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No. CE (Dist)/D-III/R&M/ 11102

Date:- 26.04.2019

To,
The Chief Engineer, all O&M Zone

The Superintending Engineer, all O&M Circle

Sub: Guidelines for execution of R&M works and utilisation funds thereof.

Ref: Tender floated for Preventive & Breakdown maintenance of Substations, HT lines, LT lines
and DTCs.

Pl. Find enclosed herewith the detail guidelines for execution of Preventive & Breakdown maintenance works through the Empanelled Agencies after finalisation of above floated tenders.

All are requested to go through the guidelines and ask all Division and Sub Division officers to implement these guidelines while allotting the works to the Empanelled Agencies after finalisation of above tenders. Overall budget has already been allotted for these maintenance works. The guidelines provide for methodology to execute the maintenance work on priority basis as per standard maintenance practice followed in MSEDCL.

Hence it is requested to follow these guidelines scrupulously and minimise the power interruptions.


Chief Engineer (Distribution)

Encl: As Above.

Copy submitted w.r.to:-

- 1) The Director (Operations / Finance), MSEDCL, Corporate Office, Mumbai.
- 2) The Joint Managing Director, MSEDCL, Regional Office, Aurangabad.
- 3) The Regional Director, MSEDCL, Regional Office, Konkan/ Pune/ Nagpur.
- 4) The Executive Director (Dist.-II), MSEDCL, Corporate Office, Mumbai.
- 5) The Executive Director (IT & BR), MSEDCL, Corporate Office, Mumbai.

Copy to:

The OSD to CMD, MSEDCL, Corporate Office, Mumbai.

Guidelines for execution of R&M works and utilization funds thereof :

Preamble :

MSEDCL has developed a vast electrical distribution infrastructure over a period. As on date, distribution of power supply to around 2.5 million consumer is being done through more than 3505 no. of substations/ switching stations, 6 lakh Distribution Transformers, 3.5 lakh km HT lines, 6 lakh km LT lines. Some of these infrastructure components / equipments have become old and deteriorated due to age resulting into breakdowns causing power interruptions. The damage caused to consumers and MSEDCL due to these breakdowns is in crores of rupees and will continue to increase unless pro-active steps are taken to prevent these breakdowns. The analysis of these breakdowns has revealed that more than two third of electrical system failures can be avoided by a routine preventive maintenance program. A planned preventive maintenance of equipments not only avoids their failure but also increase efficiency and life of the equipments. Thus, a planned preventive maintenance program with schedule of system outages is necessary rather than correcting the major problems, resulting due to untimely failure of equipments.

In view of this, it has been decided to keep a certain amount of its overall budget reserved for an ensured, regular and planned preventive maintenance of various equipments/components of the electrical network. However, while doing these preventive maintenance works, it is necessary to prioritize and follow standard recommended practices uniformly throughout the state. This will ensure that the money invested goes in proper area which will help in improving the quality and reliability of power supply to the consumers. Considering this aspect, R&M budget has been provided through micro-budgeting under different segments viz. Substation, HT Line, LT Line, DTC and transformer oil, for preventive and breakdown works separately.

2. Empanelment of contractors for R&M works :

2.1 In order to carry out the preventive maintenance work regularly and in a planned manner, corporate office has decided to empanel contractors in advance for each activity separately. To have uniformity throughout the state, standard bidding documents of each activity for empanelment of the required contractors has been prepared. The salient features of empanelment of the contractors is as under:

- i) Empanelment of the contractors is being done activity wise viz. for substation / switching stations, DTCs, HT line, LT Line, etc.
- ii) The empanelment of contractors will be for 3 years which can be extended to 5 years in case of good contractors.
- iii) For each subdivision or division and for each activity, 3-5 contractors shall be empanelled.
- iv) The standard bidding documents is being used for tendering.

- v) All the tenders for empanelment of contractors are floated by HO and would be finalized at circle/division level depending on the activity.
- vi) The amount of work orders including taxes for any activity shall be restricted to the budget provision for that activity in the particular year.
- vii) All the works under the work order shall be completed in the same financial year.

2.2 With provision of assured funds and sufficient contractors at disposal for each activity, it is expected that proper preventive maintenance will be carried out to reduce the interruptions of power, hardships to the consumers and loss of revenue to MSEDCL.

3. R&M budget allocation :

3.1 As mentioned above, minimum assured R&M budget has been provided to each circle to avoid the failure of various network components/equipments for want of their preventive maintenance. Accordingly, the R&M budget has been allocated for following six major activities.

- i) Distribution substations / switching stations
- ii) Distribution Transformer
- iii) Transformer oil
- iv) HT lines
- v) LT lines
- vi) Civil works

3.2 It is informed that budget allocation has been done activity wise and is instructed that the expenditure shall be done accordingly within activity wise budget only. Diversion of budgeted funds from one activity to other shall not be allowed. The corporate office will monitor the activity wise expenditure done towards preventive maintenance work and reduction in power failure after carrying out preventive maintenance work. The reduced power failures only will justify the proper utilization of R&M funds.

3.3 While allocation of R&M budget, following particulars are considered:

- i) No. of substations / switching stations in the Division/Circle.
- ii) No. of DTCs, DTCs failure rate in 2017-18, 18-19, oil consumption in 17-18, 18-19.
- iii) Length of HT/LT lines.
- iv) Demand and ABR of that area.
- v) R&M expenditure incurred in previous year.

4. Providing of works and funds utilization :

In the past, though preventive maintenance work was done, it was not done regularly and in planned manner. Some of the components in the network were totally neglected. Now, we are planning that all components / equipments in the network be covered under preventive maintenance. However, considering the quantum of work and required manpower and funds, preventive maintenance is required to be done on priority basis and in phases. Accordingly, the priority of works shall be done based on -

- i) Age of equipments
- ii) No. of consumers who will be affected if that equipment fails,
- iii) Electrical load on the equipment.
- iv) No. of breakdowns occurred on the equipment and financial loss caused to MSEDCL drawn from AMR/MRI data only.
- v) In addition to this the availability of spares and time taken for repairing, replacement of the equipment shall be also considered. Accordingly, action as mentioned below shall be taken:

4.1. Distribution Substations / switching stations :

Yearly regular maintenance of Substations and associated equipments is recommended. However, individual location may require more frequent maintenance due to atmospheric condition or operational nature of the equipment. For example in coastal areas having excessive moistures and areas of chemical zones having excessive deposition of chemicals, dust etc. equipments may require more frequent preventive maintenance. Similarly, heavily loaded critical equipments may also require regular preventive maintenance.

Standard tender documents prepared for preventive maintenance of Substations comprises of three parts, viz part A, B and C.

- a) Part A, which is mandatory for all Substations, involves the health checkup, that is general physical checking of all equipments of substations including their operation. This involves cleaning of all insulators and bushings, tightening of all connections, greasing and alignment of all moving parts, checking of earthing, various displays, etc. After completion of this activity for which lumpsum charges will be paid, we will have a data for each substation about the status of each equipment in the substation.
- b) Part B of this tender, involves repairing or replacement of those components or equipments which are found defective or bypassed during part 'A' activity. Generally, the major components/equipments shall be supplied by MSEDCL and balance by the contractors. However, any component/equipment, if

urgently required and if not available with MSEDCL, the same can be supplied by the contractor. The charges for the same shall be paid as per cost data rate or as per OEM's latest price list, if rate of the component is not available in cost data.

- c) Part C involves replacement of major components like power Transformer, Circuit Breaker, control panel, entire steel structure, etc. A proper indent & planning for the same shall be prepared by the concerned EE and submitted to HO through the Chief Engineer for making necessary arrangement of equipment and funds which will be provided, if available, under CAPEX.
- d) As already mentioned, all substations, at least for part A, will be covered under the tender. However, while executing the preventive maintenance works, priority to following substations will be given in descending order.
 - i) Old substations/switching stations in MIDC & metro areas.
 - ii) Old substations (beyond guarantee period)/switching stations in other Urban areas having capacity 10 MVA & more.
 - iii) Old substations/switching stations in Rural areas having capacity of 10 MVA and more.
 - iv) Old substations/switching stations in Urban areas having capacity less than 10 MVA.
 - v) Old substations/switching stations in Rural areas having capacity less than or equal to 5 MVA.
 - vi) New substations in MIDC/metro area within guarantee period having capacity 10MVA or more, except GIS substations, having loading more than 60%.
 - vii) New substations in other urban area within guarantee period, having capacity 10MVA or more (except GIS substations) and loading more than 60%..
 - viii) New substations in other areas within guarantee period having capacity 10MVA or more and loading more than 60%.
 - ix) All balance Substations.

4.2. DTC :

SBD for preventive maintenance of DTC has been prepared and tenders have been floated from HO. However, tenders finalization and placing of LoA shall be done at concerned Division level. Tenders, again as mentioned above, comprise of 3 parts viz. A, B and C.

- i) Work under part A, general physical checking of all components of DTC and their operation is mandatory and will be paid on lumpsum basis.

- ii) Work under part B, works like repairing and replacement of minor items / equipments like bushings, insulators, AB switch contacts, cable terminations, cable, jumpers, Lightning Arrestors, connectors, earthings etc. shall be taken. The materials will be either provided by MSEDCL or supplied by the contractor if not available with MSEDCL.
- iii) Work under part C comprise of works of replacement of major equipments like Distribution Transformer, AB Switch, RMU, Distribution Transformer structure etc. A proper indent and planning for these works shall be done by the concerned EE for replacement and funds provision and proposal be submitted to CE(Dist) Corporate office through concern CE. Replacement of Distribution Transformer shall be arranged immediately by providing Distribution Transformer from the available stock. However, repairing of the Distribution Transformer's shall be done through separate tenders being floated for Distribution Transformer repairing.
- iv) Considering large no. of DTCs, and limited funds available for R&M works, R&M of DTCs shall be done in 3 phases. In first phase/ 1st year, 1/3rd of DTCs shall be considered. The selection criteria for priority of these DTCs in first phase shall be as under:
 - a) The old DTCs (Beyond GP) in MIDC and Urban areas in descending order of capacity which are loaded more than 70% of their capacity.
 - b) The DTCs in Urban areas located in crowded places like markets, malls, sensitive areas, Govt. offices etc.
 - c) Old DTCs in high rise buildings.
 - d) Old DTCs in Rural areas loaded more than 70% of the capacity.
 - e) New DTCs, within GP in Urban areas which are located in important places like Railway stations, Market, crowded places and which are loaded to more than 70% of the capacity.

4.3. HT/LT lines :

SBD for empanelment of contractors for preventive maintenance of HT/LT lines has been already prepared and tenders have been floated from Head Office. These tenders shall also be finalized and orders of empanelment of contractors shall be given at Division level.

The tenders comprise of three parts viz. A, B and C.

- a) Part A comprises of routine checking of lines, associated various components, trimming of tree branches, etc. and is mandatory for the selected lines (limited to no. of km mentioned in the tender). The charges will be paid on lumpsum basis per KM of line.
- b) Part B comprises of the works, which are required to be done immediately as found during execution of part A. Such works comprise of replacement of damaged conductor, cable, insulator, bushings, cable terminations, rusted fabrication, poles, bent poles etc. Major materials like conductors, cables, poles, insulators etc. shall be supplied by MSEDCL and balance materials like fabrication, nuts & bolts, stay sets, covering, etc. shall be provided by the contractor. However, if any major material, which is urgently required to avoid any untoward incidence and if not available with MSEDCL, can be provided by the contractor.
- c) Part C Comprises of replacement work of major part of the line, eg: replacement of conductor of line for more than 10 spans (more than 600 Rmt) or replacement of rusted poles for more than 10 spans etc. For this, the concerned Executive Engineer shall prepare a proper indent and proposal for approval of Competent Authority and arranging funds. This funds would be separately analysed on the basis of availability under CAPEX.
- d) Again considering the large quantum of network and limited available funds, it has been decided to carry out these works in three phases / years. In the first year / phase, priority for preventive maintenance of lines shall be given as under:
 - a) All old Incoming Overhead lines to Substations & Switching stations in MIDC and Urban areas.
 - b) All old Incoming Overhead lines to Substations & Switching stations in Rural areas.
 - c) All old, heavily loaded (>70% of the capacities) overhead/underground outgoing feeders in MIDC and crowded and important places in Urban areas.
 - d) All old, heavily loaded (>70% of the capacities) overhead outgoing feeders in Rural area (Trunk line).
 - e) All new Overhead lines (within GP) which are loaded >70% of their capacities in MIDC and important and crowded locations in urban areas.

5. Budget :

As already mentioned, component wise fixed budget has been provided in SAP for preventive maintenance and breakdown maintenance separately.

The budget includes expenditure towards labour charges, transport, insurance, taxes, procurement of materials at HO as well as local level and also includes works to be carried by unemployed engineers. Separate guidelines will be issued for empanelment/registration of unemployed engineers.

Guidelines given for prioritizing the preventive maintenance works general instructions to be followed. However, in case of any specific local requirements, the concerned SE or EE can take the necessary decision for preventive maintenance works.

Hence, the concerned SEs and EEs shall ensure that work orders are issued within the limit of budget. All the work orders shall be released through SAP only.

6. General Instructions :

Following General Instructions for all activities are given -

- i) The preventive maintenance work shall be carried out as per the check list provided with SBD only. The certificate regarding the completion of work, including photograph, in prescribed format & jointly signed by the contractors & Section Officer, or authorized person by concerned Executive Engineer shall be submitted on online portal and with each bill.
- ii) The preventive maintenance work shall be prioritized so that these works can be completed within the budget provided for that activity. Any additional preventive maintenance work if required, shall be done only after approval of additional budget provision for that activity.
- iii) Funds approved in the R&M budget for one activity can't be used for other activity. E.g. Spare funds in Substation activity can't be used for DT activity.
- iv) The work shall be executed under the supervision of concerned Section officer or Substation operator or Principal Technician / Senior Technician authorized by the concerned Executive Engineer.
- v) A detailed execution plan for carrying out the preventive maintenance work shall be prepared jointly by the concerned EE and contractors, one month in advance. The plan shall comprise of date wise locations of Substations, DTC, HT/LT lines where preventive maintenance shall be carried, Shutdown period, man power to be deployed so that the required work can be completed within time period, name of the supervisor who will arrange shutdown and also supervise the works, intimation to the affected consumers one month in advance through SMS, arrangement of the materials, both by MSEDCL & contractor, etc.

- vi) While planning in advance, it shall be assured that power supply to any area, DTC or part of line, is not affected more than once in a month/fortnight for MIDC and other areas respectively. Accordingly, planning with all contractors shall be done by the concerned Executive Engineer.
- vii) It shall be the prime responsibility of the concerned EE that once planning of shutdowns is done and declared to the consumers and contractors, required shutdowns will be arranged without fail except in some exceptional cases where the consumers have been subjected to a prolong shutdown due to breakdown on earlier day. The concerned EE shall be held responsible for non arrangement of shutdown as per planning without mentioning any valid reason as mentioned above.
- viii) It will be responsibility of the contractor to arrange required manpower and material for preventive maintenance of any work for which shutdown has been arranged. The works shall be completed within the prescribed time limit.
- ix) The concerned CE and RD shall take regular review of the progress and proper implementation of these guidelines.

7. A separate guidelines/user manual to use IT system for carrying out those maintenance works right from empanelment, to issue work order etc., to submission of bills would be issued separately.