Paper Number: 3898

Strategies for a sustainable healthier workforce in coal abrasiveness index determination unit operation

Mulaba-Bafubiandi A.F. and Murivhula M.P.

Mineral Processing and Technology Research Centre, Department of Metallurgy, School of Mining, Metallurgy and Chemical Engineering, University of Johannesburg, P.O. Box 526, Wits, 2050, South Africa.,
E-mail:amulaba@uj.ac.za; or antoinemulaba@hotmail.com

Abrasiveness of coal is a measure of an index determined as the total mass loss of four carbon steel blades when rotated for a fixed number of revolutions in a known mass of coal under specific conditions [1].

A highly abrasive coal would significantly affect the wear rate of the materials handling plant at the chute point and during its transfer. Eskom, South Africa, relies on coal to generate 85% of the country's electricity. They have raised concerns about the quality of coal received from local producers. Non-calorific component of coal and a higher coal abrasiveness may increase electricity generation plant maintenance costs dramatically [2].

During the testing of coal to ascertain its abrasiveness index value, coal dust is generated. Coal dust is a fine powdered form of coal, which is created from the crushing and grinding or pulverizing of coal. Worker's health issues may occur due to their exposure to coal dust. These can occur through inhalation, ingestion, adsorption onto operators' skin and eye contact. A study was conducted to ascertain the volume of coal dust generated during the testing of coal abrasive index value. It led to investigating the worker's behaviour, exposure health risks and suggest mitigation alternatives. This paper discussed strategies for an improved workers' health during the testing of coal abrasiveness index value at coal mines, coal laboratory and electricity generation plants .Coal dusts were collected from the ground, from workers cloths and from the coal abrasiveness testing machines. Visual observations showed that operators were not constantly wearing the personal protective equipment (PPE). Coal dusts were found containing As, Hg, Pb, Cu, Ba, Mg, Cr, Ni, V, Si and Zn. In one of the sites, site B2 with a higher silicon content (34.09%), higher amount of manganese was found (1.09%) with a higher zinc content (0.97%). Nickel and chromium were found very high in the site C1 (2.25% and 9.50 respectively). This presentation will end with strategies to mitigate worker's exposure to coal dusts during the determination of coal abrasiveness index value hence possibly contribute to their welfare.

References

[1] Yancey H F, Geer M R & Price J D (1951).

[2] Moodely V (2006 b).