Proceedings of the 5th World Congress on Mechanical, Chemical, and Material Engineering (MCM'19)
Lisbon, Portugal – August, 2019
Paper No. MMME 132
DOI: 10.11159/mmme19.132

An Experimental Study on the Characteristics of Day-to-day Natural Ventilation in Underground Mines

Dong-Kil Lee, Jong-Myung Park
Korea Institute of Geoscience and Mineral Resources (KIGAM)
124, Gwahak-ro Yuseong-gu, Daejeon, 34132, South Korea
ldk@kigam.re.kr

Extended Abstract

Natural ventilation refers to the flow of air by change in density of air caused by differences in atmospheric conditions between the inside and outside of the mine. Some small mines still rely on natural ventilation instead of mechanical ventilation. For a more accurate assessment and prediction of natural ventilation, changes of air flowrate in the mine should be identified in advance due to changes in physical properties the inside and outside of the mine. While many studies related to pressure of natural ventilation such as [1], [2] and [3] has been conducted in the past, a few study has been done on experimental verification of actual natural ventilation and the assessment of the main influencing factors. To this end, this study designed and produced a fixed ventilation experiment device, and conducted a ventilation experiment in underground mines in Korea. As a result of measuring the change in air quantity inside and outside the mine, the effect on natural ventilation in the mine was found to be small when the temperature outside changed to a day cycle. Meanwhile, measurements of atmospheric pressure have shown that it is effective in predicting the air quantity in mines.

References

[1] H.L. Hartman, *Mine Ventilation and Air Conditioning*. John Wiley & Sons, 1982.
[2] G.E. McElory, "Engineering Factors in the Ventilation of Mines," *Bulletin 385*, U.S. Bureau of Mines. Washington, DC, pp. 196, 1935.
[3] J.P. Rees, *Ventilation Calculations*. Transvaal Chamber of Mines, Johannesburg, pp. 78, 1950.