



Research Paper

Consideration of the Effect of a Wide Particle Size Distribution on Calculations for Hydraulic Conveying

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The use of empirical and semi-empirical equations for the analysis of flow behaviour in the hydraulic transport of solids is long established. These equations however, do not apply in the case of wide particle size distributions. The author extends the use of one such equation from Durand to this case and discusses the influence of size and density distributions on such analyses.

If a plant for horizontal hydraulic transport of solids is to be designed the expected pressure loss must be known as exactly as possible because of its decisive influence on such values as pipe diameter, installed power and transport velocity. As the expenses for design tests in most cases are too high, empirical and semi-empirical equations have been developed, so as to be able to predict theoretically the pressure loss for solids conveying. Besides plant data such as pipe diameter velocity, pressure loss and pipe length, many more parameters are determined by the solids themselves and these usually vary from one solid to the other. Among these are density average particle diameter, particle shape, friction behaviour and particle-size distribution. Tests to determine the influence of the particle-size distribution have been performed within a research project funded by the German Research Foundation (DFG).