

Machinery & Plants in Indian Railways

Introduction

Machinery and Plants are expensive assets both to acquire and maintain. Hence, it is important that investments in M&P shall be made thoughtfully. Railways and Production Units (PUs) must submit their consolidated Preliminary M&P Programme for items costing more than Rs. 10 lakhs each & above each for Zonal Railways and Rs. 30 lakhs & above each for Production Units and all Road vehicles irrespective of their cost through the M&P Portal maintained by the Railway Board. For items costing up to Rs. 10 lakhs each and Electronic in-motion weigh bridges costing up to Rs.20 lakhs each (excluding Road vehicles irrespective of their cost) can be sanctioned by Zonal Railway under GM's Powers. In case of Production Units, items costing up to Rs. 30 lakhs each (excluding Road vehicles irrespective of their cost) can be sanctioned under GM's Powers. The monetary limits for submission of proposals to RB are revised from time to time as per the latest delegation of powers

Nomenclature for Machinery and Plants

For the purpose of this code, a machine that remains stationary and immovable (Job comes to machine and not vice versa) is a Machinery and Plant (M & P) item. In addition, vehicles such as Staff cars, Lorries, Diesel Utility Vehicles, Road Mobile Cranes, Front End Loader/JCB Cranes and fork lift trucks are also termed as M&P items. As against this, the following are termed as T&P items:

- All movable machines (except those mentioned above) like pneumatic drills, power saws, tools and plants (such as jigs and fixtures)
- Small tools and equipments required for the maintenance of machines
- All measuring instruments / Gauges (irrespective of their unit cost) and
- For the upkeep of the office such as furniture, computers, printers etc.

Codal life of machines

Codal life of machines is given in table below, which is subject to modification from time to time, as amended in Accounts code. The Codal life however is merely an average economic life, assumed for the specific purpose of making long term planning for replacements. Normally condemnation should be on age and condition basis, the latter being a derivative of hours of usage (double or single shift), load factor, maintenance standards etc. Proposing one-to-one replacements should be avoided, unless:

- The requirements of the proposer have remained unchanged since the original equipment was acquired and
- Machines of higher productivity and reliability cannot be economically justified.

S.No	Codal life of machines	
	Railway Board's letter No. 2002/AC-II/1/10, Dated 24.05.2006	
Class of assets		
1.	Machine Tools like Lathes, Planners, Drilling, Boring and Milling machines etc.	15
2.	High Precision and special purpose machine like wheel lathes etc.	15
3.	Tool Room and Testing Laboratory equipment	15
4.	Foundry and Forge Equipment	15
5.	Heat Treatment Equipment	15
6.	Cranes - E.O.T	25
7.	Power Generation Machinery & Switches	15
8.	General purpose light machinery e.g. band saws, floor grinder etc.	10
9.	Air compressor	15
10.	Miscellaneous machines e.g. light cleaning machines, test equipment in diesel sheds, workshops, depots and sick lines	15
11.	Construction Machinery	15
12.	Track Maintenance equipment	20
13.	Station machinery e.g. weighing machines etc.	15
14.	Miscellaneous machinery and equipment for hospital, offices etc.	10
15.	Mechanical Weigh Bridges	15
16.	Electronic-In-Motion Weigh Bridges	08
17.	Diesel Pumps	10
18.	Welding equipment including diesel welding sets	10
19.	Diesel refrigeration equipment	15
20.	Material handling equipment like FLT, Lister trucks etc.,	10
21.	Traversers	25
22.	Fuel station dispensation equipment	10
23.	Bulldozers and other earth moving equipment	15
24.	Motor Boats	10
25.	Hydraulic re-railing equipment	15
26.	Staff cars including Jeeps	07
27.	Light Motor vehicles	10
28.	Heavy Motor vehicles	10
29.	Tractors	10

P.S Since the utilisation of a machine is a function of the hours it had worked, rather than years of its physical existence, future machines should be bought with built-in clock embedded chips so that replacements are planned on the hours clocked in service. This is particularly necessary for the CNC machines with today's control technologies with very low "half life".

Creation of new assets

M&P Proposals can be initiated under DRF, CAPITAL and DF allocations. Proposals on CAPITAL (additional) account should be supported with financial justification and Rate of Return (in accordance with Para 201 and 202 of Chapter II Indian Railway Financial Code Volume-I) duly vetted by Associate Finance. Except for machines required on safety considerations, *Rate of Return* must be clearly indicated duly quantifying benefits such as reduction in cycle time, improved quality and reliability, reduction in monotony etc and indicated in the proposal.

M&P Proposals chargeable to DF should be to a minimum level, restricted to items like medical/safety equipment required for ART/ARME Items proposed under GM's Out of turn sanctions should not be included in the regular M&P Programme for Board's sanction.

Replacement proposals

The following details must be clearly spelt out in the proposal for inclusion of a machine in M&P Programme on replacement (DRF) account:

- Codal life of the machine and actual years worked along with the number of shifts per day in which the machine is working in order to compare the same with the life stated in code for double shift working.
- Intensity of usage and load factor. (Since replacement of a machine is planned after it has served a number of years, it is sometimes difficult to comment on the intensity of usage in the bygone years; All future machines should, as far as possible, therefore be procured with *clock embedded chips* and the life of machines expressed in hours of usage; see footnote to the table given above)
- Jobs undertaken and the workload for the machine.
- If reconditioning of the existing machine or outsourcing was considered and the outcome.
- Total number of similar machines in the load-centre and shortfall in capacity.
- Economics of acquiring one or two machines to replace a larger set.
- Replacement proposed should be substantially for same function and differences, if any, should be clearly brought out with reasons.

- The cost of replacement may be compared with original equipment and reason for any abnormal increase explained.
- Procurement should be completed within two/three Years. As such indenting specification should invariably accompany the proposals.
- Proposals for Road vehicles should accompany survey committee report comprising the condition of the vehicle, expenditure incurred, mileage and recommendation.

Reconditioning of M&P:- There are situations where partial/ full reconditioning of machine is financially more viable in comparison to its condemnation and replacement. This aspect should be examined to decide between replacement **and** reconditioning.

Over aged machines still being retained in the workshops and repair sheds need to be critically examined for their continued retention, so that floor space is effectively utilized, especially under cranes. M&Ps more than 20 years old should be retained only after a clear certification from the concerned CWM or Senior DME in-charge of shed that sufficient load exists for the machine.

There should be a master plan for every workshop and repair shed pinpointing locations of the machine to be procured, in additional/replacement account in future.

As and when new machines are acquired, these should straight away get installed according to this master plan. For inclusion of M&P items required for Carriage Maintenance Depots, the classification of depots into Minor, Medium and Major depots should be kept in view as stated in the Maintenance Manual for BG Coaches classification of depots.

Plan Head “41”

Plan head “41” under Demand No: 16 covers M&P items sanctioned under Machinery & Plant Programme or under GM’s powers. The CME is the Nodal officer incharge for Budget allotments and utilization of funds under this Plan Head.

Works in Progress (WIP) :

All the M & P Sanctioned and for which vetted indents have been submitted to the various procurement organizations but the work has not yet been completed or closed should be included in the Works In Progress (WIP) statement giving clear identification about the status of procurement. In the absence of any clear indication of procurement status, no funds should be allotted for the work.

A summary should also be placed on top of the statement giving totals in three groups, the first for machines costing above Rs.2.50 crores, the second for machines costing below Rs.2.50 crores and the third for machines sanctioned under General Manager’s powers of every financial year.

Total funds projection under Plan Head 41 should be advised to Railway Board in the “Works in Progress” statement. The list of items sanctioned by GM, however, need not be sent to Board. The WIP statement should be sent to Board by 15th December every year. The funds projection should be entered through M&P portal.

Monetary Ceiling for Preliminary M & P Programme:

The amount indicated as the ceiling for submission of M & P Proposals shall be distributed among various departments by the CME as the Nodal Officer. This distribution should be based on the average distribution made and the spending rate of each department in previous three years and corresponding sanction obtained from the Railway Board. The overall ceiling should, however, be followed strictly.

Format and Presentation of Proposals:

Estimated costs of the machines indicated in the proposals should be present day realistic costs and should include cost of essential accessories. The present day cost should be adopted from the latest compendium issued by COFMOW and also available in M&P Portal of COFMOW. Costs for other machines may be obtained through market surveys.

The description of the machine generated by portal (from COFMOW compendium) should be referred and corrected immediately during creation of the proposal. The description should be suitable for use in Pink Book. For non compendium items the specification and

supporting budgetary quotations must be furnished by the Railways. All other costs such as Freight, Insurance, Installation and Commissioning, D & G Charges and Customs Duty wherever applicable, must be furnished in the proposal. Allocation (Chargeable Head) should be carefully examined and included on each Proposal. Preliminary M & P Programme by the Railways should be submitted every year generally by October and after which the portal would disallow any subsequent submissions. CMEs may arrange that proposals for their Railways are submitted online, duly prioritized. Preliminary Programme for all departments will be discussed with the Railways in December/January of every year. The actual dates for the meeting will be advised to the Railways by Railway Board.

Budgeting for M&P:

In case of machines sanctioned through Machinery & Plant Programme, sanctions are normally valid for five years and for those machines sanctioned under GM's Out of Turn only three years. If in any case, a machine is still under the process of procurement and funds need to be projected in the consecutive budgets, revalidation of sanction is required. Based

on the Railway's projection in the Works-In- Progress, Budget Grant is allotted in the Pink Book of that year. This Budget Grant (Pink Book) is released in the Railway Budget and needs parliament approval. In the Pink Book, Budget Grant of not only Programmed deliveries but also for New Acquisition being sanctioned by Railway Board for that financial year is indicated. The machine-wise allotment will be made for items costing more than Rs. 2.5 crores each with a respective Pink Book Number. For items costing less than Rs. 2.5 crores each and those sanctioned under GM's Out of Turn powers, the grants are indicated under a single Pink Book number with allocation-wise breakup separately for Programmed deliveries and New Acquisitions. On receipt of the above Pink Book, individual item-wise re-distribution of the allotment made under works costing less than Rs. 2.5 crores each for both Programmed deliveries and New Acquisition will be made by the nodal officer, based on the requirement of all departments projected while framing the Works-In-Progress statement. This will again get itemized in the List of Approved Works with a unique number for individual items (viz.) LAW number. The allocation-wise allotment of Budget Grant will be advised to all the departments stating that the allotment made should be

utilized fully as planned and in case any additional grants required will be taken care of in Budgetary Reviews.

Review of M&Ps under procurement

Keeping in view the arrears of throw-forward of old sanctions, Railways should critically review all items of M & P sanctioned in previous M & P Programs, which have not been procured so far. The results of the review should be forwarded to the Board. In this review, Railways should not only indicate their recommendation as to whether the sanction to be continued or not duly furnishing detailed current status of procurement.

Separate account should be maintained for M & P items procured under GM's Powers. If an item sanctioned by GM is not procured within three years, the same should be reviewed and processed for revalidation of sanction.

Category of M&Ps

There are four categories of machines procured under the M&P Program.

- Category A: These are sophisticated and unique machines requiring extensive market survey and with specialized knowledge of the world of machine tools. They will be procured by COFMOW.
- Category B: Machines like EOT cranes, welding machines, compressors, Road Mobile Cranes, Diesel Gensets etc., that figure frequently in the M&P Programs of the railways should be carefully procured, duly eliminating unreliable vendors from a highly competitive market. In this case, when procurement is bulked, the volumes involved afford a scale economy. As the nodal procurement agency, COFMOW should consider following options, apart from the normal procurement option:
 1. Entering into Running/Rate Contracts for 2 to 3 years with necessary Price Variation Clause and place orders against the requirements of Zonal Railways / PUs.
 2. In case of machines where it is becoming difficult to establish reliable suppliers, COFMOW may also examine the ILM option (Install, maintain and lease), which can be availed by the consignee

Railways or PUs, in the same manner as construction companies hire cranes, front end loaders and other machines on long term basis.

- Category C: Special machines of unique and sophisticated nature for which the domain knowledge may not exist with COFMOW and where the requirements cannot be bulked, come under this category. These can be bought by the user railways, after seeking dispensation from COFMOW. Such dispensation should be sought from COFMOW well in time, so that procurement is not delayed.
- Category D: Other machines of smaller value below a certain limit barring certain excluded items, as stipulated by RB, as well as medical equipment whose procurement is best left to the user Railway, unless it is felt that such decentralization will compromise on quality or decelerate procurement. When a machine is proposed in the M&P Program, the user should indicate the category against each machine proposed along with his preference regarding the mode of procurement. In all the categories of M&Ps, except category D, dispensation from

COFMOW is essential for Zonal Railways to arrange procurement by themselves.

Cost and Time overruns:

Cost overruns occur mostly due to delays in decision making and procurement. The following steps should be taken to reduce the lead time and accelerate spending under this plan head.

- CMEs should generate a 10 year Master Plan for replacement on age-cum condition basis – indicating machines to be replaced on chronological basis for all departments.
- Proposals to be carefully thought out and fine tuned. Once a machine is sanctioned, there should be no road blocks like essentiality certificate etc.
- While advising Budget sanctions for new M&Ps, both in Plan Head 41 and 42, the category of the item (Para above refers) as decided is clearly indicated, so that procurement action by the concerned agency is organized in time
- Once the ----- Budget is approved, procurement action for Category A items should be instantly initiated by COFMOW, without any need for long waits in processing

of indents by the users. Minor clarifications from the Zonal Railways for site details or other technical requirements can be obtained by COFMOW, in case they are necessary, through the respective nodal officers of the user Railways.

- Debits must be passed on to the Railways or PUs, after the machines are commissioned. For this purpose COFMOW should be ----- sanctioned a suspense fund as the “Capital at charge”.
- Category D items and category C items wherein dispensation is received from COFMOW should be directly procured by the concerned user Railway or PU.
- All M&P indents should be accompanied by a site drawing, keeping it clear at the time of indenting -- except in rare and extraordinary circumstances.
- Excess over estimates: COFMOW should make a compendium of rates for all categories of machines, duly including taxes and duties. This information shall be available in COFMOW’s interactive portal (www.irmnp.com), to enable the users to indicate realistic estimates at the time of initiating the proposals, duly avoiding delays in getting sanctions for Excess over

Estimates. Irrespective of the value, excess over estimates for category A items should be sanctioned by Board and for other items by the General Manager. SOP should be modified accordingly.

i. The Tender (AT) documents should

1. Have clearly phrased the warranty clause, plugging loopholes.
2. Spell out conditions for the terms “Commissioning Certificate” and “Proving test certificate” unambiguously, binding not only the consignor but also the consignee. In order to minimize the delays caused by mismatching creation of various items of an Industrial facility, either through plan head 41 or through other related plan heads, the following execution methodology must be considered.
 - Greenfield projects should preferably be executed through turn-key route. Components of a project can be grouped into 2 or more sub-projects so that each group in itself is a complete facility.
 - Likewise facilities of setting up an assembly line must also be preferably executed through turn-key route.
 - All individual M&P items requiring associated facilities such as extensive foundations, sheds, track linking,

substantial power supply etc. must be executed through turn-key route, as spelt out in para 318 & para 426 stores code and in “Rules for entering into supply contract”.

- In Brownfield projects also where the area has to be vacated for installing new facilities and M&P may also be executed on turn-key basis.

End-loaded expenditure booking:

In most other type of projects, there is steady outflow of cash as the project advances, and the trend of expenditure is uniform.

In case of M&P procurements the booking starts only after a machine is dispatched and hence the expenditure is end loaded.

With an average lead time of 3 years, the value of W.I.P items is often therefore more than 3 times the budget sanctions.

Delays in commissioning and issue of PTC can sometimes choke expenditure-booking even more than procurement.

Budgetary Reviews:

All the Budgetary reviews will be forwarded by the departments to CME, who in turn will critically review these projections as well as the requirement of his own department and submit to Zonal Accounts duly giving reasons for

allocation-wise Variations with Budget Grant. The Zonal Accounts will forward the same to Railway Board. The various budgetary reviews, which are covered in detail in the Engineering Code, are as follows:

- August Review (AR): In this statement, funds required for the financial year will be projected item-wise in comparison with Budget grant. This statement due by in August gives a trend on requirement of funds.
- Revised Estimate (RE): Revised Estimates should be prepared carefully and machine-wise requirement should be realistically projected, taking into account the likely supply date. In other words, projections can be made only for those items which are expected to be received /commissioned before 31st of March. RE is consolidated in the month of November, and gives a half-yearly trend on utilization of the allotted Budget Grant. Based on the Railway's projection, in case of any excess / surrender, the Revised Grants are allotted by Board, which will be the target for utilization for that financial year.
- Final Modification (FM): The Final Modification statement will be consolidated in the month of January every year and this will give a still more realistic

utilization of the funds allotted and based on this statement “Final Grant” will be allotted to the Railways. FM is projected in such a way that it will almost correspond to the actuals booked for that Year with little or no variation.

- Appropriation accounts: There are two statements to be submitted indicating

Column I – Variation between Budget Grant and Final Grant.

Column IV – Variation between Final Grant and Actuals.

Machine maintenance and Annual Maintenance Contracts (AMCs)

All machines should be procured with manufacturer’s recommendations of the maintenance schedules along with spares to cover the requirement of initial years of operation. Maintenance of machines should be carried out strictly in line with these recommendations. In case of sophisticated and critical machines, where in the opinion of the concerned PHOD, in house maintenance will be detrimental, AMCs may be entered into. Even at the procurement stage, bidders may be

asked to indicate the AMC charges so that it forms part of the tender evaluation. Guidelines for typical AMC charges for various types of M&Ps may be issued by COFMOW so that there are no delays in finalizing the tender at the field levels. Powers for machine repairs and AMC should be decentralized to the field level with necessary checklists for evaluation.

Disposal of condemned and surplus machines:

The following categories of machines should be disposed off under DS8 and credit obtained expeditiously duly advising the nodal officer.

a. Machines condemned and replaced:

- When a machine is replaced and the new asset acquired, the old machine must be withdrawn from service within six months of commissioning of the new machine. This overlap is provided for the new machine to run in and stabilize. No replaced machine should be kept in service. If sufficient justification for retention is available Railway Board's approval has to be obtained for the same. But it is seen that only in rare cases and for a temporary period such approvals are accorded.

b. Machines condemned and replacements not required.

c. Surplus machines:

- A machine becomes surplus due to closure / change in activity or reduction in workload. Surplus machines are identified at regular intervals and offered to other Railways/ Production units. Such machines are transferred to them if demand exists. Similarly the list of surplus machines offered by other Railways / Production Units are scrutinized and if found suitable to our requirement, action is taken to transfer such machines to where needed. Disposal of these machines can be on 'AS IS WHERE IS' condition or by dispatch to stores depot as 'SCRAP', depending on the value it will fetch. Efforts must be made to give the machine with all its parts in working condition so as to fetch a better offer in the auction.

Maintenance of asset Register:

On Successful commissioning of a new machine, it is included in the Asset Register of M&P by allotting an Unified 9-digit Code Number (at Zonal level by the user department).

- The first two digits identify the units – LW/PER, MAS DIV etc.

- The next two digits indicate Sub Location – CR (shop) AJJ (Division) etc.
- The next two digits indicate the Machine group – Like Wheel Lathe, AJTB Lathe, Crane etc.
- The next three digits give the individual machine number.

No machine shall be kept in service without Unified Code Number, prominently painted on it for easy identification. Likewise, when a machine is disposed off or transferred to other Railway, it must be removed from the Asset register of the parent Railway.