



## REFERENCES

Company: GeoEngineering  
Name: **Hubert KIRSCHNER, M.Sc.**  
Nationality: Austrian  
Date of Birth: 10.04.1960  
Profession: Senior Engineering Geologist  
Position in firm: Graduated Consulting Engineer for Geology / Owner  
Years with firm: Since 2011

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### Key Qualification:

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25 years experience in geology, engineering geology, hydrogeology and geotechnical engineering:

- Engineering geologist for tunnelling/shaft (NATM, RMR-Q Sys.) and mass-movement (rockfall, landslide).
- Geological consultant (investigation, analysis and prediction).
- Geotechnical instrumentation and monitoring.
- Supervision for tunnel/cavern (excavation, support measures & permanent lining structures).
- Software: Geotechnical, ACAD, ArcGIS, QGIS

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### Selected References:

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Since 2011 Office: **GEOENGINEERING** / Chartered Engineering Consultant for Geology planning, tendering, investigations, supervision

### Tunnelling in Urban Area

07/2014 – 09/2016 **Confederation Line, Ottawa Light Rail Transit (OLRT)**, Ontario, Canada  
2.5 km long twin-track running tunnel including three light-rail stations, dia. 19 m in hard rock and soft ground. Hard rock excavation carried out by road -header and soft ground excavation by the excavator.  
Position: Chief Geotechnical Engineer

05/2013 – 04/2014 **MTR South Island Line (East), Admiralty Integrated Station and SCL Enabling Works, Contract C901**, Hong Kong SAR  
KIER – LAING O'ROURKE – KADEN Joint Venture, Honk Kong SAR  
Contract Partner: KIER Infrastructure and Overseas Ltd.  
Client: MTR Corporation Ltd  
Geological-geotechnical documentation and monitoring in ADM Cavern, Platform Tunnels, Adits and Underpinning in Station Box. Q - Rock mass classification and rock support determination, investigations, testing and prediction; NATM method.  
Position: Engineering Geologist

### Supervision

04/2011 – 03/2013 **New Hefei–Fuzhou High-Speed Railway Passenger Dedicated Line P.D.L / Mingan Section L3**, Jianyang (Office), PC 354300, Fujian Province, P.R.China  
Client: MoR Ministry of Railway, China  
Speed 350 km/h – ballast-less track, length 810 km

Supervision Consulting: Professional Supervision Engineer (PSE) for tunnel and subgrade in Lot V; length 52 km, 24 tunnels and subgrades.  
 Tunnel length total: 18.380,0 m; 24 tunnels between 178,0 m to 2.591,0 m length; X-section approx. 170 m<sup>2</sup>  
 Position: Professional Tunnel Expert

## Cavern

- 12/2017 – 07/2021 **ADNOC, M-Project, Al Fujairah, UAE.** The construction of three (3) units of the underground crude oil storage facility. One unit includes four caverns with a dimension of 20m x 25m x 1350m each, 7m and 5m D-shaped water tunnels, water curtain boreholes, access tunnels, compressor units, and access roads. Storage capability 42Mbbbl; investment 1.2bn USD; world's single biggest U/G oil storage facility.  
 Excavation method is drill and blast.  
 Position: Sr. Chief Geologist on site; consulting for South Korea's SK E&C (EPC Contractor).
- 04/2017 **ADNOC M-Project, Storage of Crude Oil, Al Fujairah, UAE**  
 Preparation of Tender Documents: Geological – Geotechnical Assessment  
 Geological Consultant
- 01/2012 – 03/2012 **Strategic Storage of Crude Oil Project, Visakhapatnam, India**  
 Client: Indian Strategic Petroleum Reserves Ltd. (ISPRL)  
 Underground construction: Restoration work for Wedge Failure Area (approx. 3.000 m<sup>3</sup> Volume Wedge Failure)  
 Position: Sr. Geologist
- 12/2009 – 02/2011 **Strategic Storage of Crude Oil Project, Padur, India**  
 Indian Strategic Petroleum Reserves Ltd. (ISPRL)  
 Underground oil storage caverns, Unit A  
 Four caverns 700m x 20m x 30m (LWH) with a capacity of 1,25 million metric tons, one access tunnel, two water curtain tunnels, two pump shafts, two inlet shafts, total capacity of unit A & B: 2,5 million metric tons  
 Geotechnical consultation and engineering geological documentation using KRONOS from Geodata of tunnels, shafts and caverns including recommending the rock support systems using the Q-System (Barton et al., 1978)  
 Senior-Geologist on-site
- 06/2008 – 03/2009 **Strategic Crude Oil Project in Underground Rock Caverns, Visakhapatnam, India**  
 Indian Strategic Petroleum Reserve Limited (ISPRL), Contractor: Hindustan Construction Company (HCC)  
 Underground oil caverns: 3 A-caverns 840 m x 20m x 30m (LWH); 2 B-caverns 320m x 20m x 30m (LWH); total capacity of oil storage caverns: 1,33 million metric tons; total length of access and cross tunnels 1400 m; total length of water curtain tunnels 1140 m; 5 shafts up to circa 75 m depth;  
 Geotechnical consultation and engineering geological documentation of slopes, tunnels, shafts and caverns including recommending the rock support systems in metamorphic rocks using the Q-System (Barton et al., 1978)  
 Geologist on-site

## Tunnelling

- 2017 **Koralmb Railway Project, TU Stein, Graz-Klagenfurt, Austria**  
 Position: Engineering Consultant for Geology

- 09/2010 – 10/2010 **Hydroelectric Dam Project Kühtai – Pilot Tunnel**, Tyrol, Austria  
TIWAG, Innsbruck  
Pilot tunnel (length 750 m) and execution 1100 m of core drillings to explore the area of the underground structures of the hydroelectric dam project, Kühtai, Tyrol, Austria  
Engineering geological tunnel and core drilling documentation  
Geologist on-site
- 07/2010 **New Railway Ebensfeld-Erfurt, Construction Lot Silberberg Tunnel**, Ilm Kreis, Thüringen, Germany  
Deutsche Bahn ProjektBau GmbH – Ingenieurbüro Vössing GmbH  
Circa 7,4 km long railway tunnel, parallel pilot tunnel/emergency tunnel and 8 emergency exits with total length of 4,4 km, maximum gradient 10%, conventional tunnel driving (NATM), cross-sectional area circa 180 m<sup>2</sup>, maximum overburden 120 m  
Construction supervision and engineering geological documentation  
Geologist on-site
- 07/2010 **New Railway Ebensfeld-Erfurt, Construction Lot Brandkopf Tunnel**, Ilm Kreis, Thüringen, Germany  
Deutsche Bahn Projekt Bau GmbH – Ingenieurbüro Vössing GmbH  
Double-track railway tunnel of 193 m length, conventional tunnel driving (NATM), cross-sectional area circa 100 m<sup>2</sup> (max. 180 m<sup>2</sup>), maximum overburden 120 m  
Construction supervision and engineering geological documentation  
Geologist on-site
- 06/2007 – 05/2008 **Railway Project Munich-Verona, Inn Valley Corridor, Lot H4-3, Feeder Radfeld - Baumkirchen**, Tyrol, Austria  
Brenner Eisenbahn GmbH (BEG), Innsbruck  
New railway network with construction of civil works using traditional and specialized tunnelling and building methods; total lot length 2,6 km; length of rehabilitated and shifted line 2,0 km; maximum depth of the open cuts 17,5 m; circa 750 m of pressure tunnelling using extensive jet grouting enclosure in soft ground (fluvial deposits), cross-sectional area circa 127 m<sup>2</sup>; tunnelling under existing infrastructures; very shallow overburden (to 3 m below surface); groundwater level 2 m under the surface  
Engineering geological documentation and consultancy during the pressure tunnel drive  
Senior-Geologist on-site
- 1999 – 2000 **Munich-Verona Railway Axis, feeder line North/Lower Inn valley**, Austria (Brenner Eisenbahn GmbH)  
Access tunnel (approx. 100 m)  
Brixlegg East reconnaissance tunnel (approx. 2500 m)  
Vomp East reconnaissance tunnel (approx. 4000 m)  
Vomp West reconnaissance tunnel (approx. 1500 m)  
Engineering geology consultancy services and tunnel documentation  
Geologist
- 1998 **Munich-Verona Railway Axis, feeder line North/Lower Inn valley**, Austria (Brenner Eisenbahn GmbH)  
Geological, hydrogeological and geotechnical tunnel prediction for preparation of tender documents for  
Vomp East reconnaissance tunnel (approx. 4000 m)  
Vomp West reconnaissance tunnel (approx. 500 m)  
Project geologist

## Geological-Hydrogeological Field- and Underground Investigation

- 05/2010 – 06/2010    **Patnitop Road Tunnel**, Jammu & Kashmir, India  
 JV Gammon and Marti for National Highway Authority  
 Double tube Road tunnel with emergency galleries, Length 2 x 9 km  
 Geological mapping and consulting during tendering for the contractor  
 Geologist on-site
- 06/2009 – 04/2010    **Hydroelectric Dam Project, Kaunertal Expansion, Environmental Impact Report**  
 Tyrol, Austria  
 TIWAG, Innsbruck  
 Hydropower plant expansion, construction of: earth dam with height of 121 m, reservoir with working capacity of 42 million m<sup>3</sup>, a pump-storage plant (upper stage power plant, extension capacity circa 400 MW), circa 23km of diversion tunnels and 4 stream barrages, a circa 13 km long headrace tunnel, and lower stage power plant (extension capacity circa 500 MW)  
 Hydrogeological mapping in alpine country of up to 3500 m (area circa 180 km<sup>2</sup>); establishment of a water-rights monitoring programme; data management and interpretation; compiling of environmental impact reports, maps and sections in the field of groundwater; GIS organisation and management  
 Hydrogeologist on-site
- 2002 – 2003            **Linz western ring (A26), 4th Danube crossing, Nordspange**, Upper Austria  
 (Provincial Government of Upper Austria)  
 Total length: 8.5 km; 2 motorway-tunnels (two-lines each) with 3.2 and 2.8 km, numerous access galleries, Danube River crossing; preliminary design  
 Elaboration of the 2nd phase II soil survey, coordination of drilling works and tests, geological analysis of soil survey, Completion of authority procedures  
 Project Manager for underground investigations
- Express road S-69, section Wegierska Gorka**, Milowka/Poland  
 Tunnel prediction, geological, hydrogeological and geotechnical soil investigations for 4.5 km (two-line) tunnel  
 Project Manager for underground investigations.
- 2002                    **City Express road in Katowice/Poland**  
 Tunnel prediction, geological, hydrogeological and geotechnical soil investigations for several open cut tunnels in an urban area  
 Project Manager for underground investigations.
- National Highway NH1A**, Jammu-Srinagar, India  
 National Highway Authority, Delhi  
 Geological field mapping, evaluation and presentation, including the data for the study of alternatives and feasibility 2<sup>nd</sup> phase.  
 Geologist
- 2001                    **SS 508 Sarntal valley road – competition project for the straightening of the Sarntal valley road**, Italy  
 (Autonomous Province of Bolzano, South Tyrol)  
 Basic geological mapping for the design competition  
 Geologist
- Paso Ancho Hydropower Plants**, Rio Chiriqui, Panama  
 (Andes Telecoms Consulting GmbH)  
 Basic geological mapping for conceptual study  
 Geologist

- 2000 – 2001      **Westring Linz-Westspange, 4th Danube river bridge, Nordspange, Austria**  
(Provincial Government of Upper Austria)  
Study of alternatives 2001,  
Elaboration of tender documents for Phase 1 Soil Survey, coordination of drilling works  
and tests, geological analysis of soil survey  
project manager for underground investigations  
Geologist
- 2000              **National Highway NH1A, Jammu-Srinagar, India**  
National Highway Authority, Delhi  
Basic geological field investigation carried out for the study of alternatives and feasibility  
— 1<sup>st</sup> phase.  
Geologist
- 1999              **Rheintal motorway A14 – Amberg Tunnel, Austria**  
(Provincial Government of Vorarlberg)  
Geological detail mapping  
Geological, hydrogeological and geotechnical prediction for construction of second  
tunnel tube (approx. 3,000 m)  
Project geologist
- 1998              **Arlberg expressway S16 - Strengen tunnel, Austria**  
(ASG)  
Geological detail mapping and  
Geological, hydrogeological and geotechnical prediction for two-bore motorway tunnel  
construction (each approx. 5,700 m)  
Project geologist
- 1998              **BAB A71 federal motorway – Rennsteig tunnel, Germany**  
(DEGES)  
Brandleite tunnel overpass: reconnaissance and test coordination, on-site data  
evaluation, geological-geotechnical prognosis
- 1998              **Soil/Site exploration for bedload retention basin at Wörgler Bach creek, Austrian**  
Forestal Service for Torrent and Avalanche Control.
- 1997 – 1998      **Leutasch WWTP**  
Technical-economic site assessment prepared for the wastewater treatment plant.  
Engineering Geologist
- 1997              **WILHELMY ENGINEERING**  
Exploration of sand and gravel resources in Eastern Tyrol; Site exploration in  
Telfs/Stubaital valley, St. Ulrich/Pillersee, Austria

## Geotechnics

- 04/2009 – 02/2010      **Railway Project Munich-Verona, Brenner Base Tunnel – Pilot Tunnel, Tyrol, Austria**  
– South Tyrol, Italy  
BBT-SE, Innsbruck  
56 km long twin-tube railway tunnel, emergency tunnels, multi-function junctions, access  
tunnels and water diversion tunnel  
Taking accompanying geotechnical measurements (inclinometer) during the construction  
of the pilot civil works & tunnel in the Innsbruck Gorge  
Engineering Geologist on-site

08/2006 – 06/2007 **Pir Panjal Railway Tunnel**, Jammu & Kashmir, India  
 Ircon International Limited, Delhi  
 Railway tunnel of 11 km length in the Jammu & Kashmir region with complicated geological behaviour (circa 2 km of soil, up to 1 km of overburden in the central area along with large-scale karst difficulties)  
 Engineering geological consultancy and schooling of the on-site Indian geologists for the geological-geotechnical documentation and prognosis during the tunnel driving  
 Geologist on-site

### Mass-Movement and Landslide

2003 – 2006 **alpS – GmbH, Centre for natural hazard management**  
 PROJEKT A 2.3; Multi-disciplinary analysis of processes for monitoring and modelling of unstable slopes in connection with (recent) tectonic-seismic events; investigations in Austria. Estimation of geogenic hazard potentials as well as the collection of geogenic risks in intensively used landscape parts with the development of a standardised manual insensitive high-alpine areas.  
 Deputy Project Manager

1999 **Rockfall at the Eiblschrofen massif**, Austria  
 Intensive geotechnical monitoring;  
 Project manager of the data collection centre for geology/geotechnics.

### Pipe Line

2001 **Burgas-Alexandroupolis Oil Pipeline Project**, Bulgaria/Greece  
 (BAPLINE I/V S.A. / Thraki S.A.)  
 Geological-geotechnical consultancy  
 Geologist

### Research

2001 – 2003 **Environmental tectonics of the eastern Stubai Alps and the Wipptal Valley**, Austria  
 (Ministry of Education, Science and Culture, Provincial Government of the Tyrol)  
 A brittle tectonic study to evaluate hydrological and geogenic risks as well as water resource hazards - research project  
 Hydrological-hydrogeological analysis  
 Geologist

1986 – 1996 **University of Innsbruck**  
 Structural geological analyses on the exploitation of thermal water resources in the Ötztal valley, Tyrol, Austria  
 Geotechnical surveying and mapping of the "Lainbach" torrent in the region of Reutte, Tyrol, Austria  
 Stratigraphic and tectonic analysis in the mountains of Tannheim, Tyrol, Austria

**Building Construction**

1981 – 1986

**Hanel Construction Management GmbH (Innsbruck)**

**Techno Design- & Construction GmbH (Salzburg)**

**D.I. Westhausser, Engineering Consultant (ZT) for Structural Design (Salzburg)**

Preliminary design, tender design, BOQ, detail design for various projects of structural engineering nature