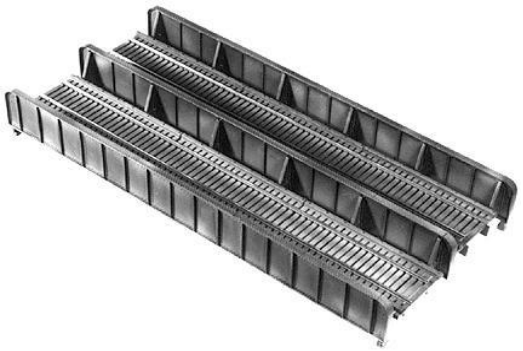

WORK STUDY TO REVIEW THE STAFF STRENGTH OF SSE/BRIDGES/ED SALEM DIVISION SOUTHERN RAILWAY

SOUTHERN RAILWAY

PLANNING BRANCH

G. 275 / WSSR-011718 / 2018-19

WORK STUDY TO REVIEW THE STAFF STRENGTH OF SSE/BRIDGES/ED OVER SALEM DIVISION SOUTHERN RAILWAY

STUDIED BY

WORK STUDY TEAM
OF
PLANNING BRANCH

MAY 2018

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(i)
ACKNOWLEDGEMENT

The work study team acknowledges its gratitude to Sr.DEN/Co-Ord/SA, ADEN/ED (Co-ordinating Officer), SSE/BRIDGES/ED (Co-ordinating Supervisor) and all the staff working under SSE/BRIDGES/ED for their valuable inputs and guidance in conducting and completing the study in time.

(ii)
AUTHORITY

Annual programme of work studies, approved by SDGM for the year 2017-18.

(iii)
TERMS OF REFERENCE

To review the staff strength of SSE/Bridges/ED over SalemDivision/S.Rly.

(iv)
METHODOLOGY

The following methodology has been adopted while conducting the study:

1) Collection of data

2) Discussion and interaction with officers of the Division and supervisors and staff of the unit.

3) Observation at Field Unit.

4) Working out the requirements on need base duly consideringbenchmarking, need basis, quantum of outsourcing and modernization.

(V)

SUMMARY OF RECOMMENDATIONS

Nil Posts.

CHAPTER I

1.0 INTRODUCTION

1.1 Indian Railways is a transport & freight handling Organization, with social and welfare obligation. Thus, safe transport of men and material are top priority for our Organization.

1.2 The term Benchmark originates from the chiseled horizonal marks that surveyors made into which an angle iron could be placed to bracket (bench) and leveling rod, thus ensuring that the leveling rod can be repositioned in exactly the same location in future. Bench Marking is also a point of reference for a measurement. It is the process used in management in which organization evaluates various aspects of their process in relation to the best practice usually within their own sector.

1.3 Bridges are expensive and key elements of the Railway Network because of their strategic location and of the dangerous consequences in failures.

1.4 The maintenance and Inspection of bridges is well planned and 5 years calendar is prepared by the Division and approved in the Zonal level.

1.5 This study is pertaining to SSE/BRIDGES/EDUnitoverSalem Division.SSE/BRIDGES/ED has been entrusted with responsibility to maintain and inspect all the Bridges and other related assets over Salem Division. No other unit is functioning in this Division.

1.6 The main function of SSE/Bridges is to inspect, record, highlight the matters to Zonal level for monitoring and further modification.Proper routine maintenance of Bridges ensures the safety of the transportation and life of the structure.

1.7 Apart from maintenance of Bridges the SSE/Bridges has to carry out the maintenance of others steel installations like:

- Foot over bridges(FOB)
- High level Tanks(HLT)
- Flood light Towers(FLT)and
- others special works like replacement of Girders, constructing of LUS etc.

1.8 The optimum man power utilization is an important factor for enhancing the productivity / operation ratio. RITES is also emphasised to conduct regular work studies to right size the man power and to justify the available Man Power on Zero base budgeting.

1.9 Keeping the above aspects in view, the work study team has made an attempt to study the present system of working at SSE/BRIDGES/EDUnit, through Benchmarking and need basis as means of reducing cost and right sizing the work force. and further growth of Technology, the work load vs requirement of staff is critically examined in the ensuing chapters.

CHAPTER II

2.0 PRESENT SCENARIO

2.1 Southern Railway has six (6) Divisions namely MAS, MDU, TPJ, PGT, TVC & SA. Bridges under Engineering Department of SA Division is functioning under the overall control of Sr.DEN/SA, assisted by DENs, ADENs, SSEs and Supervisors in extending Co-operation for smooth and efficient functioning of the Department with sub Division/units/sections.

SSE/Bridges/EDis In-charge SSE for all the sub-divisions and sections over Salem Division.

2.2 LOCATION OF THE SSE/BRIDGES/ED OVER SALEM DIVISION:

Office of the **SSE/BRIDGES/ED** is located in the Railway Colony, adjacent to the Office of the SSE/P.WAY/ED.

2.3 JURISDICTION, SUB-DIVISIONS AND SECTIONS OF THE SSE/BRIDGES/ED OVER SALEM DIVISION:

Jurisdiction of SSE/BRIDGES/ED over Salem Division is divided into six (6) Sub-Divisionsand further divided in to nine (9) sections as below:

Sl.No.	Sub-Division	Section
1	ADEN/NORTH/SA	JTJ-SA
2	ADEN/SOUTH/SA	SA-MTDM
3	ADEN/ATU	SAMT-VRI
4		SA-KRR
5	ADEN/ED	SA-TUP
6	ADEN/KRR	ED-TUP
7		KRR-DG
8	ADEN/PTJ	TUP-PTJ
9		MTP-UAM

2.4 STAFF STRENGTH:

The details of the Sanction, Actual, Vacancy and Excess are given in **Annexure – I.** The total sanction is shown as 31 including SSEs and JE. Actual is 12 as per DPO/SA's list. Whereas actual staff strength according to list of staff position issued by SSE/BRIDGES/ED dated 31.08.2017is 13 against sanctioned strength of 31. Work Study team reviews the staff strength based upon the S.A.V.E statement issued by DPO/SA only. Hence Sanctioned strength is taken as **31**.

2.5 TOTAL MAN-DAYS SERVICE BY A STAFF IN A YEAR:

No. of days per year			=	365
Less Deduction				
CL	=	10		
National Holidays	=	12		
Rest/Sundays	=	52		
Sub-Total	=	**74**	=	74
Net Man days available per year			**= 291 Working Days**	

2.6 ORGNISATIONAL SETUP:

<table>
<tr><td colspan="3">Sr.DEN/Co-Ord./SA</td></tr>
<tr><td colspan="3">DEN/SA</td></tr>
<tr><td colspan="3">ADEN/ED</td></tr>
<tr><td colspan="3">SSE/BRIDGES/ED</td></tr>
<tr><td colspan="3">JE/BRIDGES/ED</td></tr>
<tr><td colspan="3">Sr.TECH/BLACKSMITH</td></tr>
<tr><td>Tech I</td><td>Tech I</td><td>Tech I</td></tr>
<tr><td colspan="2">Tech II</td><td>Tech II</td></tr>
<tr><td colspan="3">HELPERs/BRIDGES</td></tr>
</table>

2.7 DETAILS OF THE STAFF:

There are thirteen (13) employees actually working in the Salem Division under the Bridges/Engineering Department. Their details are as below:

S. No	Name	Designat-ion	PF No.	DOB	DOA	DOR	Age
1	**KURIL SURESH RAM KISHORI** SSE/BRIDGES/ED		60800082	10.10.78	10.01.07	31.10.38	39
2	**K.S.RAMESH** App.JE/BRIDGES/ED		10040121	28.04.91	29.06.10	30.04.51	26
3	**K.KRISHNAN**	Sr.Tech Blacksmith	04325448	03.05.58	21.03.84	31.05.18	59
4	**C.COWRAN**	Riveter Gr.II	00294263	20.06.60	16.08.91	30.06.20	57
5	**M.KARUPPIAH**	Riveter Gr.II	00290361	10.03.59	19.08.91	31.03.19	58
6	**B.VENKATESAN**	Riveter Gr.III	00290350	02.12.63	16.08.91	31.12.23	53
7	**P.SAMINATHAN**	Riveter Gr.III	00290634	15.06.61	16.08.91	30.06.21	56
8	**A.SELVARAJ**	Riveter Gr.III	05254851	30.07.61	30.08.83	31.07.21	56
9	**S.MANTHIRA MOORTHY**	Bridge Helper	60800483	07.07.70	06.06.08	31.07.30	47
10	**N.RANGASAMY`**	Bridge Helper	60800410	14.06.72	06.06.08	30.06.32	45
11	**N.MURALI**	Bridge Helper	61209831	08.06.90	02.11.12	30.06.50	27
12	**A.YASAR ARAFATH**	Bridge Helper	61304232	31.05.92	23.03.13	31.05.52	25
13	**S.P.KRISHNA KUMAR**	Bridge Helper	61308250	25.04.65	25.11.13	30.04.25	52

2.8 DUTY HOURS OF STAFF IN THIS SECTION:

As per Hours of Employment Regulations (HOER)- DUTY ROSTER dated 31.12.2010, the following are the duty hours of the staff of SSE/BRIDGES/ED (classified as Continuous Roster) over Salem Division.

Activity/ Place	Shift Timings	
SSE/JE	Supervisory	
	General Duty	
Sr.TECH/BLACKSMITH	07.00 Hrs-12.00 Hrs	14.00 Hrs-17.00 Hrs
TECH Gr.I	07.00 Hrs-12.00 Hrs	14.00 Hrs-17.00 Hrs
TECH Gr.II	07.00 Hrs-12.00 Hrs	14.00 Hrs-17.00 Hrs
TECH Gr.III	07.00 Hrs-12.00 Hrs	14.00 Hrs-17.00 Hrs
HELPER/BRIDGES	07.00 Hrs-12.00 Hrs	14.00 Hrs-17.00 Hrs

2.9 **ROUTE KILOMETRES OF THE UNIT:**

This Unit covers total route kilometers of 840.32. Section wise route kms is as shown below:

S.No.	*Section*	*Km.*		*Total Km.s*
		From	*To*	
1	JTJ-ED-PTJ	218	487.2	269.20
2	IGU-CBE-PTJ	0	23.7	23.70
3	TP-ED	0	136.6	136.60
4	KRR-DG	0	70.12	70.12
5	SA-VRI	196.2	58.27	137.91
6	MGSJ-MTDM	0	37.7	37.70
7	SA-NMKL-KRR	0	85.19	85.19
8	CBF-MTP	0	33.5	33.50
9	MTP-UAM	0	46.4	46.40
			Total Kms.	***840.32***

2.10 **UTILISATION OF THE SECTION:**

According to Salem Division Working Time Table No.9 dated 01.10.2016, utilization of this Division is tabled as below:

Sl.No	Section/Stations	% Utilization of

	between	Line Capacity (yr.2015-16)
1	JTJ-MGSJ	102
2	MGSJ-SA	103
3	SA-ED	92
4	ED-IGU	98
5	IGU-PTJ	45
6	IGU-CBF	80
7	CBF-CBE	80
8	CBE-PTJ	67
9	ED-KRR	91
10	KRR-TPJ	77
11	KRR-DG	82
12	SA-VRI	83
13	MGSJ-OML	101
14	OML-MTDM	93
15	SA-NMKL-KRR	60
16	CBE-CBF	80
17	CBF-MTP	44

2.11 **TRAFFIC DENSITY:**

Traffic Density of various sections over Salem Division is tabled as under:

Sl.No	Section	Traffic Density Dn (GMT)	Traffic Density Up (GMT)
1	JTJ-SA	36.74	22.86
2	SA-ED	27.36	21.77
3	ED-CBE-PTJ	25.76	22.31
4	ED-KRR	11.23	
5	KRR-TP	11.23	

6	KRR-DG	9.55
7	SA-VRI	2.08
8	SA-MTDM	22.65
9	SA-NMKL-KRR	7.14
10	CBE-MTP	2.61
11	MTP-UAM	0.05

2.12 **MAXIMUM SPEED OF THE SECTION:**

Maximum speed of this unit over Salem Division, varies between 11.8 Kmph and 110 Kmph, which is tabulated below:

Sl.No	**Stations Between**	**Maximum Permissible Speed-** Kmph		
		Dn	**Up**	**Goods**
1	JTJ-ED	110	105	75
2	ED-IGU	110	105	75
3	IGU-PTJ (S/L)	95	95	75
4	IGU-CBF-CBE-PTJ (DOWN)	110	105	75
5	PTJ-CBE		70	75
6	CBE-CBF (UP)	110	105	75
7	CBF-IGU (UP)		70	75
8	ED-KRR	110	100	75
9	KRR-TP	110	100	75
10	KRR-DG	100		75
11	SA-VRI	80		75
12	SA-MTDM	75		

13	SA-NMKL-KRR	85		75
14	CBE-MTP	90		75
15	MTP-QLR	27	22.5	---
16	QLR-ONR	11.8		---
17	ONR-UAM	27.5	22.5	---

2.13 **CAUTION ORDER NOTICE STATIONS:**

There are Twenty (20) Caution Order Notice Stations in Salem Division.

Sl.No.	**Section**	**Station**
1	JTJ-ED	JTJ
2		ED
3	ED-CBE-PTJ	ED
4		CBE
5		PTJ
6	ED-TPJ	ED
7		TPJ
8	KRR-DG	KRR
9		DG
10	SA-VRI	SA
11		VRI
12	SA-MTDM	SA
13		MTDM
14	SA-NMKL-KRR	SA
15		KRR

16	CBE-MTP	CBE
17		MTP
18	MTP-UAM	MTP
19		ONR
20		UAM

2.14 **THE VITAL DETAILS OF BRIDGES MAINTAINED BY THIS UNIT:**

Total number of Bridges : 82

Total number of Span : 332

Total weight of Bridges : 33,403 MT

i) Various lengths of Steel Girders in service:

Sl.No.	**Length of Span Mtrs.**	**No.of Spans**
1	4.28	4
2	4.7	1
3	5.33	4
4	5.72	1
5	6.1	4
6	6.7	2
7	7.47	1
8	7.93	2
9	9.14	3
10	10.86	1
11	11.99	1
12	12.2	43
13	12.2	13
14	14.4	1
15	14.54	1
16	15.24	9
17	18.18	2
18	18.23	1

19	18.29	35
20	18.3	3
21	18.6	41
22	24.38	1
23	30.48	2
24	36.85	1
25	60.94	1
Total No.of Spans		**178**

ii) Various lengths of PSC Girders in service:

Sl.No.	**Length of Span Mtrs.**	**No. of Spans**
1	10.00	4
2	10.55	2
3	11.20	3
4	11.40	2
5	11.50	2
6	11.56	2
7	11.85	11
8	12.19	9
9	12.20	7
10	15.30	40
11	17.35	4
12	17.60	4
13	18.30	2
14	19.20	12
15	21.70	50
Total Man Days Required		**154**

2.15 **MAJOR DUTIES OF THE BRIDGE INSPECTOR AND STAFF:**

- Inspection (Steel, PSC) bridges.
- Greasing- Steel bridges.
- Painting – Steel bridges.
- Camber Measurement – PSC bridges.
- Under water Inspection.

THE OTHER STRUCTURAL INSPECTION AND MAINTENANCE WORKS ARE :

- Road over bridges (ROB) Inspection and Painting.
- Foot over bridges (FOB) Inspection, painting and maintenance.
- Flood light Towers (FLT) Inspection, painting and maintenance.
- High level tanks (HLT) Inspection, painting and maintenance.
- Workshop Steel Shed Inspection, painting and maintenance.
- Pipe line crossings Inspection, Painting and maintenance.
- Special works,strentening works,temperary girder fixing,etc.

2.16 SCHEDULE OF INSPECTIONS AND MAINTENANCE:

The schedule of Inspection for various officials is prescribed in Indian Railways Bridge Manual. As per Manual all the bridges are to be inspected by JE(Track)/JE(Works) once a year before monsoon and by AENs once a year after monsoon and important bridges by DENs once a year.All the steel structures are inspected by JE(Bridges) once in a five years and selected by JE(Bridge Engineers/Dy.CE (Bridges) as and when found necessary side by side track on the bridge should also be inspected thoroughly. The Bridges that have been referred to by AEN/DEN/Sr.DEN for inspection by a higher authority should also be inspected by higher authority in time. Details of Bridges which are of early steel and bridges which are over stressed should be filled properly in bridge registers.

The bridges over water are inspected at time of low water generally after the monsoon. The bridges requiring high climbing will be inspected during seasons when winds or extreme temperature are not prevalent. Bridges suspected of having trouble on account of thermal movement should be inspected during extreme temperatures. The bridges are inspected starting from foundation and ending with super structure.

2.16.1 BRIDGES: DETAILS OF INSPECTIONS:

The Bridge Inspector shall inspect in detail:

a) The steel work and bearings of all girders 12.2m clear span and above including that of road under/over bridges once in five years, about 20% of the inspection being carried out every year.

b) Welded girders once in three years, the initial inspection being carried out one year after installation

c) Superstructure of all prestressed concrete bridges, composite girder bridges once in five years, the initial inspection being carried out one year after installation.

d) Girders which are overstressed and kept under observation at least once a year.

e) Floor system of early steel girders once in a year. Other members once in five years.

2.16.2**OTHER STRUCTURES:**

	General	Detailed
i) FOBs	Every year	Once in 5 years
ii) ROBs-PSCs	Every year	Once in 5 years
iii)Composite – welded girders		Once in 3 years
iii) Workshops	Every year	Once in 5 years
iv) Steel Water Tanks	-	Once in 1 years
v) Flood light Towers	Every year	Once in 3 years

2.16.3 **Painting of Steel Girder Bridges and other Steel Structures:**

1. Steel Bridges	Once in 5 years
2. FOBs	Once in 5 years
3. ROBs – composite	Once in 5 years
4. Flood light Towers	Once in 5 years
5. Workshops	Once in 5 years
6. Water tanks	
Inside	Once in a year
Outside	Once in 5 years

2.16.4**GREASING OF BEARINGS IN STEEL GIRDER BRIDGES:**

1. Steel Bridges	Once in 3 years
2. Turntables	Once in a year

2.16.5**CAMBER RECORDING OF BRIDGES:**

i. Prestressed Girder Bridges Once in a year
ii. Steel Open Web Girders Once in a year

Bridge Inspection is systematic observation of condition and behavior of various components/parts. In this connection the following CE's Circular No.2/2009 details the schedule.

CE's Circular No. 2/2009 dated 26.03.2009			
INSPECTION OF BRIDGES			
Inspection of Bridges by Sr.SE/SE (Bridges):- Sr.SE/SE (Bridges) shall inspect in detail, the following items of Bridges in his jurisdiction.			
S. No.	Item to be inspected by Sr.SE/SE Bridges	Minimum Schedule	Authority
A. For other than Distressed Bridges			
i)	a) Steel works and bearings of all girders 12.2m clear span and above including that of ROBs/RUBs. b) All steel/PSC FOBs	Once in five years. 20% per year	Para 1102
ii)	All special type of steel girders such as shallow type girders & semi through type girders of irrespective of span	Once in five years. 20% per year	Supplementary instruction by CBE
iii)	Welded girders	Once in three years. The initial inspection being carried out one year after installation	Para 1102
iv)	Girders which are over stressed and kept under observation	At least once a year	Para 1102
v)	Super structure of all PSC/RCC / Composite girders with/without bearings	Once in 5 years. Initial inspection will be carried out one year after installation	Para 1102
vi)	a) Floor system of early steel girder b) Other members of steel girder	a)Once a year b) Once in 5 years	Para 1102
B) For Distressed Bridges(Item A (i) to (vi) above)			
I)	Category 'I'	Once in a month	Para 509
ii)	Category 'II'	Once in three months	Para 509

2.16.6 **UNDER WATER INSPECTION OF BRIDGE SUB-STRUCTURE**:

Under water inspection for sub structure of bridges shall be supervised with contract agency once in a year for the ear marked bridges and details shall be recorded in the register.

2.17 Asper Correction Slip No.2 dt.21.07.2000 for sub-para16 under para1107 of Chapter 11 of *IRBM, Health Monitoring of very Important Bridges* should be done periodically by an independent agency. Health monitoring will include corrosion monitoring, deteriorating of material, system damage, retrofitting, etc. The periodicity, of health monitoring is recommended as given below:

"First Survey should be conducted in case of Bridge located in other than aggressive environment (mild and moderate) in the 5th year. Subsequent surveys shall be conducted at 10 years interval".

2.18 **IMPORTANCE OF CAMBER:**

A positive, upward curve built into a beam which compensates for some of the vertical load and anticipated deflection. The Camber is the key parameter for the Open Web Girder's/PSC girder's health. The *Loss of camber* means either Girder or its part is overstressed or Overstressing of connections or Rivets in the main connections are loose, or Ply between the holes and rivets in case of Steel girders. The camber may be affected due to temperature changes and, therefore, it should be recorded near about the temperature at which it was originally recorded.

2.19 The investigation should be taken up on war footing since the failure will be sudden unlike steel girders and remedial steps should be taken for strengthening either by stressing the emergency cable or by external pre-stressing. Progressive loss of camber is an important indication of deteriorated condition of bridge. *Recording of camber is the only way to know the health of girder and hence recording of camber should be more sensitive.* Actual camber pre-stressed concrete component should be measured at the same temperature at which it was originally recorded; site will be compared with previously recorded camber.

2.20 **ROLE OF BEARINGS:**

Bearings transfer the forces coming from superstructure to the substructure. It also allows for necessary movements in the super structure which are caused by temperature variations. *Role of bearings* is transmission of vertical & horizontal forces from superstructure to substructure, to permit the longitudinal movement due to temperature variations, Translation, Rotation.

2.21 NON-DESTRUCTING TESTING METHODS MAY BE USED FOR

- estimating compressive strength of concrete
- establishing the uniformity and homogeneity of concrete
- detection of cracks, porosity, voids and other imperfections
- Position and size of reinforcement.
- Corrosion activity or its likelihood.
- Top, bottom and sides of girder/deck slab and parapet etc.

Board has approved procurement of 16 equipments for carrying out non-destructive testing of bridges. Testing facilities of Bridges is established at Head Quarters Office with the equipment procured thro' COFMOW, for catering field needs.

2.22 NUMERICAL RATING SYSTEM:

Themanual describes the Numerical Rating System for bridge inspection and this system envisages assigning numerical rating to the physical condition of bridge as whole, as also to its components. *Numerical Rating System (NRS) is a rating system used for Management of bridges*, Assessment of condition of bridge, Convenient to store the Data indicates the physical condition of a bridge as a whole. Lower the number more serious is the condition, identifies the progressive deterioration, Fixes priorities of bridge rehabilitation.

2.23 CONDITION RATING NUMBER (CRN):

Based on CRN, the condition of various bridge components is assessed those requiring rebuilding / rehabilitation immediately or on a programmed manner or which requires major/special repairs and which requires routine maintenance.With rating of Bridge condition, the

repairs & maintenance activities are prioritized withprescribed schedules.

2.24 PLANNER FOR MAINTENANCE OF BRIDGES AND OTHER STRUCTURES:

With reference to the earlier inspections and maintenance of individual bridges, the next inspection and maintenance schedules are planned for 5 years and a calendar is prepared. The 5 years calendar is prepared at the Division and approved by the Headquarters/Southern Railway. The present Running Calendar covers the period from 2014-15 to 2018-19.

2.25 VARIOUS DUTIES OF SSE/BRIDGES AS PER IRBM AND PCES CIRCULARS:

2.25.1 INSPECTION OF BRIDGES AND OTHER STRUCTURES:

I. SSE/BRIDGES is responsible for carrying out detailed inspection of:

- All welded, RCC, PSC and composite girders and their bearing within one year of installation.
- Girders kept under observation, once a year or at intervals specified by the Chief Bridge Engineer.
- Floor system of early steel girders once a year.
- Superstructure including bearings of all Steel girders of span12.2 m and above, RCC, PSC and composite girder bridges once in five years on planned basis.
- Other nominated steel structures, being maintained by him, once in five years.

II. RECORDS OF INSPECTION:

He will record the details of each one of the inspections in the register maintained for the purpose.

III. MAINTENANCE OF BRIDGES AND OTHER STRUCTURES:

He shall maintain the following structures in good condition by taking immediate action to carry out necessary repairs, painting, oiling and greasing, etc.

- Superstructure and bearing of all Steel bridges of span 12.2m and above, PSC, RCC and composite girders.
- Other steel structures as specified by Chief Engineer.

IV. He will be responsible for the erection of steel girders for all major bridges, PSC girders.

V. He will be responsible for the erection of workshop structures and flood light towers, if ordered by the Chief Engineer.

VI. He will be responsible for the accountal and periodical verification of stores, tools and plants in his charge.

2.25.2 KNOWLEDGE OF RULES AND REGULATIONS:

I. Every Bridge Inspector shall have in his possession copies of the following codes and manuals with all up to date correction slips:

- Indian Railways Permanent Way Manual, Bridge Manual and works Manual.
- Indian Railway General and Subsidiary Rules.
- Indian Railway Code for the Engineering Department.
- Schedule of dimensions.
- Circulars issued by the higher authorities.

II. Heshall be well acquainted with the rules, regulations and procedures concerning his work and duties as enjoined in the above codes and manuals. He shall keep himself in touch with the orders and circulars issued by higher authorities from, time to time and efficiently act upon them.

III. CO-ORDINATION WITH PERMANENT WAY, WORKS AND STAFF OF OTHER DEPARTMENTS:

The Bridge Inspector should keep close co-ordination with the staff of way, works, signaling, electrical, traction and other departments, when they are required to work jointly.

IV. ACCOMPANYING ON INSPECTION OF HIGHER OFFICIALS:

When the Bridge Inspector accompanies a periodical/ special inspection by the higher officials, he should have with him the following registers and documents pertaining to his section, other than the codes and manuals mentioned in para 108.

- Relevant Working Time Tables
- Inspection registers for steel work for bridges
- Rivet testing register
- Weld test register
- RCC, PSC Bridge/ Composite Girder, Bridge Inspection register
- Annual inspection registers for overstressed girders
- Upto date plans and files of bridge rehabilitation or regirdering works in progress and which are being inspected.

V. EXECUTION OF WORKS:

a) Working under traffic:

- He should take every precaution that works under traffic such as repairs and renewals of girders are carried out safely and in accordance with the rules for protection of the line.
- Before starting any work he shall ensure that he is in possession of all necessary materials and tools.
- He should make careful inspection of all temporary stagings provided and ensure that they are safe for the intended purpose.
- He should ensure that Engineering signals are exhibited at specified distances according to rules and flagmen are posted with necessary equipment.

b) Works affecting moving dimensions:

The bridge inspector shall refer any work likely to affect track or moving dimensions to the Assistant Bridge Engineer and Assistant Engineer for instructions.

c) The Bridge Inspector shall send in advance a programme of his work during the ensuing week to all the officers concerned.

d) Special Duties:

The Bridge Inspector shall carry out as and when required, such works as measurement of stress under load, verification of impact and oscillation effects and preparation of sketches for girders and other classes of steel work.

e) Tool and equipment:

The Bridge Inspector shall ensure that all tools and equipment such as compressors, pneumatic tools, derricks and jacks are used with due care and maintained in efficient working order.Returns of tools and plant in his charge should be submitted on the prescribed dates.

VI. ACTION IN CASE OF EMERGENCY:

On receipt of intimation of the occurrence of an accident (including breaches) affecting any part of the bridge or approaches or restricting free passage of trains, the Bridge Inspector should proceed to site by the quickest available means. On the way he should collect information regarding the damage, the men and material requirement at site for restoration and arrange for their movement and seek instructions regarding the restoration form the Assistant Engineer.

VII. ESTABLISHMENT:

1. Maintaining of Muster:

a. Each blank muster sheet before issue shall be initialed on the top by the Divisional Engineer/Assistant Engineer (Bridges). The attendance of artisans and helpers and other staff under him shall be checked by the Bridge Inspector according to instructions issued by theadministration from time to time. For each wage period the muster sheets should be collected and fresh ones issued.

b. The leave availed by each man should be recorded in the leave register to his account before the musters are despatched to the Assistant / Divisional Engineer's (Bridge) office.

2. Other Establishment Matters:

a. General conditions of railway service and rules relating to the conduct and discipline of railway servants are contained in

the relevant chapter of the Indian Railway Establishment Code.

b. Medical examination - The bridge inspector should ensure that all staff including casual labour are sent for medical examination on appointment, promotion and for periodical medical examination as laid down in the relevant rules.

c. Service Cards: He will arrange to maintain the service cards/ leave account of all the permanent staff working under him. Service card should be prepared as soon as appointments to permanent vacancies are made. In the case of casual labour he will arrange to issue the necessary service card to them and will maintain the L.T.I. register. All increment and promotions should be noted in the service cards and duly attested by the Assistant Engineer/Divisional Engineers (Bridges).

d. Provision in the various acts:He will ensure that the relevant provisions of payment of wages Act, Workmen's Compensation Act, Contract labour regulation and abolition act, Industrial Disputes Act and rules made thereunder, Hours of Employment Regulations, etc. as amended from time to time are complied with.

e. Promotion to higher grades.

   - The Bridge Inspector should maintain, in manuscript form, records of staff working under him in which he shall enter merits and demerits of each as and when such entries are justified.

   - The normal procedure for promotion should be by "Trade Tests." Qualified men will be entitled to promotion by seniority within their own groups.

   - He will initiate prompt action for filling up the vacancies by referring to the Assistant engineer/Divisional Engineer (Bridges).

f. He will arrange to carry out the other establishment work such as issue of passes, preparation of pay bills etc. as may be allotted to him by the administration.

g. He will ensure proper training of the artisan and other skilled men working under him at the appropriate time.

3. CORRESPONDENCE AND RECORDS:

The Bridge Inspector shall keep his correspondence and plans upto-date and ensure that the office records, registers and store ledgers are maintained systematically and posted regularly.

4. RELINQUISHMENT OF CHARGE:

a. On relinquishing charge of section, the Bridge Inspector shall prepare, in duplicate, the specified "transfer of charge" statement which will briefly contain the following:

i) Extent of charge.

ii) Important works in progress, showing position of each work and any special features to which particular attention is required.

iii) Details of inspection planned for year and extent of inspections completed.

iv) Certificate of store check and correctness of stock.

v) Establishment (Service and leave records).

vi) General notes about his section.

b. The relieving Inspector will examine all books and registers to see that they are upto date and initial them with date.

c. The Bridge Inspectors handing over and taking over charge should together travel over the whole section, inspect all the works in progress and check staff, all tools, plants and materials.

d. The "Transfer of charge" statement should be signed by both the Bridge Inspectors and forwarded to the Assistant Engineers (Bridges) or Divisional Engineer (Bridges) as may be prescribed.Errors and discrepancies which are noticed should be recorded in the statement and special attention of Assistant Engineer/Divisional Engineer (Bridges) invited to them.

2.26 DETAILS OF HARDSHIPS OF THE UNIT:

- SSE/Bridges/ED of the Unit is in-charge for the whole division, which is having a route kilometres of 840.32.
- As all the sections/sub-sections are lengthy, movement to the work spot and return to the headquarters is consuming more time, in cases more than the time of the maintenance work.
- There is no Ministerial staff available for this unit. Ministerial staff of ADEN/o/ED takes care of the pay related matters.
- There is no provision of Road vehicle for this unit. Which in turn affects their performance esp. to reach work spots at far of places where there is no regular stop or due to lesser number of trains in that particular route.
- There is no provision for watchman.
- Communication through Mobile phone (instead of provision of a walkie-talkie) is the option left for the staff of this unit, while inspection and maintenance of Bridges and other Structures, which may lead to untoward incidents.

2.27 OUTSOURCING:

Painting works in regard to Bridges and FOBs are completely Outsourced to Three (3) contractors. Whereas, painting for FLT, HLT and Workshop, yet to be outsourced to private parties. Patch Painting is done in necessary situations for Bridges, FOBs, FLTs, HLTs and Workshops.

The details of the outsourcing of painting of major Bridges and Foot Over Bridges over Salem Division are mentioned as below:

- M/s High Power V Insfrastructure Ltd., Saligramam, Chennai-93: Total Schedule Value is Rs.33,75,411.82/- (Agreement Value) for

8860 Sq.Mtrs. area of Bridges and 3950 Sq.Mtrs. area of Foot Over Bridges.

- Smt.V.Tamilselvi, Mohanur Road, Namakkal-01: Total Schedule Value Rs.15,37,224/- (Agreement Value) for 2795 Sq.Mtrs. of Bridges and 5510 Sq.Mtrs area of Foot Over Bridges.
- Sri.S.Arjun, Tiruppur: His contract period has expired and painting for some of the Bridges and FOBs is still pending.

2.28 IMPORTANT AND MAJOR BRIDGES MAINTAINED BY SSE/BRIDGES/ED OVER SALEM DIVISION:

SSE/BRIDGES/ED is responsible for maintaining *Sixty One (61) Steel Girder Bridges*; *Twenty One (21) PSC Girder Bridges* totalling to **Eighty Two (82) Bridges** with 333 Spans. Detailed List of Bridges maintained by SSE/BRIDGES/ED is shown as *Annexure No.3*.

2.29 FOOT OVER BRIDGES MAINTAINED BY SSE/BRIDGES/ED OVER SALEM DIVISION:

SSE/BRIDGES/ED is entrusted with the duty of maintaining **Thirty One (31) FOBs** over Salem Division with Tonnage of 1748. List of FOBs maintained by SSE/BRIDGES/ED is shown as *Annexure No.4*.

2.30 ROAD OVER BRIDGES MAINTAINED BY SSE/BRIDGES/ED OVER SALEM DIVISION:

Sixty Five (65) ROBs totaling tonnage of 19905, are maintained by SSE/BRIDGES/ED. List of ROBs maintained by SSE/BRIDGES/ED is shown as *Annexure No.5*.

2.31 HIGH LEVEL TANKs (HLT) MAINTAINED BY SSE/BRIDGES/ED OVER SALEM DIVISION:

Seventeen (17) HLTs are maintained bySSE/BRIDGES/ED throughout Salem Division. List of HLTs is shown as*Annexure No.6.*

2.32 FLOOD LIGHT TOWERs (FLTs) maintained by SSE/BRIDGES/ED OVER SALEM DIVISION:

SSE/BRIDGES/ED is entrusted with maintenance of fourteen (14) FLTs, whose list is shown as *Annexure No.7*.

2.33 WORKSHOPS MAINTAINED BY SSE/BRIDGES/ED THROUGHOUT SALEM DIVISION:

SSE/BRIDGES/ED is responsible for maintaining 14 Workshops/Section Shops over Salem Division, detailed list of workshops maintained by SSE/BRIDGES/ED is shown as *Annexure No.8*.

2.34 REFERENCEBOOKS AVAILABLE AT OFFICE OF SSE/BRIDGES/ED:

The following Books are available at the office of SSE/BRIDGES/ED for reference:

- Indian Railway Bridge Manual 1998 Corrected Upto Correction Slip No.34.
- Indian Railway Schedule of Dimensions- 1676 mm Guage BG Ver.2004.
- Monsoon Instructions -Ver 2003.
- Schedule of Rates-2011.
- IS 808 dated 19.9.89.
- RETS Practical Guide Book Series in regards to *Steel Structure Fabrication of Railways* by Rly. Engg. Technical Society, Pune.
- Soft copies of other related manuals and rules and regulations.

CHAPTER III

3.0 CRITICAL ANALYSIS

3.1 GENERAL ANALYSIS:

Rightsizing of Man Power in Railways is an ongoing process and it is being done after assessment by Planning Branches of concerned Divisions, Departments and by the specialized common branch under SDGM. Railway Board is fixing the annual target for surrender of posts for every zone. Technological improvements, computerization, investments in modernization, improved skills and training and even certain external factors like availability of competitive and quality products from outside, improvement and economy in outsourcing, transport etc help to achieve a better man power ratio. The productivity per employee calls for a work force which is optimum for the requirement. The ground realities are given due consideration during the review of staff strength.

A work study will have to consider not only the yardstick and benchmarks but also the scope for revising the yardsticks and for attaining or even excelling the benchmarks. Certain macro factors are also to be considered though the work study is basically a micro study of various activities, processes and time. Though the quantum of idle man power may not be linear across the departments or divisions, every unit has to strive hard to achieve the common target. This is especially so in Southern Railway since our productivity per employee ratio is less than the whole IR average. The magnitude of pending projects also demands such savings.

The outturn and workload of SSE/BRIDGES/ED over Salem Division has been analyzed with the sanctioned / actual strength and actual deployment of staff. The manpower requirement for entire activities has been calculated based upon the most recent suitable concept of benchmark technique, previous Work Study Reports and on need basis.

3.2 STAFF REQUIREMENT:

The staff requirement has been arrived at based on the practice followed by the Division/Zone in the previous Work Studies, Benchmarking and on need basis. The volume of scheduled workload

and workload carried out the by the staff in the previous years has been considered. This work study team has, based upon data and field study has arrived at numbers pertaining to requirement of staff of this section after thorough analysis.

3.3 ACTIVITY BASED MANPOWER REQUIREMENT:

All the activities such as Inspection, Greasing, Camber Recording, ROBs, FOBs, FLTs, Turn Table, Sheds, Water Tanks and RCC Bridges and other miscellaneous works performed by the staff of SSE/BRIDGES/ED are taken into account separately, while arriving at required manpower.

3.4 MANPOWER REQUIREMENT:

I) INSPECTION OF STEEL BRIDGES PER YEAR:

The list of Steel Bridges and the Inspection details are placed as **Annexure III.**

Total No. of steel bridges available = 61

Total No. Spans inspected in 5 years = 165

Total No. Spans inspected in 3 years = 13

Sl.No.	Span (m)	No.of Span	Man Day per span	Total Man Days Required
1	4.28	0.8	7	5.6
2	4.7	0.2	7	1.4
3	5.33	0.8	8	6.4
4	5.72	0.2	9	1.8
5	6.1	0.8	10	8
6	6.7	0.4	10	4
7	7.47	0.2	12	2.4
8	7.93	0.4	12	4.8
9	9.14	0.6	14	8.4
10	10.86	0.2	17	3.4
11	11.99	0.2	19	3.8
12	12.2	8.6	19	163.4

13	12.2	4.3	19	81.7
14	14.4	0.2	22	4.4
15	14.54	0.2	23	4.6
16	15.24	1.8	24	43.2
17	18.18	0.4	28	11.2
18	18.23	0.2	28	5.6
19	18.29	7.0	29	203
20	18.3	0.6	29	17.4
21	18.6	8.2	29	237.8
22	24.38	0.2	38	7.6
23	30.48	0.4	48	19.2
24	36.85	0.2	58	11.6
25	60.94	0.2	95	19
Total Man Days Required				**879.7**

Average No. Spans = 37.33

Total No. of Man days required to inspect spans = 878.16

Total No. of Manpower required in a year (878.16/291)=3.02 Men

II) **INSPECTION OF PSC GIRDER BRIDGES PER YEAR:**

The list of PSC Girders & Bridges and the Inspection details are placed as **Annexure III.**

Total No. of PSC Girder bridges available = 21

Total No. Spans inspected in 5 years = 154

Sl.No.	Span (m)	No.of Span	Man Day per span	Total Man Days Required
1	10.00	0.8	38	30.4
2	10.55	0.4	41	16.4
3	11.20	0.6	43	25.8
4	11.40	0.4	44	17.6
5	11.50	0.4	44	17.6
6	11.56	0.4	44	17.6
7	11.85	2.2	46	101.2
8	12.19	1.8	47	84.6

9	12.20	1.4	47	65.8
10	15.30	8	59	472
11	17.35	0.8	67	53.6
12	17.60	0.8	68	54.4
13	18.30	0.4	70	28.0
14	19.20	2.4	74	177.6
15	21.70	10	83	830
Total Man Days Required				**1992.6**

Average No. of Spans = 30.8

Total No. of Man days required to inspect 30.8 spans = 1567.8

Total Manpower required in a year (1992.6/291) = 6.85

III) **GREASING OF STEEL GIRDER BRIDGES PER YEAR:**

The list of Steel Girders Greasing details are placed in **Annexure III.**

Sl.No.	Span (m)	No.of Span	Man Day per span	Total Man Days Required
1	4.28	1.3	13	16.9
2	5.72	0.3	17	5.1
3	6.1	0.7	18	12.6
4	6.7	0.7	20	14.0
5	7.47	0.3	22	6.6
6	7.93	0.7	24	16.8
7	9.14	1.0	27	27.0
8	11.99	0.3	36	10.8
9	12.2	13.7	37	506.9
10	14.4	0.3	43	12.9
11	14.54	0.3	44	13.2
12	15.24	3.0	46	138.0
13	17.6	1.3	53	68.9
14	18.18	0.7	55	38.5
15	18.23	0.3	55	16.5
16	18.29	7.3	55	401.5

17	18.3	1.0	55	55.0
18	18.6	13.7	56	767.2
19	30.48	0.7	91	63.7
20	36.85	0.3	111	33.3
21	60.94	0.3	183	54.9
Total Man Days Required				**2280.3**

Total No. of Spans greasing in a year = 59.33

Total Man days required to greasing 59.33 spans = 2281.10

Total Manpower required for greasing in a year (2280.3/291) = 7.84

IV) CAMBER RECORDING OF GIRDER BRIDGES PER YEAR:

The details regarding Camber Recording of Bridges are available in **Annexure-III.**

Every year Camber Measurement is taken for PSC Bridges. Some of the Divisions execute this work through Outsourcing,i.e. Chennai Division. But in SA Division, this work is executed through Departmental staff only.

Sl.No.	Span (m)	No.of Span	Man Day per span	Total Man Days Required
1	10.00	4	3	12
2	10.55	2	3	6
3	11.20	3	3	9
4	11.40	2	3	6
5	11.50	2	3	6
6	11.56	2	3	6
7	11.85	11	3	33
8	12.19	9	3	27
9	12.20	7	3	21

10	15.30	40	3	120
11	17.35	4	3	12
12	17.60	4	3	12
13	18.30	2	3	6
14	19.20	12	3	36
15	21.70	50	3	150
16	Steel 30.48	2	3	6
17	Steel 36.85	1	3	3
18	Steel 60.94	1	3	3
Total Man Days Required				**474**

Total no. of spans camber recording is taken in a year = 158

Total Man days required to camber recording 158 spans = 474

Total Manpower required for Camber Recording in a year (474/291)

= 1.63 Men.

However, this is extremely unlikely to carryout camber recording for the 159 spans with 1.63 Men.

During field Observation, it was observed that 6 staff are required to take camber measurement of 2 spans in a day.

Total No. of Spans Camber Recording in a year = 158

If 2 camber recordings are taken in a day, 79 days are required for the total no. of 158 spans with set of 6 staff. But, on need basis, this work study allowed a set of 6 men for camber recording in a year.

Total Manpower required for Camber Recording in a year (On Need Basis) = 6 Men.

V) **INSPECTION OF OTHER STRUCTURES PER YEAR:**

Details of Other Structures Inspection - FOBs, ROBs, HLTs, FLTs & Workshops are placed as **Annexure- IV to VIII.**

Sl. No	Other Structure	No.of			Man Days per Struture	Total Man Days Reqd.
		Struc-tures	Span	Tonn-age (MT)		
1	FOBs	*31*	81	1748	5	*155*
2	ROBs	*65*	105	19905	6	*390*
3	FLTs	*14*	-	79	5	*70*
4	HLTs	*17*	-	102	6	*102*
5	Workshops	*14*	-	2585	5	*70*
					Total	**787**

Total No. of Man days required for Inspecting other structures = 787

Total No. of Manpower required (787/291) = 2.70 Men

VI) **MANPOWER REQUIREMENT FOR PATCH PAINTING AND CONTRACT PAINTING SUPERVISION:**

There are 3 contracts awarded for the painting of Bridges and other structures in SA Division, of which 1 contract work has expired, but lots of works awarded to him, are still pending. The total value of 2 contracts is Rs.49,12,635.82/-. For patch work painting and supervision of the contract paintings, on need basis, this work study team allowed 2 Men.

Total No. of Manpower required for painting = 2 Men

VII) **MANPOWER REQUIRED FOR FABRICATION (WELDER) =1 Men**

VIII) **MANPOWER REQUIRED FOR STORES =1 Men**

IX) **WATCHMAN REQUIREMENT AT SSE/BRIDGES/ED OFFICE (DAY SHIFT ONLY) =1 Men**

X) SPECIAL WORKS AND UNDER WATER INSPECTION - SUPERVISION:

The Special Works are not regularly carried out in every year and it may be varied according to the requirement and approval. It is to be noted here that almost all the works are executed through Outsourcing, planning and supervision are only done by the department. Another Important work is Under Water Inspection- which is also carried out through Outsourcing, here too departments role is limited to planning and supervision only. hence on need basis, this work study allowed 2 men for special works and Under Water Inspection.

Special Works and Under Water Inspection - Supervision

=2 Men

XI) REQUIREMENT OF SUPERVISORS:

The present sanctioned strength of Supervisors is 3 (2 SSE+1 JE), actual being 2 (1 SSE+1 JE). The Study team allowed **3 Supervisors** to continue.

XII) REQUIREMENT OF MINISTERIAL STAFF:

Presently ministerial nature of work of this Unit is partly managed by SSE/JE and partly by PB Staff of SSE/O/P.WAY/ED. The same is allowed to continue.

XIII) TOTAL MANPOWER REQUIREMENT:

Summary of total manpower requirement

Sl.No.	Activity	Manpower
1	Inspection of Steel Girders	3.02
2	Inspection of PSC Girders	5.39
3	Greasing of Girders	7.84
4	Camber Recording	6.00
5	Inspection of Other Structures	2.70
6	Painting	2.00

7	Fabrication (Welder)	1.00
8	Stores	1.00
9	Watchman	1.00
10	Special Works and UWI-Supervision	2.00
	Sub-Total	33.41
Add:	LR @ 12.5%	4.18
	Total Requirement	**37.59 or Say 38**
11	SSE/JE	3.00
	Grand Total	**41**

3.5 CALCULATION BASED ON BENCHMARKING:

As per the current benchmark issued by RB in the Month of October 2017, **(Placed as Annexure – IX)**SalemDivision falls under the classification *'Divisions less than 500 ITKms '.*

Even though ITKms of SA Division as per Headquarters is 613.64 Kms. As SA Division is having more IT Kms than that of 500 ITKms. This work study team considers SA Division as "Divisions more than 500 ITKms" as far as this study is concerned.

The first three (3) performing divisions with more than 500 ITKms are **BSP,NGP Divisions of SECRand WAT Division of ECoR**at 0.04 per ITKm.

Current IR Average : 0.09 Men per ITKm.
Current Benchmark : 0.04 Men per ITKm.

Work study team has adopted benchmarking methodology, previous work study reports & need basis to arrive at manpower requirement for

rightsizing the manpower to improve the efficiency coupled with productivity.

CALCULATION OF ITKm:

SALEM DIVISION- ADEN, PWI Section wise
Route Km, Track Km, ETKm and ITKm as on 31.03.2013

Sl.No.	DEN	ADEN	PWI	ET Km	TRACK ITKm (ET Km x 0.80)	ITKm of Bridges, Buildings etc.
1	Sr.DEN/East	SA/North	TPT	170.2	136.02	57.22
2			BQI	155.04	124.03	
3		SA/South	SA/N	167.80	134.24	88.69
4			SA/S	138.63	110.90	
5	DEN/Central	ATU	CHSM	56.47	45.18	37.41
6			ATU	63.81	51.05	
7			SA-NMKL-KRR	103.56	82.85	
8		KRR	KRR/W	104.43	83.54	101.90
9			TP	111.83	89.46	
10			KRR/E	80.64	64.51	
11	DEN/West	ED	ED	147.5	118.12	181.19
12			TUP	177.93	142.34	
13		PTJ	PTJ/E	166.54	133.23	147.23
14			MG	13.84	11.07	
15			CTR/CBF	120.84	96.67	
16			ONR MG	79.20	63.36	
Total				1858.23	1486.58	**613.64**

If the best performing Bridges unit (*Current Benchmark*) is adopted, the man power required for SSE/Bridges/ED would be

613.64 X 0.04 = 24.54or Say**25 staff**

Leaving a surplus of 06 staff.

The Indian Railway average is 0.09 per ITKm and by applying this bench mark.

Man power required at SSE/Bridges/ED

613.64 X 0.09 = 55.23or Say **55 staff**

Which is in excess of 24 to the current sanctioned strength at SSE/BRIDGES/ED, which is also unreasonable. During field visits and based on data collected, it is observed that SSE/BRIDGES/ED section has many works pending and section is being barely managed with current actual strength of 12.

3.6 The Book of sanction of SSE /BRIDGES/ED unit is 31 and the actual is 12 and the net vacancy is 19.

i. Book of Sanctioned strength – 31

ii. Actual as per S.A.V.E Statement -- 12

iii. Actual Staff position at SSE/BRIDGES/ED – 13

iv. Man power requirement as per previous work study reports -- 41

v. Man power requirement as per IR average (0.09 Men per IT Km: 613.64 IT Km) – 55

vi. Man Power requirement as per Bench mark (0.04 Men per IT Km MAS Dn.: 613.64 IT Km) – **25**

Though Benchmarking is the prime factor to identify the Man power requirement some of the other factors are also considered for the following reasons which are highlighted by the Staff and SSE/JE of the Unit.

- The distance – Total length is 840.32 km is maintained by SSE/BRIDGES/ED Unit.
- This Unit is entrusted with responsibility of maintaining and inspecting the assets of whole SA Division in respect to Bridges and other related structures.
- Whole jurisdiction of this Unit is divided into 9 sections, maintaining them while travelling to the work spot and back to

headquarters on daily basis (since stores and material are maintained at ED only)consumes lots of time.

- During May'2013, *SA-NMKL-KRR section with Kilometrage of 85.19*, has been added to the jurisdiction of this Section.
- There are lot of works pending because of 18 vacancies.SSE/BRIDGES/ED is managing the Unit with an actual strength of 12 only. (it is to be noted that of the 12 employees performing duties in this unit currently, 5 employees belong to the age group of 56 and above.)
- Some of the Painting works are not completed due to job pending from the Contractors. Because of this reason, there is an increase in patch painting work.

By considering the above facts, the Work Study team feels, on need basis, allows6 more staff over and above the requirement of staff which is calculated in the previous para based on benchmarking. Hence staff requirement is calculated as per benchmarking and need basis.

Manpower requirement based as per Benchmark	-	25
Additional manpower for manning works in the new section and additional assets	-	03
Additional manpower for loss of manpower due to movement from headquarters to work spot and back	-	03
Total Manpower requirement	**-**	**31.**

3.7 SUMMARY OF SANCTION VS REQUIREMENT:

POST	SANCTION	ACTUAL	REQUIREMENT	SURPLUS
SSE	2	1	**2**	0
JE	1	1	**1**	0
Sr.TECH BLACKSMITH	2	0	**2**	0
TECH I	4	0	**4**	0
TECH II	0	2	**2**	0

TECH III	1	3	**1**	0
HELPER /BRIDGES	21	5	**21**	0
TOTAL	31	12	**31**	0

Total requirement arrived is 31 and the study team recommends continuation of sanctioned strength as per book of sanction.

3.8 **RECOMMENDATION: Nil.**

CHAPTER IV

PLANNING BRANCH's REMARKS ON CO-ORDINATING OFFICER's VIEWS

CHAPTER V

FINANCIAL SAVINGS:**NIL.**

ANNEXURE – I

SAVE' STATEMENT ofSSE/BRIDGES/ED over SA Division as on15.02.2018					
Category	Grade Pay (Rs.)	Sanction	Actual	Vacancy	Excess
SSE/Bridges	4600	2	1	1	0
JE	4200	1	1	0	0
Blacksmith- Sr.Tech	4200	2	0	2	0
Blacksmith-Tech Gr. I	2800	4	0	4	0
Blacksmith-Tech Gr. II	2400	0	2	0	2
Blacksmith-Tech Gr. III	1900	1	3	0	2
Helper	1800	21	5	16	0
	Total	**31**	**12**	**23**	**4**

ANNEXURE – II

STATEMENT OF ACTUAL STRENGTH OF SSE/BRIDGES/ED OVER SALEM DIVISION as on 31.08.2017

Sl. No	Categories	VI th PC Scale of Pay	G. Pay	Level 7PC	Sanction	Actual	Vacancy	Excess	Remarks
1	SSE/Bridges	9300-34800	4600	L7	2	**1**	1	0	-
2	JE/Bridges	9300-34800	4200	L 6	1	**1**	0	1	Trainee JE-1 No.
3	Sr.Tech(Blacksmith)	9300-34800	4200	L 6	1	**1**	0	0	
4	Tech. Gr I	5200-20200	2800	L 5	3	**0**	3	0	
5	Tech. Gr II	5200-20200	2400	L 4	2	**2**	0	0	
6	Tech. Gr III	5200-20200	1900	L 3	1	**3**	0	2	
7	Bridge Helper	5200-20200	1800	L 1	21	**5**	16	0	
				TOTAL	**31**	**13**	**20**	**2**	

ANNEXURE – III

IMPORTANT AND MAJOR BRIDGES MAINTAINED BY SSE/Bridges/ED THROUGHOUT SALEM DIVISION.

Sl. No.	Section	Between Stations	Bridge No.	Span (m)			Material	Type	Location (km)	Weight (MT)	Last Date of				
											Inspection	Painting	Greasing	Camber	UWI
ADEN/North/SA Sub-division															
1	JTJ-SA	KEY-KNNT	37	2	x	9.14m	Steel	RIVETPG	232/29-35	63	01/13	02/13	04/16		
				3	x	15.24m									
ADEN/South/SA Sub-division															
2	SA-MTDM	MGSJ-OML	2	1	x	12.20m	Steel	RIVETPG	1/3-4	10	11/14	04/15	05/17		
3	SA-MTDM	MGSJ-OML	15 RD1	3	x	12.20m	Steel	WELDPG	7/15-17	30	10/14	03/15	08/16		
4	SA-MTDM	MGSJ-OML	15 RD2	3	x	12.20m	Steel	WELDPG	7/15-17	30	10/14	03/15	08/16		
5	SA-MTDM	MGSJ-OML	15 RD3	3	x	12.20m	Steel	RIVETPG	7/15-17	30	07/14	03/15	11/16		
6	SA-MTDM	MGSJ-OML	15 RD4	3	x	12.20m	Steel	RIVETPG	7/15-17	30	06/14	03/15	11/16		
7	SA-MTDM	MGSJ-OML	15 RD5	3	x	12.20m	Steel	RIVETPG	7/15-17	30	06/14	03/15	04/15		
8	SA-MTDM	OML-TOS	18	3	x	12.20m	Steel	RIVETPG	8/13-14	30	05/17	04/15	05/17		
9	SA-MTDM	TOS-MCRD	34	1	x	12.20m	Steel	RIVETPG	21/7-8	10	05/17	04/15	05/17		
10	SA-MTDM	TOS-MCRD	35	1	x	12.20m	Steel	RIVETPG	21/10-11	10	05/17	04/15	07/16		
11	SA-MTDM	MCRD-MTDM	50	1	x	12.20m	Steel	RIVETPG	32/15-16	10	05/17	04/15	07/16		
12	SA-SAMT	SA-SAMT	296	1	x	12.20m	Steel	RIVETPG	192/800-900	10	06/17	11/11	fixed		
13	SA-SAMT	SA-SAMT	303	2	x	12.20m	Steel	RIVETPG	194/000-200	20	06/17	11/11	fixed		

ADEN/ATU Sub-division															
14	SAMT-VRI	APN-SXT	284RD1	3	x	12.19m	PSC	'I' Girder	189/600-700	450	08/14	PSC	PSC	06/17	
15	SAMT-VRI	APN-SXT	284RD2	3	x	12.19m	PSC	'I' Girder	189/600-700	450	09/14	PSC	PSC	06/17	
16	SAMT-VRI	APN-SXT	284RD3	3	x	12.19m	PSC	'I' Girder	189/600-700	450	09/14	PSC	PSC	06/17	
17	SAMT-VRI	MPLI-APN	250	2	x	11.40m	PSC	'I' Girder	180/900-181/000	300	06/15	PSC	PSC	06/17	
18	SAMT-VRI	ETP-VGE	209	3	x	11.20m	PSC	'I' Girder	159/200-300	450	12/14	PSC	PSC	07/17	
19	SAMT-VRI	TVS-ATU	168	1	x	11.85m	PSC	'I' Girder	139/800-900	150	12/14	PSC	PSC	10/16	
20	SAMT-VRI	TVS-ATU	140	4	x	19.20m	PSC	Box Girder	124/300-400	1200	06/15	PSC	PSC	07/16	
21	SAMT-VRI	MLYR-TVS	121	3	x	12.20m	PSC	'I' Girder	116/600-700	450	10/16	PSC	PSC	10/16	
22	SAMT-VRI	SRVT-CHSM	92	2	x	11.85m	PSC	'I' Girder	102/600-700	300	12/14	PSC	PSC	11/16	
23	SAMT-VRI	KKTI-PRV	42	4	x	17.35m	PSC	Box Girder	83/200-300	800	12/14	PSC	PSC	9/17	
24	SAMT-VRI	MKSP-KKTI	31	8	x	19.20m	PSC	Box Girder	74/200-300	2400	12/14	PSC	PSC	11/16	
25	SAMT-VRI	VRI-MKSP	16	2	x	11.50m	PSC	'I' Girder	66/200-300	300	12/14	PSC	PSC	12/16	
26	SAMT-VRI	VRI-MKSP	10	8	x	11.85m	PSC	'I' Girder	61/000-100	1200	07/14	PSC	PSC	11/16	
27	SA-KRR	SA-MALR	7	3	x	12.20m	PSC	'I' Girder	3/100-200	450	04/14	PSC	PSC	12/16	
28	SA-KRR	MONR-VNGL	166	10	x	21.70m	PSC	Box Girder	71/000-72/400	2500	05/14	PSC	PSC	03/17	
	SA-KRR	MONR-VNGL	166	10	x	21.70m				2500	09/15	PSC	PSC	03/17	
	SA-KRR	MONR-VNGL	166	10	x	21.70m				2500	08/16	PSC	PSC	03/17	

	SA-KRR	MONR-VNGL	166	10	x	21.70m				2500	05/14	PSC	PSC	03/17	
	SA-KRR	MONR-VNGL	166	10	x	21.70m				2500	05/14	PSC	PSC	03/17	
ADEN/ED Sub-division															
29	SA-TUP	CV-ED	342DN	19	x	18.60m	Steel	RIVETPG	388/09-34	154	04/17	04/06	05/17		
	SA-TUP	CV-ED	342DN		x		Steel	RIVETPG		264	04/17	08/06	05/17		
	SA-TUP	CV-ED	342DN	1	x	60.94m	Steel	Throughtype		250	11/16	09/06	07/15	01/17	
	SA-TUP	CV-ED	342DN		x		Steel			175	11/13	09/07	05/17		
30	SA-TUP	CV-ED	342UP	22	x	18.60m	Steel	RIVETPG	388/10-33	242	01/15	06/15	09/16		
											01/15	07/15			
											06/15	08/15			
											06/15	09/15			
31	SA-TUP	CV-ED	CV11	2	x	18.18m	Steel	RIVETPG	389/44-46	44	05/15	08/15	04/16		
32	SA-TUP	CV-ED	CV13	1	x	18.23m	Steel	RIVETPG	390A/08-390/10	22	04/16	08/15	04/16		
33	SA-TUP	CV-ED	352Loop	1	x	6.70m	Steel	Shallow type	391/39-41	16	04/13	06/11	04/17		
34	SA-TUP	CV-ED	352SN	1	x	6.70m	Steel	Shallow type	391/39-41	16	04/16	04/11	04/17		
35	SA-TUP	ED-TPM	361	1	x	7.47m	Steel	Shallow type	395/4-6	17	06/17	05/10	06/17		
ADEN/KRR Sub-division															
36	ED-TP	KMD-PGR	204	6	x	15.24m	Steel	RIVETPG	43/300-400	102	05/13	12/12	06/16		
37	ED-TP	KRR-VRQ	158TP	2	x	10.00m	PSC	Box Girder	65/2-7	250	05/14	PSC	PSC	06/16	
				20	x	15.30m	PSC	Box Girder		750	07/15	PSC	PSC	06/16	
										750	06/16	PSC	PSC	06/1	

														6	
										750	04/13	PSC	PSC	06/16	
										750	05/14	PSC	PSC	06/16	
38	ED-TP	EL-JPM	38	1	x	12.20m	Steel	RIVETPG	125/500-600	10	02/17	01/13	04/15		
39	KRR-DG	KRR-VEI	158DG	2	x	10.00m	PSC	'I' Girder	1/7-12	250	09/14	PSC	PSC	06/16	
				20	x	15.30m	PSC	'I' Girder		750	08/15	PSC	PSC	06/16	
										750	06/16	PSC	PSC	06/16	
										750	06/13	PSC	PSC	06/16	
										750	09/14	PSC	PSC	06/16	
40	KRR-DG	VEI-PALM	27	2	x	12.20m	Steel	RIVETPG	16/800-900	20	05/15	05/15	07/16		
41	KRR-DG	VEI-PALM	43	3	x	12.20m	Steel	WELDPG	25/500-600	30	04/14	05/15	07/16		
42	KRR-DG	EDU-DG	140	2	x	18.30m	PSC	'I' Girder	70/300-400	400	05/14	PSC	PSC	01/17	
ADEN/PTJ Sub-division															
43	TUP-PTJ	CBE-PTJ	504LINK	4	x	12.20m	Steel	WELDPG	484/20-22	40	09/16	12/11	04/14		
44	TUP-PTJ	CBE-PTJ	504LINK	2	x	10.55m	PSC	'U' Girder	484/500-600	600	09/16	PSC	PSC	12/16	
				2	x	11.56m									
45	TUP-PTJ	IGU-PTJ	504MAIN	4	x	12.20m	Steel	RIVETPG	484/20-22	40	05/14	12/11	04/14		
46	TUP-PTJ	CBF-CBE	22A UP	1	x	14.40m	Steel	Shallow type	17/2-4	32	06/17	06/03	10/15		
47	TUP-PTJ	CBF-CBE	22A DN	1	x	14.54m	Steel	Shallow type	17/1-3	32	06/17	06/03	10/15		
48	TUP-PTJ	PLMD-CBF	A26	1	x	12.20m	Steel	RIVETPG	9/50-52	14	05/16	09/11	05/16		

				1	x	6.10m									
49	TUP-PTJ	PLMD-CBF	A26(6.00M SPAN-PWI)	1	x	12.20m	PSC	'I' Girder	9/49-51	14	11/13	PSC	PSC	12/16	
				1	*x*	*6.00m*									
50	TUP-PTJ	PLMD-CBF	A44	4	x	18.29m	Steel	RIVETPG	13/11-13	88	05/16	02/03	05/16		
51	TUP-PTJ	PLMD-CBF	A44	4	x	17.60m	PSC	'I' Girder	13/33-41	600	05/16	PSC	PSC	12/16	
52	MTP-UAM	MTP-QLR	1	2	x	18.29m	Steel	RIVETPG & Semi-Through	1/4-6	184	02/13	12/06	02/15	07/16	03/13
				2	x	30.48m									
53	MTP-UAM	QLR-HLG	19	2	x	12.20m	Steel	RIVETPG	8/3-4	20	11/15	03/11	fixed		
54	MTP-UAM	QLR-HLG	20	1	x	18.29m	Steel	RIVETPG	8/6-7	22	11/15	04/06	fixed		
55	MTP-UAM	QLR-HLG	24	1	x	18.29m	Steel	RIVETPG	9/3-4	22	07/16	06/11	03/15		
56	MTP-UAM	QLR-HLG	24A	1	x	11.99m	Steel	RIVETPG	9/5-6	10	06/13	03/11	03/15		
57	MTP-UAM	QLR-HLG	25	3	x	18.29m	Steel	RIVETPG	9/11-12	66	07/16	03/11	fixed		
58	MTP-UAM	QLR-HLG	28	2	x	18.29m	Steel	RIVETPG	10/5-6	56	06/13	06/06	fixed		
				4	x	5.33m									
59	MTP-UAM	QLR-HLG	30	3	x	18.29m	Steel	RIVETPG	11/1-2	66	06/13	03/11	07/16		
60	MTP-UAM	QLR-HLG	33	1	x	12.20m	Steel	RIVETPG	11/16-17	10	07/16	11/07	03/15		
61	MTP-UAM	QLR-HLG	34	1	x	36.85m	Steel	Under Slung Girder	12/8-9	103	11/15	04/11	03/15	07/16	
				1	x	5.72m									
62	MTP-UAM	QLR-HLG	35	2	x	18.29m	Steel	RIVETPG	12/8-9	44	02/16	05/06	03/15		
63	MTP-UAM	QLR-HLG	36	1	x	18.29m	Steel	RIVETPG	12/11-12	22	03/16	06/03	fixed		

64	MTP-UAM	QLR-HLG	38	1	x	18.29m	Steel	RIVETPG	13/600-800	36	06/12	04/11	06/15		
				1	x	9.14m									
				2	x	6.10m									
65	MTP-UAM	QLR-HLG	39	2	x	18.29m	Steel	RIVETPG	13/7-8	44	06/12	03/06	03/15		
66	MTP-UAM	QLR-HLG	40	2	x	12.20m	Steel	RIVETPG	13/900-14/000	23	07/13	05/11	fixed		
				1	x	4.70m									
67	MTP-UAM	QLR-HLG	44	3	x	18.29m	Steel	RIVETPG	14/700-800	66	06/12	06/11	08/15		
68	MTP-UAM	QLR-HLG	47	1	x	24.38m	Steel	RIVETPG	15/4-5	67	07/13	06/11	fixed		
				1	x	18.29m									
69	MTP-UAM	QLR-HLG	48	1	x	12.20m	Steel	RIVETPG	15/5-6	10	07/13	06/11	03/15		
70	MTP-UAM	QLR-HLG	55	3	x	12.20m	Steel	RIVETPG	16/7-8	30	06/13	02/03	fixed		
71	MTP-UAM	QLR-HLG	56	2	x	18.29m	Steel	RIVETPG	16/10-11	60	12/16	06/11	03/15		
				4	x	4.28m									
72	MTP-UAM	HLG-ONR	60	1	x	12.20m	Steel	RIVETPG	17/4-5	10	03/16	06/11	fixed		
73	MTP-UAM	HLG-ONR	62	1	x	18.29m	Steel	RIVETPG	18/1-2	26	06/13	09/04	fixed		
				1	x	6.10m									
74	MTP-UAM	HLG-ONR	67	1	x	12.20m	Steel	RIVETPG	18/6-7	10	03/13	06/11	03/15		
75	MTP-UAM	HLG-ONR	73	1	x	12.20m	Steel	RIVETPG	19/4-5	10	03/13	06/11	03/15		
76	MTP-UAM	HLG-ONR	88	1	x	18.29m	Steel	RIVETPG	20/11-12	22	01/14	03/03	fixed		
77	MTP-UAM	HLG-ONR	97	1	x	18.29m	Steel	RIVETPG	22/1-2	22	02/15	03/03	fixed		

78	MTP-UAM	HLG-ONR	101	2	x	18.29m	Steel	RIVETPG	23/7-8	55	08/16	07/11	fixed		
				1	x	10.86m									
79	MTP-UAM	HLG-ONR	112	2	x	7.93m	Steel	RIVETPG	23/10-11	76	02/15	07/11	05/15		
				3	x	18.30m									
80	MTP-UAM	ONR-WEL	143	1	x	12.20m	Steel	RIVETPG	27/8-9	10	03/13	07/11	fixed		
81	MTP-UAM	WEL-AVK	148	3	x	12.20m	Steel	RIVETPG	28/8-9	30	03/13	07/11	fixed		
82	MTP-UAM	WEL-AVK	159A	2	x	18.29m	Steel	RIVETPG	30/5-7	44	06/12	07/10	03/13		

Steel	**61 Bridges**	**178 Spans**	**3439.00**
PSC	**21 Bridges**	**154 Spans**	**29964.00**
Total	**82 Bridges**	**332 Spans**	**33403.00**

ANNEXURE -IV

FOOT OVER BRIDGES (FOB) MAINTAINED BY SSE/Bridges/ED THROUGHOUT SALEM DIVISION.

Sl.No.	Section	Station	Location	Description	Span	Tonnage (MT)	Date of	
							Inspection	Painting
ADEN/North/SA Sub-division								
1	JTJ-ED	TPT	220/13-15	Rail Type	1x 8.00m+2x5.00m+1x8.00m	40	07/14	08/11
2	JTJ-ED	DST	252/1-3	Rail Type	1x12.65m+1x12.85m	40	05/15	08/11
3	JTJ-ED	MAP	267/13-15	Lattice Type	1x21.00m	40	09/12	01/13
4	JTJ-ED	TNGR	273/22-24	Rail Type	2x9.32m	20	06/15	08/11
5	JTJ-ED	BQI	289/40-42	Lattice Type	1x20.90 m	40	05/15	08/11
6	JTJ-ED	BDY	279/37-39	Beam Type	1 x 27.80m	80	04/16	04/16
ADEN/South/SA Sub-division								
7	JTJ-ED	KPPR	326/17-19	Rail Type	1x9.70m+1x7.60m	20	05/15	08/11
8	JTJ-ED	SA	332/25-27	Rail Type	1x9.60m+1x8.60m+1x10.60m+1x10.80m+ 1x6.10m+1x11.40m+1x10.20m+1x10.00m	100	05/16	09/11
9	JTJ-ED	SA	332/30-34	Beam Type	1x23.730m+1x20.020m+1x18.840m	225	06/14	06/13
ADEN/ATU Sub-division								
10	SA-VRI	SAMT	192/000-100	IRS Type	1 x 16.80m	50	12/14	2009
11	SA-VRI	SXT	189/900-190/000	IRS Type	1 x 21.310m	50	12/14	10/15
12	SA-VRI	ATU	140/900-141/000	IRS Type	1 x 20.33m	50	12/14	11/11
13	SA-KRR	MALR	13/100-300	Steel type	1 x 18.84m	35	01/15	2013

14	SA-KRR	KLGN	39/500-600	Steel type	1 x 17.60m	35	04/14	2013
ADEN/ED Sub-division								
15	JTJ-ED	SGE	371/200-300	IRS Type	1x18.65m+1x14.40m+1x12.20m+1x28.160m	50	04/17	12/07
16	JTJ-ED	CV	387/17-19	Rail Type	1x5.155m+1x7.895m	20	11/14	08/10
17	JTJ-ED	ED	393/9-12	Rail Type	1x9.10m+1x8.00m+1x7.50m+1x11.30m+ 1x11.20m+1x11.90m	80	05/14	11/11
18	ED-CBE-PTJ	UKL	428/35-37	Rail Type	1x7.88m+1x22.58m	50	08/12	10/10
19	ED-CBE-PTJ	TUP	442/18-20	Rail Type	1x12.60m+1x12.50m	25	09/12	05/06
ADEN/KRR Sub-division								
20	ED-KRR	KMD	38/100-200	IRS Type	1x17.30m+1x8.10m	25	10/12	09/15
21	ED-KRR	KRR	64/700-800	IRS Type	1x15.70m+1x15.875m	70	04/16	06/15
22	ED-KRR	KMD	38/000-100	IRS Type	1 x 27.40	50	04/14	2013
23	KRR-TP	KLT	104/000-100	IRS Type	1 x 24.40m	50	05/14	05/14
ADEN/PTJ Sub-division								
24	ED-CBE-PTJ	SNO	460/100-200	IRS Type	1x12.50m+1x12.54m	38	11/13	05/08
25	ED-CBE-PTJ	PLMD-1	-	IRS Type	1x16.355m	50	04/13	2010
26	ED-CBE-PTJ	PLMD-2	-	IRS Type	1x15.500m	50	04/13	2010
27	ED-CBE-PTJ	CBF	15/7-9	Lattice Type	1x12.720m	15	09/13	05/07

28	ED-CBE-PTJ	CBE	17/24-26	Lattice Type	1x10.350m+1x22.130m+1x15.110m+1x8.380m +1x14.430m+1x10.510m+1x15.770m	100	03/17	06/09
29	ED-CBE-PTJ	PTJ	485/23-25	Rail Type	1x7.90m+1x5.40m+1x9.90m+ 1x9.00m+1x9.90m+1x4.60m+1x9.40m+ 1x5.00m+1x8.70m+1x7.40m+1x4.90m+ 1x9.00+1x5.40m+1x10.90m	100	07/14	07/09
30	ED-CBE-PTJ	PTJ	485/30-32	IRS Type	1x16.06m+1x7.10m	50	08/16	2010
31	MTP-UAM	MTP	32/800	Girder	2x18.35m	100	10/14	05/11

Total tonnage = 1748

ANNEXURE – V

ROAD OVER BRIDGES (ROB) MAINTAINED BY SSE/Bridges/ED THROUGHOUT SALEM DIVISION.

Sl.No.	Section	Between stations	ROB No.	Span (m)	Location (km)	Tonnage (MT)	Date of Inspection
ADEN/North/SA Sub-division							
1	JTJ-ED	TPT-KEY	22A	1x30.00m	222/8-9	400	08/14
2	JTJ-ED	MAP-TNGR	106 A	2x27.00m	267/100-200	700	09/12
3	JTJ-ED	JTJ-TPT	10A	1x25.85m	219/000-100	130	09/14
4	JTJ-ED	MAP-BDY	117	1x46.00m	273/3-5	240	New
ADEN/South/SA Sub-division							
5	JTJ-ED	KPPR-MGSJ	235 B	1x13.50m	328/5-8	200	08/15
	JTJ-ED	KPPR-MGSJ	235 B	1x20.65m	328/5-8	200	08/15
6	JTJ-ED	MGSJ-SA	241 A	1x9.40+2x15.30+1X11.50m	332/4-6	700	06/15
7	SA-VRI	SAMT-SA	304A	1x15.00m	194/700-800	400	03/15
8	SA-MTDM	OML-TOS	15 A	1x33.00m	11/400-500	450	06/14
9	JTJ-ED	BDY-BQI	147A	1x30.00m+1x11.00m	288/200-300	200	06/17
10	JTJ-ED	TPT-MOLK	23A	1x35.00m	223/1-4	300	03/13
11	JTJ-ED	DC-MVPM	287A	1x35.40m	353/30-32	325	08/14
12	JTJ-ED	DC-MVPM	DC1-A	1x27.00m	354/46-48	250	08/14
13	JTJ-ED	MVPM-DC	291A	1x39.30m	357/3-5	400	08/14
ADEN/ATU Sub-division							
14	SA-NMKL-KRR	SA-MALR	7A	1x40.20m	3/300-400	400	05/17

15	SA-NMKL-KRR	SA-MALR	15	1x20.46m	4/700-800	280	12/15
16	SA-NMKL-KRR	MALR-RASP	39	3x10.00m	16/800-900	170	12/15
17	SA-NMKL-KRR	MALR-RASP	42	1x35.60	18/600-800	350	12/15
18	SA-NMKL-KRR	MALR-RASP	54A	1x20.46m	24/500-600	200	08/16
19	SA-NMKL-KRR	MALR-RASP	60A	1x30.00m	25/600-800	300	01/17
20	SA-NMKL-KRR	RASP-PCTM	77	1x12.00+2x10.00m	31/200-300	220	01/17
21	SA-NMKL-KRR	KLGN-NMKL	117	1x33.00m	51/100-200	330	12/16
22	SA-NMKL-KRR	NMKL-LDVD	120	1x22.50m	52/200-300	225	12/16
23	SA-NMKL-KRR	NMKL-LDVD	123	1x22.50m	53/000-100	225	10/16
24	SA-NMKL-KRR	NMKL-LDVD	130	1x22.50m	55/600-700	225	09/16
25	SA-NMKL-KRR	NMKL-LDVD	135	1x12.00+2x10.00m	57/800-900	220	07/16
26	SA-NMKL-KRR	LDVD-MONR	138	1x12.00+2x10.00m	59/300-400	220	07/16
27	SA-NMKL-KRR	LDVD-MONR	142	1x20.00m	62/400-500	200	10/12
28	SA-NMKL-KRR	LDVD-MONR	145	1x12.00+2x10.00m	63/100-200	220	12/15
29	SA-NMKL-KRR	LDVD-MONR	148	1x12.00+2x10.00m	65/900-66/000	220	12/15
30	SA-NMKL-KRR	LDVD-MONR	152	1x33.00m	67/500-600	330	06/16
31	SA-NMKL-KRR	MONR-VNGL	176	2x12.00m	74/400-600	135	04/16
32	SA-NMKL-KRR	MONR-VNGL	184	1x12.00+2x10.00m	76/900-77/000	220	05/14
33	SA-NMKL-KRR	VNGL-KRR	195	1x12.00+2x10.00m	81/700-900	220	05/14
34	SA-NMKL-KRR	VNGL-KRR	163A	1x30.00m	84/500-600	300	09/14
35	SA-VRI	MKSP-KKTI	37A	1x18.30m	77/300-400	200	01/16

36	SA-VRI	CHSM-MLYR	101A	2x10.00m+1x42.85m	111/100-300	550	12/14
37	SA-VRI	TVS-ATU	141A	2x10.00m+1x39.25m	125/900-126/000	550	06/13
38	SA-VRI	ETP-VGE	213A	1x25.50m+1x42.50m	161/600-700	600	12/14
ADEN/ED Sub-division							
39	ED-CBE-PTJ	UKL-KUY	410 A	1x30.00m	429/13-15	400	12/13
40	ED-CBE-PTJ	UKL-KUY	412 A	1x25.30m	431/9-10A	400	12/13
41	ED-CBE-PTJ	TUP-VNJ	426 A	1x21.20+1x21.50+1x21.20m	442/400-500	1100	11/12
42	ED-TUP	IGR-VZ	387A	1x30.00m	411/9-412/1	300	08/12
43	ED-CBE-PTJ	UKL-TUP	417A	1x19.80m	435/12-14	100	12/15
44	ED-CBE-PTJ	ED-TPM	LC No.124	2x39.00m	394/0-1	420	05/17
45	ED-CBE-PTJ	UKL-TUP	LC No.131	1x35.00m	438/4-6	175	New
ADEN/KRR Sub-division							
46	ED-TP	MPLM-KRR	163 A	1x30.00m	64/100-200	400	09/14
47	ED-TP	MPLM-KRR	171 A	2x13.60m	62/100-200	270	10/15
48	ED-TP	MMH-LP	114 A	1x45.00m	93/700-800	400	11/14
49	ED-TP	TP	19 A	1x20.40+1x13.00m	136/3-4	135	01/16
50	KRR-DG	KRR-VEI	8A	1x30.00m	7/400-500	300	07/17
ADEN/PTJ Sub-division							
51	ED-CBE-PTJ	SUU-IGU	475 A	1x49.20m	473/30-474/2	400	07/13
52	ED-CBE-PTJ	CBF-CBE	27 C	1x12.45+2x10.60m	15/5-7	200	07/15
53	ED-CBE-PTJ	CBE-PTJ	18 A	1x30.00m	18/23-25	400	07/14

54	ED-CBE-PTJ	IGU-PTJ	482 A	2x30.00m	477/11-12	800	06/08
55	MTP-UAM	HLG-ONR	84	1x4.50m	20/6-7	50	01/15
56	IGU-CBE-PTJ	SHI-PLMD	A10	1x20.10m	5/26-28	150	04/13
57	IGU-CBE-PTJ	PLMD-CBF	A35	1x20.00m	11/400-500	200	09/13
58	IGU-CBE-PTJ	CBE-PTJ	2A	1x35.60m	21/43-45	175	12/15
59	IGU-CBE-PTJ	IGU-PTJ	LC No.146	1x35.00m	479/22-24	175	11/15
60	IGU-CBE-PTJ	IGU-PTJ	LC No.144	4x35.00m	475/22-24	175	06/14
61	ED-CBE-PTJ	SNO-SUU	LC No.143	1x32.00m	468/18-20	160	01/15
62	ED-CBE-PTJ	VNJ-SNO	455A	1x36.50m	458/800-900	180	01/15
63	ED-CBE-PTJ	TUP-VNJ	441A	1x25.00m+1x20.00m	450/13-15	125	09/15
64	ED-CBE-PTJ	PTJ-MDKI	508	1x11.800m	486/30-32	200	09/12
65	ED-CBE-PTJ	PLMD-CBE	A40a	1x21.00m	12/19-21	110	06/17

Total Tonnage = 19905.00

ANNEXURE-VI

HIGH LEVEL TANKS (HLT) MAINTAINED BY SSE/Bridges/ED THROUGHOUT SALEM DIVISION.

Sl.No.	Location	Description	Capacity in Litres	Tonnage (MT)	Date of		
					Inspection	Inside painting	Outside painting
ADEN/ATU Sub-division							
1	CHSM	H.S.Tank 13'-0"x14'-0"	90000	6.00	06/17	12/16	12/16
2	ETP	H.S.Tank 13'-0"x14'-0"	90000	6.00	06/17	12/16	12/16
ADEN/ED Sub-division							
3	ED	H.S.Tank 16'-0"x19'-0"	90000	7.50	06/17	06/17	08/12
4	ED	H.S.Tank 20'-0"x19'-0"	130000	8.50	06/17	12/16	05/14
5	ED	H.S.Tank 20'-0"x19'-0"	130000	8.50	06/17	04/14	08/12
6	ED	P.S.Tank 16'-0"x16'-0"x8'-0"	37600	3.50	06/16	06/14	07/12
ADEN/KRR Sub-division							
7	KMD	H.S.Tank 13'-0"x14'-0"	90000	6.00	03/17	05/14	05/14
8	KLT	H.S.Tank 13'-0"x14'-0"	90000	6.00	08/16	06/14	05/14
ADEN/PTJ Sub-division							
9	PTJ	C.I.Tank 17'-6"x17'-6"x8'-9"	70000	14.50	04/17	04/13	07/06
10	MTP	C.I.Tank 25'-6"x25'-6"x8'-9"	100000	21.00	05/17	03/15	03/15
11	MTP	H.S.Tank 13'-0"x14'-0"	90000	5.00	05/17	03/15	03/15

12	HLG	M.S.Tank 8'-0"x8'-0"x4'-0"	6800	2.50	05/17	05/13	09/10
13	RME	M.S.Tank 8'-0"x8'-0"x4'-0"	6800	2.50	05/16	04/12	01/11
14	ONR	M.S.Tank 6'-0"x6'-0"x6'-0"	6000	1.00	05/16	04/12	01/08
15	ONR	M.S.Tank 8'-0"x8'-0"x4'-0"	6800	1.50	05/16	01/12	01/08
16	AVK	M.S.Tank 6'-0"x6'-0"x6'-0"	6000	1.00	09/16	01/12	01/08
17	KXT	M.S.Tank 6'-0"x6'-0"x6'-0"	6000	1.00	09/16	01/12	01/11

Total Tonnage = 102.00

ANNEXURE – VII

FLOOD LIGHT TOWERS (FLT's) MAINTAINED BY SSE/Bridges/ED THROUGHOUT SALEM DIVISION.

Sl.No.	Location	Description	Tonnage (MT)	Date of	
				Inspection	Painting
ADEN/South/SA Sub-division					
1	SA	75'-0" Height (Near to Running Room, Salem-near to portal SA 1016)	5	05/16	06/15
2	SA	75'-0" Height (At ED end, Salem yard -near to portal SA 1115)	5	06/16	07/15
ADEN/ED Sub-division					
3	ED	100'-0" Height (Near to crew booking office)	8	06/16	08/16
4	ED	100'-0" Height (Near to yard Master's cabin at ED yard)	8	06/16	08/16
5	ED	100'-0" Height (Near to weigh bridge at ED yard)	8	10/16	09/16
6	ED	75'-0" Height (Near to Good shed BD Spl. Line at ED yard)	5	06/15	09/16
7	ED	75'-0" Height (Near DLS/ED, colony side cycle stand)	5	07/15	05/16
8	ED	75'-0" Height (Near Lathe shed in DLS/ED)	5	07/15	06/16
9	ED	75'-0" Height (Near main gate in ELS/ED)	5	08/15	06/14
10	ED	75'-0" Height (Near HS Tank in ELS/ED)	5	09/15	04/14
11	ED	75'-0" Height (Near DMS Store compound in ELS/ED)	5	11/15	07/14
ADEN/PTJ Sub-division					
12	PTJ	75'-0" Height (Near to RH side of 485/13 portal)	5	06/14	05/13
13	PTJ	75'-0" Height (Near to 485/1 to 2 portal b/w point 115A & 114A)	5	07/14	05/13
14	CBE	75'-0" Height (Near to FOB RH end)	5	06/17	10/13
TOTAL TONNAGE – 79 MT					

ANNEXURE – VIII

WORKSHOPS MAINTAINED BY SSE/BRIDGES/ED THROUGHOUTSALEM DIVISION

Sl.No.	Location	Description	Tonnage (MT)	Date of	
				Inspection	Painting
ADEN/ED Sub-division					
1	ED	a) Diesel shed - 12.5 x 54.00 m x 3	400	06/15	09/06
	ED	b) Diesel shed - 12.5 x 85.00 m x 2	300	06/15	09/06
2	ED	Electric Loco Shed Medium lifting bay, light lifting bay, Heavy lifting Bay, Inspection Bay	1100	06/17	02/99
ADEN/PTJ Sub-division					
3	MTP	Loco Shed Steam Engine 36'-0"x 39'-6"	50	02/14	05/11
4	MTP	C&W Shop 100'-0"X38'-0"	100	02/14	05/11
5	ONR	Loco Shed Steam Engine	25	02/15	05/11
6	CBE	AC Coach shed	200	10/13	2002
Signal & Telecommunication Workshops, Podanur Jn.					
7	PTJ	Pre-Wiring section shop 12.30x50.00m	100	01/15	05/11
8	PTJ	Pre-Wiring section shop 7.62x50.00m	20	01/15	05/11
9	PTJ	Forge and Smithy shop 2 / 7.62x38.40m	25	01/15	05/11
10	PTJ	Fabrication shop 18.30x62.40m	50	01/15	05/11
11	PTJ	Heavy Machine shop 15.68x61.12m	75	01/15	06/11
12	PTJ	Light Machine shop 12.54x118.42m	100	01/15	06/11
13	PTJ	CMT Lab and Control Board Section shop 7.60x38.20m	20	01/15	06/11
14	PTJ	Saw Mill shop 7.925x11.52m	20	01/15	06/11
TOTAL TONNAGE – 2585 (MT)					

ANNEXURE IX

CO-ORDINATING OFFICER's VIEWS