SOLID MODELING SIMULATIONS USED AS AN ALTERNATIVE METHOD TO STUDY SAFETY ISSUES IN MINE ELEVATOR/HOIST SYSTEMS

By

Dean H. Ambrose[1]

Contact author: Dean H. Ambrose
e-mail address: add5@niosh5.em.cdc.gov

ABSTRACT

The National Institute for Occupational Safety and Health (NIOSH), Pittsburgh Research Center (PRC)[2] recently developed a solid model simulator of an elevator that is used in typical underground mining operations. The purpose of this simulator is to allow investigators to visually observe the elevator model and enable them to predict the behavior of current or proposed lifting systems for coal or metal/nonmetal mining systems. The simulator provides this information easily, quickly. and cost effectively. This paper discusses the model and simulation developments and presents observations and conclusions from the simulations. The experimentation and validation results of the elevator and brake modeling developments provides qualified evidence for accepting the solid model simulator as a dynamic analysis tool and a technique for studying representative elevator/hoist systems. This method enables investigators to understand the problem sequence and better address the safety concerns. Animating the results to visualize the total system behavior can also be used to enhance training programs and accident investigations.