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Measurement of Download on A Belt Feeder Situated Beneath A 30 m^3 Capacity Mass Flow Bunker

British Steel Corporation

Research Organisation

7. CONCLUSIONS

The following conclusions apply to a mass flow bunker having an extractive belt feeder positioned directly beneath the outlet. They probably apply in principle to bunkers having other types of extractive feeders.

(1) The static download will not exceed approximately: 0.4 x weight of vertical column of bulk solid directly above outlet.

(2) As the quantity of bulk solid in the bunker increases the static download eventually reaches an asymptotic value. As a rough guide, this will not exceed the vertical force exerted by a column of bulk solid directly above the outlet, the height of which is equal to (4.5 x average outlet dimension*). If the outlet is only just large enough to give mass flow the asymptotic value will be less than the above figure.

(3) The dynamic download is about half to a quarter of the static download.

(4) Under running conditions the coefficient of internal friction "μ" of a bulk solid in the shear area has a value of approximately 0.4–0.6, the higher value applying to bulk solids consisting largely of coarse particles.

(5) The power required to drive an extractive belt feeder at a given discharge rate can be reduced by increasing the bed depth (thus allowing a reduction in belt speed) and by reducing the download (e.g. by fitting an impact breaker inside the bunker or by inserting angled chuting between the bunker outlet and the feeder).

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*Defined in Appendix 3