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PARTICLE FEED VELOCITY IMPACT ON LARGE DIAMETER DENSE MEDIUM CYCLONE PERFORMANCE

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ABSTRACT

ACARP project no. C17036 (Sherritt et al, 2010) has recently been completed and it's primary purpose of generating a set of public domain efficiency parameters on a very large DMC, i.e. 1450mm diameter has been achieved. More specifically, the project involved a suite of test runs targeting varying cyclone feed pressure, medium to coal ratio, as well as a one off duplicate trial to assess the possible magnitude of the measurement mechanisms associated with the generation of the DMC efficiency parameters. The generated data were then used to challenge various existing empirical relationships from the literature and the coal industry.

The paper focuses on a combination of data from other literature, outcomes from Sherritt et al (2010) and in-house DMC performance data to delineate the impacts on cyclone performance due to feed particle velocity, and resultant centrifugal acceleration. In particular, as feed inlet to cyclone diameter ratio is increased past the DSM standard of 0.20. It is indeed this ratio which is proposed is resulting in the vast majority of large diameter cyclones being operated at too low a feed pressure, delivering lower than optimum centrifugal acceleration. A recommended cyclone feed pressure calculation technique is proposed. Methodologies for determining feed slurry volume were compared.

Several key DMC performance parameters have been presented, including their specific relationship with particle feed velocity and centrifugal acceleration for varying cyclone diameters, and utilising the data from the recent large (1450 mm diameter) cyclone test program (Sherritt et al, 2010). A set of nominal guidelines will be proposed which will have their linkage to particle feed velocity and centrifugal acceleration, in association with other important design criteria such cyclone geometry parameters, feed pressure and M:C ratio.

Reference:
Meyers, A., & Sherritt, G. (2010). Particle Feed Velocity Impact on Large Diameter Dense Medium Cyclone Performance. In B. &. Atkinson (Ed.), *Proceedings of the Thirteenth Australian Coal Preparation Conference* (pp. 126 - 140). Mackay, Queensland: ACPS.