Contents

Part I  Plenary and Keynote Lectures

DEM Modelling in Geomechanics: Some Recent Breakthroughs  ........ 3
F. Darve, J. Duriez and R. Wan

From Particles in Steady State Shear Bands via Micro-Macro
to Macrosopic Rheology Laws ................................. 13
S. Luding, A. Singh, S. Roy, D. Vescovi, T. Weinhart and V. Magnanimo

Discrete Dynamical Model of Multi-stage Twist Superconducting
Cable and Prediction of Its Multilayer Stress-Strain Relationship  .... 21
X.J. Zheng, S.M. Jia and D.M. Wang

A General Contact Theory for Non-spherical Particles ............... 29
Y.T. Feng

DEM Simulations in Mining and Mineral Processing ...................... 37
Xiangjun Qiu

Discrete Element Modeling of Ice Loads on Ship
and Offshore Structures ........................................... 45
Shunying Ji

Part II  DEM Theory and Algorithms

Evaluation of Coarse Graining DEM Using Representative
Particle Model ....................................................... 57
Husam A. Elghannay and Danesh K. Tafti

On the Apparent Non-coaxiality of the Tangential Interaction ........ 67
Colin Thornton

Sample Size Effect on DEM Simulations of Binary Mixture .......... 73
Tang-Tat Ng and Wei Zhou
Evolutions of Fabric and Contact Forces of Granular Materials Under Continuously Varying $b$ Value Using DEM.................. 81
Daraporn Phusing, Kiichi Suzuki and Piyapong Srirat

Random Packing of Tetrahedral Particles Using the Polyhedral and Multi-sphere Discrete Element Method ......................... 91
Shiwei Zhao, T. Matthew Evans and Xiaowen Zhou

Energy Dissipation During Impact of an Agglomerate Composed of Autoadhesive Elastic-Plastic Particles .................. 101
Lianfeng (David) Liu, Colin Thornton and Stephen James Shaw

Effect of Particle Shape on Geogrid-Reinforced Granules ............ 109
Xinbao Yu and Asheesh Pradhan

Applicability Evaluation of Similarity Principle in Discrete Element Analysis.......................................................... 117
Taeyoung Yun and Heemun Park

Studies of the Performance of Particle Dampers in Centrifugal Fields and the Influence of Recovery Coefficient on Vibration Suppression ................................................................. 125
Wangqiang Xiao and Yuanyi Luo

Algorithms and Capabilities of Solidity to Simulate Interactions and Packing of Complex Shapes .................................. 139
Jiansheng Xiang, John-Paul Latham and Ado Farsi

Particle Shape Consideration in DEM Triaxial Test Simulations ...... 151
Mohammad Mohammadnia and Ali A. Mirghasemi

Study on the Microscopic Structure and the Bearing Capacity of the Elliptical Granular System in the Random Particle Size .... 161
Zhengguo Gao, Zhichang Li and Mohammad Alam

Improving Estimates of Critical Time-Steps for Discrete Element Simulations ....................................................... 169
Shane J. Burns and Kevin J. Hanley

Discussion on the Difference of the Grain Particle Parameters in Reality and DEM ................................................... 177
Huinan Sun and Zhuoqing Zhang

Stochastic Discrete Element Modelling of Rough Particles ........... 183
T. Zhao, J. Kato and Y.T. Feng

Sphere Packing Based on Geometric Algorithm Generation Method .......................................................... 193
Y. Li and Shunying Ji
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verification of an Automated Work Flow for Discrete Element Material Parameter Calibration</td>
<td>201</td>
</tr>
<tr>
<td>Michael Rackl, Kevin J. Hanley and Willibald A. Günthner</td>
<td></td>
</tr>
<tr>
<td>The Influence of Rolling Resistance on Granular Responses Under Triaxial Loading Paths</td>
<td>209</td>
</tr>
<tr>
<td>W. Zhou, J. Liu, Gang Ma, X. Ma, Xiaolin Chang and C. Zhang</td>
<td></td>
</tr>
<tr>
<td>An Investigation of Single Particle Crushing Tests on Irregular-Shaped Quartz Sand with DEM</td>
<td>217</td>
</tr>
<tr>
<td>Budi Zhao, Chin Yat Douglas Chow and Jianfeng Wang</td>
<td></td>
</tr>
<tr>
<td>The Influence of Rotational Resistance on Critical State of Granular Materials</td>
<td>225</td>
</tr>
<tr>
<td>Xiaolin Chang, Y.T. Wang, W. Zhou, Gang Ma and J.Y. Liu</td>
<td></td>
</tr>
<tr>
<td>A New Method for the Generation of Polydisperse DEM Specimens</td>
<td>235</td>
</tr>
<tr>
<td>Chaomin Shen, Sihong Liu and Yishu Wang</td>
<td></td>
</tr>
<tr>
<td>Influence of Particle Shape on Mechanical Behavior of Granular Materials</td>
<td>245</td>
</tr>
<tr>
<td>Wei Zhou, Kun Xu, Lifu Yang and Gang Ma</td>
<td></td>
</tr>
<tr>
<td>The Influence of Particles’ Aspect Ratio on the Shear Behaviour of Granular Materials</td>
<td>253</td>
</tr>
<tr>
<td>Y.H. Xie, Z.X. Yang and D. Barreto</td>
<td></td>
</tr>
</tbody>
</table>

Part III DEM-FEM Modelling of Granular Materials

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advances in Multiscale FEM-DEM Modeling of Granular Materials</td>
<td>267</td>
</tr>
<tr>
<td>Xikui Li, Z. Wang, Y. Du and Q. Duan</td>
<td></td>
</tr>
<tr>
<td>Modeling the Particle Breakage by Using Combined DEM and SBFEM</td>
<td>281</td>
</tr>
<tr>
<td>T. Luo, E.T. Ooi, A.H.C. Chan and S.J. Fu</td>
<td></td>
</tr>
<tr>
<td>Numerical Simulations of the Interactions Between a Pneumatic Tire and Granular Sand by 3D DEM-FEM</td>
<td>289</td>
</tr>
<tr>
<td>Zumei Zheng and Mengyan Zang</td>
<td></td>
</tr>
<tr>
<td>Combined Finite-Discrete Element Method Modeling of Rock Failure Problems</td>
<td>301</td>
</tr>
<tr>
<td>Wei Zhou, Wei Yuan and Xiaolin Chang</td>
<td></td>
</tr>
<tr>
<td>A New Finite Discrete Element Approach for Heat Transfer in Complex Shaped Multi Bodied Contact Problems</td>
<td>311</td>
</tr>
<tr>
<td>Clément Joulin, Jiansheng Xiang, John-Paul Latham and Christopher Pain</td>
<td></td>
</tr>
</tbody>
</table>
Numerical Simulation of In-Plane Loaded Unreinforced Masonry Walls Based on Homogenized Discrete Element Model .......................... 329
Hong Zhang, Xianglin Gu, Xiang Li and Gonglian Chen

Study on Micro-Mechanism of Concrete Hydraulic Fracturing Using DEM ................................................................. 343
Y. Yang, Tang-Tat Ng, Z.Z. Wang and Z.L. Li

Finite-Discrete Element Analysis of Interface Shear Damage to HDPE Geomembrane in Contact with Gravel Drainage Layer .... 351
Masood Meidani, Mohamed A. Meguid and Luc E. Chouinard

Simulation of Particle Dampers Using the Combined Finite-Discrete Element Method—A Simple Case .......................... 361
X.D. Chen and H.F. Wang

Investigation on the Integrity of Cement Annulus During Multi-stage Horizontal Fracturing with FEM/DEM ......................... 369

Xinger Wang, Jian Yang, Tong Wang and Wuyue Xiong

Multiscale Modeling of Granular Assemblies Based on Different Micromechanical Strain ................................................. 389
Wei Zhou, Yong Huang, Gang Ma and Xiaolin Chang

Simulation and Characterisation of Packed Columns for Cylindrical Catalyst Supports and Other Complex-Shaped Bodies .... 397
Ado Farsi, J. Xiang, John-Paul Latham, M. Carlsson, E.H. Stitt and M. Marigo

Part IV Contact, Bonding and Constitutive Modeling

A Gradient Model for Granular Materials Based on Thermo-micromechanics .......................................................... 409
C. Xiu and X. Chu

Role of DEM in Assessment of Continuum Equations for Solid–Solid Drag Force with Various Particle Size Ratios ............. 423
Payman Jalali and Timo Hyppänen

Elasticity and Mechanical Response of a Composite Particle System Induced by a Vertical Loading ............................... 429
Dengming Wang and Wei Du

Heavy Impact Compaction Modeling and Analysis on Unbound Paving Mixtures ......................................................... 437
Xiaodong Zhou, Yu Liu and Zhanping You
A Simple Multiscale Model for Granular Soils with Geosynthetic Inclusion .................................................. 445
H. Cheng, H. Yamamoto, N. Guo and H. Huang

A Novel Rock Contact Model Considering Water-Softening and Chemical Weathering Effects ......................... 455
Mingjing Jiang, Wenwen Liu and Zhaowen Liao

Investigation of Contact Parameters of DEM Model in Flow Process .................................................. 465
X. Xiao, Y. Tan, R. Deng, S. Jiang, Wei Gao and C. Hu

On the Stress-Force-Fabric Relationship in Anisotropic Granular Materials ........................................ 475
Ehsan Seyedi Hosseininia

Influences of Stiffness Ratio, Friction Coefficient and Strength Ratio on the Macro Behavior of Cemented Sand Based on DEM ...... 485
H. Zhao, Y. Sang, A. Deng and L. Ge

A 3D Mesoscopic Model for Simulating Failure Process of Concrete Based on Discrete Element Method .................. 497
J.Y. Jia and Xianglin Gu

DEM Simulation of Random Loose Packings of Micron-Sized Particles with Both Adhesion and Friction .................. 515
Wenwei Liu, Shuiqing Li and Sheng Chen

Preliminary DEM Analysis on Micro-Mechanical Behavior of the Composite Cemented Granules Under Complex Stress Conditions .................................................. 525
M.J. Jiang, Wei Liu, B.L. Xi and S.L. Jin

Part V DEM Related Methods

CFD-DEM Simulation of Flocculation and Sedimentation of Cohesive Fine Particles .................................. 537
Liu-chao Qiu, Jia-jie Liu, Yi Liu, Peng-zhi Lin and Yu Han

Elasticity Constants of Clay Minerals Using Molecular Mechanics Simulations .................................. 543
Jin-ming Xu, Cheng-liang Wu and Da-yong Huang

A Comparative Study of Three Classes of Boundary Treatment Schemes for Coupled LBM/DEM Simulations ............ 551
Jian Wu, Luc Scholtès, Anne-Julie Tinet and Michel Buès

Application of the Method of Peridynamics to the Simulation of Hydraulic Fracturing Process .................. 561
Fan Wu, Shuhui Li, Qinglin Duan and Xikui Li
Application of the Coupled Discrete Element Modelling and Modelica Based Multi-body Dynamics in System-Level Modelling ........... 571
Wei Chen, Marc van Etten, Timothy Donohue and Kenneth Williams

Equilibrium Distribution Functions in Entropic Lattice Boltzmann Method ........................................... 579
Qiang Liu, Wei Xie and Yan Wang

Parametric Sensitivity Study of Particle Shape Effect Through 3D Printing ........................................... 593
Yu-Feng Su, Bin Zhang, Seung Jae Lee and Beena Sukumaran

Study on the Multi-sphere Method Modeling the 3D Particle Morphology in DEM ................................. 601
Yu Zhou, Bo Zhou, Jianmei Li and Huabin Wang

An Upgraded CFD-DEM Investigation on the Liquefaction Mechanism of Sand Under Cyclic Loads .............. 609
M.J. Jiang, J. Liu and C. Sun

Controlling the Flow Structure in Fluidized Bed: A CFD-DEM Approach ............................................. 619
D.G. de Oliveira, O.O. Ayeni, C.L. Wu, K. Nandakumar and J.B. Joshi

Part VI Granular Flow

The Effect of Powder Flowability in the Selective Laser Sintering Process ............................................. 629
Yuan-qiang Tan, Jun-hui Zheng, Wei Gao, Sheng-qiang Jiang and Yuntian Feng

A DEM Analysis of Particle Climbing in a Vibrating Pipe .......... 637
F.X. Fan, J. Liu and M.X. Su

Influence of Inclined Angles on the Stability of Inclined Granular Flows Down Rough Bottoms ...................... 647
Guanghui Yang, Sheng Zhang, Ping Lin, Yuan Tian and Lei Yang

DEM Simulation of Particle Flow in a Parallel-Hopper Bell-Less Blast Furnace Charging Model .................... 659
Jiayong Qiu, Yusong Xu, Jianliang Zhang and Dianchun Ju

Basal Effect in Mono- and Bi-disperse Chute Flows .......... 671
Lu Jing, Fiona C.Y. Kwok, Andy Y.F. Leung and Yuri D. Sobral

LBDEMcoupling: Open-Source Power for Fluid-Particle Systems ...... 679
Philippe Seil and Stefan Pirker
Numerical Simulation of the Particular Flow on an Agricultural Screen with a Complex Motion Based on the Coupling Model of PMBK with DEM ........................................ 687
Yang Wang, Jianqun Yu, Yajun Yu and Hong Fu

Study on Drag Force Coefficients in Modeling Granular Flows in a Slot-Rectangular Spouted Bed ......................... 697
Huang Zhang and Shuiqing Li

The Development of a Simplified System for Measuring the Passage of Particles on and Through Moving Screen Surfaces Using DEM .... 709
Olumide Ogunmodimu, Indresan Govender, Aubrey Mainza and Jean-Paul Franzidis

Part VII DEM in Soil Mechanics

Analysis of Strength Characteristics for Granular Materials Based on Discrete Element Simulation .......................... 725
Duo Zhang, Yang Liu and Shun-chuan Wu

On the Use of the Uniaxial Shear Test for DEM Calibration .......... 733
T.J. Donohue, C.M. Wensrich and S. Reid

Investigation on the Rate-Dependent Behavior of Sands via DEM .... 741
Zhi-chao Wang, Du-min Kuang and Tao Zhao

DEM Analysis of Inclined Cone Penetration Test in Structured Sand Ground .......................................................... 749
M.J. Jiang, Y.N. Shen and C. Fu

Exploring the Undrained Cyclic Behaviour of Sand Using DEM ...... 757
Xin Huang, Catherine O’Sullivan, Zixin Zhang, Chung-yee Kwok and Kevin J. Hanley

Effect of Particle Shape on the Formation of Sandpile ............... 767
Bei-Bing Dai, Jun Yang, Cui-Ying Zhou and Wei Zhang

Influence of Inherent Anisotropy on the Soil Behavior in Simple Shear Tests Using DEM ....................................... 777
Jiangu Qian, Weiyi Li, Xiaoqiang Gu and Kai Xu

Influence of Rigid and Flexible Top Boundaries on Geogrid Pullout Behavior Using DEM .................................... 785
Zhijie Wang, Felix Jacobs and Martin Ziegler

DEM Analysis of Cone Penetration Tests in Pure and Structured Sand Grounds ..................................................... 793
M.J. Jiang, S. Liu and C. Fu
Discrete Element Simulation of the Direct Shear Test of Sandy Soil ................................................ 801
Yao Jiang and Yanjie Li

Micromechanical Simulation of Fines Content Effect of Soils Using the Discrete Element Method .............................. 811
Zhang Chao, Wu Shangwei, Yang Chunhe and Liu Haiming

Simulation of Sand–Tire Mixture by Discrete Element Method .. 821
Ahmad Mahboubi and Mohsen Asadi Zeidabadi

Effect of Different Temperatures and Pore Pressures on Geomechanical Properties of Pore-Filling Type of Methane Hydrate Soils Based on the DEM Simulations ..................... 827
J. He, M.J. Jiang and J. Liu

Discrete Element Analysis of the Fabric Evolution of Granular Soils During Cyclic Loading ................................. 837
Mingjing Jiang, An Zhang and Wenhao Du

DEM Simulation of Dynamic Compaction with Different Tamping Energy and Calibrated Damping Parameters .............. 845
Mingjing Jiang, Di Wu and Banglu Xi

Part VIII DEM in Rock Mechanics

Discrete Simulation of Fracturing and Failure of Rock Samples ...... 855
A. Vervoort, B. Debecker and G. Van Lysebetten

A New Rock Slicing Algorithm with Reduced Data Structure for Discrete Element Method Analyses for Rock Mechanics .......... 863
C.W. Boon, M. Lazari and S. Utili

Meso-Structure Parameters of Discrete Element Method of Sand Pebble Surrounding Rock Particles in Different Dense Degrees ........ 871
J.F. Lu, C.W. Zhang and P. Jian

Dimensions and Brittleness Effect on the Size of Process Zone in Rock-like Material Characterized by Bonded Particle Model .......... 881
Jianwen Peng, Changhong Li and Ali Tarokh

Numerical Simulation of Resonant Column Tests on Jointed Rocks Using DEM ............................................ 889
T.G. Sitharam and Sebastian Resmi

3D Numerical Modeling of Strength in Fractured Rock Mass .......... 897
M. Dehghanipoodeh, A. Baghbanan, M. Laghaei and H. Hashemolhosseini
DEM Modeling of Brittle Behavior of Rock Specimens with Two Infilled Flaws ........................................ 907
Dong Zhou and Zhihong Zhao

Three-Dimensional Discrete Element Model for Tri-axial Tests of Graded Stones Under Different Gradations ................. 917
He Wang, Biao Ma, Xiaodong Zhou and Yu Liu

3D Discrete Element Model for TBM Cutter Breaking Rock and Dynamic Loads Analysis ........................................ 927
Li Wu, Fan Yang, Jian Wang and Guangxin Wang

Calibration of Microscopic Mechanical Parameters of Granite Using Actual Distributions and Orthogonal Simulations ........... 935
Da-yong Huang, Jin-ming Xu and Tao Chen

Part IX  DEM in Chemical Engineering

CFD-DEM Simulation of a Conical Spouted Bed Operating with High Density Particles .............................................. 947
Shahab Golshan, Reza Zarghami, Navid Mostoufi, Murat Koksal and Gorkem Kulah

CFD-DEM Study the Effect of Carrier-Drug Mass Ratio on the Aerosolisation Process in Original and Modified Dry Powder Inhalers ......................................................... 957
Zhenbo Tong, Wenqi Zhong and Aibing Yu

A Numerical Study of the Effect of Loading Profiles on Mixing/Segregation of Particles in the Truck Mixer via DEM ............... 967

From Micro to Macro: A Comparative Study of DEM and FEM in Modelling Hopper Flow ............................................. 977
Qi Luo, Qijun Zheng and Aibing Yu

Simulation of Multiphase Reactive Gas Transport Using Smoothed Particle Hydrodynamics ........................................ 987
Jihoe Kwon, Heechan Cho, Jinyoung Je and Donwoo Lee

DEM-CFD Modelling of Electrostatic Phenomena in Fluidization .... 995
Chunlei Pei and Chuan-Yu Wu

Numerical Simulation of Gas-Solid Flow in a Wurster Fluidized Bed ................................................................. 1005
Hang Zhou, Haigang Wang and Qiuya Tu

CFD Simulation of Hydrodynamics of Three-Dimensional Circulating Fluidized Beds with EMMS Model ....................... 1013
Investigation of Gas-Solid Flow Dynamics and Heat Transfer in Fluidized Beds by Using DEM-LES Coupling Approach. ............ 1023
Shuai Wang, Kun Luo, Chenshu Hu and Jianren Fan

Part X DEM in Geotechnical and Ocean Engineering

Investigating the Origin of the Soil Arch in the Trapdoor Problem: Photoelastic Measurement and Discrete Element Simulation .......... 1039
Young-Hoon Jung, Tae-Gyun Kim, Danbi Sim and Sang-Young Shin

Influence of Base Roughness on Kinematic and Mechanical Characteristics of Debris Flows ........................................... 1047
Wei Zhou, Zhiqiang Lai, Lifu Yang, Gang Ma, Yuan Chen and Tianqi Qi

Numerical Study on Seismic Isolation Effect of Gravel Cushion .... 1055
Xueliang Zhao, Qian Zhang, Qi Zhang and Jianming He

Interaction Between Floater and Sea Ice Simulated with Dilated Polyhedral DEM .......................................................... 1065
L. Liu, S. Sun and Shunying Ji

Investigation into the Soil-Root Composites Using Distinct Element Method ................................................................. 1075
M.J. Jiang, Y.G. Zhu and B.L. Xi

Macro and Micro Structural Characteristics of Force Chains in Overlying Strata Above Top Caving Mining Face .............. 1085
X.G. Han, J.-A. Wang, W.D. Pang and C. Liang

DEM Analysis of Small-Displacement Earth Pressure Against a Rigid Retaining Wall with the Wall Moving Towards Structured Sand ................................................................. 1093
M.J. Jiang, M.Y. Niu, J. He and C. Fu

Part XI Powder Technology

Numerical Investigation of Optical Sorting Using the Discrete Element Method ................................................................. 1105

Dependence of Granular Materials Homogenization on Geometrical Aspects in Commonly Used Mixers via DEM ...................... 1115
M. Kohout, T. Barczi, T. Travnickova, J. Havlica and C. Ratnayake

The Effect of Rotational Speed on Granular Dynamics and Homogenization in a Vertical Bladed Mixer ................................. 1123
J. Havlica, K. Jirounkova, P. Petrus, T. Travnickova and M. Kohout
DEM Modelling of Silo Loads Asymmetry Induced by Eccentric Discharge ................................................... 1133
B. Chen, A. Roberts and T. Donohue

Concurrent Adaptive Mass-Conserving Comminution
of Granular Materials Using Rigid Elements ......................... 1143
Francesco De Cola, Nicola Bombace, Simone Falco and Nik Petrinic

Understanding Size Segregation in Tumbling Mills ................. 1153
Rahul K. Soni and B.K. Mishra

Part XII  DEM in Mechanical Engineering

Modeling Roughness Effect of Joint Using Rough-Joint Model . 1171
Chia-Chi Chiu, Meng-Chia Weng and Tsan-Hwei Huang

DEM in Analyses of Nuclear Pebble Bed Reactors .................. 1183
Heikki Suikkanen, Ville Rintala and Juhani Hyvärinen

Modified Modeling of Self-twist Process of Multistage Cable
Based on Discrete Element Method ........................................... 1193

DEM Analysis of Interaction Between Granular Materials
and a Cutting Blade ............................................................... 1201
Murino Kobayakawa, Shinichiro Miyai, Takuya Tsuji
and Toshitsugu Tanaka

DEM Simulation of Rubble Ice Accumulation in Front
of Water Intake Area of Nuclear Power Plant ......................... 1209
and W. Chen

Optimizing Heavy Equipment for Handling Bulk Materials
with Adams-EDEM Co-simulation ........................................... 1219
D.R. Curry and Y. Deng

Part XIII  DEM in Agricultural Engineering

Nonlinear Dynamic Process of Soil Tillage Under Straw Mulching Model ............................................................. 1227
Zhao Jikun, Xing Lei and Huang Shujun

Study of Connection Mechanics Model and Mechanical
Properties of Corn Kernel Carpopodium Based on DEM ............ 1241
Yajun Yu, Maojian Zhang, Jiyang Yu, Hong Fu and Jianqun Yu

The DEM-Based Digital Design Platform for Agricultural
Machinery—AgriDEM .......................................................... 1253
Hong Fu, Cong Jin and Jianqun Yu
Study on Screening Efficiency of Banana Vibrating Screen
Based on 3D DEM Simulation ........................................ 1265
Jinpeng Qiao, Chenlong Duan, Yuemin Zhao, Haishen Jiang
and Hairui Diao

Determination and Analysis for Parameters of Shape, Size,
Physical and Mechanical Properties of Soybean Grains .............. 1277
Fengyan Lv, Xiaomei Wang, Maojian Zhang, Hong Fu and Jianqun Yu

Investigation of the Shape, Dimensions and DEM Modeling
Method of Maize Grains ..................................................... 1287
Xiaomei Wang, Fengyan Lv, Jian Liu, Jianqun Yu and Hong Fu

Part XIV  DEM in Transport Engineering

Material Transport Study into a SAG Mill by DEM Impact
on the Inclination of Lifter .................................................. 1299
Alejandro Gutierrez, Fernando Lillo and Sebastián Ugalde

Numerical Simulation of the Interaction between the Grousers
of Tracked Vehicle and the Soil Using Discrete Element Method ...... 1307
Rui Zhang, Dianlei Han, Qiaoli Ji, Yuan He and Songsong Ma

Discharging Trajectory of the Bucket Wheel Stacker-Reclaimer
Based on DEM ................................................................. 1315
Yu Li, Gongbo Yang, Jiquan Hu and Wenming Han

DEM Analysis of Ballast Breakage Under Train Loads
and Its Effect on Mechanical Behaviour of Railway Track ........... 1323
Xu Zhang, Chunfa Zhao and Wanming Zhai

Simplified Multi-sphere Model-Based DEM Simulation of Particle
Behavior in Hopper During Ship Loading for Dust Control .......... 1335
Yuan Tan, Willibald A. Günthner and Stephan Kessler

Part XV  High Performance DEM Computing

GPU DEM Simulations and Experimental Studies of Ball
Milling Process for Various Particle Shapes ............................. 1345
Patrick Pizette, N. Govender, N.-E. Abriak and Daniel N. Wilke

MercuryDPM: A Fast and Flexible Particle Solver Part A:  
Technical Advances ......................................................... 1353
T. Weinhart, D.R. Tunuguntla, M.P. van Schrojenstein-Lantman,
A.J. van der Horn, I.F.C. Denissen, C.R. Windows-Yule, A.C. de Jong
and A.R. Thornton
Proceedings of the 7th International Conference on Discrete Element Methods
Li, X.; Feng, Y.; Mustoe, G. (Eds.)
2017, XLIX, 1455 p. 966 illus. In 2 volumes, not available separately., Hardcover
ISBN: 978-981-10-1925-8