

Classification of staff in Workshops

The staff employed in Railway workshops, other than Ministerial staff may be classified under the following broad categories:

- (i) Unskilled Artisans Grade (ii) Skilled Gr. III (iii) Skilled Gr. II
(iv) Skilled Gr. I (v) Sr. Technician (Vi) Supervisory Staff

The classifications of staff under CLW incentive scheme in Workshops are as under:

- ✓ Direct Worker (DW): Sr. Technician, Technician I, Technician II, Technician III
- ✓ Essential Indirect Worker (EIW): Crane Driver, Gunner, Rigger, JEs
- ✓ Indirect Worker (IW): Helper I & Helper II

PRODUCTION CONTROL ORGANISATION (PCO)

PURPOSE: To obtain a most economic combination of resources i.e. the best use of man, machine and materials.

(i) Best use of Men - Assign appropriate person to a location in appropriate number.

(ii) Best use of Machine

- Machines should be optimally utilized with no idle time
- Machines should be maintained as per the schedule
- Machines should be in good working conditions
- Machines should deliver products in minimum time with minimum wastage with accuracy

(iii) Best use of Material

- ✓ Materials should be selected as per required specifications
- ✓ Materials should have good past record of performance
- ✓ We should select a best method of doing a work so that a product can be finished in minimum time in minimum cost with desired quality.

Production Engineer

- ✓ The Head of the Workshop, **Chief Workshop Manager (CWM)** is assisted by the Production Engineer (PE) who is responsible for efficient planning and functioning of the Production Control

Organization (PCO). The broad function of this department is the function of the following Offices/Sections:-

- a) Progress Office b) Planning Office: (i) Drawing Office (ii) Rate fixing
- c) Inspection

- a) **Progress Office** :

Main Function of Progress Office are:

- ✓ Assign work order number to a work.
- ✓ Arrange for printing of documents as required (IS-1 to IS-34)
- ✓ Release all documents to Shops
- ✓ Specify date of completion (PDC)
- ✓ Draw raw materials from Stores against each requisition
- ✓ Coordinate progress of manufacture of components
- ✓ Preparation of monthly report of production and their deliveries
- ✓ Inter-section and inter-shop movement of components

Planning Office

(a) Planning Section

- ✓ Study of drawing and specifications
- ✓ Preparation of Scroll process Sheet (IS-1) indicating sequence of operations
- ✓ Section or load centre where the operation is to be carried out.
- ✓ Study the layout of shops where a particular component is to be manufactured
- ✓ Select suitable machines
- ✓ Deciding requirement of special tools, Jigs and Fixers
- ✓ Ensuring availability of handling facilities

(b) Rate Fixing Section

- ✓ responsible for fixing allowed time for various operations involved in the process sheet
- ✓ maintenance of synthetic data for fixing rates (time) for individual operation

- ✓ indicating allowed time in the process sheet for each operation involved
- ✓ to scrutinize all the completed piece work cards
- ✓ Issue of excess time cards

Fixing of Allowed Time (AT)

Observed Time: - The actual time recorded during time study on completion of the element.

Performance Rating of Workers: -

- ✓ It is the assessment of the skill and effort applied by a worker while completing a work & every worker should be rated independently.
- ✓ It is based on the principle that an average worker working under the non incentive conditions just to earn his basic wage, is said to be working at 60 rating (or he could be said to be producing 60 units of work per hour)
- ✓ The same average worker while working under incentive conditions can work at such a speed and with such effort to earn 33.33 % incentive i.e. at an 80 rating (or producing 80 units of work per hour)
- ✓ This rating is done by the rate fixers of the rate fixing department.

Normalizing: -

- ✓ After completion of the time study, the actual times of all the elements in the work cycle should be converted to the time at 80 rating i.e. the time which the average worker should take to do each element when working under a incentive scheme.

In Normalizing, the actual times of all the elements in the work cycle should be converted to time at 80 rating.

This conversion is done by the following formula:

Normal Time = Actual time (observed time) x Observed Rating 80 (i.e. incentive rating)

Allowances - The following allowances are added to the normal time on a cumulative basis:

i) Fatigue

- ✓ As it is not humanly possible for any person to work continuously with a set-speed, an allowance to cover fatigue is added.
- ✓ Since this varies with the types of work, **an allowance up to 25%** is given.

ii) Contingencies Allowance: -This includes cleaning swarf, grinding of tools, using of s
procuring cutting

Compound etc. and for this purpose, **an allowance up to 12 -1/2%** on the operating tin

(iii) Production bonus: - An allowance of **33 $\frac{1}{3}$ %** is added as production bonus.

(iv) Gauging on machining:- **5% allowance** is added for all machining operations whe
is necessary.

Allowed Time = Normal Time + Allowance

Example : Let the **normal time** of all the elements as a result of
number of studies
(average) = 1 Hour.

Solution: - Normal Time = 1 hr.
Add allowances as under.

(a) Fatigue 25 % = $1 \times 0.25 = 0.25$ hrs.
= $1 + 0.25 = 1.25$ hrs.

(b) Contingency $12\text{-}1/2\%$ = $1.25 \times 12.5\% = 0.156$ hrs.
= 1.25 + 0.156 = 1.406 hrs.

(c) Bonus $33\frac{1}{3}\%$ = $1.406 \times 33\frac{1}{3}\%$ = 0.468
= $1.406 + 0.468 = 1.87$ hrs.

(d) Gauging 5 % (not on jobs) = $1.87 \times 5\% = 0.09$
= $1.87 + 0.09 = 1.96$ hrs.

Allowed time for this job will be issued as under:

Without Gauging= 1.87 hrs.

And with Gauging = 1.96 hrs.

Time Taken = 75 % of the allowed time of 1.96 hrs.
= 1.46 hrs.

Time saved = 1.96 hrs.—1.46=0.50 hrs.

This time saved is equivalent to $33\frac{1}{3}\%$ of the time taken which
proves that the average worker will complete an operation in 75%
of the allowed time when he will earn $33\frac{1}{3}\%$ of bonus.

Preparatory Time:

- ✓ The preparatory time is added per batch.
- ✓ This is the time taken by a worker in collecting and drawing tools, raw materials etc.

Extra Time: Extra time over the allowed time can be allowed due to:

(i) Excess machining work required on castings, forgings, bar etc.

(ii) Hard material. (iii) Defect in machine for which the worker is not responsible

Job Card: Job card may be defined as the record that shows the time worked by the workmen on individual operation. These are used in shops which are covered by the Incentive scheme. Job cards are printed by the PCO (Adrema section) separately for each operation indicated on the route card and sent to the shop concerned. The job cards for a section will be kept by the sectional JE. When an operator has to commence an operation concerned, the JE will enter the ticket no. of the workman on the job card for the operation concerned and will give it to him to take it to the time booth for punching “on” and handing it over to the TBC. When the job is completed and another one is to be started, the worker will take the job card of the new job to the Time booth, ask for the job card of the previous job, punched “off” the previous job card and punched “on” the new job card and will hand over both the job cards to the TBC.

Job card for squad work: This card will be used for each of the workmen (including leading hand) handling the operation covered by the squad summary card. Sufficient number of such blank cards will be supplied to the SSE. At the time of starting the job the JE will enter the Ticket No. of the leading hand on the squad summary card and hand it over to the leading hand along with a separate job card for him and for each man in gang, duly filled in, in respect of Ticket no., category, work order no. and signed by the JE concerned. The leading hand will punch “on” the squad summary card and the job card of the men in the gang and hand over all the punched on cards to the Time Booth.

Time taken- Job cards/squad cards are the basic documents on the basis of which incentive bonus is calculated. Job cards /squad cards are used for booking of time spent by workers on jobs. The Job cards /squad cards punched “on” and “off” with the aid of time recording blocks, when operations are commenced and completed respectively. From the time of punching, the job cards should remain in the custody of TBC. The total time taken for the operation is ascertained from the punched time on the job cards and recorded in the relevant columns in the job cards by the TBC.

Time saved/Time Lost- (i) The difference between the “Time allowed” and the “Time taken” is the time saved, if the former is greater than the latter and time lost if it is otherwise. The time taken is ascertained from the time of commencement and completion as recorded on the job/squad cards.

(ii) Where two or more worker are engaged on the same job, the net time saved/lost from each squad card as worked out will be distributed over the worker in proportion to the time taken by each of them.

(iii) Allowed time on job cards should be adrema printed. Hand written/typed allowed time on the job cards should be countersigned by PE/APE.

Incentive Bonus Rates

- ✓ Time saved or lost will be evaluated at the Incentive Bonus hourly rates as fixed by the Railway Board for different categories of staff from time to time.

Hourly Rate of Incentive Bonus

Category	Rate
JE	49.65
Sr. Technician	49.65
Tech. I	43.30
Tech. II	38.50
Tech. III	32.20
Helper I	25.45
Helper II	24.50

Payment of incentive bonus

(a) **Direct Workers-** The total of time taken as recorded on job cards is deducted from the total allowed time obtained from job cards passed by the inspectors. The net time saved is multiplied by the prescribed rate of the category of worker and bonus paid accordingly.

(b) **Essential indirect workers and supervisors-** EIW are paid bonus at 80% of the average bonus earnings of the section. For this purpose a concept of standard hour is used to simplify calculations for hours of work per month.

The formula for working out standard hours is:

Total No. of GA card hours actually worked by the direct workers during preceding 6 months/one year

-----X 208

Total No. of hours which the workers should have worked as per the scheduled Working Hours during preceding 6 months/one year

Total net time saved by the section

Section percentage = -----X 100
Standard hours x No. of direct workers in the section

Bonus payable to EIW =

Section %age X 80 X No. of GA card hours X hourly rate of the worker

100 X 100

For supervisors bonus is calculated as

Section %age X 80 X No. of GA card hours X hourly rate X No. of DW under incentive scheme

100 X 100 X (No. of DW under incentive scheme + No. of DW under non-incentive scheme)

Calculation of monthly Incentive Bonus Payment to SSE of incentive shop is as under:

Basic Pay X 15 X (No. of working days of month – No. of days of absence)

100 X No. of working days during month

Note-- No. of days of absence will include CL, LAP, duty outside HQ, training, sick leave etc.

(c) Drawing Office

Main Functions are:

- ✓ Custodian of all drawings.
- ✓ Preparation of part drawing to facilitate manufacturing operations.
- ✓ Designing/drawing various Jigs and Fixers, template, gauges, etc. for economical manufacture of components

Inspection:**Important functions are:**

- ✓ Inspection of components, assemblies etc. on completion of each operation to ensure the production as per the drawings and specifications.
- ✓ Bringing to the notice of the concerned authority of deviations from Drawings and Specifications for rectification and rejection.
- ✓ Certification on job cards and route cards regarding quantities passed or rejected.

Elements of Costing System in Workshop**i) Material Cost****ii) Labour Cost****iii) Oncost****ON COSTS**

Expenditure which cannot be charged direct to the cost of articles manufactured or work done is termed "On Cost".

Types of On Cost:

1. Proforma on Cost
2. General on Cost
3. Shop on Cost

1. PROFORMA ON COST

- ✓ Includes all on cost which is not included in cost of work done in Railway Workshops but which would be included in commercial costing. Items included in Proforma on Cost are:

(a) Share of expense for the Rolling Stock management in Zonal Headquarters Office and Establishment in Offices of Mechanical Department of Workshops.

(b) General Superintendence of all Service Departments such as Financial, Personnel and Material Management etc. including Officers and Office Establishment of Security Department and Medical Services.

(c) Contribution to Provident Fund in respect of non-pensionable staff.

(d) Gratuity and Special contribution to Provident Fund in respect of non-pensionable staff.

(e) Pension liabilities – Pensionable Staff.

(f) Payment under Workmen's Compensation Act.

(g) Depreciation of plant and buildings.

h) Repairs of M&P other than those charged to cost of manufacture and repairs to buildings, Yards etc.

i) Cost of materials used and labour expended on the maintenance of Electric lighting throughout the Workshop,

2. GENERAL ON COST:

✓ General on Cost denotes cost other than Proforma on cost, that is incurred in common with all the Shops or Departments in Workshop.

a) Leave, sick, hurt and Holiday pay paid to workshop employees whose wages are not charged to shops ie. Yard Establishments.

b) Wages, Overtime etc. of staff such as Workshop apprentices, Tool Keepers not attached to Shops.

c) Freight charges that cannot be directly allocated to jobs.

d) Electrical power which is not possible to allocate to shops.

e) Hydraulic and Pneumatic power and gas that cannot be allocated to shops.

f) Working expenses of Crane and shunting engines, lorries, autotrucks, traversers etc. provided for use of the workshop when not chargeable to Shop on cost.

g) Water charges that cannot be allocated to shops.

h) Experimental work when not appropriately charged directly to job itself.

i) Yard Lighting.

3. SHOP ON COST

✓ Shop on cost includes all on cost incurred within accounting unit, such as a shop or a department or a section. Items included are:

a) Wages, Overtime etc of Workshop apprentices attached to shops, Charge men, Mistries, unskilled labour except when employed as direct labour tally men, store men, Oilers, Shop Clerks etc.

b) Shop scrap (credit) ie. Scrap which cannot be allocated to job.

c) Defective and spoilt work in the case of experimental work.

d) Power charges whether electric, pneumatic, gas or Hydraulic which can be directly allocated to shops.

e) Consumable stores for shop use viz oil for lubrication, sponge, emery / glass cloth, soap etc.

f) Small tools for shop use.

WORK ORDER SYSTEM IN WORKSHOP

✓ Workshop Expenditure is analyzed with the aid of the Work Order System representing different units for different Heads of Expenditure.

✓ There exists a separate unit for each sub- detailed head of financial accounts, to which Workshop expenditure is chargeable.

- ✓ Separate units are also provided to ascertain the amount that has to be accepted, adjusted or billed for.

WORK ORDERS USED IN WORKSHOP:

1. Revenue Standing Work Orders –

- ✓ Those are intended for collecting Revenue expenditure but excludes the cost of addition, alternation and improvement to machinery and plant.
- ✓ These Worker Orders are never closed.
- ✓ Controlled by Progress Department.

2. Special Work Order –

- ✓ Issued for special work.
- ✓ They are issued on the receipt of requisition.
- ✓ These Work Orders are closed after completion of the job.
- ✓ Controlled by Accounts Department

Revenue Standing Work Orders are of two kinds:

1. Work Orders for Repair and Maintenance.

2. For Stores Stock

- ✓ **Standing Work orders for Repair and Maintenance are divided into following sections:**

- i. Manufacturing Work Orders – are used in Process Shop like Foundry and Saw Mill producing semi manufactured materials
- ii. On Cost Work Orders - Shop On Cost and General on Cost
- iii. Repair to Rolling Stock –Diesel and Electric Locomotives
- iv. Repair to Machinery and Plants
- v. Other Departmental Work (Divisional)
- (vi) Other Departmental Work (Non-Divisional) work done for Other Railway

Work Order Number Any standing work order for repair and maintenance has 8 digits arranged in 4 groups:

1 st	2 nd	3 rd	4 th
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(a) **1st & 2nd digits** indicate control work order i.e. **Main Head of Work order series**.

(b) **3rd & 4th** represent **Shop number** within the Workshop.

(c) **5th, 6th & 7th** digits indicate **detailed identification of Work**.

(d) **8th digit** is the **self checking digit**.

Examples: Diesel Loco - 55

i) POH to Body: **5 5 - - 7 0 1**

(ii) POH to Under Carriage **5 5 - - 7 0 2**

Including coupling

(iii) POH to power Pack (Engine): **5 5 - - 7 0 6**

(iv) POH to Wheel, Bearing & Axles: **5 5 - - 7 0 7**

Repair to Machinery & Plant -56

i) Repair & maintenance of **5 6 - - 5 6 1**

all types of machines

ii) Repair & maintenance of **5 6 - - 5 6 7**

Cranes of all types

(iii) Repair, maintenance &

Overhaul of Gauges, jigs & fixtures etc **5 6 - - 5 6 5**

Shop Oncost -52

(i) All consumable stores materials: **5 2 - - 4 5 5**

(ii) Electric current supplied to Shop: **5 2 - - 4 5 7**

**(iii) Wages, overtime, etc. Of
JE, Sr.Tech, Helper & shop clerks: 5 2 - - 4 5 6**

General Oncost - 53

(i)Wages, Overtime, etc. to yard staff: 5 3 0 0 4 8 1
(ii)Freight charges not chargeable to any job: 5 3 0 0 4 8 6
(iii)Repair to furniture etc.
(Labour & material): 5 3 0 0 4 9 2
(i)Yard lighting: 5 3 0 0 4 8 7

WORK ORDER REGISTER

-All Works carried out on Requisitions should be registered and serially numbered in Work Order Register (W 826)

-Separate Register for different Department/ Divisions etc.

Format of Work Order Register:

- | | |
|--|---|
| 1. Work Order no. and date | 2. Date of commencing Work |
| 3. Date of completion | 4. Description of Order |
| 5. By whom ordered (Reference No.) | 6. Shops through which the work has to go |
| 7. Head of account to which to be charged. | 8. Remark as to dispatch |

