

SYMPOSIUM PAPER

IMPROVED METHODS FOR ESTIMATION OF COAL IN SITU DENSITY AND MOISTURE [REPORT ON ACARP PROJECT C10042]

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ABSTRACT

The lack of a precise method for the measurement of in situ density is one of a number of factors that cause errors when estimating coal resources and reserves, and performing site tonnage and quality reconciliations. The ability to accurately quantify the tonnes of product coal at a specified quality from a particular area of the resource is of vital importance to the financial viability of any new operation attempting to develop marginal deposits.

This paper details the outcomes from the recently completed ACARP Project C10042, "Estimation of Insitu Density". The project sought to determine a viable empirical measure of in situ density and then develop a model for its estimation utilising a suite of chemical analyses that quantified the key porosity, rank and moisture characteristics. The in situ density measurement procedure utilised the coal application of the Australian Standard for the field measurement of soil density, AS1289.5.3.2-1993. Using this technique seven mines were visited (5 QLD / 2 NSW) to generate over 50 data sets. The specific goal of obtaining a wide range of coal types for the project data evaluation and model development was successfully achieved with sample rank (as R_v max) ranging from 0.43 to 2.53. The complete ACARP project report, no. C10042, "Estimation of in situ density from apparent relative density and relative density analyses" (Meyers, et al, 2003) should be read in conjunction with this paper to fully appreciate the data generation, evaluation and modelling processes.

Using non-linear multivariable analysis, ash, volatile matter and ultimate carbon content were shown to generate an excellent correlation with the measured insitu density. Subsequently, a model was developed for the estimation of insitu density achieving a model accuracy of $\pm 0.014RD$ units at a 95% confidence limit (CL). To supplement this model of in situ density, the same data set was used to generate a model for in situ moisture, leading to the successful development of a suitable model with an accuracy of $\pm 1.4\%$ moisture units at a 95% CL.

Reference :

Meyers, A., Clarkson, C., Wex, T., & Leach, K. (2003). Improved Methods for Estimation of Coal in Situ Density and Moisture. *Advances in the Study of the Sydney Basin; Symposium*. Wollongong: University of Wollongong.