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.
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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.

31.03.2008

(A.P.Sinha)
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-

NORMS OF AVAILBILITY, 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 COMMITTE

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 % = [Available hours / Scheduled hours] X 100.

1.9 Utilized % = [Utilized hours/ Available hours] X 100.

1.10 Net utilization % = Availability% X utilization% or

= [Utilized hours/ Scheduled Hrs] X 100.

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

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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

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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

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Deputy Manager (Maint)
RMD, Bolani Ores Mines

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		
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

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General Manager (Maint.)
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STEEL AUTHORITY OF INDIA LTD
RAW MATERIALS DIVISION
KOLKATA

OFFICE ORDER

Ref : RMD/C/MAINT/06/ 04/ 156 **Dated 06-07-06**

The present method of calculating Availability% & Utilisation% is as per the office order office order RMD/C/ED(M)/04/718 dated 8/5/1996. The current practice or methodology for calculating Availability & Utilisation is not technically correct as there are chances of getting more than 100% availability for a equipment which is not possible. Also it is not easy to calculate the actual hour for which a equipment is available in a particular shift / day /month from the Availability% figure obtained from the present method.

Hence the present method of calculating Availability%, Utilsation% and Operational Utilisation% has been changed with the approval of competent authority. The standard practice or methodology for calculating Availability & Utilisation% prescribed by Uniform Cost Committee formed vides Office Order no. SAIL/Tech/(Input) dated 20/10/1986 is to be followed w.e.f. 01-04-06.

Method based on Uniform Cost Committee

For Calculation of Availability & Utilisation Total Fleet is to be considered

Schedule Hrs = No of Working Days X 16 hrs For Two Shift Operation
= No of Working Days X 24 hrs For Three Shift Operation

Seen by ED I/c (RMD) 7/7

Available Hrs = Schedule Hrs - Breakdown Hrs

Availability % = [Available Hrs / Schedule Hrs] X 100

Utilised Hrs = [Available Hrs - Idle Hrs]

Utilisation % = [Utilised Hrs / Available Hrs] X 100

Net Utilisation% = Availability X Utilisation %

= [Utilised Hrs/ Schedule Hrs] X 100

There would not be any change in method in calculating the idle hour, breakdown hr etc. But if equipments are utilised on holidays or maintenance shift then the clock hour for that shift to be added to overall schedule hour 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 schedule shift.

The norms have been fixed considering the various factors like shift delays, schedule maintenance, preventive maintenance, breakdown etc and therefore mines must ensure that there is no over & under working of equipment. Mines should follow this method to calculate Availability% & Utilisation% for individual equipments month wise and reason for deviation from Norm should be recorded.

The norms suggested for Two & Three shift operation for different equipments is given below.

Norm for Two Shift Operation

Sl No.	Equipment	Availability %	Utilisation%
1.	Rear Dump Dumpers 35 Te	65	75
2.	Rear Dump Dumpers 50 Te	70	75
3.	Electric Excavators upto 4.6 M^3 Capacity	75	60
4.	Electric Hydraulic Excavators above 4.6 M^3 Capacity	75	65
5.	Diesel Excavators upto 4.5 M^3 Capacity	65	60
6.	Diesel Excavators above 4.5 M^3 Capacity	70	65
7.	Diesel Driven Blast Hole Drill upto 150mm Dia	60	70
8.	Electric Driven Blast Hole Drill upto 150mm Dia	70	70
9.	Dozers upto 410 HP	60	70
10.	Ore Dressing Plants	85	85

Norm for Three Shift Operation

Sl No.	Equipment	Availability%	Utilisation%
1.	Rear Dump Dumpers 35 Te	60	75
2.	Rear Dump Dumpers 50 Te	65	75
3.	Electric Excavators upto 4.6 M^3 Capacity	70	60
4.	Electric Hydraulic Excavators above 4.6 M^3 Capacity	70	65
5.	Diesel Excavators upto 4.5 M^3 Capacity	60	60
6.	Diesel Excavators above 4.5 M^3 Capacity	65	65
7.	Diesel Driven Blast Hole Drill upto 150mm Dia	60	70
8.	Electric Driven Blast Hole Drill upto 150mm Dia	65	70
9.	Dozers upto 410 HP	60	70
10.	Ore Dressing Plants	80	85

The mines must consider the all the equipments in the fleet for calculating the Availability% & utilization% and hence the mines should fix the number of equipments that would be considered for calculating the fleet strength. The mines should follow this method to calculate the number of equipments required to meet the excavation target. In case where a particular equipment is under breakdown for more than 3 months or under major revamping then the same equipment should be excluded from the fleet. The mines must start sending the data in the new format which is enclosed for your kind perusal.

The above system / methodology of calculation will be uniformly applicable in all mines under RMD w.e.f 1/4/2006. Also it is suggested that the mines should calculate Availability & Utilisation% of all HEMM for the year 2005-2006 for comparison purpose with the present year figure.

Illustration (Method for Calculating Availability% & Utilisation%)

Given below is an illustration for calculating Availability & Utilisation

Schedule Hrs	Extra Schedule Hrs	Total Schedule Hrs	Break Down Hrs	Actual Availabl e Hrs	Idle Hrs	Actual Utilised Hrs	Availabilit y %	Utilisation %
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

Schedule Hrs = No. of Working Shift per Day X No. of Working Day X 8 hrs

Assumptions

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

Malik 6/7

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Distribution

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