

S.15: ADDITIONAL SPECIFICATIONS
BOX PUSHING**1. SUBMISSION OF PRELIMINARY DESIGN ALONG WITH TENDER:**

The Tenderer/Contractor shall submit along with his tender a preliminary design and a sketch showing the details of RCC box of required inside dimensions to be cast and pushed below the formation by jacking technique, size of thrust bed required along with the other works associated with thrust bed, methodology of pushing the RCC Box by Jacking Technique and other important details and features proposed, along with the tender documents to check the general adequacy of the section proposed and also to evaluate his offer along with other tenderers, without which the offer is liable for rejection.

The successful Tenderer shall be required to submit in triplicate detailed calculations and drawings of the RCC Box by Jacking / Pushing Technique to the Engineer-in-Charge who will have the same scrutinized/checked. Comments on the design/drawing will be advised to the Contractor who shall there upon submit suitably corrected calculations/drawings for scrutiny and approval. Thereafter the Contractor shall supply to the Railway/K-RIDE free of charge one set of neatly executed approved drawing in reproduction film along with five sets of prints on strong paper done by an approved process and three neat copies of the calculations as finally accepted and approved.

Any further changes if still required due to site conditions shall also be done with the approval of Engineer-in-Charge. However, the ultimate responsibility of the safety of the design shall rest with the Tenderer / Contractor.

The Contractor shall also engage one consulting Engineer who shall be well conversant and have adequate field experience in executing the RCC Box by Jacking/Pushing Technique (in addition to the overseer/Engineer mentioned in the relevant clause above) at his own cost and who will be responsible for RCC Box by Jacking/Pushing Technique work.

2. BOX PUSHING WORK:**SUBMISSION OF DETAILED DESIGN AND DRAWINGS FOR APPROVAL**

After award of the tender the contractor shall submit the detailed design calculations in 3 copies along with the drawings for Railway/K-RIDE Administration approval within a period of 30 days after issue of the acceptance letter.

It shall be responsibility of the tenderer/s to ensure continued attendance and assistance of design Engineer's representative and get the design and drawings approved by the GM/ K-RIDE/ Bangalore.

After the approval of designs and drawings by Railways/K-RIDE, the contractor is required to submit 6 copies of approved design, the original being typed on electronic typewriting machine on bond paper, the report being bound suitably. The final design report shall be comprehensive giving all the detailed design calculations, brief theory for the basis of design etc. as directed by Engineer-in-charge. The tenderer/s shall also submit 8 (eight) copies of approved detail drawings including one reproducible (tracing) media to the full drawing sheet size 71 x 66 cm as well as 4 sets of drawings reduced to (A4) size using the standard reduction procedures.

3. DESIGN AND DRAWINGS FOR TEMPORARY ARRANGEMENTS

The successful tenderer is also required to submit a detailed drawing showing the method of construction and temporary arrangements he proposes to make for allowing the Rail traffic above during the construction of Road Under Bridge. He shall be required to give detailed design, calculation for stresses and

displacements etc, at various construction stages. These shall also be got approved from Railways/ K-RIDE and shall form part of the report as above. Nothing extra is payable for above and the cost of the same shall be deemed to have been included in the Lumpsum Price quoted for the various items of works.

The design and drawings after approval shall be the property of the Railway and Railway / K-RIDE shall have exclusive right to use and reuse it else-where. The contractor shall have no claim whatsoever in this regard.

In case computer programmes are used for analysis and design of the bridge structure, the same shall be used so as to give a format of output as would be for manual calculations. Copy of the computer programme shall be supplied. In such cases design calculations shall be validated by a sample manual calculation to the satisfaction of the Engineer / Employer, Bangalore. Otherwise the entire calculations shall have to be carried out by detailed manual calculations.

The tenderer shall specially note that while every effort shall be made to approve the design and drawings expeditiously, no claim shall be entertained on account of delays in approval of design and drawings for whatsoever reasons.

Railway/K-RIDE may decide to get the detailed design checked by any independent agency or at Research Designs and Standards organization, Lucknow of Ministry of Railway. The contractor shall ensure the regular presence and assistance of the consultants for the checking of the designs by the above agencies in their offices.

The item for construction of one RCC box by box pushing technique:

- The following works would form part of this item as per the approved General arrangement drawings. Procurement/fabrication of necessary plant and equipment like- jacking line jacks, pumps and other plants
- and equipment required for execution of this work.
- Earthwork in excavation for thrust bed and box pushing, including shoring / sheet piling or any other arrangement to the satisfaction of Railway / K-RIDE required to protect the earth slopes / adjoining structures and disposal of the excavated earth as per the direction of Engineer-in-charge.
- Casting of thrust bed as per contractor's design duly approved by the Railway / Engineer / Employer.
- Drag sheet shall be provided by the contractor to minimize the friction and disturbance of the soil supporting the track during box pushing operations. Max. number of drag sheets as directed by Engineer-in-charge shall be provided based on actual requirement at site. All arrangements required in connection with drag sheet shall be provided free of cost and nothing extra will be paid. The contractor will be at liberty to utilize modern methods, of reducing skin friction etc. as approved by the Engineer-in-charge.
- Necessary provision of opening in the roof of boxes for bentonite pumping if required during the pushing operations.
- Manufacturing and fabrication of the front end frame/cutting shield and intermediate jacking stations etc.
- Pre-casting and curing of RCC box units including fixing of front and frame/cutting shield, with all fabricated work should be done in casting yard.
- Jacking of precast boxes to form the opening under running railway traffic conditions. The maximum allowable deviation of the precast boxes at any time from the theoretical alignment will be

limited to 200mm horizontal and 100mm in vertical direction. Box pushing work shall be done only in day-light hours and in the presence of K-RIDE supervisor. The contractor will further ensure the rate of box pushing such that it will not disturb the Railway tracks above and will be personally responsible for the safety of Railway traffic. However, maintenance of track if any required during box pushing operations will have to be done by contractor at no extra cost. The number of man power required as decided by Engineer-in-charge will have to be arranged by the contractor. Further the provision of Engineering indicators required for imposing caution order including caution watchman also will have to be supplied by contractor at no extra cost.

- Grouting of gaps with suitable material, having adequate structural strength at intermediate jacking stations after completion of pushing so that no leakage occurs from the joints at intermediate jacking station during the service of the bridge.
- Provision of M:30 PCC wearing coat on the floor of the box with design camber. Provision longitudinal drainage arrangements within the RCC boxes on either side of the box as approved by the Railway/K-RIDE.
- Construction of footpaths, wheel guard's boxes and parapet wall as per design to be submitted by the Tenderer for approval of the K-RIDE.

Electrical Fittings: Concealed conduit pipe shall be left on either side of the box during casting for laying of electrical cables/wires in it. Contractor shall provide 30 points for fittings lamps including provision for junction boxes. The scheme shall be got approved by the Department before construction of RCC box.

During the execution of work if any sub-soil water is met with, the contractor will make their own arrangements to bail out/pump out such water from the site, free of cost. Any un-foreseen accumulated rain water, during the progress of work, shall be bailed out/pumped out by the contractor free of cost and the Lumpsum Price quoted should include all these elements.

4. **GENERAL RESPONSIBILITY OF CONTRACTOR:**

Contractor shall be responsible for all the damages caused to the property, by his labour, public or animals caused during the execution of the work by him and shall indemnify the K-RIDE for such damages it is finally taken over by the Railways. He will be liable to be called upon to make good the damage or loss which may occur during such execution.

5. **RCC BOX BY JACKING/PUSHING TECHNIQUE:**

The rate to be quoted for the RCC BOX by JACKING/PUSHING TECHNIQUE shall be inclusive of cost of labour and materials (including ordinary portland cement Grade 43/Grade 53 and MS/Tor Steel for Reinforcement), design and drawings as stated elsewhere. The rate quoted shall also be inclusive of all fares and charges of materials (either by road or rail), plant, equipment, Octroi, toll, taxes and other levies, royalties and patent rights, incidental charges etc. and must be consolidated one for all items of work. The Tenderer shall quote in the tender a lumpsum amount for which he will undertake to do the whole work as above and subject to the conditions of contract.

a. **STAGE PAYMENT FOR RCC BOX BY JACKING/PUSHING TECHNIQUE: TERMS OF PAYMENT**

- (1) On completion of thrust bed, payment equivalent to 10% of the Box pushing item value (of box pushing item).
- (2) On completion of casting of box for the complete length payment equivalent to 30% of the contract value of box pushing item will be payable.

However, progressive payments can be made for the length of the box cast which will be payable as per the following formula:

Payment due :{ (length of the box cast) }
 { (Total length of box for jacking/pushing) x 30% of the
 { } contract value for box pushing item

- (3) On completion of jacking/pushing of 50% of contract RCC box to the full length value for box pushing item.

However, progressive payment can be made for the length of box and jacked / pushed based on the formula below:

Payment due= (Length of the RCC box jacked/pushed) x 50% of the (total length of the RCC box jacked/pushed contract value for box pushing item. The remaining 10% shall be paid after completion of finishing items for the correct corresponding alignment and level.