16 January: Legislation Course at IQM Puchong
2. 17-22 February: Training Course for Short Firer 1/2025 at IQM Puchong
3. 26-27 February: Effluent Sampling & Analysis at Universiti Sains Malaysia, Penang
4. 7-11 April: OSH Coordinator for the Mineral Industry 1/2025 in Kota Kinabalu, jointly with Sabah Quarry Owners Association
5. 15-17 April: Drilling Course 1/2025 in Kuching, jointly with Sarawak Quarries Association
6. 22-24 April: Drilling Course 2/2025 at IQM Puchong
7. April 2025: Launch of The Quarry Directory Malaysia 2025
8. 5-7 May: Crushing & Screening Course 1/2025 at IQM Puchong
9. 26-30 May: OSH Coordinator for Mineral Industry 2/2025 Course at IQM Puchong
10. 3-4 June: Blast Monitoring Course at IQM Puchong
11. 16-20 June: Environmental Management Course at IQM Puchong
12. 23-26 June: Professional Drone Pilot Certification at Drone Academy Asia, Cyberjaya

Looking ahead, our flagship event, **IQM CONEX 2025 Quarry Conference & Exhibition**, will take place from 14–15 October 2025 at the Palm Garden Hotel, IOI Resort City, Putrajaya, under the theme “**Smart Technologies & ESG Integration (ST-ESG 2025)**”. This highly anticipated gathering will delve into transformative technologies and sustainable practices shaping the future of the quarrying industry.

As part of the celebrations, IQM is honored to host the **International Presidents’ Meeting** on 13 October 2025, bringing together global leaders in quarrying for knowledge sharing and collaboration.

Further enhancing the spirit of our 35th anniversary, IQM will also launch a special commemorative coffee table book - a timeless publication that not only captures the Institute’s historical milestones, achievements, but also serves as a technical reference for professionals in the quarrying and mining industry.

In closing, we invite all stakeholders to play an active role in disseminating this information and contributing to the continued success of **IQM CONEX 2025**. Let us celebrate our legacy, embrace innovation, and build a sustainable future together.

INTERNATIONAL AFFILIATIONS:



The Institute of Quarrying
United Kingdom



The Institute of Quarrying
Australia



The Institute of Quarrying
Southern Africa



The Institute of Quarrying
New Zealand



The Institute of Quarrying
Malaysia



The Institute of Quarrying
Hong Kong



PRESIDENT'S MESSAGE

As we approach the midpoint of the year, we simultaneously commemorate our momentous **35th anniversary celebration**. As the President, I intend to establish a dedicated column to articulate insights on the progress of IQM and to highlight significant forthcoming events.

This year, the Institute of Quarrying Malaysia (IQM) is once again proud to host its flagship event - the **IQM CONEX 2025 Quarry Conference & Exhibition**. Themed **“Smart Technologies & ESG Integration (ST-ESG 2025)”**. The conference aims to explore cutting-edge innovations and sustainable practices that are reshaping the future of the quarrying and mining industry. As we celebrate IQM's 35th anniversary, we invite all stakeholders to help spread the word and contribute to the success of this landmark event.

The conference and exhibition will once again take place at the Palm Garden Hotel, Putrajaya, on the **14th and 15th of October 2025**. This year's program features a lineup of ten to eleven papers, showcasing the latest research, technological advancements, and practical insights from across the industry.

Adding to the celebratory atmosphere of our **35th anniversary**, IQM will proudly unveil a well curated coffee table book at the Conex Event on 14th October 2025 - a commemorative publication that chronicles the history, milestones, and visionary goals of the Institute of Quarrying Malaysia. This special edition also serves as a technical reference book, offering valuable insights, and best practices for professionals across the quarrying and mining industries.

The inaugural day, 14th October, will commence with an official opening ceremony to be officiated by the Director General of the Department of Mineral and Geoscience Malaysia. A notable highlight of the day will be the Panel Discussion segment, which will feature six International Presidents from various countries. This esteemed panel will engage in a dynamic and robust dialogue on the thematic focus of the conference: ESG Integration, sharing global perspectives and best practices in environmental, social, and governance strategies within the quarrying industry.

This will be followed by an inspiring Keynote Address 1 delivered by the International President of the Institute of Quarrying UK, Mr. Ben Williams followed by Keynote Address 2 which will be presented by IQM's Deputy President, Dato' Professor Ir. Ts. Dr. Eric Goh, providing further insights into the conference theme. The second day of **IQM CONEX 2025** will continue with two significant Keynote Addresses, 3 & 4, by Mr. Chris Gray, President of the Institute of Quarrying New Zealand followed by an engaging presentation from Associate Professor Dr. Syed Fuad of University Science Malaysia.

Towards the end of the event, the conference will also feature a Lucky Draw - a well-received segment that brought a touch of excitement to the proceedings. Proceeds from the draw will go toward supporting the IQM Education Fund, reaffirming our commitment to advancing knowledge for the younger generation.

In anticipation of **CONEX 2025**, IQM will convene the **International Presidents' Meeting** on 13th October, bringing together the 6 global leaders of the Institute of Quarrying. This will underscore IQM's commitment to international collaboration and knowledge exchange.





2025 IQM COURSES AND ACTIVITIES

JANUARY

14 - 16 January
Legislation Course for
Mining & Quarrying
2025 (IQM)

**IQM
NEWSLETTER**

CNY HOLIDAYS

FEBRUARY

17 - 22 February
Training Course for
Shot-Firers 1/2025
(IQM)

26 - 27 February
Effluent Sampling &
Analysis
(USM, Penang)

MARCH

Shot-Firers Exam

PUASA MONTH

**IQM CONEX 2025
ANNOUNCEMENT**

**HARI RAYA
HOLIDAYS**

APRIL

**QUARRY DIRECTORY
2025 (out for sale)**

7 - 11 April
OSH Coordinator
Certification for Mineral
Industry 1/2025 (KK)

15 - 17 April
Drilling Course 1/2025
(Kuching)

22 - 24 April
Drilling Course 2/2025
(IQM)

MAY

5 - 7 May
Crushing & Screening
Course 1/2025 (IQM)

26 - 30 May
OSH Coordinator
Certification for Mineral
Industry 2/2025
(IQM)

3 - 4 June
Blast Monitoring
Course 1/2025 (IQM)

JUNE

16 - 20 June
Environmental
Management Course
1/2025 (IQM)

21 June
23rd AGM / Technical Talk
(IQM/Four Points by
Sheraton)

23 - 26 June
Professional Drone
Pilot Certification (IQM)

JULY

1 - 3 July
Crushing & Screening
Course 2/2025
(Kuching)

14 - 19 July
Training Course for
Shot-Firers 2/2025 (IQM)

24 July
Shot-Firers Exam

AUGUST

5 - 8 August
Quarry Planning &
Design (IQM)

18 - 19 August
Quarry Economics
1/2025 (IQM)

25 - 26 August
Quarry Economics
2/2025 (Kuching)

SEPTEMBER

10 - 12 September
Structural Geology &
Streographic
Projection
(FYS, Penang)

OCTOBER

13 October
International IQ
Presidents Committee
Meeting
(Palm Garden Hotel,
IOI Resort)

13 - 15 October
IQM Conex 2025
(Palm Garden Hotel,
IOI Resort)

DEEPAVALI HOLIDAYS

NOVEMBER

27 Oct - 1 Nov
Training Course for
Shot-Firers 3/2025
(IQM)

6 November
Shot-Firers Exam

24 - 27 November
Underground
Blasting Course
(IQM)

DECEMBER

8 - 10 December
Professional ESG
Certification
(IQM)

15 - 17 December
Professional ESG
Certification
(Kuching)



ANNUAL SUBSCRIPTION FOR 2025

Please be informed that your Membership Subscription Fee for year 2025 is due for payment. Kindly ensure that payment is made by 1st August 2025.

Payment can be made by crossed cheque / bank draft / Online Transfer to :

INSTITUTE OF QUARRYING MALAYSIA BHD

Maybank 014187208342

(Kindly email bank transaction advice)

The following subscription rates apply for 2025

Fellow (FIQ)	:	RM250.00
Member (MIQ)	:	RM200.00
Technical Member (TMIQ)	:	RM190.00
Associate	:	RM180.00



We would like to inform you that if you choose to pay your Membership Fee in advance for three (3) years, you will be entitled to an additional year of free membership (3 years + 1 year). This is a great opportunity to maximize your membership benefits.

If you have any queries or need any clarification on your membership status kindly contact Madam Nirmala Devi at Tel : 03-80624194 Email : nirmala@iqm.com.my

I _____ Membership No : _____

enclose my crossed cheque/online transfer slip number . _____

for RM _____ being Membership Fee for year _____ payable to

INSTITUTE OF QUARRYING MALAYSIA BHD.

E-mail : _____ Handphone No : _____

TO ALL RECIPIENTS OF QMC & QMPC

CONTINUING PROFESSIONAL DEVELOPMENT

The Institute is committed to recognizing and promoting the professionalism of individuals within the quarrying industry. Professionalism is built through a combination of work experience and qualifications, and Continuing Professional Development (CPD) plays a key role in this process. CPD is a way of ensuring continual improvement and personal growth, while also keeping your career documentation up to date.

We strongly believe that participating in CPD ensures your qualifications remain current and relevant.

Starting in 2023, all QMC and QMPC holders are required to complete 60 hours of CPD to maintain their certification. In addition, to remain certified, you must be an active member of IQM. Attached, you will find the CPD Record Form, which includes examples of activities that qualify for CPD hours.

Please note, the QMC and QMPC certifications now have an expiration date. Certificates issued before 2023 will no longer be recognized. To renew your certification, you will need to submit the relevant forms. These certifications are valid for 3 years and are renewable thereafter. A renewal fee of RM40.00 will apply, and upon renewal, you will receive a new certificate along with an IC-sized membership card.

If you are not yet a member of IQM, you can download the membership form from our website at www.iqm.com.my, complete it, and submit it along with the payment.

We encourage all QMC and QMPC recipients to submit their renewal applications along with the CPD Record Form summary to ensure the continued validity of your certification.

For further enquires on the above, kindly contact Madam Nirmala Devi at :

Tel : 03-8062 4194 / 8062 4195 email : nirmala@iqm.com.my

QMC / QMPC RENEWAL FORM

I _____ Membership No : _____
wish to renew my QMC / QMPC for year _____
Certificate No. : _____

Enclose is my renewal fee of **RM40.00** transferred online to
Institute of Quarrying Malaysia Bhd - Maybank 014187208342

Email : _____ Handphone No : _____

SUMMARY - CONTINUING PROFESSIONAL DEVELOPMENT (CPD) RECORDS FOR YEAR

Name: _____ IC No: _____

Conferment Year of QMC / QMPC Award _____

IQM Membership No: _____

CPD Requirements: 60 hours (3 years)

	Category	Date	CPD Activity/Topic CPD Provider	Allowable CPD hours	Total CPD hours
1	Related Training to Quarrying Activities			No Limit	
2	Company/Inst.Training <ul style="list-style-type: none"> • On-job Learning • In-house Training • Apprenticeship 			Maximum 10 hours per year	
3	Participants of Conferences/Seminars and Technical Talks			No Limit	
4	Technical Presentations at Conferences/Seminars or Technical Talks			Maximum 15 hours per year	
5	Contributions/Services in related Professional Institutional Activities			Maximum 15 hours per year	
6	Informal Learning <ul style="list-style-type: none"> • Private study • Reading of technical publications/manuals • Technology knowledge update using Internet 			Maximum 5 hours per year	
TOTAL					



IQM CONEX 2025

QUARRY CONFERENCE & EXHIBITION

SMART TECHNOLOGIES & ESG INTEGRATION (ST-ESG 2025)

14 - 15 October 2025

Palm Garden Hotel
Putrajaya, a Tribute Portfolio Hotel,
IOI Resort City, 62502 Putrajaya, Malaysia.



Organised By



INSTITUTE OF QUARRYING
MALAYSIA

Supported By



DEPARTMENT OF MINERAL &
GEOSCIENCE MALAYSIA

INTERNATIONAL AFFILIATIONS:



The Institute of Quarrying
United Kingdom



The Institute of Quarrying
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The Institute of Quarrying
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The Institute of Quarrying
Malaysia



The Institute of Quarrying
Hong Kong

ST-ESG 2025

SMART TECHNOLOGIES & ESG INTEGRATION

The Quarrying Industry is internationally recognised as a vital contributor to national development, especially for countries striving toward Developed Nation status. Through its crucial role in infrastructure development and industrialisation, the industry provides the essential building materials for constructing iconic buildings, roads, and public amenities - laying the foundation for systematic societal progress. Organised quarrying has a rich history dating back thousands of years to ancient Egyptian, Greek, and Roman civilizations, where stone materials were widely used in the creation of homes, roads, and public services.

As the world embraces the rapid leap into the era of Smart Technologies and Environmental Social Governance (ESG), the quarrying sector must evolve to remain competitive and relevant. This includes acquiring state-of-the-art knowledge, adopting innovative technologies, enhancing management skills, and embedding sustainable and responsible practices into operations. Modern quarrying must now balance technological advancement with ESG commitments to ensure long-term community benefit and environmental stewardship.

In line with this evolution, the theme for **IQM CONEX 2025** is “**Smart Technologies and ESG Integration (ST-ESG 2025)**,” a timely reflection of the industry’s forward-thinking direction. Hosted by the Institute of Quarrying Malaysia (IQM) in conjunction with its **35th Anniversary and the Institute of Quarrying Presidents’ Meeting**, the event will bring together government bodies, industry leaders, equipment manufacturers, academia, and young graduates. Highlights include presentations on cutting-edge technologies, efficient ESG practices, and the conferment of major accolades such as the Quarry Manager Certificate, Quarry Manager Practicing Certificate, and the IQM Excellence Award. As the only international technical platform of its kind, CONEX 2025 aims to elevate the quarrying industry to new heights of excellence - a true win-win for all stakeholders involved.

PROPOSED TOPICS

- Smart Technologies: Applications, Economic Benefits and ESG Impacts
- Future of AI in Efficient Quarrying: Opportunities and Challenges
- Technological Evolution towards Effective Smart Quarries
- Big Data Analytics towards Economic Quarrying
- Innovative Drone Applications for Quarry Planning and Operations
- Smart Technologies for more Productive and Cost-effective Rock Drilling
- Latest Smart Technologies trends in Rock Blasting/Shot-Firing
- Amplifying Quarry Transport Efficiency with Smart Technologies
- Economic Crushing & Screening using AI and Smart Technologies
- Guidelines and Benefits of Implementing ESG practices in Quarries
- Resourceful Setup and Evaluation of ESG Principles for Quarrying
- Success Stories on ESG Sustainability Practices in Quarrying

Don't Wait

Register Now!

Call for more details &

registration :

03-80624194

03-80624195

IQM CONEX 2025



IQM COURSES & ACTIVITIES HELD FROM JANUARY TO JULY 2025

The Institute of Quarrying Malaysia (IQM) successfully conducted a series of impactful courses and industry-focused activities in the first half of 2025, aimed at enhancing professional development, knowledge sharing, and compliance within the quarrying sector.

We are proud to share some moments from these events.

Below are photos capturing the highlights of the training sessions and activities carried out.

Effluent Sampling, February - USM



Drilling 1-2025, April - IQM





Drilling 2-2025, April - Kuching



OSH, April - Kota Kinabalu





OSH, May - IQM



Drone, June - Drone Academy



AGM and Technical Talk - June





EMC, June - IQM



CRUSHING & SCREENING, July - Miri





Hilton Gravel Pits SSSI

Reviewing Biological SSSIs for Evidence of Mineral Extraction and the Associated Main Habitats

By Simon Higson CMLI MIQ, Felstone Consulting Ltd

Biological Sites of Special Scientific Interest (SSSIs) at former mineral workings provide quarry managers, planners, and designers with a valuable resource of information about the habitats which may be developed during future restoration projects. This information could also be used to underpin post-development calculations for biodiversity net gain (BNG).

In this article, Simon Higson MIQ, director of Felstone Consulting Ltd, summarizes his recent paper to the 2004 Extractive Industries

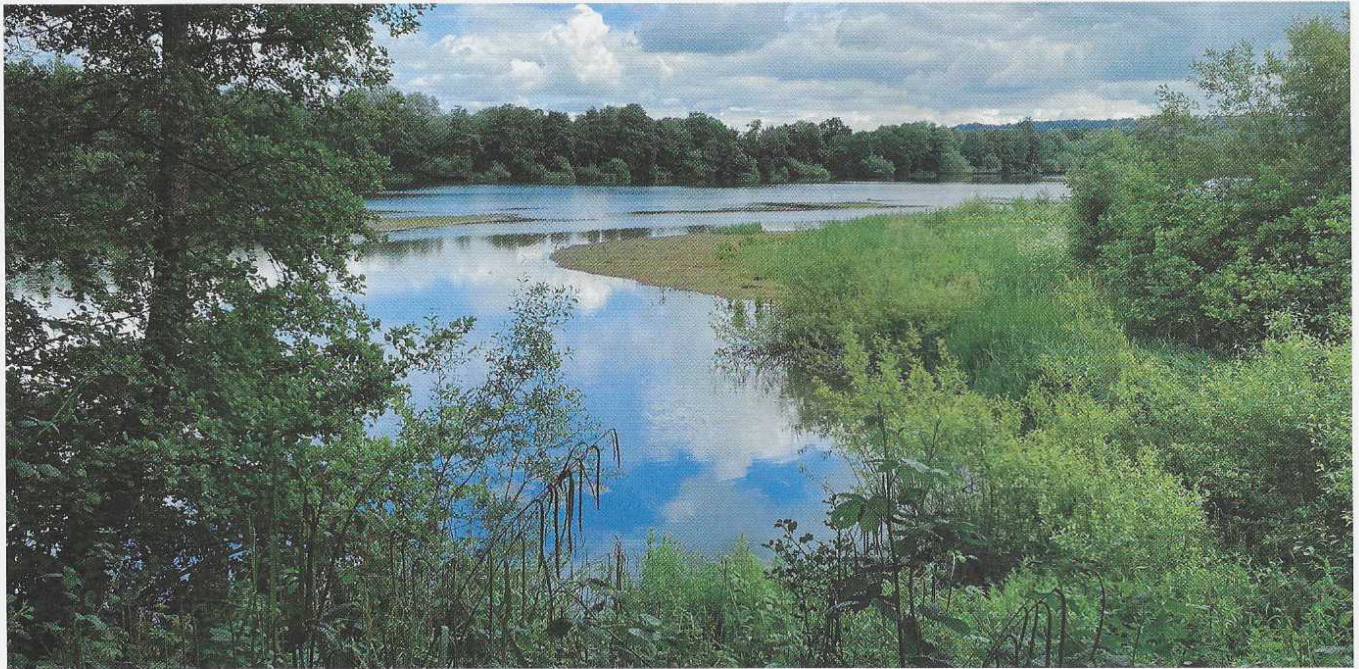
Geology (EIG) conference in Hull.

A review was carried out of a sample of 97 SSSI sites within England at former workings of sand, gravel, sandstone, limestone, clay, and chalk. Extending over 4,452ha across 39 counties of England, the main habitats incorporate types of grassland, dwarf shrub heath, woodland, open water, fen, marsh, and swamp. The identified sites, taken from Natural England's Designated Sites View database, were all designated over a 28-year period between 1982 and 2010.

Background and context

BNG and the Environment Act 2021

Planning applications for new mineral extraction and quarrying operations are within the scope of the statutory framework for BNG and must deliver at least a 10% increase. The statutory biodiversity metric tool is used to calculate biodiversity value for the purposes of biodiversity net gain and includes assessing habitats, hedgerows, and watercourses. The process requires



Sevenoaks Gravel Pit SSSI, which was visited and photographed as part of the study in 2024

judgements to be made about the condition and distinctiveness of habitats, among other things, prior to development, but also of those included at the end of working ('post-development') as part of restoration.

Restoration of mineral workings

The National Planning Policy Framework requires that planning policies ensure worked land is reclaimed at the earliest opportunity, taking account of aviation safety, and that high-quality restoration and aftercare of mineral sites takes place. Planning applications for new mineral extraction and quarrying operations will require a restoration scheme to be prepared.

The industry actively promotes the restoration legacy of its sites. For example, the MPA's National Nature Park is an interactive map of former quarries and other former industrial locations returned to nature with public access, which are now considered of special interest to nature conservationists and members of the public.

The RSPB handbook 'Habitat Creation for the Minerals Industry', and the MPA's celebratory brochure and film produced in 2021 to mark the 50th anniversary of its restoration and biodiversity awards, and the UN Biodiversity Summit (COP 15) also provide useful reference materials. Personal communication with Dr R.N. Humphries also noted several publications which cover key factors in wildlife recovery in quarries.

There are also Biodiversity Action Plans, Green Infrastructure Strategies, and other initiatives (such as Local Nature Recovery Strategies) relating to areas where mineral extraction takes place and can be a consideration for new development proposals, eg the Great Ouse Valley Green Infrastructure Priority Area in Huntingdonshire, which relates to a series of significant nature reserves comprising former gravel pits, wetland meadows, and wet woodland.

SSSI designation

Sites of Special Scientific Interest (SSSIs) safeguard England's most important areas of natural heritage. Natural England has a legal duty to act for the benefit of SSSIs, as specified in the Wildlife & Countryside Act 1981 and subsequent amending legislation.

Within the Joint Nature Conservation Committee (JNCC) 'Guidelines for the Selection of Biological SSSI's Part 2: Detailed guidelines for habitats and species group, 10 Artificial Habitats', it is recognized that:

- 4. '...disused gravel pits and canals may become important freshwater habitats...'
- 5. 'In some largely agricultural districts, old quarries and workings assume a particular importance as refuges for semi-natural vegetation and may be among the few available habitats for many species of plants and animals.'

Overview of main findings of the study

The full EIG paper sets out the methodology and overview of the main findings of the study, along with a schedule of the sample of 97 SSSI sites, and should be referred to for further information. A summary of the main habitats recorded at each of the SSSIs in relation to each type of mineral working is covered below.

These main habitats are taken directly from Natural England SSSI database/citations and, as such, will require interpretation by an ecologist to consider how they relate to future projects and/or BNG calculations – for example to the UK Habitat Classification, to habitats recorded in the field under a Phase 1 Habitat Survey, or the evaluation of soil conditions and the practicalities of achieving certain plant communities during restoration.

Sand and gravel workings

There were 27 SSSIs on former sand and gravel workings, with the following main habitats:

- Standing open water and canals
- Neutral grassland – lowland
- Broadleaved, mixed, and yew woodland – lowland.

Sevenoaks Gravel Pit was notified as a SSSI in 1989 due to its biological interest: 'The interest of this group of lakes, formed by the flooding of the former gravel workings and fed by the river Darent, centres on its breeding bird populations. Extensive landscaping to create shallows, spits, and islands, and the planting of trees and aquatic plants have provided conditions suitable for both breeding and wintering birds.'

Restoration design considerations for future sand and gravel extraction projects, where biodiversity enhancement is a key priority, include:

- Aim for diverse vegetation structure
- Use water levels to create open water/aquatic, marsh, and terrestrial habitats
- Include range of depths of water, profiles, and transitions around margins
- Create shallows, spits, and islands
- Plant establishment (seeding, planting, and/or natural regeneration)
- Include areas of low disturbance (people, boats and watercraft, animals – domestic and agricultural).

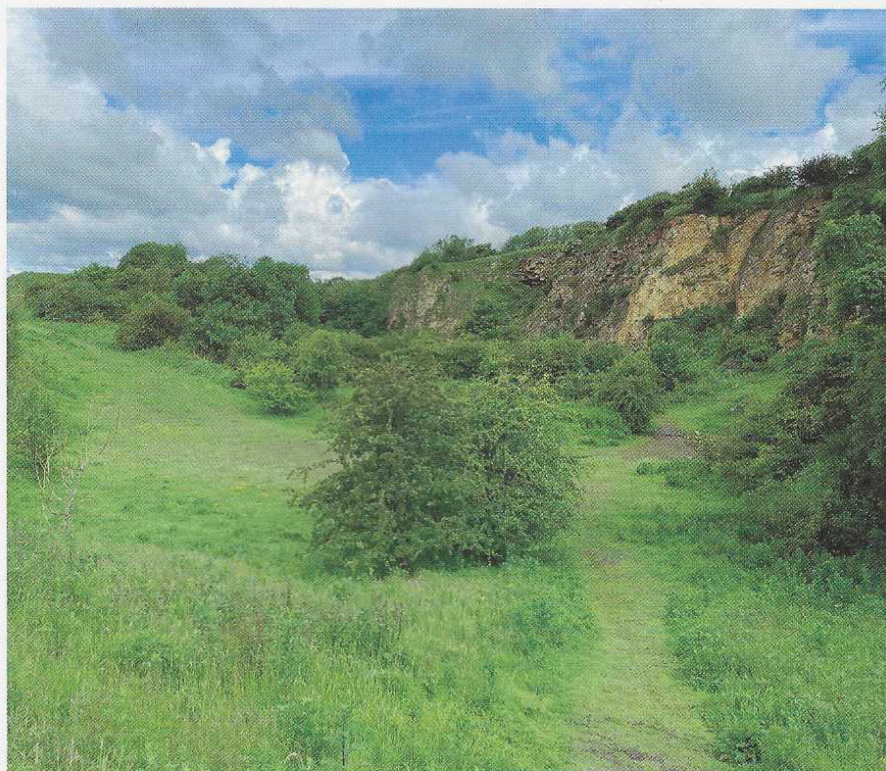
Limestone quarries

There were 33 SSSIs on former limestone workings, with the following main habitats:

- Calcareous grassland – lowland
- Broadleaved, mixed, and yew woodland – lowland
- Inland rock.

Wingate Quarry was notified as a SSSI in 1984 due to its biological interest: 'Wingate Quarry was worked for magnesian limestone between the mid-18th century and the mid-1930s and is one of the largest and most varied examples of magnesian limestone grassland in Co. Durham.'

Restoration design considerations ➤



Wingate Quarry SSSI, which was visited and photographed as part of the study in 2024.

for future limestone extraction projects, where biodiversity enhancement is a key priority, include:

- Aim for a varied species-rich grassland cover (from sparse areas with bare ground, to thicker and taller scrub and woodland edge)
- Vary the topography (gradient/slope, aspect, elevation, exposure)
- Use exposed limestone substrates (bedrock, subsoils, and other soil-forming materials) as well as or instead of topsoil (if high nutrient concentrations)
- Avoid agricultural improvements
- Keep soil fertility low, avoid artificial fertilizer applications to inhibit the more competitive species
- Minimize artificial drainage, allowing for wetness variation, seasonal ponding, as well as areas of permanent standing water
- Plant establishment (seeding, planting and/or natural regeneration)
- Management by cutting and/or light grazing in autumn, to allow for a variety of vegetation heights and structure (possibly also localized disturbance for early successional plants)
- Control the growth of scrub (and prevent shading out of grassland plants)
- Limit weed control to noxious or harmful invasive non-native plants, allowing other species to flourish.

Chalk pits

There were 16 SSSIs on former chalk workings, with the following main habitats:

- Calcareous grassland – lowland
- Inland rock
- Broadleaved, mixed, and yew woodland – lowland.

Grays Thurrock Chalk Pit was notified as a SSSI in 1993 due to its biological interest: 'Active mineral extraction ceased in the early 1920s and since that time natural colonization of the pit bottom has created a range of woodland, scrub, and calcareous grassland habitats that are important for the assemblage of invertebrate fauna they support'.

Restoration design considerations for future chalk extraction projects, where biodiversity enhancement is a key priority, include:

- Undulating terrain (gradient/slope,

aspect, elevation, exposure) with loose rock piles, as refuges for amphibians

- Aim for varied habitat cover (from sparse grassland areas to thicker and taller scrub and woodland)
- Use exposed chalk substrates as well as or instead of topsoil
- Keep fertility low, avoid artificial fertilizer applications to inhibit the more competitive species
- Minimize artificial drainage, allowing for wetness variation, seasonal ponding, as well as areas of permanent standing water
- Limit weed control to noxious or harmful invasive non-native plants, allowing other species to flourish
- Plant establishment (seeding, planting and/or natural regeneration)
- Management by cutting or grazing, to allow for a variety of vegetation heights and structure (possibly also localized disturbance for early successional plants and/or no-cut zones).

Clay pits

There were 13 biological SSSIs on former clay workings, with the following main habitats:

- Standing open water and canals
- Fen, marsh, and swamp – lowland
- Broadleaved, mixed, and yew woodland – lowland.

Morley Brick Pits was notified as a SSSI in 1986 due to its biological interest: 'The site consists of a series of flooded pits, originally dug for clay and which now contain acidic water colonized by a range of plants and animals which are becoming rare in Derbyshire...Round the open water are communities of tall fen with reedmace which merge into willow carr. This gives way to drier woodland...'

Restoration design considerations for future clay extraction projects, where biodiversity

Grays Thurrock Chalk Pit SSSI, which was visited and photographed as part of the study in 2024



enhancement is a key priority, include:

- Use upper pit slopes for drier habitats, with the pit floor for wetland pools and areas of water
- Include range of depths of water, profiles, and transitions around margins
- Use exposed clay/marl substrates as well as or instead of topsoil
- Aim for varied habitat cover, from standing open water, through to fen, carr, and woodland
- Plant establishment (seeding, planting and/or natural regeneration)
- Management by cutting or grazing, to allow for a variety of vegetation heights and structure (possibly also localized disturbance for early successional plants and/or no-cut zones).

Limitations and discussion

The full EIG paper *op cit* includes a section relating to limitations and discussion and should be referred to for further information. For example, it was recognized that the review of SSSIs was limited to England. It is expected that there will be other important sites in Scotland, Wales, and Northern Ireland which have not been included, but would still provide a useful resource for designers.

The review did not consider the current condition of the individual SSSI sites and how they relate to their condition at the time of the original designation. Most of the example sites visited by the author were being managed by the local Wildlife Trusts, although when that involvement started was not investigated.

Similarly, when reviewing older sites for their wildlife value and how they may provide examples for future quarry development, it is important to recognize the influence of working methods at the time and subsequent interventions.

The incorporation of habitats into specific project proposals will require interpretation



Mortley Brick Pits SSSI, which was visited and photographed as part of the study in 2024

and judgement from an ecologist to consider how they relate to the BNG metric and any existing site surveys/fieldwork. Specialist input into soils and water regime will also be required to ensure that the terrestrial plant communities targeted can be successfully created.

The restoration design considerations for future mineral workings should also form part of wider multi-disciplinary technical inputs, such as geotechnical engineering, health and safety, and operations.

Conclusions and recommendations

Biological SSSI sites and analysis of the associated main habitats provide a resource for professionals engaged in planning new extractive projects and undertaking biodiversity net gain (BNG) calculations of proposed restoration schemes.

The identified sites may help designers identify precedents for their schemes and identify suitable habitat types/mix to deliver biodiversity gains. This will help to support robust, evidence-based judgements about the potential condition and distinctiveness of habitats included in future restoration proposals and aid ecologists undertaking post-development calculations within the BNG metric.

The research also highlights the positive contribution that the extractive industry has made to biodiversity as part of restoration phases more generally. This should assist decision-makers, consultees, and stakeholders in understanding the potential opportunities for nature recovery associated with mineral extraction projects.

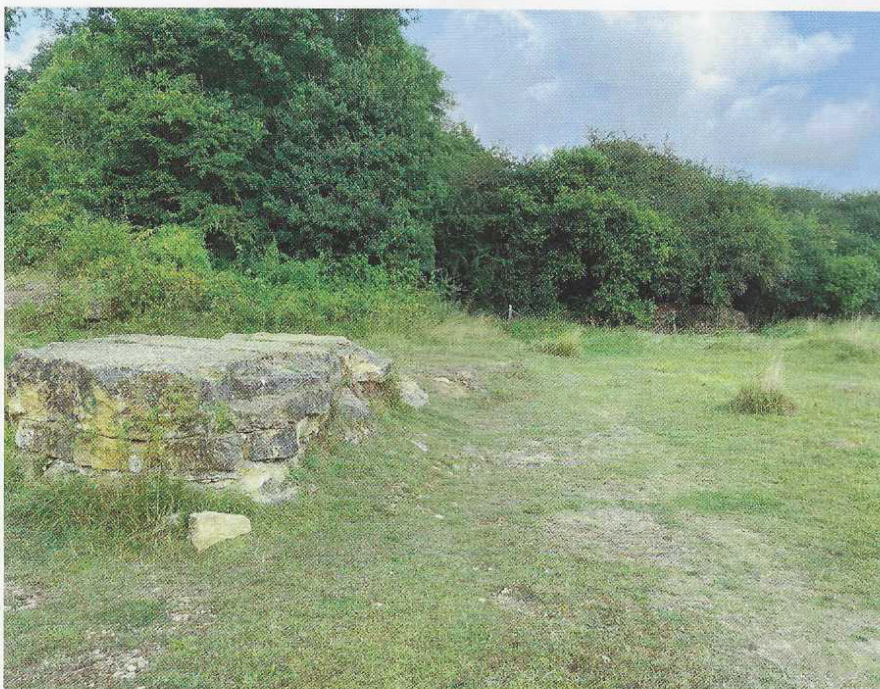
ACKNOWLEDGEMENTS

Thanks to Simon Mullins CMLI and Issy Finlay BSc (Hons) at Felstone Consulting Ltd, who helped with the preparation of this paper. Thanks also to Dr R.N. Humphries and Dr A. Thompson for comments and contributions both during and after the 'Nature Recovery Session' at EIG Hull 2024.

QM

Note: This article will, in due course, be featured on Agg-Net.com where it will include a full and extensive list of references.

Stonesby Quarry SSSI



Safe Storage, Handling, and Transportation of Ammonium Nitrate in Malaysia: Risk Management and Police Compliance



Ammonium nitrate (AN) is a critical industrial chemical used primarily in fertilizers and explosives, particularly in mining and quarrying operations across Malaysia. Despite its beneficial uses, AN poses significant risks under certain conditions, including detonation, combustion, and potential use in illegal explosive devices. Consequently, the storage, handling, and transportation of ammonium nitrate in Malaysia are tightly regulated by multiple agencies, including the Department of Occupational Safety and Health (DOSH), the Department of Environment (DOE), the Fire and Rescue Department (BOMBA), and most importantly, the Royal Malaysia Police (PDRM) under the Explosives Act 1957.

Hazards and Risks

AN is a strong oxidizer, meaning it does not burn by itself but enhances the combustion of other materials.

The main hazards associated with ammonium nitrate include:

- Sensitivity: AN is not sensitive to friction, impact and static but shouldn't be exposed to heat. Number one rule when handling and storing AN is to eliminate sources of ignition and combustible/flammable materials.
- Explosion Risk: While stable under normal conditions, AN can detonate when exposed to high temperatures or contamination with fuels, metals powder, or organic substances and under confinement (e.g. walls of the storage area)
- Fire Risk: If involved in a fire, it can decompose and release toxic gases such as nitrogen oxides and ammonia.
- Environmental Risk: Spillage or runoff can contaminate water bodies, leading to eutrophication and aquatic toxicity.
- Security Risk: AN can be misused for the fabrication of improvised explosive devices (IEDs), which makes it a substance of concern for national security.

Storage Controls

AN must be stored in compliance with the Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations 1996 (CIMA), particularly for facilities holding threshold quantities. Storage best practices include:

- Location: Storage facilities must be located away from populated areas and ignition sources.
- Structure: Buildings must be non-combustible and designed to prevent contamination (e.g., lined floors, maximum 1 wooden pallet below AN and exceed wooden pallet piles must be placed away from storage of AN).
- Separation: AN must be segregated from combustible and reactive materials (e.g., diesel, acids, chlorates). Forklift and heavy vehicles which contained fuel and other sources of ignition such as batteries must be separated from the AN storage area when not in use.
- Ventilation and Temperature Control: Storage areas should be cool, well-ventilated, and protected from moisture ingress to prevent caking and decomposition.
- Inventory Management: Real-time inventory record must be in place to monitor inflow and outflow, ensuring that discrepancies are quickly detected and investigated.



Picture 1: Crater caused by Tian Jin's port ammonium nitrate explosion incident (estimated 800 metric tonnes) in 2015

Handling Procedures

Handling ammonium nitrate requires well-documented Standard Operating Procedures (SOPs), employee training, and emergency preparedness. Key measures include:

- **PPE Use:** Handlers must use gloves, safety glasses, and proper clothing.
- **Spill and Fire Response:** When the decomposition of AN has started, the only effective firefighting agent is water to remove heat from the AN. ABC powder type fire extinguisher is only good for fighting combustion of material near Ammonium nitrate but not on Ammonium Nitrate. Some workplaces prohibited firefighting AN if fire is out of control due to its nature that may lead to detonation. Spill kits must be readily available that include shovel and plastic bag. The contaminated AN must be stored separately and disposed off properly or used as blasting agent in the drilled holes in quarries or mines.
- **Training and Drills:** Workers must receive regular chemical management training, and facilities should conduct fire and chemical spill drills in coordination with BOMBA and local authorities.

Transportation Requirements

The Land Public Transport Agency (APAD) and the Royal Malaysia Police regulate the road transport of ammonium nitrate. Requirements include:

- **Permits and Licensing:** Transport companies must hold licenses under the Explosives Act 1957 such as Pol 123 and Pol 124.
- **Vehicle Specifications:** Vehicles must be placarded as "Class 5.1 Oxidizing Agent," be fitted with GPS tracking, fire fighting equipment, and chemical-resistant containment.
- **Route Planning:** Transport routes must avoid densely populated area and sensitive area, and escort arrangements is required
- **Emergency Response:** All transporters must carry a Safety Data Sheet (SDS) detailing the properties of the chemical and emergency actions.

Police Compliance and Security Protocols

The Royal Malaysia Police plays a central role in controlling ammonium nitrate through licensing, security oversight, and enforcement. Under the Explosives Act 1957:

- Storage, Import, Export and Removal Licenses: Entities must apply for permits to import, store, and remove (transport) AN, including detailing the purpose, quantity, and storage address.
- Security Checks: PDRM conducts site inspections to verify security features, including fencing, access control, and CCTV.
- Audits and Compliance: License holders are subject to regular audits. Non-compliance may lead to suspension, fines, or prosecution under national security laws.

Conclusion

The handling of ammonium nitrate in Malaysia demands a coordinated approach to safety, security, and environmental stewardship. Employers must ensure robust risk controls are implemented across the entire lifecycle of AN - from import to end use—while ensuring full compliance with legal and police requirements. Failure to manage AN responsibly could lead to industrial accidents, environmental damage, and potential national security threats. Therefore, all stakeholders - including traders, manufacturers, transporters, and end-users—must remain vigilant, well-trained, and fully compliant with Malaysian laws and best practices. Austin Powder Malaysia Sdn. Bhd. practices the Basis of Safety and Good Explosive Practices in the storage, handling, transportation and application of ammonium nitrate. We will continue to share the latest information and good practices on explosives safety with the IQM community.



Picture 2: aftermath of Beirut's port ammonium nitrate explosion incident (estimated 2,750 metric tonnes) in 2020

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