

Report

1. SYSTEM:

Four new raw mill feed bins were designed and installed in 2007. The bin design was somewhat based on functional design of Jenike & Johanson, USA. A typical bin is show in drawing # HOLTEC A - 06188 – 36 – 1 - 01. It consists of a 3897 x 4000 mm cross section at top converging to a 691 x 4000 mm cross section at the bottom over the height of 5706 mm. Below the outlet, the Schenck apron weigh feeder is installed.



RM Feed Hopper



Apron Weigh Feeder



Shuttle Conveyor arrangement

These bins, two of which are used for high grade limestone and low grade limestone for one production line of raw mill. The crushed limestone is fed by shuttle conveyor where the material is transported by series of belt conveyors from the stock pile.

2. SITUATION:

These four bins reportedly worked well for their six weeks after commissioned. However, problems started being experienced in later operation. Intermittent flow problems have been experienced since that time.

The material build up continues through the hopper, particularly at the backend of the bin as shown below. The bin was designed for mass flow pattern but an arch develops at the hopper outlet or the interface cross-section between hopper and feeder. After some period, material flows at centre, create flow channel/rathholing. It makes frequent blockage and need to deploy people for cleaning of bin under unsafe condition.

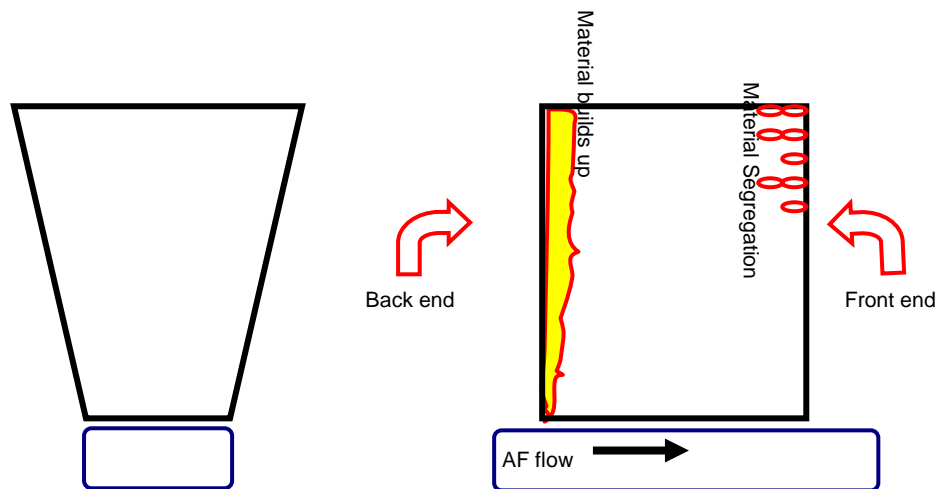
Also, the flow stream of limestone is delivered by the shuttle conveyor to a hopper, will eject the coarse particles in front-end of the hopper, allowing segregation of repose slopes in side of the bin.



Coarse particles segregation in the front end of the bin



Fine particles segregation in the back end of the bin



Material buildup and segregation Pattern

3. FURTHER COMMENTS

- There is an interface chute between apron WF and the hopper as shown in drawing.
- The recommend hopper has a TIVAR lining over the entire inner surface but the actual system has only small portion of the interface chute between apron and bin

- The recommended hopper was based on results generated with -6mm particles having moisture content of 8%. But moisture content normally range of 4 – 6% during dry season (May – Sept) and may go up to 10% during monsoons.
- There is a volatile material like clay which varies time to time in the limestone. It influences the build up in the hopper when percentage increased

