Machine Hour Rate

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Machine Hour Rate

Meaning and Definition:

- Machine hour rate represents the hourly cost of factory overhead for operating a particular machine and is obtained by dividing the factory expenses connected with a machine for a given period by the number of hours worked by the machine during that period.

- The Institute of Cost and Management Accountants, London, defines the machine hour rate as “an actual or pre-determined rate of cost apportionment or overhead absorption which is calculated by dividing the cost to be apportioned or absorbed by the number of hours for which a machine or machines are operated or expected to be operated.”

Reason for calculating machine hour rate:

Machine hour rate is computed for the recovery or absorption of factory overhead. This basis for recovery of overhead is adopted in those industrial concerns where most of the work is carried on with the help of machines and as such most of the factory expenses are caused by machine operations.

For computing the machine hour rate, each machine or a group of similar machines in a production department is considered as a smaller department and the departmental expenses are re-apportioned to the machines or groups of machines in the department. For this purpose, the following basic factors are to be considered:

(i) Base Period: A ‘Base Period’ is to be taken for each machine for computing the machine hour rate. The base period refers to the period of time for which the hourly rate is to be computed and may be a year, a quarter, a month or a week.

(ii) Normal Hours of Working: The number of normal or standard working hours of each machine in the base period has to be estimated.

(iii) Distribution of Expenses: All the departmental expenses to be considered for computing the machine hour rate are divided into two parts:

(a) Standing charges (or fixed expenses): Standing charges include all those expenses which remain fixed or constant and relate to the department as a whole. These are not affected by the operation of the machines e.g., rent, rates and insurance of factory building, cost of factory supervision, factory lighting, insurance of machine etc.

(b) Running charges (or variable expenses or machine expenses): These include the expenses which are incurred in connection with the operation of the machines e.g., depreciation, repairs and maintenance, power, steam, water, etc.

(iv) Computation of Hourly Rate of Standing Charges: For computing the machine hour rate all the standing charges relating to the Production department will be apportioned to the individual machines on the following bases.

Items	Basis of Apportionment
(a) Factory Rent, Rates and Insurance	**(a)** Floor Area occupied by each machine
(b) Factory Lighting	**(b)** Number of lighting points.
(c) Factory Supervision	**(c)** Number of workers engaged on each machine or floor area
(d) Insurance of Machinery	**(d)** Time devoted by supervisory staff of each machine and value of machinery
(e) Miscellaneous Expenses e.g., lubricating oil, grease, cotton waste, sundry stores.	**(e)** Actual quantity used (whenever possible) or any other equitable basis.

(v) Computation of Hourly Rate of Machine Charges

The hourly rate of various items of 'machine charges' or 'running charges' will be computed separately in the following manner:

(a) Depreciation: For the purpose of calculating the hourly rate of depreciation of machine, the original cost of the machine, its effective working life in terms of running hours after giving due consideration to the risk of obsolescence and its estimated scrap value (or residual value) at the end of its working life will have to be ascertained. The hourly rate of depreciation of the machine will be calculated by the following formula:

Hourly Rate of Depreciation = (Original Cost of Machine — Estimated Scrap Value) / Effective Working Life of Machine in terms of Running Hours

(b) Repairs and Maintenance: Generally, the cost of repairs and maintenance of the machine over its effective working life is estimated on the basis of past experience. The hourly rate of repairs and maintenance cost will be ascertained by applying the following formula:

Hourly Rate of Repairs and Maintenance = Estimated Cost of Repairs and Maintenance over the life of the machine / Effective Working Life of Machine in terms of Running Hours

(c) Power, Steam and Water: The hourly cost of power, steam and water consumed will be ascertained on the basis of:

(i) actual hourly consumption, or

(ii) estimated hourly consumption ascertained on the basis of past experience. The hourly rates of standing charges and running charges will be aggregated to obtain the machine hour rate.

FORMAT FOR COMPUTING MACHINE-HOUR RATE

Computation of Machine-hour Rate

Base Period..... Working hours.....

Particulars	*Per Day or Per Week or Per Month or Per Year (Base Period)*	*Per Hour*
Standing or Fixed Expenses :	Rs.	Rs.
1. Rent, Rates and Taxes (According to the areas used by each machine)	.....	
2. Lighting and Heating (In the ratio of light points or bulbs or floor area)	.....	
3. Supervision Expenses (Time devoted by Supervisory Staff to each machine)	.....	
4. Labour Welfare Expenses (In the ratio of number of workers)	.....	
5. Insurance (In the ratio of insurance value or capital value of each machine)	.....	
6. Manager's Salary	.....	
7. Foreman's Salary	.....	
8. Canteen Expenses		
9. Consumable Stores—Lubricants, Cotton waste, etc. (On the basis of given information)	.....	
10. Other expenses (on justified basis)	.....	
Total Standing Charges	.....	
Standing Charges p.h. = $\frac{\text{Total Standing Charges}}{\text{Working hour in base period}}$		.....
Machine Expenses or Variable Expenses :		
1. Depreciation = $\frac{\text{Cost of Machine – Scrap Value}}{\text{Total Working Life of Machine in Hours}}$		.....
2. Repairs and Maintenance = $\frac{\text{Repairs and Maintenance}}{\text{Working hours for given amount of Repairs and Maintenance}}$		.....
3. Power = Units Consumed p.h. × Units Rate		.....
4. Steam and Water (As per instruction given)		.....
Machine-hour Rate		.....

ILLUSTRATION 15. Following annual charges are incurred in respect of a machine in a shop where manual labour is almost nil and where work is done by means of five machines of exactly similar type of specification :

		₹
(*i*)	Rent and Rates (proportional to the floor space occupied) for the shop	4,800
(*ii*)	Depreciation on each machine	500
(*iii*)	Repairs and maintenance for the five machines	1,000
(*iv*)	Power consumed (as per meter) @ 5 P. per unit for the shop	3,000
(*v*)	Electric charges for light in the shop	540
(*vi*)	Attendants : There are two attendants for the five machines and they are each paid ₹ 60 per month.	
(*vii*)	Supervision : For the five machines in the shop there is one supervisor whose emoluments are ₹ 250 p.m.	
(*viii*)	Sundry supplies such as lubricants, jute and cotton waste etc., for the shop	450
(*ix*)	Hire-purchase instalment payable for the machine (including ₹ 300 as interest)	1,200

The machine uses 10 units of power per hour. Calculate the machine hour rate for the machine for the year.

SOLUTION

Annual working hours are calculated as under :

Power consumed has been given for the purpose of calculating working hours.

Total amount of power consumed = ₹ 3,000

Rate of power (10 units @ 5 P. per unit) = 50 paise an hour

Total working hours of machines = 6,000 hrs. $\left(i.e.\ \frac{₹\ 3,000}{50\ \text{Paise}}\right)$

No. of machines = 5

Working hours per machine = $\frac{6,000}{5}$ = 1,200 hrs. a year.

COMPUTATION OF MACHINE HOUR RATE FOR THE YEAR

Particulars	₹	₹
Standing Charges :		
Rent and rates (1/5th of ₹ 4,800)	960	
Lighting charges (1/5th of ₹ 540)	108	
Attendant's salary for machine (1/5th of 2 × ₹ 60 × 12)	288	
Supervision per machine (1/5th of ₹ 3,000)	600	
Sundry supplies per machine (1/5th of ₹ 450)	90	
	2,046	
Hourly Rate of Standing Changes = $\frac{₹\ 2,046}{1,200}$		1.70
Machine Expenses :		
Depreciation $\left(₹\ \frac{500}{1,200}\right)$		0.42
Repairs and maintenance $\left(₹\ \frac{200}{1,200}\right)$		0.17
Power (10 units of power @ 5 p. per unit)		0.50
Machine Hour Rate		2.79

NOTE : Interest of hire-purchase instalment is purely a financial matter and has not been included while computing the machine hour rate.

ILLUSTRATION 16. From the details furnished below you are required to compute a comprehensive machine-hour rate :

Original purchase price of the machine (subject to depreciation at 10% per annum on original cost)	₹ 3,24,000
Normal working hours for the month (The machine works to only 75% of capacity)	200 hours
Wages of Machineman	₹ 125 per day (of 8 hours)
Wages for a Helper (Machine attendant)	₹ 75 per day (of 8 hours)
Power cost for the month for the time worked	₹ 15,000
Supervision charges apportioned for the machine centre for the month	₹ 3,000
Electricity & Lighting for the month	₹ 7,500
Repairs & Maintenance (machine) including consumable stores per month	₹ 17,500
Insurance of Plant & Building (apportioned) for the year	₹ 16,250
Other general expenses per annum	₹ 27,500

The workers are paid a fixed dearness allowance of ₹ 1,575 per month. Production bonus payable to workers in terms of an award is equal to 33.33% of basic wages and dearness allowance. Add 10% of the basic wage and dearness allowance against leave wages and holidays with pay to arrive at a comprehensive labour-wage for debit to production.

SOLUTION

CALCULATION OF COMPREHENSIVE MACHINE HOUR RATE

(Effective hours 150) (1)

		Per Month	*Per Hour*
Fixed Costs			
Supervision Charges		3,000.00	
Electric and Lighting		7,500.00	
Insurance of Plant & Building $\left(₹\ 16{,}250 \times \frac{1}{12}\right)$		1,354.17	
Other General Expenses $\left(₹\ 27{,}500 \times \frac{1}{12}\right)$		2,291.67	
Depreciation $\left(₹\ 32{,}400 \times \frac{1}{12}\right)$		2,700.00	
		16,845.84	112.31
Variable Costs			
Repairs and Maintenance		17,500	116.67
Power		15,000	100.00
Wages of Machine Man	(2)		44.91
Wages of Helper	(2)		32.97
			406.86

Working Notes :

(1) Effective machine working hours per month = 200 hours × 75% = 150 hours

(2) *Wages per Machine Hour*

	Machineman	*Helper*
	₹	₹
Wages for 200 hours (₹ 125 × 25 days)	3,125	
(₹ 75 × 25 days)		1,875
Dearness Allowance	1,575	1,575
	4,700	3,450
Production Bonus (1/3 of Wages + DA)	1,567	1,150
	6,267	4,600
Leave Wages (10% of Wages + DA)	470	345
	6,737	4,945
Effective wage rate per machine hour (150 hours in all)	44.91	32.97

NOTE : Working days in a month = $\frac{\text{200 hours}}{\text{8 hours (Daily hrs.)}}$ = 25

Thank You