Psychrometric Evaluation of Workplace Impacts Upon Change to Battery Mobile Equipment From Diesel

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ABSTRACT

Mine access construction cost is often the largest component or even majority of a mining project's total capital, and ventilation flow capacity typically defines the quantity and size of these developments. With a strong shift towards new technology in mobile equipment electrification, Owners are seeking savings in mine access brought on by reductions in total mine ventilation requirements. Control of heat underground is a key and often defining consideration for underground airflow demand. With new battery electric equipment, engineers are using energy balance and efficiency calculations to approximate heat generated in the workplace. The moisture produced by diesel engines contains latent heat, versus the solely sensible heat produced by battery machines, and these impact physiological heat for workers differently. Psychometric analysis is used to improve the comparison of diesel to battery mobile equipment to capture the net effect on workers underground. The analysis and discussion presented in this paper aims to improve confidence for projects evaluating or adopting this new technology.