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REGIONAL ENVIRONMENTAL ASSESSMENT OF GRANITE MINING WITH SPECIAL EMPHASIS ON LAND DEGRADATION IN KHAMMAM AND KARIMNAGAR DISTRICTS

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REGIONAL ENVIRONMENTAL ASSESSMENT OF GRANITE MINING WITH SPECIAL EMPHASIS ON LAND DEGRADATION IN KHAMMAM AND KARIMNAGAR DISTRICTS

Granite is a minor mineral; it is a major contributor in foreign exchange earnings. India is the second largest exporter of raw granite after China and ahead of Brazil and South Africa. India ranked fifth in the export of processed (value added finished) product. Granite contributed 4.51% exports value of all ores and minerals in 2007-08. The exports value of granite was next to diamond and iron ore during 2007-08. (IMYB-2010)

Telangana State is one of the important Granite producing states unique varieties are

- Jet black granite of Warangal and Khammam districts
- Tan brown variety of Karimnagar district

Mining

Production of blocks of considerable size and weight is a special feature of granite mining. The process and equipment used for granite mining differ considerably from those used for mining other minerals. The mining of granite involves two important stages of operation: one is actual block splitting either from sheet rock or boulder and the other operation involves many items of works, such as removal of weathered zone or overburden, opening of faces, lifting of cut blocks, transportation and many other ancillary works before and after the block splitting. The actual block splitting from the sheet rocks or boulders is mainly done manually or in some cases by semi-mechanised methods whereas the other operations, such as removal of overburden, lifting and transportation of cut blocks, etc. are carried out by mechanised method.

There are a very few mines which adopt the modern method of block splitting by using flame-jet burner and diamond wire saw for cutting. Heavy-duty derrick cranes of capacity to handle

Environment

Environmental problems are similar to any opencast mining operations. The general degradation of land due to unscientific and selective mining is a common feature. Because of paucity of suitable land in leased area, the overburden, consisting of soil and weathered material, is being dumped in a disorganised manner in nearby fields, waterways, etc., creating hindrance to cultivation and natural waterways; besides, air pollution causing breathing problems. Further, the blasting and movement of heavy vehicles generate dust and aggravates air pollution in addition to noise pollution.

Air Pollution

Though the Granite mining practices are manual and semi-mechanised except few mechanized mines, dust generation is inevitable. Mining operations such as drilling, blasting, loading and movement of dumpers on haul road, dumping of material will release dust in to the ambient environment has adverse effect on the people working in the mines people living in the vicinity and also on the plant and cattle. Ambient Air samples collected on Millipore 8” X 10” Glass fiber filter paper using Respirable Dust Sampler (RDS) and High Volume Sampler (HVAS). Workplace air samples have been collected in the

breathing zone using Personal Samplers (PS) using 25 mm dia Cellulose Membrane Ester Filter paper. Sampling and analysis was carried out as per the

National Standards. Suspended Particulate Matter (SPM) in the mines exceeding the National Standards. (Annexure –I)

Water Pollution

The sediments discharged into the surface courses by the mine discharging waters and the drainage from the plant and dumps are the chief sources of water pollution. It also increases the hardness of water. The other pollution effects normally found in the mine discharge water from limestone mines are:-

(a) Increase in electrical conductivity
(b) Increase in calcium content
(c) Increase in magnesium content
(d) Increase in sulphate ions.

Land Degradation

Land in India suffers from varying degrees and types of degradation stemming mainly from unstable use and inappropriate management practices. Loss of vegetation occurs due to deforestation, cutting beyond the silviculturally permissible limit, unsustainable fuelwood and fodder extraction, shifting cultivation, encroachment into forest lands, forest fires and over grazing all of which subject the land to degradational forces. Other important factors responsible for large-scale degradation are the extension of cultivation to lands of low potential or high natural hazards, non-adoption of adequate soil

conservation measures, improper crop rotation, indiscriminate use of agro-chemicals such as fertilisers and pesticides, improper planning and

management of irrigation systems and extraction of ground water in excess of the recharge capacity.

In addition, there are a few underlying or indirect pressures such as land shortage, short-term or insecure land tenancy, open access resource, economic status and poverty of the agriculture dependent people, which are also instrumental to a significant extent, in the degradation of the land. Land degradation manifest itself chiefly in the form of water erosion, followed by wind erosion, biophysical, and chemical deterioration.

Land degradation is the inevitable result of any form of mining, particularly opencast mining, which thoroughly disturbs the physical, chemical, and biological features of the soil and alters the socioeconomic features of the area. Although there are no data available for the area actually affected by mining and quarrying, mining lease area is approximately 0.8 mha, which may be taken as degraded directly due to mining activities in addition to the areas affected indirectly.

Exploitation of mineral resources creates huge waste/sub grade material dumps. A waste is a waste as long as it is unused. Waste dumps all along the mining belt for various minerals reveal necessity of attention to be paid for its utility for prosperity of human kind by way of creation of large scale employment in rural areas This would form as best environmental mining planning practice.

Noise Pollution

The noise generated by the heavy earth moving machinery like dozers, haulers, dumpers exceeds 90 dB. Within the cement plant various processing operations using the varied machinery contribute to noise pollution. The

impulsive noise generated and the ground vibration during blasting is highly dangerous to the fauna and also causes annoyance to the public. (Annexure – II)

The Granite Conservation and Development Rules, 1999 are expected to bring uniformity and stability in quarry leases for granite and facilitate scientific mining which will ultimately help in proper planning, utilisation and management of granite resources in the country.

In many areas, we may find lot of mineral waste. If extensive studies are made the said waste also can be put to use and it adds to the growth of the Nation by conserving the valuable and exhaustible mineral resource.

Mining operations such as drilling, blasting, loading and movement of dumpers on haul road, dumping of material will release dust in to the ambient environment has adverse effect on the people working in the mines people living in the vicinity and also on the plant and cattle. Blasting fumes contain various noxious gases like SO2; NO2; NO; N2O, NH3. Ambient Air samples collected on Millipore 8" X 10" Glass fiber filter paper using Respirable Dust Sampler (RDS) and High Volume Sampler (HVAS). Workplace air samples have been collected in the breathing zone using Personal Samplers (PS) using 25 mm dia Cellulose Membrane Ester Filter paper.

The impacts of mining on environment due to granite mining and processing plants are many but a number of them can be mitigated more successfully and at less cost by prudent site selections and proper management plans. Depending on the type of facility and the medium being considered (air, water, plant, animal or human communities), the area that might be influenced by a mine / plant can extend beyond the site and its

immediate environs. The characteristics of the natural resources and land use in the air its dispersion for long distances downwind are relevant and so are the environmental impacts along transportation corridors. Industrial growth is no longer a sole justification, increased knowledge of public health effects and experience with the degradation of air, water and land that can occur in the absence of sound planning in mining/industrial area is a major concern to be thought of.

The impact due to mining is not restricted to air, water and land but also on local population. There is a potential stress on the existing community infrastructure and especially medical facilities etc., due to the influx of workers in to mining industry. Similarly, the influx of workers from other localities or regions changing local demographic patterns and disrupting social and cultural values, as well as living pattern of the residents. It has now touched upon the social issues like health and safety of the population. All these contribute to environmental degradation and as such the issues are on regional scale rather project specific.

The impacts of mining on environment due to mining and processing plants are many but a number of them can be mitigated more successfully and at less cost by prudent site selections and proper management plans.

The regulatory agencies should assess the impact of mining on environment, monitor the activities periodically and enforce effectively and strictly the provisions of various Acts, Rules & Regulations concerning the Mining and Environmental Protection for Sustainable Development.

Environment impacts due to various developmental activities in these districts are significant and impact assessment of few areas in these districts requires immediate attention.

S.No.	Sampling Date	Sample Location	Duration of Sample	Season	SPM
1	Aug, 2013	Over burden Bench	24 hours	Monsoon	255 µg / m^3
2	Aug, 2013	View Point	8 hours	Monsoon	275.52 µg / m^3
3	Aug, 2013	Near Rest Shelter	8 hours	Monsoon	236.45 µg / m^3
4	Aug, 2013	Near The Generator	8 hours	Monsoon	229.92 µg / m^3
5	Aug, 2013	Over burden Bench	8 hours	Monsoon	1025.64 µg / m^3

Annexure - I

Ambient Air Quality Data

S.No.	Sampling Date	Sample Location	Duration of Sample	Season	SPM
1	Feb, 2014	Over burden Bench	24 hours	Winter	950 µg / m3
2	Feb, 2014	Mine View Point	8 hours	Winter	455 µg / m3
3	Feb, 2014	Rest Shelter	8 hours	Winter	762 µg / m3
4	Feb, 2014	Near The Generator	8 hours	Winter	680 µg / m3
5	Feb, 2014	Over burden Bench	8 hours	Winter	825 µg / m3
6	Feb, 2014	First Bench Operation	8 hours	Winter	485 µg / m3

Workplace Air Quality Data

S.No.	Sampling Date	Sample Location	Duration of Sample	Season	SPM
1	Aug, 2013	Dumper Operator	1 hour	Monsoon	387 µg / m3
2	Aug, 2013	Shovel Operator	1 hour	Monsoon	277 µg / m3
3	Aug, 2013	Dumper Operator	1 hour	Monsoon	347 µg / m3
4	Aug, 2013	Driller	1 hour	Monsoon	1110 µg / m3
5	Aug, 2013	Driller	1 hour	Monsoon	1138 µg / m3
6	Aug, 2013	Drilling Operation	1 hour	Monsoon	583 µg / m3

S.No.	Sampling Date	Sample Location	Duration of sample	Season	SPM
1	Feb, 2014	Driller (Operator)	2 hours	Winter	475 µg / m3
2	Feb, 2014	Driller (Assistant)	2 hours	Winter	520 µg / m3
3	Feb, 2014	Static Sample	2 hours	Winter	761 µg / m3
4	Feb, 2014	Shovel Operation	2 hours	Winter	125 µg / m3
5	Feb, 2014	Dumper Operation	2 hours	Winter	355 µg / m3
6	Feb, 2014	Static Sample	2 hours	Winter	275 µg / m3
7	Feb, 2014	Static Sample OB bench	2 hours	Winter	325 µg / m3

Annexure - II

Permissible Sound Level for Occupational Noise exposure

Duration Per Day / Hours	Sound Pressure Level db (A) Allowed response
8	90
6	92
4	97
2	100
1.5	102
1	105
0.5	110
0.5 or Less	115

Observed Sound Levels

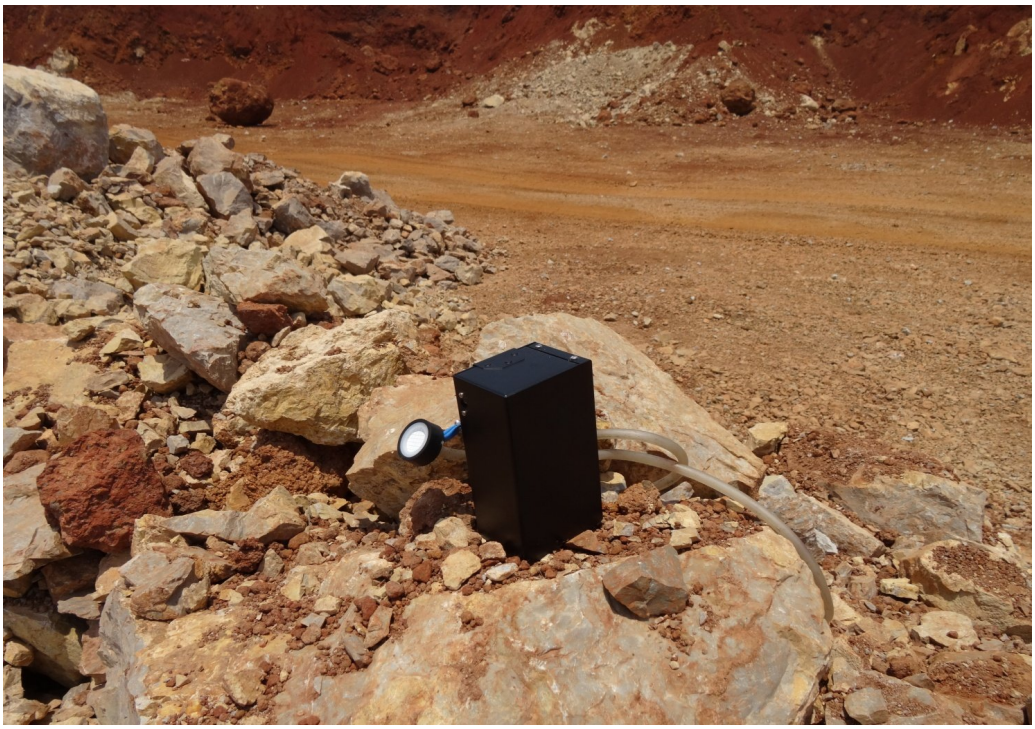
Sampling Location	Sound Pressure Level db (A)
Mines	78-92
Hauler	92
Dumper	94
Crusher	115
Dozer	108
Ramp	92
Haul Road	85-92
Rest Room	85

Analytical Report of Water Samples																											
Sl.No.	*Lab. No.*	*Particulars of the Sample Village / Mandal*	*Station code for O.U*	*Date of Collection*	*D.T.W*	*Geology*	*Latitude*	*Longitude*	*pH*	*Sp cond at 25°C mic.Sie / cm.*	*TDS Calculated mg/lit.*	*Co3 as CaCo3*	*HCO3 as CaCo3*	*CL*	*F*	*NO3 as N*	*So4*	*Na*	*K*	*Ca*	*Mg*	*T.H. as CaCo3 mg/lit.*	*SAR*	*Classification*	*RSC meq / L*	*Classification*
												mg/l.	*mg/l.*	*mg/l.*	*mg/l.*	*mg/l.*	*mg/l.*	*mg/l.*	*mg/l.*	*mg/l.*	*mg/l.*					
BIS Permisable limits									6.50 to 8.50		500-2000	200-600	200-600	250-1000	1.0-1.5	10.16	200-400	No Guidelines	No Guidelines	75-200	30-100	200-600	*0-10 (Excellent), 10-18 (Good), 18-27 (Doubtfull), above 27 (U.S.)*		*0-1.25 (P.S.), 1.26-2.5 (M.R), 2.5 above (U.S)*	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	1167	Bhupalapally	_	_	_	_	_	_	7.91	657	420	0	168	80		2.00	36	41	17	40	29	220	1.21	C2S1	-1.04	P.S.
2	1168	Bhupalapally	_	_	_	_	79°51'34.7"	18°25'04.9"	6.66	450	288	0	148	40		0.70	15	18	6	64	5	180	0.59	C2S1	-0.64	P.S.
3	1169	Bhupalapally	_	_	_	_	79°50'48.2"	18°23'48.2"	8.17	1300	832	0	396	100		17.50	42	172	2	48	39	280	4.48	C3S1	2.33	MR
4	1170	Bhupalapally	_	_	10	_	79°50'33.8"	18°22'59.2"	7.75	650	416	0	177	50		15.00	20	22	1	56	34	280	0.56	C2S1	-2.06	P.S.
5	1171	Kundur Palli	_	_	_	_	79°50'42.2"	18°23'26.6"	7.11	1400	896	0	312	150		26.50	72	122	2	104	44	440	2.53	C3S1	-2.56	P.S.
6	1172	Manju Nagar (Ganpur (M)	_	_	52	_	79°51'46.9"	18°23'41.4"	7.99	640	410	0	233	50		0.80	10	19	2	104	5	280	0.49	C2S1	-0.94	P.S.
7	1173	Taklapadu (V) Ganpur (M)	_	_	67	_	79°52'15.2"	18°22'46.6"	7.19	1000	640	0	273	120		5.40	32	75	2	80	34	340	1.76	C3S1	-1.34	P.S.
8	1174	Basavaraj Palli Ganpur (M)	_	_	70	_	79°53'03.3"	18°21'56.6"	7.24	2350	1504	0	383	350		50.00	104	361	2	80	49	400	7.84	C4S1	-0.34	P.S.
9	1175	Pulluramaiya Palli (V)	_	_	_	_	79°50'45.9"	18°24'04"	7.07	1250	800	0	223	140		40.00	53	87	2	112	39	440	1.80	C3S1	-4.33	P.S.
10	1176	ZPSS High School	_	_	_	_	79°52'09.9"	18°26'06.3"	6.91	1040	666	0	248	120		2.80	84	71	8	120	15	360	1.63	C3S1	-2.24	P.S.
11	1177	Sanjeev Nagar Colony	_	_	_	_	79°55'48.8"	18°25'56.4"	6.86	850	544	0	182	110		1.10	77	58	3	56	39	300	1.45	C3S1	-2.37	P.S.
12	1178	Boggula Wagu, Stream sample, Bhupalapalli	_	_	_	_	79°53'30.7"	18°28'37.0"	8.11	450	288	0	100	60		2.50	28	28	5	40	15	160	0.96	C2S1	-1.20	P.S.

13	1179	Percolation Tank RF	–	–	5	–	79°52'49.7"	18°27'22.3"	7.60	230	147	0	68	25		0.75	8	6	11	32	2	90	0.25	C1S1	-0.45	P.S.
14	1180	C.N. Nagar	–	–	–	–	79°52'36.0"	18°27'16.3"	7.63	400	256	0	129	40		0.15	12	17	4	48	10	160	0.59	C2S1	-0.63	P.S.
15	1181	Bombula gadda	–	–	–	–	79°52'26.5"	18°26'49.5"	7.06	780	499	0	253	70		0.30	32	33	3	80	29	320	0.79	C3S1	-1.34	P.S.
16	1182	Ramnagar (V)	–	–	–	–	79°51'30.4"	18°26'37.5"	6.89	950	608	0	168	120		8.00	100	53	3	104	24	360	1.22	C3S1	-3.83	P.S.
17	1183	Bhupalapalli	–	–	–	–	79°50'54.8"	18°27'42.3"	7.67	1050	672	0	63	50		4.50	355	36	10	104	44	440	0.74	C3S1	-7.53	P.S.
18	1184	Jangedu (V) Bhupalapally (M)	–	–	–	–	79°50'32.7"	18°26'39.7"	7.15	2400	1536	0	373	480		15.00	81	197	3	96	131	780	3.07	C4S1	-8.13	P.S.

Geological studies in the field

Enormous dust dispersion due to movement of Hauler in benches.

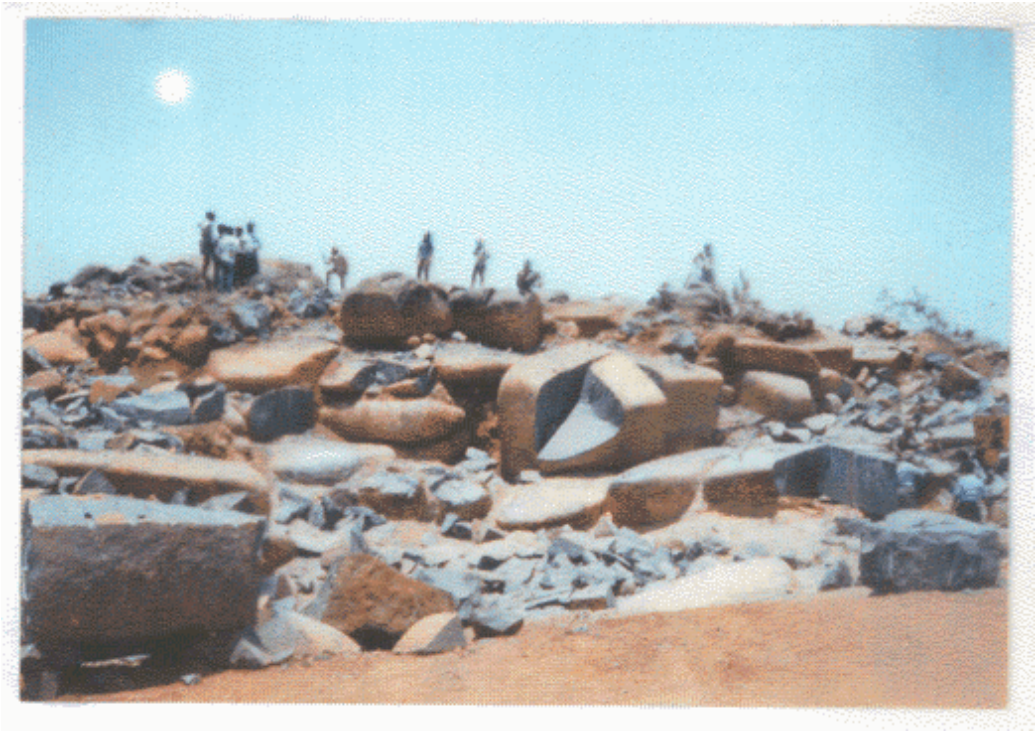


Static sample collection in the second bench using Personal Sampling Pump

Hauling operation for block recovery

Crane in operation in a black granite mine

Granite Block cutting machine



Cutting and dressing of grantie blocks manually

Dressed granite blocks along with the waste rock generated