



POWTECH 2020 SPECIAL EDITION

Leading Trade Fair for Powder & Bulk Solids
Processing and Analytics

30.9.–1.10.2020
NÜRNBERG, GERMANY

PRESS RELEASE

July 2020

POWTECH 2020 Special Edition: How particle simulation will change process engineering for the long term

- **Industry knowledge and trend themes at the POWTECH 2020 Special Edition**

From the perspective of climate and environmental protection, or simply looking after resources in general, customers are increasingly asking whether the products they acquire have a sustainable life cycle. Since the Covid-19 crisis, critical discussion is also focusing on the supply chains. These are all good reasons for businesses to think carefully about the overall life cycle of their products in the future. They must consider not only the economic aspects but also environmental and social demands as a priority. The use of advanced simulation processes can contribute to more sustainable production, and this is one of the themes for the POWTECH Special Edition from 30 September to 1 October 2020. The Special Edition, adapted as a consequence of the global Covid-19 pandemic, focuses this year on knowledge sharing, including the area of simulation.

In many sectors of industry, simulation is now considered a standard tool in product development and optimization. The finite element method (FEM) is routinely used to test the structural mechanics of components. Simulation provides important insights into the development process, and in many cases it has substantially reduced the development time for new products. The situation with process engineering is quite different. The only routine solution in this area to date has been to optimize turbomachinery using

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computational flow dynamics (CFD). Now, the discrete element method (DEM) offers suitable state-of-the-art tools to simulate particle flows and mechanical process workflows. Dr Jorge Carregal Ferreira, head of the Rocky DEM unit at the Grafing office of CADFEM GmbH, an exhibitor at POWTECH, describes this in detail: “Physical simulation has previously been used only to a limited degree, if at all, in mechanical process engineering to date. Reliance is generally placed on experience or on lab tests. But the limit is regularly reached when scaling up from test benches in the lab to large-scale plant intended for manufacturing, or when transferring from a familiar production plant to a new facility. In these areas, simulation lets us understand the key influences and make the right decisions regarding process parameters. The result is significant cost savings, since the risk of having to readjust the production plant is reduced. It is also possible to perform parameter studies, sensitivity analyses and optimization processes to establish the right process parameters.”

Individually simulating millions of particles

Sustainable manufacturing therefore demands a sound understanding of the physical effects of the individual processes, or “unit operations”, which add up to form the overall process. Here, too, physical simulation can lead to important insights and improve the manufacturing process. Mechanical process engineering is very strongly characterized by particle and material flows. Materials and bulk solids are crushed, transported, classified, mixed, separated and treated. Entire components are transported, sorted, treated and further processed. “Using the discrete element method (DEM), we can simulate these processes, and understand and optimize them,” comments Dr Ferreira. “This takes account of the movements and contacts between all the particles. With a very large number of particles, often more than a million, this calls for suitably powerful hardware. Using GPU (graphics processing unit) technology, the DEM now lets us simulate a much larger number of particles and the actual particle shape.”



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Optimizing plants with particle simulation – from quarries to tablet production

Quality control in mixing processes is based on the quality of the mixture and throughput performance. In practice, measuring mixture quality is very difficult, since the plant must be stopped, and access allows for only a limited test sample. “This is where the DEM simulation helps to make the process transparent, since we can determine the quantitative mix quality at any time and at any location using the right statistical analysis. We can then determine the impact of the influencing parameters and input values, which will enable us to recommend the ideal operating parameters.”

In the pharmaceutical industry, tablet coating is an important element in the tablet production process. Although the tablet contains the expensive active ingredient, for reasons of customer acceptance the coloured surfaces must be produced with a high level of accuracy and no trace of damage. These coating processes are therefore crucial, since even a small number of tablets with damaged edges must be disposed of as waste, which incurs high costs. With DEM simulation it is possible to arrange the upscaling and process parameters to keep waste to a minimum.

“We assume that DEM simulation will become a standard tool in mechanical process engineering in the next three to five years,” Ferreira sums up. “That is comparable with the situation in mechanical engineering, in which the finite element method has grown to become a standard tool in the past 15 years and is now used on a routine basis. And just like the situation with mechanical engineering, simulation will result in significant changes in process engineering.”



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POWTECH 2020 Special Edition: Safe Networking

The latest developments in simulation will also play a part at the POWTECH 2020 Special Edition – both in the trade forums and for the exhibitors. Following the global impacts of the coronavirus pandemic, this year's edition has a particular focus on knowledge sharing. At the heart of the POWTECH Special Edition are the trade forums, which will be held in two exhibition halls with due observance of all safety regulations. The accompanying exhibition will give all exhibitors the opportunity to present their innovations in an efficient and appealing manner. Predefined stand designs and spacious meeting areas will guarantee the observance of all hygiene and safety regulations. Following the event, parts of the programme will be made available online for participants.

Process technology worldwide

POWTECH World is a global network of trade fairs and conferences related to mechanical processing technology. The events of POWTECH World form the ideal platform for global knowledge-sharing and new, worldwide business connections. Other forthcoming POWTECH World Events:

- **IPB China**
International Powder & Bulk Solids Processing Conference & Exhibition, 29 to 31 July 2020, Shanghai, China
- **POWTECH India**
India's Leading Technology Expo for Processing, Analysis and Handling of Powder & Bulk Solids, 11 to 12 February 2021, Mumbai, India



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Partnership beyond business

In these turbulent times with unpredictable developments, NürnbergMesse offers all its customers and trade fair participants as much planning certainty and transparency as possible under the circumstances. Under the hashtag #PartnershipBeyondBusiness, all our communication channels are open for questions and suggestions from exhibitors, visitors and other interested parties. For contact details and updated information on the status of the trade fair please go to:

www.powtech.de/partnership

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