



Technical Article

The Use of Measured Flow Properties for Dimensioning the Outlet of a Mammoth Silo for Coal Storage

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This article describes a procedure for predicting the outlet size of a large flat-bottomed coal silo to ensure reliable flow. The design is based on the flow properties measured on relevant samples of the bulk solid and a mixture of existing silo theories and common sense. Due to the special features of the Eurosilos not all the steps in the procedure are actually needed in the case described, but are given for completeness.

1. Introduction.

At the end of 1980 work commenced on the design and construction of a mammoth silo of the Eurosilos type [1] for the storage of approximately 10,000 metric tons of coal. This type of silo is basically a cylindrical-shaped, covered ground storage for large amounts (up to 100,000 m³) of bulk solids. A typical cross-section is given in Fig. 1.

The bulk material is loaded through the top centre of the silo, using a telescopic chute to avoid the formation of dust. A suspended feeder/conveyor system distributes the material over the top surface. On emptying this same system

directs the material back to a central flow channel formed within the material where it is withdrawn by gravity flow through the outlet in the bottom centre of the silo. The features of this Eurosilo storage system are described elsewhere [2].

With the foundations of the silo already under construction, little was known about the required outlet geometry. The existing outlet design had been based on some practical experience of the manufacturer of the vibratory feeder to be installed under the outlet.