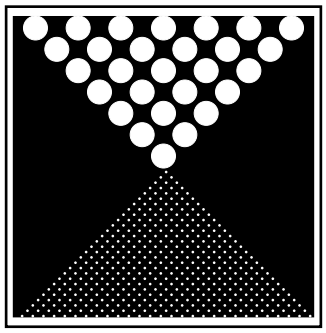
ASSOCIATION FOR THE STUDY OF THE MICROMECHANICS OF GRANULAR MEDIA

ASSOCIATION POUR L'ETUDE DE LA MICROMECANIQUE DES MILIEUX GRANULAIRES

POWDERS AND GRAINS 2001

4th INTERNATIONAL CONFERENCE ON MICROMECHANICS OF GRANULAR MEDIA



NEW WORLD HOTEL

SENDAI, JAPAN

21st-25th May 2001

FINAL BULLETIN

A E M M G

(Association pour l'Etude de la Micromécanique des Milieux Granulaires)

President: P. Evesque, École Centrale de Paris

Scientific Committee

OBJECTIVES

Following in the spirit of past conferences at Clermond-Ferrand, France in 1989; Birmingham, England in 1993; Durham, USA in 1997, the purpose of this first meeting in the new century is to communicate continuing developments in research on the micromechanics of granular media.

Understanding the behavior of granular media in terms of micromechanics is of fundamental importance in a number of areas of science and technology – the complexity of the mechanics requires interdisciplinary discussions involving applied mathematicians, statistical physicists, geologists, and chemical/civil/mechanical/agricultural engineers. Practical goals of this activity are improvements in industrial production, process performance, construction design, and so on.

The topics discussed in this meeting range from quasi-static problems to dynamic problems, and are divided into 15 groups: packing geometry, cohesion/cracking, measurement system, wave propagation, quasi-static modeling, quasi-static behavior, submerged behavior, localized deformation, externally disturbed behavior, shear flow, vertical flow, surface flow, vibrated flow, mixed flow and viscous flow/crushing. Each group contains theoretical, experimental and computational approaches by researchers with different backgrounds; such combination will provide new insights not only into the respective sub field but also into other relevant fields. I am convinced that this meeting will be of great benefit to every participant.

I am grateful for financial support provided by the Japan Society for the Promotion of Science, the Japanese Geotechnical Society, Hosokawa Powder Technology Foundation and the Kajima Foundation. I am also grateful to the Executive Committee and the Scientific Committee for their kind help in organizing this meeting. Finally, I would like to thank all the authors for their contibution to the Proceedings and wish all of you an enjoyable and stimulating meeting.

Yuji Kishino

POWDER & GRAINS 2001
PROGRAM

Sunday, May 20

1400-1800 Registration

1800 Welcome Reception and Buffet

Monday, May 21

0830 Announcements

SESSION 1- WAVE PROPAGATION

0835 X.Jia & P.Mills
(Université Paris VI & VII, France)
Sound propagation in dense granular materials (invited lecture)

0915 E.Somfai, W.van Saarloos & J.-N.Roux
(Universiteit Leiden, Netherlands)
Wave propagation in force chains

0930 S.Sen, M.Manciu, F.S.Manciu & A.J.Hurd
(State University of New York at Buffalo, USA)
Impulse propagation in granular chains

0945 G.Gudehus, I.Loukachev & N.Pralle
(University of Karlsruhe, Gremany)
Inelastic behaviour of grain skeletons with propagation of plane shear waves

1000 F.Oka & B.Boutillier
(Kyoto University, Japan)
Analysis of wave propagation characteristics through saturated granular material by a gradient-viscoelastic model

1015 Discussion

1030 Coffee and Posters

SESSION 2- VERTICAL FLOW

1115 C.S.Chou, M.J.Li, J.Smid, J.T.Kuo & S.S.Hsiau
(National Pingtung University of Science and Technology, Taiwan)
Flow patterns and stresses on the wall in a moving granular bed with centric discharge

1130 J.F.Ferellec, J.Martinez, S.Masson & K.Iwashita
(Institut National des Sciences Appliquées, France)
Influence of particle rolling resistance on silo flow in DEM simulations

1145 R.Rechtman, R.Peralta-Fabi & G.Caballero
(UNAM, Mexico)
Arching in silos and piles

1200 D.Petit, F.Pradel, G.Ferrer & Y.Meimon
(Institut Français du Pétrole, France)
Shape effect of grain in a granular flow

1215 Discussion

1230 Lunch

SESSION 3- MIXED FLOW

1400 S.Yuu
(Kyushu Institute of Technology, Japan)
Numerical simulation of gas-solid two-phase and powder flows (invited lecture)

1440 M.Y.Louge, H.Xu & J.T.Jenkins
(Cornell University, USA)
Studies of gas-particle interactions in a microgravity flow cell

1455 H.Hayakawa & H.Kuninaka
(Kyoto University, Japan)
Coefficient of restitution of elastic disks

1510 A.Castellanos, J.M.Valverde, M.A.S.Quintanilla & P.Mills
(Universidad de Sevilla, Spain)
The effect of particle aggregation on the collapse of gas-fluidized beds

1525 B.H.Xu, A.B.Yu & P.Zulli
(The University of New South Wales, Australia)
The effect of interparticle forces on powder fluidization behaviour

1540 Discussion

1555 Coffee and Posters

SESSION 4- SUBMERGED BEHAVIOR

1640 V.De Gennaro
(CERMES, ENPC-LCPC, France)
On the structural anisotropy of sands

1655 K.Iwashita & M.Oda
(Saitama University, Japan)
Numerical simulation of granular materials subjected to cyclic loading under constant volume by modified distinct element method

1710 J.Miyamoto & H.Sekiguchi
(Kyoto University, Japan)
Effect of wave loading history on the initiation and development of liquefaction in sand beds

1725 M.Miyata, T.Sugano, G.G.W.Mustoe, M.Nakagawa & T.Tanaka
(Port and Harbour Research Institute, Japan)
Study on the force support system within a rubble rock foundation using discrete element method

1740 Discussion

1830 Dinner

2000 Poster Session

Tuesday, May 22

0830 Announcements

SESSION 5- QUASI-STATIC MODELING

0835 S.Luding
(Institute for Computer Applications 1, Germany)
From DEM simulations towards a continuum theory of granular matter
(invited lecture)

0915 M.Satake
(Tohoku Gakuin University, Japan)
Stress and strain in granular materials

0930 P.Evesque
(École Centrale de Paris, France)
Modelling the micro-macro passage in the quasi-statics regime of granular matter

0945 Ph.Dubujet & B.Cambou
(École Centrale de Lyon, France)
Static anisotropy in granular materials

1000 K.Kaneko, Y.Kishino, T.Kyoya & K.Terada
(Tohoku University, Japan)
Numerical multi-scale modeling and analysis of granular media based on the homogenization theory

1015 Discussion

1030 Coffee and Posters

SESSION 6- VERTICAL / SURFACE FLOW

1115 A.Samadani & A.Kudrolli
(Clark University, USA)
Segregation and layering in the flow of wet granular matter

1130 W.Chen, K.Lu, Z.Jiang, M.Hou & L.Lam
(Chinese Academy of Sciences, China)
Electric-field induced retardation of granular flows in a pipe

1145 N.Mitarai & H.Nakanishi
(Kyushu University, Japan)
Instability of granular flow on rough inclined plane

1200 D.Bideau, I.Ippolito, M.A.Aguirre, A.Calvo & N.Nerone
(Université de Rennes I, France)
Some experiments on granular surface flows

1215 Discussion

1230 Lunch

SESSION 7- VISCOUS FLOW AND CRUSHING

1400 D.J.Benson
(University of California, USA)
The simulation of powder processing with Eulerian finite element Methods (invited lecture)

1440 T.Aizawa & T.Iwai
(University of Tokyo, Japan)
Effect of the powder characteristics on the Non-Newtonian flow of powder-binder compound in the metal powder injection molding

1455 N.Roussel, C.Lanos & Y.Mélinge
(Institut National des Sciences Appliquées, France)
Drainage condition of saturated granular media under shearing

1510 Y.Xu, W.Huang & G.Lian
(China Agricultural University, China)
On the normal viscous force between two colliding spheres with an interstitial power-law liquid

1525 W.X.Yuan, A.S.Burbidge, K.A.Fisher, P.A.Langston & D.I.Wilson
(The University of Birmingham, UK)
A microscale model of paste flow in piston-driven extrusion process

1540 Discussion

1555 Coffee and Posters

SESSION 8- PACKING GEOMETRY

1640 Y.F.Xu, H.Matsuoka & D.A.Sun
(Nagoya Institute of Technology, Japan)
Fractal model for grain-size distribution of soils

1655 L.Oger, P.Richard, J.P.Troadec & A.Gervois
(Université de Rennes I, France)
Comparison between a 2D froth and a cut of 3D froth

1710 M.Nicolas, P.Duru & O.Pouliquen
(Technopôle de Château-Gombert, France)
Compaction of a packing of hard spheres under horizontal shear

1725 T.Tsuchikura & M.Satake
(Maebashi Institute of Technology, Japan)
A consideration on the statistical analysis of particle packing using loop tensors

1740 Discussion

1830 Dinner

2000 Poster Session

Wednesday, May 23

0830 Announcements

SESSION 9- QUASI-STATIC BEHAVIOR

0835 C.Thornton & L.Zhang
(Aston University, UK)
A DEM comparison of different shear testing devices (invited lecture)

0915 L.Rothenburg & N.P.Kruyt
(University of Waterloo, Canada)
On limitations of the uniform strain assumption in micromechanics of granular materials

0930 J.T.Jenkins & L.LaRagione
(Politecnico di Bari, Italy)
Fluctuations and state variables for random arrays of identical disks

0945 Y.Kishino, H.Akaizawa & K.Kaneko
(Tohoku University, Japan)
On the plastic flow of granular materials

1000 K.Maeda, N.Kuwabara & H.Matsuoka
(Nagoya Institute of Technology, Japan)
Micromechanical analysis on formation process of microstructure in granular material during compression and shear

1015 Discussion

1030 Coffee and Posters

SESSION 10- SURFACE FLOW

1115 A.V.Orpe & D.V.Khakhar
(Indian Institute of Technology-Bombay, India)
Granular flow in quasi-2d rotating cylinders

1130 P.Schiffer, P.Tegzes, T.Vicsek, R.Albert & A.-L.Barabási
(Pennsylvania State University, USA)
Repose angle studies of wet granular media

1145 A.Schinner, K.Kassner, H.-G.Mattutis, K.M.Aoki, T.Akiyama, J.Aoki & S.Takahashi
(Otto-Von-Guericke University, Germany)
History-dependent structure in granular piles

1200 Q.Sun & G.Wang
(Tsinghua University, China)
Discrete simulations of the impact process in aeolian saltation

1215 Discussion

1230 Lunch

1330 Excursion

1830 Dinner

2000 Video Session

Thursday, May 24

0830 Announcements

SESSION 11- LOCALIZED DEFORMATION

0835 I.Vardoulakis
(National Technical University of Athens, Greece)
Thermo-poro-mechanical analysis of rapid fault deformation (invited lecture)

0915 F.Darve & F.Laouafa
(Université J. Fourier, France)
Mechanical instabilities in granular media

0930 M.R.Kuhn
(University of Portland, USA)
Strain gradient dependence and shear band formation in granular materials

0945 K.Nübel & G.Gudehus
(University of Karlsruhe, Germany)
Evolution of localized shearing; dilation and polarization in grain skeletons

1000 F.Calvetti, C.di Prisco & R.Nova
(Milan University of Technology, Italy)
Modelling of pipeline-landslide interaction

1015 Discussion

1030 Coffee and Posters

SESSION 12- VIBRATED FLOW

1115 G.Metcalfe, S.G.K.Tennakoon, L.Kondic, D.G.Schaeffer & R.P.Behringer
(CSIRO, Australia)
Solid-liquid transitions of horizontally shaken dry granular materials

1130 C.Lesaffre, V.Mineau, D.Picart & H.Van Damme
(CEA Le Ripault, France)
Densification under vibration of fully saturated granular packings

1145 A.Ugawa, K.Suzuki & O.Sano
(Tokyo University of Agriculture and Technology, Japan)
Pattern formation of thin granular layer due to vertical vibration

1200 J.L.Turner, M.T.Lusk & M.Nakagawa
(Colorado School of Mines, USA)
Grain boundary motion in particulate material

1215 Discussion

1230 Lunch

SESSION 13- COHESION AND CRACKING / CRUSHING

1400 K.Sako, R.Kitamura & M.Yamada
(Kagoshima Universiy, Japan)
A consideration on effective cohesion of unsaturated sandy soil

1415 I.Preechawuttipong, R.Peyroux & F.Radjaï
(Université Montpellier II, France)
Microscopic features of cohesive granular media

1430 C.L.Martin & D.Bouvard
(Université J. Fourier, France)
Cohesion of powder compacts containing hard and soft particles

1445 Y.Yamazaki & T.Mizuguchi
(Hiroshima University, Japan)
Labyrinthine pattern by front aggregation in drying water-granule systems

1500 D.Robertson & M.D.Bolton
(Cambridge University, UK)
DEM simulations of crushable grains and soils

1515 Discussion

1530 Coffee and Posters

SESSION 14- EXTERNALLY FORCED BEHAVIOR

1615 A.Corfdir, P.Lerat & J.-N.Roux
(Laboratoire Central des Ponts et Chaussées, France)
Translation and rotation of grains within an interface between granular media and structure

1630 B.Baylac, S.Masson & J.Martinez
(Institut National des Sciences Appliquées, France)
Localisation analysis from DEM simulations of soil-structure interfaces

1645 J.-C.Géminard, W.Losert & J.P.Gollub
(École Normale Supérieure de Lyon, France)
Frictional mechanics of granular materials : Wet friction, aging, and binary mixtures

1700 H.P.Kuo, Y.L.Ding, A.S.Burbidge, J.P.K.Seville, D.J.Parker, Y.Tsuji & M.J.Adams
(The University of Birmingham, UK)
Validation of soft-sphere DEM simulations using the PEPT technique

1715 H.Takahashi, H.Yamanaka, S.Sekino & H.Hashimoto
(Tohoku University, Japan)
Study on the mixing behavior of excavated soils and additives in an excavated soil-recycling machine

1730 Discussion

1900 Banquet

Friday, May 25

0830 Announcements

SESSION 15- SHEAR FLOW

0835 R.P.Behringer, J.Geng, D.Howell, E.Longhi, G.Reydellet, L.Vanel, E.Clément & S.Luding
(Duke University, USA)
Fluctuations in granular materials (invited lecture)

0915 J.T.Jenkins
(Cornell University, USA)
Dense, plane flows of compliant, frictional spheres

0930 H.H.Shen
(Clarkson University, USA)
Sample size effect on the constitutive relations of granular materials

0945 H.J.Kim
(Korea Railroad Research Institute, South Korea)
A Study on the dynamic behavior of granular materials in a sheared granular flow

1000 B.Sève, I.Iordanoff & Y.Berthier
(Laboratoire de Mécanique des Contacts, France)
On the application of granular media shearing in tribology

1015 Discussion

1030 Coffee and Posters

SESSION 16- MEASUREMENT SYSTEM

1115 Y.P.Cheng, D.J.White, E.T.Bowman, M.D.Bolton & K.Soga
(Cambridge University, UK)
The observation of soil microstructure under load

1130 D.Bonamy, L.Laurent & F.Daviaud
(Service de Physique de l'état Condensé, France)
Electrical conductance of a thermally perturbed packing: on the origin of granular Fragility

1145 H.G.B.Allersma
(Delft University of Technology, Netherlands)
Optical analysis of stress and strain around a penetrating probe in a granular medium

1200 T.Yanagida, A.J.Matchett & J.M.Coulthard
(University of Teesside, UK)
Damping and elastic properties of binary powder mixtures

1215 Discussion

1230 Lunch

Poster Presentations

PACKING GEOMETRY

R.Y.Yang, R.P.Zou & A.B.Yu
(University of New South Wales, Australia)
Voronoi tessellation of packing of fine uniform spheres

D.Picart, L.P.Terzulli, C.Lesaffre & V.Mineau
(CEA Le Ripault, France)
Packing density of a polydispersed granular material

F.Radjaï & S.Roux
(Université Montpellier II, France)
Features of the granular texture

H.Troadec, F.Radjaï, S.Roux & J.C.Charmet
(Université Montpellier II, France)
A model for the statistics of local fabrics in granular media

A.Murakami, H.Sakaguchi, T.Takasuka & H.Fuji
(Okayama University, Japan)
Study of microtopology and its evolution in granular materials using a cellular automata model

COHESION AND CRACKING

M.A.S.Quintanilla, A.Castellanos & J.M.Valverde
(Universidad de Sevilla, Spain)
Correlation between bulk and interparticle contact forces for fine powders

T.Mizuguchi, A.Nishimoto, S.Kitsunezaki, Y.Yamazaki & I.Aoki
(Kyoto University, Japan)
Directional crack propagation in drying process of wet granules

F.Mabille, Y.Haddad, J.Y.Delenne & J.C.Benet
(INRA Montpellier, France)
Experimental study of the rheology and the cracking of granular media with cementation

MEASUREMENT SYSTEM

P.Breul & R.Gourvès
(Sol Solution Geotechnical Consultancy, France)
Geoendoscopy: a means to link mechanical and morphological information

E.Lévêque, B.Gilles, C.Laroche & C.Coste
(École Normale Supérieure de Lyon, France)
Huge fluctuations in weight measurements at the bottom of a 2D vertical sheet of grains

T.Yanagida, A.J.Matchett & J.M.Coulthard
(University of Teesside, UK)
Energy dissipation of binary powder mixtures subject to vibration

G.D'Anna & G.Gremaud
(École Polytechnique Fédérale de Lausanne, Switzerland)
Vibration-induced "thermally activated" jamming transition in granular media

WAVE PROPAGAION

B.Gilles & C.Coste
(École Normale Supérieure de Lyon, France)
Nonlinear elasticity of a 2D regular array of beads

V.A.Osinov
(University of Karlsruhe, Gremany)
The role of dilatancy in the plastodynamics of granular solids

QUASI-STATIC MODELING

F.Radjaï
(Université Montpellier II, France)
Features of force transmission in granular media

N.Gaspar & M.A.Koenders
(Kingston University, UK)
Estimates of the shear modulus of a granular assembly using heterogeneous media techniques

H.-G.Matuttis, N.Ito, H.Watanabe & K.M.Aoki
(The University of Tokyo, Japan)
Vectorizable overlap computation for ellipse-based discrete element method

H.Tsunekawa & K.Iwashita
(Takenaka Corporation, Japan)
Numerical simulation of triaxial test using two and three dimensional DEM

QUASI-STATIC BEHAVIOR

J.Rajchenbach
(Université Paris VI, France)
Is the classical elasto-plastic modelling relevant to describe the mechanical behaviour of cohesionless packings?

S.H.Liu & H.Matsuoka
(Nagoya Institute of Technology, Japan)
A microscopic study on stress-dilatancy relationship of granular materials by DEM

S.Niiseki
(Tohoku University, Japan)
Formulation of Rowe's stress-dilatancy equation based on plane of maximum mobilization

T.Nakai, T.Hoshikawa, M.Hinokio, H.Yoshida, Y.Korenaga & E.Q.Chowdhury
(Nagoya Institute of Technology, Japan)
Formulation of the influence of the density and the stress path dependency of plastic flow in sand

S.J.Antony & M.Ghadiri
(University of Surrey, UK)
Stress transition around large spherical inclusions in granular media

SUBMERGED BEHAVIOR

P.Evesque
(École Centrale de Paris, France)
A simple modelling of experimental data on compressions of granular media

T.G.Sitharam, S.V.Dinesh & N.Shimizu
(Indian Institute of Science, India)
Phase transformation behavior in granular materials using DEM

H.Morimoto, N.Okada & M.Kazama
(Tohoku University, Japan)
Evaluation of elastic energy of granular asseembles subjected to various consolidation histories by DEM

Y.Tobita, K.Kamo & N.Yoshida
(Tohoku Gakuin University, Japan)
Constitutive formulation of cyclic and liquefaction behavior of sand with account for fabric changes

T.Sugano, M.Miyata, T.Tanaka, M.Nakagawa, G.G.W.Mustoe & D.Kozawa
(Port and Harbour Research Institute, Japan)
Experimental study on the force support system within a rubble rock foundation

LOCALIZED DEFORMATION

G.Combe & J.-N.Roux
(Laboratoire Central des Ponts et Chaussées, France)
Microscopic origins of quasi-static deformation in dense granular assemblies

N.Onizuka, M.Hori, K.Iwashita & T.Suzuki
(Kisarazu National College of Technology, Japan)
Model experiment and numerical simulation of dip-slip fault formation using granular media

M.Mukitani, N.Yagi & R.Yatabe
(Takamatsu National College of Technology, Japan)
Influence of shear test method and restraint condition on residual strength of granular materials

S.Kitsunezaki & A.Kurumatani
(Nara Women's University, Japan)
Stripe patterns induced by slow deformation of a container

EXTERNALLY FORCED BEHAVIOR

C.Claquin & F.Emeriault
(INSA, France)
Interface behavior of granular materials: discrete numerical simulation and statistical homogenization

P.Schiffer, I.Albert, J.Sample & A.-L.Barabási
(Pennsylvania State University, USA)
The drag force in granular media

P.Porion, A.M.Faugère, N.Sommier & P.Evesque
(Université d'Orléans, France)
How to use turbula mixer as a good blender with dry beads

SHEAR FLOW

H.Xu, M.Y.Louge & J.T.Jenkins
(Cornell University, USA)
Flow development of a sheared collisional granular flow

F.Chevoir, M.Prochnow, J.T.Jnkins & P.Mills
(Cornell University, USA)
Dense granular flows down an inclined plane

M.Lubert & A.de Ryck
(École des Mines d'Albi-Carmaux, France)
Size and morphology effects in the shearing of silicagel particles

Y.L.Ding, H.P.Kuo, A.S.Burbidge & J.P.K.Seville
(University of Birmingham, UK)
Similarity rules for rotary kiln scale-up

Y.Khidas, M.Ammi, R.Delannay & G.Schliecker
(Université de Rennes I, France)
Experimental study of friction and rotational modes in a cylinder packing under shear stress

VERTICAL FLOW

F.Chevoir, M.Prochnow, P.Moucheront, F.da Cruz, F.Bertrand, J.-P.Guilbaud, P.Coussot & J.-N.Roux
(UMR LCPC-CNRS, France)
Dense granular flows in a vertical chute

M.Luong
(Ecole Polytechnique, France)
X-ray computed tomography of sugar crystals flow in silo

A.Awazu
(Osaka Prefecture University, Japan)
System width dependency of dynamics of grains: Transition between one dimensional states and two dimensional states

D.Désérable, S.Masson & J.Martinez
(Institut National des Sciences Appliquées, France)
Influence of exclusion rules on flow patterns in a lattice-grain model

SURFACE FLOW

T.Pöschel, C.Salueña & T.Schwager
(Humboldt University, Germany)
Can we scale granular systems?

S.Douady, B.Andreotti, A.Daerr & P.Clade
(École Normale Supérieure, France)
The four fronts and the two avalanches

L.S.Tsimring & I.S.Aranson
(University of California, USA)
Continuum description of avalanches in granular media

L.Staron, J.P.Vilotte & F.Radjaï
(Institut de Physique du Globe, France)
Friction and mobilizaion of contacts in granular numerical avalanches

D.Bonamy, B.Faucherand, M.Planelle, F.Daviaud & L.Laurent
(Service de Physique de l'Etat Condensé, France)
Granular surface flows in a rotating drum : experiments and continuous description

M.Nakagawa & M.Miyata
(Colorado School of Mines, USA)
Effects of particle shape on angle of repose

G.Félix, U.D'Ortona & V.Falk
(ENSIC, France)
Avalanches of dry granular material in rotating drums

A.Modaressi & P.Evesque
(École Centrale de Paris, France)
Study of avalanching at a free surface using computer simulation

S.Inagaki
(Ibaraki University, Japan)
Pressure distribution under a two-dimensional sandpile

T.Elperin & A.Vikhansky
(Ben-Gurion University of the Negev, Israel)
Free surface problems in mechanics of granular materials

Y.C.Zhou, B.H.Xu, A.B.Yu & P.Zulli
(The University of New South Wales, Australia)
Numerical study of sandpile formation and force evolution

A.Valance, F.Rioual, C.Misbah & Z.Csahok
(Université de Rennes I, France)
Nonlinear dynamics of aeolian sand ripples

VIBRATED FLOW

P.Evesque, A.A.Ivanova & V.G.Kozlov
(École Centrale de Paris, France)
Liquefaction of granular matter in viscous liquid under vertical vibration

N.Katsura, A.Shimosaka, Y.Shirakawa & J.Hidaka
(Doshisha University, Japan)
Simulation for flow behavior of vibrating granular materials using cellular automata

A.Routledge, P.J.King, M.R.Swift & K.A.Benedict
(University of Nottingham, UK)
The stability of granular surfaces under horizontal and vertical vibration

M.Shapiro, V.Dudko, V.Royzen, A.Alexeev & A.Goldshtein
(Technion-Israel Institute of Technology, Israel)
Vibrofluidization of vibrated granular layers: Experiments and simulations

MIXED FLOW

L.S.Tsimring, D.K.Clark & I.S.Aranson
(University of California, USA)
Spatiotemporal dynamics of a shallow fluidized bed

J.M.Valverde, A.Castellanos & M.A.S.Quintanilla
(Universidad de Sevilla, Spain)
The mobility of fine particles in uniform gas-fluidized beds

H.Nakanishi & N.Mitarai
(Kyushu University, Japan)
Particle diffusion in the cooling process of granular gas

F.Pradel, C.Lanaud & Y.Meimon
(Institut Français du Pétrole, France)
Interaction between granular and gas flows: the pinning effect

VISCOUS FLOW AND CRUSHING

D.Bouvard & C.L.Martin
(Université J. Fourier, France)
Micromechanical modelling of powder sintering

F.M.Shen & T.H.Aizawa
(University of Tokyo, Japan)
Finite element analysis of cold isostatic pressing with consideration of cracking

Y.Nakata, Y.Kato, M.Hyodo, H.Murata & A.F.L.Hyde
(Yamaguchi University, Japan)
One-dimensional compression behaviour for sand through single particle crushing strength

MEETING INFORMATION

The Conference will be held at the following hotel:

New World Hotel
Nakayama-Minami 25-5, Izumi, Sendai 981-3217, Japan
Phone: +81 22 277 3111 (from abroad), 022 277 3111 (in Japan)

Registration will begin on Sunday afternoon at the Main Lobby on the second floor. The welcome reception on Sunday evening will take place in Diamond Hall on the ground floor. Most of the social programs, including oral sessions, will be held in this hall. Posters will be displayed in a lobby at the hall entrance. Lunches and evening meals will be served also in a divided section of this hall.

Single full day sessions of oral presentations will be held on Monday, Tuesday and Thursday. Discussions of posters will take place on Monday and Tuesday evenings. An excursion is planned on Wednesday afternoon and a session devoted to videos will take place on Wednesday evening. The banquet will be held on Thursday evening. The conference will end with lunch on Friday.

A 35 mm slide projector, an overhead projector and a VHS-video projector for most of the video formats will be available in the Diamond Hall during the daytime sessions. On Wednesday evening, a video session will be held for supplementary presentations or demonstrations. Those who intend to give a video presentation should contact Yuji Kishino (kishino@civil.tohoku.ac.jp). The posters will be displayed during the conference. Poster display boards are 2.1m high by 0.9m wide. Details on the poster sessions will be announced at the registration desk.

Those planning to attend, who have not yet finished their registrations, should return the Conference Registration Form by fax as soon as possible. The registration fee and the fax number for reply are noticed on the form. The New World Hotel is offering discount room rates for the participants. Participants should make reservation by returning Hotel Accommodation Form by fax.

HOTEL ACCOMMODATION

The Meitetsu World Travel Inc. has been appointed to the official travel agent for conference, and they will take care of the hotel accommodations for participants.

Meitetsu World Travel Inc.
Chuo 1-7-18, Aoba, Sendai 980-8451, Japan
Phone: +81 22 227 3611 / FAX: +81 22 261 4623
Email: mwt233@plum.ocn.ne.jp

The New World Hotel offers special room rates for conference participants. Please return the attached form to make the reservation by **April 25, 2001**.

New World Hotel
Nakayama-Minami 25-5, Izumi, Sendai 981-3217, Japan
Phone: +81 22 277 3111

Room rates for conference participants are as follows;

Single 8,500 yen (per night)

Twin 13,000 yen (per night)

Triple 16,500 yen (per night)

Room rates include breakfasts and tax.

These room rates are applied only for those payments finished before **May 11, 2001**.

Cancellation Policy

If you wish to cancel your hotel reservation after receiving your hotel voucher, your notice of cancellation must be made in writing and sent directly to the Meitetsu World Travel Inc. by fax or e-mail.

7 days notice	All room charge will be refunded
2 - 6 days notice	20% of first night room charge will be non-refundable
1 day notice	50% of first night room charge will be non-refundable
No notice given	100% of first night room charge will be non-refundable

Note: Refunds will be made after the conference.

How to reach the New World Hotel in Sendai

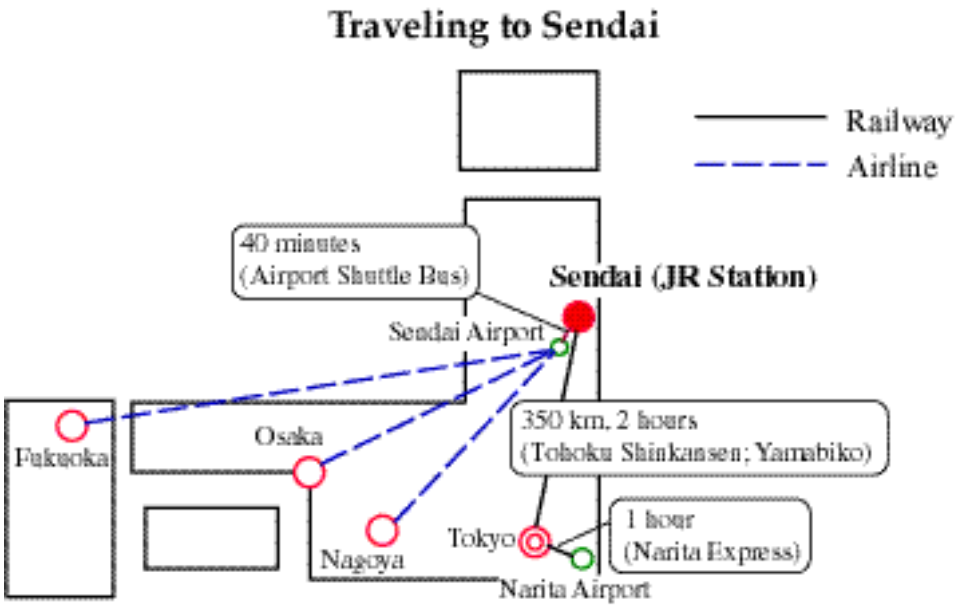
Sendai is located 350 km north of Tokyo on the Pacific Coast of Japan. As the number of international flights to Sendai is limited, most visitors from abroad usually travel to Sendai by train, after arriving at Tokyo/Narita International Airport. Domestic flights from major airports, including Osaka/Kansai, Osaka/Itami, Nagoya and Fukuoka, are also available. However, there are no flights from Tokyo. This is because the Shinkansen, (the Bullet Train), is so efficient, that airlines can not compete.

Traveling to Sendai by Train via Narita Airport

To travel to Sendai by train, you have to transfer at Tokyo. Narita Express takes you from Narita Airport to Tokyo in about one hour and Tohoku Shinkansen, (Yamabiko), from Tokyo to Sendai in about two hours. You can purchase all the necessary tickets to Sendai at the green ticket counter, (JR Counter), at Narita Airport. Narita Express leaves once or twice an hour from Narita Airport and all the seats are reserved seats. The regular fare from Narita Airport to Sendai is approximately 13,500 yen.

Traveling from Sendai Airport

Visitors arriving at Sendai Airport are advised to travel first to Sendai Station by Airport Shuttle Bus. It will take about 40 minutes. The fare is 910 yen. You may use a taxi from the airport directly to the New World Hotel. However, it is very expensive (about 10,000 yen).

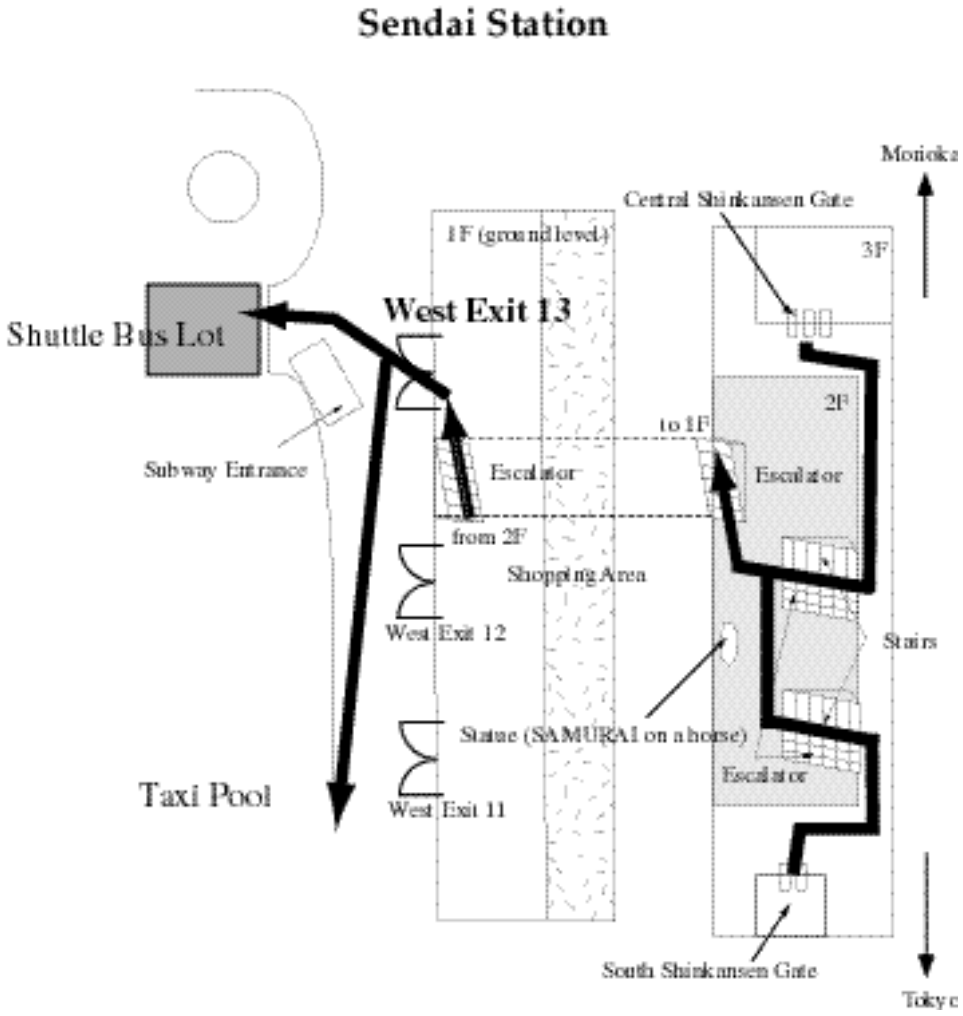


Traveling from Sendai Station to the New World Hotel

Shinkansen platforms in Sendai Station are on the 4th floor. The main exit of Sendai Station is the west exit, in front of which pedestrian's decks are spread on the second level. A taxi pool and bus terminals, including Airport Shuttle Terminal, are located under the decks. You should exit the station at the ground level. To travel from Sendai Station to the New World Hotel, you may take either a hotel shuttle bus or a taxi. The drive usually takes about 30 minutes. The hotel is located in the suburbs, near a huge white statue taller than the hotel with13 story floors.

1) Hotel Shuttle Bus (Free): The shuttle bus stops at a parking lot just in front of West Exit 13 on the ground level. The bus departs every day at 12:30, 17:00, 19:00 and 21:30. On Sunday May 20, other special bus services will be available hourly from 13:00 to 18:00. A sign, "Powders & Grains 2001", will be attached to the bus.

2) Taxi: You can take a taxi just in front of West Exit 12, 13 on the ground level. The fare from Sendai Station to the New World Hotel is about 3,000 Yen. In Japan, you need not tip taxi drivers.



FAX TRANSMISSION

To: Meitetsu World Travel Inc. Fax No.: +81-22-261-4623

CONFERENCE REGISTRATION FORM

(IF YOU HAVE ALREADY FINISHED REGISTRATION, PLEASE DISCARD THIS FORM)

☐ Mr. ☐ Ms. ☐ Dr. ☐ Prof.

Family name: Given name:

Affiliation:

Address:

Country:

Phone: Fax: Email:

Registration fee:

☐ 55,000 yen (general participant)

☐ 30,000 yen (student)

The fees include a copy of the Proceedings, the evening reception on Sunday 20 May, evening meals on Monday, Tuesday and Wednesday, the banquet on Thursday, lunch and coffee for each of the five days of the conference, and the excursion on Wednesday. The fee for an accompanying person who wishes to have meals and to attend social events listed above will be 25,000 yen and should be paid upon arrival at the conference site.

Payment by

☐ Bank Check/Bank Transfer (Payment charge should be included.)

☐ I will send a bank draft payable to the order of

☐ I have attached a copy of the receipt of remittance to

P&G2001 M.W.T
Bank of Tokyo-Mitsubishi, Sendai Branch
Branch code: 320, Account number: 1146935

* Personal checks are not accepted.

☐ Credit Card

☐ Visa

☐ Mastercard

Card No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry Date ☐☐/☐☐

Card Holder:

Signature of card holder:

Date: _____, 2001 Signature: _____

Please return this form until **April 25, 2001** to:

Meitetsu World Travel Inc., Sendai Branch
Chuo 1-17-18, Aoba, Sendai 980-8451, Japan
Fax: +81-22-261-4623

FAX TRANSMISSION

To: Meitetsu World Travel Inc. Fax No.: +81-22-261-4623

HOTEL RESERVATION FORM

☐ Mr. ☐ Ms. ☐ Dr. ☐ Prof.

Family name: Given name:

Affiliation:

Address:

Country:

Phone: Fax: Email:

Hotel Accommodation:

Hotel: The New World Hotel

Check-in Date: May _____, 2001 Check-out Date: May _____, 2001

Accommodation Fee:

☐ Single 8,500 yen x ____ person(s) x ____nights = _____yen

☐ Twin 6,500 yen x ____ person(s) x ____nights = _____yen

☐ Triple 5,500 yen x ____ person(s) x ____nights = _____yen

Total amount _____yen

☐ I would like to share the room with _____ , _____

☐ I would like to leave sharing to the organizer.

Payment by

☐ Bank Check/Bank Transfer (Payment charge should be included.)

☐ I will send a bank draft payable to the order of

☐ I have attached a copy of the receipt of remittance to

P&G2001 M.W.T

Bank of Tokyo-Mitsubishi, Sendai Branch

Branch code: 320, Account number: 1146935

* Personal checks are not accepted.

☐ Credit card

☐ Visa

☐ Mastercard

Card No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Expiry Date ☐☐/☐☐

Card Holder:

Signature of card holder:

Date: _____, 2001 Signature: _____

Please return this form until **April 25, 2001** to:

Meitetsu World Travel Inc., Sendai Branch

Chuo 1-17-18, Aoba, Sendai 980-8451, Japan

Fax: +81-22-261-4623