

Editorial to special issue “Modeling and simulation of granular materials and granular flows”

Eduardo M. B. Campello¹

Published online: 9 January 2017
© OWZ 2017

Granular materials and flows of granular matter can be found in a myriad of natural phenomena and human applications, and over various length scales: from stone piles and rock sliding to fine powders and particle flows; from mounds of sand and construction materials to compact aggregates of very high added value in the food, pharmaceutical, chemical and microelectronics industries. Knowledge on the physics of such materials has evolved enormously over the past decades, especially with the aid of computational methods, but still there is a lot to pursue. Many technological applications wherein these materials are observed may benefit from such advancements. The purpose of this special issue is to provide to the journal’s readers a few recent contributions in this direction. We aim to present contributions focused not only on specific aspects of the fundamental physics of granular materials, but also on industrial and engineering applications.

Seven papers were collected for that purpose. The first two address interesting aspects related to the microstructure

and contact phenomena in collections of grains. The third deals with the generation of dense samples of grains, an issue that is still attracting the attention of researchers due to its paramount importance to the simulation of compact granular systems. The next two contributions are concerned with practical applications, one dealing with the motion of grains in certain industrial processes and the other with buried explosions in soils. Finally, the issue closes with two papers on the modeling of the interaction between granular materials and other types of materials or objects that surround them, namely a fluid medium (whereby the grains are carried in a flow) and thin, flexible (continuum-solid) rods.

We hope that the issue may be of use to readers interested in granular materials from a broad perspective. At the same time, we hope that many more contributions may be made available in the literature in the years to come: The challenges involved in the study of these materials are far from being fully resolved.

✉ Eduardo M. B. Campello
campello@usp.br

¹ Department of Structural and Geotechnical Engineering,
University of São Paulo, São Paulo, Brazil