



A Short Course on
NATM and Observational Methods in Rock Tunneling

By
Prof. Wulf Schubert & Prof. Kurt Klima
Graz University of Technology, Austria

10 – 12 November 2008
CEE Seminar Room B (BLK N1, B1b-14), NTU

Jointly Organised by
Society for Rock Mechanics & Engineering Geology
Defence Science & Technology Agency

Supported by
Protective Technology Research Centre, Nanyang Technological University

Synopsis: Following a very successful short course in Nov 2007 on *Engineering geology, rock mechanics and tunneling*, Professors Schubert and Klima are back with a more advanced course on tunnelling, with a focus on the NATM and observational methods in rock tunnelling covering the entire process from planning, design to construction. Based on a balanced combination of the fundamentals of engineering geology and rock mechanics with many practical engineering examples in varying geological conditions, this short course will prepare the participants with the necessary knowledge and skills to deal with real engineering problems with a view on managing geological risks.

Registration Fee:

SRMEG Members: \$1100.00
Non-SRMEG Members: \$1200.00 (including a one-year membership with SRMEG).
PDU: 18 (pending approval)
(Registration fee covers course handouts, tea breaks and lunches)

Registration:

Title and Full Name (underline Surname / Family Name): Prof / Dr / Mr / Mrs / Ms*		Member of SRMEG: YES NO	
Organisation: Address:			
Phone: (Office)		(Mobile)	Fax:
Email:			
Method of Payment			

- By bank Draft / Cheque in Singapore Dollars drawn on a bank in Singapore and made payable to:
“Society for Rock Mechanics & Engineering Geology”

Bank Draft/Cheque Numbers: _____ Issuing Bank: _____

- Cash

_____ Date

_____ Signature

Please send registration and payment to:
Ms Zhang Yaning, Blk N1.1, #B3-02, 50 Nanyang Avenue, Singapore, 639798
Tel: (65) 6790 6895 Fax: (65) 6790 6841 Email: YNZHANG@ntu.edu.sg Website: www.srmeg.org.sg



Short Course on NATM and Observational Methods in Rock Tunnelling
Prof. Kurt Klima, Prof. Wulf Schubert, Graz University of Technology, Austria

Preliminary Program (10 – 12 Nov 2008, NTU)

Monday, November 10th 2008		
9:00	Introduction	Course organization
9:30	Tunnelling	Historical review on tunnelling methods Development of NATM Basic principles of the observational method
11:00	Geology	Procedure and methods of engineering geological field investigation Use of existing maps, reports, satellite and aerial photos Development of first model
12:30	Lunch break	
13:30	Geology	Field investigation Improvement of first model by field checking/mapping Preliminary characterization and classification
16:00	Geotechnical engineering	Rock mass classification and characterization Classification methods, application and limitations
17:00	End of lecture	

Tuesday, November 11th 2008		
9:00	Geology	Underground investigation methods; drilling, borehole tests, geophysical methods, lab sampling
10:30	Rock Mechanics	Properties of rocks and discontinuities, strength; influence of rock structure on strength and deformation, Determination of rock mass properties Failure mechanisms in blocky rock masses and methods for analysis
12:30	Lunch break	
13:30	Geol/RM	Classification in rock mass types and assessment of basic failure modes, criteria and practical application
15:30	Tunnelling	Excavation methods Drill & blast TBM Control of blasting vibrations
17:00	End of lecture	

Wednesday, November 12th 2008		
9:00	Geology	Sources of geological risk Wrong/incomplete geological model Faults, Karst
11:00	Tunnelling	Excavation and support sequences, typical layout and criteria for application Support types and their effect
12:30	Lunch break	
13:30	Geology	Geological work during construction Documentation of actual geological conditions Updating of model
15:00	Tunnelling	Monitoring Layout of monitoring program Data acquisition, processing and interpretation Safety management
16:30	Contract	Risk sharing, effects of geological/geotechnical uncertainties
17:00	End of lecture	

About the Lecturers

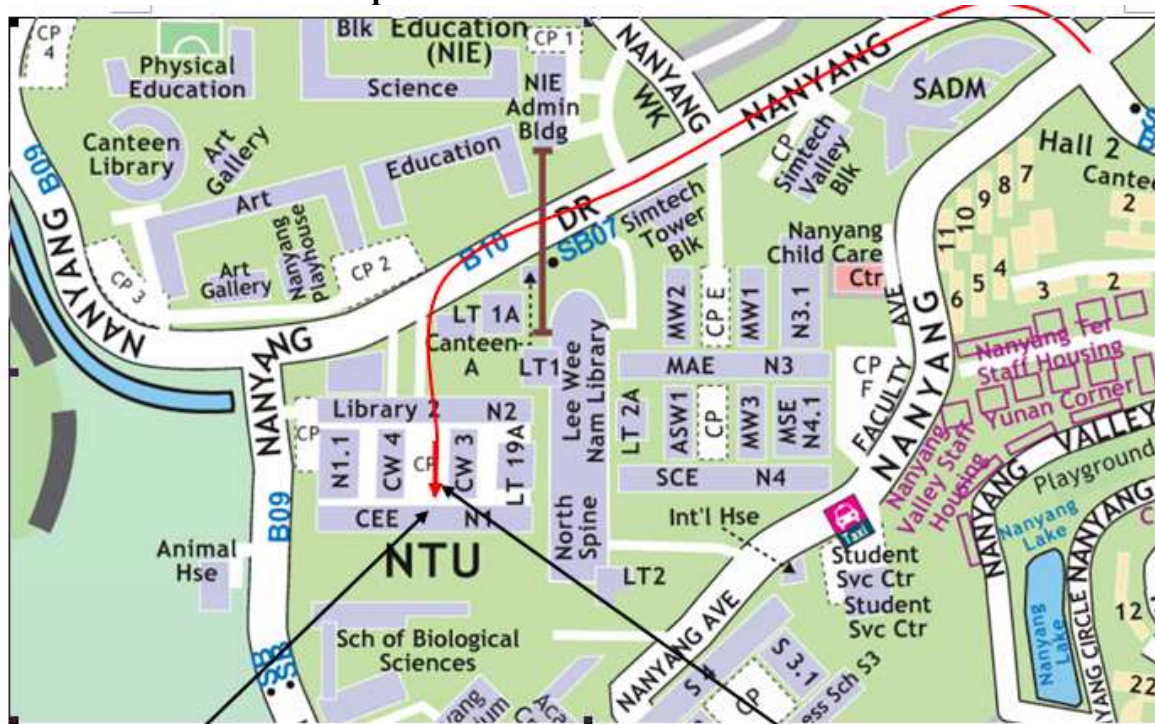
Prof. Wulf Schubert

Prof. Wulf Schubert has 30 years of professional experience in tunnelling. After working for GEOCONSULT mainly on tunnel projects around the world for more than 12 years, he was appointed full professor at the Graz University of Technology for Rock Mechanics and Tunnelling in 1992. His focus in research during the last 15 years was on tunnelling in poor ground. He produced more than 100 publications. Parallel to the research and teaching, he has continued with consulting to keep up with the day to day problems, and he has involved in design, construction supervision, and consulting for underground projects in Austria, Germany, Italy, Spain, Greece, Turkey, Iran, Slovenia, Korea, Taiwan, Thailand, Hong Kong, China, Nigeria, Pakistan, Venezuela, USA, Brasil, Argentina, Chile, Bolivia (total approx. 1.200 km tunnels). He is senior partner in the engineering company Gruppe Geotechnik Graz. Prof. Wulf Schubert has served as Vice President for the ISRM, is active in various working groups in the ISRM and ITA, and currently president of the Austrian Society for Geomechanics and editor of the journal FELSBAU.

Prof. Kurt Klima

Prof. Kurt Klima was born in 1950 in Salzburg, and studied Geology at Graz University. He finished his studies with the degree of "Dr.phil." in 1980. Since 1979 he has been with the Institute of Applied Geosciences at Graz University of Technology, and since 1992 in the position as Assistant Professor. The main fields of his research are on the faults and the wide field of rock mass characterisation. Since 1999 he is Professional Engineer and senior partner in the 3G Gruppe Geotechnik Graz ZT GmbH geotechnical consulting company. Besides the research activities, Kurt Klima was involved in many tunnelling and hydropower projects in Austria and abroad (mainly in China and South America).

Course Venue Location Map



Course Venue: BLK N1, Level B1, Seminar room B (B1b-14)

Car-park (free parking)