

**Government of India**  
**Ministry of Railways**  
**Research Designs and Standards Organisation (RDSO)**  
**Manak Nagar, Lucknow (INDIA) -226011**

**Global Notice for Expression of Interest**

Ministry of Railways, Research Designs and Standards Organisation (R.D.S.O.), Lucknow is interested in **‘Exploring the Worldwide Technological Advancements and Global availability of proven systems for “Transition System on Approaches of Bridges” to provide at approach of bridges for gradual variation in stiffness & without significant elastic / plastic settlement during train operation for higher axle loads and high speed ( Axle load 25T & 32.5T upto 100 kmph and for passenger traffic at speed 160 Kmph) as per details given in the document”**.

In order to ensure smooth running of the train, a transition system is required which will bring about gradual change in elastic behavior of the track while entering the bridge. Firms who have experience/capability in Design and Standardize such systems viz Transition system on Approaches of Bridges, use of which can enable to provide at approach of bridge for gradual variation in stiffness & without settlement during train operation requested to see the complete details and document on RDSO's website [www.rdsso.indianrailways.gov.in](http://www.rdsso.indianrailways.gov.in)→Tenders →EOI. For any other clarification, Firms may contact Jt. Director/GE-I, RDSO, Lucknow on Telephone No. +91-0522-2465722 or/ and email: [dir.ge1.rdsso@gmail.com](mailto:dir.ge1.rdsso@gmail.com) & [awasthi.sanjay@gov.in](mailto:awasthi.sanjay@gov.in) on any working day for further details.


The firms are requested to submit details in the prescribed format latest by **30.06.2020 (15:00 hrs)** to Jt. Director/GE-I, Geotechnical Engineering Directorate, RDSO, Manak Nagar, Lucknow –226011 (INDIA).

Firms expressing interest shall note that:

1. Technical details along with design are to be submitted for Transition system on Approaches of Bridges, use of which can enable to provide at approach of bridge for gradual variation in stiffness & without settlement during train operation. Use of materials proposed may be mentioned along with the relevant specifications, values/properties against the general requirements described in the Technical requirements of this document.
2. The Firm should have adequate expertise and experience of the design and/or construction of bridge transition, for use in at least two Railways (India/Abroad) & five major bridges and their design has proven for satisfactory field performance for atleast 5 years on high GMT routes with minimum 25t axle load & passenger traffic speed upto 160kmph.
3. It may please be noted that this EOI is only for the purpose of exploring the suitable transition system at approach of Railway Bridges in India having various standard span length and height of embankment up to about 20 m in plain terrain & upto 35-40m in hilly terrain.
4. Further modifications and corrigendum to this EOI will be published/ uploaded on RDSO website only. Firms are advised to visit RDSO website regularly for any modifications/ corrigendum to this EOI.

**Contact Address:**

S. K. Awasthi, Jt. Director/GE-I  
Research Designs & Standards Organisation (RDSO),  
Ministry of Railways,  
Manak Nagar,  
Lucknow – 226 011,  
Uttar Pradesh, India

  
28/05/2020  
(S.K. AWASTHI)  
Jt. Director/GE-I/RDSO

## **ANNEXURE-A**

### **Instructions/ Guidelines for the firms expressing their interest against Global Expression of Interest (Eoi)**

#### **1. DISCLAIMER:**

Indian Railways reserves the right not to proceed with the process or at a later stage to change the process as per the requirements of Indian Railways. It also reserves the right to decline to discuss the process further with any party expressing interest.

#### **2. PURPOSE OF INVITING EOI:**

The purpose of this Global EOI is to explore the Worldwide Technological Advancements and Global availability of proven systems for transition of embankment suitable to Railway bridges on Indian Railway to provide at approach of bridge for uniformity in elasticity of track structure, gradual variation in stiffness & without settlement during train operation for **Axle load 25T & 32.5T upto 100 kmph and for passenger traffic at speed 160 Kmph**

#### **3. GENERAL INSTRUCTIONS FOR SUBMITTING RESPONSE TO EOI:**

##### **3.1 Eligibility criteria**

- i) Firm should be an existing designer and having experience in construction of Transition system on Approaches of Bridges in at least two Railways (India/Abroad) & five major bridges and their design are proven for satisfactory field performance for atleast 5 years on high GMT routes with minimum 25t axle load & passenger traffic speed upto 160kmph.
- ii) The Transition system on Approaches of Bridges offered by the Firm should be as per International Standards. However, the general functional requirements which are intended for bridge transition system for use in Indian Railway for existing provisions of axle load and speed are enclosed with this document (**Annexure – 'C'**)

**3.2** i) If the offered Transition system on Approaches of Bridges is a proven design and standard, then the Firm shall provide the details of design, construction & its performance on any of the World Railway in last 5 years.

- ii) Budgetary estimate of approximate cost of Transition system on Approaches of Bridges including its construction cost to be submitted.

**3.3** General & Technical details to be provided by firm: General & technical details like as Annexure-C shall be submitted by the firm with their offer. The firm will be required to furnish supporting documents (such as Codal Provision, Design Document, material specifications lab reports, field reports etc.) to establish that they are meeting the laid down requirements.

**3.4** The details submitted by the firm shall be scrutinized by RDSO. The deficiency as observed in the offer during technical scrutiny or additional information as considered necessary will be advised to the firm. The additional information must be made available by firm within two weeks of advice.

**3.5** Submission by firms: The intending firm shall ensure the submission in the format given in **Annexure - B**.

**3.6** The submission by Interested firms shall be made to Jt. Director/GE-I, Geotechnical Engineering Directorate, RDSO, Manak Nagar, Lucknow- 226011 by **30.06.2020 (15:00 Hrs)** in the enclosed Format for "**Letter of Response at Annexure B**".

- 3.7 The respondents must furnish the application form & details **in duplicate** as required in the enclosed **"Format for Letter of Response"** at **Annexure-B** and details stipulated in **Annexure-C**. All pages of the documents should be signed with stamp.
- 3.8 The firm shall legally indemnify Ministry of Railways against any possible claims/ legal/ other disputes at present or which may arise in future from any other party in connection with the intellectual property rights of the drawings and design or any other documents submitted by the firm or any other patent rights.
- 3.9 RDSO reserves all the rights of this exercise. In case of any doubt/dispute, decision of RDSO shall be final.

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**ANNEXURE - B**

**FORMAT FOR LETTER OF RESPONSE**

Respondents Ref No.:

Date:

Jt. Director/GE-I  
Geotechnical Engineering Directorate,  
Research Designs & Standards Organization (RDSO)  
Ministry of Railways, Manak Nagar  
Lucknow (INDIA), Pin - 226011

Dear Sir,

**Subject: RESPONSE TO – GLOBAL EOI FOR PARTICIPATION**

1. We, the undersigned, offer the following information in response to the Expression of Interest sought by you.
2. We are duly authorized to represent and act on behalf of \_\_\_\_\_ (hereinafter the "respondent")
3. We have examined and have no reservations to the EOI Document including Addenda No(s)\_\_\_\_\_.
4. We are attaching with this letter, the copies of original documents defining: -
  - 4.1 The Respondent's legal status;
  - 4.2 Its principal place of business;
  - 4.3 Its place of incorporation (if respondents are corporations); or its place of registration (if respondents are cooperative institutions, partnerships or individually owned firms);
  - 4.4 Self certified financial statements of last three years, clearly indicating the financial turn over and net worth.
  - 4.5 Copies of any market research, business studies, feasibility reports etc sponsored by the respondent, relevant to the subject of this EOI under consideration
5. We shall assist Ministry of Railways (MoR) and/or its authorized representatives to obtain further clarification from us, if needed.
  - 5.1 RDSO and/or its authorized representatives may contact the following nodal persons for further information on any aspects of the Response:

S. No.	Contact Name	Address	Telephone	E Mail

6. This application is made in the full understanding that:
  - 6.1 The EOI is only for exploring Worldwide Technological advancements and Global availability of proven systems for transition from embankment to bridge to provide at approach of bridge for Uniformity in elasticity of track structure, gradual variation in stiffness & without settlement during train operation for **Axle load 25T & 32.5T upto 100 kmph and for passenger traffic at speed 160 Kmph.**

- 6.2 Information furnished in response to EOI shall be used confidentially by RDSO as required. Confidentiality of the information furnished by the firm in this EOI will be maintained by GE/RDSO.
- 6.3 RDSO reserves the right to consider or not to consider any or all applications, cancel the EOI without any obligation to inform the respondent about the grounds of same.
7. In response to the EOI, we hereby submit the following details annexed to this application -
- 7.1 Turn-over of the firm during the last three financial years with the copies of annual report.
- 7.2 Details of customer(s)/Railways where for transition of embankment to bridge to provide at approach of bridge for Uniformity in elasticity of track structure, during train operation for **Axle load 25T or higher upto 100 kmph speed and for passenger traffic at speed of 160 Kmph** by the firm including detail document during last 3 years
- 7.3 Experience and expertise for the Transition System on Approaches of Bridges proposed in EOI.
- 7.4 Complete details of the Transition System on Approaches of Bridges with drawing and specification as per **Annexure-C** to this EOI.
- 7.5 Details of Intellectual Property Rights (IPR) held, patent filed/held and MoU/ agreement signed.
- 7.6 Details of ISO/equivalent certification, if any.
- 7.7 Documents in proof of Eligibility criteria
- 7.8 Undertaking as per Annexure-B1
- 7.9 Para-wise compliance of Requirements as per Annexure-C and supporting documents.
8. The undersigned declare that the statements made and the information provided in the duly completed application are complete, true, and correct in every detail. We also understand that in the event of any information furnished by us being found later on to be incorrect or any material information having been suppressed, RDSO may delete our name from the list of qualified Respondents. we further under that RDSO will give first preference to the applicants considered relevant for the purpose.

Yours sincerely,

(Sign)  
NAME:

In the Capacity of duly authorized  
to sign the response for and on  
behalf of

Date:



**ANNEXURE-B1**

(To be taken on non-judicial stamp paper of appropriate value as applicable in the respective state and dully notarised& witnessed)

**UNDERTAKING**

I, .....son of ..... aged about ..... Years resident of ..... do hereby solemnly affirm as under

1. That the deponent is the Authorised signatory of (Name of the Sole Proprietorship Concern/Partnership Firm/ Registered Company/ Joint Venture).
2. That the deponent declares on behalf of (Name of the Sole Proprietorship Concern/ Partnership Firm/ Registered Company/Joint Venture) that:
  - a) In regard to matters relating to the security and integrity of the country, no charge sheet has been filed by an agency of the Government / conviction by a Court of Law for an offence committed by the -----(name of the entity) or by any sister concern of the -----(name of the entity) that would result in disqualification.
  - b) In regard to matters other than the security and integrity of the country, -----(name of the entity) has not been convicted by a Court of Law or indicted / passed any adverse order by a regulatory authority against it or it's any sister concern which relates to a grave offence, or would constitute disqualification. Grave offence is defined to be of such a nature that it outrages the moral sense of the community.

DEPONENT

**VERIFICATION**

I declare that the contents of para 1 to 2 above are true as per my knowledge and nothing has been hidden.

DEPONENT





**GENERAL TECHNICAL AND FUNCTIONAL REQUIREMENTS**

The elastic behavior of the track changes abruptly from approach of the bridge to the bridge proper. Due to this sudden change in the elastic behavior of track between adjacent locations normally the moving train experiences jerk causing discomfort to passengers and plastic settlements at junction resulting in damage to abutment and frequent maintenance. In order to ensure smooth running of the train, a transition system is required which will bring about gradual change in elastic behavior of the track.

**A. Factors of Transition System settlement/ failure and improvements/ Remedial measures.**

Some of the factors which may contribute to settlement of approaches:

- Improper compaction while backfilling or construction
- Compaction and consolidation settlement of backfill material
- Consolidation of subsoil
- Poor drainage
- Traffic volume
- Approach slab condition and design, if provided
- Track deterioration in approaches etc.
- Change in dynamic forces due to change in stiffness.
- Due to change in stiffness in transition, load taken by sleepers or even dynamic interaction between rail-wheel may get altered. This needs to be looked into and if required, may also be included in the study. Higher vertical forces is one of the reason for higher settlement in approaches.

Some of the different methods which may have been adopted as Remedial measures in bridge transition:

- Improvement of approaches, including backfill material, approach slab etc. & its proper design/execution as per specified methodology/machineries etc.
- Drainage improvement
- Ground improvement if required
- Use of Geosynthetics, Grouting etc.
- Compaction techniques for improvement in settlement characteristics.
- Reinforcement techniques- RE Wall etc.

**B. Operating conditions of Indian Railways (IR)/Dedicated Freight Corridors Corporation of India Ltd. (DFCCIL):**

i) Axle load and Speed

Traffic Type	Axle Load	Speed
Mixed Traffic (On Indian Railways)	25T (Freight)	100 kmph
	Passenger (with Loco of 19.5t axle load)	160 kmph
Freight (On DFCCIL)	32.5T (applicable for formation & bridges with track structure for 25t)	100 kmph

ii) Traffic Density, GMT (A Route) on IR : 7.0 to 130 million tons (Annual)

- iii) Gauge: : Broad Gauge, Nominal (1676 mm).
- iv) Rail Section: 52 Kg/60 Kg
- v) Sleepers: Pre-stressed Concrete Sleepers in track on formation and on ballasted deck bridges , Channel sleepers on steel girder bridges.
- vi) Sleeper Density: 1540 / 1660 per km
- vii) Ballast Depth: 300mm/350mm
- viii) Formation and Blanket: as per the RDSO Specification No. RDSO/2018/GE: IRS-0004(D) Part IV, July 2019

### **C. General Technical / Functional Requirements:**

1. Bridge Transition System is required for following track loading conditions:
  - a) For Plain terrain:
    - (I) For 25T axle load upto speed of 100 kmph and for Passenger Trains upto speed 160 kmph on IR mixed traffic routes
    - (II) For 32.5T axle load upto speed of 100 kmph for DFCCIL tracks
  - b) For Hilly terrain: For 25T axle load and passenger traffic at prevailing slower sectional speeds on IR mixed traffic routes
2. Suitable Designs of Bridge Transition System should be submitted for above 2 loading cases along with detailed drawings, material specifications and necessary dimensions.
3. Detailed specifications should be given for the materials used in proposed Transition systems for both natural materials viz. Subgrade, aggregates, blanket material, granular layers material etc. and synthetic materials viz. Geo-synthetics items: Geotextile, Geogrid, Geocell etc. and for any other material proposed to be used in the Transition System.
4. Design methodology followed for designing the transition system may be explained. Stiffness/settlement may be one of the criterions, other factors taken into consideration may also be included and explained in detail.
5. Details of suitable drainage arrangements for efficient drainage in the Transition Area or at formation – bridge interface should be indicated viz. Use of geo-composite drains or any special drainage arrangement along with their function, laying procedure, size and material specifications. There is wide variation in rainfall and other environmental factors in India and these should be accounted for in the proposed drainage solutions.
6. Information on laying of proposed system where these are in use should be submitted. Field Performances of proposed systems are to be submitted. Studies/Trials reports conducted on proposed system may also be submitted, if available.
7. Maintenance requirement and procedure for maintenance for the proposed system during the service may also be elaborated.
8. Proposed design of bridge transition should be proven i.e. its performance should be satisfactory during service under the designed axle load and speed. Performance monitoring report of the proposed system or certificate from the user railways should be submitted along with design.
9. The proposed Transition system solutions should be in two categories i.e. for new construction and for existing bridges i.e. construction/upgradation of transition system in






existing lines/existing bridges should also be submitted. Some solution may be suggested for providing transition to the Bridges being commissioned in traffic blocks e.g insertion of RCC Box for RUBs/Subways, etc.

10. Analysis or calculations of change/variation in stiffness from track on embankment to track on bridge for the proposed system should be submitted. Codal requirements in World Railways for rate of change of stiffness, if specified may be submitted.
11. Measures to be taken or World Railways Practices to reduce stiffness of track on bridge gradually in combination with increase in stiffness on embankment at bridge approach, if available should be submitted. The proposal submitted may include suggestions for improvements and other options as per the practice prevalent on Leading Railways.
12. Variation in track structure at bridge approach from the normal track structure, if proposed may also be submitted. Inputs given to track structure to supplement the methodology adopted in transition embankment may be elaborated, if any. Even inputs which may be required in the bridge system itself (which may vary with the type of bridge and its related parameters i.e. ballasted/non-ballasted, height, PSC/Steel girder, bearing used etc.) in consonance with other adopted measures may also be referred and explained.
13. Formation design, thickness, specifications of material used in normal embankment of the Railway system where the stated Transition system is being used. Depending on the characteristics of material and thickness of various layers, its stiffness may vary and eventually may affect the system of transition adopted. Subsoil characteristics and improvement work carried out, if any, should also be detailed.
14. Height of embankment at bridge approach can vary from 10m to 20 m in plain terrain and upto 35-40m in hilly terrain. Design of transition system can be submitted for different range of embankment heights.
15. Details on any other relevant items/aspects apart from above which are required or envisaged to adequate and durable & economical design of transition system for the envisaged loading conditions may also be given.
16. The proposed design of Bridge Transition along with materials proposed to be used in the design should be environmental friendly.
17. Indian Railway having the various types of bridges constructed with PSC girder, steel girder and composite girder of standard and non-standard span length. The stiffness/deflection criteria of the different types of girder material may also be considered in designing of the transition system. Transition system for both ballasted/non-ballasted deck bridges, further differentiation of major and minor bridge (which is less than 12.2m span in Indian Railways) are to be given. Height of the bridge is another factor which can be considered for various designs of bridge design.
18. Performance monitoring of the proposed system should also be given in the proposal. Like settlement, track parameters, TRC, track modulus measurement, dynamic forces development/ measurement in bridges (it may be important due to change in stiffness characteristics and associated accelerations changes which are normally studied in bridge system for design of its various factors ) etc.

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28/05/2020  
(S K Awasthi)  
Jt. Director/GE-1/RDSO

