

Predicting Annual Underground Thermal Flywheel Effects

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ABSTRACT

The intake air for an underground mine varies daily with the rise and fall of the sun, and annually with the changing of the seasons. This study analyses the effect on the mine working environment of the annual variation of air intake temperature and humidity. A method is proposed to model the seasonal temperature variation in all parts of a cold climate mine. The method is demonstrated in VentSim Design and compared to a comprehensive data set of observed temperature. A Thermal Flywheel effect is observed, whereby temperature variations from the surface are damped and delayed deeper in the mine due to the thermal capacitance of the rock strata.