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Experimental and computational investigation on the flow behavior of granular particles through an inclined rotating chute SUSHIL SHIRSATH, JOHAN PADDING, HERMAN CLERCX, HANS KUIPERS, Eindhoven University of Technology, Eindhoven, Netherlands — In blast furnaces operated in the steel industry, particles like coke, sinter and pellets enter from a hopper and are distributed on the burden surface by a rotating chute. Such particulate flows suffer occasionally from particle segregation in chute, which hinders efficient throughflow. To obtain a more fundamental insight into these effects, monodisperse particles flowing through a rotating chute inclined at a fixed angle has been studied both with experiments and with a discrete particle model. We observe that the prevailing flow patterns depend strongly on the rotation rate of the chute.With increasing rotation rate the particles are moving increasingly to the side wall.The streamwise particle velocity is slightly reduced in the first half length of the chute due to the Coriolis force, but strongly increased in the second half due to the centrifugal forces.The particle bed height becomes a two-dimensional function of the position inside the chute, with a strong increase in bed height along the sidewall due to the Coriolis forces. It was found that the DPM model was agreed well with the experimental measurements.We will also discuss ongoing work, where we investigate the effects of binary particle mixtures with different particle size or density, different chute geometry.

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