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Modelling and optimization of wet and dry fine grinding processes

In mining and minerals industry fine milling processes gets more and more important, e.g. because of fine-grained ore and steadily increasing product requirements. As consequence, for large-scale fine milling processes, stirred media mills are increasingly used. In parallel sustainability, especially energy and water consumption get more and more crucial. On this basis at first it will be shown how by considering the stress energy distribution, the material transport and the media distribution within the mill, the wet stirred media milling process can be predicted and optimized regarding energy efficiency, mill and media wear as well as product particle size distribution. However, recently dry operation of stirred media mills came into focus for the minerals industry in order to improve efficiency compared to tumbling ball mills or to avoid use of water and eventually expensive drying processes. By controlling the powder flow behaviour the energy efficiency, operation robustness and throughput can be maximized.