Re-evaluate the thresold value of Limestone

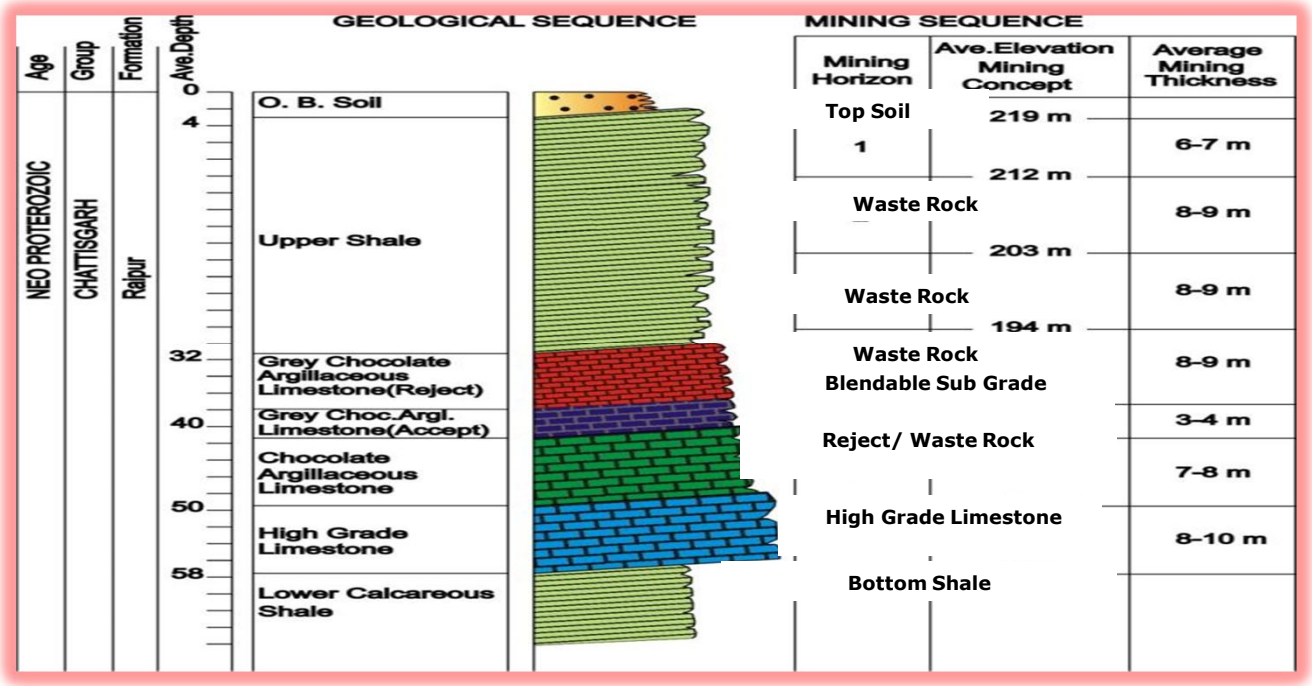
Objectives: Plan and Operate the Quarry coherently with the Raw material strategy and management of reserves and how to explore the optimum use of Low Grade ore for Mineral Conservation and Sustainable Mining in India.
Name of the Mine: Dungri Limestone Quarry
Name of the company: Bargarh Cement Works of ACC Ltd.
Location: AT/PO- Bardol, Dist- Bargarh, Odisha-768038
Lease Holds Area: 448.392 Ha.
Plant Capacity: 2.5 MTPA Cement.(Captive)

Following parameters being considered during Reserve calculation:

Parameters	Norm
Cut off Grade	CaO>40%, SiO2% <18%
Threshold value	35%CaO, 4% MgO, 18%SiO_2 as per IBM Circular No **No.T-45031/CGBM/2007(PF) Dated:**
Reserve (As on 01-04-2016 (in **Million Tonnes**)	Category 111 HG Limestone (CaO 45% and SiO2 -10%) :-12.903 MG Limestone (CaO 40% and SiO2 -18%) :-4.402 **Total :- 17.305**
Depth (m)	84 Mtr from surface .
Bulk Density	2.76 for high grade & 2.93 for medium grade and un-used sub grade (As per approved mining plan)

Stratigraphic Sequence:

- Holsari quartzite and quartzitic sandstone
- Soil.
- Upper Calcareous Shale.
- Grey Chocolate Argillaceous Limestone.
- Chocolate Argillaceous Limestone with Shale Bands.
- Fine Grained High Grade Limestone.
- Lower Calcareous Shale.



Geology:

Lithology	SiO_2%	Al_2O_3%	Fe_2O_3%	CaO%	MgO%	LOI%	TC%	LSF
Lower Calcareous Shale	27.9	7.4	2.6	33.3	1.1	27.0	62	
Fine Grained Limestone(HG)	**10.0**	**1.5**	**0.6**	**48.7**	**0.9**	**38.3**	**89**	**151.1**
Chocolate argillaceous limestone	33.3	9.2	2.5	29.5	1.1	24.0	55	
Grey chocolate argillaceous limestone(Upper Part)(SG)	30.6	8.1	2.5	31.5	1.1	25.5	59	
Grey chocolate argillaceous limestone(Lower Part)(MG)	**19.6**	**4.4**	**1.8**	**40.7**	**1.1**	**32.2**	**75**	**62.1**
Upper calcareous shale:	55.6	11.2	3.4	13.5	1.1	12.4	26	

Lime Saturation Factor (LSF)

The Lime Saturation Factor is a ratio of CaO to the other three main oxides. Applied to clinker, it is calculated as:

$LSF=CaO/(2.8SiO_2 + 1.2Al_2O_3 + 0.65Fe_2O_3)$

Often, this is referred to as a percentage and therefore multiplied by 100.

LSF to be maintained in limestone 102-104.

70% Fine grained Limestone and 30% Medium Grade limestone blended and produced cement grade limestone with LS 102 to 104.

AFR like PetCoke for Kiln and Calciner in place of Coal :

With the objective to maximize consumption of medium grade limestone in Raw mix, it is advised to use of 100% **Petcoke usage** at Kiln & Calciner.. Use of AFR (Petcoke) in place of **Coal** in cement plant will increase the medium grade limestone consumption having **CaO 35% to 40 %** with **SiO2 upto 20%.**

Chemical Parameters.(Raw Mix)	HG Limestone	MG Limestone
SiO2 [%]	10.50	20.40
Al2O3 [%]	1.50	4.10
Fe2O3 [%]	0.40	1.50
CaO [%]	47.50	39.10
LSF	151.10	62.10

Sub-grade Limestone(Cao 30-35% and SiO2> 18 %) Resources Category 221-6.305 Million Tonnes ,As per approved MMP the sub-grade Limestone is stacking outside the UPL in non-mineralized area for future use.

Proposed Thresold Value of Limestone Odisha State may be considered as:

CaO: 35%(Min), SiO2: **20%**(Max), MgO: 4%(Max),& Alkalies-0.5%(Max).

THANK YOU