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MINOR MINERALS

30.11 GRANITE

(FINAL RELEASE)

GOVERNMENT OF INDIA
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30-11 Granite

Granite technically refers to a light-coloured granulose plutonic rock composed of felspars, plagioclase, quartz (35% approx.) and minor amounts of mafic minerals (45% approx.), such as, biotite, hornblende, pyroxene, iron oxides, etc. But, in commercial parlance, the term granite has become synonymous with all those crystalline rocks which have pleasing colours, strength to bear the processes of quarrying and cutting & polishing and which are used commonly for decorative purposes. Being more resistant to wear and tear as well as weathering, granite is most sought-after stone to be used as building as well as decorative stone. The fascination for granite is due to its amenability for taking mirror-like polish, high compressive strength, longevity and aesthetics. India possesses enormous deposits of all types of dimension stones and is considered as one of the prominent producers of dimension stones in the world. The Dimension Stone Industry employs a workforce of over one million at its various sectors in the country. This Industry plays a vital role in the economy of the States like Tamil Nadu, Andhra Pradesh, Telangana, Karnataka and Rajasthan. Granite Industry is valued at $40 billion and has a potential to generate semi-skilled employment, especially in rural areas.

Within the country, granite used for decorative purposes is considered costly when compared with other materials, hence, its utilisation and trade in the domestic front has been relatively low when compared to its export potential.

RESERVES/RESOURCES

India is endowed with abundant resources of wide variety of granite comprising over 200 shades. As per NMI data, based on UNFC system (as on 1.4.2015) reserves/resources of granite dimension stone of all types have been estimated at 46,320 million cubic metres. Of these resources, 264 million cubic metres (less than 1%) fall under Reserves category, while the remaining 46,056 million cubic metres (about 99%) fall under Remaining Resources category.

Of the total granite reserves, about 36 million cubic metres of all grades fall under Proved category while 228 million cubic metres fall under Probable category.

Statewise break-up of total resources reveals that Karnataka & Rajasthan share about 20% each of the resources which are followed by Jharkhand (19%), Gujarat (18%), Andhra Pradesh (5%) and Madhya Pradesh & Odisha (4% each). These States together account for 90% of the total resources. Gradewise classification reveals that about 7% of the total resources fall under Black granite while 92% under Coloured granite. About 1% resources are of Unclassified grade.

The details of Reserves/Resources as on 1.4.2015 are furnished in Table-1.

EXPLORATION & DEVELOPMENT

The exploration & development details, if any, are covered in the Review on Exploration & Development under "General Reviews".

PRODUCTION

The granite being building stone comes under 'Minor Mineral' as defined in Clause (e) of Section 3 of MM(DR) Act,1957, hence the producers report the production data directly to the respective States and not to IBM. However, efforts were made to collect this information through correspondence with the State Directorates of Mining and Geology of individual States or visiting their websites. But data of only a few States could be collected. All possible information/data that could be gathered has been presented in this Review.

Major production of granite in raw as well as processed form is generally from Andhra Pradesh, Telangana, Rajasthan, Karnataka, Tamil Nadu and Gujarat. Statewise production of granite is given in Table-2.

Table – 1 : Reserves/Resources of Granite (Dimension Stone) as on 1.4.2015
(By Grades/States)

(In thousand' cubic metres)

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						
All India : Total	**35741**	**201377**	**26574**	**263692**	**38462**	**51990**	**8234**	**837325**	**2063964**	**42543908**	**512216**	**46056098**	**46319790**
By Grades													
Black Granite	6936	6060	3909	16906	-	45690	1	50934	466039	2572581	23538	3158783	3175688
Coloured Granite	28805	195316	22665	246786	38462	6300	8233	786391	1276125	39843847	448438	42407795	42654581
Unclassified	-	-	-	-	-	-	-	-	321800	127481	40240	489521	489521
By States													
Andhra Pradesh	-	-	-	-	-	-	-	-	-	2360396	-	2360396	2360396
Assam	-	-	-	-	-	-	-	-	800	583150	-	583950	583950
Bihar	-	-	-	-	-	-	-	-	179000	698612	-	877612	877612
Chhattisgarh	-	-	-	-	-	-	-	-	-	50057	-	50057	50057
Gujarat	-	-	-	-	-	-	-	-	-	8501947	-	8501947	8501947
Haryana	-	-	-	-	-	-	-	-	-	34000	-	34000	34000
Jammu & Kashmir	-	-	-	-	-	-	-	-	-	44570	40000	84570	84570
Jharkhand	-	-	-	-	-	-	-	-	651300	8197110	26930	8875340	8875340
Karnataka	26363	19389	21836	67587	-	-	-	238	1231625	8012784	25659	9270306	9337893
Kerala	140	-	-	140	-	-	-	-	99	2570	-	2669	2808
Madhya Pradesh	-	160	-	160	-	-	-	-	-	1885924	108000	1993924	1994084
Maharashtra	-	-	-	-	-	6300	-	486925	-	665622	-	1158847	1158847
Meghalaya	-	-	-	-	-	-	-	-	-	-	286467	286467	286467
Odisha	-	80000	-	80000	-	-	-	330328	-	1432492	5160	1767980	1847980
Rajasthan	5581	100380	4500	110461	38462	-	-	-	-	9021742	20000	9080204	9190665
Tamil Nadu	-	1448	238	1686	-	45690	8234	7	-	503818	-	557749	559435
Telangana	-	-	-	-	-	-	-	-	-	45494	-	45494	45494
Uttar Pradesh	-	-	-	-	-	-	-	-	-	494819	-	494819	494819
West Bengal	3658	-	-	3658	-	-	-	19827	1140	8802	-	29768	33426

Figures rounded off

Table-2: Statewise Production of Black/Coloured Granite

(In cu m)

State	Year		
	2016-17	2017-18	2018-19
Rajasthan#	3842846	3090758	-
Telangana	1186956	1195899	1109743
Andhra Pradesh	921450	1146656	-
Gujarat#	605853	465648	537965
Karnataka	406666	46202	39532
Kerala*#	253	1564	1000
Goa**	-	419400	417242

Source: *As received from State DGMs and their websites.*
Note : *" - " NA*
** Dimension stone*
*** Basalt*
 # Quantity in tonnes

USES & SPECIFICATIONS

Uses

Granite is the most sought-after among all building stones. In ancient times, granite pillars and beams were a preferred material to support the huge structures of temples and palaces and for making protective walls around them. With the invention of modern tools of greater hardness and polishing ability, the use of granite has rather increased on account of its aesthetic value. The modern motorised tools of tungsten carbide and brazed diamond have enabled the user to cut & polish granite as per the specifications of the Building Sector. Presently, cut and polished granite slabs of 20 mm thickness are preferred for flooring, while tiles of 10 or 12 mm thickness are used for cladding. In addition, gravestones and monuments of various shapes and sizes are also in vogue. The flexibility of the cutting tools has engendered creation of many artifacts of granite for decorative purposes.

Granite also finds its application in making garden furniture, such as, benches, fountains and many other articles which are used for landscaping and/or decorative purposes. The cut-to-size small blocks are used as cobblestone, kerbstone, road sidings and for many other innovative purposes.

Crude granites are utilised for structural purpose after little dressing & sizing, whereas processed granites are used mostly in the construction of buildings and monuments and for interiors and exterior facing. Granites, because of its superior wear resistance and non-denting quality are used as parts in various meteorological and engineering instruments, such as, surface plates, straight edges, parallels, cubes, V' blocks and work-mounting tables of co-ordinate measuring machines.

The surface plates are used as flat datum surface whenever precise measurements of dimensions and geometrical relationships are to be carried out. For this purpose, harder varieties of granite are preferred as they can bear the high-degree of grinding, polishing and calibration required for achieving flat surfaces. For its use as surface plates, granites should have properties, such as, close grain size, homogeneity, high density & hardness, uniform colour, low moisture absorption and should be free from flaws.

Specifications

The properties of granite which are normally valued for exploitation are compressive strength, tensile strength, density, p-wave velocity, etc. For marketability, other requirements like colour, texture, granularity, size, water absorption, porosity, hardness, moisture content, etc. are also essential. Raw blocks should be free from normal defects like fractures, joints, shears, hairline cracks, segregation, veins, etc.

POLICY

Granite is a 'Minor Mineral' under the MM(DR) Act, 1957. The grant of various mineral concessions for granite is, therefore, administered under the Minor Mineral Concession Rules of the respective State Governments. However, the Granite Conservation and Development Rules, 1999 aims at uniform rules for conservation, systematic development and scientific exploitation of granite resources.

WORLD SCENARIO

The top five granite producing countries in descending order were China, Brazil, India, Saudi Arabia and Italy.

Currently, the USA is the world's biggest consumer of granite and its demand is largely fulfilled by imports from Brazil, China & India.

The European Union (EU) is one of the biggest markets for the worldwide Natural Stone Industry. India has also been one of the key players in the global export of natural stones, with substantial share in global exports.

FUTURE OUTLOOK

India possesses one of the best granite deposits in the world having excellent varieties comprising over 200 shades. India accounts for over 20% of the world resources in granite. The total granite resources in India as on 1.4.2015 are estimated at 46,320 million cum.

The current environment for granite industry remains challenging. There are multiple headwinds like competition from engineered stone, closure of granite quaries and change in demand trends. Dimension stone market is said to grow at a fervent pace as the demand for granite, marble, sandstone and other dimension stones and stone products is on the rise as the residential consumption and privates pending on home are increasing. In addition to this, residential remodelling activity is expected to rise as home owners continue to opt for larger kitchens and multiple bathroom, expending the space devoted to countertops. A similar rate of growth in exports can also be achieved with the help of suitable policy framework, infrastructure and other facilities which the Industry expects to consolidate for augmentation of prospects. A well-planned, concerted and dedicated efforts are essentially needed for promotion of Indian stones to galvanise their export prospects.

There is a need to integrate environmental concern and social & economic development of region into mineral development programmes for achieving sustainable development. Granite mining adversely impacts the environment due to removal of top soil and overburden, which results in degradation of land. The recovery of saleable granite blocks is very low and the waste is mostly in the form of granite rocks having defects of colour, cracks, grain size etc. and these wastes could be used in manufacturing M-sands. The basic objective of sustainable development in mining is to meet the needs of the present without compromising the ability of future generations to meet their own needs.