

Sustainable zero waste mining: use of lime sludge-paper waste at cement plant, Naokari Limestone Mines, Awarpur

Mining industry is all about the raw material from mining and optimal utilization of resources available for maximum output is the need of the era. This in turn a longstanding impact on sustainability and cost benefit for the entire cement industry. The Naokari limestone mines of UltraTech Cement Ltd. Unit: Awarpur Cement Works in Maharashtra is never in dearth of resources. But the resource criticality lies in the sensitive quality variation.

For sustainable mining and adopting to the global strategy of zero waste mining and use of alternatives e.g. by product and co-products, at ACW the alternative of use of Lime sludge, the waste of paper industry was implemented after detailed R&D and brain storming.

Lime sludge is the process waste of Balharsha Industries Limited (BILT) containing high percentage of CaO. Being the waste of paper mill it is bound to disposed off as per guidelines of Maharashtra Pollution Control Board (MPCB). BILT management was stocking the lime sludge in their premises but after certain time it became over stocking resulting in space crisis and also affecting the surrounding environment and a non-compliance.

The characteristic of lime sludge is powdery from having high moisture content 25% to 40% and sticky in nature with toxic and bad smell, difficulties were faced initially

i.e. transfer points chutes getting jam due high moisture and it is tedious job to clean, hampers the crusher/conveying system. The process started by unloading lime sludge near crusher hopper feeding started by wheel loader with ROM limestone feeding as there is no suitable arrangement to feed



Blind peer reviews carried out

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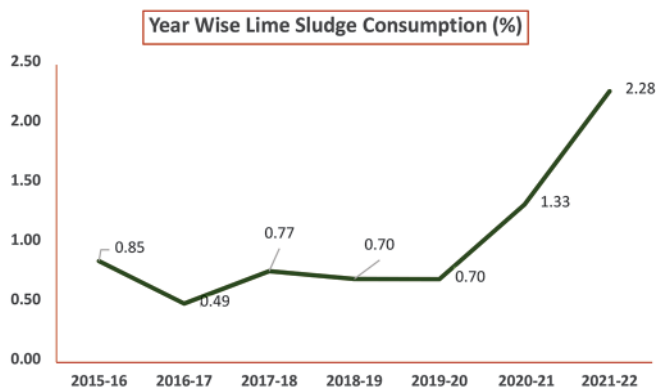
at plant side. Journey was started in FY 2014 on trial basis and established for the sustenance in view of benefit of the organization

New strategies have been identified to use lime sludge after brain storming sessions including all levels of employees to find how to boost lime sludge consumption. Numbers of ideas generated from wage board level employees. In year 2019-20 continuous lime sludge feeding by wheel loader stopped and started new initiatives i.e.

- Unloading of incoming lime sludge under the proposed blasts.
- Direct feeding in hopper with dumpers with pauses with limestone
- Started unloading, spreading and drying on the proposed drilling site
- Loading of lime sludge with wheel loader on the limestone.

Various steps taken to improve lime sludge consumption throughout the year

- Unloading of lime sludge in place of safety bunds on the drilling face
- After blasting pushed the lime sludge on the top of blasted material
- Addition of lime sludge in blast until blast is fully exhausted
- Stopped unloading under the blast to avoid jamming in crusher
- Increased numbers of raw of lime sludge unloading on proposed blast took high volume blast up 1.00 lac



quantity and unloaded stocked lime sludge with excavator and dumper around 3000-5000MT and spread with dozer for drying and uniform mixing

Benefits

Achieved initial annual lime sludge consumption from 0.8% in to 1.33% in FY 20-21 and 2.26% in the year 2021-22 up to Jun-2021 and plan to meet 2-2.5% at the end of year without any hiring wheel loader with the aim of zero stock in mine by 31.03.2022.

- Positive impact on environment by consuming waste material of Balharsha Industries Limited
- Concrete solution for Balharsha Industries Limited to waste management.
- Mines life enhancement by reducing ROM limestone LSF up to 5 LSF in raw mix.
- Improved cement plant kiln performance by addition of high CaO material.

PREDICTION OF BLAST-INDUCED GROUND VIBRATION USING MULTI-VARIATE REGRESSION ANALYSIS IN AN OPENCAST MINE

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