



Research Paper

## **Inclined Screw Conveyors - DEM Analysis of the Impact of Intermediate Bearings**

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The design and sizing of high inclination screw conveyors for bulk materials is still often based on experience from the equipment manufacturers. To assure an efficient sizing based on trusted calculation methods the Institute of Materials Handling Material Flow Logistics (fml), Munich, Germany, is working on a research project, funded by the Deutsche Forschungsgemeinschaft (DFG), which is aimed at analyzing inclined screw conveyors. By the use of simulations by the discrete element method the influence of intermediate bearings on the conveying process, which is very hard to constitute analytically and experimentally, can be analysed.

The requirements regarding reliability, performance and economic efficiency of conveyors, as well as energy efficiency and environmental protection, have increased significantly in recent years. The advantages, such as the simple and robust assembly, low equipment and maintenance costs, low susceptance to failure, and in particular the dust-proof design, therefore, often lead to the use of screw conveyors. In ship unloaders, for example, they are used for the vertical transport of bulk material from the hold as well as for the inclined transport along the boom.

As the length of the boom conveyor – according to the dimensions of the ship unloader – is in the area around 30 m, intermediate bearings are necessary to

avoid impermissible distortion of the screw. Other applications for inclined screw conveyors, which require an intermediate bearing due to their length, can be found in the silo discharge in cement plants.