

Invitation to the Injection Workshop

Hagerbach, Switzerland, 4 – 6 October 2021

Master Builders Solutions Underground Construction

Dear Tunnellers and Miners

We would like to invite you to our practical Injection Workshop in Hagerbach Underground Testing Facility.

The workshop at a glance

The main scope of this workshop is to demonstrate technical solutions for ground consolidation, rock bolting, water ingress reduction and rehabilitation of concrete structures for both tunnelling and mining. The injection technologies covered at the workshop comprise micro cements, colloidal silica mineral grout, polyurethanes, polyurea silicates and acrylic resins.

The main emphasis will be to explain and show different areas of use and demonstrate the practical application including details with suitable pumps and equipment setup.

The workshop is aimed at selected engineers and contractors from the tunneling industry as well as the mining industry, accompanied by their Master Builders Solutions underground representative. The workshop will feature full scale practical demonstrations of injection works. The participants will be divided into groups of approximately 10-12 people per group. Four different workstations will be set up for the practical demonstrations.

Practical information

The workshop, both theoretical and practical sessions, takes place in the underground galleries of the Hagerbach test facility. The workshop will feature different working scenarios (dirty). The course will be held in English language (theoretical and practical part). Participants are required to bring their own safety boots/shoes. Paper-coverall, helmets, safety glasses, dust masks, gloves and ear plugs will be provided at the workshop. All activities will take place underground with an ambient temperature of approximately 15° C. The outdoor temperature at this time of year can vary between +3 to +23° C.

Hotel

Will be booked by us according to your travel itinerary. For those requiring rooms before or after the workshop dates, these will have to be organized and paid by the participants themselves.

Note that there will be the Master Builders Solutions Sprayed Concrete Workshops from 6 - 8 October 2021. You also got the invitation to this workshop in the same mail.

Travel information

Transportation from Zurich Airport to the workshop location and back by bus will be provided. Departure time from Zurich Airport on Monday 4/10/2021 is early evening at 6 pm.

For those arriving later can take train service from Zurich Airport to the Welcome-Diner at Hotel Post in Sargans at their own cost. The diner starts at 7:30 pm.

For those arriving early, you do not have to wait at the airport until 18:00:

- If you would like to visit Zurich, there are trains which take you to Zurich downtown (travel time approx. 10 minutes). Make sure that you will be back at the airport before 18:00.
- If you prefer to make your own way to the hotel (on your own cost), please let us know.

Please plan as follows:

The latest time for your arrival Zurich Airport should be Monday 4 October 2021 at 5pm.

The earliest time for your departure from Zurich Airport back to your destination should be Wednesday 6 October 2021 at 7pm.

Costs

The participants are required to cover their own flights/travel costs to and from Switzerland (Zurich Airport). Participants will be charged CHF 1'450 per person per workshop for the following:

- hotel accommodation from 4 – 6 October 2021,
- transportation from and to the airport, when travelling with the workshop buses,
- local transportation,
- special event, breakfasts, lunches and dinners

Please note that a cancellation fee will be charged, for any cancellations within 5 days before the workshop start date.

If you have any questions, please send a mail to ugc-workshops@mbcc-group.com

Please register at the workshop as soon as possible under ugc-workshops@mbcc-group.com.

We are looking forward to welcome you in Hagerbach



Uwe Wyink
Global Technical Manager Rock Reinforcement

Injection course I: 4th – 6th October 2021

Monday 4th October 2021

- 17:30 Meeting point is the "Hello Bar" in Terminal 1 arrivals
- 18:00 Transfer from Zurich airport to the Welcome dinner at Hotel Post, Sargans
- 19:30 Welcome dinner at the Hotel Post
- 21:45 Transfer to hotels

Tuesday 5th October 2021

- 07:30 Bus transfer to Hagerbach
- 08:00 Theoretical session:
 - » Welcome and practical information, *U. Wyink*
 - » Presentation: MasterRoc injection systems, *U. Wyink*
 - » Water ingress reduction and ground stabilization with micro cements and colloidal silica, *N. Chittenden*
 - » Ground consolidation & void filling with polyurethanes and polyurea silicate resins, *Ch. Herrmann*
 - » Water stopping with accelerated 1&2 K polyurethanes, *Y. Girard*
 - » Fine crack injection and concrete repair with acrylic resins and polyurethanes, *M. Zamecnik*
- 10:45 Introduction into practical stations & PPE distribution
- 11:00 Practical injection demonstration in groups (**session 1**)
- 12:30 Lunch in restaurant Hagerbach
- 13:30 Group Photo in main gallery
- 13:45 Practical injection demonstration in groups (**session 2**)
- 15:30 Theoretical session auditorium
 - » Equipment for modern cementitious injection. (*Hányi*)
 - » Injection methodologies for water ingress reduction and ground stabilization in tunneling. Areas of use and possibilities for different injection technologies (*K. G. Holter, NGI*)
 - » Equipment for 1k + 2k polyurethanes (*DESOI*)
- 17:00 Wrap of the day
- 17:30 Diner barbeque at Hagerbach
- 20:00 transfer from Hagerbach back to the hotels

Wednesday 6th October 2021

- 07:30 Bus transfer to Hagerbach
- 08:15 Practical injection demonstration in groups (**session 3**)
- 10:00 Practical injection demonstration in groups (**session 4**)
- 11:45 Plenary injection demonstration: *Lead: U. Wyink*
 - » Water stopping between TBM segments
 - » Rapid strength development for ground consolidation with polyurea silicate resin
- 12:30 Lunch in underground restaurant in Hagerbach
- 13:30 Auditorium, final session (quiz, discussion and questions)
- 14:30 Conclusion of course
- 14:35 Bus departs for Zürich airport

Stations/Demonstrations:

- » **Station 1:**
Pre-injection for water ingress reduction and ground stabilization with micro cements and colloidal silica, *N. Chittenden, J. Schwarzkönig, G. Bordeianu*
- » **Station 2:**
Fine crack injection in tunnel linings and concrete repair with acrylic resins and polyurethanes
M. Zamecnik, L. Matzner, D. Grassi, I. Bridi
- » **Station 3:**
Ground consolidations, rock bolting and void filling with polyurea silicate and polyurethane resins
U. Wyink, Ch. Herrmann, J. Walachowski
- » **Station 4:**
Water stopping and water ingress reduction with accelerated polyurethanes,
Y. Girard, A. Walker

