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STEEL AUTHORITY OF INDIA LIMITED
RAW MATERIALS DIVISION
BOLANI ORES MINES

Inter office Correspondence

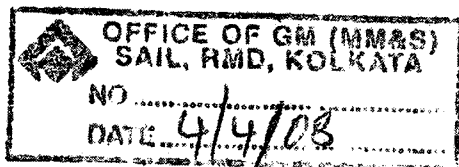
No. GM(Maint) /B- <u>54</u>	Date : 3rd April, 2008
From: <p style="text-align: center;">General Manager (Maint)</p>	To: <ol style="list-style-type: none"> 1. GM-BOM, Bolani 2. GM-MIOM, Meghahatuburu 3. GM-GOM, Gua 4. GM-BIM, Barsua 5. GM-KIOM, Kiriburu 6. GM (Proj)- RMD, Kolkata ✓ 7. GM (MM&S), RMD-Kolkata 8. GM (F&A), RMD-Kolkata
Fleet of HEMMs and Annual Procurement Plan	

Please find enclosed herewith Fleet recommended by Committee duly approved and replacement/procurement plans for HEMMs for 2008-09 onwards.

Encl: a.a *


3/4/08
(A. P. Sinha)

Copy to: The Asst. Director, RMD, Kolkata.



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Sub: Composite plan for procurement / replacement of HEMMs for RMD Mines 2008-09 onwards.

1. A committee was constituted vide Office Order No. RMD/K/TA/19/5993 dt. 14/08/2007 to calculate optimum fleet strength and equipment size for achieving targeted overburden / waste removal. ROM production with desired quality of finished product at optimum cost. Recommendations of the committee in respect of Hydraulic Excavators of 7.5 to 8 Cbm capacity, Rear dumper 100T, Bull dozers, water sprinklers, motor grader, mobile cranes, and tyre handler suitable for 100Te Dumpers were accepted and circulated vide RMD/Rkl/Maint/ dt. 15/12/2007 (Copy enclosed at C/1). Excavation of waste and ROM in BIM has been planned with 3 nos 7.5 Cbm Excavators and 6 nos 100te Dumpers. Since BIM's hopper can not accommodate 100T dumpers and modification of its hopper at present is not possible due to hill in front of hopper, it has been envisaged that hoppers of BIM will be fed from precrusher stockpile near hopper with the help of 3 nos of 4.5 to 6 cu-meter shovels and 6 nos. of 50 T dumpers.
2. Further to this a separate committee was constituted to reconsider recommendations in respect of equipment size & fleet of drills and front end loaders. The recommendations of the committee have been approved except for front end loaders of Gua. The report has been circulated vide GM (Maint)/RMD/BOM/B-1545 DT. 21/03/2008. Gua has asked 1 no. higher size pay loader of 7.5 cu-meter which will be put up to committee for reconsideration. (A copy enclosed at C/2).
3. Further in head of mines meeting held at RMD HQ Kolkata on 7th -8th Feb, 2008, it was decided that to maintain consistency in quality, hoppers in the mines should be fed from precrusher stockpile near hopper. The subject was referred to the same committee which has been formed vide order no. RMD/K/TA/19/5993 DT. 14/08/2007. The committee has submitted its report and has been approved. (Copy enclosed at C/3).
4. The composite plan for replacement / procurement of HEMMs is proposed as under. The plan has been made on the assumption that new equipments will be procured only on replacement proposal of existing HEMMs with proper justification of higher level of production and status of health of equipments at that time.

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4.1 7.5 to 8 cumeter Hydraulic Excavators

Name of Mine	Existing fleet of 4.5/5.5/6 cbm excavators	Recommended fleet of 7.5 to 8 cbm hyd. Excavators	Proc. Plan 2008-09	Proc. Plan 2009-10	Proc. Plan 2010-11	Proc. Plan 2011-12	Projected fleet strength of 7.5-8 cbm Excavators in 2012-13
KIOM	6	6	1	3	1	1	6
MIOM	8	6	1	3	1	1	6
BOM	7	8	2	3	2	1	8
BIM	8	3	1	1	1	--	3
GOM	5	5	1	3	1	--	5

- KIOM- 1no Excavator of 7.5-8 cbm proposed in 2011-12 will be procured after 1no Telecon shovel of Apr 2007 and 1 no 4.5 cbm Excavator of March08 is phased out.
- BOM- 1 no 7.5-8 cbm Excavator for 2011-12 is to be procured after 1 no Excavator of 4.5Cbm procured in Mar 08 is phased out.

In BIM Excavation of ROM and waste will be done by 7.5 to 8 Cumeter Excavators and 100Te dumpers and feeding to hopper will be done by 50Te dumpers and 4.5 to 6 Cumeter excavators.

4.5 to 6 Cbm shovel BIM

Name of Mine	Recommended fleet of 4.5 to 6 Cbm shovel	Proc. Plan 2008-09	Proc. Plan 2009-10	Proc. Plan 2010-11	Proc. Plan 2011-12	Projected fleet strength of 4.5 to 6 cbm excavators in 2012-13
BIM	3	-	1	1	1	3

1 no Excavator proposed in 2011-12 is to be procured after 1 no Excavator procured in May 07 is phased out

AS J.
25/03/08

Sh. Selen

File Committee on Equipment

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REPORT OF THE COMMITTEE FOR CALCULATING OPTIMUM FLEET STRENGTH AND EQUIPMENT SIZE OF HEMMs REQUIRED, FOR RMD MINES

A committee has been constituted vide office order noRMD/K/T4/19/5953 dated 14.08.07. The scope of work of the committee is to calculate the fleet strength and equipment size for achieving the targeted ROM production, overburden / waste removal with desired quality of finished product at optimum cost, using advanced software. The committee met on 10th / 11th September, 2007 and had preliminary discussions at RMD office Rourkela. The committee decided to finalise the fleet size and fleet strength for HEMMs and allied equipments for KIOM, MIOM, BOM, BIM AND GOM from 2008-2009 onwards..

While taking up the jobs of Chiria and Taldih, the committee will co-opt a member from MECON, in consultation with MECON management to finalise fleet strength and fleet size.

The committee will finalise the fleet size and fleet strength for HEMMs and allied equipments for flux group of mines by 15.11.07

Some of the members of the committee visited Noamundi Iron Mines and West Bokaro Colliery of TISCO, Donimalai Iron Ore Mine of NMDC and Jindal Mines at Thakurani of M/S JSPL to see the working of high capacity HEMMs. The committee members observed that those equipments are highly productive and cost effective..

In RMD mines Production has to increase quite substantially from 2008-2009 as mentioned below.

KIOM- 6.2 MT ROM, 1.2 MT waste
Hill 3 will be added.

MIOM- 5.7 MT ROM, 1.2 MT waste
Central block will have to be started.

BOM- 8.48 MT of ROM and 2MT of waste.
1.2 MT production from 600TPH

BIM- 3.6 MT ROM & 2.5 MT waste..

GOM- 5MT ROM & 2.5 MT waste.

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RMD/CMC/39.

The committee is of the opinion that due to quality requirements, at least 3 mining faces will be operating at a time and equipments for waste removal are to be exclusively deployed. As such, shovels of 7 to 8 cum capacity & 100Te dumpers should be considered for production and waste removal in the mines to achieve the desired target of production and waste removal. At the same time pre crusher blending should be carried out. Higher size of equipments will reduce requirement of manpower as well as highly productive and cost effective

[Signatures]
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**ESTIMATED OWNING AND OPERATING COST
OF DUMPERS AND SHOVELS (IN RS)**

Serial no	Description	8 cum shovel	4.5 cum meter shovel	100Te dumper	50Te dumper
1.	Price	800 lacs	400 lacs	300 lacs	170 lacs
2.	Salvage Value @ 10 %	80 lacs	40 lacs	30 lacs	17 lacs
3.	Depreciated value.	720 lacs	360 lacs	270 lacs	153 lacs
4.	Economic life of equipment in hours.	36000	30000	25000	20000
5.	Yearly run of equipment in hours.	3000	3000	3000	3000
6.	Life of equipment in years.	12	10	8.33	6.66
7.	Depreciation cost per hour. (3/4)	2000	1200	1080	765
8.	Interest & insurance	2000	1100	800	500
9.	Total owning cost per hour.	4000	2300	1880	1265
10.	Fuel @ 60/46/40/26 liters @ Rs 34.50	2070	1587	1400	884
11.	Lubricant cost.	210	150	130	90
12.	Average repair & manufacture cost.	2800	2400	1800	1200
13.	Total operating cost. (10+11+12)	5080	4137	3330	2174
14.	Total owning & operating cost.(9+13)	9080	6437	5210	3439

Typ. 8108.33/hr.

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COST ECONOMY OF 8 CUM SHOVEL AS COMPARED WITH 4.5CUM SHOVEL IN COMBINATION WITH 100Te DUMPER AND 50Te DUMPERS RESPECTIVELY

Description	8 Cum Shovel	4.5cum Shovel
Bucket capacity.	8	4.5
Fill factor.	0.9	0.9
Density of material.	2.4	2.4
Cycle time.	28	26
Job efficiency.	0.8	0.8
Production per hour.	1777	1077

COST COMPARISON FOR HANDLING OF PER TON OF ORE BETWEEN COMBINATION OF 1) 7.5-8 CUM SHOVEL AND 100Te DUMPERS AND 2) 4.5-5 CUM SHOVEL AND 50Te DUMPERS

	7.5-8CUMSHOVEL 100Te DUMPERS	4.5-5 CUM SHOVEL 50Te DUMPERS
Payload capacity	90	45
Number of passes	$90 / (8 \times 2.4) = 5$	$45 / (4.5 \times 2.4) = 5$
Cycle time for loading in Dumper in minutes	$5 \times 28 / 60 = 2.33$	$5 \times 26 / 60 = 2.16$
Hauling time for 3 kms in minutes	5.29	5.29
Return time in minutes	5.29	5.29
Turn, dump, Spot	2.00	2.0
Total cycle time.	14.91	14.74
No. of trips per hour	$60 / 14.91 = 4.02$	$60 / 14.74 = 4.07$
Productions per hour.in Te	$90 \times 4.02 = 362$	$45 \times 4.07 = 183$
No. of dumpers required to match shovel output.	$1777 / 362 = 4.9 = 5$ dumpers	$1077 / 183 = 5.88 = 6$ dumpers
Hourly owning and operating cost of the combination Shovel and Dumpers	$5210 \times 5 + 9080 = 35130$	$3439 \times 6 + 6437 = 27071$
Cost per ton	$35130 / 1777 = \text{Rs}19.76$	$\text{Rs}25.13$

ASSUMING OUT PUT RATE OF 7.5-8 CUM SHOVEL AND 4.5-5 CUM SHOVEL AS 800Te AND 400Te RESPECTIVELY



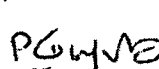
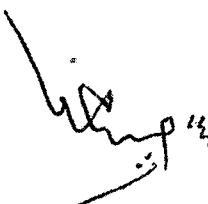

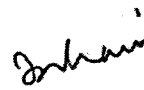

Cost per ton	$\text{Rs}43.91$	$\text{Rs}67.67$
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ABOVE CALCULATIONS INDICATE THAT COMBINATION OF 7.5-8 CUM SHOVEL AND 100Te DUMPERS ARE MORE COST EFFECTIVE.

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ASSUMPTIONS

1. Dumping platform and Primary Crusher U/S hopper will be made suitable to accommodate 100Te Dumpers for all RMD Mines as per the recommendation of CET.
2. Hopper at BIM cannot be used for 100Te Dumpers unless major modification is done. Till such time 50Te Dumpers will be used for Dumping purpose. A live pre crusher stock pile for both wet and dry material will be maintained. ROM feed will be stacked at the stockpile by 100Te Dumpers and subsequently carried by 50Te Dumpers from stock pile to Hopper. Requirement of Excavators, Dumpers as well as operators will increase substantially.
3. Although technically 4.5-5.5 cum shovel can give an output of 1077 T/Hr but for last 3 years with relatively new set of shovels and dumpers we have not achieved output more than 400t/hr in RMD Mines. Considering the fact that this trend will continue due to various other constraints we have kept the output rate of 7.5-8 cum Shovel as 800Te per hour as compared to the standard specified rate of 1700 Te per hour.
4. As mining will be done in different areas and in different benches for fulfilling the demand of both BO and DO and due to higher capacity of the shovels marching will have to be restricted requirement of shovels will be more resulting some unutilized capacity of shovels.
5. As per mining plan from 2008 onwards RMD Mines will operate new areas thus increasing the possibility of deployment of more equipments. Shovels having capacity of more than 7.5 cum will not meet the purpose resulting unutilized capacity and increase in operating and owning cost.
6. Fleet requirement calculation is based on the fact that pre crusher stock pile will be used when ROM supply from mines is disrupted. Fleet requirement for pre crusher stockpile will have to be reviewed in case of pre crusher live stockpile concept for achieving consistent quality. Total ROM will be fed to hopper from the stock pile in such case. However in BIM we have already considered the concept of live stockpile.

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EQUIPMENT SIZE

HYDRAULIC EXCAVATOR - 7.5 - 8 CUM BUCKET CAPACITY

REAR DUMPER - 100 T

BLAST HOLE DRILL - 6" TOP HAMMER TYPE.

BULL DOZER - EQUIVALENT TO D355 DOZER OF BEML

FRONT END LOADER - 5 CUM BUCKET CAPACITY

WATER SPRINKLER - 28KL CAPACITY

MOTOR GRADER - BG825 TYPE OF BEML

MOBILE CRANE - 40 T, 20 T AND 10 T PICK AND CARRY

**TYRE HANDLER - SUITABLE FOR HANDLING TYRE
FOR 100T DFUMPER**

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CALCULATION FOR FLEET STRENGTH AND EQUIPMENT SIZE OF HEMM FOR RMD MINES TO BE DEPLOYED FROM 2008-2009

KIRIBURU IRON ORE MINES:-

ROM TARGET = 6.2 MT
WASTE REMOVAL = 1.2 MT

FLEET STRENGTH REQUIREMENT CALCULATION AND JUSTIFICATION

HYDRAULIC EXCAVATOR

7.5-8CUM BUCKET CAPACITY EXCAVATOR

OUTPUT RATE IS ESTIMATED AS 800T PER HOUR

SHOVEL UTILISATION HOUR PER YEAR = $300 \times 3 \times 8 \times .8 \times .7 = 4032 \text{ HR/YR}$

TONNAGE HANDLED PER YEAR PER EXCAVATOR = $800 \times 4032 = 3225600 \text{ T}$

OUTPUT RATE HAS BEEN ESTIMATED ON THE BASIS OF OUTPUT RATE FOR EXCAVATOR OF 4.5-5.5 CUM CAPACITY ACHIEVED IN RMD MINES DURING LAST 3 YEARS. THE ACHIEVED RATE IS 380 - 400 T/HR

EXCAVATOR REQUIREMENT

A) WET CIRCUIT OPERATION:

30% OF ROM = 1.86 MT

NUMBER OF EXCAVATORS REQUIRED = $1.86 / 3.22 = .57 = 1$

B) DRY CIRCUIT OPERATION

70% OF ROM = 4.34 MT

NUMBER OF EXCAVATORS REQUIRED = $4.34 / 3.22 = 1.34 = 2$

C) WASTE REMOVAL - 1.2 MT

NUMBER OF EXCAVATORS REQUIRED = $1.2 \text{ MT} / 3.22 = .37 = 1$

D) EXCAVATOR FOR PRECRUSHER STOCKPILE

FOR MAINTAINING CONSISTENCY IN QUALITY, UNINTERRUPTED FEEDING TO HOPPER AND TO MEET ANY EXIGENCY 1 EXCAVATOR IS REQUIRED TO BE DEPLOYED IN PRECRUSHER STOCKPILE

TOTAL NUMBER OF EXCAVATORS = A+B+C+D=5

TOTAL 5 EXCAVATORS ARE REQUIRED.

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Mary A. Panto

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LM/p

Subis

Chadman

REAR DUMPERS

DUMPER OUTPUT RATE 278 T PER HOUR.

THE RATE HAS BEEN CALCULATED ON THE BASIS OF THE FOLLOWING CALCULATIONS.

CAPACITY 100T (PAYLOAD CAPACITY 90 T)
TOTAL CYCLE TIME 19.4 MINUTES FOR 3KM LEAD DISTANCE.
LOADING TIME= 3 MINUTES
HAULING TIME FOR 3 KM LEAD @ 25 KM PER HOUR= 7.2 MINUTES
RETURN TIME =7.2 MINUTES
TURN, DUMP, SPOT ETC TIME, MIN=2 MINUTES
TOTAL CYCLE TIME=19.4 MINUTES
NUMBER OF TRIP PER HOUR = $60/19.4 = 3.09$ TRIPS
OUTPUT PER HOUR= $3.09 \times 90 = 278 \text{ T/HR}$

DUMPER UTILISATION HOURS PER YEAR = $300 \times 3 \times 8 \times .8 \times .7 = 4032 \text{ HR/ PER}$
YEAR CAPACITY OF DUMPER PER YEAR = $4032 \times 278 = 1120896 \text{ T}$

REQUIREMENT OF DUMPERS

A) TOTAL EXCAVATION / PER DUMPER OUTPUT PER YEAR = $7.4 \text{ MT/ } 1.1 = 6.72 = 7$

B) FOR PRE CRUSHER STOCKPILE = 1

TOTAL REQUIREMENT = $A+B = 7+1 = 8$

TOTAL 8 DUMPERS ARE REQUIRED

Q. No. 6

By

M. A. P. G. V. S. R. S.

W. P. S. S. S. S. S.

Ch. S. S. S. S. S.

BLAST HOLE DRILL

HILL NO.1 AND 2 - 2 NOS.
HILL NO. 3 - 2 NOS.

TOTAL -4 NOS BLAST HOLE DRILLS ARE REQUIRED.

BULLDOZER

LOADING AND BUNKER - 2 NOS.
HILL NO. 1, 2 AND 3 - 3 NOS.
WASTE REMOVAL AND MISCELLANEOUS JOBS - 2 NOS.
TOTAL -7 NOS BULLDOZERS ARE REQUIRED.

FRONT END LOADER

PREPARATION OF HAUL ROADS, SAFETY BERMS, HOUSE KEEPING AND MISCELLANEOUS JOBS.
LOADING IN CASE OF B/D OF RECLAIMER
TOTAL 1 NO. LOADER WILL BE REQUIRED

WATER SPRINKLER

HILL NO 3- 1
HILL NO. 1&2 -1

TOTAL -2 NOS WATER SPRINKLER IS REQUIRED.

MOTOR GRADER

1 NO MOTOR GRADER WILL BE REQUIRED FOR PREPARATION OF HAUL ROAD MINING FACE AND OTHER MISCELLANEOUS JOBS. AND 1 NO STAND BY.
TOTAL 2 NOS.

TYRE HANDLER

REQUIRED FOR HANDLING TYRES SUITABLE FOR 100T DUMPERS
TOTAL 1 NO. REQUIRED

MOBILE CRANE

40 T CAP- 1 NO. FOR MAJOR JOBS 20T CAP-1 NO. 10T CAP. PICK AND CARRY -2 NOS.
TOTAL 4 NOS. CRANES ARE REQUIRED

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MEGHAHATUBURU IRON ORE MINES -

ROM TARGET = 5.7 MT
WASTE REMOVAL = 1.2 MT

FLEET STRENGTH REQUIREMENT CALCULATION AND JUSTIFICATION

HYDRAULIC EXCAVATOR

7.5-8CUM BUCKET CAPACITY EXCAVATOR

OUTPUT RATE IS ESTIMATED AS 800T PER HOUR

SHOVEL UTILISATION HOUR PER YEAR = $300 \times 3 \times 8 \times .8 \times .7 = 4032 \text{ HR/YR}$

TONNAGE HANDLED PER YEAR PER EXCAVATOR = $800 \times 4032 = 3225600 \text{ T}$

OUTPUT RATE HAS BEEN ESTIMATED ON THE BASIS OF OUTPUT RATE FOR EXCAVATOR OF 4.5-5.5 CUM CAPACITY ACHIEVED IN RMD MINES DURING LAST 3 YEARS. THE ACHIEVED RATE IS 380-400 T/HR

EXCAVATOR REQUIREMENT

A) EXISTING AREA ROM 4.5 MT UPTO 2009-2010
EXCAVATOR REQUIREMENT $4.5/3.22 = 1.39 = 2$

B) CENTRAL BLOCK 1.2 MT UPTO 2009-2010
EXCAVATOR REQUIREMENT $1.2/3.22 = .37 = 1$

FROM 2011 ONWARDS ROM FROM CENTRAL BLOCK WILL BE 4.5 MT AND FROM EXISTING AREA WILL BE 1.2MT. EQUIPMENT DEPLOYMENT WILL BE JUST REVERSE.

C) WASTE REMOVAL - 1.2MT

NUMBER OF EXCAVATORS REQUIRED = $1.2\text{MT}/3.22 = .37 = 1$

D) EXCAVATOR FOR PRECRUSHER STOCKPILE

FOR MAINTAINING CONSISTENCY IN QUALITY, UNINTERRUPTED FEEDING TO HOPPER AND TO MEET ANY EXIGENCY 1 EXCAVATOR IS REQUIRED TO BE DEPLOYED IN PRECRUSHER STOCKPILE

TOTAL NUMBER OF EXCAVATORS = $A+B+C+D=5$

TOTAL 5 NOS. EXCAVATORS ARE REQUIRED.

ASub.

Mr

Manoj Kumar

LMP

anurag

DDP

REAR DUMPER

DUMPER OUTPUT RATE 278 T PER HOUR.

THE RATE HAS BEEN CALCULATED ON THE BASIS OF THE FOLLOWING CALCULATIONS:

CAPACITY 100T (PAYLOAD CAP. 90 T)

TOTAL CYCLE TIME 19.4 MINUTES FOR 3KM LEAD DISTANCE.

LOADING TIME= 3 MINUTES

HAULING TIME FOR 3 KM LEAD @ 25 KM PER HOUR= 7.2 MINUTES

RETURN TIME =7.2 MINUTES

TURN, DUMP, SPOT ETC TIME, MIN=2 MINUTES

TOTAL CYCLE TIME=19.4 MINUTES

NUMBER OF TRIP PER HOUR = $60/19.4 = 3.09$ TRIPS

OUTPUT PER HOUR= $3.09 \times 90 = 278$ T/HR

DUMPER UTILISATION HOURS PER YEAR - $300 \times 3 \times 8 \times .8 \times .7 = 4032$ HR PER YEAR

CAPACITY OF DUMPER PER YEAR = $4032 \times 278 = 1120896$ T

REQUIREMENT OF DUMPERS

A) TOTAL EXCAVATION / PER DUMPER OUTPUT PER YEAR= $6.9 \text{ MT} / 1.1 = 6.27 = 7$

B) FOR PRE CRUSHER STOCKPILE = 1

TOTAL REQUIREMENT=A+B= 7+1=8

TOTAL 8 DUMPERS ARE REQUIRE D

BLAST HOLE DRILL

PRESENT WORKING AREA - 2

CENTRAL BLOCK - 2

TOTAL NOS REQUIRED - 4.

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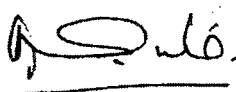


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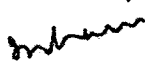
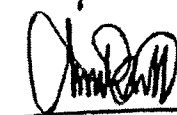
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BULLDOZER SSP-2, PSP-2 DUMP YARD -1 MINING -3 STOCKPILE -1 <u>TOTAL 9 NOS. REQUIRED.</u>	
FRONT END LOADER PREPARATION OF HAUL ROADS, SAFETY BERMS, HOUSE KEEPING AND MISCELLANEOUS JOBS, LOADING IN CASE OF B/D OF RECLAIMER <u>TOTAL 1NO. LOADER REQUIRED</u>	
WATER SPRINKLER PRESENT WORKING AREA -1 CENTRAL BLOCK-1 <u>TOTAL 2 NOS. REQUIRED</u>	
MOTOR GRADER PRESENT WORKING AREA -1 STANDBY-1 <u>TOTAL 2NOS. REQUIRED</u>	
TYRE HANDLER REQUIRED FOR HANDLING TYRES SUITABLE FOR 100T DUMPERS <u>TOTAL 1NO. REQUIRED</u>	
MOBILE CRANE 40 T CAP- 1NO. FOR MAJOR JOBS 20T CAP-1 NO10T CAP. PICK AND CARRY -2 NOS. <u>TOTAL 4 NOS. CRANES REQUIRED</u>	

LARSUA IRON MINES:-

ROM TARGET = 3.6 MT
WASTE REMOVAL = 2.5 MT

FLEET STRENGTH REQUIREMENT CALCULATION AND JUSTIFICATION

HYDRAULIC EXCAVATOR

7.5-8CUM BUCKET CAPACITY EXCAVATOR
OUTPUT RATE IS ESTIMATED AS 800T PER HOUR
SHOVEL UTILISATION HOUR PER YEAR = $300 \times 3 \times 8 \times .8 \times .7 = 4032$ HR/YR
TONNAGE HANDLED PER YEAR PER EXCAVATOR = $800 \times 4032 = 3225600$ T

OUTPUT RATE HAS BEEN ESTIMATED ON THE BASIS OF OUTPUT RATE FOR EXCAVATOR OF 4.5-5.5 CUM CAPACITY ACHIEVED IN RMD MINES DURING LAST 3 YEARS. THE ACHIEVED RATE IS 380-400 T/HR

EXCAVATOR REQUIREMENT

A) WET CIRCUIT OPERATION:

30% OF ROM = 1.08 MT

NUMBER OF EXCAVATORS REQUIRED = $1.08 / 3.22 = .33 = 1$

B) DRY CIRCUIT OPERATION

70% OF ROM = 2.52 MT

NUMBER OF EXCAVATORS REQUIRED = $2.52 / 3.22 = .78 = 1$

C) WASTE REMOVAL 2.5 MT

NUMBER OF EXCAVATORS REQUIRED = $2.5 \text{ MT} / 3.22 = .77 = 1$

D) EXCAVATOR FOR PRECRUSHER STOCKPILE

EXISTING HOPPER CANNOT ACCOMMODATE 100T DUMPERS. DUMPERS CARRYING ROM IS TO BE DUMPED IN A PRE CRUSHER STOCK PILE. ROM WILL BE STACKED SEPARATELY FOR WET CIRCUIT AND DRY CIRCUIT. EXCAVATORS REQUIRED TO HANDLE TOTAL ROM TO HOPPER FROM PRECRUSHER STOCKPILE WILL BE AS FOLLOWS

EXCAVATOR 4.5- 6 CUM CAPACITY -3 NOS

TOTAL NUMBER OF EXCAVATORS = A+B+C+D=3 NOS. 7.5 CUM EXCAVATOR AND 3 NOS. 4.5-6CUM EXCAVATOR

TOTAL 6 NOS. ARE REQUIRED

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REAR DUMPER

DUMPER OUTPUT RATE 278 T PER HOUR.

THE RATE HAS BEEN CALCULATED ON THE BASIS OF THE FOLLOWING CALCULATIONS:

CAPACITY 100T(PAYLOAD CAP. 90 T)

TOTAL CYCLE TIME 19.4 MINUTES FOR 3KM LEAD DISTANCE.

LOADING TIME= 3 MINUTES

HAULING TIME FOR 3 KM LEAD @ 25 KM PER HOUR= 7.2 MINUTES

RETURN TIME =7.2 MINUTES

TURN, DUMP, SPOT ETC TIME, MIN=2 MINUTES

TOTAL CYCLE TIME=19.4 MINUTES

NUMBER OF TRIP PER HOUR = $60/19.4 = 3.09$ TRIPS

OUTPUT PER HOUR= $3.09 \times 90 = 278$ T/HR

DUMPER UTILISATION HOURS PER YEAR - $300 \times 3 \times 8 \times .8 \times .7 = 4032$ HOUR PER YEAR

CAPACITY OF DUMPER PER YEAR = $4032 \times 278 = 1120896$ T

REQUIREMENT OF DUMPERS

A) TOTAL EXCAVATION / PER DUMPER OUTPUT PER YEAR = $6.1 \text{ MT} / 1.1 = 5.54 = 6$

B) FOR PRE CRUSHER STOCKPILE

EXISTING HOPPER CANNOT ACCOMMODATE 100T DUMPERS. DUMPERS CARRYING ROM IS TO BE DUMPED IN A PRE CRUSHER STOCK PILE. ROM WILL BE STACKED SEPARATELY FOR WET CIRCUIT AND DRY CIRCUIT. DUMPERS REQUIRED TO HANDLE TOTAL ROM TO HOPPER FROM PRECRUSHER STOCKPILE WILL BE 6 NOS. OF 50T CAPACITY DUMPERS

TOTAL REQUIREMENT=A+B= 6 NOS. 100T DUMPERS+6 NOS. 50T DUMPERS=12 NOS. DUMPERS

TOTAL 12 NOS. DUMPERS (6 NOS 110t & 6 NOS 50T) ARE REQUIRED

[Handwritten signatures and initials]

BLAST HOLE DRILL

3 WEST -2.

AREA 5-1

TOTAL 3 NOS. DRILLS ARE REQUIRED**BULLDOZER**

LOADING POINT AT VALLEY -2 MINING -3 WASTE DUMP-1

TOTAL 6 NOS. DOZERS ARE REQUIRED**FRONT END LOADERS**

PREPARATION OF HAUL ROADS, SAFETY BERMS, HOUSE KEEPING AND MISCELLANEOUS JOBS. -1 NO.

LOADING OF FINES IN WAGONS- 3 NOS.

TOTAL-4 NOS. FRONT END LOADERS ARE REQUIRED**WATER SPRINKLER**


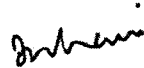
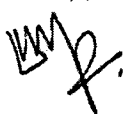
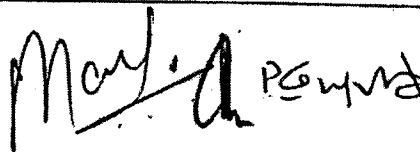
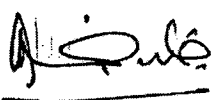
PRESENT WORKING AREA -2

TOTAL 2 NOS. WATER SPRINKLERS ARE REQUIRED**MOTOR GRADER**PREPARATION OF HAUL RODS, MINING FACES AND MISC JOBS- 1NO
STAND BY-1NO**TOTAL 2 NOS. MOTOR GRADERS ARE REQUIRED****TYRE HANDLER - 1**

REQUIRED FOR HANDLING TYRES SUITABLE FOR 100T DUMPER

MOBILE CRANE

40 T CAP- 1NO. FOR MAJOR JOBS 20T CAP-1 NO. 10T CAP. PICK AND CARRY -2 NOS

TOTAL 4 NOS. MOBILE CRANES ARE REQUIRED

BOLANI ORE MINES:-

ROM TARGET = 8.4 MT
WASTE REMOVAL = 2 MT
600TPH OUTPUT = 1.2 MT

FLEET STRENGTH REQUIREMENT CALCULATION AND JUSTIFICATION

HYDRAULIC EXCAVATOR

7.5-8CUM BUCKET CAPACITY EXCAVATOR
OUTPUT RATE IS ESTIMATED AS 800T PER HOUR
SHOVEL UTILISATION HOUR PER YEAR = $300 \times 3 \times 8 \times .8 \times .7 = 4032$ HR/YR
TONNAGE HANDLED PER YEAR PER EXCAVATOR = $800 \times 4032 = 3225600$ T

OUTPUT RATE HAS BEEN ESTIMATED ON THE BASIS OF OUTPUT RATE FOR EXCAVATOR OF 4.5-5.5 CUM CAPACITY ACHIEVED IN RMD MINES DURING LAST 3 YEARS. THE ACHIEVED RATE IS 380-400 T/HR

EXCAVATOR REQUIREMENT

A) WET CIRCUIT OPERATION:

50% OF ROM = 4.2 MT

NUMBER OF EXCAVATORS REQUIRED = $4.2 / 3.22 = 1.30 = 2$

B) DRY CIRCUIT OPERATION

50% OF ROM = 4.2 MT

NUMBER OF EXCAVATORS REQUIRED = $4.2 / 3.22 = 1.30 = 2$

C) WASTE REMOVAL 2MT

NUMBER OF EXCAVATORS REQUIRED = $2 \text{ MT} / 3.22 = .62 = 1$

D) EXCAVATOR FOR PRECRUSHER STOCKPILE

FOR MAINTAINING CONSISTENCY IN QUALITY, UNINTERRUPTED FEEDING TO HOPPER AND TO MEET ANY EXIGENCY 1 EXCAVATOR IS REQUIRED TO BE DEPLOYED IN PRECRUSHER STOCKPILE

TOTAL NUMBER OF EXCAVATORS = $A+B+C+D=6$

TOTAL 6 NOS. EXCAVATORS WILL BE REQUIRED

[Handwritten signatures and initials at the bottom of the page]

BLAST HOLE DRILL G AREA-3 F AREA - 2 NOS <u>TOTAL 5 NOS. DRILLS WILL BE REQUIRED.</u>	
BULL DOZER GAREA -2 F AREA -2 D AREA AND PANPOSH -1 LUMP SIDING -1 FINE SIDING AND DH5-2 TOTAL 8 NOS. DOZERS WILL BE REQUIRED	
FRONT END LOADERS PREPARATION OF HAUL ROADS, SAFETY BERMS, HOUSE KEEPING AND MISCALANEOUS JOBS. -1NO. LUMP SIDING -2 NOS. FOR PUSHING OF FINES IN LUMP SIDING-2 NOS. <u>TOTAL 5NOS. LOADERS WILL BE REQUIRED</u>	
WATER SPRINKLER G AREA-1 F AREA-1 D AREA, HAUL ROAD ETC-1 <u>TOTAL 3NOS. WATER SPRINKLER WILL BE REQUIRED</u>	
MOTOR GRADER PREPARATION OF HAUL RODS, MINING FACES AND MISC JOBS- 1NO STAND BY-1NO <u>TOTAL 2NOS. MOTOR GRADERS WILL BE REQUIRED</u>	
TYRE HANDLER REQUIRED FOR HANDLING TYRES FOR 100T DUMPER <u>TOTAL 1NO. WILL BE REQUIRED</u>	
MOBILE CRANE 40 T CAP- 1NO. FOR MAJOR JOBS 20T CAP-1NO.10T CAP. PICK AND CARRY -2 NOS. <u>TOTAL 4 NOS. CRANE WILL BE REQUIRED</u>	

ASub Mr Mur Pump 13
W/p Submini Ch W/p

GUA ORE MINES:-

ROM TARGET = ~~3.26~~ ^{5.00} MT ✓
WASTE REMOVAL = ~~1.4~~ ^{2.5} MT ✓

FLEET STRENGTH REQUIREMENT CALCULATION AND JUSTIFICATION

HYDRAULIC EXCAVATOR

7.5-8CUM BUCKET CAPACITY EXCAVATOR

OUTPUT RATE IS ESTIMATED AS 800T PER HOUR

SHOVEL UTILISATION HOUR PER YEAR = $300 \times 3 \times 8 \times .8 \times .7 = 4032$ HR/YR

TONNAGE HANDLED PER YEAR PER EXCAVATOR = $800 \times 4032 = 3225600$ T

OUTPUT RATE HAS BEEN ESTIMATED ON THE BASIS OF OUTPUT RATE FOR EXCAVATOR OF 4.5-5.5 CUM CAPACITY ACHIEVED IN RMD MINES DURING LAST 3 YEARS. THE ACHIEVED RATE IS 380-400 T/HR

EXCAVATOR REQUIREMENT

**A) DRY CIRCUIT OPERATION
FOR 3 MINING AREAS**

AREA OT HILL
ROM+WASTE = ~~1.58~~ ^{2.5} MT. $2.5 \text{ MT} / 3.22 = 0.78 = 1$
NUMBER OF EXCAVATORS REQUIRED = ~~1.58/3.22 = .49~~ $\rightarrow 1$

AREA BAI HILL
ROM+WASTE = ~~1.58~~ ^{2.5} MT. $2.5 \text{ MT} / 3.22 = 0.78 = 1$
NUMBER OF EXCAVATORS REQUIRED = ~~1.58/3.22 = .5~~ $\rightarrow 1$

AREA RANICHUA
ROM+WASTE = ~~1.58~~ ^{2.5} MT. $2.5 \text{ MT} / 3.22 = 0.78 = 1$
NUMBER OF EXCAVATORS REQUIRED = ~~1.58/3.22 = .5~~ $\rightarrow 1$

B) EXCAVATOR FOR PRECRUSHER STOCKPILE
FOR MAINTAINING CONSISTENCY IN QUALITY, UNINTERRUPTED FEEDING TO HOPPER AND TO MEET ANY EXIGENCY 1 EXCAVATOR IS REQUIRED TO BE DEPLOYED IN PRECRUSHER STOCKPILE

TOTAL NUMBER OF EXCAVATORS = A+B=4

TOTAL 4 NOS EXCAVATORS ARE REQUIRED.

ASilo. *Mr. Murali* *14*
WMP *anubhai* *Chandra* *WMP*

REAR DUMPER**DUMPER OUTPUT RATE 278 T PER HOUR.**

THE RATE HAS BEEN CALCULATED ON THE BASIS OF THE FOLLOWING CALCULATIONS:

CAPACITY 100T (PAYLOAD CAP. 90 T)

TOTAL CYCLE TIME 19.4 MINUTES FOR 3KM LEAD DISTANCE.

LOADING TIME= 3 MINUTES

HAULING TIME FOR 3 KM LEAD @ 25 KM PER HOUR= 7.2 MINUTES

RETURN TIME =7.2 MINUTES

TURN, DUMP, SPOT ETC TIME, MIN=2 MINUTES "

TOTAL CYCLE TIME=19.4 MINUTES

NUMBER OF TRIP PER HOUR = $60/19.4 = 3.09$ TRIPS

OUTPUT PER HOUR= $3.09 \times 90 = 278 \text{ T/HR}$

DUMPER UTILISATION HOURS PER YEAR – $300 \times 3 \times 8 \times .8 \times .7 = 4032$ HOUR PER YEAR

CAPACITY OF DUMPER PER YEAR = $4032 \times 278 = 1120896 \text{ T}$

REQUIREMENT OF DUMPERS

A) TOTAL EXCAVATION / PER DUMPER OUTPUT PER YEAR = $\frac{7.5}{4.76 \text{ MT}} / 1.1 = \frac{6.8}{4.3} = 1.57$

B) FOR PRE CRUSHER STOCKPILE = 1 ✓

TOTAL REQUIREMENT = $A+B = 1.57 + 1 = 2.57 \approx 3$

TOTAL 3 NOS. DUMPERS ARE REQUIRED

3

3

PGM 15
3

<p>BLAST HOLE DRILL</p> <p>AREA1-2 AREA2-2 NOS. (OT Hill, RANICHUA, BAI HILL)</p> <p><u>TOTAL 4 NOS. OF DRILLS WILL BE REQUIRED</u></p>	
<p>BULLDOZER</p> <p>MINE-4 NOS. ZERO POINT, LOADING AND PSH-2</p> <p><u>TOTAL 6 NOS. DOZERS WILL BE REQUIRED</u></p>	
<p>FRONT END LOADERS</p> <p>PREPARATION OF HAUL ROADS, SAFETY BERMS, HOUSE KEEPING AND MISALANEOUS JOBS-1 NO.</p> <p>DEVELOPMENT - 2 NOS</p> <p>LOADING OF HMP ORE IN WAGONS -2</p> <p><u>TOTAL 5 NOS. OF LOADERS WILL BE REQUIRED</u></p>	
<p>MOTOR GRADER</p> <p>PREPARATION OF HAUL RODS, MINING FACES AND MISC.JOBS- 1NO</p> <p>STAND BY-1NO</p> <p><u>TOTAL 2 NOS. MOTOR GRADERS WILL BE REQUIRED</u></p> <p>WATER SPRINKLER - All AREAS</p> <p>TOTAL - 2NOS WATER SPRINKLER WILL BE REQUIRED</p>	<p><i>ASub</i></p>
<p>TYRE HANDLER</p> <p>REQUIRED FOR HANDLING TYRES FOR 100T DUMPER TYRES</p> <p><u>TOTAL 1 NO. TYRE HANDLER WILL BE REQUIRED</u></p>	
<p>MOBILE CRANE</p> <p>40 T.CAP- 1NO.20T CAP-1 NO. FOR MAJOR JOBS 10T CAP. PICK AND CARRY -2 NOS.</p> <p><u>TOTAL 4NOS. CRANE WILL BE REQUIRED</u></p>	<p><i>h</i></p>

ASub *h* *ASub* *h* *ASub* *h* *ASub* *h* *ASub* *h*

1D-Bhargava (A.P. SINHA) DGM (Main) RMD-GUA RMD-Rankela
 LNC GUPTA (M. BISWAS) DGM (CD) RMD-Rankela AGM (P&D), KVKoh
 16
 P. K. GUPTA
 AGM (P&D), KVKoh

16
 P. K. GUPTA
 AGM (P&D), KVKoh

Steel Authority of India Limited
Raw Materials Division
Bolani Ores Mines

Inter Office Correspondence

No. GM(Maint)/RMD/BOM/B- 4836

Date : 31.3.2008

From : GM(Maint), RMD, BOM.

To : 1. GM, BOM.
 2. GM, MIOM.
 3. GM, GUA.
 4. GM, BIM.
 5. GM, KIOM.
 6. GM, KIM.
 7. GM (MM & S), RMD, Kolkata.
 8. GM(F&A), RMD, Kolkata.
 9. GM (Proj.), RMD, Kolkata.
 10. DGM(PPC), RMD, Kolkata.

Sub : Norms for Availability, Utilization & Economic Life of HEMM.

Norms for Availability, Utilization & Economic Life of HEMM, as recommended by the Committee, have been approved and will be effective from 1.4.2008.

The above will be reviewed every year by GM (Maint.), Raw Materials Division.



(A.P. Sinha) 31.03.2008

GM (Maint),

RMD.

Bolani Ores Mines.

General Manager (Maint.)

SAIL, RMD, Bolani Ores Mines
Bolani

C.c.to :-

1. The Executive Director I/c., RMD, Kolkata - for kind information.
2. The Executive Director, RMD, Kolkata - -do-

7c

file
CMC/01


NORMS OF AVAILABILITY, UTILIZATION, ECONOMIC LIFE OF HEMMS.

A committee had been constituted for fixing norms for Availability / utilization of HEMMs in RMD mines vide office order No RMD/K/GM(Maint)/4/169 dt 15.11.2006. The report submitted by the committee has been approved and the new norms will be applicable from 1st April, 2008.

REPORT OF THE COMMITTEE

1. Definition and methodology to be adopted for arriving at the availability, utilization and net utilization norms for heavy earth moving equipments are given below:

- 1.1 Number of equipment: Total population of equipment of any category, will form the basis for calculation of norms for the category.
- 1.2 Scheduled hours: No of working days X 24 hrs for three shift operation and No of working days X 16 hours for two shift operation.
- 1.3 The term hours will mean clock hours and not the service hours recorded by the hour meters of the equipment.
- 1.4 Breakdown hours: Time for which the machine is down and not available for operation and also time taken to attend all repairs, maintenance and capital repairs during the scheduled hours would be considered as breakdown hours.
- 1.5 Available hours = Scheduled hours – Breakdown hours.
- 1.6 Idle hours: Time for which the machine is available for operation and not utilized and idle hours will mean hours lost on account of power failure, stoppage of work due to blasting operations, weather conditions, tiffin time or industrial relations, shortage of operators, POL shortage etc.
- 1.7 Utilized hours: Time for which equipment is operated & available hours minus idle hours for which the equipment is not put to use (for any reason whatsoever) will be called utilized hours. Utilized hours = (Available hours – Idle hours).
- 1.8 Availability % = $\left[\frac{\text{Available hours}}{\text{Scheduled hours}} \right] \times 100$.
- 1.9 Utilized % = $\left[\frac{\text{Utilized hours}}{\text{Available hours}} \right] \times 100$.
- 1.10 Net utilization % = Availability% X utilization% or
= $\left[\frac{\text{Utilized hours}}{\text{Scheduled Hrs}} \right] \times 100$.


21.03.08
General Manager (Maint.)
SAIL, RMD, Botani Ores Mines
Botani

1.11 If the equipments are utilized on holidays or maintenance shift then the clock hour for that shift will be added to overall scheduled hours i.e. the particular shift would be added with other normal shift. There would not be any concept of available factor & extra available hours and any working on Sunday or maintenance shift will be considered as normal scheduled shift.

1.12 The mines must consider all the equipment in the fleet for calculation of Availability% & Utilization%.

1.13 Illustration for calculating Availability% and Utilization%.


Given below is an illustration for calculating availability & utilization

Scheduled hrs	Extra scheduled hrs	Total scheduled hrs	Breakdown hrs	Actual available hours	Idle hours	Actual utilized hours	Availability %	Utilization%
1	2	3=2+1	4	5=3-4	6	7=5-6	8=5/3*100	9=7/5*100
400	16	416	100	316	50	266	75.96	84.18

Scheduled hours = No of working shifts per day X No of working days X 8 hrs.

Assumptions.

- Suppose mines operate in one shift each on two Sundays during a month then the scheduled hours for Sundays will be added to the overall scheduled.
- The breakdown hours occurring in that extra shift will be added with that of breakdown hours for other scheduled shifts.
- Similarly idle hours occurring in that extra shift will be added to that of idle hours for other scheduled shifts.
- In case of mines operate only half of the shift especially in maintenance where production is normally operated for 4 hours then mines should add only 4 hours to that of extra scheduled hours.


31.03.08
General Manager (Maint.)
SAIL, RMD, Bolani Ores Mines
Bolani

2.1 Based on above the norms for 3 shift operation are as under:

Sl.No.	Equipment	Existing norms		Suggested norms	
		% Availability	% Utilization	% Availability	% Utilization
1	50Te dumpers	65	75	70	80
2	85/100Te dumpers			85	80
3	35Te dumpers	60	75	65	75
4	Elect Excavators up to 4.6 cumeter	70	60	70	70
5	Electric hydraulic excavator above 4.6 cumeter	70	65	70	70
6	Diesel hyd Excavators up to 4.6 cumeter	60	60	70	75
7	Diesel Excavator above 4.6 cumeter/7.5 to 8 cbm	65	65	85	80
8	Diesel driven blast hole drill up to 150mm	60	70	70	70
9	Electric diesel driven blast hole drills up to 150mm	65	70	70	75
10	Dozers up to 410 HP	60	70	70	70

[Signature]
31.03.68
General Manager (Maint.)
SAIL, RMD, Bolani Open Mines
Bolani

2.2 Norm for two shift operation

Since RMD is heading towards three shift operation in all the mines, however, two shift operation may continue for sometime till 3-shift operation is fully implemented. In the norm for 2-shift operation, availability may be a little above the norm for three shift operation. As such the norm for two shift operation is recommended as below:

Sl.No.	Equipment	Existing norms		Suggested norms	
		% Availability	% Utilization	% Availability	% Utilization
1	50Te dumpers	70	75	70	80
2	85Te dumpers			85	80
3	35Te dumpers	60	75	70	75
4	Elect Excavators up to 4.6 cumeter	70	60	70	65
5	Electric hydraulic excavator above 4.6 cumeter	70	65	75	75
6	Diesel Excavators up to 4.6 cumeter	60	60	70	75
7	Diesel Excavator above 4.6 cumeter	65	65	85	80
8	Diesel driven blast hole drill up to 150mm	60	70	70	70
9	Electric diesel driven blast hole drills up to 150mm	65	70	70	75
10	Dozers up to 410 HP	60	70	75	70

31.03.88
General Manager (Maint.)
SAIL, RMD, Bolani Open Mines
Bolani

3. Norms for economic life of Mining equipments.

SN	Equipment	Capacity	Norms recommended by the committee (which ever is earlier)		Existing norms	
			Hours	Years	Hours	Years
1	Rear dumper	35 Te	20000	8	12000	5
2	Rear dumper	50Te	32000 with AMC	10	-	-
3	Rear dumper (Existing)	50Te	25000	10	15000	7
4	Electrical Excavator	Up to 4.6 cum	25000	15	25000	15
5	Diesel excavator	3Cumetr & above	32000 with AMC	10	15000	-8-
6	Diesel excavator (Existing)	3Cumetr & above	25000	10	15000	8
7	Blast hole drills	Up to 150mm	20000	10	12000	6
8	Dozers	Above 250HP	20000	10	16000	9
9	Front end loaders		15000	10	10000	7
10	Motor graders		15000	10	10000	7

31.03.08
General Manager (Maint.)
SAIL, RMD, Bolani Ores Mines
Bolani



STEEL AUTHORITY OF INDIA LIMITED
RAW MATERIALS DIVISION
KOLKATA

RMD/KTA/19/5993

14.08.07

OFFICE ORDER

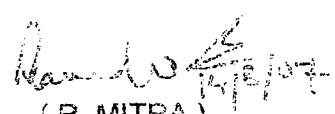
It has been decided to constitute a committee with the following executives for calculating optimum fleet strength and equipment size of HEMMs required for the mines of RMD :

- | | | |
|-----|---|--------------|
| | S/Shri | |
| 1) | A.P. Sinha, DGM (Maint), RMD, Rourkela | --- Chairman |
| 2) | S.K. Ghosh, DGM(Maint.), Barsua | |
| 3) | D. Bhargava, DGM (Maint.-OHP), Gua | |
| 4) | U.C. Tripathy, DGM (Mech.), Meghahatuburu | |
| 5) | S.D. Pahari, DGM (Mines), Kiriburu | |
| 6) | N.C. Gupta, DGM (P&D), Rourkela | --- Convenor |
| 7) | P. K. Gupta, AGM(P&D), Kolkata | |
| 8) | M. Biswas, AGM (CBRS), Bolani | |
| 9) | S.P. Samantrai, AGM (MM), Barsua | |
| 10) | T.J. Kuty, Sr. Mgr.(F&A), Meghahatuburu | |
| 11) | R. Mondal, Sr. Mgr. (Elec.), Kuteshwar | |
| 12) | R K. Bhoi, Mgr. (Mech.), Kalta | |

The committee shall use advanced software to calculate the fleet strength & equipment size for achieving the targeted overburden / waste removal, ROM production, with desired quality of finished product, at optimum cost.

The committee shall take up the job of calculating optimum fleet strength and equipment size of all HEMMs (including Front End Loaders, Motor Graders, Cranes etc.), to be introduced in the RMD mines from 2008-09 onwards and submit its report to ED I/C(RMD) within 28th September '07. While taking up the jobs for China and Talidih, the committee may co-opt a member from MECON, in consultation with MECON management.

This issues with the approval of competent authority.


(R MITRA)
D.G.M.(T.A.)

Distribution : All committee members / All HOMS & DROs

Copy for kind information to :

1. ED I/c. (RMD), Kolkata
2. ED (RMD), Kolkata