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 EoI/ 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 →EoI. 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 EoI 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)

ANNEXURE-A

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.

ANNEXURE - B

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 firmincluding 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-Cand 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:

ANNEXURE – C

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 : (-) 5^0C to 50^0C.
   vi) Rail Temperature : (-) 15^0C to (+) 76^0C.
   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) and /or Wider PSC sleeper of RDSO design (for 25t axle load) to drawing no. RDSO/T-8527(Part)(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 ±1mm 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 isinstalled 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 -15^0 to 76^0C 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 65^0C to 76^0C 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) <u>Liners</u> (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 earlieror 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.

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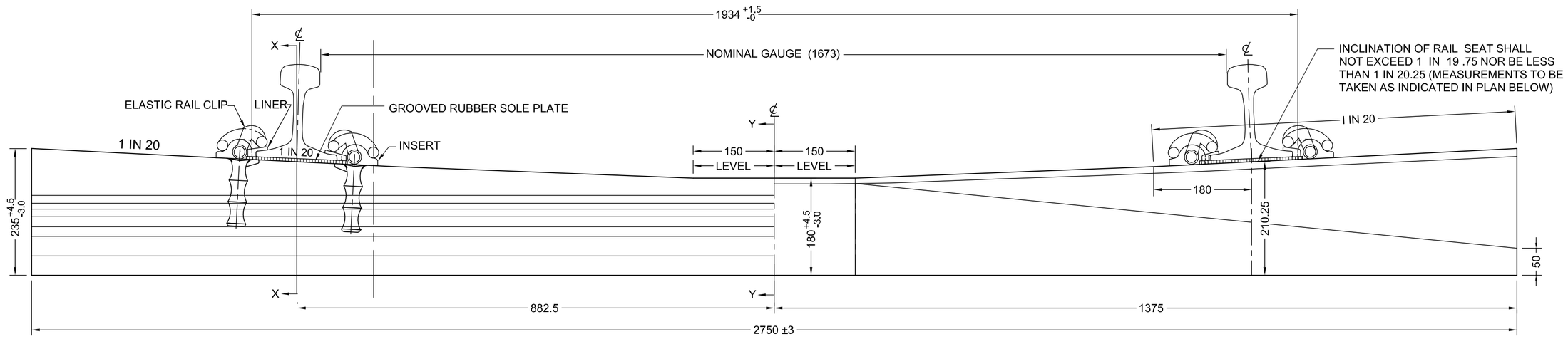
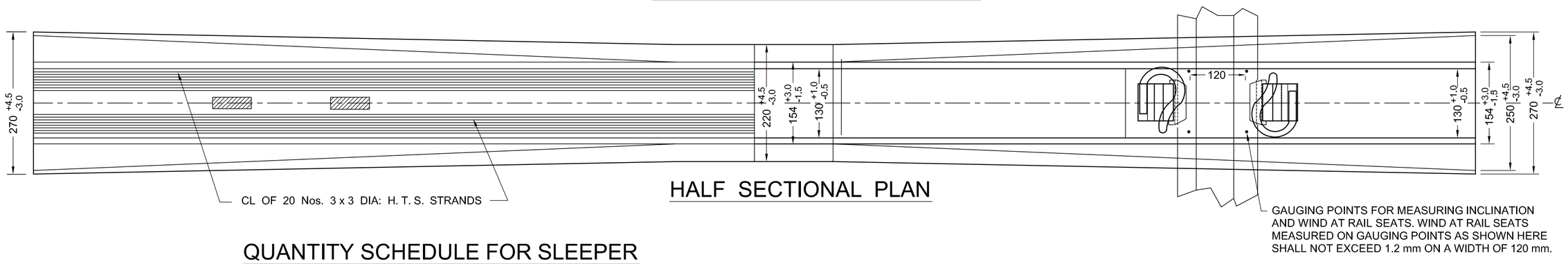
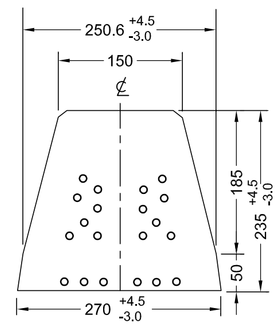


HALF SECTIONAL ELEVATION



HALF SECTIONAL PLAN



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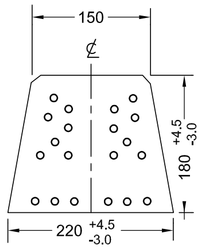

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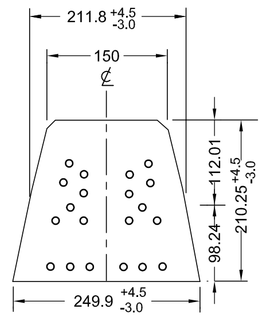
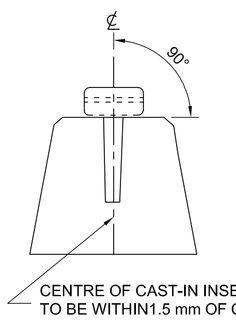
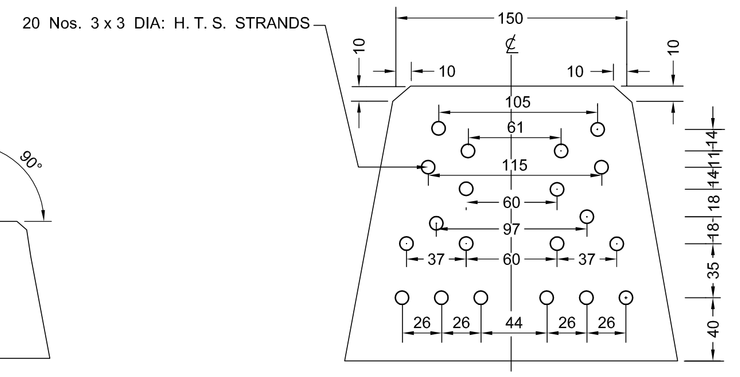


SECTION ON XX





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

QUANTITY SCHEDULE FOR SLEEPER

DESCRIPTION	DRG N o	MATERIAL	SPECIFICATION	No. PER SLEEPER	VOLUME PER SLEEPER	APPROX. WEIGHT EACH IN Kg.	APPROX. TOTAL WEIGHT IN Kg.
SLEEPER	RDSO/T-7008	CONCRETE	IRS/T-39	1	108900 cm^3	267	267
REINFORCEMENT	RDSO/T-7008	H.T.S.	IS: 6006	20 NOS. 3ply3 mm STRAND	-	0.4565	9.13
INSERTS	RDSO/T-6901	SGCI	IRS/T-46	4			

VALUES FOR STATIC BEND TEST

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

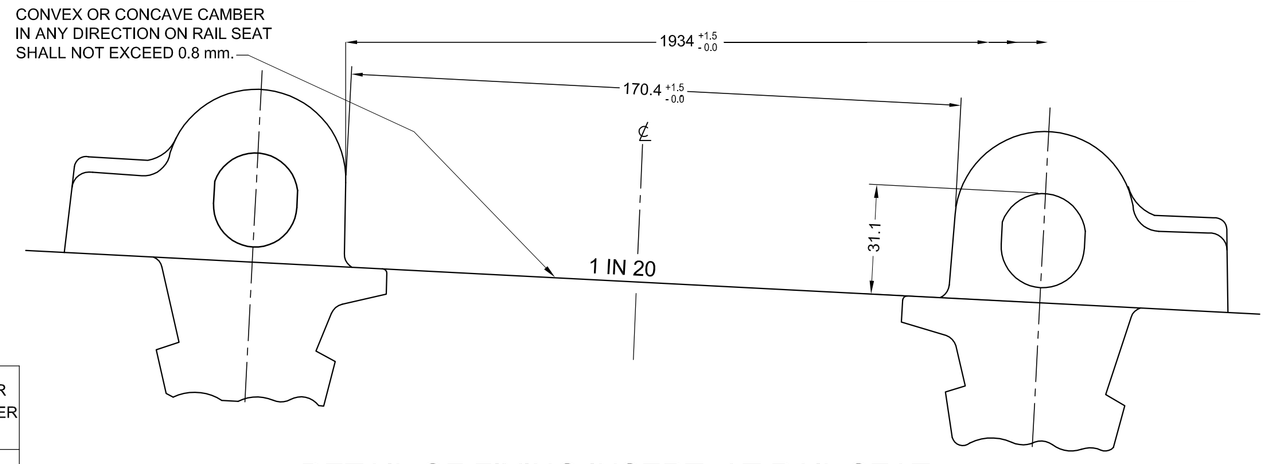
QUANTITY SCHEDULE FOR RAILSEAT ASSEMBLY FOR 1673 mm GAUGE, 60 Kg.(UIC)

DESCRIPTION	DRG N	MATERIAL	SPECIFICATION	No. PER SLEEPER
GROOVED RUBBER SOLE PLATES	RDSO/T-7010	COMPOSITE RUBBER	RDSO/ M&C/ RP- 200/2007	2
LINERS	RDSO/T-6937	GLASS FILLED NYLON-66	IRS/T-44	4
ELASTIC RAIL CLIP MARK-V	RDSO/T-5919	-	IRS/T-31	4

ALT-1

QUANTITY SCHEDULE FOR RAILSEAT ASSEMBLY FOR 1676 mm GAUGE, 60 Kg.(UIC)

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



DETAIL OF FIXING INSERT AT RAIL SEAT

9. FOR ACHIEVING 1676 mm GAUGE ON THIS SLEEPER WITH 60 Kg.(UIC) RAIL TO DRG. No.RDSO/T-7008 LINERS TO DRG: No. RDSO/T-8222 & 8223 ARE TO BE USED. FOR 1673 mm GAUGE USE LINER TO DRG. NO.RDSO/ T- 6937
8. PART SHOWN IN QUANTITY SCHEDULE SHALL BE TO LATEST SPECIFICATION & DRAWING.
7. THE LATEST VERSION OF DRAWING TO BE CONFIRMED FROM RDSO BEFORE TENDERING.
6. FOR USE OF 60 Kg RAIL ON THIS SLEEPER TO DRG. No. RDSO/T-7008, REFER ASSEMBLY DRG. No. RDSO/T-7009.
5. MARKINGS ON SLEEPERS SHALL BE TO DRG. NO. RDSO/T-2466.
4. EACH STRAND SHALL BE TENSIONED WITH AN INITIAL FORCE OF 29 KN. ALT-1
3. CONCRETE SHALL CONFORM TO ~~IRS/T-45~~, IRS/ T- 39 , OF GRADE M-60.
2. ALL CORNERS SHALL BE ROUNDED OFF TO A RADIUS OF 5 mm UNLESS OTHERWISE SPECIFIED.
1. ALL DIMENSIONS ARE IN MILLIMETRES.

NOTE

IRS / T-39

SPECIFICATION

MILLIMETRES
10 0 10 20 30 40
20 0 20 40 60 80
50 0 50 100 150 200

SCALE

ALT:	DESCRIPTION	DATE
1.	QUANTITY SCHEDULE FOR RAIL SEAT ASSEMBLY FOR 1676 mm. GAUGE & 1673mm GAUGE & NOTE No. 9 ADDED AND NOTE NO.3 ALTERED.	XX.12.11

R. D. S. O.

PRESTRESSED CONCRETE SLEEPER FOR 25t AXLE LOAD FOR B. G. ON 136 RE RAILS.

STAN ID
CANC LD
REV ID

ADVANCE
26 - 02 - 2009

(T)

RDSO/T-7008

A.N.GUPTA	KAMLESH JHA
DDST	JDS/T-IV
A/D	
COMPUTER BY	
TRC:	
K.J.SINGH	R.L.WAGHMARE
DRG: CHD:	
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CAL: CH:	
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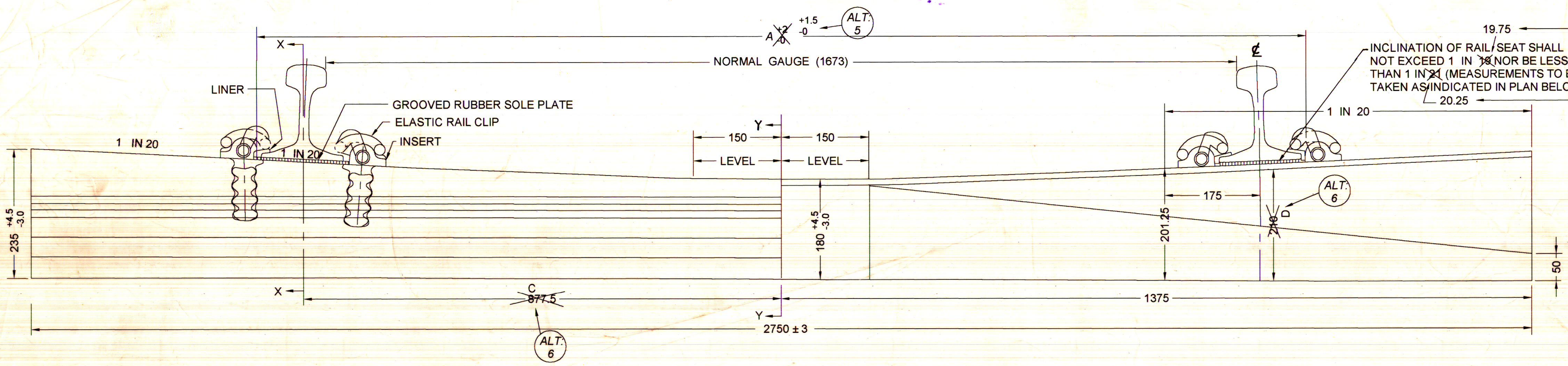

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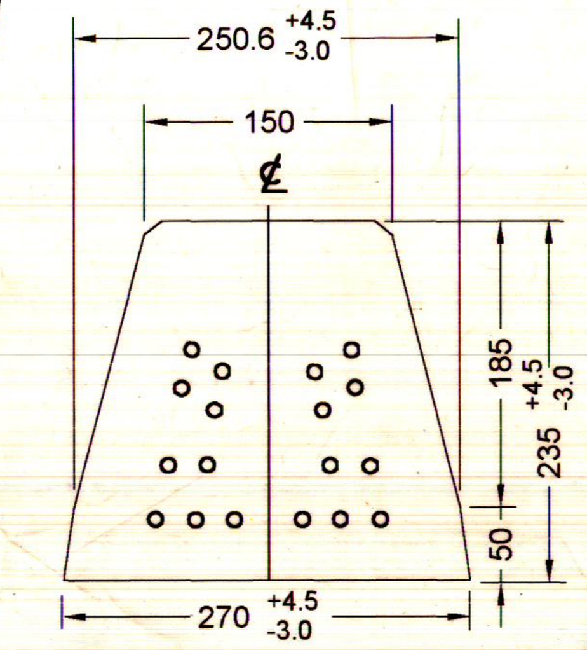

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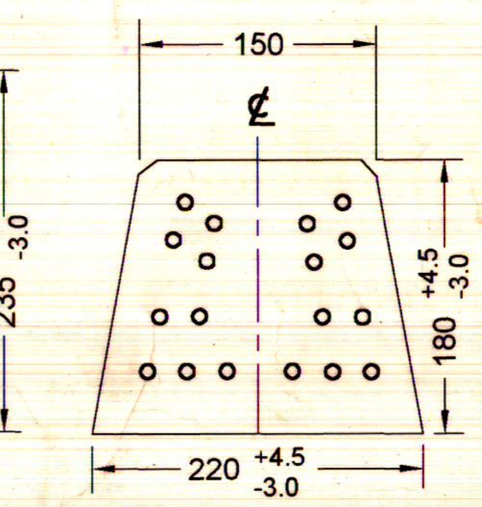

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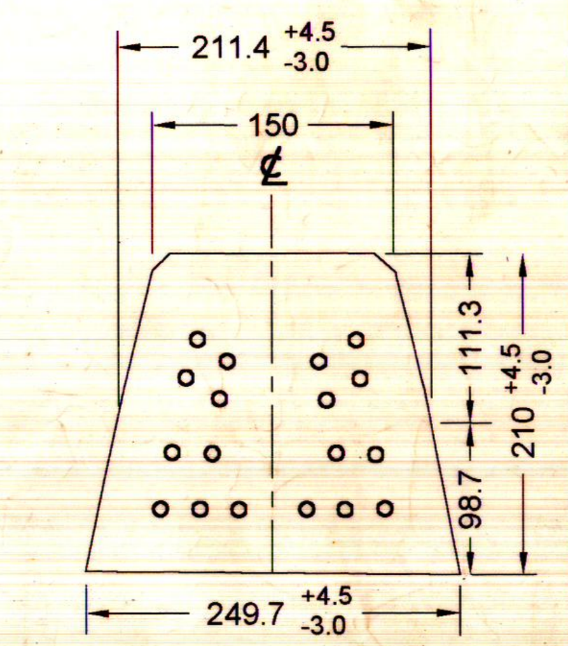

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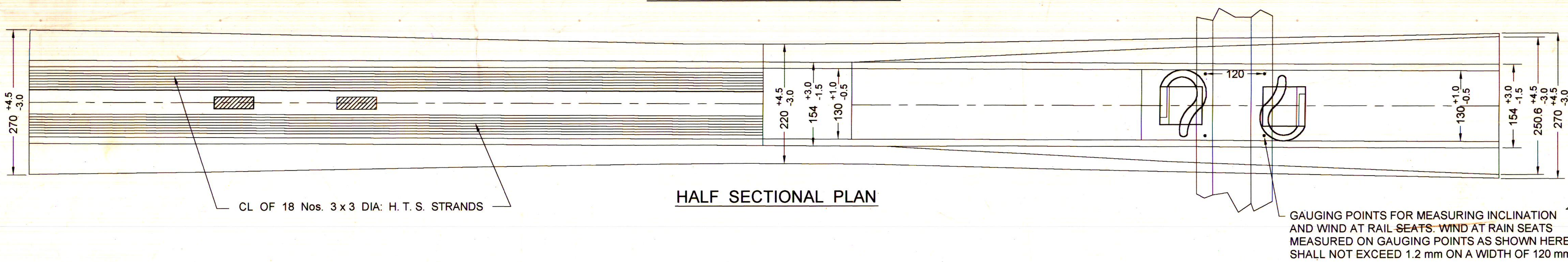
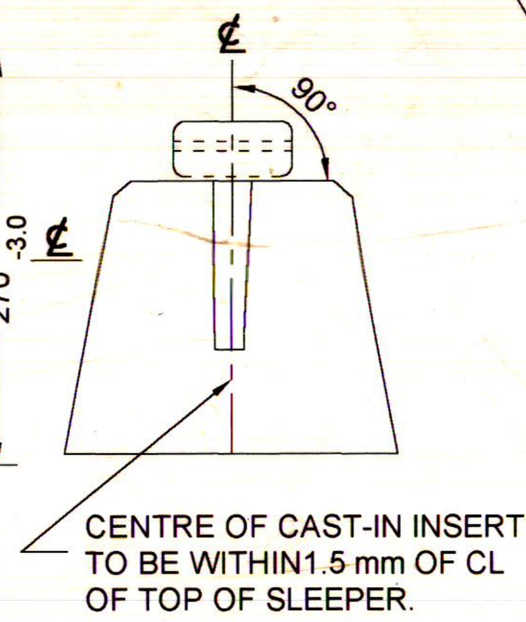
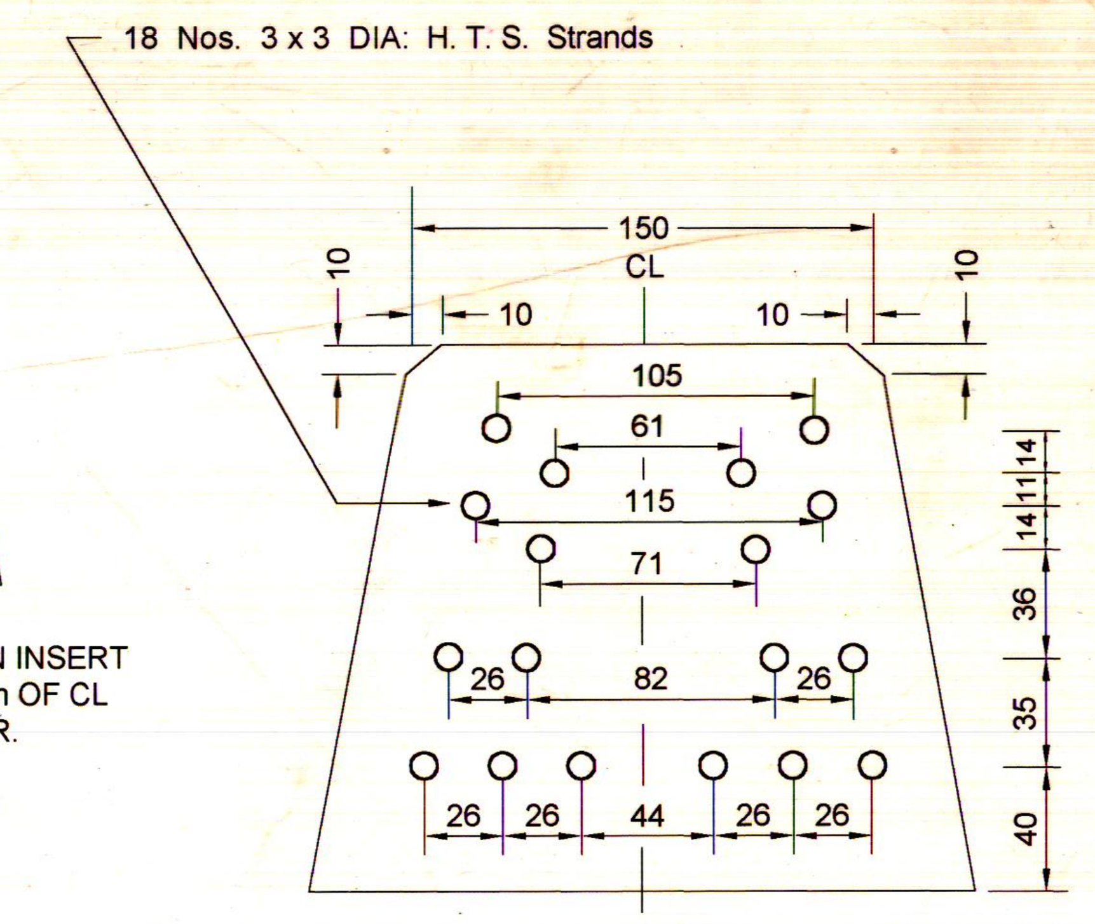
(AT 877.5 mm FROM CENTRE)



HALF SECTIONAL PLAN



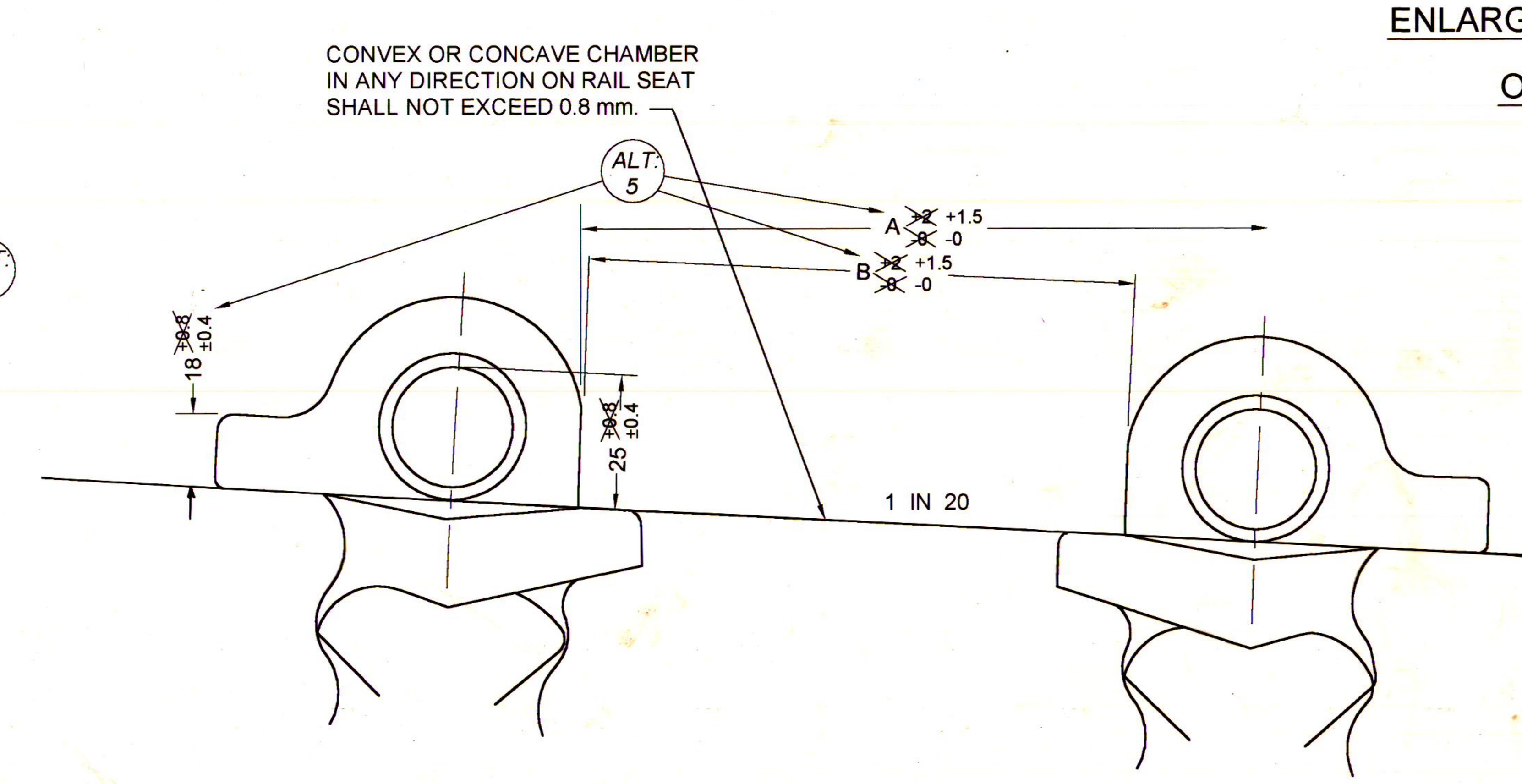


ENLARGED VIEW OF DISPOSITION OF H. T. S. STRANDS.

QUANTITY SCHEDULE

DESCRIPTION	RUNNING RAIL SECTION	DRG. NO.	MATERIAL	SPECIFICATION	NO. PER SLEEPER	VOLUME PER SLEEPER	WEIGHT EACH IN KG.	TOTAL WEIGHT IN KG.
SLEEPER	52 Kg.	RDSO/T-2495	CONCRETE	IRS/T-39	1	108900 CM³	267	267
	60 Kg (UIC)	RDSO/T-2496						
REINFORCEMENT	52 Kg.	RDSO/T-2495	H. T. S.	(ALT: 5) IS:6006 AMENDMENT No:3, JUNE 1993	18 Nos. 3 x 3 mm DIA: STRANDS	1047 CM³	0.4565	8.217
	60 Kg (UIC)	RDSO/T-2496						
INSERT	52 Kg.	RDSO/T-381	~~MCI~~	~~IRS/T-32~~	4	-	~~1.57~~	~~6.28~~
	60 Kg (UIC)		SGCI	~~DRAFT IRS SPECN. FOR SGCI~~ IRS/T-46		-	1.55	6.20
ELASTIC RAIL CLIP MK III	52 Kg.	RDSO/T-3701	Si - Mn. SPRING STEEL	IRS/T-31	4	-	-	-
	60 Kg (UIC)							
GROOVED RUBBER SOLE PLATE	52 Kg.	RDSO/T-3703	RUBBER	IRS SPECN. FOR 6 mm THICK GROOVED RUBBER SOLE PLATE (PROVISIONAL - 1997)	2	-	-	-
	60 Kg (UIC)	RDSO/T-3711						
LINER	52 Kg.	RDSO/T-3702	GFN-66	IRS/T-44 ~~IRS SPECN. FOR GLASS FILLED NYLON 66 INSULATING LINER (PROV.)~~	4	-	-	-
	60 Kg (UIC)	RDSO/T-3706						
	52 Kg.	RDSO/T-3738	M. S.	IRS SPECN. FOR METAL LINER FOR ~~IS:226-75~~ USE WITH ELASTIC RAIL CLIP (PROV.-1995)				
	60 Kg (UIC)	RDSO/T-3740						

ALT: 5



DETAIL FOR FIXING INSERT AT RAIL SEAT

TABLE OF DIMENSIONS

RUNNING RAIL SECTION	DRAWING NO.	MARKING ON SLEEPER	DIMENSIONS (mm) A	B	C	D
52 Kg.	RDSO/T-2495	RT-2495	1901.5	148	877.5	210
60 Kg. (UIC)	RDSO/T-2496	RT-2496	1921.5	162	880.5	210.15

ALT: 6

NOTE

10. FOR USE OF 52 Kg RAIL ON SLEEPER TO DRG. No. RDSO/T-2496, REFER ASSEMBLY DRG. No. RDSO/T-3731.
9. DRAWINGS TO RDSO/T-2495 ALT-2 & RDSO/T-2496 ALT-3 HAVE BEEN REVISED & REDRAWN AS RDSO/T-2495 & RDSO/T-2496 ALT:4
8. PART SHOWN IN QUANTITY SCHEDULE SHALL BE TO LATEST SPECIFICATION & DRAWING.
7. THE LATEST VERSION OF DRAWING TO BE CONFIRMED FROM RDSO BEFORE TENDERING.
6. FOR NON-TRACK CIRCUITED LINES M.S. LINERS CAN BE USED IN LIEU OF GFN/COMPOSITE INSULATING LINERS.
5. MARKINGS ON SLEEPERS SHALL BE TO DRG. NO. RDSO/T-2466.
4. EACH STRAND SHALL BE TENSIONED WITH AN INITIAL FORCE OF 27 KN.
3. CONCRETE SHALL CONFIRM TO IRS/T-39.
2. ALL CORNERS SHALL BE ROUNDED OFF TO A RADIUS OF 5 mm UNLESS OTHERWISE SPECIFIED.
1. ALL DIMENSIONS ARE IN MILLIMETRES.

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:	DESCRIPTION	DATE
6.	DIMENSION C & D SPECIFIED	6-5-99
5.	TOLERANCES ALTERED QUANTITY SCHEDULE REVISED	24-8-98
4.	DIMENSION ALTERED, QUANTITY SCHEDULE REVISED. PCS. NUMBER DELETED.	10.6.96

R. D. S. O.

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

STAN D
CANC LD
REV D

ADVANCE (T) 4.11.78 & 18.12.78

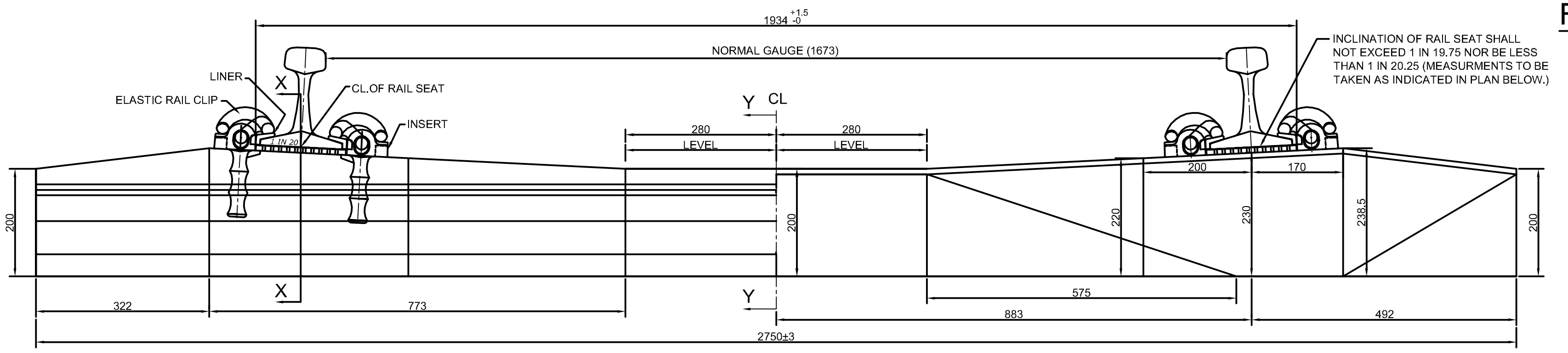
RDSO/T-2495 & 2496

DIGITIZED IN 2005 K.J. SINGH DDST-III

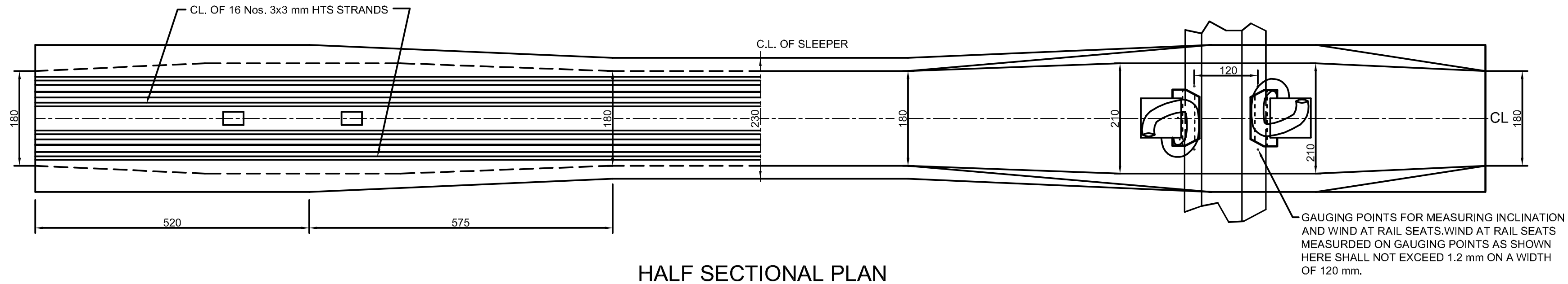
CH: | C.D.A. | A.D.E. | TRC: CH: | SAVITA | DRG: CHD: | EAL: CH: | C.R.No. PAGES | CT/SRC/32 14 OF 10-6-96 | FILE PAGE

FILE PAGE	CT/SRC/3/2 -	C.R.No. PAGES	– –	CAL: CH:	M.SHIVANNA –	DRG: CHD:	M.S.SHAIKH M.SHIVANNA	APPD ADE/T DST-IV	S.K.AWASTHI PRANAV KUMAR	ED-II:	VIPUL KUMAR

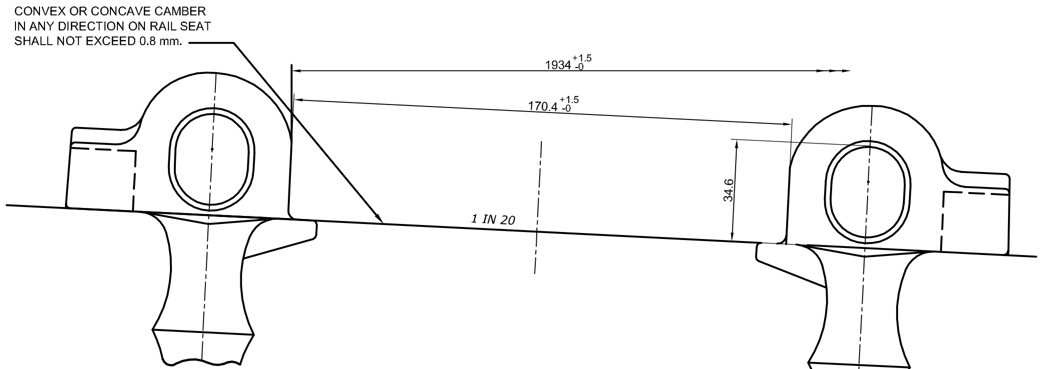
FOR TRIAL ONLY.



HALF SECTIONAL ELEVATION



HALF SECTIONAL PLAN



DETAIL OF FIXING INSERT AT RAIL SEAT

SPECIFICATION	SCALE	ALT:	DESCRIPTION	DATE
IRS / T-39	MILLIMETRES 10 0 10 20 30 40 20 0 20 40 60 80 50 0 50 100 150 200			

R. D. S. O.

WIDER PRESTRESSED CONCRETE SLEEPER FOR 25 t AXLE LOAD FOR 136 RE & 60 kg UIC RAILS.

STAN 0
CANC 10
REV 0

ADVANCE
16-03-2015

(T)

RDSO/T-8527(PART)