## **Belt Conveyor Dynamics in Transient Operation for Speed Control**

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**Abstract :** Belt conveyors play an important role in continuous dry bulk material transport, especially at the mining industry. Speed control is expected to reduce the energy consumption of belt conveyors. Transient operation is the operation of increasing or decreasing conveyor speed for speed control. According to literature review, current research rarely takes the conveyor dynamics in transient operation into account. However, in belt conveyor speed control, the conveyor dynamic behaviors are significantly important since the poor dynamics might result in risks. In this paper, the potential risks in transient operation will be analyzed. An existing finite element model will be applied to build a conveyor model, and simulations will be carried out to analyze the conveyor dynamics. In order to realize the soft speed regulation, Harrison's sinusoid acceleration profile will be applied, and Lodewijks estimator will be built to approximate the required acceleration time. A long inclined belt conveyor will be studied with two major simulations. The conveyor dynamics will be given.

Keywords : belt conveyor , speed control, transient operation, dynamics

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