

International Workshop on Constitutive Modelling – Development, Implementation, Evaluation, and Application

Hong Kong, China, 12 and 13 January 2007 (Friday and Saturday)

Workshop website: <http://www.cse.polyu.edu.hk/cemodel>

ORGANIZERS:

- The Hong Kong Polytechnic University
- International Association of Computer Methods and Advances in Geomechanics (IACMAG)

SPONSORING ORGANISATIONS:

- China Institution of Soil Mechanics and Geotechnical Engineering of China Civil Engineering Society
- Hong Kong Geotechnical Society
- Geotechnical Division of the Hong Kong Institution of Engineers
- Hong Kong Society of Theoretical and Applied Mechanics
- Geomechanics Committee, Applied Mechanics Division of the American Society of Mechanics Engineering

ORGANIZATION

Workshop Chairman:

Professor Jian-Hua YIN, The Hong Kong Polytechnic University, Hong Kong, China

Co-Chairman:

Professor Chandra S. DESAI, University of Arizona, USA

Assistants:

Miss Hannah W.H. ZHOU and Mr M.D. ZAMAN

Local Organizing Committee:

Prof. J.-H. YIN (Chair) and Prof. X.S. LI (Co-Chair)

Dr. Mark H.C. CHAN, Prof. Y.M. CHENG, Prof. K.T. CHAU, Dr. S.L. CHIU, Dr. Daman LEE, Ir L.M. MAK, Prof. Y.H. WANG, Prof. Robina WONG, Prof. J. YANG, Dr. K.C. YEO, Prof. Albert T. YEUNG, Prof. Z.Q. YUE, Prof. L.M. ZHANG

Workshop Technical Program

Jan 11, 2007 (Thursday)
Hotel check-in and Free time
16:00-20:00 Reception Podium TU201 The Hong Kong Polytechnic University (PolyU)

Jan 12, 2007 (Friday)

7:30-19:00 **Registration (Podium TU201)**

9:00 – 10:45 Plenary Session 1 (Opening Ceremony and Invited Papers)
Venue: TU201- Cheung On Tak Lecture Theater (張安德演講廳)

8:40-9:05 **Opening Ceremony: MC - Professor K.T. CHAU**

- Opening Remarks by Professor J.-H. YIN (Co-Chairman of Workshop)
- PolyU's Welcoming Speech by Professor J.M. KO (Vice-President of The Hong Kong Polytechnic University)
- Guest Speech by Ir Raymond CHAN, JP (Head of the Geotechnical Engineering Office, HKSARG)
- Introduction on the International Association of Computer Methods and Advances in Geomechanics (IACMAG) and Declaration of the Opening of the Technical Program of the Workshop by Professor Chandra S. DESAI (President of IACMAG and Co-Chairman of Workshop)

9:05- 10:25 **Invited Papers: Chairs - Professor K.T. CHAU and Professor Fusao OKA**

- "Some strengths and weaknesses of 'bubble' models" by Angeliki GRAMMATIKOPOULOU, Lidija ZDRAVKOVIC and David M. POTTS (UK)
- "All soils all states all round geo-analysis integration" by Akira ASAOKA (Japan) and Toshihiro NODA
- "Modelling the behaviour of bonded geomaterials under chemical attack" by Roberto NOVA (Italy)
- "Unified constitutive models: simplified for practical applications" by Chandrakant S. DESAI (USA) and Shantanu SANE

10:25-10:35 (10 mins) **Q & A**

10:35-10:55 **Coffee & Tea (Podium TU201)**

10:55-12:15 **Parallel Session A-1**
TU201- Cheung On Tak Lecture Theater (張安德演講廳)
Chairs – Professor Y.M. CHENG and Professor Helmut F. SCHEWEIGER

- "A practical volume-mass constitutive model for unsaturated soils" by Delwyn G. FREDLUND, Hung Quang PHAM and Murray and Del FREDLUND (Canada)
- "A refined theoretical model extended to unsaturated soils: formulation and implementation into a coupled hydro-mechanical finite element code" by Jean-

10:55-12:15 **Parallel Session B-1**
TU101- Tin Ka Ping Lecture Theater (田家炳演講廳)
Chairs – Professor Jun YANG and Professor Toshihisa ADACHI

- "Comparison of elasto-plastic and hypoplastic modelling of structured clays" by David MASIN (Czech Republic)
- "A constitutive model for damage analyses in granular soils" by Xueyan LIU (The Netherlands) and Tom SCARPAS
- "On the definition of the fatigue loading for sand" by Andrzej

10:55-12:15 **Parallel Session C-1**
TU103- Wong's International Lecture Theater (王氏國際演講廳)
Chairs – Professor - Y.H. WANG and Professor Nicolae CRISTESCU

- "Micromechanical approach to the behavior of unsaturated porous media" by Xavier CHATEAU (France) and Luc DORMIEUX
- "An equivalent non-linear constitutive model for jointed rock mass: sensitivity analysis" by T.G. SITHARAM and V.B. MAJI (India)

<p><u>Michel PEREIRA (France)</u>, Henry WONG and Philippe DUBUJET</p> <ul style="list-style-type: none"> ▪ “Study on nonlinearity of the shear strength of unsaturated soils” by Pei-Yong LI, <u>Qing YANG (China)</u>, Mao-Tian LUAN and Dong-Lin WANG ▪ “Effect of end-restraint on failure process and stress-strain curve for geomaterial specimen with random material imperfections” by <u>Xue-Bin WANG (China)</u> ▪ “Constitutive modelling of the effect of anisotropy on deformation of sand” by <u>Ali LASHKARI (Iran)</u> and Manouchehr LATIFI <p>12:15-12:25 Q & A</p>	<p>NIEMUNIS, Torsten WICHTMANN, and <u>Theodor TRIANTAFYLIDIS (Germany)</u></p> <ul style="list-style-type: none"> ▪ “Dynamic constitutive model of frozen soil under high strain rates” by <u>Qin Yong MA (China)</u> and Mei-Feng CAI ▪ “A new anisotropic model for creep in soft soils” by <u>Martino LEONI (Germany)</u>, P.A. VERMEER and X.J. YU <p>12:15-12:25 Q & A</p>	<ul style="list-style-type: none"> ▪ “Identification of bituminous concrete elasto-plastic parameters from a structural test” by <u>Delphine CUISINIER (France)</u>, Y. BERTHAUD and M. FRANÇOIS ▪ “Modeling of fabric anisotropy effects in granular soils” by <u>Zhong-Xuan YANG (Hong Kong, China)</u>, Jun YANG and Xiang-Song LI ▪ “A new method for generating geometry model of concrete mesostructure” by <u>Zheng-Yu REN (China)</u> and Jun-Yong WU <p>12:15-12:25 Q & A</p>
<p>12:25-13:40 (75 mins) (Podium TU201: Buffet Lunch) Lunch Meeting of Board Members of IACMAG and Editorial Members of IJOG: Visit to PolyU’s Soil, Rock and Geology Labs (Optional) During Lunch</p>		
<p>13:40-16:00 Plenary Session 2: Development - Soils TU201- Cheung On Tak Lecture Theater (張安德演講廳) Chairs - Professor X.S. LI and Professor Roberto NOVA</p> <ul style="list-style-type: none"> ▪ “Multilaminate framework for modelling soil behaviour” by Florian SCHARINGER,, <u>Helmut F. SCHWEIGER (Austria)</u>, and Vahid GALAVI ▪ “A generalised plasticity model for swelling clays: formulation, implementation and validation” by M. SÁNCHEZ, <u>A. GENS (Spain)</u>, L. GUIMARÃES and S. OLIVELLA ▪ “Constitutive modelling of non-coaxial behaviour and bonding effects in geomaterials” by <u>Hai-Sui YU (UK)</u>, Sia Min TAN and Yunming YANG ▪ “Modelling the long term behaviour of rockfill” by <u>Eduardo E. ALONSO (Spain)</u> and Luciano A. OLDECOP ▪ “An elasto-plastic model for unsaturated soil” by <u>Guang-Xin LI (China)</u> and Wei Si ▪ “Method to consider the influence of intermediate principal stress and the influence of density and/or confining pressure in constitutive modeling of soils” by <u>Nakai TERUO (Japan)</u> and Masaya HINOKIO ▪ “Characterization of microstructure of granular material” by Xia LI and <u>Xiang-Song LI (Hong Kong, China)</u> <p>16:00-16:10 (10 mins) Q & A</p>		
<p>16:10-16:30 (20 mins) Coffee & Tea (Podium TU201)</p>		

16:30 – 18:10 **Plenary Session 3: Implementation, Evaluation and Applications**

TU201- Cheung On Tak Lecture Theater (張安德演講廳)

Chairs - Professor Albert T. YEUNG and Professor Y.K. CHOW

- “Progressive cut slope failure in transversely isotropic ground” by Toshihisa ADACHI (Japan), Fusao OKA, Sayuri KIMOTO, and Hideyuki KOBAYASHI
- “Laboratory observation, development and application of ballast constitutive model for rail tracks” by Buddhima INDRARATNA (Australia), Cholachat RUJIKIATKAMJORN and Rohan WALKER
- “Numerical study on one-dimensional consolidation with different thickness using an elasto-viscoplastic model” by Sayuri KIMOTO and Fusao OKA (Japan)
- “Finite element modelling of a tunneling process in granular soil” by Annamaria CIVIDINI and Giancarlo GIODA (Italy)
- “Critical state of samples of ellipsoids of two sizes” by Tang-Tat NG (USA)
- “An independent principal stress control apparatus and two numerical models of soil” by Akitoshi MOCHIZUKI (Japan), Sokkheang SRENG, Xianfeng MA, Min CAI and Jie XIONG
- “Effect of creep on the settlement–time relation during primary consolidation of clay” by Hiroshi MATSUDA (Japan), Wonjin BAEK and Jongwha BAEK
- “Strain and stress paths in geotechnical structures and requirements to constitutive models of geomaterials” by Marta DOLEZALOVA (Czech Republic)

19:10-19:20 (15 mins) **Q & A**

19:20-21:00 **Dinner**

Communal Building (文康大樓), 4th Floor, Staff Restaurant (南北小廚), PolyU

Jan 13, 2007 (Saturday)

7:30-12:00 **Registration (Podium TU201)**

8:20 – 10:40 **Plenary Session 4: Development – Rocks and Applications**

TU201- Cheung On Tak Lecture Theater (張安德演講廳)

Chairs - Professor Quentin YUE and Professor Hai-Sui YU

- “Mechanical behavior of soft sedimentary rock, testing and modeling” by Feng ZHANG (Japan), Guanlin YE, Kiyokazu NAITO, Hla. AUNG and Atsushi YASHIMA
- “Hydromechanical modeling of unsaturated rock and application to nuclear waste storage”, by Yun JIA, Kun SU, Gilles DUVEAU and Jianfu SHAO (France)
- “Constitutive equation for rocks” by Nicolae D. CRISTESCU (USA)
- “Rheological damage fracture model for slope stability analysis” by Wei-Yuan ZHOU (China), Peng LIN and Qiang YANG
- “3D FE analysis of tunnel-pile interaction using a strain dependent soil model” by Y.K. CHOW (Singapore), C. H. PANG and K. Y. YONG

- “Seafloor-riser interaction model” by Charles P. AUBENY and Giovanna BISCONTIN (USA)
- “Techniques for simulation of large-scale nonlinear soil-structure systems” by Ahmed ELGAMAL (USA), Jinchi LU, Liangcai HE, Kincho H. LAW, and Zhaohui YANG

10:40-10:50 (10 mins) Q & A

10:50-11:10 (20 mins) Coffee & Tea (Podium TU201)

11:10–12:25 Parallel Session A-2

TU201 - Cheung On Tak Lecture Theater (張安德演講廳)

Chairs – Dr. Daman LEE and Professor Jianfu Shao

- “Understanding and thinking on the thermomechanical approach of constitutive modeling for geomaterials” by Liang KONG (China)
- “3d physical and finite element modelling seepage study” by Dr Rakesh Kumar VINOD (India)
- “Time-dependent behaviour of soils described by an elasto-viscoplastic model” by Zhen-Yu YIN (France) and Pierre-Yves HICHER
- “A thermomechanical damage framework for constitutive models for rate-independent dissipative geomaterials (Part I) by Xuan GUO and Cheng Gang ZHAO (China)
- “Dual-surface damage model for natural clays within the thermomechanical framework (Part II) Xuan GUO and Cheng Gang ZHAO (China)

12:25-12:35 Q & A

11:10 – 12:25 Parallel Session B-2

TU101 – Tin Ka Ping Lecture Theater (田家炳演講廳)

Chairs – Dr. Mark CHAN and Professor Antonio GENS

- “3D modelling of footings on soft soil” by Harald KRENN and Minna KARSTUNEN (UK)
- “Numerical simulation for disturbing influence on subgrade soil in mining subsidence area” by Guang-Yun YU (China), Ping SHENG and Li-Bo WANG
- “Finite element analysis of reinforced soil subjected to cyclic loading” by K. RAJAGOPAL (India) and N. UNNIKRISHNAN
- “Landslide stability analysis under rainfall and reservoir water level fluctuation by FEM” by Xinli HU (China), Huiming TANG and Yingzi XU
- “Probabilistic volume element modelling in failure process analysis of quasi-brittle materials” by Ming ZHANG (China), Zhong-Kui LI and Qing-Bin LI

12:25-12:35 Q & A

11:10 – 12:25 Parallel Session C-2

TU103 - Wong’s International Lecture Theater (王氏國際演講廳)

Chairs – Dr. K.C. YEO and Professor Feng ZHANG

- “Assessment of the influence of anisotropy and inhomogeneity on the stability of underground opening using a micromechanics model” by Shuhong WANG (China), Tianhong YANG, Chun-an TANG, and Shanyong WANG
- “Gradient dependent limit theorems for elastoplastic geomaterials” by Jidong ZHAO (Australia), Daichao SHENG and Scott W. SLOAN
- “Fully coupled deformation analysis of slope due to rise of ground water level” by Haiyan MING (China) and Xiang-Song LI
- “Stress-dilatancy relationship for rockfill material” by Farzin KALANTARY and S. JAHANGIRI MOAOURI (Iran)

12:25-12:35 Q & A

12:35-13:20 (45 mins) (Podium TU201: Buffet)

13:20 – 15:20 **Plenary Session 5: Development, Evaluation and Applications**

TU201- Cheung On Tak Lecture Theater (張安德演講廳)

Chairs - Professor L.M. ZHANG and Professor Mao-Song HUANG

- “Constitutive modelling in the context of geoenvironmental engineering – some recent developments” by Hywel R. THOMAS (UK) and Suresh C SEETHARAM
- “Comparison between drained and undrained behaviors under triaxial compression tests of sand” by Kiichi SUZUKI (Japan), Eiki NAKAYAMA and Takeko MIKAMI
- “A anisotropic bounding surface model for natural clays” by Maosong HUANG (China) and Xing WEI
- “Evaluation on two non-classical constitutive models for granular materials by discrete element method” by Mingjing JIANG (China), Hehua ZHU and David HARRIS
- “Digital image processing based numerical approach for constitutive modelling development of heterogenous geomaterials” by S. CHEN and Z.Q. YUE (Hong Kong, China)

15:20-15:30 (10 mins) **Q & A**

15:30-15:50 (20 mins) **Coffee & Tea (Podium TU201)**

15:50 - 18:40 **Plenary Session 6**

Discussion on: *Impediments to Use Advanced Constitutive and Numerical Models in Geotechnical Practice*

TU201- Cheung On Tak Lecture Theater (張安德演講廳):

Chairs – Professor Chandra DESAI, Professor David POTTS, and Professor Jianhua YIN

15:50 – 16:20 **Report by coordinators Professor Chandra DESAI and Professor J.-H. YIN on a few key issues and topics in the discussion theme area (30 mins)**

16:20 – 17:20 **Presentations/Comments by panelists (5 minutes for each) (total 60 minutes)**

Academics:

- “Multilaminate model vs plaxis hardening soil model” by Florian SCHARINGER, Helmut F. SCHWEIGER (Austria) and VAHID GALAVI
- “Development and application of constitutive model for railway ballast” by Buddhima INDRARATNA (Australia), Wadud SALIM and Cholachat RUJIKIATKAMJORN
- “Path dependent elasto-plastic constitutive model for geomaterials” by Marta DOLEZALOVA (Czech Republic)
- Discussion from “Constitutive modelling of non-coaxial behaviour and bonding effects in geomaterials” by Hai-Sui YU (UK), Sia Min TAN and Yunming YANG
- Discussion from “Some strengths and weaknesses of ‘bubble’ models” by Angeliki GRAMMATIKOPOULOU, Lidija ZDRAVKOVIC and David M. POTTS (UK)
- Discussion from “Unified constitutive models: simplified for practical applications” by Chandrakant S. DESAI (USA) and Shantanu SANE
- “Finite element prediction of the effects of faulting below an existing building” by Annamaria CIVIDINI, Giancarlo GIODA (Italy), and Lorenza PETRINI

- “Nonlinear elastic visco-plastic modelling and a simplified method for calculating settlement of soil with creep” by Jian-Hua YIN (Hong Kong, China)

Practitioners:

- “Validation of geotechnical computer programs” by Mark H. C. CHAN (Hong Kong, China)
- “Full-scale pumping test to confirm the effectiveness of seepage cut-off system-a case study” by Lap-Ming MAK (Hong Kong, China)
- “Impediments to use advanced constitutive and numerical models in geotechnical practice – an opinion” by Jack W. PAPPIN (Hong Kong, China)

17:20 – 18:45 **Discussion including questions to the panel as well as comments by the audience**
(total 85 minutes)

18:45 – 18:50 **A brief presentation to invite delegates to the 12th IACMAG** by Professor K. RAJAGOPAL
(5 mins)

18:50-19:00 **Closing Ceremony: MC - Professor Robina WONG**

- **Remarks and Vote of Thanks to All Speakers** by Ir L.M. MAK (President of the Hong Kong Geotechnical Society) (5 mins)
- **Remarks and Thanks to All LOC Members, Assistants, and Sponsors, Declaration of the Closing of the Workshop, and Announcements** by Professor X.S. LI (Co-Chair of Local Organizing Committee of the Workshop) (5 mins)

(Collection of CPD Certificate afterward)

19:00-23:00 **Banquet**

at Li Ka Shing Tower (李嘉誠樓), 14th Floor, Four Seas Restaurant (聚賢樓中餐廳), PolyU

A map for all events is as follows:

