

Bulk Solids Centre Czech Republic (BSC)

The European Federation of Chemical Engineering (EFCE) godfathered the Bulk Solids Centre Czech Republic (BSC) providing during all this time advice, guidance and experience through the Working Party on Mechanics of Particulate Solids (WPMPs). This new workplace in the Czech university is an open space for international collaborations across Europe and beyond in fields associated with bulk solids handling. Here, you will find a research group plenty of energy and enthusiasm headed by Prof. Jiri Zegzulka, internationally recognised for his expertise in this field, with modern facilities, tools and equipment to face new challenges. The opening ceremony of BSC was on 8th April 2016 in the Innovation Centre VSB-TU Ostrava. The Working Party on Mechanics of Particulate Solids of EFCE represented by its chairman Prof. Álvaro Ramírez-Gómez opened the centre.



Figure 1: The opening ceremony (from the left Assoc. Prof. S. Mišák, Assoc. Prof. A. Király, Prof. Dr. Á. Ramírez-Gómez, Prof. Dr. J. Zegzulka).

The Bulk Solids Centre Czech Republic is part of the VSB - Technical University of Ostrava and its activity is oriented to the understanding of the behaviour of bulk solids during handling and to transfer new technologies to industry. Basic science is being conducted, especially on the angle of internal friction. Many problems received from companies are tackled performing numerical simulations that are experimentally validated to provide innovative solutions to their needs, a good number of patents has been already derived from solutions proposed. The characterization of the bulk materials (mechanical-physical, chemical, geometrical, morphological and many other properties) is also possible here, where many experience has been gained already. The types of studies in which BSC researchers have been involved until now are very diverse and in many different sectors (chemical, civil, mining, agricultural...).

Nowadays, within the doctoral program “*Transport and Material Handling*” of the VSB - Technical University of Ostrava, a doctoral theses is being developed in BSC to solve mixing problems of fly ash with other components. Figure 2 shows a truck mixer in operation mixing fly ash for the production of building material.

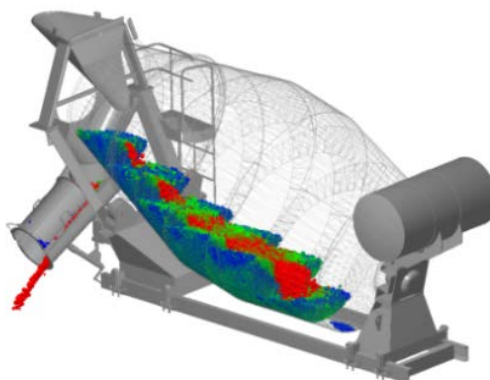


Figure 2: Simulation of a truck mixer in operation (MSc. J. Hlosta).

Another research area in which work is being carried out is in the conveying of materials. Research scientists are facing transport problems in different types of conveyors: screw and vibratory conveyors, and bucket and rake elevators. BSC has twelve prototypes of diverse machinery which allow validating and verifying numerical models developed (their physical and technical limitations). They have been successfully used already to solve handling problems to several companies, an example is shown in Fig. 3.

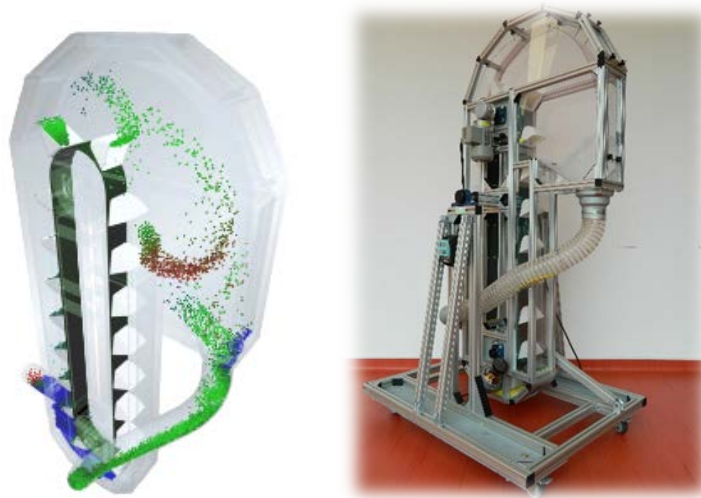


Figure 3: Simulation and prototype for bucket shape optimization.

Research developed in the agricultural field where companies have been already involved focuses in tillage, sowing and harvesting operations (Fig. 4).

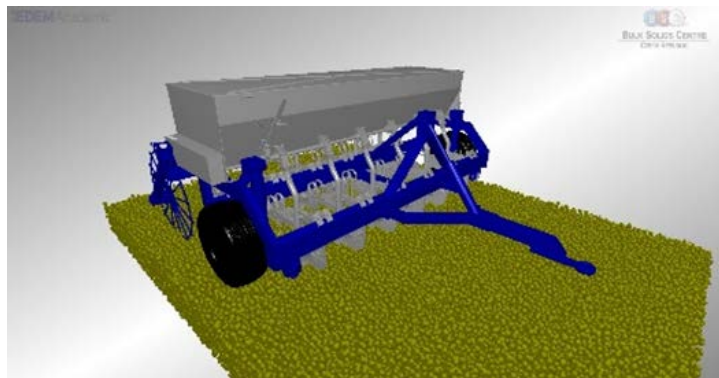


Figure 4: Simulation of sowing operation (MSc. M. Zidek).

These are only a few examples of the activity carried out. If you are interested to contact with the Bulk Solids Centre of the Czech Republic please send an email to jiri.zegzulka@vsb.cz, or to the postal address Bulk Solids Centre, Prof. Jiri Zegzulka, 17. Listopadu 15, 708 33 Ostrava – Poruba, Czech Republic.



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