

LIMESTONE AND OTHER CALCAREOUS MATERIALS



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(Part- III : Mineral Reviews)

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## LIMESTONE & OTHER CALCAREOUS MATERIALS

(ADVANCE RELEASE)

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# 18 Limestone & Other Calcareous Materials

Limestone is a sedimentary rock composed mainly of calcium carbonate ( $\text{CaCO}_3$ ) in the form of the mineral calcite. The two most important constituents are calcite and dolomite. Limestone often contains magnesium carbonate, either as dolomite  $\text{CaMg}(\text{CO}_3)_2$  or magnesite ( $\text{MgCO}_3$ ) mixed with calcite. Such rocks are termed as 'dolomitic' or 'magnesian' limestone. Limestones altered by dynamic or contact metamorphism become coarsely crystalline and are referred to as 'marbles' and 'crystalline limestones'. Other common varieties of limestones are 'marl', 'oolite' (oolitic limestone), shelly limestone, algal limestone, coral limestone, pisolitic limestone, crinoidal limestone, travertine, onyx, hydraulic limestone, lithographic limestone, etc. However, the limestone which is used by industries in bulk quantity is a bedded type sedimentary limestone.

Other calcareous material used by industry are 'limeshell', the thick calcareous shells of molluscs deposited in the form of beds as well as present in ancient lakes and shallow seas. "Marl", a lime rich mud which contains variable amounts of clays and silt.

A limestone rock which separates well along the stratification into a few centimetres thick slab is termed 'flagstone'. The dimensional limestone is used for building and ornamental stone.

## RESOURCES

The total reserves/resources of limestone of all categories and grades as per NMI data based on UNFC system as on 1.4.2015 have been estimated at 203,224 million tonnes, of which 16,336 million tonnes (8%) are placed under reserves category and 1,86,889 million tonnes (92%) are under remaining resources category. Karnataka is the leading state having 27% of the total resources followed by Andhra Pradesh and Rajasthan (12% each), Gujarat (10%), Meghalaya (9%), Telangana (8%), Chhattisgarh and Madhya Pradesh (5% each) and remaining 12% by other states. Gradewise, cement grade (Portland) has leading share of about 70% followed by Unclassified grades (12%) and BF grade (7%). Remaining (11%) are different grades [Table-1(A)].

The total resources of marl of all categories and grades as per NMI data based on UNFC system as on 1.4.2015 have been estimated in Gujarat at 135.56 million

tonnes of which 123.86 million tonnes (91%) are under reserves category and 11.70 million tonnes (9%) are under remaining resources category [Table - 1 (B)].

## EXPLORATION & DEVELOPMENT

The exploration & Development details are given in the Review of "EXPLORATION & DEVELOPMENT" in "GENERAL REVIEWS".

## PRODUCTION AND STOCKS

### Limestone

The production of limestone in 2016-17 at 313.2 million tonnes increased by about 2% as compared to that of the previous year.

There were 771 reporting mines in 2016-17 as against 807 during the previous year. Twenty seven mines each producing more than 3 million tonnes per annum contributed 42% of the total production of limestone in 2016-17. The share of 15 mines each in the production range of 2 to 3 million tonnes was 11% of the total production. 24% of the total production was contributed by 54 mines each producing 1 to 2 million tonnes annually. The remaining 23% of the total production was reported by 673 mines and two associated mines during the year. Twenty five principal producers contributed about 77% of the total production. About 3.3% of the production was reported by public sector mines as against 4% in the previous year.

About 97% of the total production of limestone during 2016-17 was of cement grade, 2% of iron & steel grade and the rest 1% consisted of chemical grade.

Rajasthan was the leading producing state accounting for (21%) of the total production of limestone, followed by Madhya Pradesh & Andhra Pradesh (11% each), Chhattisgarh & Karnataka (10% each), Gujarat, Tamil Nadu & Telangana (8% each), Maharashtra & Himachal Pradesh (4% each), and the remaining 5% was contributed by Meghalaya, Odisha, Uttar Pradesh, Assam, Jharkhand, Jammu & Kashmir, Kerala and Bihar.

Mine-head closing stocks of limestone at the end of the year 2016-17 was 14.4 million tonnes as against 12.6 million tonnes in previous year.

Average daily labour employment in limestone mines in 2016-17 was 20,800 as against 23,987 in the previous year (Tables - 2 to 6).

## LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 1(A) : Reserves/Resources of Limestone as on 01.04.2015**  
(By Grades/States)

Grade/State	Reserves				Remaining Resources						Total Resources (A+B)		
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)
		STD121	STD122			STD221	STD222						
<b>All India: Total</b>	<b>9438939</b>	<b>3015917</b>	<b>3880897</b>	<b>16335753</b>	<b>4870440</b>	<b>4852713</b>	<b>8623172</b>	<b>7111337</b>	<b>22629060</b>	<b>130787772</b>	<b>8014504</b>	<b>186888998</b>	<b>203224752</b>
<b>By Grades</b>													
Chemical	184411	98399	95562	378372	126704	113184	601969	19590	1825142	2372558	14268	5073415	5451787
S.M.S.(O.H.)	135571	853518	10146	999235	12497	280089	740140	512977	4582258	1822480	239223	4065664	5064898
S.M.S.(L.D.)	2636	182	584	3402	821	108139	11468	7992	49894	223762	-	402075	405477
S.M.S.(O.H. & L.D. mixed)	-	-	-	-	-	-	-	-	-	167182	-	167182	167182
B.F.	247462	44404	51201	343068	139602	569999	77704	509245	1053678	11302892	6871	13659989	14003057
S.M.S. & B.F. mixed	40226	101941	27728	169894	32974	7234	49524	4712	122103	711755	240733	1169033	1338928
Cement (portland)	8373610	1693372	3549049	13616030	4282507	3601959	6651670	5069573	13298490	88338670	6895165	128138034	141754065
Cement (white)	133	23	115	270	4730	3054	2702	117000	-	2231	-	129716	129986
Cement (portland & white)	1776	-	930	2706	14125	8540	13707	338670	62101	506688	39000	982832	985538
Cement (blendable/beneficial)	183933	51087	64749	299769	165958	91508	340110	42227	44217	490999	-	1175019	1474788
B.F. & cement mixed	49731	208	35456	85394	1040	26623	6308	3869	45	89942	-	127828	213222
S.M.S.,chemical & paper	2207	-	273	2479	353	2169	1329	-	151	1228617	-	1232618	1235097
Paper	25551	-	-	25551	472	-	359	120738	27197	747971	-	896737	922289
Others	43906	41787	7861	93555	18419	15407	33432	102098	515719	2509307	232908	3427289	3520844
Unclassified	138164	108746	36731	283642	69172	17934	81277	217708	5092748	19027097	324804	24830740	25114381
Not-known	9623	22250	513	32385	1066	6876	11474	44938	79318	1245622	21532	1410827	1443212
<b>By States</b>													
Andhra Pradesh	1003483	19713	385133	1408329	269901	53722	706890	82112	268002	18666131	3466741	23513499	24921828
Arunachal Pradesh	-	-	-	-	-	-	-	-	49220	433575	1	482796	482796
Assam	25542	152546	-	178088	167902	21973	4257	154644	39859	901623	-	1290258	1468346
Bihar	12410	-	306	12715	3096	2558	1405	67926	38210	724118	10558	847872	860588
Chhattisgarh	1025180	7128	145576	1177885	1071824	751825	427410	1332250	485933	5558135	-	9627377	10805262
Daman & Diu	-	-	-	-	-	-	-	-	-	128670	-	128670	128670
Gujarat	750236	173244	76324	999804	277146	159554	120210	21110	906641	18772852	-	20257514	21257318

(Contd.)

LIMESTONE AND OTHER CALCAREOUS MATERIALS

Table-1(A) (Concl.)

Grade/State	Reserves				Remaining Resources							Total Resources (A+B)	
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334		Total (B)
		STD121	STD122			STD221	STD222						
Haryana	-	-	-	-	1425	15507	3382	-	2200	52163	-	74677	74677
Himachal Pradesh	555180	209851	69908	834938	191300	327757	40840	1530937	26121	3234938	37339	5389231	6224169
Jammu & Kashmir	443339	31917	79147	554404	54863	9008	20510	43611	370	1752569	207283	2088214	2642618
Jharkhand	88172	-	291116	117288	95008	13529	29265	89572	13220	354319	11803	606715	724003
Karnataka	461049	2154	1113795	1576998	497136	559903	1355522	1572501	13920771	34952588	-	52858420	54435419
Kerala	11472	-	-	11472	123106	77	-	21161	2888	35228	-	182459	193931
Madhya Pradesh	816293	1093490	545321	2455103	419938	256187	498590	566011	830331	4045838	269859	6886754	9341858
Maharashtra	424035	143115	39905	607055	583978	206162	136835	28595	234518	1056168	-	2246255	2853310
Manipur	-	-	-	-	-	-	-	10197	2138	33718	-	46053	46053
Meghalaya	135836	87904	1822	225562	68457	39289	46200	464670	2811179	14048758	-	17478553	17704116
Nagaland	-	-	-	-	825	-	-	-	1005500	745875	-	1752200	1752200
Odisha	255555	77879	61007	394442	173797	548527	420634	139924	50397	361350	32635	1727264	2121706
Puducherry	-	-	-	-	-	-	-	4433	4333	6966	-	15732	15732
Rajasthan	2471143	933889	863351	4268382	367799	1538090	4529048	596071	761855	11365794	939808	20098465	24366847
Sikkim	-	-	-	-	-	-	-	-	-	2380	-	2380	2380
Tamil Nadu	334445	82892	56572	473909	209632	99882	91350	92843	33440	598942	-	1126088	1599997
Telangana	625569	195	400766	1026529	254912	28110	92020	113416	921577	11710694	3038478	16159208	17185736
Uttar Pradesh	-	-	12849	12849	33360	129180	38375	142763	40000	31200	-	414878	427727
Uttarakhand	-	-	-	-	5035	91872	60429	29486	164879	1191059	-	1542760	1542760
West Bengal	-	-	-	-	-	-	-	7104	15482	22120	-	44706	44706

Figures rounded off.

LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 1 (B) : Reserves/Resources of Marl as on 01.04.2015  
(By Grades/States)**

(In tonnes)

Grade/State	Reserves			Remaining Resources					Total Resources (A+B)		
	Proved STD111	Probable STD121 STD122	Total (A)	Feasibility STD211	Pre-feasibility STD221 STD222	Measured STD331	Indicated STD332	Inferred STD333		Reconnaissance STD334	Total (B)
<b>All India : Total By Grade</b>	<b>117115856</b>	<b>4650000 2090000</b>	<b>123855856</b>	<b>11704870</b>	-	-	-	-	-	<b>11704870</b>	<b>135560726</b>
Unclassified	117115856	4650000 2090000	123855856	11704870	-	-	-	-	-	11704870	135560726
<b>By State</b>											
Gujarat	117115856	4650000 2090000	123855856	11704870	-	-	-	-	-	11704870	135560726

Figures rounded off.

LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 2: Principal Producers of Limestone, 2016-17**

Name and address of producer	Location of mine	
	State	District
Ultra Tech Cement Ltd, 'B' Wing, Ahura Centre, 2 <sup>nd</sup> Floor, Mahakali Caves Road, Andheri (E), Mumbai-400 093, Maharashtra.	Andhra Pradesh	Kurnool
	Chhattisgarh	Raipur
	Gujarat	Amreli
	Himachal Pradesh	Solan
	Karnataka	Kalaburagi
	Madhya Pradesh	Neemuch
		Rewa
		Satna
		Sidhi
		Maharashtra
Chandrapur	Rajasthan	Chittorgarh
		Jaipur
		Nagaur
		Pali
	Tamil Nadu	Ariyalur
	Uttar Pradesh	Sonbhadra
Shree Cement Ltd, Post Box No. 33 Bangur Nagar, Beawar – 305 901, Rajasthan.	Chhattisgarh	Raipur
	Rajasthan	Ajmer
		Pali
The ACC Ltd, Cement House, 121, Maharshi Karve Road, Mumbai – 400 020, Maharashtra.	Chhattisgarh	Durg
	Himachal Pradesh	Bilaspur
	Jharkhand	Singhbhum (W)
	Karnataka	Kalaburagi
	Madhya Pradesh	Katni
	Maharashtra	Yavatmal
	Rajasthan	Bundi
	Tamil Nadu	Coimbatore
Odisha	Bargarh	
Ambuja Cement Ltd, Elegant Business Park, MIDC Cross Road B Off Andheri Kurla Road, Andheri-(East), Mumbai - 400 059 Maharashtra	Chhattisgarh	Baloda Bazar
		Raipur
	Gujarat	Junagadh
	Himachal Pradesh	Solan
	Maharashtra	Chandrapur
	Rajasthan	Pali
J. K. Cement Limited, Kamla Tower, Kanpur-208 001, Uttar Pradesh.	Rajasthan	Chittorgarh
	Karnataka	Nagaur
		Bagalkot
The India Cement Ltd, Coromandel Towers, 93, Santhome High Road, Karpagam Avenue, Raja Annamalai Puram, Chennai – 600 028, Tamil Nadu.	Andhra Pradesh	Kadapa
	Telangana	Nalgonda
		Ranga-Reddy
	Tamil Nadu	Ariyalur
		Perambalur
		Salem
		Namakkal

(Contd.)

Table - 2 (Contd.)

Name and address of producer	Location of mine	
	State	District
Century Textiles & Industries Ltd, Century Bhawan, Dr. Annie Besant Road, Worli, Mumbai- 400 030, Maharashtra.	Chhattisgarh	Raipur
	Madhya Pradesh	Satna
	Maharashtra	Chandrapur
The Ramco Cement Ltd, 5th Floor, Auras Corporate Centre, 98, Dr Radhakrishnan Salai, Mylapore- 600 004, Chennai.	Andhra Pradesh	Krishna
	Karnataka	Chitradurga
	Tamil Nadu	Ariyalur
		Perambalur
Chennai.		Thoothukudi
		Virudhunagar
Tamil Nadu		
J. K. Lakshmi Cement Ltd, JK Puram, Basantgarh Pindwara -307 019, Rajasthan.	Chhattisgarh	Durg
	Rajasthan	Sirohi
Dalmia Cement Ltd (Bharat) Dalmiapuram, Main Road, Kallakudi Lalgudi, Tiruchirappalli- 621 651, Tamil Nadu.	Andhra Pradesh	Kadapa
	Tamil Nadu	Ariyalur
		Tiruchirappalli
Lafarge India Private Ltd, Equinox Business Park Tower-3, East Wing 4th Floor, Off Bandra Kurla Complex, LBS Road, Kurla-West, Mumbai-400 070, Maharashtra.	Chhattisgarh	JanjgirChampa
	Rajasthan	Raipur
		Chittorgarh
Jaiprakash Associates Ltd, Sector – 128, Noida – 201 304, Gautam Buddha Nagar Uttar Pradesh.	Andhra Pradesh	Krishna
	Gujarat	Kutch
	Madhya Pradesh	Rewa
Kesoram Industries Ltd, 9/1, R. N. Mukherjee Road, 8 <sup>th</sup> Floor, Kolkata – 700 001, West Bengal.	Telangana	Karimnagar
	Karnataka	Kalaburagi
Chettinad Cement Corp. Ltd, 4 <sup>th</sup> Floor, Rani Seethai Hall Building, 603, Anna Salai, Chennai – 600 006, Tamil Nadu.	Tamil Nadu	Ariyalur
		Dindigul
		Karur
	Karnataka	Perambalur
		Kalaburagi
Birla Corporation Ltd, Birla Building, 9/1 R. N. Mukherjee Road, Kolkata – 700 001, West Bengal.	Madhya Pradesh	Satna
	Rajasthan	Chittorgarh

(Contd.)

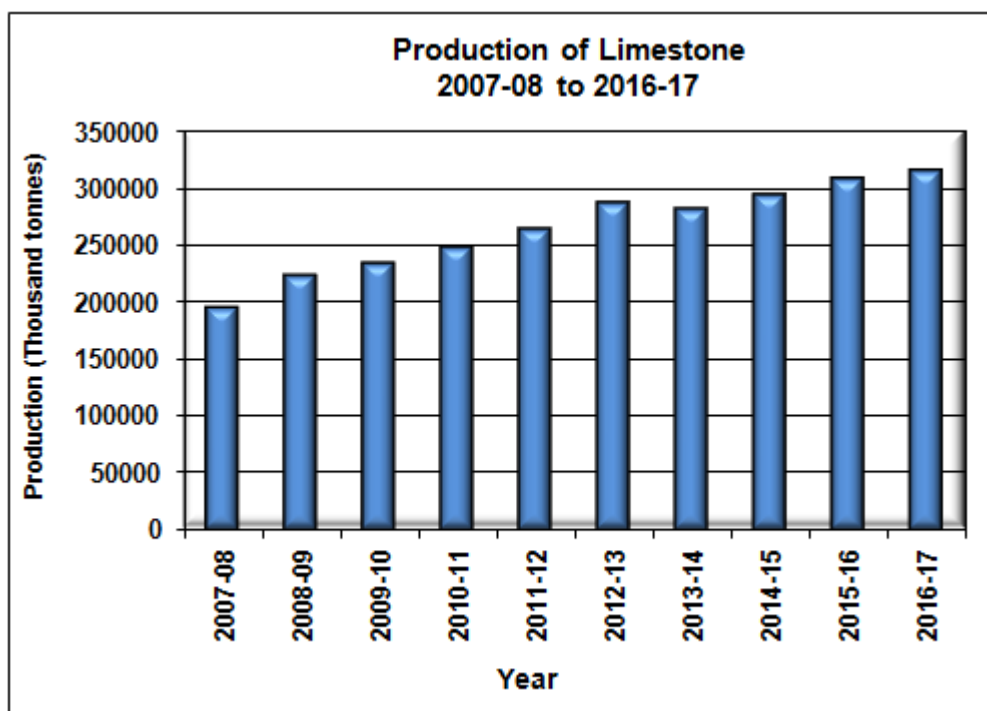
LIMESTONE AND OTHER CALCAREOUS MATERIALS

Table - 2 (Contd.)

Name and address of producer	Location of mine	
	State	District
Zuari Cement Ltd, Krishna Nagar, Yerraguntla-516 311, Andhra Pradesh.	Andhra Pradesh Telangana	Kadapa Nalgonda
Wonder Cement Ltd, R.K.Nagar, Nimbahera,-301 601,Rajasthan	Rajasthan	Chittorgarh
Prism Cement Ltd, Kurnool 305, Laxmi Niwas Apartments, Ameerpeth, Hyderabad-500 016, Andhra Pradesh.	Andhra Pradesh Madhya Pradesh	
Binani Cement Ltd, 37/2,Chinar Park New Town, Rajarhat Main Road, P.O. Hatiara Kolkata-700 157 West Bengal	Rajasthan	Satna Sirohi
A.P. Mineral Dev. Corpn. Ltd; 3 <sup>rd</sup> Floor Rear Block, HMWSSB, Premises, Khairatabad, Hyderabad – 500 004, Andhra Pradesh.	Telangana	Adilabad

Table - 2 (Concl.)

Name and address of producer	Location of mine	
	State	District
OCL India Ltd, Rajgangpur Cement Works, Rajgangpur Odisha-770 017	Odisha	Sundergarh
Heidelberg Cement India Limited, 9th Floor, Infinity Tower C, DLF Cyber City, Phase-II Gurgaon-122 002, Haryana.	Madhya Pradesh Karnataka	Damoh Tumakuru
Penna Cement Industries Ltd, Lakshmi Nivas Plot No.-705, Road No.- 03, Banjara Hills, Hyderabad-500 034, Andhra Pradesh.	Andhra Pradesh Telangana	Anantapur Kurnool Nalgonda
Sanghi Industries Ltd, 10 <sup>th</sup> Floor, Kataria Arcade, Opp.S.G. Highway, P.O. Makaraba, Ahmedabad-380 051, Gujarat.	Gujarat	Kachchh
Bharti Cements Corporation Limited, 8-2-626, Reliance Majestic,Road No-10 Banjara Hills, Hyderabad-500 034 , Andhra Pradesh.	Andhra Pradesh	Kadapa



LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 3 : Production of Limestone, 2014-15 to 2016 -17  
(By States)**

(Qty in '000 tonnes; Value in ₹'000)

State	2014-15		2015-16		2016-17 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>India</b>	<b>293273</b>	<b>58000375</b>	<b>307001</b>	<b>68673970</b>	<b>313196</b>	<b>66883775</b>
Andhra Pradesh	34676	6145183	32579	6556564	35251	7077680
Assam	665	172962	777	230415	1594	444051
Bihar	473	119709	459	172141	190	61867
Chhattisgarh	23588	5095514	27667	7013331	31919	7889042
Gujarat	26010	4041937	25622	4370924	24923	4330213
Himachal Pradesh	12710	1969904	12390	2180979	11009	2055194
Jammu & Kashmir	130	17986	1232	395375	825	261235
Jharkhand	792	355281	1076	509938	1146	552197
Karnataka	24008	3782551	27062	4325671	29784	5057615
Kerala	511	271081	487	353323	376	217852
Madhya Pradesh	39530	7024166	39430	8868182	35843	6421422
Maharashtra	12085	2338475	13036	2842122	12119	2400796
Meghalaya	3691	2399582	3834	2622258	5103	3006804
Odisha	3409	1189212	4532	1489611	4751	1599859
Rajasthan	61844	12515775	67336	15253871	67078	14528213
Tamil Nadu	22227	5989520	23008	6623612	23840	6087154
Telangana	23972	4043053	23878	4437332	24789	4479942
Uttar Pradesh	2952	528484	2596	428321	2656	412639

**Table – 4 : Production of Limestone, 2015-16 and 2016-17  
(By Frequency Groups)**

Production group (In tonnes)	No. of mines		Production for the group (‘000 tonnes)		Percentage in total production		Cumulative percentage	
	2015-16	2016-17(P)	2015-16	2016-17(P)	2015-16	2016-17(P)	2015-16	2016-17(P)
<b>All Groups</b>	<b>807(1)</b>	<b>771(2)</b>	<b>307001</b>	<b>313196</b>	<b>100.00</b>	<b>100.00</b>	-	-
Up to 10000	335	289(1)	869	662	0.28	0.21	0.28	0.21
10001 - 50000	139(1)	154(1)	3733	4115	1.22	1.31	1.50	1.52
50001 - 100000	65	72	4730	5192	1.54	1.66	3.04	3.18
100001 - 200000	65	53	9638	7545	3.14	2.41	6.18	5.59
200001 - 300000	27	27	6836	6748	2.23	2.15	8.41	7.74
300001 - 400000	22	20	7530	7094	2.45	2.27	10.86	10.01
400001 - 500000	14	15	6447	6748	2.10	2.15	12.96	12.16
500001 - 600000	15	9	8358	4992	2.72	1.59	15.68	13.75
600001 - 700000	8	6	5078	3822	1.65	1.22	17.33	14.97
700001 - 800000	9	7	6729	5375	2.19	1.72	19.52	16.69
800001 - 900000	8	16	6771	13518	2.21	4.32	21.73	21.01
900001 - 1000000	13	7	12427	6586	4.05	2.10	25.78	23.11
1000001 - 2000000	48	54	67514	74975	21.99	23.94	47.77	47.05
2000001 - 3000000	13	15	30880	34639	10.06	11.06	57.83	58.11
3000001 & above	26	27	129461	131185	42.17	41.89	100.00	100.00

( ): Figures in parentheses indicate associated mine of limestone with chalk, dolomite & shale.



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**Table -5 : Production of Limestone, 2015-16 & 2016 -17**  
(By Sectors/States/Districts/Grades)

State/District	2015-16										2016-17 (P)											
	Grades					Total					Grades					Total						
	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	
<b>India</b>	<b>807(1)</b>	<b>296002</b>	<b>7140</b>	<b>3859</b>	-	<b>307001</b>	<b>68673970</b>	<b>771(2)</b>	<b>302785</b>	<b>6596</b>	<b>3815</b>	-	<b>313196</b>	<b>66883775</b>								
Public sector	26	7787	4435	-	-	12222	4468997	27	6935	3548	-	-	10483	3190901								
Private sector	781(1)	288215	2705	3859	-	294779	64204973	744(2)	295850	3048	3815	-	302713	63692874								
<b>Andhra Pradesh</b>	<b>76</b>	<b>31788</b>	<b>655</b>	<b>136</b>	-	<b>32579</b>	<b>6556564</b>	<b>72</b>	<b>34412</b>	<b>813</b>	<b>26</b>	-	<b>35251</b>	<b>7077680</b>								
Anantapur	12	1457	65	-	-	1522	237928	12	2277	54	-	-	2331	413689								
Cuddapah	7	9317	2	-	-	9319	1627384	6	11440	-	-	-	11440	1912751								
Guntur	11	4076	4	136	-	4216	735656	15	4408	143	26	-	4577	815612								
Krishna	11	5814	355	-	-	6169	1774654	11	5287	348	-	-	5635	1785791								
Kurnool	35	11124	229	-	-	11353	2180942	28	11000	268	-	-	11268	2149837								
<b>Assam</b>	<b>3</b>	<b>777</b>	-	-	-	<b>777</b>	<b>230415</b>	<b>3</b>	<b>1594</b>	-	-	-	<b>1594</b>	<b>444051</b>								
Karbi Anglong	1	171	-	-	-	171	64207	1	105	-	-	-	105	41517								
North Cachar Hills	2	606	-	-	-	606	166208	2	1489	-	-	-	1489	402534								
<b>Bihar</b>	<b>1</b>	<b>459</b>	-	-	-	<b>459</b>	<b>172141</b>	<b>1</b>	<b>190</b>	-	-	-	<b>190</b>	<b>61867</b>								
Rohtas	1	459	-	-	-	459	172141	1	190	-	-	-	190	61867								
<b>Chhattisgarh</b>	<b>68</b>	<b>27362</b>	<b>305</b>	-	-	<b>27667</b>	<b>7013331</b>	<b>66</b>	<b>31638</b>	<b>281</b>	-	-	<b>31919</b>	<b>7889042</b>								
Baloda bazar	3	15	-	-	-	15	2233	2	1091	-	-	-	1091	210426								
Bastar	9	51	++	-	-	51	17669	9	46	++	-	-	46	17638								
Durg	28	2892	305	-	-	3197	902781	31	4896	281	-	-	5177	1383978								
Janjgir-Champa	2	1967	-	-	-	1967	684648	2	2042	-	-	-	2042	524991								
Kabirdham	1	++	-	-	-	++	24	1	++	-	-	-	++	25								
Raigarh	1	8	-	-	-	8	2388	1	12	-	-	-	12	4135								
Raipur	23	22429	-	-	-	22429	5403577	19	23551	-	-	-	23551	5747842								
Rajnandgaon	1	++	-	-	-	++	11	1	++	-	-	-	++	7								

(Contd.)

LIMESTONE AND OTHER CALCAREOUS MATERIALS

Table - 5 (Contd.)

State/District	2015-16										2016-17 (P)											
	Grades					Total					Grades					Total						
	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	
<b>Gujarat</b>	<b>112</b>	<b>22186</b>	-	<b>3436</b>	-	<b>25622</b>	<b>4370924</b>	<b>105</b>	<b>21528</b>	-	<b>3395</b>	-	<b>24923</b>	<b>4330213</b>								
Amreli	2	5259	-	-	-	5259	961473	2	4993	-	-	-	4993	962409								
Jamnagar	21	1104	-	120	-	1224	201728	19	410	-	110	-	520	97036								
Junagadh	56	6736	-	1703	-	8439	1320761	53	6568	-	1596	-	8164	1219957								
Kuchchh	7	7215	-	++	-	7215	1105211	5	7154	-	++	-	7154	1043595								
Porbandar	25	1693	-	1613	-	3306	752967	25	2151	-	1689	-	3840	966576								
Surat	1	179	-	-	-	179	28784	1	252	-	-	-	252	40640								
<b>Himachal Pradesh</b>	<b>18</b>	<b>12155</b>	<b>207</b>	<b>28</b>	-	<b>12390</b>	<b>2180979</b>	<b>21</b>	<b>10760</b>	<b>239</b>	<b>10</b>	-	<b>11009</b>	<b>2055194</b>								
Bilaspur	1	3549	-	-	-	3549	535851	1	3334	-	-	-	3334	544401								
Sirmaur	15	758	207	28	-	993	324581	18	883	239	10	-	1132	342109								
Solan	2	7848	-	-	-	7848	1320547	2	6543	-	-	-	6543	1168684								
<b>Jammu &amp; Kashmir</b>	<b>6</b>	<b>1232</b>	-	-	-	<b>1232</b>	<b>395375</b>	<b>5</b>	<b>797</b>	<b>28</b>	-	-	<b>825</b>	<b>261235</b>								
Anantnag	1	1	-	-	-	1	419	-	-	-	-	-	-	-								
Pulwama	4	559	-	-	-	559	159801	4	317	28	-	-	345	93183								
Srinagar	1	672	-	-	-	672	235155	1	480	-	-	-	480	168052								
<b>Jharkhand</b>	<b>11</b>	<b>1076</b>	-	-	-	<b>1076</b>	<b>509938</b>	<b>10</b>	<b>1146</b>	-	-	-	<b>1146</b>	<b>552197</b>								
Garhwa	3*	-	-	-	-	-	-	3*	-	-	-	-	-	-								
Palamu	1*	-	-	-	-	-	-	1*	-	-	-	-	-	-								
Ranchi	2*	-	-	-	-	-	-	2*	-	-	-	-	-	-								
Singbhum (West)	5	1076	-	-	-	1076	509938	4	1146	-	-	-	1146	552197								
<b>Karnataka</b>	<b>66</b>	<b>26194</b>	<b>868</b>	-	-	<b>27062</b>	<b>4325671</b>	<b>60</b>	<b>28877</b>	<b>907</b>	-	-	<b>29784</b>	<b>5057615</b>								
Bagalkot	44	2760	797	-	-	3557	923225	37	3971	794	-	-	4765	1287974								
Belagavi	8	85	42	-	-	127	46541	8	120	81	-	-	201	68690								
Chitradurga	3	94	-	-	-	94	34615	3	68	-	-	-	68	22083								
Kalaburagi	8	23028	-	-	-	23028	3241637	9	24632	-	-	-	24632	3627292								
Shivamogga	1	-	29	-	-	29	6921	1	-	32	-	-	32	7591								
Tumakuru	2	227	-	-	-	227	72732	2	86	-	-	-	86	43985								

(Contd.)

LIMESTONE AND OTHER CALCAREOUS MATERIALS

Table -5 (Contd.)

State/District	2015-16										2016-17 (P)											
	Grades					Total					Grades					Total						
	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	
<b>Kerala</b>	<b>1</b>	<b>487</b>	-	-	-	<b>487</b>	<b>353323</b>	<b>1</b>	<b>376</b>	-	-	-	<b>376</b>	<b>217852</b>								
Palakkad	1	487	-	-	-	487	353323	1	376	-	-	-	376	217852								
<b>Madhya Pradesh</b>	<b>118(1)</b>	<b>36275</b>	<b>3086</b>	<b>69</b>	-	<b>39430</b>	<b>8868182</b>	<b>117(1)</b>	<b>33460</b>	<b>2334</b>	<b>49</b>	-	<b>35843</b>	<b>6421422</b>								
Damoh	2	3618	-	-	-	3618	839318	1	3482	-	-	-	3482	435949								
Dhar	12	92	-	-	-	92	15339	9	60	-	-	-	60	12251								
Jabalpur	1	-	18	-	-	18	3680	1	-	9	-	-	9	2714								
Katni	41(1)	3624	3021	69	-	6714	1940046	50(1)	3596	2176	49	-	5821	1240922								
Neemuch	2	4000	-	-	-	4000	634455	2	2816	-	-	-	2816	376364								
Rewa	8	4413	-	-	-	4413	985128	9	3152	4	-	-	3156	685920								
Satna	48	19166	47	-	-	19213	4239161	41	19326	145	-	-	19471	3507940								
Sidhi	4	1362	-	-	-	1362	211055	4	1028	-	-	-	1028	159362								
<b>Maharashtra</b>	<b>17</b>	<b>13035</b>	<b>++</b>	<b>1</b>	-	<b>13036</b>	<b>2842122</b>	<b>17</b>	<b>12118</b>	-	<b>1</b>	-	<b>12119</b>	<b>2400796</b>								
Chandrapur	8	10178	-	1	-	10179	2138116	7	9492	-	1	-	9493	1828196								
Yavatmal	9	2857	++	-	-	2857	704006	10	2626	++	-	-	2626	572600								
<b>Meghalaya</b>	<b>13</b>	<b>3790</b>	-	<b>44</b>	-	<b>3834</b>	<b>2622258</b>	<b>13</b>	<b>5036</b>	-	<b>67</b>	-	<b>5103</b>	<b>3006804</b>								
Jaintia Hills	10	1782	-	-	-	1782	491722	10	2591	-	-	-	2591	718397								
Khasi Hills East	3	2008	-	44	-	2052	2130536	3	2445	-	67	-	2512	2288407								
<b>Odisha</b>	<b>6</b>	<b>4526</b>	<b>6</b>	-	-	<b>4532</b>	<b>1489611</b>	<b>6(1)</b>	<b>4750</b>	<b>1</b>	-	-	<b>4751</b>	<b>1599859</b>								
Bargarh	1	703	-	-	-	703	346048	1	754	-	-	-	754	492165								
Koraput	1	215	-	-	-	215	62029	1	135	-	-	-	135	40332								
Sundergarh	4	3608	6	-	-	3614	1081534	4(1)	3861	1	-	-	3862	1067362								

(Contd.)

LIMESTONE AND OTHER CALCAREOUS MATERIALS

Table -5 (Concl.d.)

State/District	2015-16						2016-17 (P)							
	Grades			Total			Grades			Total				
	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value	No. of mines	Cement	Iron & Steel	Chem.	Others	Qty	Value
<b>Rajasthan</b>	<b>36</b>	<b>65349</b>	<b>1861</b>	<b>126</b>	-	<b>67336</b>	<b>15253871</b>	<b>34</b>	<b>65006</b>	<b>1812</b>	<b>260</b>	-	<b>67078</b>	<b>14528213</b>
Ajmer	1	1408	-	-	-	1408	301409	1	1026	-	-	-	1026	248525
Banswara	1	1373	-	-	-	1373	241732	1	1270	-	-	-	1270	232300
Bundi	1	791	-	-	-	791	247765	1	808	-	-	-	808	225506
Chittorgarh	10	22056	-	-	-	22056	4602091	10	21700	-	-	-	21700	4304422
Jaipur	1	4240	-	-	-	4240	890341	1	4462	-	-	-	4462	889233
Jaisalmer	2	505	1861	-	-	2366	1022799	2	417	1812	-	-	2229	929928
Kota	1	2378	-	-	-	2378	584876	1	2516	-	-	-	2516	602727
Nagaur	5	1196	-	126	-	1322	477984	4	1117	-	260	-	1377	526443
Pali	6	19921	-	-	-	19921	4129197	6	20275	-	-	-	20275	4040804
Sikar	1	38	-	-	-	38	9488	2	18	-	-	-	18	4793
Sirohi	5	11443	-	-	-	11443	2746189	3	11089	-	-	-	11089	2443388
Udaipur	2*	-	-	-	-	-	-	2	308	-	-	-	308	80144
<b>Tamil Nadu</b>	<b>223</b>	<b>22836</b>	<b>152</b>	<b>20</b>	-	<b>23008</b>	<b>6623612</b>	<b>209</b>	<b>23653</b>	<b>181</b>	<b>6</b>	-	<b>23840</b>	<b>6087154</b>
Ariyalur	38	11206	19	-	-	11225	3081494	37	12233	-	-	-	12233	2764580
Coimbatore	4	876	-	-	-	876	314429	4	907	-	-	-	907	348588
Dindigul	20	1909	6	11	-	1926	498918	17	2134	9	5	-	2148	485724
Kamarajar	-	-	-	-	-	-	-	1	++	-	-	-	-	160
Karur	19	821	36	-	-	857	244605	18	915	24	-	-	939	256544
Krishnagiri	1	-	2	-	-	2	697	2	5	5	-	-	10	4304
Madurai	8	107	20	9	-	136	66490	8	220	13	1	-	234	101493
Namakkal	13	11	11	-	-	22	8986	12	33	5	-	-	38	15762
Perambalur	28	3580	-	-	-	3580	971563	29	2743	-	-	-	2743	666853
Salem	26	396	19	-	-	415	209586	23	418	17	-	-	435	178751
Thoothukudi/Tuticorin	8	887	6	-	-	893	371629	6	791	19	-	-	810	314233
Tiruchirappalli	14	2037	4	-	-	2041	393762	14	2217	2	-	-	2219	424447
Tirunelveli	32	511	13	-	-	524	275184	25	379	78	-	-	457	290253
Virudhunagar	12	495	16	-	-	511	186269	13	658	9	-	-	667	235462
<b>Telangana</b>	<b>30</b>	<b>23878</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>23878</b>	<b>4437332</b>	<b>29</b>	<b>24789</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>24789</b>	<b>4479942</b>
Adilabad	2	4014	-	-	-	4014	845127	2	3885	-	-	-	3885	795435
Karimnagar	2	845	-	-	-	845	449540	2	870	-	-	-	870	500373
Nalgonda	22	15105	-	-	-	15105	2522081	21	16096	-	-	-	16096	2570404
Ranga Reddy	4	3914	-	-	-	3914	620584	4	3938	-	-	-	3938	613730
<b>Uttar Pradesh</b>	<b>2</b>	<b>2596</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2596</b>	<b>428321</b>	<b>2</b>	<b>2656</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2656</b>	<b>412639</b>
Sonbhadra	2	2596	-	-	-	2596	428321	2	2656	-	-	-	2656	412639

Figures in parentheses indicate associated mine of limestone with dolomite and shale.

(\*) Only labour reported.

(++): Negligible

LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 6 : Mine-head closing Stocks of Limestone, 2015-16 & 2016-17  
(By States/Grades)**

(In '000 tonnes)

State	2015-16					2016-17 (P)				
	Grades					Grades				
	Cement	Iron & Steel	Chem.	Others	Total	Cement	Iron & Steel	Chem.	Others	Total
<b>India</b>	<b>9643</b>	<b>2132</b>	<b>858</b>	-	<b>12633</b>	<b>11513</b>	<b>1900</b>	<b>981</b>	-	<b>14394</b>
Andhra Pradesh	533	81	10	-	624	599	69	6	-	674
Assam	44	-	-	-	44	37	-	-	-	37
Chhattisgarh	171	20	-	-	191	393	15	-	-	408
Gujarat	1815	3	767	-	2585	1540	3	878	-	2421
Himachal Pradesh	90	55	-	-	145	121	55	-	-	176
Jammu & Kashmir	30	-	-	-	30	12	-	-	-	12
Jharkhand	14	163	-	-	177	14	163	-	-	177
Karnataka	2140	427	-	-	2567	3547	393	-	-	3940
Kerala	39	-	-	-	39	15	-	-	-	15
Madhya Pradesh	1374	471	27	-	1872	1785	658	30	-	2473
Maharashtra	10	9	++	-	19	10	6	++	-	16
Meghalaya	35	-	5	-	40	208	-	10	-	218
Odisha	132	434	-	-	566	142	424	-	-	566
Rajasthan	1606	245	37	-	1888	1597	-	52	-	1649
Tamil Nadu	486	224	12	-	722	548	114	5	-	667
Telangana	1124	-	-	-	1124	945	-	-	-	945

## Limeshell

The production of limeshell at 12,343 tonnes during 2016-17 increased by 19% as compared to the preceding year.

There were 7 reporting mines in both the years 2016-17 and 2015-16. Four principal producers accounted for 95% of the total production during the year. There were no public sector mines reporting production in the current year as compared to one mine in the previous year.

68% of the total production of limeshell was reported from Kerala and remaining 32% from Karnataka (Table - 7 to 9).

Mine-head closing stocks of limeshell in the year 2016-17 was 2720 tonnes as against 996 tonnes in the previous year (Table - 10).

The average daily employment of labour during the year 2016-17 was 484 as against 534 in the previous year.

**Table – 7 : Principal Producers of Limeshell  
2015-16**

Name and address of producer	Location of mine	
	State	District
The Vaikom Limeshell Co.op Society Ltd, No. 3145, P.O. Pallippurathussery, Vaikom-686 606, Distt. Kottayam, Kerala.	Kerala	Kottayam
Karappuram White Limeshell Vyavasaya Co-op. Society Ltd, Muhamma, Taluk: Cherthala Alappuzha-688 525, Kerala.	Kerala	Alappuzha
Muhamma Clam Marketing Society Ltd, Vill. Thanneermukom South, Taluk: Cherthala Alappuzha-688 525, Kerala.	Kerala	Alappuzha

(Contd.)

LIMESTONE AND OTHER CALCAREOUS MATERIALS

Table-7 (Contd.)

Name and address of producer	Location of mine	
	State	District
Suresh P.Pednekar, Gangotri Ashram Road,Karwar, Distt. Uttara Kannada Karnataka-581 301	Karnataka	Uttara Kannada

Table-7 (Concl.)

Name and address of producer	Location of mine	
	State	District
Viakom TalukWhite Limeshell Co-op. Society Ltd.,No.K. 357, Ambika Market, P.O. Vaikom Distt. Kottayam, Kerala-686 144.	Kerala	Kottayam

**Table – 8 : Production of Limeshell, 2014-15 to 2016-17  
(By States)**

(Qty in tonnes; Value in ₹'000)

State	2014-15		2015-16		2016-17 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>India</b>	<b>16353</b>	<b>37137</b>	<b>10353</b>	<b>28613</b>	<b>12343</b>	<b>33588</b>
Karnataka	200	240	1221	1258	4003	6596
Kerala	16123	36867	9132	27355	8340	26992
Tamil Nadu	30	30	-	-	-	-

**Table – 9 : Production of Limeshell, 2015-16 & 2016-17  
(By Sectors/States/Districts)**

(Qty in tonnes; Value in ₹'000)

State/District	2015-16			2016-17 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
<b>India</b>	<b>7</b>	<b>10353</b>	<b>28613</b>	<b>7</b>	<b>12343</b>	<b>33588</b>
Public sector	-	-	-	-	-	-
Private sector	7	10353	28613	7	12343	33588
<b>Karnataka</b>	<b>2</b>	<b>1221</b>	<b>1258</b>	<b>2</b>	<b>4003</b>	<b>6596</b>
Uttara Kannada	2	1221	1258	2	4003	6596
<b>Kerala</b>	<b>4</b>	<b>9132</b>	<b>27355</b>	<b>4</b>	<b>8340</b>	<b>26992</b>
Alappuzha	2	4915	15126	2	4973	16139
Kottayam	2	4217	12229	2	3367	10853
<b>Tamil Nadu</b>	<b>1*</b>	<b>-</b>	<b>-</b>	<b>1*</b>	<b>-</b>	<b>-</b>
Cuddalore	1	-	-	1	-	-

(\*) Only labour reported

**Table – 10 : Mine-head Closing Stocks of Limeshell, 2015-16 & 2016-17  
(By States)**

(In tonnes)

State	2015-16	2016-17 (P)
<b>India</b>	<b>996</b>	<b>2720</b>
Karnataka	804	2635
Kerala	168	60
Tamil Nadu	24	25

(P) :Provisional

LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Marl**

Production of marl during 2016-17 was 2,204 thousand tonnes as compared to 2,390 thousand tonnes in the preceding year. The entire production of marl was reported as associate mineral with limestone in both the years. There were five associate mines reporting production of Marl during

2016-17 as against same during the previous year. The entire production was reported by private sector mines from Gujarat State. (Tables-11 to 13)

Mine-head stock of marl at the end of 2016-17 was 1,321 thousand tonnes as against 1,227 thousand tonnes at the beginning of the year (Table - 14).

**Table – 11: Principal Producers of Marl, 2015-16 (P)**

Name and address of producer	Location of mine	
	State	District
*Ultratech Cement Ltd, B-Wing, 2 <sup>nd</sup> Floor, Ahura Centre, Mahakali Caves Road, Andheri (E), Mumbai- 400 093.	Gujarat	Amreli
* Ambuja Cement Limited, Elegant Business Park, MIDC, Cross Road B Off Andheri, Kurla Road Andheri East, Mumbai - 400 059.	Gujarat	Amreli
*Gujarat Sidhee Cement Ltd, N.K.Mehta International House, 178, Backbay Reclamation, Mumbai-400 020.	Gujarat	Junagadh
*Saurashtra Cement Ltd, N.K.Mehta International House, 178, Backbay Reclamation, Mumbai-400 020.	Gujarat	Porbandar

\* Producing as an associated mineral with Limestone.

**Table – 12 : Production of Marl, 2014-15 to 2016-17  
(By States)**

(Qty in tonnes, Value in L'000)

State	2014-15		2015-16		2016-17 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>India</b>	<b>2179488</b>	<b>257598</b>	<b>2389707</b>	<b>319957</b>	<b>2203701</b>	<b>316310</b>
Gujarat	2177449	257030	2389707	319957	2203701	316310
Tamil Nadu	2039	568	-	-	-	-

**Table – 13 : Production of Marl, 2015-16 to 2016-17  
(By Sector/States/Districts)**

(Qty in tonnes; Value in L'000)

State/District	2015-16			2016-17 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
<b>India/ Private Sector</b>	<b>(5)</b>	<b>2389707</b>	<b>319957</b>	<b>(5)</b>	<b>2203701</b>	<b>316310</b>
<b>Gujarat</b>	<b>(5)</b>	<b>2389707</b>	<b>319957</b>	<b>(5)</b>	<b>2203701</b>	<b>316310</b>
Amreli	(2)	1692416	267451	(2)	1606109	269546
Junagadh	(2)	169814	17693	(2)	68905	9695
Porbandar	(1)	527477	34813	(1)	528687	37069

Figures in parentheses indicate associated mines with limestone.

LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 14 : Mine-head Stocks of Marl, 2016-17 (P)**  
(By States)

State	At the beginning of the year	At the end of the year
<b>India</b>	<b>1226957</b>	<b>1321040</b>
Gujarat	1013979	1108242
Tamil Nadu	212978	212798

(Qty in tonnes)

## MINING & MARKETING

In India, limestone mines are worked by opencast method. Captive mines are mechanised and supply feed to cement and iron & steel units. Some mines have well laid road-cum-rail routes. The large mines are developed by forming benches in overburden and limestone bed. The face length, width and height of the benches correspond to the mining machinery deployed and production schedule. Heavy earth-moving machinery like 3.3 to 4 cu m capacity hydraulic excavators in combination with 10-35 tonnes dumpers are normally used. Other mines are mainly worked by semi-mechanised and manual opencast mining methods. As per MCDR reports drilling is done by Jack hammer & Wagon drill and blasting is done by ANFO, Slurry explosives, imulsion explosives etc.

Limestone production from Kurnool, Andhra Pradesh and from Adilabad in Telangana are used in paper mills, sugar, cement and steel plants. Tile, mosaic, chip and polished stonemakers also use limestone.

Limestone produced in Bihar is supplied mainly to cement plants, foundries and lime kiln units.

In Raipur and Durg districts of Chhattisgarh, the limestone produced is suitable for Iron & Steel Industry. The Bhilai Steel Plant obtains its requirements of limestone from Nandini mines in Durg district. The cement grade limestone is also produced in the region and there is large cluster of cement plants in and around Raipur.

Limestone produced in Gujarat is consumed mainly in cement and chemical industries and also in textile, foundries and steel plants. The dolomitic limestone in Gujarat is used for making slabs and tiles.

Limestone produced in Himachal Pradesh is supplied to cement plants, paper industry, sugar mills and lime kilns. The production from Bilaspur district is despatched to fertilizer unit of National Fertilizers Ltd, (NFL) at Naya Nangal.

Limestone produced in Jammu & Kashmir is suitable for cement manufacturing.

In Karnataka, limestone is supplied generally to paper mills and cement plants. However, limestone of Kalaburagi district, commonly known as 'Shahabad stones', is used as flag stone or flooring stones.

Limestone from Madhya Pradesh is used in cement, sugar, paper, steel and lime industries.

In Maharashtra, apart from cement and sugar industries, limestone is used in Ferro-manganese Industry as flux and also in Tanning Industry.

Limestone mined in Rajasthan is consumed in captive cement plants on a large scale. Limestone of Nagaur district is utilised as feed for white cement plants as well as in steel plants as low silica SMS grade flux and in Chemical Industry. Crystalline limestone of Rajasthan is widely known as a decorative ornamental stone. The limestone worked in Bundi district and Raghunathgarh in Jaipur district is an excellent flagstone, for use as a paving stone.

The limestone produced in Dehradun-Garhwal areas of Uttarakhand used to be supplied to Sugar, Paper, Steel, Glass, Chemical and Cement Industries in the past.

Limestone in Tamil Nadu is consumed by various industries like Cement, Steel, Paper, Foundry, Fertilizer and Chemicals.

Limeshell from Kerala is used mainly in Chemical, Cement and White cement Industries. It is also used in the manufacture of polyfibre and in Tanning industry.



## USES

Limestone used for industrial purpose falls under 'major mineral', while the use of limestone in lime kilns and for building purposes comes under 'minor mineral' as per Mines and Minerals (Development and Regulation) Act, 1957.

The threshold value of limestone has been revised by IBM, through a Notification in 2009, as follows:

(i) For limestone deposits in Chhattisgarh, Gujarat, Himachal Pradesh, Madhya Pradesh, Maharashtra, Rajasthan, Uttarakhand & Uttar Pradesh - CaO - 34% (min), MgO - 4% (max).

(ii) For limestone deposits of Andhra Pradesh, Jharkhand, Karnataka, Kerala, Odisha & Tamil Nadu - CaO - 35% (min), MgO - 4% (max), SiO<sub>2</sub> - 18% (max) & Alkalies - 0.5% (max).

The principal use of limestone is in the Cement Industry. Other important uses are as raw material for the manufacture of quicklime (Calcium Oxide), slaked lime (Calcium hydroxide) and mortar. Pulverised limestone is used as a soil conditioner to neutralise acidic soils (agricultural lime). It is used in sculptures because of its suitability for carving. It is often found in medicines and cosmetics. In some circumstances, limestone is used for glass making. As a reagent in fuel-gas desulphurisation, it reacts with sulphur dioxide for air pollution control. It can suppress methane explosions in underground coal mines. It is added to toothpaste, paper, plastic, paint, tiles and other materials as both white pigment and cheap filler. In blast furnaces, limestone binds with silica and other impurities to remove them from the iron.

Lime is prepared by heating limestone in kilns up to 1000 °C. The CO<sub>2</sub> released is effluxed and 'quicklime' (CaO) formed remains as hard white lumps.

This when slaked with water and mixed with sand, forms mortar or plaster. Commonly, the commercial lime is prepared as dry hydrated lime Ca(OH)<sub>2</sub> by adding to quicklime the right amount of water (18 parts to 56 parts of CaO). The value of lime for most purposes depends upon its CaO (or CaO + MgO) content.

The manufacture of metallic calcium is one of the latest uses of lime. Calcium is used in reducing organic compounds, desulphurising petroleum, debismuthising lead production of hard lead alloys and calcium-silicon alloys, and in the manufacture of calcium hydride which is further used as an efficient hydrogen carrier.

Limeshell is used mainly in Chemical and White Cement Industries. It is also used in the manufacture of Polyfibre and in Tanning industry. Marl is used as lithographic stone.

## SPECIFICATIONS

### Cement Industry

Cement is a binder, a substance used in construction that sets, hardens and adheres to other materials. Cement used in construction are usually inorganic, often lime or calcium silicate based. Magnesia, sulphur and phosphorus are regarded as deleterious elements. Limestone should have less than 3% magnesium oxide (MgO), maximum tolerance being 5 percent. The presence of P as P<sub>2</sub>O<sub>5</sub> more than 1% considerably slows down the setting time of Portland Cement. Indian cement manufacturers prescribed that the limestone should have CaO 42% (min), Al<sub>2</sub>O<sub>3</sub> 1 to 2%, Fe<sub>2</sub>O<sub>3</sub> 1 to 2%, SiO<sub>2</sub> 12 to 16% and MgO 4% (max). The broad chemical specifications of cement grade limestone (r.o.m.) for cement manufacture suggested by the National Council for Cement and Building Materials, New Delhi, are given in Table-15.

## LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 15 : Broad Chemical Specifications of Cement Grade (Run-of-Mine) Limestone (Clause 6.1.1)**

Oxide component/ Other Constituents	Acceptable range for manufacture of Ordinary Portland Cement (33, 43 & 53 Grade) (percent)	Limiting values taking into con- sideration other types of cements, scope of beneficiation and blending (percent)
CaO	44-52	40 (min)
MgO	3.5 (max.)	5.0 (max)
SiO <sub>2</sub>	To satisfy LSF, silica	–
Al <sub>2</sub> O <sub>3</sub>	Modules and alumina	–
Fe <sub>2</sub> O <sub>3</sub>	Modules	–
TiO <sub>2</sub>	<0.5	<1.0
Mn <sub>2</sub> O <sub>3</sub>	<0.5	<1.0
R <sub>2</sub> O (Na <sub>2</sub> O + K <sub>2</sub> O)	<0.6	<1.0
Total S as SO <sub>3</sub>	<0.6	<0.8
P <sub>2</sub> O <sub>5</sub>	<0.6	<1.0
Cl	<0.015	<0.05
Free silica	<8.0	<10.0

*Source: Report on Norm for limestone deposits for cement manufacture by National Council for Cement and Building Materials, New Delhi, May 2001.*

### Iron & Steel Industry

In Iron & Steel Industry, limestone is used both in blast furnace and steel melting shop as a flux after calcining. It is also added as flux in self-fluxing iron ore sinters. It has two basic functions in steel making, first to lower the temperature of melting and second, to form calcium silicate which comes out as a slag, as it combines with silica in iron ore.

For use in the blast furnace, the calcium carbonate (CaCO<sub>3</sub>) content in limestone should not be usually less than 90 percent. The combined SiO<sub>2</sub> and Al<sub>2</sub>O<sub>3</sub> should not exceed 6% though up to 11.5% is allowed; MgO should be within 4% and sulphur and phosphorus as low as possible.

In Steel Melting Shop (SMS), insolubles in limestone should not exceed more than 4 percent.

Good fluxing limestone should naturally be low in acid constituents like silica, alumina, sulphur and phosphorus. Limestone should be dense, massive, preferably fine-grained, compact and non-fritting on burning.

BIS has prescribed specifications for flux grade limestone for use in steel plants as per IS : 10345 - 2004 (Second Revision; Reaffirmed 2009).

### Glass Industry

Glass Industry requires high calcium limestone (94.5% CaCO<sub>3</sub>) and 97.5% of combined CaCO<sub>3</sub> and MgCO<sub>3</sub>. Iron and other colouring matters are regarded as objectionable and Fe<sub>2</sub>O<sub>3</sub> should be up to 0.20% (max). For colourless glass, limestone should contain 98.5% CaCO<sub>3</sub> (min), iron content as Fe<sub>2</sub>O<sub>3</sub> should not be more than 0.04%; and for bottle glass, Fe<sub>2</sub>O<sub>3</sub> up to 0.05% is used. The BIS specifications (IS : 997 - 1973); First Amendment, (Reaffirmed Feb.2013) for limestone for use in Glass Industry are as follows:

Silica as SiO <sub>2</sub>	2.5%
Total iron (Fe <sub>2</sub> O <sub>3</sub> )	
a) Calcite or marble	0.05%
b) Limestone	0.10%
c) Dolomitic limestone or dolomite	0.15%
Lime (as CaO)	53.0%
Total lime and magnesia (as CaO+MgO)	54.50%

### Chemical Industry

The calcium carbide manufacturers generally prefer lime containing 95% CaO (min) with limitations of not more than 3% SiO<sub>2</sub>, not more than 0.95% phosphorus and other impurities not exceeding more than 2%. For the manufacture of bleaching powder, lime containing 95% and above CaO is required. Total Fe<sub>2</sub>O<sub>3</sub>+Al<sub>2</sub>O<sub>3</sub>+MnO<sub>2</sub> should be less than 2%; MgO should be below 2% and SiO<sub>2</sub> less than 1.5%. Bleaching powder is prepared by absorption of chlorine by dry hydrated lime. The hydrated lime should not contain more than 2% excess water. Iron

## LIMESTONE AND OTHER CALCAREOUS MATERIALS

and manganese oxides lead to unsuitability of the product and iron oxides tend to discolour the bleached material. Magnesia renders the bleaching powder hygroscopic. Silica and clay impede solution and settling of bleaching powder.

BIS has prescribed specification for limestone for use in chemical industry as per IS: 3204:1978 (First revision, Feb, 2009).

The BIS specifications of limestone for chemical industries are furnished in Table-16.

### Sugar Industry

In Sugar Industry, lime is used for clarification of cane and beet juice, viz, removing the impurities from the juice and also for precipitating sugar from impurities. Milk of lime 1% in volume of cane juice is added to pre-heated juice. Limestone used in Sugar Industry must be high in active lime (CaO 80% min),

but low in iron, alumina and silica. Magnesia should be less than one percent. Excess silica is undesirable because it separates as a gelatinous precipitate which covers the sugar crystals and retards their growth and filtration. Magnesia is objectionable because magnesium carbonate is soluble in sugar juice. Presence of iron tends to colour the finished product.

### Fertilizer Industry

Limestone is used only as carrier in the manufacture of calcium ammonium nitrate fertilizer. For this purpose, limestone should contain  $MgCO_3 + CaCO_3$  85% (min),  $SiO_2$  5% (max) and acid insolubles 14% (max).

### Foundry Industry

The chemical requirements of limestone for use in foundries as per BIS specification (IS : 4140 -1978); has been withdrawn.

**Table – 16 : Specifications of Limestone for Chemical Industry (Bleaching Powder, Caustic Soda, Calcium Carbide and Sugar Industries) (IS : 3204 - 1978; First Revision, Reaffirmed 2013)**

Characteristics	Requirement in percent by mass for			
	Bleaching powder	Caustic soda	Calcium carbide	Sugar
Loss on ignition	46.00	46.00	46.00	44.00
$SiO_2$ (max)	0.75	–	1.00	2.00
$Fe_2O_3$ (max)	0.15	–	0.25	–
CaO (min)	54.00	53.00	54.00	50.00
MgO (max)	2.00	1.00	0.80	1.00
$Mn_2O_3$ (min)	0.06	–	–	–
$CO_2$ (min)	42.00	42.00	42.00	41.00
S (max)	–	–	0.10	–
P (max)	–	–	0.01	–
$Al_2O_3 + Fe_2O_3$ (max)	–	–	0.50	1.50
$SiO_2 + Al_2O_3 + Fe_2O_3$ (max)	–	3.00	–	–

LIMESTONE AND OTHER CALCAREOUS MATERIALS

**INDUSTRY & CONSUMPTION**

India was the second largest cement producing country in the world after China. There were 210 large cement plants having an installed capacity of 410 million tonnes in 2015-16 in addition to more than 350 mini cement plants having estimated capacity of around 11.10 million tonnes per annum. The total installed capacity of cement in 2015-16 was thus about 421.10 million tpy against 356 million tpy in the preceding year. Besides, there are three white cement plants having a total 990,000 tpy capacity. The total production of cement reached 283.45

million tonnes in 2015-16 registering a growth of about 6.52% over the preceding year.

In 2016-17, the total consumption of limestone, as reported by different industries was 242.45 million tonnes. Cement was the major consuming industry accounting for 92% consumption, followed by iron & steel (5%) and chemical (2%). The remaining consumption was reported by aluminium, alloy steel, sugar, paper, fertilizer, glass, metallurgy, foundry, etc. Consumption of limestone from 2014-15 to 2016-17 is given in Tables - 17(A). Information on consumption of limestone in Iron & Steel industry by principal plants is given in Table - 17 (B).

**Table - 17 (A) : Consumption\* of Limestone, 2014-15 to 2016-17  
(By Industries)**

(In tonnes)			
Industry	2014-15	2015-16 (R)	2016-17 (P)
<b>All Industries</b>	<b>266432500</b>	<b>294263400</b>	<b>242459100</b>
Aluminium/Alumina	213200	375500	176800
Alloy steel	44100	75200	33600
Cement	248500800	276329400	223110700
Chemical	4649800	4887700	5013100
Fertilizer	700	2200	1500
Ferro alloys	1700	5600	10600
Foundry	500	500	700
Glass	76400	93800	68000
Iron & Steel	11482700	11064200	12636500
Metallurgy	22600	3500	48100
Paper	5200	5200	-
Sugar (e)	993100	918800	717400
Others**	441700	501800	642100

Figures rounded off.

\* Includes actual reported consumption and/or estimates made wherever required and due to paucity of data, coverage may not be complete. Where the apparent consumption of limestone was 249521600 tonnes by the year 2016-17.

\*\* Include, Calcination, ceramic, electrode, refractory, sponge iron & thermal power.

LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 17 (B) : Consumption\* of Limestone in Iron & Steel Industry, 2013-14 to 2015-16  
(By Principal Plants)**

(In tonnes)

Plant	2013-14	2014-15 (R)	2015-16 (R)
Bhilai Steel Plant	NA	1310662	1448069
Bokaro Steel Plant	870034	806394	761925
Durgapur Steel Plant	566832	547518	464579
IISCO Steel Plant	26763	116159	NA
Rourkela Steel Plant	762313	921641	862154
Visvesvaraya Iron & Steel Plant	6021	22889	NA
Visakhapatnam Steel Plant	6021	NA	NA
JSW Steel Ltd	74307 <sup>@</sup>	65164 <sup>@</sup>	59849 <sup>@</sup>
Tata Steel Ltd	2823939	2862638	2947033
IDCOL, Kalinga Iron Works Ltd	3514	1419	NIL
Tata Metallics Limited	84811	81761	58102
Kirloskar Ferrous Industry Ltd	NA	49365	41062
KIOCL Ltd	51553	21485	1863
VISA Steel Plant	NA	6401	13082
Neelachal Ispat Nigam Ltd	NA	84722	82230
Jayaswal Neco Industries Ltd	96779	95520	76917
Sunflag Iron & Steel Co.Ltd	25667	25667	30566

\* Includes actual reported consumption and/or estimates made wherever required and due to paucity of data, coverage may not be complete.

@ Salem plant

## FOREIGN TRADE

### Exports

In 2016-17 export of limestone was 4.29 million tonnes. Limestone was mainly exported to Bangladesh (97.62%) & UK (1.19%). As per the foreign trade policy 2015-20, the exports of limestone, lime kankar, lime shell and chalk are free. Exports of limestone decreased slightly to 3.23 million tonnes in 2015-16 from 3.81 million tonnes in the previous year. Limestone in bulk was exported mainly to Bangladesh (95%), UK (2%) & Bhutan (1%). During the same period, exports of chalk also decreased marginally to 481 tonnes from 490 tonnes in the previous year. Chalk was exported mainly to Nepal (81%), Bangladesh (6%), Bhutan (4%) and Egypt (2%).

Exports of bleaching powder were at 16,562 tonnes in 2015-16 as compared to 16,976 tonnes in the previous year. Bleaching powder was exported mainly to Bangladesh (55%), Sri Lanka & USA (9% each), Nepal (7%), Algeria (5%) and Kenya (3%) besides other countries.

In 2015-16, about 371 tonnes of calcium carbide was exported as against 412 tonnes in the previous

year, mainly to Bangladesh (38%), Oman (16%), UAE (13%), China (12%) and Equatorial Guinea (6%) (Tables- 18 to 22).

### Imports

In 2016-17 import of limestone was 17.8 million tonnes. Limestone was mainly imported from UAE (80.25%), Oman (12.44%), Malaysia (2.47%), Vietnam (1.79%) & Iran (1.76%). As per the foreign trade policy 2015-20, the import of limestone, lime kankar, lime shell and chalk are free. Imports of limestone increased to 17.18 million tonnes in 2015-16 from 13.94 million tonnes in the previous year. Imports of chalk in 2015-16 drastically decreased to 6,174 tonnes as against 26,734 tonnes in the previous year. Limestone was imported mainly from UAE (74%) & Oman (17%), while chalk was imported mainly from Vietnam (96%) & France (2%) besides other countries.

Imports of calcium carbide decreased drastically to 61,936 tonnes in 2015-16 from 78,331 tonnes in the previous year. Calcium carbide was imported mainly from China (59%), Bhutan (32%) and South Africa (8%). The imports of bleaching powder was not available for both current and previous years (Tables- 23 to 27).

## LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 18 : Exports of Limestone in 2016-17  
(By Countries)**

Country	2016-17 (P)	
	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>4293116</b>	<b>4719325</b>
Bangladesh	4190905	3593453
UK	51215	502863
Ireland	6167	66992
France	5366	63735
Belgium	4969	50469
Bhutan	4856	40887
Canada	4046	47841
USA	3556	74081
Italy	2907	35680
Netherlands	2536	29383
Japan	2317	30055
Other Countries	14276	183886

**Table – 19 : Exports of Limestone  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>3812759</b>	<b>4671971</b>	<b>3236010</b>	<b>4694273</b>
Bangladesh	3684066	3542496	3063174	2929791
UK	35929	351812	71891	751802
Bhutan	28510	177263	27482	215400
USA	4036	65859	6015	185042
Ireland	6869	59323	8168	79831
Belgium	6024	64558	6302	67549
France	4329	41332	6317	64978
Nepal	16134	67352	16342	46285
Korea, Rep. of	1837	21276	3233	41791
Japan	2489	32522	2094	34473
Other countries	22536	248178	24992	277331

LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 20 : Exports of Chalk  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>490</b>	<b>2978</b>	<b>481</b>	<b>3816</b>
Nepal	358	1211	391	2438
Bhutan	-	-	19	273
Kenya	++	8	1	207
Oman	25	239	2	198
Bangladesh	-	-	27	166
Egypt	23	193	12	127
UAE	1	4	1	119
Malaysia	1	71	1	71
USA	++	1	10	42
South Africa	21	114	6	41
Other countries	61	1137	11	134

**Table – 21 : Exports of Bleaching Powder  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>16976</b>	<b>667839</b>	<b>16562</b>	<b>568546</b>
Bangladesh	7408	144042	9171	179733
USA	1349	99799	1437	122858
Algeria	1938	117835	786	52866
Sri Lanka	825	25480	1493	44695
Kenya	308	24620	416	33723
Iran	-	-	254	16456
Nepal	1336	15757	1220	15551
Madagascar	536	36656	208	14407
Mauritius	322	21534	168	11556
Angola	126	7951	168	10366
Other countries	2828	174165	1241	66335

**Table – 22 : Exports of Calcium Carbide  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>412</b>	<b>22973</b>	<b>371</b>	<b>20636</b>
Bangladesh	153	9207	144	9266
Oman	1	106	60	3233
UAE	233	12022	48	2484
Nepal	++	242	34	1854
China	--	--	45	1561
Equatorial Guinea	--	--	24	1289
Suriname	--	--	16	942
Qatar	--	--	++	6
Djibouti	24	1370	--	--
Kenya	1	26	++	1

## LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table – 23 : Imports of Limestone  
(By Countries)**

Country	2016-17 (P)	
	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>17802681</b>	<b>21279930</b>
UAE	14285990	15656057
Oman	2214165	28318
Malaysia	440307	1516933
Vietnam	319128	522362
Iran	313801	351265
Bhutan	14023	31882
Egypt	17442	77572
Indonesia	51132	49518
Philippines	42003	62758
Pakistan	29314	68485
Thailand	18250	25459
Other countries	57126	2889331

**Table – 24 : Imports of Limestone  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>13943781</b>	<b>22138585</b>	<b>17187164</b>	<b>23772767</b>
UAE	10610965	14066632	12722921	14391609
Oman	2132145	2984367	2981700	3901617
Malaysia	499560	2136958	572171	2321059
Vietnam	262582	1667673	278773	1565974
Thailand	199747	485422	173279	581347
Indonesia	32306	35845	155655	331559
Egypt	26289	134100	17504	88441
Philippines	60900	109042	44000	73381
Australia	21094	158227	50976	71266
Unspecified	-	-	7695	69279
Other countries	98193	360319	182490	377235



LIMESTONE AND OTHER CALCAREOUS MATERIALS

**Table –25 : Imports of Chalk  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
<b>All Countries</b>	<b>26734</b>	<b>47715</b>	<b>6174</b>	<b>46310</b>
Vietnam	6516	39250	5943	38276
France	20106	2194	106	2656
Sri Lanka	-	-	15	1406
Denmark	20	403	36	1263
China	53	3268	53	1024
Italy	15	1171	12	924
Japan	7	329	2	319
UK	2	205	3	250
Germany	7	688	4	184
Chinese Taipei/Taiwan	8	185	++	8
Other countries	++	22	--	--

**Table – 26: Imports of Calcium Carbide  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (L'000)	Qty (t)	Value (L'000)
<b>All Countries</b>	<b>78331</b>	<b>3152508</b>	<b>61936</b>	<b>2542902</b>
China	46136	1727767	36252	1409268
Bhutan	19509	901180	20055	869578
South Africa	4157	173891	4687	207983
Russia	-	-	672	45161
Malaysia	-	-	205	9324
Hong Kong	-	-	23	887
Indonesia	8526	349513	42	698
Germany	++	16	++	3
New Zealand	3	83	-	-
Thailand	++	51	-	-
Other countries	++	7	-	-

**Table – 27 : Imports of Bleaching Powder  
(By Countries)**

Country	2014-15		2015-16 (P)	
	Qty (t)	Value (L'000)	Qty (t)	Value (L'000)
<b>All Countries</b>	<b>++</b>	<b>55</b>	<b>++</b>	<b>3</b>
UK	++	2	++	2
Germany	++	7	++	1
USA	++	46	-	-
Other countries	-	-	-	-

## FUTURE OUTLOOK

India has huge resources of limestone distributed over different parts of the country. It is comfortably placed in terms of annual capacity and production of cement. Cement-grade limestone occurs in all the limestone-bearing areas, while SMS, BF and chemical-grade limestones occur in selective areas. Concerted efforts to locate SMS and BF grade limestone along with cement- grade limestone are imperative to meet the growing demand.

As per the Report of the Working Group, formerly Planning Commission of India, the total limestone requirement during 12<sup>th</sup> Plan (2012-2017) with growth scenario of cement @ 10%, 11% and 12% for the respective GDP growth of 8%, 9% and 10% is projected at 3,163 million tonnes, 3,253 million tonnes and 3,385 million tonnes, respectively.

As per the GOI's new policy of allotment of mining blocks through auctioning, upto 01.11.2017, total 33 blocks were auctioned. Out of these 33 blocks, 17 blocks were limestone blocks. (3 in Andhra Pradesh, 2 in Jharkhand, 3 in Chhattisgarh, 1 in Odisha, 4 in Rajasthan, 3 in Gujarat, 1 in Maharashtra) containing 2037.12 million tonnes reserves.

