

9th WORLD CONFERENCE  
ON EXPLOSIVES AND BLASTING



EFEE

# STOCKHOLM 2017

10th – 12th September, Stockholm, Sweden  
The Brewery Conference Centre.



## President's Foreword

At the beginning of my foreword and on behalf of the European Federation of Explosives Engineers - EFEE I would like to invite you all to our next 9th World Conference on Explosives and Blasting which will take place in Stockholm from 10th - 12th September 2017.

The EFEE World Conference on Explosives and Blasting has established itself as one of the most important international blasting events. It all started in year 2000 with the 1st EFEE World Conference in Munich and after Prague 2003 it continued on regular basis every other year. All eight of our previous EFEE World Conferences with great success proved how really important events where we can mutually share our different experiences and skills are.

We expect the EFEE 9th World Conference on Explosives and Blasting to be as successful as our previous World Conferences and to attract participants and delegates not only from Europe but also from all over the World. The Conference is organised in cooperation with the Swedish national association - Swedish Rock Construction Committee (Bergsprängningskommittén).

We are delighted to announce Gold Sponsorship from EPC, ForcIt, Lubrizol, Maxam, Orica and Yara and Silver Sponsorship from AkzoNobel, Davey Bickford and Sigicom. Our call for papers has attracted an excellent response with exceptional quality papers across a diverse topic range, see the reverse of this circular for further details.

Stockholm is the cultural, medial, political, and economical centre of Sweden. It hosts the annual Nobel Prize ceremonies and banquet at the Stockholm Concert Hall and the Stockholm City Hall. The earliest written mention of the name Stockholm dates from 1252, by which time the mines in Bergslagen made it an important site in the iron trade. Stockholm is located on Sweden's south-central east coast, where the freshwater Lake Mälaren — Sweden's third largest lake — flows out into the Baltic Sea. The central parts of the city consist of fourteen islands that are continuous with the Stockholm archipelago. Over 30% of the city area is made up of waterways and another 30% is made up of parks and green spaces. The city's oldest section is Gamla stan (Old Town), located on the original small islands of the city's earliest settlements and still featuring the medieval street layout. Stockholm is one of the cleanest capitals in the world. The city was granted the 2010 European Green Capital Award by the EU Commission; this was Europe's first "green capital".

The most important fact which has to be highlighted in relation to our Conference - is that on 21st of October 1833 was born in Stockholm Alfred Bernhard Nobel the Swedish chemist, engineer and innovator worldwide known for inventing the dynamite. During the Conference the participants and spouses can choose various options which is offering attractive Stockholm for sightseeing and visit of different interesting places.

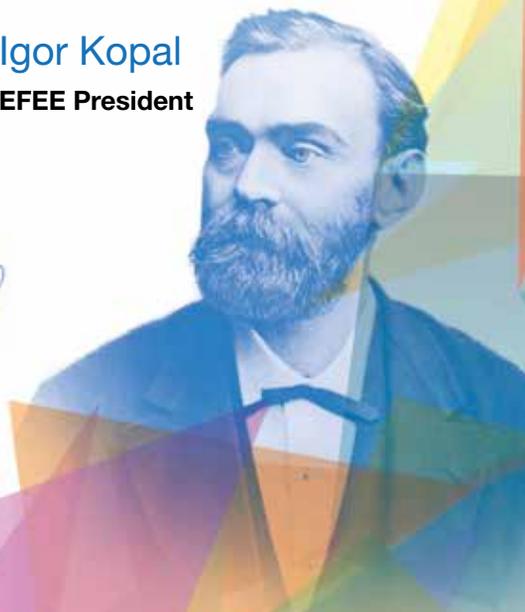
EFEE 9th World Conference on Explosives and Blasting 2017 will take place at the Brewery - Conference Centre Stockholm a short walking distance from the city centre. The venue offers a unique conference room and halls, is bright, spacious and modern with excellent loading and logistic possibilities coupled with great interior structural design, which enables a natural flow for the participants. During breaks, participants can enjoy some fresh air out on the 40-meter long terrace or just savour the breath-taking panoramic view of the city centre of Stockholm and the sparkling waters surrounding it. Experiences like these really confirm the feeling of being in one of the best conference spaces in Stockholm.

The Conference will start on Sunday 10th September with registration, workshop and welcome reception and will continue on Monday 11th September and Tuesday 12th September with technical sessions and exhibition. The Gala dinner is planned for Monday evening and will take place at Winterviken in former Alfred's Nobel factory. A superb building that dates back to 1891 with wooden beams and classic features will host this event. In accordance with experiences from our previous eight Conferences we expect over 450 delegates and professionals from over 50 different countries with a large industry exhibition. This will create a really unique forum for meetings and discussions of professionals from tunnelling, construction, demolition, quarry as well as the mining industry. We have to share mutually everything new, good experiences - as well as bad experiences to avoid mistakes in the future and improve the techniques. It applies to all of us - explosives end-users, manufactures, drilling and blasting operators, consultants and contractors.

Finally please let me point out one more time the importance of EFEE 9th World Conference on Explosives and Blasting and I'm really looking forward to meeting you all in Stockholm from 10th - 12th September 2017.



Igor Kopal  
EFEE President



[www.efee2017.com](http://www.efee2017.com)

## Technical Committee

Roger Holmberg, Sweden - (Chairman)  
Robert Farnfield, UK  
Finn Ouchterlony, Sweden  
Jörg Rennert, German  
Jerry Wallace, US

## Conference Committee

Heinz Berger - (Chairman)  
José Carlos Gois  
Roger Holmberg  
Donald Jonson  
Jari Honkanen  
Johan Finsteen Gjødvad  
James Tyler

## Registration

Conference registration includes admission to all technical sessions, the exhibition, a copy of the printed proceedings and admission to the welcome drinks reception on Sunday 10 September.

## Early Bird Registration

Delegate (Non EFEE Member): kr. 6,800.00 (excluding tax)  
Student: kr. 500.00 (excluding tax)  
EFEE Members: kr. 6,100.00 (excluding tax)  
*Including: Individual, Company and Associate Members – one discounted registration only.*  
EFEE National Members: kr. 5,440.00 (excluding tax)

National Members are entitled to one discounted registration only.

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

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

▶ Register today on-line: [www.efee2017.com](http://www.efee2017.com)

For further information please email: [info@efee2017.com](mailto:info@efee2017.com)

## Official Languages

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

## Schedule of Events

### Sunday 10 September 2017

10.00 – 16.30 Workshop – E4 Construction Project - *Meet at the Hilton Stockholm Slussen for transfer to the at 10am*  
- Further timings are show under Sunday Workshop\*  
12.00 – 18.00 Exhibition Set-up – *The Brewery Conference Centre*  
12.00 – 18.00 Conference Registration – *The Brewery Conference Centre*  
18.00 – 19.30 Welcome Drinks Reception and Opening  
Speeches – *The Brewery Conference Centre*

### Monday 11 September 2017

08.00 – 12.00 Conference Registration – *The Brewery Conference Centre*  
08.30 – 17.00 Technical Sessions – *The Brewery Conference Centre*  
09.00 – 17.00 Exhibition – *The Brewery Conference Centre*  
19.30 till late Gala Dinner – *Winterviken, Alfred Nobel Factory*

### Tuesday 12 September 2017

08.30 – 16.00 Technical Sessions – *The Brewery Conference Centre*  
09.00 – 17.00 Exhibition – *The Brewery Conference Centre*  
17.00 Conference Close – *The Brewery Conference Centre*

## Sunday Workshop\*

For the first time in EFEE Conference history the workshop will include a site visit to the biggest road construction project in Sweden – E4 The Stockholm bypass – Förbifart Stockholm.

This essential new section of Stockholm network is 21 km long with over 18 km being routed underground, to reduce the impact on Stockholm's natural and cultural environment, requiring a huge amount of drilling and blasting work using the very latest research and technology.

After this superb visit we will have the unique opportunity to discuss the project with the client, contractors and consultants including key areas of the design, environmental impacts, challenges in blasting and much more.

Further information surrounding the project is available by visiting: [www.trafikverket.se/en/thestockholmbypass](http://www.trafikverket.se/en/thestockholmbypass)

### Timings

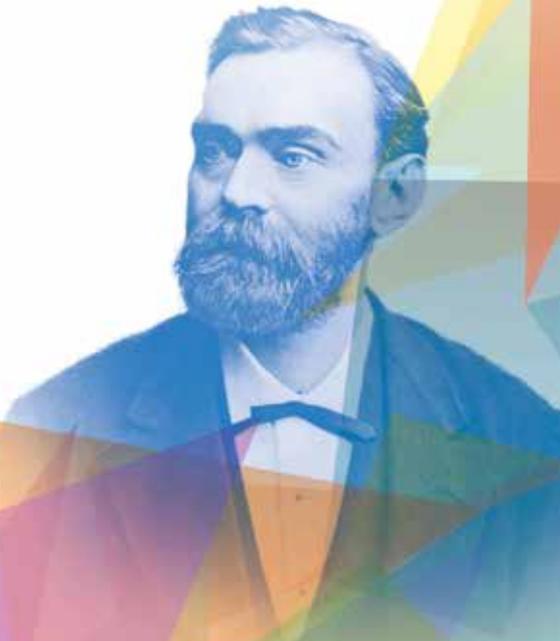
10:00 Depart from the Hilton Stockholm Slussen  
10:30 E4 The Stockholm bypass  
12:00 Return to Hilton Stockholm Slussen  
12:30 Lunch  
13:30 Workshop presentation and discussion  
16:30 Workshop close

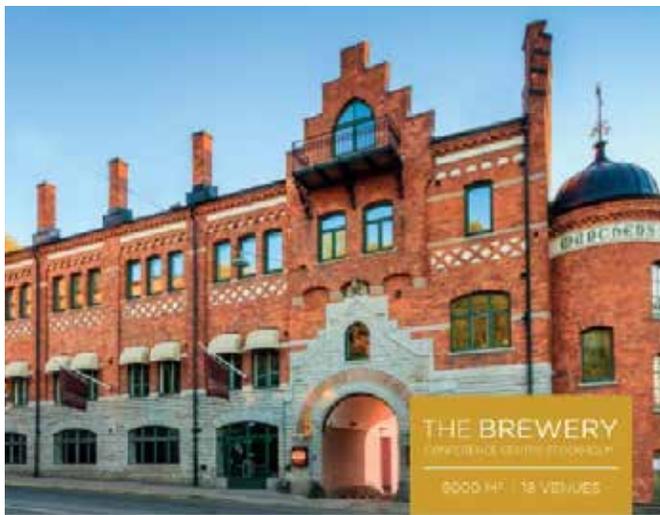
### Tickets

*Entry includes:*

Transfers, site visit, lunch and post project presentation and discussions.

The cost to participate is SEK1,450.00 for EFEE members and SEK1,950.00 for non-members (excluding tax).





## Exhibitors

The conference includes a large exhibition, taking up 1000 metres squared. The exhibition will display and demonstrate the latest developments across the industry. Areas covered include explosives, consultants, suppliers and manufacturers. All lunches and coffee breaks will be served around the exhibition hall. The latest list of exhibitors is available on our website.

If you are interested in becoming a sponsor or exhibitor please visit: [www.efee2017.com](http://www.efee2017.com)

## Venue Information

The 2017 EFEE conference including welcome reception, technical presentations and exhibition will take place at The Brewery Conference Centre, Stockholm a short distance away from Stockholm's beautiful city centre.

The Brewery is one of the most characteristic elements in the skyline of Stockholm as well as being a greatly appreciated memento of a distant industrial epoch. Beer was produced there for over 100 years to satisfy the thirsts of Stockholmers and the last bottle ever to be filled was capped in 1971.

In the early 1970's The Brewery was converted to a fully functioning conference and exhibition centre.

For further information please visit: [www.m-b.se/en](http://www.m-b.se/en)

## Accommodation

Guest accommodation has been secured at the **Hilton Stockholm Slussen**.

The Hilton Stockholm Slussen is located in the hip Södermalm area of Stockholm, with fantastic views over the water and Old Town.

Facilities include two restaurants, Eken Bar, complimentary WiFi, fitness centre, a selection of rooms and superb city view.

The hotel is also just a short (10 minute) walk from the Brewery Conference Venue in Stockholm.

For booking information please visit: [www.efee2017.com](http://www.efee2017.com)

## Welcome Drinks Reception

The welcome drinks reception marks the opening of the conference and will take place on the evening of Sunday 10 September at The Brewery Conference Centre in Stockholm. The cost of attending is included in the registration fee. Additional tickets can be purchased for partners at SEK 300 (excluding tax).

## Gala Dinner

Experience the beginning of the blasting industry by visiting Alfred Nobel's incredible Winterviken factory.

The evening will transport you to the beginnings of the industry with a look at the incredible Swedish innovator and chemist, Alfred Nobel. The dinner will take place at Winterviken, Alfred Nobel's factory, a superb building that dates back to 1891 with wooden beams and classic features.

The evening includes a presentation encompassing the history of the building and Alfred Nobel's association, a luxurious Swedish menu paired with local wines prepared by one of Sweden's most reputed chefs - Markus Aujalay and finishes with Swedish entertainment.

*Entry includes:*

Welcome drink, 3 course meal, wine, coffee and entertainment.

The cost to participate is SEK 1,100 (excluding tax).

Tickets are available to purchase through the registration process.

## Activities

### Open Top Bus Tour

Hop on and off as many times as you like. The ticket is valid for 24h and takes you to the city's most famous sights. Comfortably seated in an open top double deck bus you are guided by headphones. Buy tickets on board or online.

To view the timetable or place your booking please visit:  
[www.opentoptours.com](http://www.opentoptours.com)



### Guided Bicycle Sightseeing Tour

Guided tour by bike where you will experience Stockholm from its most beautiful side. See the city gems, famous landmarks and viewpoints. During the afternoon tour more time is spent in the National City Park and less time in the city. Language: English.

Point of departure is Narvavägen 17-19 (at the Historical Museum) on the following dates and times

1/9-14/9 Wed-Sun 11am & 3.30pm **Prices from 300 SEK**

To view the timetable or place your booking please visit:  
[www.bikesweden.se](http://www.bikesweden.se)



### Old Town and Riddarholmen Tour

Fancy a walking tour in the historical heart of Stockholm? See the most famous sights such as the Royal Palace. The tour includes a visit to the island of Riddarholmen, with a stunning view of Lake Mälaren and the lakeside of the city.

Limited space. Language: English. Tours depart daily during September at 2pm.

Tour length 1,5h. Meeting Point: Stortorget, the Old Town.

**Prices from: 150 SEK**

Booking is available on the Stockholm Our Way website:  
[www.stockholmourway.com](http://www.stockholmourway.com)



### Boat Trip to Drottningholm Palace

Board a century-old steamer and sail to world heritage site – Drottningholm, the private residence of the Swedish Royal Family. Travel time 50 minutes on Lake Mälaren offering beautiful scenery.

Tour length 3h **Prices from 270 SEK**

To view the timetable or place your booking please visit:  
[www.strommakanalbolaget.se](http://www.strommakanalbolaget.se)

## Travel by Air

Stockholm Arlanda Airport, located North of Stockholm, serves as a base for domestic and international flights.

[www.swedavia.com/arlanda](http://www.swedavia.com/arlanda)

## Travel by Airport Shuttle

The most convenient way to travel from Arlanda airport to central Stockholm is via the Arlanda Express. Tickets can be purchased in advance via their website

[www.arlandaexpress.com](http://www.arlandaexpress.com)

Tickets cost circa 280 SEK each way.

### Flight journey lengths:

- 2 hours 40 minutes from Paris
- 2 hours 15 minutes from London
- 8 hours from New York

Further flight information please visit:

[www.skyscanner.net](http://www.skyscanner.net)

## Travel by Public Transport

Public transport is relatively inexpensive and useful for negotiating the city's islands and historical sites. The fastest way to get around is by metro, which covers most of the city.

## Stockholm Information

Stockholm is Sweden's capital city and the centre of its culture, media and economy.

This beautiful city is often referred to as the 'Venice of the North' as the city is spread across 14 coastal islands connected by 57 bridges at the mouth of Lake Malaren, by the Stockholm archipelago and the Baltic Sea. In 2010 the city was granted the European Green Capital Award in recognition of it being one of the cleanest capitals in the world.

Stockholm was first recognised as a city in 1252, although, it is thought to have been a settlement since the Stone Age. The city's oldest section is Gamla stan (Old Town), located on the original small islands of the city's earliest settlements.

Stockholm is of course the home of Alfred Nobel and a thriving blasting industry which we will be taking full advantage of during the conference programme.

More recently Stockholm has become famous for its software industry, fine seafood and famous summer music festivals.

For further information please visit:

[www.visitstockholm.com](http://www.visitstockholm.com)

## Rates

	Item	Amount
<b>Early Bird Discount</b> Registration before 31 July 2017	Early Bird Conference registration for <b>NON EFEE Members</b>	kr. 6,800.00
	Early Bird Conference registration for <b>EFEE Members</b> (individual/corporate) and those applying for EFEE Membership	kr. 6,100.00
	Early Bird Conference registration for <b>Students</b>	kr. 500.00
	Early Bird Conference registration for <b>EFEE National Members</b> (one discounted registration, per membership)	kr. 5,440.00
Registration from 1 August 2017	Conference registration for <b>NON EFEE Members</b>	kr. 7,800.00
	Conference registration for <b>EFEE Members</b> and those applying for EFEE Membership	kr. 7,000.00
	Conference registration for <b>Students</b>	kr. 500.00
	Conference registration for <b>EFEE Corporate Members</b> (one discounted registration, per membership)	kr. 6,300.00
Gala Dinner	Gala Dinner tickets include half a bottle of wine per person and entertainment	kr. 1,100.00
Welcome Drinks Reception	Additional tickets to the Welcome Drinks Reception	kr. 300.00
Proceedings	Printed Proceedings	kr. 785.00
	USB Proceedings	kr. 600.00
Sunday Workshop	Tickets for EFEE Members	kr. 1,450.00
	Tickets for NON EFEE Members	kr. 1,950.00
EFEE Membership	One year individual membership	kr. 750.00

The above rates exclude Swedish taxes (typically 25% VAT).

## Booking Information

### EFEE Members

EFEE members qualify for a discounted conference registration package. The cost to become an EFEE member is just SEK 750 for professionals and SEK 250 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.

### 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 Members

EFEE National 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.

EFEE Membership – Join EFEE to take advantage of the discounted conference rate. Membership is available to purchase during the registration process.

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

**Book online today: [www.efee2017.com](http://www.efee2017.com)**

## Gold Sponsors



## Silver Sponsors



www.daveybickford.com

## Technical Papers

A range of abstract have been submitted to our technical committee for approval including:

### Blast Vibration and Seismology

- Blast induced vibrations in Malmberget
- Blast Pattern Expansion – A numerical approach
- Close range blasting in adverse geotechnical conditions
- Controlled blast vibrations on the third set of locks: Panama Canal Expansion Program
- Improved logistical efficiencies through vertical emulsion pipelines
- Misfire detection using Wavelet Transforms of Blast Seismograms
- Modern theory = Flexible blasting = Low vibrations
- Prediction of blasting damage based on measurement while drilling technique
- Response Spectrograms in ground vibration analysis
- Testing of a full-scale building under external blast
- The development of a new geometrical blast fragmentation model and its application to Grade Engineering
- The influence of charge confinement on vibration level in blasting
- Underground blasting optimization: Maximum advance and minimum damage

### Blasting Work Experiences

- Blasting close to a substation with a low threshold value. Test blasts, vibration prediction and execution of rock excavations
- Comparative assessment of the application of non-electric and electronic initiation systems in open pit mining: A case study
- Controlled blasting at the Diversion Dam, Snohomish County, WA
- Controlled explosive demolition of a mineral processing plant at Mantoudi, Greece. Stage 2 of the project: Rotary Kilns facilities
- Detonation performance of novel hydrogen peroxide and nitrate based hybrid explosives
- Dynamic response of a defective slope subjected to open-pit to underground mining blasting
- Extraction of contiguous seam and overburden using through seam blasting technique
- High speed video comparison of non-ideal explosive detonation using cylindrical and rectangular shaped charges
- Water blasting of steel box stanchions

### Construction Blasting

- Control of blast induced overbreak in tunnelling projects of Himalayas, India
- Study on numerical calculation and application of blasting of tunnel excavation

### EU Directives and Harmonisation Work

- Ammonium Nitrate; REACH and EU Precursor regulation
- More than Track and Trace – new advantages of Track and Trace software

### Health, Safety and Environment

- Best practices guide for urban blasting operations
- Effect of sample selection, transport and storage on reactive ground test results
- Evaluation of excavation damaged zone characterization methods in nuclear waste disposal facility in Finland
- Repackaging of explosives: A task not anticipated in the Danish regulations
- Reporting system and database for blasting related incidents – another value adding EFEE project
- Toxic fumes from detonation of emulsion explosives

### Blast Design Management

- Blast management plan in Gol-e-Gohar Iron Ore Mine, Iran
- Classification of the requirements for blast design
- Cloud scanning and photogrammetry – A comparison of blast face surveying techniques
- Shock physics computer modelling of Air-Deck behaviour during rock blasting

### New Applications and Training

- Utilization of aerial drones to optimize blast and stockpile fragmentation

### Quarry Experience

- Estimating effect of underground vibrations on the stability of Highwall in a Limestone Quarry
- Investigation of particle size distribution of muckpile in a Dolomite Quarry

### Technical Development

- A case study to determine the blast efficiency in sublevel caving methods via mining software
- A new approach to blasting services contracts
- A new era of Blast Initiation Systems reducing safety risks, costs and enabling automation
- Cutoff in surface delays due to flyrock
- Economic losses in pit productivity versus yield from fines reduction in aggregate operations
- Experimental evaluation of stemming performance in surface blasting
- Explosive cutting of pipelines for the determination of materials properties
- Influence of stemming length, initiation sequence and energy distribution on rock movement and selectivity during a blast
- Innovation in up holes deviation measurements in sublevel stopping mines
- Ring blasting mine to mill optimisation
- Ring blasting modelling and optimisation
- Stabilization of emulsion explosives utilizing optimized co-surfactant systems - Increased efficiency