





PRODUCTION UNITS AND WORKSHOPS OF INDIAN RAILWAYS

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PRODUCTION UNITS

- Chittaranjan Locomotive Works (1950)
- Integral Coach Factory, Perambur (1953)
- Banaras Locomotive Works (1956)
- Rail Wheel Factory, Yelahanka (1984)
- Diesel Loco Modernization Works, Patiala (1986)
- Rail Coach Factory, Kapurthala (1986)
- Modern Coach Factory, Rae Bareilly (2012)
- Railway Wheel Plant, Bela (2014)



WORKSHOPS

Railway	Name of the Workshop
1. Eastern Railway	(i) Locomotive Workshop, Jamalpur (ii) Railway Workshop, Kanchrapara (iii) Carriage Workshop, Lilluah (iv) Budge Budge Bogie Workshop, Howrah
2. East Central Railway	(i) Mechanical Workshop, Samastipur (ii) Carriage Workshop, Harnaut
3. East Coast Railway	(i) Carriage Workshop, Mancheshwar
4. Northern Railway	(i) Carriage & Wagon workshop, Alambagh (ii) Mechanical Workshop, Amritsar (iii) Locomotive Workshop, Charbagh (iv) Carriage & Wagon Workshop, Jagadhri (v) Carriage & Wagon Workshop, Kalka
5. North Central Railway	(i) Wagon POH Workshop, Jhansi (ii) Rail Spring Kaarkhana, Gwalior
6. North Eastern Railway	(i) Railway Mechanical Workshop, Gorakhpur (ii) Railway Workshop, Izzatnagar

WORKSHOPS

Railway	Name of the Workshop
7. Northeast Frontier Railway	(i) Railway Workshop, Dibrugarh (ii) Rly. Workshop, New Bongaigoan (iii) Rly. Workshop, Tindhari
8. North Western Railway	(i) Carriage Workshop, Ajmer (ii) Locomotive Workshop, Ajmer (iii) Railway Workshop, Bikaner (iv) Carriage Workshop, Jodhpur
9. Southern Railway	(i) Locomotive Workshop, Golden Rock (ii) Carriage Workshop, Perambur (iii) Locomotive Workshop, Perambur
10. South Central Railway	(i) Lallaguda Railway Workshop (ii) Carriage Workshop, Tirupati (iii) Wagon Workshop, Guntupalli
11. South Eastern Railway	(i) C&W Workshop, Kharagpur (ii) Diesel Multiple Unit Manufacturing Factory, Haldia

WORKSHOPS

Railway	Name of the Workshop
12. South East Central Railway	(i) Wagon Repair Workshop, Raipur (ii) Motibagh Railway Workshop, Nagpur
13. South Western Railway	(i) Carriage Repair Workshop, Hubli (ii) Mysore Railway Workshop
14. Western Railway	(i) Bhavnagar Railway Workshop (ii) Loco, Carriage & Wagon Workshop, Dahod (iii) Railway Workshop, Junagarh (iv) Carriage Repair Workshop, Lower Parel (v) Railway Workshop, Mahalaxmi (vi) C&W Workshop, Pratap Nagar, Vadodara
15. West Central Railway	(i) Coach Mid-life Rehabilitation Workshop, Bhopal (ii) Wagon Workshop, Kota
16. Central Railway	(i) Carriage Workshop, Matunga (ii) Locomotive Workshop, Parel (iii) C&W Workshop, Kurduwadi, Solapur



ROLE OF PU AND WORKSHOPS

WHY IN-HOUSE MANUFACTURE OF ROLLING STOCK ?

- Owning the technology
- Costs lower
- Self-dependence
- Costs much less to maintain assets as many critical sub-assemblies are also manufactured here.
- Enable import substitution and promote ancillary industries
- Exports

AND WORKSHOPS ?

- IR is single player in Railroad industry in country
- Better coordination
- Cheaper Maintenance
- Ease to implement modifications
- Strategic Importance
- Conserves and develops knowledge capital of IR

MISSION

- Evolving optimal designs for Rolling Stocks
- Manufacturing Rolling stock in a cost effective manner
- Maintenance ensuring operational efficiency and safety
- Planning, procurement and maintenance of Machinery & Plant.
- Ensuring realization of the full potential of the assets.
- Adopting and maintaining the best practices in the industry with excellence in all areas of operation.
- Arranging relief and rescue in any unlikely event of Railway disasters.

GENERAL CLASSIFICATION OF WORKSHOPS

- CARRIAGE WORKSHOPS
- WAGON WORKSHOPS
- LOCOMOTIVE WORKSHOPS
- OTHER WORKSHOPS

WHAT THEY DO?

1. Periodic Maintenance of Railway Rolling Stocks
2. Manufacture of articles required by other departments of the Railways.
3. Manufacture or repair of rolling stocks or components for—
 - i. Other Zonal Railways/Production units
 - ii. Other Government Department.
 - iii. Others.



ORGANIZATION STRUCTURE



PRODUCTION UNITS

AT HEADQUARTERS

- GENERAL MANAGER (GM)

Head of the administration and the overall organization of the production units.

- Principal Chief Mechanical Engineer (PCME)

Head of the Mechanical Engineering Department and responsible for manufacturing, M&P, disaster relief and other mechanical equipment of the Railway.

- Principal Head of Department of other departments (PHoDs)

Administrative head of the other departments of the production units.

AT PRODUCTION UNITS

- Chief Workshop Engineers (CWEs)
Responsible for different divisions of the production unit
- Chief Planning Engineers (CPLE)
Responsible for planning related to the production unit
- Chief Quality Manager (CQM)
Responsible for quality of the production
- Chief Design Engineer (CDE)
Responsible for design and product development in production unit.
- Chief Safety Officer (CSO)
Responsible for organizational safety of the unit

AT PRODUCTION UNITS

- Deputy Chief Mechanical Engineers (Dy.CMEs)
Responsible for different areas like manufacturing, wheels, M&P, Fabrication, Production planning etc of the unit
- Works Managers (WMs)
Assist Dy.CMEs in their Responsible for different areas of workshop
- Assistant Works Managers (AWMs)
Responsible for different areas of workshop



ZONAL WORKSHOPS

AT HEADQUARTERS

- GENERAL MANAGER (GM)

Head of the administration and the overall organization of Zonal Railway.

- Principal Chief Mechanical Engineer (PCME)

Head of the Mechanical Engineering Department and responsible for rolling stock, disaster relief and other mechanical equipment of the Railway.

- Chief Workshop Engineer (CWE)

Administrative head of the department for workshops. Responsible for budgetary controls in the workshop and issues instructions in all matters relating to policy formulation of workshops.

AT WORKSHOPS

- CHIEF WORKSHOP MANAGER (CWM)

Head of the administration and the overall organization of the Workshop

- Deputy Chief Mechanical Engineers (Dy.CMEs)

Assist CWM in running the workshops and responsible for different areas of workshop

- Deputy Chief Mechanical Engineers (Dy.CEE)

Assist CWM in running the workshops and responsible for electrical part of workshop

- Deputy Chief Account Officer (Dy.CAO)

Assist CWM in running the workshops and responsible for accounts of workshop

AT WORKSHOPS

- Deputy Chief Material Manager (Dy.CMM)
Assist CWM in running the workshops and responsible for material management of workshop
- Workshop Personnel Officer (WPO)
Assist CWM in running the workshops and responsible for personnel and industrial relations
- Production Engineer (PE) and Works Managers (WMs)
Assist CWM in running the workshops and responsible for different areas of workshop
- Assistant Works Managers (AWMs)
Assist CWM in running the workshops and responsible for different areas of workshop

PRODUCT MIX

□ LOCOMOTIVES

- Electrical Locomotives : WAM4, WAP4, WAP5, WAP7, WAG7, WAG9, WAG12
- Diesel Locomotives: 1) ALCO Locos: WDM2, WDM3A, WDM3D
2) HHP Locos: WDP4D, WDG4, WDG4D, WDG5, WDS6, YDM4

- ## □ Coaching Stock: 1) LHB coaches : AC, non-AC, Power Cars, Parcel Van, Saloons 2) ICF coaches: AC, non-AC, Brake Van, Inspection Carriages

- ## □ Wagons: BOXN, BOXN-HL BLC, BCN, BCCN, BTPN etc.

- ## □ Others: ART/SPART, ARME/SPARME, SPIC, 180T Breakdown Crane, Tower Cars

ROLLING STOCK PROGRAM

Primarily Meant for

- New Acquisition
- Replacement
- Modernization
- Major Modification
- High Value Capital Unit Exchange Spares

ROLLING STOCK PROGRAM

Procedure Calculation New Acquisition

- Additional Requirement for Increase In Traffic = B
- Reduction for Change In Traffic Pattern = C
- Condemned in Previous Year = E
- Accident Damage = F

Provisions Required In The RSP = B-C+E+F

ROLLING STOCK PROGRAM

WESTERN RAILWAY				
ROLLING STOCK PROGRAMME FOR 2020-21				
NEW ACQUISITION				
Works Costing Below Rs. 2.50 crores				
			<i>(Figure in thousand of Rupees)</i>	
Particulars	Allocation	Anticipated Cost	Outlay proposed for 2020-21	Balance to complete work
<u>Locomotives</u>				
ELS/BRCY: Proposal for procurement of Flexi coil Bogie Frame with Rigging for WAP4 type Electric locos. Qty- 12 nos. @ Rs.15.01 Lakhs each	RRSK	18018	1	18017
ELS/BRCY: Procurement of set of protective Relays conforming to CLW specification no. CLW/ES/R27/Alt. Z consisting of 3 items.Qty- 04 nos. @ Rs.6.18 Lakhs each	CAP	2472	1	2471
ELS/BRCY: Procurement of Main Air Compressor Capacity -1750 LPM, type RR20100 CG(M) make M/S ELGI for 3 phase Electric Loco.Qty- 06 nos. @ Rs.6.76 Lakhs each	CAP	4057	1	4056
ELS/BRCY : Procurement of set of Filter Assembly for 3 phase Loco WAP5 & WAP7.Qty- 06 nos. @ Rs.3.41 Lakhs each	RRSK	2047	1	2046
ELS/BRCY: Procurement of Crowned Gear Coupling (Hurth coupling) for 3 Phase WAP5 Loco. Qty 12 nos.Qty- 08 nos. @ Rs.7.16 Lakhs each	RRSK	5729	1	5728

PRODUCTION PROGRAM

- Issued by Railway Board to the PUs
- PUs/Workshops permitted to plan for 80% of previous years volume
- Facilitates in Advance Preparation of
 - ✓ Materials
 - ✓ Tooling and Machinery
 - ✓ Consumables

PRODUCTION PROGRAM

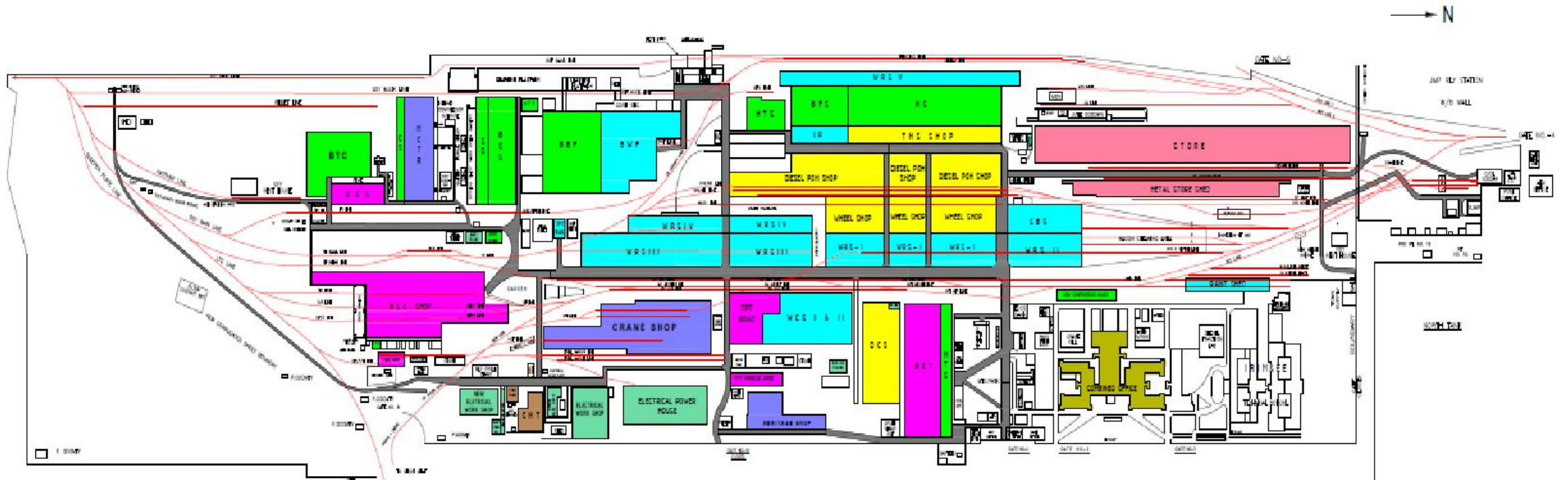
2020/M(PU)/1/4	Revised Coach Production Programme 2020-21			Annexure
Coach/ Product Variants	ICF	RCF	MCF	Total
LHB COACHES				
LWFAC	16	4	16	36
LWFAC Tejas			23	23
LFCWAC	24	12	14	50
LWACCW	89	87	65	241
LWACCW Tejas			56	56
LWACCN	357	289	162	808
LWACCN Economy (83 berths)	22	122		144
LWACCN Tejas			132	132
LWCBAC	36	19	18	73
LWCBAC Tejas			13	13
LFCZAC				0
LSCZAC	4	4	7	15
LFCZAC Tejas	0			0
LSCZAC Tejas	0			0
LWSCZ	22	12	13	47
LS (Deen Dayalu)	147	142	160	449
LS (Antyodya)				0
LS (Hamsafar)				0
LWSCN	448	192	222	862
VP/Parcel Van/LHB		385		385
Brake Van Tejas Sleeper			23	23
Brake Van Garib Rath	3	3		6
Brake Van Tejas Sitting				0
LSLRD	112	79	105	296
RA	16			16
AC RA	16			16
Oscillograph/Rest Car (RDSO)	5			5
Vistadome coaches	27			27
Training Cars*	6			6
Total LHB	1350	1350	1029	3729

DEPARTMENTALIZATION OF WORKSHOPS

- The Workshops are sub-divided into 'Shops' which are further sub-divided into 'sections' for the purpose of technical control, as well as financial and cost control.
- The Shops are under the supervision of 'Shop Superintendents (SSEs) who have under them are Junior Engineers (JEs) to assist them in the work of supervision.
- The Shops are either Process Shops, (i.e. Manufacturing Shops) or Job Shops (i.e. Repair shops).
- The Process Shops consists of fabrication shops, welding shops, and others are Job shops
- Each shop should be allotted a shop number by which it can be distinguished.

LAYOUT OF A WORKSHOP

LAYOUT OF JAMALPUR WORKSHOP AS ON 01.02.2020





INCENTIVES

CLASSIFICATION OF STAFF

- Unskilled Artisans Grade or Helper/ Assistants
- Skilled Technician Gr. III
- Skilled Technician Gr. II
- Skilled Technician Gr. I
- Senior Technician
- Supervisors

PRINCIPLE OF INCENTIVE PAYMENT

- Time study at the work place
- Not possible to work continuously at the same efficiency
- Source of motivation for worker
- Time saved has a money value associated to it
- Basic wages are ensured
- Time saving ceiling limit of 50% of allowed time

ADVANTAGES

FOR THE ADMINISTRATION

- No requirement of additional manpower
- Higher and efficient machine / assets utilization
- More productivity and less pilferage of working hours

FOR THE WORKERS

- It gives satisfaction of “earning more by working more”
- Leading to more purchasing power and satisfaction
- And as an end result the Organization is benefited with better
- Industrial relations and discipline.

INCENTIVE SYSTEMS ON IR

- One is based on saving of time in each activity by the employee, thereby performing the activity in lesser time than the prescribed time - giving scope for increased outturn (**Chittaranjan Pattern**)
- The other one is directly linked to outturn given by a group. This is Group Based Incentive Scheme (**Also known as Tirupathi Scheme**).

CHITTARANJAN PATTERN INCENTIVE SCHEME (CLW)

- 1) Chittaranjan Locomotive Works(CLW), Chittaranjan – in 1954
- 2) Diesel Locomotive Works(DLW) , Varanasi
- 3) ICF, Perambur – in 1960
- 4) Carriage Wagon Workshop, Liluah
- 5) Locomotive Workshop, Jamalpur
- 6) Carriage Wagon Workshop, Kharagpur

SALIENT FEATURES

- Chittaranjan Pattern incentive (CLW) scheme was started in 1954 in Chittaranjan Locomotive Works (CLW), Chittaranjan
- It is based on the time saved by workers against the prescribed time for each activity set by the work-study group.
- It is so designed that a reasonably efficient worker should be able to earn 33.33 % incentive.
- However the maximum limit set is that the employee can not save time more than 50% of the allowed time for an activity. i.e. more than 50% saving in time will not be eligible for incentive benefit.

GROUP INCENTIVE SCHEMES (GIS)

- 1) Tirupapti Workshops / South Central Railway – in January, 2002
- 2) Coach Rehabilitation Workshop, Bhopal(WCR) – in October, 2004
- 3) Rayanapadu Workshop [Guntapalli / South Central Railway]
- 4) Carriage Repair Workshop , Mancheswar/East Coast Railway
- 5) Rail Wheel Factory (RWF), Yalehenka/Bangalore
- 6) Rail Coach Factory (RCF), Kapurthala
- 7) Diesel Modernization Works (DMW), Patiala

SALIENT FEATURES

- It is a group based incentive scheme
- Group Attendance Factor- To assist in getting better attendance at work
- No-Overtime, Idle time can be booked only in the event of power failure
- All the staff in the Group are eligible for incentive under GIS.
- En-route detachments and Sick markings within 100 day of POH are considered for incentive payment
- 70% Incentive for individual Shop Outturn.
- 30% Incentive for Workshop Outturn to Traffic.

FINANCES OF INDIAN RAILWAYS

SOURCES

- ✓ RAILWAY EARNINGS
- ✓ CAPITAL FUND
- ✓ DEVELOPMENT FUND (DF)
- ✓ DEPRECIATION RESERVE FUND (DRF)
- ✓ RASHTRIYA RAILWAY SURAKSHA KOSH (RRSK)
- ✓ EXTRA BUDGETARY RESOURCES
 - BONDS (Issued by IRFC)
 - Borrowings (LIC etc.)
 - Infrastructural development Funding (World Bank, JICA etc.)

FINANCES OF INDIAN RAILWAYS

REVENUE EXPENDITURES

- SALARY AND PENSIONS
- SPARES
- CONSUMABLES
- OPERATING EXPENSES like TA, printing, telephone, other allowances etc.
- TRAINING
- STAFF WELFARE
- CLEANLINESS AND HOUSEKEEPING

All these expenses are expected to be met
by railway earnings

FINANCES OF INDIAN RAILWAYS

CAPITAL EXPENDITURES

- NEW LINES
- ROLLING ASSETS
- SIGNALLING ASSETS
- OHE AND ELECTRIFICATION
- BUILDING AND OFFICES
- NEW RAILWAY UNITS LIKE SHEDS, DEPOTS, WORKSHOPS
- M&P

FINANCES OF INDIAN RAILWAYS

GROSS BUDGETARY SUPPORT

- ✓ CAPITAL FUND
- ✓ DEVELOPMENT FUND (DF)
- ✓ DEPRECIATION RESERVE FUND (DRF)
- ✓ RASHTRIYA RAILWAY SURAKSHA KOSH (RRSK)

□ EXTRA BUDGETARY RESOURCES

- BONDS (Issued by IRFC)
- Borrowings (LIC etc.)
- Infrastructural Funding (World Bank, JICA etc.)

FINANCING OF PU & WORKSHOPS

PU and Workshops are cost centre of Indian Railways

WORKING
CAPITAL ???

WORKSHOP MANUFACTURING
SUSPENSE!

FINANCING OF PU & WORKSHOPS

PU's and Workshops are cost centre of Indian Railways

ELEMENT OF COSTING IN WORKSHOP

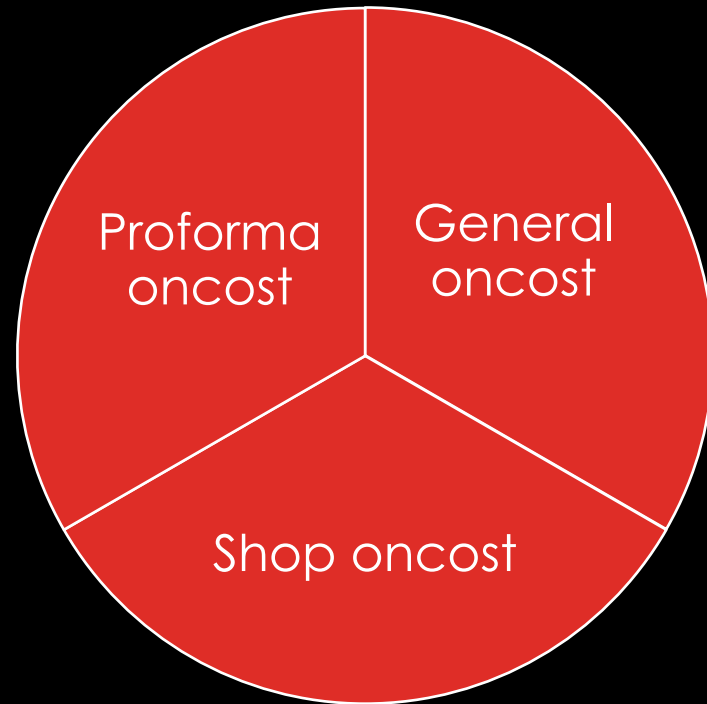
MATERIAL COST

LABOR COST

ONCOST

FINANCING OF PU & WORKSHOPS

OVERHEADS OR ONCOST IN WORKSHOPS



FINANCING OF PU & WORKSHOPS

□ 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.

- ✓ Revenue Standing Work Orders
 - Collect Revenue expenditure
 - Order book never closes
- ✓ Special Work Orders → issued on the receipt of requisition

FINANCING OF PU & WORKSHOPS

Revenue Standing Work Orders

1. Manufacturing Work Orders – are used in Process Shop producing semi manufactured materials
2. Repair to Rolling Stock – Diesel and Electric Locomotives
3. Repair to Machinery and Plant
4. Other Departmental Work (Divisional)
5. Other Departmental Work (Non-Divisional) work done for Other Railway

CHANGES IN WORKSHOP MANAGEMENT

- Introduction of Enterprise Resource Planning (WMIS) application to integrate production planning, inventory and dispatches
- Extend it to integrate with MMIS/IPAS & HR applications
- Elimination of manual job cards, scroll sheets etc.
- Robust on line costing module
- Costing for Non Railway Customers on Marginal costing model under consideration to boost workshop outturn
- Establish CENTER OF EXCELLENCE (COE) in each workshop to showcase niche technologies, and adapting it in the workshops, such as WELDING COE,ER,JAMALPUR.
- Establish Industry 4.0 AUTOMATION standards wherever feasible to eliminate manual intervention, boost outturn, ensure flawless repeatability and reliability of output of the shop

**GOO
D
DAY!!**

