

भारत सरकार- रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन (अ. अ. मा. स.)
मानक नगर, लखनऊ -226 011 (भारत)
रुचि की अभिव्यक्ति के लिए वैश्विक सूचना
सूचना संख्या: सीटीई/एफ/ग्लोबल/इओआई/ बैलास्टेड ट्रैक

अनुसंधान अभिकल्प और मानक संगठन (अ. अ. मा. स.), रेल मंत्रालय, लखनऊ-226 011(भारत), भारतीय रेल नेटवर्क पर प्रचलित एवं प्रकल्पित परिचालन परिस्थितियों में उपयुक्त तथा न्यूनतम 25 टन धुरा भार हेतु अभिलेख में दिए गए विवरण के अनुसार बैलास्टेड ट्रैक के क्षेत्र में मॉडर्न फास्टेनिंग सिस्टम की विश्वस्तरीय प्रौद्योगिकी उन्नयनता एवं वैश्विक उपलब्धता खोजने के लिए इच्छुक है।

ऐसी कंपनियों (फ़र्म) जिनके पास इस प्रकार की मॉडर्न फास्टेनिंग सिस्टम के निर्माण एवं आपूर्ति का सामर्थ्य एवं अनुभव है, उनसे निवेदन है कि अ. अ. मा. स. की वेब साइट www.rds.indianrailways.gov.in → Tenders → EOI पर विस्तृत विवरण का अवलोकन करें अथवा निदेशक / रेलपथ-IV, अनुसंधान अभिकल्प और मानक संगठन, रेलपथ अभिकल्प निदेशालय, मानक नगर, लखनऊ -226 011(भारत) के फोन संख्या +91-522-2452796 अथवा ईमेल: dtd5rds@gmail.com पर किसी भी कार्य दिवस में अन्य जानकारी हेतु संपर्क कर सकते हैं।

इच्छुक कंपनियों (फ़र्मों) से अनुरोध है कि वे अपना विवरण निर्धारित प्रोफॉर्मा में निदेशक / रेलपथ-IV, अनुसंधान अभिकल्प और मानक संगठन, रेलपथ अभिकल्प निदेशालय, मानक नगर, लखनऊ -226 011 (भारत) को दिनांक 31.03.2016 (15:00) बजे तक प्रस्तुत कर दें।

अभिरुचि व्यक्त करने वाली फ़र्म कृपया ध्यान दें कि:

1. बैलास्टेड ट्रैक के लिए मॉडर्न फास्टेनिंग सिस्टम की विशिष्टियों हेतु उनके द्वारा प्रस्तावित तकनीकी विवरण में, तकनीकी जरूरतों के अंतर्गत दर्शाए गए मानकों के सापेक्ष, प्राप्त किये गए परिमाण का स्पष्ट उल्लेख होना चाहिए।
2. पिछले तीन वर्षों एवं वर्तमान वर्ष में आपूर्ति की गई मॉडर्न फास्टेनिंग सिस्टम का आपूर्ति विवरण विभिन्न देशों के अनुसार मात्रा सहित स्पष्ट उल्लेख करें।
3. कृपया ध्यान दें कि, इस रुचि अभिव्यक्ति का उद्देश्य केवल बैलास्टेड ट्रैक के लिए मॉडर्न फास्टेनिंग सिस्टम की विश्वस्तरीय प्रौद्योगिकी उन्नयनता एवं वैश्विक उपलब्धता की खोज के लिए है जो कि निर्धारित तकनीकी जरूरतों को पूर्ण करता हो।

निदेशक / रेलपथ-IV
कृते महानिदेशक/रेलपथ
अ. अ. मा. स., मानक नगर, लखनऊ
(भारत सरकार के राष्ट्रपति की ओर से)

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

Global Notice for Expression of Interest

Notice No. CT/EF/Global Eol/ Ballasted Track

Ministry of Railways, Research Designs & Standards Organisation (R.D.S.O.), Lucknow is interested in **‘Exploring the Worldwide Technological Advancements and Global availability in the field of Modern Fastening System for Ballasted Track suitable for use on Indian Railway Network under prevailing and envisaged operating conditions minimum for 25T axle load as per details given in the document’**.

Firms who have experience and capability in manufacturing and supplying such Modern Fastening System for Ballasted Track are requested to see the complete details and document on RDSO's website www.rdso.indianrailways.gov.in→Tenders →Eol. For any clarification, Firms may contact Director/Track-IV, RDSO, Lucknow on Telephone No. +91-522-2452796 or / and email: dtd5rdso@gmail.com on any working day for further details.

The firms are requested to submit details in the prescribed format latest by 31.03.2016 (15:00 hrs) to Director/Track-IV, Research Designs & Standards Organisation (RDSO), Anusandhan Bhawan, Track Design Directorate, Manak Nagar, Lucknow –226011 (INDIA).

Firms expressing interest shall note that:

1. Technical details submitted for specifications of Modern Fastening System for Ballasted Track proposed by them shall clearly mention the values/properties achieved against the parameters described in the Technical requirements.
2. Supply details submitted for Modern Fastening System for Ballasted Track in last three years and in the current year shall clearly mention country wise the quantity of proposed Modern Fastening System supplied.
3. It may please be noted that this Eol is only for the purpose of exploring the Worldwide Technological Advancements and Global availability of Modern Fastening System for Ballasted Track, meeting stipulated Technical requirements.

Director/Track-IV
for Director General (Track)
RDSO, Lucknow
(for & on behalf of President of India)

Instructions/ Guidelines for the firms expressing their interest against Global Expression of Interest (Eoi) Notice No. CT/EF/Global Eoi/ Ballasted Track.**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. This Eoi shall not be considered in any way a proposal for procurement of Modern Fastening System for Ballasted Track. The intending participants will furnish offer at their own cost and no claims, whatsoever, in this reference will be entertained by the Railways.

2. PURPOSE OF INVITING Eoi:

The purpose of this Global Eoi is to explore the Worldwide Technological Advancements and Global availability of Modern Fastening System for Ballasted Track, which meets the functional, technical and performance requirements/parameters given in this document, suitable for use on Indian Railway Network under prevailing and envisaged operating conditions for minimum 25T axle load. The proposed Modern Fastening System for Ballasted Track should meet the requirements as per **Annexure-‘C’** or as per International Standards.

3. GENERAL INSTRUCTIONS FOR SUBMITTING RESPONSE TO Eoi:**3.1 Eligibility criteria**

- i) Firm should be an existing manufacturer / supplier of Modern Fastening System for Ballasted Track
- ii) The Modern Fastening System offered by the Firm should meet the requirements mentioned in this document (**Annexure – ‘C’**) or should be as per International Standards.
- iii) Firm should have supplied to any of the World Railway in last three years, the Modern Fastening System for Ballasted Track having properties minimum or superior to the requirements envisaged in **Annexure –‘C’**.
- iv) Interested firm shall have experience in designing, manufacturing and supplying the Modern Fastening System for Ballasted Track being used on world railway networks. Documentary proof by the firm shall be attached as below in respect of the following:

Year of supply	Name of the railway where proposed Modern Fastening System for Ballasted Track or any fastening component has been supplied and used.	Approximate quantity of such Modern Fastening System for Ballasted Track/ fastening component used.	Specification/ performance parameters of the supplied modern fastening system	Performance Guarantee Given (if any)
2012-13				
2013-14				
2014-15				
2015-16 (till current month)				

- v) Budgetary estimate of approximate cost of the Modern Fastening System for Ballasted Track to be submitted.
- 3.2** General & Technical details to be provided by firm: General & technical details as per **Annexure-C** shall be submitted by the firm with their offer. The firm will be required to furnish supporting documents to establish that they are meeting the laid down target values.
- 3.3** 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.
- 3.4 Submission by firms:** The intending firm shall ensure the submission in the format given in **Annexure - B**.
- 3.5** The submission by Interested firms shall be made to Director/Track-IV, RDSO, Anusandhan Bhawan, Manak Nagar, Lucknow- 226011 by 31.03.2016 (15:00 Hrs) in the enclosed Format for **“Letter of Response at Annexure B”**. In the EoI, the firms should mention RDSO’s Notice No. CT/EF/Global EoI/ Ballasted Track.
- 3.6** 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.
- 3.7** 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.
- 3.8** RDSO reserves all the right of this exercise. In case of any doubt/dispute, decision of RDSO shall be final.

Director/Track-IV,
For Director General (Track)
RDSO, Lucknow.

FORMAT FOR LETTER OF RESPONSE

Respondents Ref No.:

Date:

Director/Track-IV
Building: Anusandhan Bhawan,
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 vide your Notification No. CT/EF/Global Eoi/ Ballasted Track
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 project 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 Modern Fastening System for Ballasted Track suitable for use on IR network under prevailing & envisaged operating conditions for 25T axle load and not for its procurement.
 - 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 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 Modern Fastening System for Ballasted Track have been supplied by the firm including quantity during last 3 years.
 - 7.3 Experience and expertise for the Modern Fastening System for Ballasted Track proposed in EoI.
 - 7.4 Complete details of the Modern Fastening System for Ballasted Track 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 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.

Yours sincerely,

(Sign)

NAME:

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

Date:

SALIENT TECHNICAL AND FUNCTIONAL REQUIREMENTS OF MODERN FASTENING SYSTEM FOR BALLASTED TRACK FOR 25T AXLE LOAD FOR INDIAN RAILWAYS**A. GENERAL**

1. Presently, for 25T axle load, PSC sleeper (drawing RDSO/T-7008 copy enclosed) is being used on Indian Railways. This sleeper has the same dimensional profile as most commonly used BG line sleeper for 22.9T axle load (drawing RDSO/T-2496 copy also enclosed).
2. Fastening components viz. SGCI insert, rubber pad, ERC & Liners suitable for RT-7008 sleeper for 25T axle load have also been developed. Currently, two different types of Elastic Rail Clips namely ERC Mk-III & ERC Mk-V are being used on IR for 25t axle load, which use the raw material - Silico Manganese Spring Steel rods (Grade 55Si7) of 20.64mm dia. & 23mm dia. respectively.

Rubber Pad (10mm thick Composite GRSP) made up of two layers of different compositions of rubber fused together, is being used for 25t axle load.

Both insulating liners (GFN-66) & non-insulating metal liners (Mild Steel) have been used. The raw material used for manufacture of insulating liners is glass filled nylon-66 (GFN-66) moulding granules of natural colour with about 33% glass filler having UV resistant properties. The insulating liner is conditioned by immersing in boiling water for adequate time to ensure minimum 3% absorption of water. The raw material used for manufacture of non-insulating metal liner is Mild Steel conforming to IS: 2062 grade E250, Quality C.

In order to achieve improved performance and service life of Fastening System under the envisaged operating conditions of Indian Railway, it is considered essential to first explore the global technological advancements and availability of Modern Fastening System for Ballasted Track for 25T axle load meeting the requirements/parameters mentioned in Para 'B' below or superior.

3. Operating conditions of IR:**i) Axle load and Speed**

Traffic Type	Axle Load	Speed
Goods	25T	100 kmph
Passenger	21T	160 KMPH (Existing) 200 kmph (Proposed)

- | | | |
|---------------------------------|---|---|
| ii) Electric Traction (Minimum) | : | 25 KV AC. |
| iii) Track Circuits | : | DC. |
| iv) Gauge: | : | Broad Gauge,
Nominal (1676 mm). |
| v) Ambient Temperature | : | (-) 5 ⁰ C to 50 ⁰ C. |
| vi) Rail Temperature | : | (-) 15 ⁰ C to (+) 76 ⁰ C. |
| vii) Humidity | : | 100% |

4. Existing Track Structure on Indian Railways:

UIC 60 grade-880 Rails laid on Pre-stressed Concrete Sleepers at sleeper density 1540/1660 nos. per km with elastic fastenings and ballast cushion varying from 200 mm to 300 mm.

B. GUIDING TECHNICAL REQUIREMENTS FOR FASTENING SYSTEM FOR 25T AXLE LOAD

1. General:

- a) The fastening system design should be such that it can be used on existing PSC sleeper of RDSO design (for 25t axle load) to drawing no. RDSO/T-7008 (copy enclosed) with or without change in design of rail seat, while keeping the sleeper dimensions same.
- b) The fastening system should be suitable for mixed traffic conditions as defined in para A.3 above.

2. Technical parameters of the fastening system

a) Elastic Rail Clip:

- (i) The minimum toe load of elastic rail clip should not be less than 850kg.
- (ii) The elastic rail clip should pass the fatigue test for at least 2.5 million cycles.

OR

It should satisfy the fatigue requirement of ± 1 mm dynamic oscillation, at maximum design toe load, for three million cycles. The loss of toe load after the fatigue test should not be more than 10%.

OR

Fulfilling requirements of Fatigue test as per any proven International Standard can also be submitted.

- (iii) At present, when the elastic rail clip is installed in 25t assembly on IR, the minimum extra elastic margin is not less than 3mm over the design / specified deflection and as such there is no permanent set in the clips upto 3mm from the design/specified deflection. For this purpose, load deflection curve is drawn to establish that the designated toe load imparted by the clip in 25t assembly is within limit of proportionality with minimum 3mm margin. The extra elastic margin of the proposed clip is to be mentioned clearly giving the load deflection curve. Any International practice/norm for the same along with drawing of load deflection curve can also be submitted.

b) Rail Pad:

- (i) The rubber pad should be fit for Indian operating conditions of mixed traffic and rail temperature variation of -15° to 76°C without adversely affecting the life of other components. The operating conditions and parameters of the proposed rubber pad can also be submitted.
- (ii) In Indian climatic conditions, phenomenon of high creep is observed in rubber pad. The rubber pad material should be suitable to be used in the hot weather conditions especially when the rail temperature is in the range of 65°C to 76°C which is common on IR. Any International practice / norm for the same can also be submitted.
- (iii) The rail pad should meet the technical requirements as adopted by any major world railway system operating under similar, mixed traffic environment in respect of stiffness, damping, hardness and resilience.
- (iv) An increased rail seat area would help in better load distribution and in increasing the service life of the rail pad. Therefore, increased area of rubber pad at rail seat will be desirable.
- (v) Rail Pads can be of any suitable material i.e. TPU, PU, Rubber or EVA etc conforming to International Standards & suitable for Indian operating conditions for 25T axle load. At present, the minimum service life of rail pad stipulated on IR is 8 years or 300 GMT whichever is earlier. Any International practice / norm followed in reputed railway network can also be submitted with the proposal.

c) Liners (as applicable):

- (i) The insulating / non-insulating liners should meet the technical requirements as adopted by any major world railway system operating under similar, mixed traffic environment.
- (ii) Insulating / non-insulating liners can be of any suitable material conforming to International Standards & suitable for Indian operating conditions for 25T axle load.

d) Fastening assembly

- (i) The assembly should satisfy, among other parameters, the fatigue requirement of the minimum loss of toe load, creep resistance and change in vertical static stiffness, during the laboratories tests, as per the International standards. Reference in this regard is to be submitted.
- (ii) The fastening system including clip should not be prone to corrosion and should not cause corrosion in rail foot also. In this regard supporting documents like report of corrosion resistance tests on fastening system conducted in reputed laboratory shall be submitted. For avoiding rail foot corrosion, the technology/ methodology of effectiveness of system against rail foot corrosion needs to be demonstrated.
- (iii) In order to facilitate de-stressing process, change of rail etc. the fastening should be capable of being removed and installed in a short

time with no reduction in toe load & without breakage of components of fastening system.

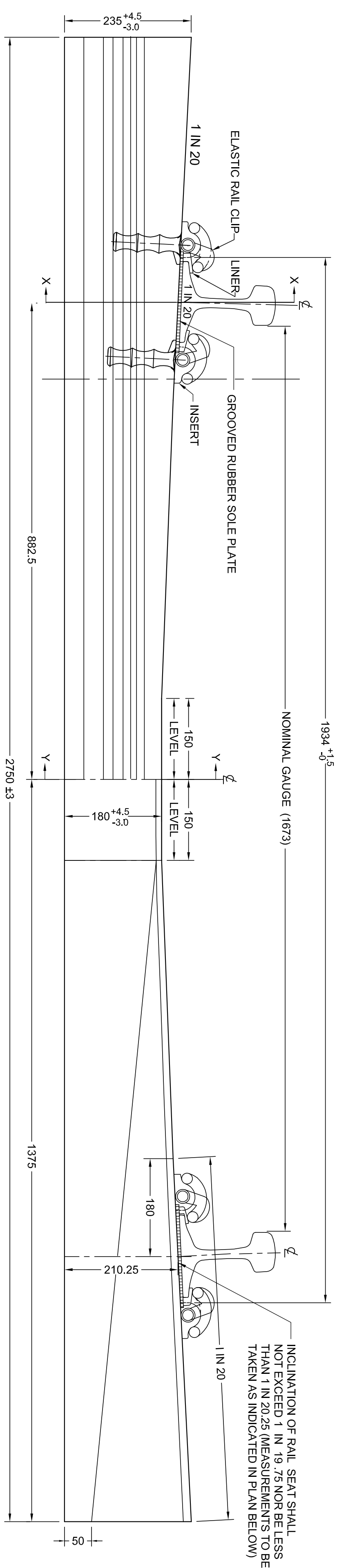
- (iv) It should be possible to use the same fastening (or with minimum changes) in location like level crossing (with check rails), bridges (with guard rails), sharp curves (with check rails/with a facility of gauge adjustment), points and crossings etc.
- (v) The fastening system should have insulating components/ alternative arrangements, to make for use in track circuited area.
- (vi) Individual components of fastening system should be replaceable during the entire service life.
- (vii) The components of the assembly should have matching life and the desirable service life for the complete fastening system should not be less than rail life or 15 years or 1000GMT whichever is earlier or as per any International practice or norm followed in worldwide railway systems. Reference in this regard is to be submitted.

Firms should submit the results of above-mentioned tests i.e. fatigue test, static/dynamic stiffness test, tests on rail pad, clip toe-load test, corrosion test etc. satisfying technical requirements mentioned as mentioned above or as per international standards. Reference in this regard is to be submitted.

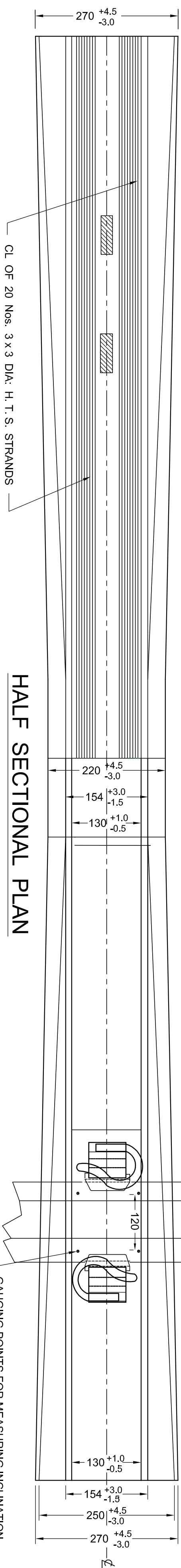
C. LIST OF DOCUMENTS TO BE SUBMITTED

Following documents are required to be submitted in the EoI:

- (i) Drawings (minimum A3 size) and specifications of each component and of the complete fastening assembly system.
- (ii) Certificates / proof that the fastening system and its components will meet the technical requirement, as stated in the EoI documents.
- (iii) Supply made in last 3 years and in current year in the format given at 3.1 (iv) of **Annexure-A**.
- (iv) Performance/ Warranty proposed to be given if any in terms of Traffic (Gross Million Tonnes - GMT) and/or time period or in other equivalent terms
- (v) Performance certificate from the customer, if any.
- (vi) Details of R&D facilities if any.
- (vii) Details of R&D studies done/being done.
- (viii) All the details stipulated under Para A&B of Annexure "C".
- (ix) Technical specifications, drawings for various components and assemblies being proposed, manufacturing process and shall clearly mention the values achieved against the target values mentioned in the Para B above.
- (x) ISO/ equivalent Certificate, if any.



HALF SECTIONAL ELEVATION



HALF SECTIONAL PLAN

QUANTITY SCHEDULE FOR SLEEPER

DESCRIPTION	DWG. NO.	MATERIAL	SPECIFICATION	APPROX. TOTAL WEIGHT EACH SLEEPER IN KG.	APPROX. TOTAL WEIGHT EACH SLEEPER IN KG.
SLEEPER	RDSO/T-7008	CONCRETE	IRS/T-39	108900 cm ³	267
REINFORCEMENT	RDSO/T-7008	H.T.S.	IS: 6006	20 NOS. 3φ13 mm STRAND	0.4565
INSERTS	RDSO/T-6901	SCGI	IRS/T-46	4	9.13

VALUES FOR STATIC BEND TEST

CRACKING LOAD (KN)		FAILURE LOAD
CENTRE TOP	CENTRE BOTTOM	AT RAILSEAT (KN)
65	60	270
		490

QUANTITY SCHEDULE FOR RAILSEAT ASSEMBLY

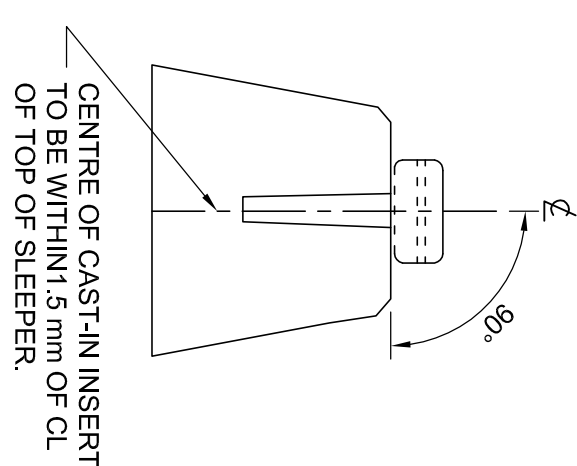
FOR 1673 mm GAUGE, 60 kg.(UIC)

DESCRIPTION	DRG N	MATERIAL	SPECIFICATION	NO. PER SLEEPER
GROOVED RUBBER SOLE PLATES LINERS	RDSOT-7010 RDSOT-6937 RDSOT-5919	COMPOSITE RUBBER GLASS FILLED NYLON#6 -	RDSOI M&C / RF-200/2007 IRST-44 IRST-31	2 4 4

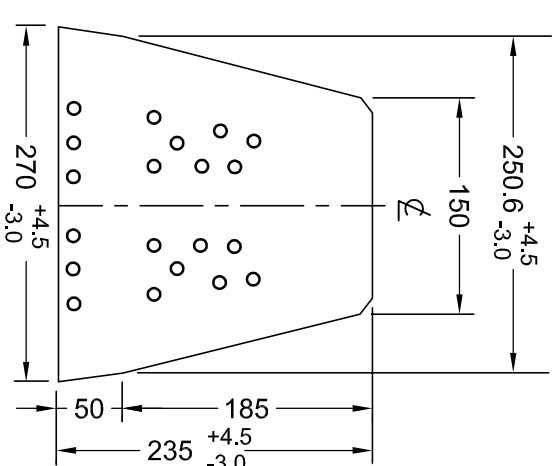
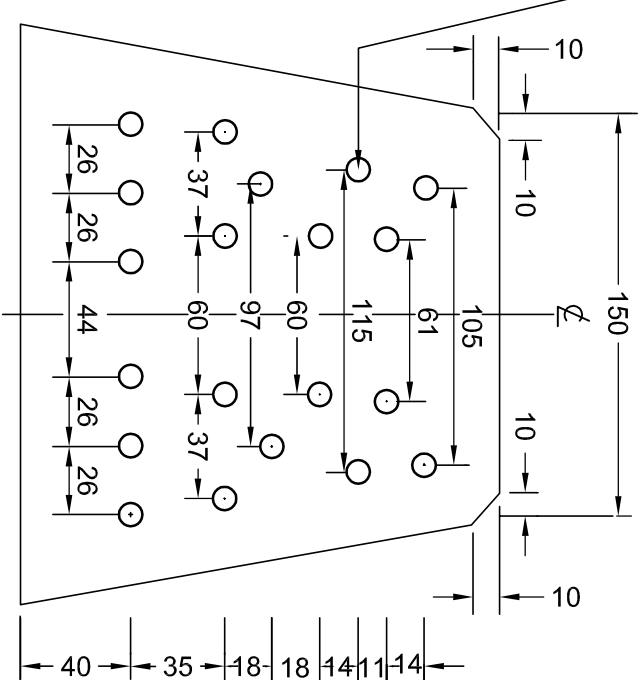
QUANTITY SCHEDULE FOR RAILSEAT ASSEMBLY

FOR 1676 mm GAUGE, 60 kg.(UIC)

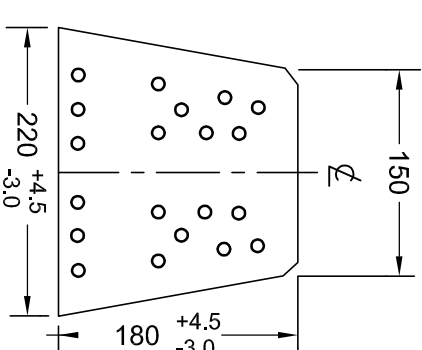
DESCRIPTION	DWG. N	MATERIAL	SPECIFICATION	NO. PER SLEEPER
GROOVED RUBBER SOLE PLATES	RD50-T7010	COMPOSITE RUBBER	RD50 M&C/ RP- 200/2007	2
LINERS	RD50T-8222 RD50T-8223	GLASS FILLED NYLON-66	IRS-T-44	2
ELASTIC RAIL CLIP MARK-V	RD50T-5919	-	IRS-T-31	4



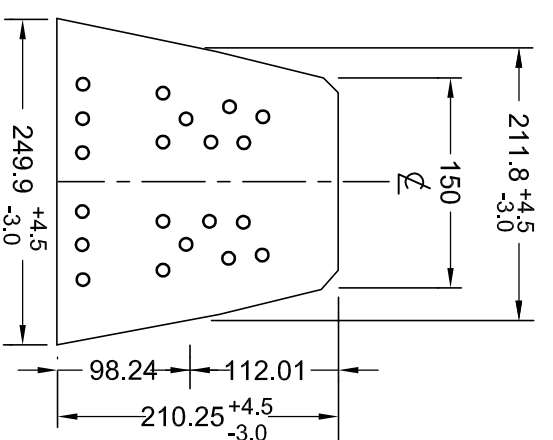
ENLARGED VIEW OF DISPOSITION
OF H. T. S. STRANDS.



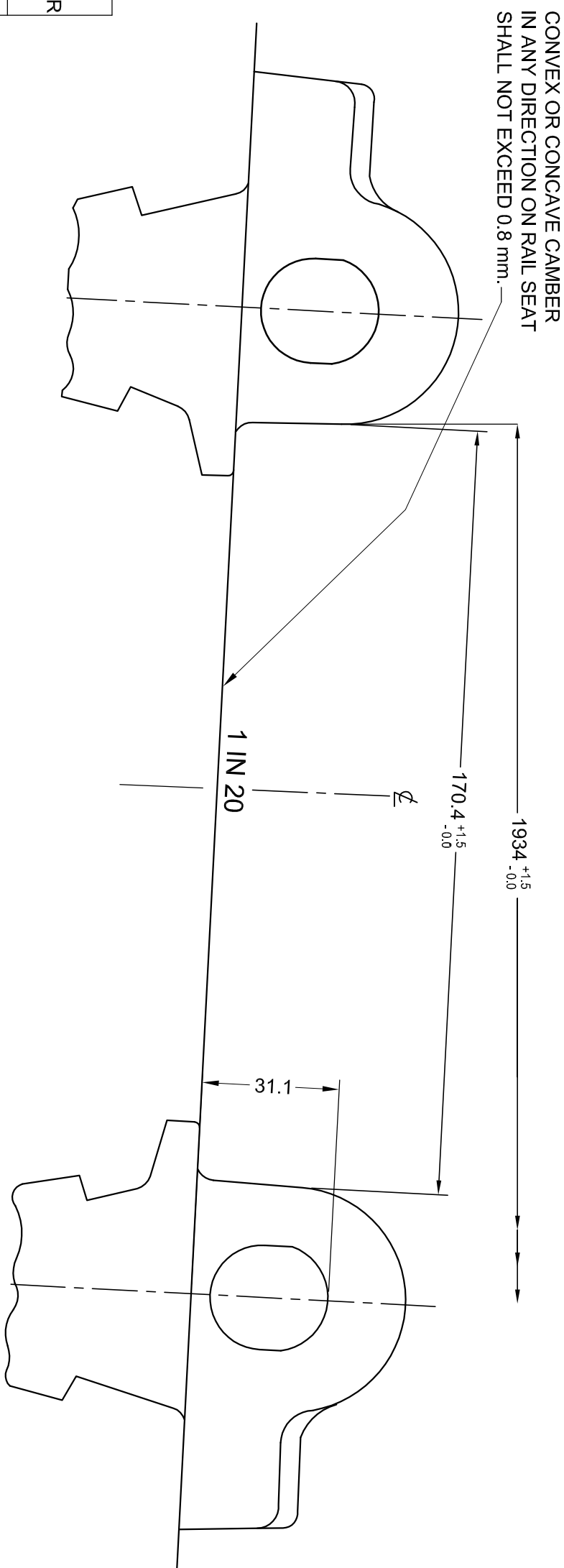
END ELEVATION



SECTION ON YY



SECTION ON XX



DETAIL OF FIXING INSERT AT RAIL SEAT

THIS DRAWING IS THE PROPERTY OF
RESEARCH DESIGN AND STANDARDS ORGANISATION
(MINISTRY OF RAILWAYS)
LUCKNOW - 226011, INDIA
AND SHALL NOT BE USED, COPIED, REPRODUCED IN
PART OR WHOLE, WITHOUT PRIOR CONSENT IN WRITING.

Q.
S.
D.
R.

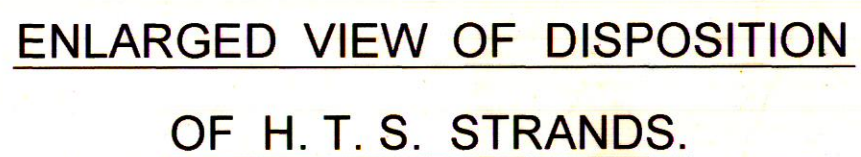
PRESTRESSED CONCRETE

SLEEPER FOR 25t AXLE LOAD FOR

B. G. ON 136 RE RAILS.

STAN 2	ADVANCE	(T)
CANC ID	26 - 02 - 2009	
REV 2		

6. FOR USE OF 60 kg RAIL ON THIS SLEEPER TO DRG. No. RDSOT-7008, REFER ASSEMBLY DRG. No. RDSOT-7009. 5. MARKINGS ON SLEEPERS SHALL BE TO DRG. NO. RDSOT-2466. 4. EACH STRAND SHALL BE TENSIONED WITH AN INITIAL FORCE OF 29 KN. 3. CONCRETE SHALL CONFORM TO IS:3745 IRS / T-39, OF GRADE M60. 2. ALL CORNERS SHALL BE ROUNDED OFF TO A RADIUS OF 5 mm UNLESS OTHERWISE SPECIFIED. 1. ALL DIMENSIONS ARE IN MILLIMETRES.	NOTE	AL T-1	SPECIFICATION IRS / T-39	SCALE MILLIMETRES 10 0 10 20 30 40 20 0 20 40 60 80 50 0 50 100 150 200	ALT: 1.	DESCRIPTION QUANTITY SCHEDULE FOR RAIL SEAT ASSEMBLY FOR 1676 mm. GAUGE & 1673mm GAUGE & NOTE No. 9 ADDED AND NOTE NO.3 ALTERED.	DATE XX.12.11	SLEEPER FOR 25t AXLE LOAD FOR B. G. ON 136 RE RAILS. RDSOT/-7008	STN E C&W REV E ADVANCE 26 - 02 - 2009 (T)
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CONVEX OR CONCAVE CHAMFER
IN ANY DIRECTION ON RAIL SEAT
SHALL NOT EXCEED 0.8 mm.

ALT. 5

18 ± 0.4

25 ± 0.4

1.5 ± 0.4

A $\begin{matrix} \times & +1.5 \\ \times & 0 \\ \times & -0 \end{matrix}$

B $\begin{matrix} \times & +1.5 \\ \times & 0 \\ \times & -0 \end{matrix}$

1 IN 20

TABLE OF DIMENSIONS

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PRESTRESSED CONCRETE
SLEEPER FOR 1673 mm GAUGE
G. 52 Kg. & 60 Kg. (UIC) RAILS.

STAN <u>D</u> -----	ADVANCE (T) 4.11.78 & 18.12.78
CANC <u>LD</u> -----	
REV <u>D</u> -----	

RDSO/T-2495 & 2496

NOTE

IRS / T-39

SPECIFICATION

SCALE

ALT:

DATE _____