

Detection of oversize material after screening in Sinter Making

1.0 Introduction: In Sinter Plant, sinter is produced by incipient fusion of different raw materials like iron ore fines, lime stone, dolomite, coke breeze and metallurgical waste in sinter machines. Sinter is a porous iron bearing material which is being charged in Blast furnace to produce Hot Metal. 80% of sinter requirement in Blast Furnace is fulfilled by 3nos of sinter machines. Following are the capacity of three sinter machines.

	Area(M2)	Bed height(mm)	Capacity(MT)
Sinter m/c-1	378	650	3.6
Sinter m/c-2	312	500	2.6
Sinter m/c-3	408	700	3.6

Different belt conveyors are used for transportation of above mentioned raw materials in huge quantity. Different yard equipments like Blender Reclaimers, Twin Boom Stackers etc are used for stacking and reclaiming of basemix and sinter in the open yard. Sinter machine is an endless chain of pallet cars. Where basemix is charged and its top layer is ignited and air is being sucked from the bottom of the sinter machine. Then sinter is being formed layer by layer till the bottom of the pallet cars. This sinter is being crushed and screened for different sizes. Different mat size screens are used in the before sending the required size of sinter to Blast Furnace.

2.0 Present Scenario: Different size fractions are being separated by using different mat size vibrating screens. Usually sinter of +5mm sizes are sent to blast furnace. -5mm size sinter, will not be sent to BF, as it will reduce the bed permeability of Blast Furnace. This size fraction (-5mm) will be reused in the sinter making as an input material. This size(-5mm) fraction sinter is called Sinter Returns. This sinter returns comes back from Blast Furnace after screening through the conveyors like BC-22, BC-23. At the same time sinter of size 10mm to 20mm is used in pallet cars at the bottom to protect the grate bars of the pallets. This size fraction (10mm to 20mm) is called Bed Material/Hearth Layer. This bed material is separated in a vibrating screen of mat size 10mm. Just after screening this bed material is carried to sinter machine through conveyor P-2-1. Similarly coke breeze of -3mm size is also being carried through the conveyor CF-9 after screening. But due to damage/hole in the screen mats, oversize material comes on the conveyors like BC-22,BC-23, P-2-1 and CF-9. This oversize material causes jammings of different chutes of the downstream if not observed in time.

3.0 Required Solution:

Providing high resolution intelligent camera (using AI), the early detection of bigger size material can help us to reduce the delay due to jamming. At the same time repair of screens can be taken up just in time.



(BC-22 conveyor with oversize material)



(BC-23 conveyor with oversize material)