

**PART - V**  
**TECHNICAL SCHEDULE**

**TECHNICAL SCHEDULE OF ARC FOR RELAGGING OF CONVEYOR**  
**PULLEYS OF MOHP BY COLD VULCANIZING**

1.0 JOB DESCRIPTION

There are about 252 Nos. of conveyor pulleys in use in our Mechanical Iron Ore handling Plant(MOHP) located at berth No. 9. The diameters of these pulleys range from 400 mm to 1450 mm and face width from 1050 mm to 1800 mm. Among these, the drive pulleys are to be lagged with 20 mm thick diamond grooved synthetic rubber as per Drg. No. 039324 enclosed with the tender while others are to be lagged with 20 mm thick plain synthetic rubber through cold vulcanizing process.

2.0 SCOPE OF WORK

The tenure of the contract period will be two years. The tenderer shall take all factors into account including probable increase in cost of materials, consumables during the 2 years contract period and quote accordingly. The total surface area of all the pulleys works out to around 1080 sq. mtrs. As per inspection of all conveyor pulleys carried out recently, total estimated quantity for re-lagging of pulleys works out to 150 sq. mtrs. for each contractual year, 35% (approx) of which is required to be executed during fair season period of Oct. to May months and balance 65% (approx) during Plant slack period/shutdown period from i.e. June to Sept. months. Relagging of worn-out pulleys surfaces is required to be carried out using wear resistant quality 20 mm thick synthetic rubber sheets, specifications of synthetic rubber have been indicated in the tender under para(13). The performance guarantee applicable for re-lagging with 20 mm thick synthetic rubber sheets shall be 2 years.

2.1 Size and type of pulleys to be relagged cannot be indicated at this stage but same will be indicated in the order/regularising order to be placed on the contractor from time to time during the tenure of the contract in accordance with our MOHP requirements. Whenever required by us, relagging or patching up of pulleys whose relagged surface is fully or partially worn-out, is to be carried out round the clock in-situ where the pulley has been installed in the Plant during the tenure of the contract in order to reduce downtime period of vital machines, conveyors, equipments, etc., for pulley replacement from wornout lagging. All required facilities for such in-situ working will be made available by the Port to the Contractor. Contractor should gear up to undertake such in-situ works at a short notice of 4 hours, whenever and wherever required.

2.2 The tenderer should have his set up established workshop facilities in and around Vasco for attending the relagging work in-situ at short notice, whenever required in emergency condition.

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- 2.3 The tenderer should have experience of carrying out similar works in the past and enclose documentary evidence in that respect alongwith his tender submitted. Also he should furnish a list of works in hand at the time of submitting the tender containing details such as (a) Name of Work (b) Location of Work (c) Amount of work (d) Present status, etc.

3.0 FACILITIES AVAILABLE FOR RELAGGING BY COLD PROCESS

Generally re-lagging of worn out pulleys by cold process is to be carried out at the Site workshop of MOHP. However, re-lagging in-situ shall also be carried out whenever required on pulleys installed at site in MOHP to meet emergency requirements and to bring down downtime of equipments from replacement of pulleys with worn out lagging. Pulleys requiring re-lagging at Site Workshop of MOHP will be removed from the site by the Port staff and handed over to the contractor for re-lagging in small batches, say 3 to 5 nos. but same cannot be guaranteed always. Required facility for relagging, such as crane, electricity, water, etc. can be made available at Site Workshop free of cost. Storage facilities for storing contractor's materials consumables etc., required for re-lagging work can also be provided to the extent possible on chargeable basis.

4.0 WORKING TIMINGS

Normal working hours of Site Workshop is from 0830 hrs. to 1730 hrs with a break for lunch from 1230 to 1330 hrs. MOHP works all the seven days in a week. Whenever required by us, re-lagging of a pulley or a batch of pulleys shall be carried out round the clock to meet Plant's requirements. Tenderer will be permitted to work beyond the working hours of the Site Workshop with prior permission of the Engineer or his representative.

5.0 REQUIREMENT OF MATERIALS, LABOUR, CONSUMABLES, TRANSPORTATION, ETC. FOR RE-LAGGING WORKS

Required materials, consumables, skilled/unskilled labour, supervisors and transport for carrying materials, labour etc., from contractor's workshop/ works to MOHP site workshop and back shall be arranged by the contractor and Port will not take any responsibility for the same.

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6.0 RATES/PRICES

The rates quoted for re-lagging by cold process for synthetic rubber shall be on per sq. mtrs. basis and shall be inclusive of all incidental charges like taxes, duties, excise, levies, packing, forwarding, transit insurance for pulleys etc.,(exclusive of service tax which will be paid extra as applicable) as well as travelling expenses, supply and transportation of all required materials, consumables, etc. boarding and lodging expenses of contractor's technician/supervisory personnel etc., if any, labour for transportation to the site of work and back to contractor's work/camp, hiring of any casual/additional labour if required for proper execution of the work.

7.0 OUTPUT

An output of minimum 2 sq. mtrs. of re-lagging by cold process per day shall be guaranteed during fair season period of the plant from February, 2012 to May, 2013 and October, 2013 to May, 2014 whenever required by us. However an output of minimum 30 sq. mtrs shall be guaranteed during Plant Shutdown period of Aug.2013 and Aug.14 to meet Plant requirement of re-lagging of large number of pulleys at that time.

8.0 COMMENCEMENT OF WORK

The work of re-lagging shall commence within 8 days of receipt of the order by the tenderer. It may be noted that the adherence to required output as indicated above is a must, to ensure that the plant goes into operation soon after completion of the shutdown works and any delay to stick to required output will call for application of liquidated damages as per contract conditions.

9.0 **MOBILISATION AND COMPLETION PERIOD:**

**The successful tenderer shall mobilise the work within 7 days on placement of the order. The above mobilisation period will be given only once when the pulley is ordered for relagging for the first time but not for each subsequent order placed on the tenderer time to time. The contractor should then take up immediately as work arises during the currency of contract period which will be intimated by regularising order. The contractor shall ensure that the conveyor pulleys are to be relagged within 2 days.**

10.0 INSPECTION OF SITE WORKSHOP OF MOHP

Inspection of Site Workshop at MOHP can be arranged during office hours with prior instructions.

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11.0 SAMPLE OF RUBBER FOR RE-LAGGING

Tenderer shall furnish alongwith his tender single piece of rubber that shall be used by him for re-lagging by cold process using synthetic rubber in approximate size of 150 x 150 x 20 mm thick for our consideration/ further reference/analysis etc., without which tender submitted by him is liable for rejection.

12.0 PULLEY SURFACE JOINTS :

Circumferential joint across the width of the surface and longitudinal joint along the surface of the pulley are permitted while re-lagging with standard size 2.5mtrs x 1.5mtrs width rubber sheets. However, by proper arrangement length wise and width wise of the sheet, such joints shall be limited by the contractor to bare minimum numbers on any of the pulley during re-lagging the entire surface area of a pulley to be relagged. However, for patching of the pulley in-situ same shall be carried out as per site conditions.

Circumferential joint while relagging entire surface area shall be located far away as possible towards the centre of the pulley surface from the edge of a pulley to avoid possibility of joint failures from conveyor belt deviation on the relagged pulley. Further the joint shall not have any protrusion above the relagged surface but shall be flush with the relagged rubber sheet surface to avoid belt deviation and its cutting from any protrusion.

13.0 METHOD/SEQUENCE APPLICABLE FOR RELAGGING OF CONVEYOR PULLEYS OF MOHP BY COLD PROCESS USING SYNTHETIC RUBBER OF WEAR RESISTANCE QUALITY.

- a) Pulley to be relagged is to be mounted on wooden blocks of suitable height for free rotation during re-lagging. Shafts, bearing journals are to be protected from any damages during re-lagging. Pulley surface is to be cleaned of all adhesive and degreased before re-lagging work commences.
- b) Finished thickness of bounded rubber in respect of both non-drive and drive pulleys shall be 20 mm, non-drive pulleys shall have plain outer surface whereas drive pulleys shall have diamond grooved pattern for better grip and self cleaning.
- c) Finished rubber surface should follow the contour of the machined surface of pulleys.
- d) Wear resistant superior quality synthetic rubber sheet of appropriate size shall be used for re-lagging. The surface area of the sheet coming in contact with pulley surface during re-lagging shall be made rough by grinding for better adhesion of binding agents between the mating surfaces.  
Appropriate bonding agents are then applied on both surfaces of pulley and rubber sheet in required layers and rubber sheet is then wrapped round the pulley surface by rotating the pulley. For better adhesion, the rubber sheet is gently tapped all over the surface area. Joint portion is to be ground to bring it in level with adjoining surface of the rubber.

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14.0 TECHNICAL SPECIFICATION FOR SYNTHETIC RUBBER TO BE USED FOR RE-LAGGING

Superior quality wear resistant synthetic rubber sheet of required thickness shall be used for re-lagging of conveyor pulleys. Thickness formed out of layers of rubber sheets shall not be accepted and shall not be used for re-lagging by the tenderer for the re-lagging works. Only one solid thickness sheet as per requirement shall be used. Specification of synthetic rubber are indicated below:

| <u>SR. No.</u> |   | <u>SYNTHETIC RUBBER</u> |
|----------------|---|-------------------------|
| 1.             | SHORE HARDNESS (A)                            | 65 + 5                  |
| 2.             | SP. GRAVITY                                   | 1.3 MAX                 |
| 3.             | TEAR STRENGTH                                 | 15 KG/INCH SQ.          |
| 4.             | TENSILE STRENGTH (PS)                         | 3500                    |
| 5.             | ELONGATION @ BRAKE %                          | 325                     |
| 6.             | ABRASION LOSS (DIN 53516)                     | 0.021 CC/HR.            |
| 7.             | HEAT BUILDING GOODWINCH<br>FELEXOMETIC 1 TO F | 26                      |

Tenderer shall furnish the specifications of synthetic rubber that shall be used by him for relagging.

15.0 Please note that methods/sequences furnished under technical schedule above is only illustrative and not exhaustive and is indicated for tenderers guidance only. Tenderer should carry out work as per actual requirements of re-lagging to meet our requirements and technical specification applicable to relagging.

16.0 PERFORMANCE OF RELAGGED PULLEYS

16.1 Pulley relagged by the contractor are required to perform satisfactorily without any joint failure, joint opening, peeling of rubber sheet wrapped around the surface areas and wear and tear of sheet for a period of two years from the date of completion of work to avoid any downtime of machines/conveyors at the plant and consequent production loss which the Port cannot afford during busy seasonal activities. Hence, the contractor is required to ensure using superior and wear resistant quality rubber sheet and use only consumables of high quality and having self life. Further, he shall ensure that re-lagging works are carried out in the Plant under proper and strict supervision to ensure best workmanship to avoid any premature failure of joints and against peeling of rubber from the pulley.

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16.2 In the event of any failure of re-lagging due to poor workmanship/joint failure, opening, peeling off, abnormal wear, etc., in the currency of guarantee period of 2 years, same will have to be redone by tenderer at his own cost. Engineer at his discretion may recover any consequential loss suffered by the Plant on this account in the event of Port suffering production loss from such failure.

**16.3 Harbour Entry Permits will be issued on chargeable basis during contractual guarantee period of two years.**

17.0 A) JOINT MEASUREMENT

The successful tenderer immediately after completion of each relagging work shall make relevant entries and sign a joint measurement book maintained by the Port in the prescribed format. He shall record therein the type /name of the pulley re-lagged, size of pulley, size of lagging, type of rubber used, date of commencement and date of completion and other related information which will be entered after the entire job of re-lagging on each pulley or batch of pulleys completed as per tender conditions and will be jointly signed by the contractor and the Engineer's representative. The measurement book shall be submitted alongwith Tenderer's bill for the completed work as per order issued by the Port. No bill will be entertained without the submission of the measurement book.

B) The contractor shall submit their bills in this office within 15 days of completion of work duly certified by the Port site Engineer.

**18.0 The contract period of 2 years is extendable to the required extent till placement of order of new contract at the same terms and condition.**

19.0 The Tenderer has to maintain a close liaison with the Port staff at Site Workshop and Plant staff and ensure that work is attended as per site requirements.

20.0 The Tenderer should inspect the Plant and fully acquaint himself with the site conditions under which the re-lagging work has to be carried out in MOHP either in-situ or at Site Workshop. The tenderer should make his own arrangements like making scaffolding, working platform etc. All safety measures as per Dock Safety Regulation Act, 1990 shall be strictly followed in such cases when working at height and when work is to be done in-situ.

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- 21.0 The tenderer should always keep in stock at Site the minimum required materials, consumables etc., at all times. The expiry date of the consumables to be used for re-lagging shall be available on the containers from the manufacturers/suppliers for our verification whenever required.
- 22.0 A request for allotment of an open space if available for storage of contractor's material in MOHP premises can be considered on chargeable basis as per following schedule of rates:

| Description   | Rate(Rs.)  | Area  |
|---|--|---|
| a) Licence fee on Port land for maintenance of Office Bldg., and other Structural | 292/-<br>per 10 sq. mtrs.<br>or part thereof<br>per month or<br>Part thereof | At Mormugao Harbour,<br>Vasco at General<br>Wharf Level |