



EFEE



12th WORLD CONFERENCE ON EXPLOSIVES AND BLASTING DUBLIN 2023

Royal Dublin Society, Dublin, Ireland – 9th to 12th September 2023

President's Foreword

On behalf of the European Federation of Explosives Engineers – EFEE, I am delighted to invite you all to our 12th World Conference on Explosives and Blasting taking place in Dublin, Ireland from 9th – 12th September 2023.

The EFEE World Conference on Explosives and Blasting has established itself as one of the most important international blasting events and continues to grow in both size and reputation.

The conference is organised in cooperation with the Irish Mining & Quarrying Society (IMQS) and Fáilte Ireland (National Tourism Development Authority) to whom we are hugely grateful for their support and for welcoming us to this superb destination.

The city of Dublin is the capital of Ireland, located on the east coast of Ireland. The city is framed by mountains and famous for its breadth of Irish pubs and cosmopolitan outlook.

The 12th World Conference on Explosives and Blasting 2023 will take place at The Royal Dublin Society (RDS). The RDS offers considerable conference space providing an ideal home for the exhibition, technical presentation rooms and networking and catering areas.

This year we have an exciting reception being added to the programme for Emerging Professionals. The Emerging Professionals are a new EFEE initiative, aimed toward anyone with less than 10 years of involvement in EFEE. We are open to all professionals (young and experienced alike). The reception will take place from 7pm until 11pm on Saturday, 9th September. It is free to attend and we hope as many of you as possible will join us.

The conference will formally start on Sunday 10th September with registration, technical excursion and Irish Welcome Reception and will continue on Monday 11th September and Tuesday 12th September with technical sessions and the exhibition.

Our large exhibition attracts leading names in the explosives and blasting industry. It's an integral part of the conference allowing the demonstration of new technologies and for participants to form global relationships with suppliers. A large number of exhibitors and sponsors have already confirmed their support.

The conference will be supported by explosives end-users, manufactures, drilling and blasting operators, consultants and contractors. We anticipate over 450 professionals from over 50 different countries, creating an engaging and unique forum for meetings and discussions between professionals from tunnelling, construction, demolition, quarrying as well as the mining industry. The conference is an excellent opportunity to share industry experiences, to learn about new technologies, products and techniques.

I'm really looking forward to welcoming you all to Dublin for our 12th World Conference, 9th – 12th September 2023.

Viive Tuuna

**President, EFEE –
European Federation of Explosives Engineers**



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REGISTRATION NOW OPEN - VISIT
www.efeeeworldconference.com

Technical Committee

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Robert Laszlo Romania

Ruairi O'Connor Ireland
Jörg Rennert Germany
Janeen Smith USA

Conference Committee

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Alan Dolan
Johan Finsteen Gjøvdad
José Carlos Góis
Bernard Vercouteren van den Berge

Roger Holmberg
Jari Honkanen
Donald Jonson
James Tyler

Registration

Conference registration includes admission to all technical sessions, the exhibition, a copy of the proceedings and admission to the Irish Welcome Reception on Sunday 10th September 2023 at the Royal Dublin Society.

Early Bird Registration

Delegate (Non EFEE Member): €785.00 (excluding tax)
Student: €75.00 (excluding tax)
EFEE Individual Members: €710.00 (excluding tax)
EFEE Corporate Members: €630.00 (excluding tax)
EFEE National Association Members: €630.00 (excluding tax)

Individual, Company and National Association Members – one discounted registration per person or organisation.

All participants including speakers are required to pay the registration fee.

To take advantage of our “early bird” registration discount, register online before Monday 31st July 2023:

Register today on-line: www.efeeeworldconference.com

For further information please email:
info@efeeeworldconference.com

Official Languages

The official language of the conference is English.
All technical papers will be presented in English.

Schedule of Events

Saturday 9th September 2023

19.00 – 23.00 Emerging Professionals Reception, free entry -
Horse Show House, Ballsbridge

Sunday 10th September 2023

09.00 – 14.00 Special Technical Session & Panel Discussion -
Clayton Hotel Ballsbridge
10.00 – 15.00 Dublin Walking Tour - *Merrion Square*
12.00 – 16.00 Exhibition Set-up - *Royal Dublin Society, Hall 4*
12.00 – 19.00 Conference Registration - *Royal Dublin Society, Hall 4*
18.00 – 20.00 Irish Welcome Reception and Opening Speeches,
Entertainment - *Royal Dublin Society, Concert Hall*

Monday 11th September 2023

08.00 – 12.00 Conference Registration - *Royal Dublin Society, Hall 4*
08.30 – 17.00 Technical Sessions - *Royal Dublin Society, Hall 4*
08.30 – 17.00 Exhibition - *Royal Dublin Society, Hall 4*
20.00 – 23.30 Guinness Storehouse Networking Dinner -
Gravity Bar Guinness Storehouse

Join us at the home of Ireland's famous stout for a superb evening of networking, food, entertainment and of course Guinness.

Tuesday 12th September 2023

08.30 – 15.00 Technical Sessions - *Royal Dublin Society, Hall 4*
08.30 – 15.00 Exhibition - *Royal Dublin Society, Hall 4*
15.00 Conference Close

Wednesday 13th September 2023

08.30 – 16.00 Breedon Cement Ireland Tour

Reduction of CO2 Technical Session & Panel Discussion | Sunday 10th September

EFEE is hosting a special technical session and panel discussion on 10th of September 2023 as part of the Dublin Conference - Reduction of CO2 and other emissions in blasting.

This session of presentations in the Clayton Hotel Ballsbridge from 9am, followed by a panel discussion, is organised by EFEE's environmental sub-committee “Emissions connected to blasting”. It aims to provide information on the solutions currently developed to reduce emissions and the carbon footprint of blasting works. Companies, consultants, and academic players will present their work related to products, software, and methods that can help the blasting profession meet the decarbonization and sustainability requirements of the extractive industry.

Tickets include the presentation and panel discussion, lunch and refreshments:

EFEE / IMQS - Member: €95.00 + local taxes

EFEE / IMQS - Non-Member: €125.00 + local taxes

Tickets are available to purchase during conference registration.

Breedon Cement Ireland Tour | Wednesday 13th September

For our industrial visit, we are delighted to present a visit to Breedon Cement Ireland. Based in Kinnegad, Co. Westmeath, it is one of the most modern cement plants in Europe. Numbers are limited so book your place!

The tour will be held on Wednesday 13th September from 8.30am until 4pm.

Tickets are available to purchase during conference registration and include transfers and lunch:

Ticket costs:

EFEE / IMQS - Member: €120.00 + vat*

EFEE / IMQS - Non-Member: €150.00 + vat*

**Rates are being charged by IMQS and include lunch and transfers.*

For further information, please visit [Cement - Breedon \(breedongroup.com\)](http://Cement - Breedon (breedongroup.com)).



Rates

Prices quoted are for individual items	Early Bird 31 July € Rate*	Registration 1 August € Rate*
Conference registration for NON EFEE Members	€785.00	€895.00
Conference registration for EFEE Individual Members and those applying for EFEE Membership	€710.00	€810.00
Conference registration for EFEE Corporate Members (one discounted registration per membership)	€630.00	€730.00
Conference registration for EFEE National Association Members (one discounted registration per membership)	€630.00	€730.00
Conference registration for Students	€75.00	
Guinness Storehouse networking dinner - includes coach transfer, dinner, beverages & entertainment	€120.00	
Welcome reception and celebration	€65.00	
Additional printed proceedings	€85.00	
Additional USB proceedings	€70.00	
Emerging professionals reception	Free	
Technical Session & Panel Discussion - EFEE or IMQS Member	€95.00	
Technical Session & Panel Discussion - Non Member	€125.00	
Breedon Cement Ireland Tour - EFEE or IMQS Member	€120.00	
Breedon Cement Ireland Tour - Non Member	€150.00	
City Tour - EFEE & IMQS Member	€25.00	
City Tour - Non Member	€35.00	
To join EFEE - individual membership fee	€75.00	

*All rates are subject to Irish VAT

Booking Information

EFEE Membership

EFEE members qualify for a discounted conference registration package. The cost to become an EFEE member is just €75.00 for professionals and €25.00 for students (excluding tax). EFEE membership can be purchased during the registration process **which will immediately allow you to take advantage of the discounted rates.**

Discounted membership fees are also available for employees of EFEE Corporate members and members of EFEE National associations and ISEE.

EFEE Corporate Members

If your organisation is an EFEE Corporate Member the company qualifies for one discounted delegate registration. Any further bookings must be completed at the standard member registration rate.

EFEE National Association Members

EFEE National Association Members also qualify for one discounted delegate registration. Any further bookings must be completed at the standard member registration rate.

Students

Take advantage of our competitive student registration packages. Your student reference number will be required during the registration process.

Register before 31st July to take advantage of our early bird offers.

Book online today:

www.efeeeworldconference.com

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www.iie-online.com



www.uielimited.com

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www.tradestarcorp.com



www.carlsonsw.com



www.epc-groupe.co.uk



www.maxam-deutschland.com



www.tegetec.com



Exhibition

The conference includes a large 1,500 metre squared exhibition. The exhibition will display and demonstrate the latest developments across the industry. Areas covered include explosives, consultants, suppliers and manufacturers.

Conference catering, including lunches and coffee breaks will be served in the Exhibition Hall. There are networking areas, a demonstration stage and a host of opportunities for industry engagement. To view the latest list of exhibitors and for further information surrounding the exhibition and sponsorship, please visit: www.efeworldconference.com

Venue Information

The 2023 EFEE World Conference will take place at the **Royal Dublin Society (RDS)**, located on Merrion Road, Ballsbridge – Hall 4.

This member club and convention centre has modern facilities and ample space to host our exhibition and technical presentations. RDS is best known for hosting the Dublin Horse Show. RDS is well connected to public transport links allowing Dublin city centre to be easily explored. For further information please visit: www.rds.ie

Accommodation

Accommodation has been secured for the nights of Saturday 9th through to Wednesday 13th September 2023 at the **Clayton Hotel Ballsbridge**, Merrion Rd, Dublin 4, D04 P3C3, Ireland.

Located adjacent to the RDS, the Clayton Hotel is a well catered four-star hotel in the Ballsbridge district of the city. You can easily walk or take public transport to the heart of the city. The hotel has 335 modern, well-appointed rooms. The room rate is €229.00 per night, including breakfast and VAT and available on a first come, first served basis.

Hotel Reservation

Further information surrounding room rates, booking and cancellation policy are available during the registration process.

Emerging Professionals Reception

The Emerging Professionals are a new EFEE initiative, aimed toward anyone with less than 10 years of involvement in EFEE. We are open to all professionals (young and experienced alike). The purpose of the reception is to provide an avenue for networking and socialising within the industry to help expand professional networks and become involved in EFEE. The reception will take place on Saturday, 9th September from 7pm until 11pm at Horse Show House, Ballsbridge and include drinks, nibbles, networking, and entertainment.

Attendance will be free of charge and available to book with conference registration. If you are interested in sponsoring or becoming involved with the Emerging Professionals, please contact sponsorship@efeworldconference.com

Irish Welcome Reception

This year our welcome reception will be a celebration of Ireland and includes drinks, substantial canapes and Irish dancers. The event will take place on the evening of Sunday 10th September from 6pm at the **Royal Dublin Society** in the Concert Hall. The cost of attending is included in the registration fee. Additional tickets can be purchased for partners at €65.00 (excluding local taxes).

Guinness Storehouse Dinner

A special evening has been planned for Monday 11th September at the famous **Guinness Storehouse**, in their incredible Gravity Bar with 360-degree views of Dublin. The evening will encompass local cuisine, entertainment, breath-taking views and of course the world's most famous stout - Guinness.

This informal, networking evening includes: transfers, access to the Guinness Storehouse Tour, welcome drink, bowl foods, wine, coffee and entertainment. The cost to attend is €120.00 (excluding local taxes). Tickets are available to purchase through the registration process.



Activities

City Parks

Cherished and adored, the city's green spaces include the hidden oasis of Iveagh Gardens and St Stephen's Green, which was used for public executions until the 1770s. Make like a local by spending an afternoon cycling through the Phoenix Park, one of Europe's largest enclosed city parks – with a large herd of fallow deer for company; seek out the statue of Oscar Wilde in Merrion Square; or take time out at Dubh Linn Gardens, tucked just behind Dublin Castle.

Dublin Castle

Perched on the site of a Danish Viking fortress from 930AD, and with its first stone cast by King John of England in 1230. Under British rule from that point until 1921 (it was a key target during the 1916 Easter Rising), it has been a court, a fortress, even a site of execution in its time, and its architecture has evolved and grown with each metamorphosis. Wander the grounds, or take a guided tour to the state apartments, medieval undercroft and the Chapel Royal.

www.dublincastle.ie



The Books of Kells and Trinity College

This glorious Early Christian illuminated manuscript is quite simply a masterpiece. Located within Trinity College's Treasury, the tour here includes a visit to the Long Room Library, one of Europe's most magnificent libraries housing over 200,000 of Trinity's oldest books. Afterwards, wander around the charming campus of Trinity, which dates back to 1592 and boasts an impressive list of alumni including Bram Stoker, Oscar Wilde and Jonathan Swift. The Front Square and Campanile are a delight, while the college also houses the modern Science Gallery, and the Douglas Hyde Gallery, with changing contemporary art exhibitions.

www.tcd.ie/library/old-library



The National Museum of Ireland

The National Museum of Ireland is just one of the city's must-visit museums, housed within a lovely Palladian building from 1890. The National Gallery of Ireland includes wonderful European and Irish fine art, with an acclaimed collection of works by Irish painter Jack B Yeats. See Irish design through the ages at the National Museum of Decorative Arts and History in Collins Barracks, and head to the Hugh Lane Gallery to see the world-renowned Francis Bacon Studio.

www.museum.ie

Dublin

Dublin is the capital of Ireland and is the largest city in the country. The city centre is small but lively and full of characteristic pubs and restaurants, shopping districts, theatres, parks, government buildings, and museums.

Dublin is easy to navigate thanks to its compact size but still offers plenty to see including characterful pubs, fine dining, castles and world-class exhibits.

Getting there

Royal Dublin Society is 4.5km from the centre of Dublin, approximately a 20-minute drive. Several European capital cities are just a stone's throw away, such as London (1 hour), Amsterdam (1.5 hours), Paris (1.5 hours) and Brussels (1.5 hours).

Travel by Air

Dublin Airport www.dublinairport.com

Dublin Airport is located approximately 10km north of Dublin City Centre and is approximately 16km from the Royal Dublin Society. There are non-stop flights from most major European cities and connecting flights from The Middle East, Africa, Asia, Canada, The United States and Australia.

Flight Journey Lengths:

- 1 hour 10 minutes from London
- 6 hours 15 minutes from New York

For further flight information please visit: www.skyscanner.net

Onward Journey to Dublin City Centre and RDS

Bus

The RDS is serviced by the Aircoach (Route 702) that brings customers directly to and from Dublin airport. Aircoach stops are located on Merrion Road in front of the RDS main complex entrance. The journey is approximately 25 minutes from the airport to RDS, expect to pay between €10.00 and €20.00.

Aircoach Bookings for people with disabilities must be made in advance. For more information on timetables visit www.aircoach.ie or call +353 (0)1 844 7118.

There is a bus route that will take you to the city centre from RDS, it is bus 4/ 7/ 7A from RDS Ballsbridge which will take you to Merrion Square. Then you will need to catch the 15A/ 15B bus from Merrion Square to Dame Street, stop 7581. The journey is approximately 30 minutes and the buses run every 15 minutes: goo.gl/maps/xPaGDmBcLgc8QJPQ9 Expect to pay around €2.00 per person. "Leap" cards can be used for public transport.

For more information on public transport, visit: www.dublinbus.ie

Taxi

Distance from Dublin airport to the city centre: 10.5 km (6.5 miles).

Taxis are available at the Taxi rank outside Arrivals. The taxi will take you on the M1 and then the M50, going by the port to get to the RDS. The journey is 15km and approximately 25 minutes from the airport to RDS, expect to pay between €30.00 and €40.00.

Taxi app Uber is well-established and presents a good alternative to city taxis. Several Taxi companies operate in Dublin, and their rates can vary.

Do not accept rides from drivers who might approach you inside or in front of the terminal, you will risk being overcharged.

Public Transport

Further information surrounding Dublin's public transport including journey planners and availability can be found by visiting:

www.dublinpublictransport.ie

By Car

If you are driving by car, there is parking at the RDS: Car Parking Opening Hours:

Merrion Road Car Park Monday to Friday 7.30am – 6.30pm

Simonscourt Road and Anglesea Road Car Parks Monday to Friday 7.30am – 6.30pm

Parking is €7.00 per car per day.

Technical Papers

The technical sessions will be divided into key themes. Authors will present their papers in English to an audience in a lecture style format with some time for questions from the audience. A range of abstracts have been submitted to our technical committee for approval including:

Blast Design Management

- Blast optimization through GMT dated measurements system
- Blast optimization using electronic detonators and topographic tools associated with blast design software
- Development of a methodology for measuring crack growth by blasting using non-contact techniques
- Effects of blast-induced vibrations on underground concrete structures
- Rock blast design steps in mining based on rock blast categories
- Rock mass characterization and its influence on blast performance derived from blast modeling
- Worse-Silva equation for modeling fragmentation caused by row timing

Blasting Work Experiences

- A comprehensive approach to multi-face blasting planning aimed at improving active rockburst prevention
- Blast Folding of a 150m high concrete chimney in Copenhagen
- Blasting experience in Chuquicamata Underground Mine: challenges during the caving process
- Blasting related slope instability risk and controls
- Explosives efficiency in rock salt and potash blasting: guidelines and best practices
- Gassing rate as a function of emulsion temperature to optimise stemming timing: using new MEMU truck data
- Improved advance through new blast patterns in civil tunneling
- In situ optimization of drilling and blasting operations for dimension stone mining
- Lessons learned during initial slot blasting in Chuquicamata Underground Mine
- On the influence of the angles of breakage in the pull efficiency of tunneling by drill and blast
- Optimization of blasting parameters burden and spacing - A case study of Včeláre and Trebejov Open Pits
- Precision blast in a quarry – The Powhatan Water Tower Shot
- Technical and safety challenges in the blast demolition process of a 208 m high chimney together with a 105 m high cooling tower
- The latest technology application for flyrock control and analysis as critical blast impacts
- Working at altitude while using old and new technologies

Blast Vibration and Seismology

- Blast induced vibrations and strain rate effects in dynamic capacity of underground concrete structures
- Blast vibration in layered coal strata: measurements, analysis and modelling
- How to blast cooling towers in critical neighborhoods
- Multidirectional ground vibration modelling in rock blasting
- Natural frequency of structures near rock blasting operations
- Numerical modelling of vibrational effects on buildings from blasting
- Reduction of vibrations caused by blasting works in mitigating the negative effects on the environment
- Using blast vibration limits and the supporting science to improve operations and reduce liability
- Vibration prediction as a tool in planning

Health, Safety & Environment

- Austin Powder environmentally responsible
- Expectations for safely undertaking explosive demolition
- Flyrock prediction analysis to reduce safety distance and achieve better cost optimization
- Improving semi-empirical flyrock models with accurate information from blast surveying technology
- Potential method of minimizing air overpressure from blasting by using of a simple calculator based on blast layout, sequence and detonator timings
- Shock and transient pressure damage to electronic detonators - A practical test
- Technical challenges linked to the discovery of un-detonated centennial nitroglycerin-based charges (sticks) during the restructuring of a railway tunnel for Montreal's new electric light metro network
- Track and Trace – A worldwide competition for the explosive industry

New Applications and Training

- Blasting optimization in open pit operations based on the combination of rock properties through drill monitoring and the selective loading application
- Mechanising and automating development charging using wireless initiation
- Shock polar analysis applied to any equation of state for the unreacted explosive
- Understanding the impact of floor disruption blasting on low wall slope stability
- Working with “new media” from insights on “The Detonators” series to video depositions for court cases

Technical Development

- 50 years of blasting work through the ages
- Advances in predictive blast movement modelling using advanced physics engine techniques
- Advances on rock structural recognition from drill monitoring in underground mining using discontinuity index and machine learning techniques
- Analytical study to improve blasting fragmentation in metasedimentary rock with complex lithology at Indonesian coal mine
- Automatic analysis system of rock fragmentation based on deep learning
- Benefits of the journey to digital blasting in a large quarry in the south of France
- Comparison of top and inner muck pile fragmentation with emphasis on reliability of 3D fragmentation evaluation
- Drill and blast tunnelling cycle time improvement using latest generation of Electronic Initiation System in Norwegian projects
- Eliminate AN residue from coating agent on Ammonium Nitrate during emulsion production: Using an incineration and centrifugation method at emulsion plant
- Ignition mechanism for non-ideal explosives
- Influence of heterogeneity of rock on blast-induced crack evolution and fragment size distribution
- Innovative developments in drilling and blasting in the K+S mines to comply with OEL and safety standards
- The mechanics of presplitting