PUBLISHED PAPER

DELINEATION OF LARGE DIAMETER DENSE MEDIUM CYCLONE PERFORMANCE

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ABSTRACT

This paper details the key outcomes from Australian Coal Research Program (ACARP) Project No. C17036. The primary purpose of the project was to generate a set of public domain efficiency parameters on a very large dense medium cyclone (DMC), i.e., 1450mm diameter. The project undertook a suite of test runs targeting the variations in cyclone feed pressure and medium-to-coal (M:C) ratio, as well as conducting repetitive tests to assess the possible experimental errors during data collection to evaluate the effect of different parameters on DMC efficiency. The generated data was then used to challenge various existing empirical relationships from the literature and coal industry operations relating to DMC performance.

The following points are the key conclusions that have been drawn from the work discussed in this paper:

1. The project demonstrated that a quality data set could be produced if the relevant key risk areas are managed effectively.
2. The DSM equivalent cyclone diameter should be determined prior to calculation of the required cyclone feed pressure, using... **'DSM Equivalent' Dc = Di / 0.2**.
3. The large diameter DMC data from the ACARP project indicates that the separation efficiency does not rapidly decline as the cyclone diameter increases. Instead, performance values similar to that expected from smaller diameter cyclones are achievable.
4. Data sets from various cyclone diameters assessed in this paper highlight a consistent DMC efficiency, independent of the cyclone diameter. Key design parameters to mitigate the risk of excessive Ep breakaway below ~4mm point are feed pressure (>9D equivalent) and M:C ratio (>4).
5. Data from the repetitive test runs indicated a good agreement on all size fractions for determined yield%, Ep, t1 and t0 efficiency parameters.

Reference:
Meyers, A. D., & Sherritt, G. (2010). Delineation of Large Diameter Dense Medium Cyclone Performance. In R. Q. Honaker (Ed.), *International Coal Preparation Congress* (pp. 276 - 287). Lexington, Kentucky USA: Society for Mining, Metallurgy and Exploration, Inc.