

Human Performance Variability and Responsiveness to Training in Traditional and Autonomous Haulage Operations

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ABSTRACT

A study was undertaken to assess excavator operator performance variability and rates of improvement to targeted performance training, in both traditional and autonomous haulage mechanized open-cut operations.

The study involved the analysis of historical field performance data captured from various dispatch systems, during historical simulation-based training projects. Performance averages and standard deviations of individual operator performance baselines were calculated, before training, and after training. Each result was then categorized as a traditional, or an autonomous haulage project, and the averages of the categories were compared.

The study found that there was a larger variation between excavator operators in a traditional operation as compared to autonomous haulage operations. It is hypothesized that this is likely due to the significantly larger sample of traditionally operated sites; spanning a wider number of geographies, ore types, and operator skill level. The study also found that there was a negligible difference between the average rate of improvement for targeted simulator training in traditional and autonomous haulage operations. Finally, the study found negligible differences in operator variability or rates of improvement between different autonomous haulage manufacturers.

The study indicates that despite the many advantages in safety and production offered by autonomous haulage systems, excavator performance autonomous operations are still influenced by excavator operator performance at similar rates to traditional operations. Therefore sites with autonomous systems should continue to invest in training systems for their operators, regardless of the autonomous vendor they implement.