Case Study:

Utilization of Red Mud in Cement Industry

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Replacement of laterite with red mud for cement clinker manufacturing - UltraTech Cements Limited, Sidhi Cement Works

UltraTech Cements Limited, Sidhi Cement Works, is operating an integrated cement plant located at Sidhi district of Madhya Pradesh State. Plant uses the dry process for cement manufacture. It has two kilns. Kiln-1 is operating with a capacity of 4,400 TPD clinker and Kiln-2 is operating with a capacity of 5,200 TPD clinker.

UltraTech Cements Limited, Sidhi Cement Works installed red mud handling and utilising system in April 2019. Plant started using red mud that was generated from Hindalco, Renukud aluminium refinery as an alternative raw material in cement kilns. Presently, plant is using 3,800 metric tonnes of red mud with 14% moisture as monthly consumption, which is equivalent to 20% of total laterite replacement.

Usage of red mud in cement kiln has also accounted for enhancement in production and other economic and environmental benefits such as, neutralization of any acids generated due to the presence of sulphur in pet coke and reduction in raw material cost and overall production cost.

Cost comparison of red mud and laterite is given below:

Material	UOM	Cost (On dry basis)	Difference
Laterite	INR/MT	729	284
Red Mud	INR/MT	445	

During operation of the new system, UltraTech Cements Limited, Sidhi Cement Works experienced problems like frequent jamming of red mud hopper, which was overcome by installing vibrator and blaster in hopper.

Composition of major constituents in red mud and laterite makes red mud viable for replacing laterite. Alkali content in red mud adds value in terms of neutralizing SOx if plant is using pet-coke as major fuel. Composition of red mud and laterite is shown below:

Particular	Red mud (%)	Laterite (%)
SiO_2	10.4	18.9
Al_2O_3	20.52	25.29
Fe_2O_3	37.2	39.3
CaO	3.47	1.47
MgO	0.48	0.86
LOI	10.2	12.48
Na_2O	5.17	0.01
K_2O	0.12	0.76
SO_3	0	0.04
TiO_2	10.94	2.83
P_2O_5	0.06	0.15