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Titolo	Granular Dynamics, Contact Mechanics and Particle System Simulations : A DEM study / / by Colin Thornton
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ISBN	3-319-18711-2
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (202 p.)
Collana	Particle Technology Series, , 1567-827X ; ; 24
Disciplina	530.410113
Soggetti	Amorphous substances Complex fluids Applied mathematics Engineering mathematics Chemical engineering Fluids Chemometrics Soft and Granular Matter, Complex Fluids and Microfluidics Mathematical and Computational Engineering Industrial Chemistry/Chemical Engineering Fluid- and Aerodynamics Math. Applications in Chemistry
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters.
Nota di contenuto	Foreword -- Preface -- Introduction -- Theoretical Background -- Contact Mechanics -- Other Contact Force Models -- Particle Impact -- Agglomerate Impacts -- Fluidised Beds -- Quasi-Static Deformation -- Index.
Sommario/riassunto	This book is devoted to the Discrete Element Method (DEM) technique, a discontinuum modelling approach that takes into account the fact that granular materials are composed of discrete particles which interact with each other at the microscale level. This numerical simulation technique can be used both for dispersed systems in which the particle-particle interactions are collisional and compact systems of

particles with multiple enduring contacts. The book provides an extensive and detailed explanation of the theoretical background of DEM. Contact mechanics theories for elastic, elastic-plastic, adhesive elastic and adhesive elastic-plastic particle-particle interactions are presented. Other contact force models are also discussed, including corrections to some of these models as described in the literature, and important areas of further research are identified. A key issue in DEM simulations is whether or not a code can reliably simulate the simplest of systems, namely the single particle oblique impact with a wall. This is discussed using the output obtained from the contact force models described earlier, which are compared for elastic and inelastic collisions. In addition, further insight is provided for the impact of adhesive particles. The author then moves on to provide the results of selected DEM applications to agglomerate impacts, fluidised beds and quasi-static deformation, demonstrating that the DEM technique can be used (i) to mimic experiments, (ii) explore parameter sweeps, including limiting values, or (iii) identify new, previously unknown, phenomena at the microscale. In the DEM applications the emphasis is on discovering new information that enhances our rational understanding of particle systems, which may be more significant than developing a new continuum model that encompasses all microstructural aspects, which would most likely prove too complicated for practical implementation. The book will be of interest to academic and industrial researchers working in particle technology/process engineering and geomechanics, both experimentalists and theoreticians.