

**PUBLISHING THE DETAILS OF TENDER/CONTRACTS FINALIZED BY RAILWAYS ON WEBSITE FOR THE MONTH OF FEBRUARY'2011**

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Tender No.	Item/ Nature of work	Mode of tender enquiry	Date of Publication of NIT	Types of bidding (single/ two bid system)	Last date of Receipt of tender	Nos. of tender Received	Nos. & Names of Parties qualified after technical evaluation	Nos. & Names of Parties not qualified after technical evaluation	Whether contract awarded to lowest tender/ Evaluated L-1	Contract No. & date	Names of contractor	Value of contract in Rs.	Scheduled date of Completion of supplies.
ET/TRS/WC/09/10-11	"White metalling of TM TAO-659 Suspension Bearing Shells" Total Qty. 500 Pairs (PE-300 Pair & CE-200 Pair)	Open	30.10.10	Single	02.12.10	(04 Nos.) M/s Maruthi Engineering Works, Vijayawada M/s Chandra Udyog, Howrah M/s Jahgirdar Engineering Services, Nagpur M/s Krishna Engineering Works, Hyderabad.	(04 Nos.) M/s Maruthi Engineering Works, Vijayawada M/s Chandra Udyog, Howrah M/s Jahgirdar Engineering Services, Nagpur M/s Krishna Engineering Works, Hyderabad.	Nil	Tender awarded to lowest offer i.e. M/s Maruthi Engineering Works, Plot No. 49 & 50, 100 Feet Road, Auto Nagar, Vijayawada-520 007 (AP)	ET/TRS/WC/09/10-11, dtd. 23.02.11	M/s Maruthi Engineering Works, Plot No. 49 & 50, 100 Feet Road, Auto Nagar, Vijayawada-520 007 (AP)	39,74,800/-	22.02.2012

Sd/-  
(Ajay Mathur)  
Divisional Elect. Enggr. (TRS)  
/ Sr. DEE(TRS)/ELS/ET

Registered With A.D.

WEST CENTRAL RAILWAY

OFFICE OF THE  
Sr. DEE(TRS)/ELS/ITARSI  
Phone & FAX 07572 - 265179

No.ET/TRS/WC/09/10-11

Date : 23—02—2011

M/s Maruthi Engineering Works,  
Plot No. 49 & 50, 100 Feet Road,  
Auto Nagar, Vijayawada-520 007 (AP)

*Dear Sirs,*

**Sub: — Acceptance Letter for the work of “White metalling of Traction Motor TAO-659 Suspension Bearing Shells” Total Qty. 500 Pairs (PE-300 Pair & CE-200 Pair)**

Ref: — 1. Your offer No. ME/WCR/ET/RC/300PE&200CE, dtd.30.11.2010.  
2. This office Tender No. ET/TRS/WC/09/10-11, (Tender opened on 02.12.2010 at 15.15 Hrs.)

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This is to inform you that, the offer submitted by you against the tender referred above for subject work has been accepted by Railway administration at a total cost of Rs.39,74,800/- for 500 pairs of PE & CE (Rs. Thirty Nine Lakhs, Seventy Four Thousand, Eight Hundred only) (@ Rs. 8,250/- per pair PE and Rs. 7,499/- per pair CE) including all taxes, duties, material charges, labour charges, transportation charges (to & fro), octroi & service charges etc. No extra payment shall be made by Railway administration under any circumstances. However, the details of rates and quantities accepted by Railway's are shown at **Serial No. 19**, of this acceptance letter. The terms and conditions of this contract are as under.

1. **SCOPE OF WORK**:—The detailed Scope of Work and work to be carried out in Suspension bearing shells are shown in enclosed tender technical specification part-IV. Final Inspection Certificate is enclosed as Annexure-A
2. **QUANTITY**:— 500 pairs (300 pairs of PE and 200 pairs of CE)
3. **CONSIGNEE**:— Sr. DEE(TRS)/ELS/Itarsi, will be the consignee for the work. The Sr.Divisional Finance Manager, West Central Railway, Bhopal, shall be bill paying authority.
4. **TRANSPORT**: — All the transport required from initial to final completion of work including raw material, test, To and Fro movement from Electric Loco Shed, W.C.Rly./Itarsi, and for rectification of defects noticed at the time of commissioning shall be arranged by contractor. For carrying out rectifications at Railway's site, the contractor shall have to make his own arrangements for materials and Labour etc. In the emergency if bearings transported by the Railway staff, Transportation charges @ Rs. 250/- per pair for one side transportation shall be recovered from contractors bill.

5. **SECURITY DEPOSIT:**— The security deposit /rate of recovery/mode of recovery shall be as under :-
  - a. Total Security Deposit will be **Rs. 1,98,740/- (Rs. One Lakh, Ninety Eight Thousand, Seven Hundred Forty only)**.
  - b. The earnest money **Rs. 85,720/- (Rs. Eighty Five Thousand, Seven Hundred Twenty only)** deposited by the contractor will be retained by the railways as part of security deposit for the due and faithful fulfillment of the contract by the contractor.
  - c. The balance amount of security deposit of **Rs. 1,13,020/- (Rs. One Lakh, Thirteen Thousand, Twenty only)** will be recovered from the running bills only of the contract at the rate of 10% of the bill amount till the full security deposit is recovered.
  
6. **PERFORMANCE GUARANTEE:**—The firm should give a Performance Guarantee in the form of an irrevocable Bank Guarantee or FDR, TDR etc. as mentioned in tender documents amounting to **Rs. 1,98,740/- (Rs. One Lakh, Ninety Eight Thousand, Seven Hundred Forty only)**. The P.G. should be furnished by the firm in any form mentioned in tender document before signing of the contract agreement and shall be initially valid up-to the stipulated date of completion plus 60 days beyond that.
  
7. **DEPOSIT FOR RESIDUAL VALUE:** — The contractor shall have to furnish a Bank Guarantee or Indemnity Bond for Rs. 4,00,000/- (Rs. Four Lakhs) as additional Security Deposit for 80 Pairs of Bearings. The Bank Guarantee shall be submitted on Non-judicial stamp paper worth Rs. 250/- (Rs. Two Hundred Fifty Only) issued by any Nationalized Bank in favour of The President of India, acting through Sr. Divisional Finance Manager, West Central Railway, Bhopal and Indemnity Bond shall be submitted on Non-judicial stamp paper worth Rs.250/- (Rs. Two Hundred Fifty Only) in favour of Sr. Divisional Electrical Engineer (TRS) Electric Loco Shed, West Central Railway,Itarsi. The verification charge of Bank Guarantee/Indemnity Bond shall be borne by contractor and this amount shall **Not be refundable under any circumstances.** The BG/IB shall be released upon receipt of the material by Railway duly repaired.
  
8. **LEGAL CHARGES:**—A fee of Rs.200/- per legal document, like partner-ship deed, bank guarantee, Indemnity Bond or power of attorney executed before the execution of the contract, the contractor will submit above charges for obtaining legal advice from law officer.
  
9. **COLLECTION AND DELIVERY:**—
  - 9.1. At one time bearings in lots of 80 pairs will be handed-over to the contractor for remetalling. The lot size can be increased/decreased depending upon the availability of the bearings at ELS/W.C.R/Itarsi.
  - 9.2. The lot may consists of 40 pairs of PE and 40 Pairs of CE bearings.
  - 9.3. The contractor shall collect the bearings for remetalling from ELS/ W.C.Rly./Itarsi, on his risk and cost. The remetalled bearings shall be delivered after satisfactory inspection and testing at his works.
  
10. **COMPLETION PERIOD:**— The first lot of bearings must be completed within 60 Days from the date handing-over of suspension bearings. The subsequent lot must be completed within **45 days** from the date of handing-over of suspension bearings. The completion of work includes all the tests, stage inspection and transportation of finished bearings from contractors work at ELS/ET. The entire work shall be completed within **12 (Twelve) months from the date of issue of this acceptance letter.**

11. **INSPECTION:** —
- 11.1. The contractor shall afford the facilities related to inspection to the representative of Sr. Divisional Electrical Engineer (TRS) Electric Loco Shed, West Central Railway, Itarsi, during stage and final inspection. Representative of Sr. DEE(TRS)/ELS/ET have free access to inspect, the progress of work at any time any stage with or without prior intimation at the contractor premises to check the quality of the work. The contractor shall have to bear all testing charges for tests carried out in house or outside.
- 11.2. **STAGE INSPECTION:-** The following inspection at various stage will be carried out by the authorized representative of Sr. DEE/TRS/ET at firms premises.
- a. Inspection and testing of raw materials.
  - b. Inspection of facilities available and re-metalling process.
- 11.3. **FINAL INSPECTION (INSTALLATION AND COMMISSIONING):**— All Test specified shall be carried out jointly by the contractors and Railway's representative after completion of the re-metalling work of the bearings at contractors premises with contractor testing equipments. After the work of remetalling and machining of suspension bearings as-per specification all necessary inspection regarding workmanship, dimension, analysis of chemical composition of white metal, ultra sonic test and bond test shall also be carried-out by the authorized representative of Railway's at firm's premises, expenses for which will be borne by the firm. Inspection certificate will be signed by authorized representative of Railway and the firm jointly as-per annexure-A. Remetalled suspension bearings shall be dispatched to ELS/ET from the works of the contractor only after the satisfactory inspection and testing by the representative of Sr.DEE/TRS/ET at the contractor's work and issue of necessary instruction for dispatching the remmetalled bearings to ELS/Itarsi.
- 11.4. On receipt of remetalled bearings at Electric Loco Shed, Itarsi, if any defects/damages or defective workmanship is noticed by the ELS/ET. the same shall be taken back for rectification by the contractor within 07 (Seven) days from the date of receipt of message from Sr. DEE/TRS/ ELS/ET., at his own expenditure and the rectified bearings shall be returned to ELS/ET, by the contractor within 03 (Three) weeks from the date of lifting of defective suspension bearings from ELS/ET at his risk and cost.
- It may be clearly noted that, the final acceptance will be granted only on receipt and successful fitment and testing of remetalled bearings with motors by the Railway to the satisfaction of the Sr. DEE/TRS/ELS/ET. The assembly will be done by the Railway, in the presence of contractors representative if desired by Sr. DEE(TRS)/ELS/ET. All defect noticed during the assembly will be rectified by the contractor at the railway's site or at his works as directed by the Sr. DEE(TRS)/ET. A completion certificate for each lot will be granted after satisfactory inspection, testing of remetalled bearings assembled on motors by Railway in case contractor fails to depute his representative to associate in the assembly and testing in each lot, he shall have to accept the defects advised by the Railway and rectify them or bear the cost of rectification done by Sr. DEE(TRS)/ELS/ET.

12. **DEVIATION**:— In your offer, you have mentioned the following terms and conditions. The deviation accepted by Railway's are as under

Sr. No.	Firm's Condition	Railway's Remarks
01.	100% payment against delivery of each consignment	Not acceptable. The Railway's special terms and conditions (Part-III) para-3.12(Page-60), in this regard shall be applicable on the firm as detailed at clause 13 below.

13. **PAYMENT TERMS**: —

13.1 Payment to the extent of 90% of the completed work of repair, Re-metalling and rehabilitation of suspension bearings shall be made after inspection of remetalled/rehabilitation bearings duly inspected at contractor's site and receipt in good condition at Railway's site duly supported with challan, test certificate, excise gate pass, photocopy of PAN etc.

13.2 The balance 10% Payment shall be made only after successful completion of warranty period or against a performance bank guarantee for the like amount valid for period of 02 (Two) months beyond the warranty period.

13.3 It may be noted that, the payments as above are subject to compliance of contractual obligation followed by Railway in works contract which are brief signing of agreement, verification of Power of attorney by Railway's legal department furnishing valid ITCC, Security Deposit money, MB entries, Bill in Railway's standard form etc. PAN to be submitted along with Bill, without PAN no payment will be made. It is also mandatory to provide the following information by the contractor along with bill.

1. Contractor's Bank a/c no.
2. Name of the Bank.
3. MICR code of the Bank.

14. **TAXES**:— Commercial tax of M.P. Government, Income tax and Education Cess as applicable shall be deducted from contractor bill.

15. **WORKS CONTRACT TAX**:— The works contract tax/commercial tax/ trade tax where ever applicable shall be deducted from contractor bills. Tenderer may consider this aspect while quoting for the work.

16. **FORM OF BILL**:— Bill should be submitted in Bill form No. EB-4 (On Account contractor certificate) and final bill form No.EB-3.

17. **WARRANTY PERIOD**:— The warranty period is 18 (Eighteen) months after the date of commissioning or 24 (Twenty Four) months from the date of receipt of material, whichever is earlier. Any failure due to poor workmanship and material, contractor is liable to rectify the defects free of cost during the warranty period.

18. **QUALITY ASSURANCE PLAN**: — Within 30 days of acceptance of offer and completing the formalities of signing of the contract agreement and depositing the security deposit. The contractor shall submit testing certificate in support of the material confirming to relevant specification and/or approved drawings to the Sr.DEE/TRS/ET, for his approval. The QAP along with these details shall be sent to the Sr. DEE/TRS/ELS/ET for his approval. The firm shall proceed with the work only on receipt of approval.

19. **SCHEDULE OF RATES:** — The schedule of rates and quantities accepted by Railway administration are as under:

Sr. No.	Description of Work	Qty.	Unit rate in Rs.	Total amount in Rs.
01.	“White metalling of Traction Motor TAO-659 Suspension Bearing Shells” (Pinion End and Commutator End (Total Qty. 500 Pairs)			
(i)	Pinion End (PE)	300 Pairs	8,250/-	24,75,000/-
(ii)	Commutator End (CE)	200 Pairs	7,499/-	14,99,800/-
<b>GRAND TOTAL</b>		---	---	39,74,800/-
<b>(Rs. Thirty Nine Lakhs, Seventy Four Thousand, Eight Hundred only)</b>				

20. **PRICE VARIATION CLAUSE:-** No price variation for this tender/contract will be applicable. The rates quoted should therefore be firm. The price value quoted by the tenderer and accepted by the Railway shall be treated as firm during the entire period of completion of work.
21. **REFUND OF SECURITY DEPOSIT & PERFORMANCE GUARANTEE:-** The P.G. shall be released after physical completion of the work based on “completion certificate” issued by the competent authority stating that, the contractor has completed the work in all respect satisfactorily. The SD, however, shall be released only after the expiry of the maintenance period and after passing the final bill based on “No claim Certificate”.
22. **QUANTITY OPTION:—**The Railway reserves right to increase or decrease the quantity by 25% during the currency of contract. The total cost will be adjusted accordingly.
23. **LIQUIDATED DAMAGE:—** If the contractor fails to complete the works with in the time as specified in the contract for the reasons other then the reasons specified in force majeure clause LD charges @ 0.5% of the contract value of the work for each week or part of the week subject to the maximum limit as mentioned as below will be recovered from the contractors and same will be deducted form contractors bill.
- (a) For contract value up to Rs. 2 Lakhs – 10% of the total contract value.
- (b) For contract value above Rs. 2 Lakhs – 10% of first 2 Lakhs and 5% of the balance.
- The competent authority while granting extension to the currency of contract under clause of GCC may also be considered levy to token penalty as deemed fit based on the merit of the case.

24. **FAILURE TO COMPLETE THE WORK WITHIN THE TIME LIMIT:** —

- 24.1. Contractor should take all care to avoid delay on account of contractor works. If work is delayed on account of contractors, penalty shall be imposed as-per the contract stipulation.
- 24.2. If the contractor fails to carry out, execute and complete the work to be done by him under this contract within the time specified in the tender form, the contractor shall accept a reduction in the total amount payable to him by the Railway as per the GCC.
- 24.3. No Labour transport material handling equipment tools, tackles, machines and equipment shall be provided by the Railway for execution of work.

25. **CONTRACTORS LIABILITIES:** —

- 25.1. All the materials, labour, tools, plant, machinery & equipments, required for the work should be arranged by the contractor at the site of work at his own cost.
- 25.2. The contractor will be responsible for any damage to the material/ equipment or injury to labour during the period of work and he should take prior precautions to safeguard the material/equipment and ensure safety of his labour.
- 25.3. The work completed by the contractor will be inspected by authorized representative of Sr. DEE(TRS)/Electric Loco Shed, West Central Railway, Itarsi and accepted after satisfaction. If any complaint is received regarding the work, the same will have to be rectified by the contractor free of cost.
- 25.4. In addition to the conditions laid down the actual conditions such as GCC etc. prevailing at the time of signing the contract document shall supersede any of the provision as mentioned in the tender document.
- 25.5. All the legal and financial implications as a result of modification in Government policy and act will be accordingly accommodated and shall be acceptable to the contractor.
- 25.6. All the disposals regarding this tender remains under the jurisdiction of Bhopal court.
- 25.7. General conditions of contract amended up-to date will be applicable.
- 25.8. The contractor will be responsible for any compensation to be paid to his employees as a result of any mishap during the course of work. Railway will not be responsible for any injury, loss of life/damages to contractor's labour or supervisors.
- 25.9. The contractor shall remain at all time liable and responsible to the Railways for any loss or damage caused to Bogie frame The assessment of damage shall be done by Railways and this assessment shall be final and binding on the contractor.
- 25.10. The Railways will also be authorized to recover the amount of loss suffered by the Railways from the contractor under these provisions and the decision and determination by the Railways or its authorized representative and shall not be challenged in any court of law or arbitration or otherwise and the contractor after signing this agreement hereby irrevocably authorizes the Railways to set off and adjust such loss or damage against the amount of security deposit and/or outstanding payment and in the event of short fall, the contractor shall immediately , on issuing a certificate by the Railways, pay the same amount to the Railways without demur or objection.

26. **TERMINATION OF CONTRACT:**— Where-ever the contract is rescinded, the Security Deposit shall be forfeited and the performance Guarantee shall be encashed and the balance work shall be got done independently without risk and cost of the failed contractor. The failed contractor shall be debarred from participating in the tender for executing the balance work. If the failed contractor is a JV or a partnership firm, than every member/partner of such a firm shall be debarred from participating in the tender for balance work either in his/ her individual capacity or as a partner of any other JV/Partnership firm.
27. **EMPOWERMENT OF FIELD ORGANIZATIONS:** —
- 27.1. Railway Board vide letter No.2007/CE/I/CT/18,dtd.28.9.2007,introduced Performance Guarantee in works contracts and doing away with risk & cost tenders has been discussed in detail. The following guidelines are issued with the Finance concurrence of FA & CAO and sanction of General Manager, for disposal of risk and cost tender.
- 27.2. After signing of the agreement and submission of performance guarantee, the work has commenced and the contractor abandons the work without completing it, then performance guarantee shall be encashed and Security Deposit recovered so far shall be forfeited. Balance Security Deposit shall be recovered from his unpaid dues of the existing contract. If there is still some balance left, it should be recovered from his other ongoing contracts with his Railway/Other Railways/other Govt. departments.
- 27.3. The agreement is signed and the Performance Guarantee submitted, thereafter the contractor does not commence the work. In such a case, the performance Guarantee shall be encashed and the amount of equal to security deposit shall be recovered from the on going contracts of the contractor. Further, if the contractor is not the working contractor of the Railway, then action would be taken for recovery of these dues from other Railways/Government departments.
- 27.4. After the issue of Letter of Acceptance, the contractor does not come forward to sign the agreement and does not submit the performance guarantee within the stipulated time. In such a case, the amount equivalent to performance guarantee shall be recovered from his on going contracts. If the contractor is not a working contractor of this Railway or required amount is not available with West Central Railway, then action will be taken for recovery of these dues from his on going contracts with other Railways/Govt. departments.
- 27.5. The tenderer withdraws his offer before expiry of validity period of his offer or issue of Acceptance Letter, whichever is earlier then in such a case. His EMD shall be forfeited in case L-1, withdraws his offer, then, tender should also be discharged as-per extant instructions.

In all the above cases, the failed contractor/tenderer who has withdrawn the offer shall be debarred from participating in the tender for executing the work/balance work. If the failed contractor/tenderer who has withdrawn the offer is JV or a partnership firm then every member/partner of such firm shall be debarred from participating in the tender for the balance work either in his individual capacity or as a partner of a JV/Partnership firm.

28. **SIGNING OF CONTRACT AGREEMENT:** —

28.1. The contractor shall have to furnish ownership deed, certificates of registration, legal documents, Performance guarantee Power of attorney in favor of the person signing the contract agreement etc. within 07 days of receipt of the letter of acceptance.

28.2. The contractor will be intimated regarding vetting of above said legal documents and tenderer shall arrange for signing of contract agreement within 07 (Seven) days after receiving the intimation in this connection. In case the firm is a partnership firm, the contract agreement as power of attorney shall be signed by all partners.

29. **GOVERNANCE OF CONTRACT:**— This contract shall be governed by the latest General conditions of contract, IRS standard conditions of contract and Railway's standard Arbitration clause. In case of any ambiguity between GCC and special conditions of contract, special conditions of contract will prevail.

30. This being a works contract hence, all general terms and conditions of works contract of West Central Railway, shall be applicable to firm.

All other Railway's terms and conditions of tender booklets are binding to firm.

You are advised to please attend this office within **Seven days** from the date of receipt of this acceptance Letter with performance guarantee and Indemnity Bond.

Please sign each and every page of this acceptance letter and return one copy to this office in token of acceptance of all conditions mentioned above.

*Thanking you,*

Yours Sincerely,

DA: Part-IV & Annex-A

Sd/-  
( Neeraj Sharma )  
Asstt. Div. Elect. Engineer (TRS)  
/ Sr. DEE(TRS)/ELS/ET.  
For and on Behalf of President of India,

C/- Sr. DFM/WCR/Bhopal. — For information and necessary action please.

C/- SSE/M-6/TRS/ET — He will supervise the work and progress must be submitted to undersigned regularly.

C/- SSE(CS)/TRS/ET — For information & necessary action.

DA: Part-IV & Annex-A

Sd/-  
/ Sr. DEE/TRS/ELS/ET

**PART-IV**

WEST CENTRAL RAILWAY

ELECTRIC LOCO SHED, ITARSI  
ELECTRICAL DEPARTMENT

Tender Specification No. ET/TRS/WC/09/10-11

**TENDER SPECIFICATION FOR THE WORK OF  
"WHITE METALLING OF TRACTION MOTOR TAO-659 SUSPENSION BEARING  
SHELLS", TOTAL QTY. 500 PAIR (PE-300 PAIR & CE-200 PAIR)**

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- 4.1.0. **QUANTITY**:— Total quantity 500 pairs (300 pairs of PE and 200 pairs of CE)  
The suspension bearings to be re-metalled, shall be supplied in pairs. One suspension bearing pairs means suspension bearing shells in two halves each of pinion end or two halves each of commutator end. The defective suspension bearing to be given for remetalling work shall be with the existing white metal in it as condition basis. The released material shall be retained by the firm.
- 4.2.0. **SCOPE OF WORK**:—The work comprises of complete Repair, demetalling, remetalling, reconditioning and rehabilitation of old used suspension bearing shells of TAO-659 Traction Motors. Worn out suspension bearing shells shall be supplied by Railways, in pairs. The following work shall be carried out on the old used suspension bearing shells as-per modified drawing No.WR-CCG-EL/1-TM-067 Alt-4 stile-1 for PE suspension bearings and drawing No.WR-CCG-EL/1-TM-066 Alt-4 stile-1 for CE suspension bearings.  
Cleaning of worn out shells of suspension bearings shall be carried out and after cleaning, the shells shall be repaired by machining inner grooves completely up-to flat surface.
- 4.2.1. 100% Face matching of both halves of old suspension bearings shells must be checked and reclaimed accordingly with light pass test.
- 4.2.2. Reclamation of Dowell holes has to be done to the proper size as-per drawing.
- 4.2.3. Trousing of white metal seats from outer dia.
- 4.2.4. Matching of remetalling of shells with dial indicator method as-per drawings.
- 4.2.5. Bottom halves of PE side suspension bearing hole to be increased from 8 x 53 mm. to 16 x 106mm.
- 4.2.6. Felt riveting holes on each halves in both groves must be 05 Nos. instead of 03 Nos. holes size 3.2mm.
- 4.2.7. After machining of remetalled shells tapperness should be given on bore area on both end must be  $\frac{1}{4}^{\circ}$  taper for 50mm length on PE SB and  $\frac{1}{2}^{\circ}$  taper for 25mm length on CE.
- 4.3.0 **BABBITTING**: —
- 4.3.1. **GENERAL**:—The detailed procedure for white metalling (Babbitting) of both used and new axle suspension bearings of traction motors is furnished here. The main aim of this procedure is to obtain an adhesion as perfect as possible between steel shell and babbit (white metallic lining), which is necessary for good mechanical strength as well as good thermal conductivity of bearings.

- 4.3.2. **FOR USED AXLE SUSPENSION BEARILNG ONLY.**
- 4.3.3. **DEMETALLING OF SHELL:** — Suspension bearing shells requiring re-babbiting to be kept in furnace at a temperature of 400-450°C in a tray. The white metal will melt and accumulate in tray. Take out the bearing shell from the furnace and scrap them to remove any left over metal with a suitable mild steel strip and finally clean the surface with asbestos cloth.
- 4.3.4. **INSPECTION OF BEARING SHELLS:** — Inspect the bearing shells for any deformations such as ovality in bore diameter, deformation in collar thickness and felt grooves etc. Ovality should not be more than 0.3mm. The dimensions of the bearing shells should be as per drawing only. The shells not confirming to the dimensions or having any deformation and cracks detected by ringing test/ultrasonic test should be straightway rejected.
- 4.3.5. **CONDITION OF FIXTURES/CLAMPS/SEPARATING STRIPS ETC.:** - All the fixtures/clamps and separating strips etc. must keep in clean condition when not in use and also should be protected against rusting by a coat of graphite painting stopping off paste may be prepared by mixing 1 Kg. of magnesium with 2.5 liters of sodium silicate and 1.2 liters of water.
- 4.3.6. **MATCHING AND CLEANING OF BEARING SHELLS:**-To have good bond strength between bearing shell and white metallic lining. It is essential that shell should be thoroughly cleaned and should not have any rusted. Greased/carbonized surfaces on any other irregularities.
- 4.3.7. **MACHINING OF SHELLS:**— Machine all the surfaces of bearing shells which are to be tinned and white metallated by providing a cut of 0.05mm to ensure that no rust/Carbon/any other irregularities and foreign remain.
- 4.3.8. **DE-GREASING AND WASHING OF SHELLS:**— After machining bearing shells should be degreased by using white sprit/try-chloranthy/dilute hydrochloric acid. Then wash the bearing shells with hot water having a temperature of 60 to 70°C.  
**NOTE:**— De-greased and washed surfaces of the bearing shells should not be touched by hand.
- 4.3.9. **PROTECTION OF THE PORTION OF BEARING SHELLS WHICH ARE TO BE TINNED.**
- 4.3.10. Apply a coat of stopping off paste having following composition with the help of brush on the surfaces or parts of bearing shells which are to be tinned and white metallated. Composition of stopping off paste
- a. Magnesium oxide - 1 Kg.
  - b. Sodium silicate - 2.5 Ltrs.
  - c. Water - 1.25 Ltrs.
  - d. Materials and plant required for tinning of bearing shell.
  - e. Pour tin as per BS-2801, Grade Sn.99.85.
  - f. Tin bath unit.

4.3.11. **FLUX**

Prepare the flux with following ingredients.

- (a) Zinc chloride - 32.6% by weight.
- (b) Ammonium chloride - 2.1% by weight.
- (c) Hydrochloric Acid - 6.7% by weight.
- (d) Water - 58.6% by weight.

4.3.12. **PRE HEATING OF BEARING SHELLS**:-The bearing shell should be preheated at a temperature of 250+/-10°C in a Temperature controlled oven fitted with thermocouple and pyrometer etc. It is essential to avoid projection of tin while dipping the bearing shells in the tin bath.

4.3.13. **FLUXING OF BEARING SHELLS**:-Apply liquid flux by brush on heated bearing surfaces which are to be tinned and white metallated.

4.3.14. **TIN BATH** Maintain the temperature of tin bath at 300 +/- 10°C. Usefully pure tin as per BS 2801 grade Sn.99.85. Cover the molten and heated tin having temperature 300 +/- 10°C with a thin layer of molten flux prepared just sufficient to cover the tin and keep the bath clean. Remove surplus periodically.

The preheated bearing shell with the flux brushed should be immersed slowly in the tin bath having temperature of 300+/- 10°C for 2 to 3 times for a total period of 5 to 8 minutes, depending upon the size to ensure that all the surfaces of bearing shells has tinned properly and there is no sign of blackening. At each time of removing the bearing shell from tin bath clear the brass from the surface of tin bath and remove excess tin from bearing shell surface with a fluxed brush and at the same time check the continuity of the tin layer on the bearing shell. Finally after obtaining very shine finish, keep the bearing shell for cooling. These tinned surfaces should be protected from any damage.

4.3.15. **PROCEDURE FOR WHITE METALLING**

4.3.16. **WHITE METAL**:— To have good bond strength, use white metal as per IS 25-1979 grade 84. Temperature of white metal should maintain at 430°C to 460°C and dross should be removed from top of the molten white metal by prickling Ammonium chloride powder and screening with an asbestos sheet.

4.3.17. **ASSEMBLY OF BEARING SHELLS**: — During assembly of bearing shell halve put a separator strip in between two halve and block the windows of lubricating pad with the help of some suitable plugs and then finally clamp them. These strips are used to ensure that both halve of the bearing shell get separated easily after white metalling.

4.3.18. **CENTRIFUGING METHOD**:—Centrifuging method is superior than gravity method and as well as provide better bond strength.

4.3.19. Assembled bearing halve should be heated at 250 +/- 10°C in a temperature controlled oven fitted with thermocouple and pyrometer etc. Apply a coat of flux on the heated bearing surfaces. Immersed the heated bearing shell in the tin bath having temperature between 280°C to 300°C and keep it for such time, its temperatures reaches up-to 280°C.

- 4.3.20. The heated bearing shell should be removed from the bath and placed in spinning machine immediately to avoid any heat loss.
- 4.3.21. Keep the guard of machine in position and run the spinning machine at set speed. Molten white metal having temperature of 430 to 460°C should be poured through the funnel, while spinning machine is running at set speed to avoid metal being poured directly down the bearing surfaces. Care should be taken to avoid splashing of molten white metal as far as possible. After pouring the white metal run the spinning machine further for 2 to 3 minutes and spray water continuously to cool the bearing surfaces.
- 4.3.22. **DRAWINGS**:— The suspension bearings shall be re-metalled as-per the following drawings.  
(a) Drg No.WR-CCG-EL/1-TM-067 Alt-4 stile-1 for PE Suspension bearings.  
(a) Drg No.WR-CCG-EL/1-TM-066 Alt-4 stile-1 for CE Suspension bearings.
- 4.3.23. **PACKING**:— The axle bearing assemblies shall be suitably packed to prevent transit damage. The bearing halves shall be assembled with the dowel pins and then held together by providing steel straps at least three places. The inside surface of the assembled axle bearing shall be suitably protected by filling the space with either corrugated paper. Each assembly before it is packed in a wooden crate, shall suitably be coated with anti rust varnish on the outer surface in order to avoid rusting during long time storing or otherwise and then the assembly shall be sealed in a thick polythene/plastic envelop duly sealed. Each assembly or a number of assemblies shall than be packed in a wooden crate, taking necessary precautions to protect the top and bottom surface from damage and holding each assembly in a fixed position with the help of wooden segments suitably nailed to the crate

/ Sr. DEE(TRS)/ELS/ET

LOT NO.

Inspection date -----

Final inspection report for re-metalling of old SB for T.M. TAO 659 (PE/CE pair's)

Inspection date = .....

Quantity:- (A) PE/SB = ..... pair's. (B) CE/SB = ..... pair's.

Sr. No.	PE/CE Type	Rly. No.	Firm No	N/O 1/O2	Step size	ID with Lining	Thick-ness of lining	Hole In felt Grove channel	Hole size in PE/SB in bottom hauls.	Dowell hole in Outer-size.=01 nos.	Dowell hole for joint pairs.= 04 nos.	Grove in wick pad packet at all corner	Collar size with white metal	Grove in both joint of hauls on both end	Taper ness at both end PE/SB= 50mm, at ¼° CE/SB=25m , at ½°	Surface finishing	Condition of felt grove channel	Bond Test	Remark's
		STD	--	--	--	As per Step size.	3mm	5 per hauls pair	16x 106 mm	Dia 20.2 x 14mm	Dia 10.2 x 12mm		32 mm	As per drg.					
01																			
02																			
03																			
04																			
05																			
06																			
07																			
08																			

Railway Representative

Firm's Representative