

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

TESTING OF ELASTIC RAIL CLIPS/MK-IV TO
DRAWING NO. - RDSO/T-4054



REPORT NO. TM-8
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REPORT ON TESTING OF ERC-MK-IV
TO DRAWING NO. RDSO/T-4054

1.0 INTRODUCTION

Track Design Directorate in their note no. CT/FD/2/ERC MK-IV dated 2/3.12.96 conveyed that Railway Board is in the process of deciding placement of an order for manufacture and supply of ERC/MK-IV for extensive field trials. Moreover, 68th TSC also desired that the efficacy of design of ERC MK-IV be checked up by RDSO before going for extensive field trials.

Track Design Directorate desired that the following tests be carried out :

- i) Application and deflection tests.
- ii) Maximum stress test on 8 ERCs.
- iii) Pulsator test with 60 Kg. rail seat assembly with standard load and cycles of application for MCI insert to Drg. No. RDSO/T-381, GR sole plate 6mm thick with Drg. No. RDSO/T-3711 and metal liner with Drg. no. RDSO/T-3740 (GFN Liner as per Drg. no. T-3706)

2.0 Details of Tests :

2.1 Application and deflection test

The above tests are being conducted on 8 clips on each firm's samples. In this test the ERC is driven in a fixture whose dimensions conform to that of the standard assembled track.

In this test, it is observed whether the driving of ERC MK-IV is feasible and the flat bearing areas are within the specified limits i.e.;

Major axis	28.0 mm (minimum)
Minor axis	9.5 mm (minimum)

Upto January 1997, 71 sets samples of ERC MK-IV have been tested in Track laboratory, out of which 65 sets of samples conform to the specifications. In this context, test report/job identification nos. may be referred in Annexure I.

2.2. Maximum Stress Test :

The above test is being conducted for 4 clips of each firm where samples conform to the application and deflection test. In this test, out of 8 ERCs, only 4 ERCs which were having higher toe-load are selected for stress measurements. Upto January 1997, 4 samples of each of the 65 firms have been tested for stress measurement and the stress values were found below the specified maximum value of 148 Kg/mm² in all the cases.

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2.3 Pulsator Test with 60 Kg.rail seat assembly

8 nos. ERC/MK-IV samples of 2 firms were selected. Criteria of selection was those samples which exhibited maximum values of toe-load and stress.

2.3.1 Pulsator Test :

The test assembly with two rail seats having 490 mm gauge using 60 Kg. rail and selected ERC/MK-IV to Drg. No. RDSO/T-4054, GFN liners to Drg. No. RDSO/T-3707 & RDSO/T-3708, G.R. Sole Plate 6 mm thick to Drg. no. RDSO/T-3711 were subjected to pulsating loads at 300 CPM. General arrangement of the test is shown in Fig.1.

2.3.2 The loading norms were as under :

Stage I:

- a) No. of cycles : 2 million
- b) Loading : Vertical (V) : 7.5t max. to 1.0t min.
Lateral (L) : 3.0t max. to 0.4t min.
Ratio (L/V) : 0.40

Stage II :

- a) No. of cycles : 0.5 million
- b) Loading : Vertical (V): 7.5t max. to 1.0 t min.
Lateral (L) : 4.6t max. to 0.62t min.
Ratio (L/V) : 0.62

3.0 OBSERVATIONS

On completion of Stage I & II loadings, toe loads of the tested clips were measured for determining the loss of the toe loads.

The reduction in toe load after completion of Pulsator test for Stage I & Stage II of loading is given in Annexure II.

4.0 REMARKS

4.1 Earlier static tests i.e. application and deflection tests on ERC/MK-IV have revealed satisfactory application and stress values, below the specified limits.

4.2 Two sets of samples of the ERC MK-IV to Drg. No. RDSO/T-4054, withstood the stipulated loading cycles under Pulsator.

4.3 The loss of toe loads of the clips with respect to original toe-load was found in the range of 50 Kg. to 110 Kg. (3.93% to 8.66%) & 20 kg to 65 kg (1.56% to 5.2%) for Job no. TM/TL/12/6 and Job No. TM/TL/12/7 respectively.

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Annexure I

Statement showing the test report/Job identification number of the firms with their name or identification mark engraved on the heel of ERC/MK-IV which passed the application test, deflection test and stress test.

S.N.	Test Report/ Job identification number	Name of the firms or Identification marks of ERC-MK-IV	Remarks
1.	26/89	M/s Mahabir Metal	
2.	30/89	M/s Jain Industries	
3.	33/89	M/s Plastico Metal	
4.	35/89	M/s Sikka	
5.	11/95	AN5/1	
6.	12/95	MUS/1	
7.	13/95	SNS/1	
8.	14/95	VTS/1	
9.	15/95	TK5/1	
10.	16/95	FF5/1	
11.	17/95	MIS/1	
12.	19/95	PR5/1	
13.	20/95	PK5/1	
14.	21/95	TY5/1	
15.	22/95	VSS/1	
16.	23/95	RT5/1	
17.	24/95	RJS/1	
18.	27/95	PL5/1	
19.	28/95	PT5/1	
20.	29/95	CE5/1	
21.	30/95	K 5/1	
22.	31/95	L 5/1	
23.	32/95	R 5/1	
24.	34/95	SS5/1	
25.	35/95	RS5/1	
26.	36/95	BJ5/1	
27.	37/95	SI5/1	
28.	38/95	PB5/1	
29.	39/95	NR5/1	
30.	40/95	SV5/1	
31.	41/95	LF5/1	
32.	42/95	WIS/1	
33.	43/95	NW5/1	
34.	46/95	BA5/1	
35.	47/95	AS5/1	
36.	48/95	KD5/1	
37.	49/95	CE5/1	

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S.N.	Test Report/ Job identification number	Name of the firms or Identification marks of ERC-MK-IV	Remarks
38.	54/95	HIT5/4	
39.	55/95	RC5/2	
40.	56/95	JIS/1	
41.	58/95	KMS/1	
42.	64/95	B 5/1	
43.	65/95	MA5/1	
44.	66/95	RHS/1	
45.	11/96	SH6/1	
46.	12/96	RM6/1	
47.	13/96	ME6/1	
48.	14/96	AE6/1	
49.	15/96	HT6/1	
50.	16/96	SCB/96	
51.	17/96	RR6/1	
52.	18/96	RK6/1	
53.	19/96	SR6/1	
54.	20/96	MV6/1	
55.	21/96	HE6/1	
56.	22/96	BP6/1	
57.	23/96	RT6/1	
58.	24/96	RX6/1	
59.	25/96	SM6/1	
60.	26/96	RF6/1	
61.	27/96	MF6/1	
62.	28/96	D 6/1	
63.	29/96	SS6/1	
64.	30/96	LE6/1	
65.	31/96	/A\ 6/1	

Annexure II

Statement showing the Toe Load of ERC-MK-IV used for
Pulsator test with 60 Kg. nail assembly

Job No. TM/TL/12/6 with ERC-MK-IV marking as MIS/1

S.N.	Clip No.	TOE LOAD (Kg.)		Stress Kg./mm	Loss of Toe Load Kg.	Remarks
		Before Pulsator Test	After Pulsator Test			
1.	17/95-1	1270	1220	134.30	50 (3.93%)	Loss of Toe Load is not substan- tial.
2.	17/95-3	1270	1160	135.21	110 (8.66%)	
3.	17/95-4	1280	1205	141.09	75 (5.86%)	
4.	17/95-6	1260	1165	127.04	95 (7.53%)	

Job No. TM/TL/12/7 with ERC MK-IV marking as MA 5/1

1.	65/95-4	1235	1180	113.73	55 (4.45%)	Loss of Toe Load is not substantial
2.	65/95-5	1250	1185	128.50	65 (5.20%)	
3.	65/95-7	1240	1190	124.91	50 (4.03%)	
4.	65/95-8	1280	1260	135.78	20 (1.56%)	

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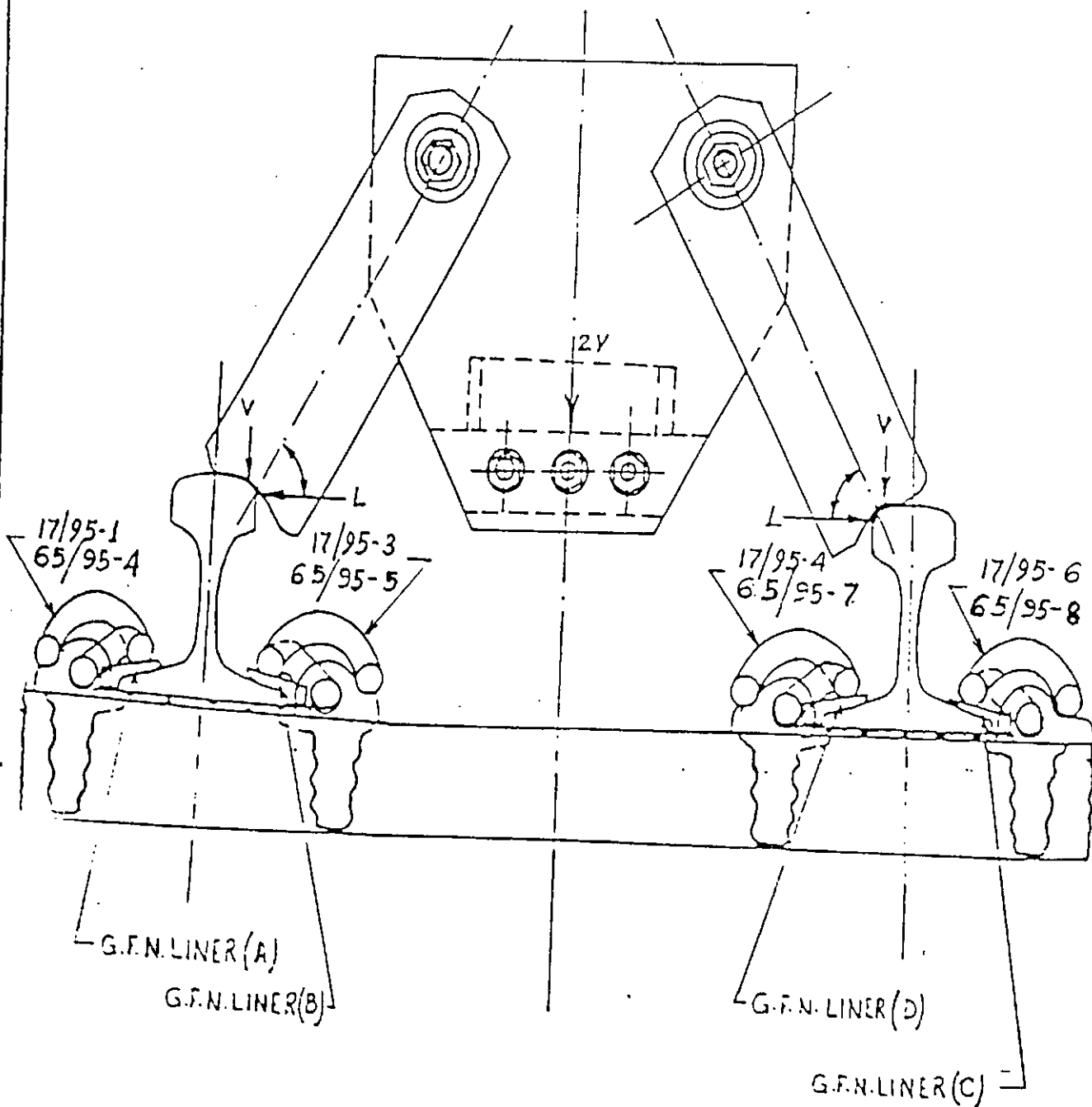
FIGURE - 1

STAGE - I :- VERTICAL (V) = 7.5t max TO 1.0t min
LATERAL (L) = 3.0t max TO 0.4t min } L/V = 0.4, 2x10⁶ CYCLES

STAGE - II :- VERTICAL (V) = 7.5t max TO 1.0t min
LATERAL (L) = 4.6t max TO 0.62t min } L/V = 0.62, 0.5x10⁶ CYCLES

FOR JOB NO. TM/TL/12/6, ERC-MK-IV USED ARE 17/95-1, 17/95-3, 17/95-4 & 17/95-6

FOR JOB NO. TM/TL/12/7, ERC-MK-IV USED ARE 65/95-4, 65/95-5, 65/95-7 & 65/95-8



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GENERAL ARRANGEMENT OF THE TEST