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1.0 Historical Perspective

First EMU train ran in the country from Bombay VT to Kurla on Central Railway on 03.02.1925, heralding the era of electric traction in the country. Gradually, the services were extended to Kalyan. Thereafter, the EMU services were introduced on other zonal Railways as indicated below :

Western Railway

On Western Railway, the EMU services were introduced on Churugate – Borivali section on 05.01.1928. The services were gradually extended upto Virar.

Southern Railway

The EMU services were introduced on meter gauge section from Madras Beach – Tambaram on 11.03.1931. On the broad gauge, the services were introduced on Madras Central – Gummidipundi section on 14.04.1979.

Eastern Railway

The EMU services were introduced on Howrah – Bandel section of Howrah Division on 01.02.1957. The services were gradually extended to Bardhaman in the year 1963. The EMU services were introduced on Sealdah Division also on Sealdah – Ranaghat Section.

South Eastern Railway

The EMU services made their debut on S.E.Railway on 01.05.1968 on Howrah– Mecheda section of Kharagpur division. In due course, the services were extended to Kharagpur / Midnapur and other sections viz. Panskura – Haldia and Santragachi – Bargachia.

Northern Railway

The EMU services were introduced on Circular Ring Railway from Nizamuddin to Nizamuddin on 15.08.1982.

South Central Railway

The EMU services were introduced on 09.08.2003.

Today, the EMU services are in operation in all the 5 Metropolitan cities viz. Bombay, Delhi, Madras, Calcutta and Hyderabad.

1.1 EMU SERVICES IN SOUTH EASTERN RAILWAY

Calcutta being a magnificent metropolitan city, Millions of commuters throng the city from far flung areas in the morning for work and return in the evening. It was planned to connect the suburbs with Calcutta by introducing fast and frequent Electric Multiple Unit trains along with electrification of Kharagpur-Howrah section. Tikiapara was an ideal location for maintenance of EMUs as it was nearest to Howrah.

i. TIKIAPARA CARSHED:

The shed made a beginning when seven numbers of 4 coach units were brought from ICF & EMU services started between Howrah and Panskura on 01.05.1968. This was also the date of energisation of Howrah-Kharagpur section. In those days there were about 37 suburban trains. These trains were hauled by steam locomotives and had conventional rakes. The journey time was more. The frequency of trains was too much inadequate. The commuters breathed a sigh of relief with the introduction of Electric Multiple Unit trains.

Important additional facilities like two numbers 30/6 Tonnes EOT crane, stationary air compressor, under floor wheel lathe, baking oven etc. were provided in the Carshed in 1969. In view of the increasing holding, two additional inspection pits were added in the year 1983 along with extension of heavy lifting bay by 75 feet.

The fleet of EMU coaches got augmented in phases. The 8-car rake was introduced initially consisted of two units each comprising 3660mm stock of one motor coach, two driving trailer and one plain trailer coach each i.e in formation DT-MC-TC-DT. There were three driving cabs per unit, one at each end and the third in the MC for use in emergency. Now the unit formation is 1 MC (D) + 2TC. These services are introduced in 25KV AC traction.

In view of the increased traffic, it was decided to convert all the EMU rakes from 8 to 9-car formation during 1992-93. Today Tikiapara carshed is holding 100 motor coaches and 203 trailer coaches. 12-car rakes introduced in the year 2009 and now 6 no 12-car rakes are in service for which extension of shed is under progress. The carshed also imparts training to the Motormen, Guards, Loco Inspectors, Chief Loco Inspectors & Maintenance staffs with its locally made simulator.

There is a small Railway Colony attached to Carshed. It has 130 quarters to house essential staff. Railway Recreation Club and Health Unit situated within the colony offer recreation and medical facilities to the staff and their families.

The shed was getting loaded to its optimum capacity. Therefore, another EMU carshed was felt for reducing the load of Tikiapara Carshed.

ii. PANSKURA CARSHED:

Due to the increasing EMU fleet in S.E.Railway, there was a need to establish maintenance shed at Panskura. This shed has come up on 03.04.97 and started functioning w.e.f. 15.08.97. The shed is located near to Kharagpur and work as a satellite shed having 4 lines. Out of which 2 are pit lines, 1 is provided with washing platform and 1 is for berthing of rakes. This shed is not having Heavy Lifting facility.

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2.0 Introduction

Introduction of EMU services over different sections is given below: -

Sr.No.	Section	Kms	Date of Introduction.
01	Howrah-Panskura	71	1.5.1968
02	Howrah -Kharagpur	116	1.2.1969
03	Panskura -Haldia	70	1.5.1976
04	Kharagpur –Midnapur	13	25.1.1984
05	Santragachi-Domjur	18.5	22.4.1984
06	Santragachi -Bargachia	28.5	23.9.1984
07	Bargachia -Mahendralal Nagar	5	22.7.2000
08	Mahendralal Nagar-Amta	12	27.11.2004
09	Balichak local (Extend up to Balichak)	91	12.11.2000
10	Shalimar-Santragachi Local	6	17.09.2003
11	Ladies Special in Howrah- Kharagpur	116	06.09.2009
12	12- Car rake in Howrah- Kharagpur- Midnapur	129	29.11.2009

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2.1 No. of trains per day

Suburban Section				Non Suburban Section			
Sections	UP	DN	Total	Sections	UP	DN	Total
HWH-BCK-HWH	1	1	2	HWH-MDN-HWH	16	15	31
HWH-PKU-HWH	27	26	53	HWH-KGP-HWH	7	8	15
HWH-MCA-HWH	7	8	15	HWH-HLZ-HWH	2	2	4
HWH-KIG-HWH	1	1	2	HWH-AMZ-HWH	9	9	18
HWH-BZN-HWH	0	1	1	PKU-HLZ-PKU	1	1	2
HWH-ULB-HWH	3	3	6	KGP-MDN-KGP	0	1	1
SHM-MCA-SHM	2	1	3				
SHM-SRC-SHM	2	3	5				
Total	43	44	87	Total	35	36	71
Up = 78, Dn = 80, Grand Total = 158 EMU trains run per day.							
Note: EMU Trains cancelled on Sunday / Holiday – Up=15 & Dn=15.							

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2.2 Night stabling of rakes

Tikiapara Carshed = 3, Mecheda Stn. =7, Panskura Carshed = 6, Panskura Stn = 1, Kharagpur Carshed = 2, Kharagpur Stn = 1, Midnapur Stn = 3, Haldia Stn. = 1, Amta Stn. = 2 (**Total = 26**)

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3.0 Car sheds & MTC facilities

EMU & MEMU both services are maintained. All types of maintenance schedule such as Trip Inspection (TI) on 10 days, IA on 45 days and 6 monthly IC on 180 days are followed. Staff sanctioned & on roll as on 31.01.12 (Gr.C+Gr.D) : 747/658 (This included TPKR Shed, KGP MEMU Carshed & PKU Carshed).

3.1 Tikiapara carshed (TPKR)-EMUs & MEMUs. Capacity -22.5 rakes (8-car)

Tikiapara Car shed is headed by Sr.DEE/TRS/TPKR & assisted by AEE/TRS/TPKR.

(a) Line capacity:

- Heavy lifting - 2 lines
- Inspection - 2 lines
- Stabling (With pit) - 4 lines
- Stabling(without pit-3)&Washing (1) - 4 lines
- Total 12 lines

- Shunting neck - Both ends (for 9- coach rake, now augmenting for 12-coach rake)

Sr.No.	Line No.	Length of Pits (in mts)	Remarks.
1	Heavy lifting = 2 no	219	2 no suitable for 10-car & under extension for 12-car
2	Inspection = 2 no	219	2 no suitable for 10-car & under extension for 12-car
3	Stabling = 4 no	206	4 no suitable for 9-car & under extension for 12-car

(b) Schedule Inspections:

Sr No	Type of Inspection	Taken at	After days	Time taken	Avg. no of inspections carried out during the month.
1	Safe to run/ Daily inspection	Stabling point & shed	Daily	3-4 hrs.	(a) IA – 14 EMU Rakes + 3 MEMU rakes
2	Trip inspection	At Shed	Once in 10 days	6-7 hrs.	(b) TI – 29 EMU Rakes + 5 MEMU Rakes.
3	Monthly (IA)	-do-	Once in 45 days	8 hrs.	(c) IC - 2 EMU Rakes + 1 MEMU rake
4	6-monthly (IC)	-do-	Once in 180 days	(i) 2 days for 1 EMU rake (ii) 1 day for 1 MEMU rake (in 2 shift)	(d) Washing – 1 rake every day.

3.2 EMU Carshed Panskura(PKU):

Capacity - 9.5 rakes

A car shed at PKU exists for maintenance of EMU Coaches but there is no lifting facility. Sr.DEE/TPKR looks after Panskura carshed also. Staff on roll (Included in the TPKR Staff strength) as on 31.01.12 (Gr.C+Gr.D) : 39 (Including 5 supervisors)

(a) Line capacity.

Inspection - 2 lines (Suitable for 10 Car rake)

Stabling & washing - 2 lines (-Do-)

Total 4

(b) Following Inspections Schedule carried out in this shed.

Sr No	Type of Inspection	Taken at	After days	Time taken	Avg. no of inspections carried out during the month.
1	Safe to run/ Daily inspection	Stabling point & shed	Daily	3-4hrs.	(a) TI-22 EMU rakes (b) Washing – 1 rake every day.
2	Trip inspection	At Shed	Once in 10 days	6-7 hrs.	

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4.0 Salient features of coaches

Salient features of 3660 mm(Actual 3658mm) AC BG EMU(Electrical Multiple Unit, Type-WAU-4) :

SL.No.	Item	Description
1	Gauge	1676 mm
2	Coach Builder	ICF,M/s Jessop & BEML
3	Unit formation	DMC+ TC+TC
4	Type of Traction	25KV ac
5	Wheel arrangement	Bo-Bo
6	Max. Axle Load (DCL condition) (i) Steel spring stock - (MC) (ii) Air spring stock - (MC) (iii) Steel spring stock - (TC)	19.24t 20 t 16.25t
7	Coach Dimension a) Coach Length b) Coach Width c) Coach Height d) Buffer Height e) Max. height from Rail level to panto under lock down condition	20726 mm 3658 mm 3810 mm 1090 mm 4398 mm

8	Length of EMU rakes 8 Car rake (2 MC+6 TC). 9 Car rake (3 MC+6 TC) 12 Car rake (4 MC+8 TC)	: 172.6 Mts : 194.1 Mts : 258.7 Mts
9	KVA rating of TFR excluding Aux. Load.	1000 KVA
10	Wheel Diameter (New) Wheel Diameter (Condemning)	MC -952 mm & TC -952 mm MC -877 mm & TC -857mm
11	Gear Ratio	20:91
12	A. Traction Motor a) Type b) Volts (V) c) Current (A) d) Output (HP) e) R.P.M f) Drive g) Make B. Control & Aux. Supply	253 BX & 4601 AZ (Axle Hung Nose Suspension) 535V 340A 224 HP/167 KW 1260 Single Reduction spur gear drive M/s BHEL 110 Volt DC
13	No. of Passenger / Unit	Seat – 400 Crush – 774 Dense Crush – 1148
14	(i) Max Permissible speed (i) Max. Operating speed	(i) 100 kmph (Air Spring) 96 kmph (Steel Spring) (ii) 95 kmph (Air Spring) 80 kmph (Steel Spring)
15	Braking rate	- 0.76 m/sec.sq. from speed 100km/h to 50 km/h. - 0.84m/sec.sq. from speed 50km/h to 0 km/h..

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4.1 Reliability

It is an index to measure Reliability of single unit (i.e. 1 MC + 2 TC) which is computed by kms earned by all the units (Presently 83 units are running on line) divided by no of failures of rakes on line during the period. The average value of reliability during the last three years is 30.66 lakh Km.

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4.2 Punctuality loss

It is an index to measure loss of punctuality of trains which is computed by no of trains lost punctuality during run divided by total nos of trains run during the period. The average value of punctuality during the last three years is 0.07%..

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4.3 Ineffectiveness

It is an index to measure ineffectiveness of coaches which is computed by no of coaches remains ineffective divided by total holding of coaches during the period. The average value of ineffectiveness during the last three years is 7.55%..

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5.0 Holding of coaches & rakes

5.1 Rake holding (As on 31.01.12)

Sl. No.	Type	Make		Total	Rakes In formation	Rake in service/Traffic Spare/Main Spare/POH
		ICF	BEML			
1.	M/C	94	6	100	i) 9-Car : 25 ii) 12-Car: 06	i) In Service : 9-Car= 21 12-Car= 05 ii) Traffic Spare: 9-Car= 01 iii) Main. Spare: 9-Car= 01 12-Car = 01 iv) On POH : 9-Car= 02
2.	T/C	191	12	203		

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5.2 Coach distribution (As on 31.01.12)

(a) Holding				
S No	Items	No. of rakes.	Motor Coach	Trailer Coach
1	i) 9 Car rake	25	75	150

2	ii) 12 Car rake	6	24	48
3	iii) Loose Coaches	-	1	5
	T o t a l	31	100	203
(b) In Service Link:-				
S No	Items	No. of rakes.	Motor Coach	Trailer Coach
1	i) 9 Car rake	21	63	126
2	ii)12 Car rake	5	20	40
	T o t a l	26	83	166
(c) Traffic Spare at KGP C/Shed				
S No	Items	No. of rakes.	Motor Coach	Trailer Coach
1	9 Car rake	1	3	6
	T o t a l	1	3	6
(d) Maintenance Spare :				
S No	Items	No. of rakes.	Motor Coach	Trailer Coach
1	i) 9 Car rake at TPKR C/Shed	1	3	6
2	ii)12 Car rake at TPKR C/Shed	1	4	8
	T o t a l	2	7	14
(e) On POH:				
S No	Items	No. of rakes.	Motor Coach	Trailer Coach
1	9 Car rake at KGP (W/Shop)	2	6	12
	T o t a l	2	6	12

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