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HYDRODYNAMIC STUDY WITH SPECIAL EMPHASIS ON VELOCITY PROFILE AND PRESSURE DROP IN 180^{O} PIPES BENDS

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Abstract

Pipelines used to transport coal from where it is mined to where it is consumed. For very short distances, large trucks are used to transport coal, but trains and barges are preferred for long distances. In some cases it is more economical to move the coal by pipeline than by train or barge. This can happen when there is no suitable railway or waterway to transport the coal, or when it must be moved very long distances. There are two types of coal pipelines, slurry and log. Slurry pipelines use a slurry of water and pulverized coal. The ratio of coal to water is about 1 to 1 by weight. Coal log pipelines use coal that has been compressed into logs with a diameter 5 to 10% less than the diameter of the pipeline and a length about twice the diameter of the pipeline. The ratio of coal to water is about 3 or 4 to 1. In general, when pipelines are used to transport coarse slurry, the slurry velocity must be relatively high in order to suspend the solids. Such slurry transport is very abrasive to the pipe and the pump, and the power consumed is high. Consequently, coarse-slurry pipelines are economical only over relatively short distances, normally not more than a few miles. An important application of coarse-slurry pipeline is "concrete pumping," in which concrete is pumped from a parked truck through a portable steel pipe attached to a side boom to reach rooftops and bridge decks. It is a method of conveying and laying concrete employed increasingly in construction. The concentrate of the ore is mixed with water and then pumped over a long distance to a port where it can be shipped for further processing. At the end of the pipeline, the material is separated from the slurry in a filter press to remove the water. This water is usually subjected to a waste treatment process before disposal or return to the mine. Slurry pipelines offer an economic advantage over railroad transport and much less

noise disturbance to the environment, particularly when mines are in extremely remote areas. Typical materials that are transferred using slurry pipelines include coal, copper, iron, and phosphate concentrates, limestone, lead, zinc, nickel, bauxite and oil sands. Slurry pipelines are also used to transport tailings from a mineral processing plant after the ore has been processed in order to dispose of the remaining rocks or clays. For oil sand plants, a mixture of oil sand and water may be pumped over a long distance to release the bitumen by ablation. These pipelines are also called hydro-transport pipelines.

Keywords : Wear Analysis, Pneumatic Conveying, Slurry Pipeline, Coal Pipeline, U Bend, CFD Analysis in 180^{o}bend.