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Developing a method to quantify material density from volumetric data with micro-focus X-ray tomography.

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Density information is crucial in optimizing industrial important processes such as coal processing and there are a plethora of methods to obtain this information. One such accepted method is float-and-sink analysis during the modelling of coal washability which is expensive, time consuming and environmentally hazardous. The density information obtained is also not in real-time and consequently some inaccuracies are inevitable. Image analysis for coal washability modelling from basic unprocessed rock-face photographs is a technique that enjoys significant research investment due to the speed and ease of obtaining modelling data using only a camera. It is debatable how well the image analysis modelling approximates the reality of a complex and heterogeneous coal seam and thus requires verification with alternate reliable techniques such as micro-focus X-ray tomography. X-ray imaging is based on the X-ray absorption properties of materials having different densities. However, for 3D tomographic analysis a complete density analysis is difficult and requires extensive post-processing. This presentation describes a method using micro-focus X-ray tomography to validate mineral density results obtained from image analysis modelling of photographs of rock faces. This method consist of a calibration technique that accurately connects mineral densities with X-ray absorption images. For future work 3D Micro XCT results will be compared to conventional float-and-sink analysis.

Apply to be considered for a student award (Yes / No)?

No

Level for award (Hons, MSc, PhD, N/A)?

N/A

Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

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