SOUTH CENTRAL RAILWAY

Headquarters Office,
Personnel Department/SC
Dated: 22-03-2012

No. P[R]673/VI

ALL CONCERNED

PERSONNEL BRANCH SERIAL CIRCULAR No.30/2012

Copy of Board's letter No.E[MPP]/2009/3/10/HRRC dated 02.03.2012 is forwarded for information, guidance and necessary action. Board's letter dated 02.03.2012 together with letters dated 21.12.2009, 15.01.2010 and 03.06.2011 quoted under reference have been placed on the website ***and can be accessed at the address www.scr.indianrailways.gov.in*** .

(M.SREERAMULU)
SPO/Rules
For Chief Personnel Officer

Copy of Board's letter No. E[MPP]/2009/3/10/HRRC dated 02.03.2012 [RBE No.27/2012]

Sub: Revision of Training Modules of Supervisors

Ref: [i] Board's letter No. E[MPP]2009/3/10 dated 03.06.2011
[ii] Board's letter No. E[MPP]2009/3/16 dated 15.01.2010
[iii] Board's letter No. E[MPP]2009/3/12 dated 21.12.2009

*****

Board vide their letters referred above have revised the training period for Supervisors from 18 months to 12 months and some of the Railways have sought clarification whether the revised training is applicable to the staff who are already undergoing training or for those being inducted in future batches. The matter has been considered and it has been decided that the revised training period will be applicable to future batches from the date of issue of the letter quoted above.

2. However, a situation may arise where the previous/ batch of trainees undergoing 18 month training may complete their training after the new batch undergoing the revised training of 12 months. For example:

RRB Panel/ Batch	Training Period	Commencement of Training	Completion of Training
X	18 months	April 2011	September 2012
Y	12 months	July 2011	July 2012

3. In such a situation, it has been decided that the training of the previous panel/batch may be reduced before the date of completion of the training of the new batch undergoing the revised training of 12 months without affecting the course content. Thereafter, the earlier batch be allowed to join first followed by subsequent batches, after successful completion /passing of training as per extant procedure/practice providing them the benefit of seniority and fixation of pay as a onetime exception.

Sd/-
[Anil Wason]/DD [MPP) /RB

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Back Ref.	INDEX No.1077 TRAINING FACILITIES	S.C. No.
-	Revision of Training Modules of Supervisors : Board have decided that, in a situation where the previous batch of trainees undergoing 18 months training completing their training after new batch undergoing training for 12 months, the training of the previous batch may be reduced to the date before the completion of training of new batch undergoing the revised training of 12 months without affecting the course content, and allowed to join first after successful completion of training, as a one time exception.	30/2012

Government of India
Ministry of Railways
(Railway Board)

RBE No. 225/2009.

No.E(MPP)/2009/3/12 New Delhi, dated 21 -12-2009.

The General Managers
All Indian Railways including Production Units

The Director,
Indian Railway Institute of Signal Engineering & Telecommunication,
Secunderabad.

Sub: Revised Training Module for Supervisors of Signal & Telecom Department.

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The Report of the Task Force under Human Resource Reforms Committee constituted to review the Training Modules for S&T Department has since been received. The Board (ML & MS) have approved the training modules recommended by the Committee. Accordingly, the revised training module for Supervisors of Signal & Telecom Department are circulated herewith. The details and sequence of the training programme is annexed at Annexure-I and the training module is annexed at Annexure-II.

2. For better management of training, the following decisions/inputs are also communicated:

(i) Institutional training programme for Supervisors of S&T Department be continued to be held at IRISET. However, to improve the field training component of induction programme, it has been decided that the same should be controlled by the respective training managers viz. CSE for Signalling Supervisors and CCE for Telecom Supervisors on the respective Railways.

(ii) A 52 weeks induction programme with Institutional Training at IRISET in 2 phases has been approved for all categories of directly recruited Supervisors which includes 12 weeks of attachment without giving them independent charge, for gaining on-the-job experience.

iii) During the period of on-the-job attachment, the Trainee Supervisors should be attached with senior officials at the workplace, who would act as their mentors and guide them to learn how they are expected to discharge their official duties, when they are put on a working post. During this period, the Trainee Supervisors are not required to work independently or take decisions at their level, instead they would assist the officials with whom they are attached in discharge of their official duties. However, as the working in Telecom Branch does not have safety implications of the nature of Signal Branch, in the

last phase of their training, the Telecom Branch Supervisors can be detailed on working post under the supervision of a senior official.

(iv) Refresher course and promotion course for Signal and Telecom Supervisors have been merged in a single course of four weeks duration. This would be held at IRISET, as at present. The supervisors are required to undergo this course once in four years. In between this period, modular courses of duration of three days to a week should be developed to enable the Supervisors to update their knowledge on technical as well as general subjects such as quality circles, organizational behaviour, leadership, industrial relations and labour laws etc. These modular courses should be delivered at S&T Training Centres on Zonal Railways preferably or any other institutes as may be decided by the respective Zonal Railways.

(v) The Course Content for General and Subsidiary Rules should be developed by IRISET, in consultation with the Railways and ZRTIs. This standardized course should be for 3 Weeks period to be conducted by respective ZRTI's of the Railways in between the spells of field Training on the job attachment.

(vi) The detailed course contents and lesson plans would be prepared by IRISET, as at present.

Please acknowledge receipt.

Hindi version will follow

(K. Harikrishnan)
Director(MPP)
Railway Board.

No.E(MPP)/2009/3/12 New Delhi, dated 21-12-2009.

Copy to:

1. The General Secretary, AIRF, 4, State Entry Road, New Delhi, with 35 spares.
2. The General Secretary, NFIR, 3 Chelmsfor Road, New Delhi, with 35 spares.
3. The Secretary General FROA, Room No.256-A Rail Bhavan New Delhi with 5 spares.
4. The Secretary General, IRPOF, Room No.268 Rail Bhavan New Delhi with 5 spares
5. The Secretary RBSS Group 'A' Officers Association, Room No.462, Rail Bhavan.
6. All Members, Departmental Council and Secretary Staff side National Council 13-C, Ferozeshah Road, New Delhi with 90 spares
7. The General Secretary, AIRPF Association, Room No,256 Rail Bhavan New Delhi with 5 spares.

For Secretary/Railway Board.

Copy to:

CRB, FC, ML, MM, MS, MT, DG(RHS), DG(RPF), AM(Budget), AM(CE), AM(C&IS), AM(Comml), AM(Elect), AM(Fin.), AM(Mech.), AM(Plg), AM(Project), AM(PU), AM(Sig), AM(Staff), AM(Rly Stores), AM(T&C), AM(Telecom), AM(Traffic), AM(Works), Adv.L(RS), Adv(Vig), Adv.Fin(Exp), Adv(IR), LA, OSD(MIS). ED(Plg), ED(Accts), EDF(BC), EDCE(B&S), EDCE(G), EDCE(Plg), ED(Coaching), ED(CC), ED(C&IS), ED(E&R), EDEE(Dev), EDEE(G), EDE, ED(RRB), EDE(N), EDE(Res), EDF, EDF(E), EDF(S), EDF(B), EDF(RM), EDF(X)I, EDF(X)II, ED(H), EDLM, ED(MIS), EDE(GC), ED(T&MPP), EDME(Chg), EDME(Fr.), EDME(Tr.), EDME(TOT), EDME(Dev), EDME(W), ED(PC)I, ED(PC)II, ED(PP), ED(Project), ED(Project/DMRC, EDRE, ED(safety), JS, JS(C), JS(E), JS(G), JS(P), IG/RPF(Hqs), IG/RS, ED(Sig), ED(Stat & Econ), EDRS(C), EDRS(C), EDRS(G), EDRS(P), EDRS(S), EDRS(W), ED(TD), EDTT(M), EDT(MC), EDT(P), ED(T&C), EDCE(P), ED(PM), ED(PG), EDTC®, EDTC(FM), EDTT(F), EDTT(FM), EDTT(S), EDV(A), EDV(E), EDV(T), ED(W).

E(Trg), E(NG)I, E(NG)II, E(G), F(E)III and Budget Branches of Railway Board

Annexure-1

The details and sequence of the training programme

(Figure in weeks)

S.No.	Module	JE (Signal)	SE (Signal)	JE (Tele)	SE (Tele)
1	Joining Formalities	1	1	1	1
2	Phase I at IRISET	14	12	14	12
3	Field Training	6	6	6	6
4	Phase II at IRISET	14	13	14	13
5	G&SR (ZRTI)	3	3	3	3
6	Attachment on a working post without independent charge	12	12	12	12
7	Special course on Managerial/Executive skills	-	2	-	2
8	Presentation/Project Work	1	2	1	2
9	Posting Exam	1	1	1	1
	Total	**52 weeks**	**52 weeks**	**52 weeks**	**52 weeks**

ANNEXURE-II

TRAINING MODULES OF INDUCTION AND REFRESHER COURSES FOR SUPERVISORY STAFF OF SIGNAL BRANCH

S No	Subject	JE Sig Ph_I	JE Sig Ph_II	SE Sig Ph_I	SE Sig Ph_II	Inter JE_Sig Ph_I	Inter JE_Sig Ph_II	Refresher SSE/JE
1	Briefing & Registration	2	2	2	2	2	2	2
2	Basics of Signalling Engineering	16		16		10		
3	Interlocking Plans & Locking Concepts	18		18		12		
4	Mechanical Signalling-Single Wire & Rodding	14		14		8		
5	Mechanical Signalling-Double wire	8		8		8		
6	Locking Table	14		14		14		
7	Dog Chart	10		10		10		
8	Colour Light & Automatic Signalling	10		10		6		2
9	Control Tables, Indication & Signal Controls	16		16		14		
10	Interlocking with Metal-Carbon Relays	24		24		12		10
11	Circuit Practices - Metal to Carbon Relays	24		24		14		
12	Signalling Relays & Cables	10		10		6		
13	Reversers & Slot Circuits	10		10		4		2
14	Electric Point Machine & Signal machine	10		10		6		2
15	Block Working-S.L.Token & D.L.Block Instruments	16		16		6		
16	Train Detection- Track ckts	12		12		6		4
17	Signalling in 25 KV AC Electrified		10		10		6	4
18	Signalling General, Specifications & safety		16		12		8	4
19	Power Supply for Signalling		8		8		6	4
20	Interlocking with Metal-Metal Relays		16		16		8	10
21	Panel Interlocking with Metal-Metal Relays		14		14		14	
22	RRI Siemens		10		10		10	
23	Circuit Practice- Siemens		18		18			
24	Electronic Interlocking		12		12		10	6
25	Tokenless Block Instrument for S.L		16		16		10	
26	Intermediate Block Signalling,Block Working -Axle Counters		12		12		6	6
27	Train Detection Devices- Axle Counters-Analog & Digital		14		14		8	4
28	AWS, TPWS,Data loggers,ETCS, ACD		10		10		10	6
29	Construction, Maintenance Practices		10		10		6	
30	Mechanical Signalling Lab	18		18		14		
31	Out door Mech Sig Lab	16		16		10		
32	Electrical Signalling Lab	40	32	40	32	12	18	10
33	Out door electrical Sig Lab	38		38		20		6
34	Block Lab	24	24	24	24	12	12	8
35	ODT lab		4		4			
36	Telephony Lab		2		2			
37	Control Lab		4		4		4	
38	OFC Lab		4		2			
39	Digital Lab						2	

40	Microprocessor /Microcontroller Lab		4		4			
41	Line Plant Practice & Telecommunication Cables		4		4			
S No	Subject	JE Sig Ph_I	JE Sig Ph_II	SE Sig Ph_I	SE Sig Ph_II	Inter JE_Sig Ph_I	Inter JE_Sig Ph_II	Refresher SSE/JE
42	Principles of Telephony		4		4			
43	Train Traffic Control		4		4		4	
44	Optical Fibre Cables & Systems		4		4		4	
45	Mobile Train Radio Communication		2		2			
46	Information Technology & Hardware		2		2			
47	MS-Office						6	
48	Auto CAD		10		10			
49	Vigilance		2		2		2	2
50	Rajbhasha		2		2		2	2
51	Tenders and Contracts		2		2		4	2
52	Establishment		6		6		4	4
53	Accounts		2		2		2	4
54	Accidents Case Studies		6		6		4	2
55	Disaster Management & Accident Communication		4		4		4	2
56	Library/Holidays/Extra Classes/CD-spare	32	30			13	18	
57	Comm Skills,Time Management,Team working,Group Disc, Quiz		12				12	
58	Stress Management		6				4	
59	Extn Lectures-P way/C&W/Stores/Fire Fighting/First Aid/AV		10		10		8	6
60	Visit to Local Stations/ Firms		8		8		12	
61	Visit to Out stations		18		12		18	
62	Project Assignment/Presentation	2	8	4	10	2	10	
63	Theory Exam	18	14	16	12	17	10	4
64	Practical Exam	16	16	18	16			
65	Open House Discussion	2	2	2	2	2	2	2
	Total Hours	**420**	**420**	**390**	**360**	**240**	**270**	**120**
	Total Weeks	14	14	13	12	8	9	4

Each session would last for an hour and in each week 30 sessions would be conducted

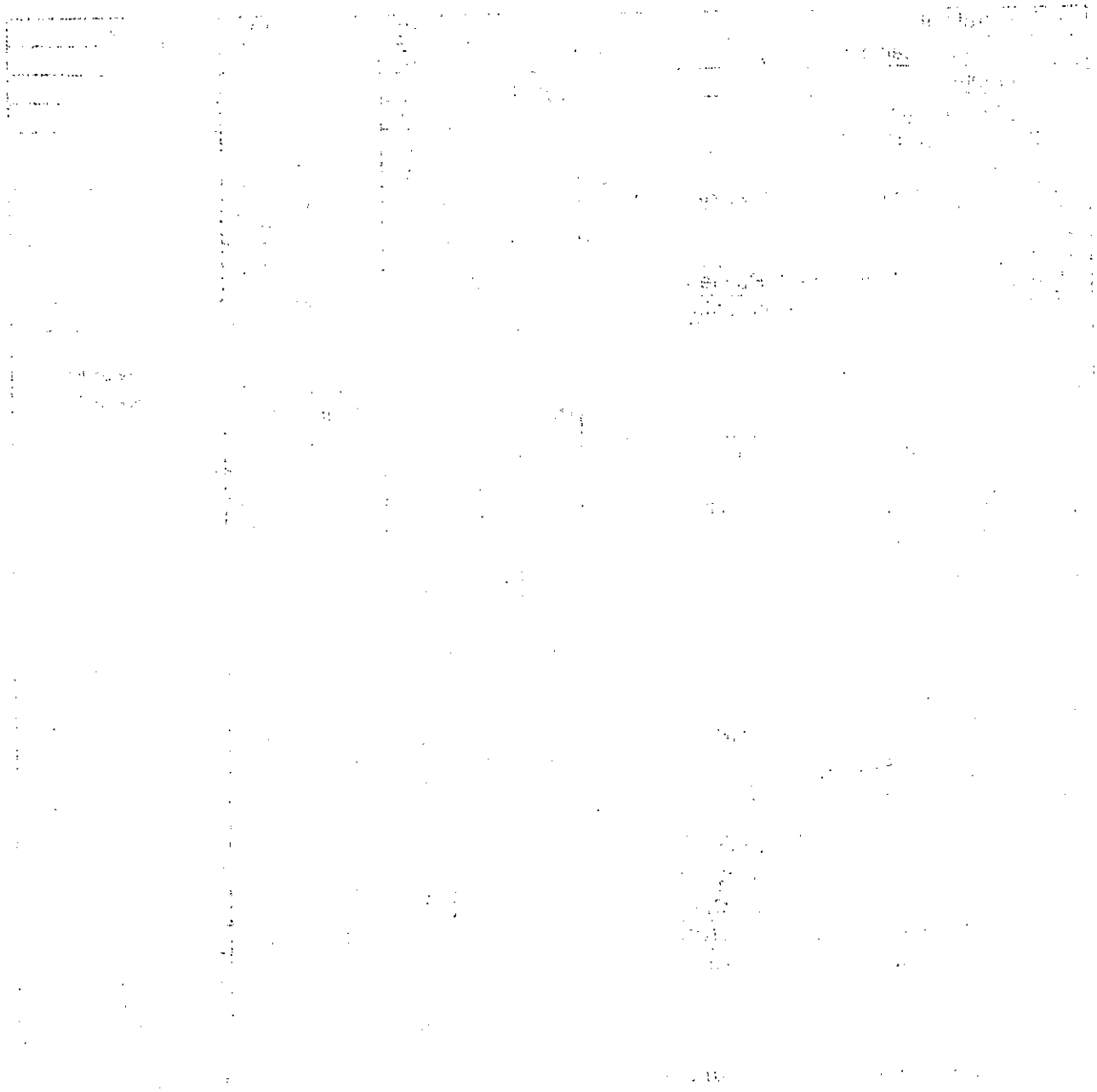
TRAINING MODULES OF INDUCTION AND REFRESHER COURSES FOR SUPERVISORY STAFF OF TELECOMMUNICATION BRANCH

S No	Subject	JE Tel Ph_I	JE Tel Ph_II	SE Tel Ph_I	SE Tel Ph_II	Inter JE_Tel Ph_I	Refresher SSE/JE
1	BFG+REG	4	2	2	2	2	2
2	S&T Org/Telecom wing/Manuals	4		4		2	
3	Circuit Components & Devices	4				2	
4	Network Analysis	6					
5	Electronics Fundamentals	8					
6	Applied Electronics	8		6		4	
7	Modulation Techniques (Analog & Digital)	8		8		4	
8	Digital Electronics	12				8	
9	Microprocessors	12		6			
10	Microcontrollers	12		6			
11	Applications of Microprocessors & Microcontrollers	10					
12	Radio Propagation	8		6		8	
13	Electronic measurements	12		12		8	
14	Line Plant Practice (6 quad cable)	12		8		4	
15	Public Address system	10		8		6	
16	Power Plant practice	10		8		6	
17	Telephony principles – Instruments	6		4		6	
18	Introduction to SPC Exchanges	8		6			
19	Electronic Exchange - OKI	8			4		
20	Electronic exchange – C-DOT	8		8			
21	Multiplexing (Analog)	12		8		16	
22	Multiplexing (Digital)	16		16		8	
23	Train Traffic Control	12		10		4	
24	Microwave – Analog	8		6		6	
25	Microwave – Digital	12		12		4	
26	Data Communication & Networking (Part-I)	16		16		12	
27	Basic concepts of signalling	8		12		20	
28	Block signalling - Introduction	8		12			
29	Trolley working	2		2			
30	First aid & Fire fighting	4		4		2	2
31	Computer basics (Excel)			4			
32	General (Stores - 2 hrs, Estb - 2 Hrs, Contracts - 2 Hrs, Accounts-1Hr, Vigilance - 1 Hr, DAR - 1 Hr Official Language - 1 Hr					10	
33	Microprocessors, Microcontrollers & applications					6	
34	Passenger information system (PIS)					6	4
35	Power supply Protection Arrangements					16	
36	Public information system		12		**12**		
37	Power supply arrangements		8		10		
38	Sigg. in Telecom		**12**				
39	Electronic Exchange – ISDN		12		12		6
40	SDH Principles & Applications		24			12	

41	Mobile Communications (VHF, GSM, GSM-R, WLL-DECT, TETRA)		**20**				
42	Data communication & Networking (Part-II)		20		20		
43	OFC Principles, Cable details & laying		**12**		10	18	
44	SDH Equipment & Networks including EI interface		**24**				
45	Disaster management communication		8		8		2
S No	**Subject**	**JE Tel Ph_I**	**JE Tel Ph_II**	**SE Tel Ph_I**	**SE Tel Ph_II**	**Inter JE_Tel Ph_I**	**Refresher SSE/JE**
46	Earthing & Lightning Protection for different Telecom. Installations		10		8		2
47	Computer basics (Excel)		0				
48	MS Office (MS Acess)		0				
49	CAD		0				
50	Establishment matters		12		14		
51	Tenders & Contracts		8		9		
52	Accounts & Stores		8		12		
53	Introduction to quality standards such as CENELEC, ISO (an awareness)		4		4		
54	Introduction to RAM-Reliability Models		2				
55	Data acquisition, collection &stastical analysis to draw plans for practices for Predictive & preventive maintenance, MTBF,MTBR calculations & Concepts		2				
56	Personality Development & Communication Skills		6		6		
57	Accident case study		2				
58	Field experiences		2				
59	Official language		2		2		2
60	Introduction to RAM-Reliability Models , MTBF,MTBR calculations & Concepts; Data acquisition, collection &stastical analysis to draw plans for practices for Predictive & preventive maintenance.				2		
61	Signalling in Telecom Networks				10		
62	OFC Measurements & Networks				15		
63	Mobile Communications (VHF, GSM, GSM-R, WLL-DECT, TETRA)				14	2	
64	SDH				18		
65	Multiplexing-Digital (SDH) & Equipment						10
66	Multiplexing-Digital (PDH)						8
67	Control communication						4
68	Mobile Train Radio Communication						8
69	Data Communication & Networking, Intranets of Railways						10
70	Optic Fibre Cable & Systems, Sources, Detections, laying practices						8
	LABS						
1	Microprocessor & Microcontrollers	10		12		6	
2	Signalling Labs	10		12			
3	Electronics Lab	6		6		6	
4	Digital Electronics	8					
5	Out door Telecom Lab	10		16		12	2

6	Control Lab	12		12		12	4
7	MW Lab (Analog & Digital)	12		12		10	
8	Computer lab	0					
9	Telephony Lab	16		12		16	
10	Public Address System	6		6			
11	MUX Lab	16		10		18	
12	Data Communication & Networking Lab	8		6			
13	SDH Lab		24			16	
14	OFC Lab		24		30	8	
15	Computer Lab (Internet & Railnet)		10		12		
16	Data Communication & Networking		24		12		
S No	**Subject**	**JE Tel Ph_I**	**JE Tel Ph_II**	**SE Tel Ph_I**	**SE Tel Ph_II**	**Inter JE_Tel Ph_I**	**Refresher SSE/JE**
17	Pasenger Information System		12		8	4	
18	Electronic Exchange Lab		12		18		
19	Mobile Communication Lab & DMC		12		6	4	
20	Networking Lab					8	6
21	PIS						2
22	Exchange						6
23	PDH MUX						6
24	DMW						4
25	OFC (Medium)						6
26	STM & DTA						12
70	EXTENSION LECTURES	0	6	0	4	2	2
71	AUDIO-VISUAL	6	8	10	12	0	0
72	LOCAL VISIT	0	12	12	16	0	0
73	STUDY TOUR	0	0	0	30	0	0
74	GROUP DISCUSSION	0	10	0	8	0	0
75	PROJECTS / MONOGRAPH	0	12	0	0	0	0
76	THEORY EXAMINATIONS	18	28	28	28	18	2
77	PRACTICAL EXAMINATIONS	12	12	10	12	10	0
78	Open House Discussion	2	2	2	2	2	0
	Total Hours	420	420	360	390	354	120
	Total Weeks	14	14	12	13	12	4

Each session would last for an hour and in each week 30 sessions would be conducted



Government of India
Ministry of Railways
(Railway Board)

RBE No. 11 /2010

No.E(MPP)/2009/3/16 New Delhi, dated 15 .01.2010

The General Managers,
All Indian Railways including Production Units

The Director
Indian Railways Institute of Electrical Engineering (IRIEEN).
Nasik.

Subject :- Revised Training Module for Supervisors of Electrical Department.

The Report of the Task Force under Human Resource Reforms Committee constituted to review the Training Modules for Electrical Department has since been received. The Board (ML & MS) have approved the training modules recommended by the Committee. Accordingly, the revised training module for Supervisors of Electrical Department is circulated herewith. The details and sequence of the training programme is annexed at Annexure –I and the training module is annexed at Annexure-II.

2. For better management of training, the following decisions/inputs are also communicated:-

(i) The institutional training for electrical supervisors would be shifted from Centralised Electrical Training Institute, Thakurli to Indian Railway Institute of Electrical Engineering, Nasik in due course. However, for the present Centralised Electrical Training Institute, Thakurli would continue to meet specialized and need based training requirements of Zonal Railways.

(ii) A 52 week induction programme with institutional training in two phases has been approved for all categories of directly recruited Supervisors. The induction programme includes 8 weeks of field training and 14 weeks of Attachment/on the job experience. The details and sequence of the training under induction programme are given in Annexure-I.

(iii) Between the two phases of institutional training, the trainee Supervisors would be sent for field training/field visits wherein they should be given exposure

.../-

to practical work at various field units where these candidates are likely to be posted on completion of their training programme. The detailed programme of field training should be given to the candidates before completion of the first phase of institutional training. Each Zonal Railway would nominate a SAG officer as nodal training manager in Headquarters Office who shall monitor the programme of induction training for Supervisors.

(iv) The course content for General and Subsidiary Rules training for Electrical Supervisors would be developed by respective ZRTIs. This course shall be conducted before sending trainee Supervisors for Attachment/on the job experience.

(v) Final phase of training shall comprise of on the job attachment wherein after completion of institutional and field training, the trainee supervisors shall be posted in the field units allocated to them by the concerned Railways. During this Period, the trainees would perform like a Supervisor working on an active assignment but would not be given independent charge. The programme for this attachment/on the job experience would be framed by the Officer in charge of the Division/extra Divisional Field Units where these Supervisors are to be finally posted.

(vi) The refresher course and promotional course for Electrical Supervisors shall stand merged and shall be delivered as a refresher course once in three years. This refresher course shall be delivered in an e-learning module which would include a component of institutional training for one week at the respective Zonal Electrical Training Schools. The details for e-learning module shall be worked out by Indian Railways Institute of Electrical Engineering (IRIEEN), Nasik in consultation with Zonal Railways.

The details of composite training module for institutional training of all categories of Electrical Supervisors have been indicated in Annexure-II. The lesson plans for the course content given in composite training module shall be developed by IRIEEN, Nasik/Centralised Electrical Training Institute, Thakurli.

Please acknowledge receipt.

Hindi version will follow.

(K. Harikrishnan)
Director (MPP)
Railway Board

No.E(MPP)2009/3/16

New Delhi, dated 15.01..2010

Copy to:-

1. The General Secretary, NFIR, 3 Chelmsford Road, New Delhi for information with 35 spares.
2. The General Secretary, AIRF, 4 State Entry Road, New Delhi for information with 35 spares.
3. The Secretary General, FROA, R.No.256-A, Rail Bhawan, New Delhi for information with 5 spares.
4. The Secretary General, IRPOF, R.No.268, Rail Bhawan, New Delhi for information with 5 spares.
5. The Secretary, RBSS Group 'A' Officers Association, Room No.462, Rail Bhawan.
6. All Members, Departmental Council and National Council and Secretary Staff Side National Council, 13-C, Ferozeshah Road, New Delhi(90 spares)
7. The General Secretary, All Indian RPF Association, Room No.256, Rail Bhawan, New Delhi-110 001 for information with 5 spares.

For Secretary/Railway Board.

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ED(Plg.), ED(Accts.), ED Fin.(BC), EDCE(B&S), EDCE(G), EDCE(Plg.), ED(Coaching), ED(CC), ED(C&IS), ED(E&R), EDEE(Dev.), EDEE(G), EDE, ED(RRB), EDE(N), EDE(Res.), EDF, EDF(E), EDF(S), EDF(B), EDF(RM), EDF(X)I, EDF(X)II, ED(H), EDLM, ED(MIS), EDE(GC), ED(Trg.&MPP), EDME(Chg), EDME(Fr.), EDME(Tr.), EDME(TOT),EDME(Dev.), EDME(W), ED(PC)I, ED(PC)II, ED(PP), ED(Projects), ED(Projects)/DMRC, EDRE, ED(Safety), JS, JS(C), JS(E), JS(G), JS(P), IG/RPF(Hqs), IG/RS, ED(Sig), ED(Stat&Eco), EDRS(C), EDRS(G), EDRS(P), EDRS(S), EDRS(W), ED(TD), EDT(M), EDT(MC),EDT(P), ED(T&C), EDCE(P), ED(PM), ED(PG), EDTC(R), EDTC(FM), EDTT(F), EDTT(FM)EDTT(M), EDTT(S), EDV(A), EDV(E), EDV(T),ED(W) .

E(Trg.), E(NG)I, E(NG)II, E(G) Branches of Railway Board.

Chief Commissioner of Railway Safety, Lucknow

ANNEXURE-I

The details and sequence of the training programme

(Figure in weeks)

S.No.	Module	JE (Electrical)	SSE (Electrical)
1	Joining Formalities	1	1
2	Phase I of Institutional Training	12	12
3	Field Training	8	8
4	Phase II of Institutional Training	12	12
5	General and Subsidiary Rules (ZRTI)	3	3
6	Attachment/on-the-job experience	14	14
7	Presentation/Project Work	1	1
9	Posting Exam	1	1
	Total	**52 weeks**	**52 weeks**

ANNEXURE-II

Composite Training Module for Institutional Training of Electrical Supervisors

Sr.No.	Description	No. of Sessions
1.	**Basic Orientation** General introduction to Indian Railways – Brief History, salient features, freight & passenger business priorities, organizational structure. Introduction to Electrical Department- organizational structure, functions, salient features, role of electrical department in railway working , key priorities, challenges etc.	12
2	**Instrumentation** Basic concepts of Condition Monitoring of electrical and mechanical equipments, insulation Resistance, Polarization Index, Capacitance measurement, tan delta testing, partial discharge and surge comparison test, condition monitoring of transformers, Nondestructive testing techniques – visual testing, Dye penetrant testing, Magnetic Particle testing, eddy current testing and ultrasonic testing, NDT testing applications in various functions of elect department, Theory and practice of Dissolved Gas Analysis (DGA)/Gas Chromatograph radiographic test	30
3	**Basic Electronics** Classification of electronic components, theory of passive components – L,C,R, Active Components – semiconductor physics, construction and operating principle, specification and testing of Power Diodes, Zener Diodes, LEDs, BJTs, UJT, MOSFET, SCR, GTO and IGBT. Practical work on – oscilloscopes, testing of passive electronic components – L,C,R, Testing of active components – Diodes, Transistors, SCR, TRIAC, GTO, IGBT.	18

4	**Power Electronics** Control of 3 phase drives – Variable Voltage Variable Frequency (VVVF) drives, overview of power electronics in 3 phase locomotives, Static Inverter (SI Unit) and AC Coach Inverter Unit.	18
5	**Manufacturing Technology** Jigs and fixtures, specifications and selection of cutting tools and grinding wheels, welding techniques, checking of weld joints and defect prevention and classification, properties and selection of electrodes.	18
6	**Engineering Materials and Metallurgy** Classification and specification of steels used in Railways, heat treatment processes, corrosion prevention and paints, theory of metal wear and lubrication, plain and roller bearings – theory, application, selection, maintenance and precautions, lubricants – specifications, properties and selection, rubber components – specifications and storage, electrolytic copper, stress strain diagram	18
7	**Train Lighting** Introduction to Train Lighting Systems, theory and practice MOG/EOG/HOG schemes, Alternators, Rectifier/Regulator, Batteries including VRLA, Coach wiring, lighting and fans, microprocessor based drives, Rake Links, maintenance schedules and activities. Relevant Codes and Manuals, RDSO, SMIs and Modification Sheets	18
8	**Air Conditioning** Air Conditioning systems on Coaches – Heat load calculations and basic theory and practice of air conditioning, air conditioning systems on coaches, LHB coaches, familiarization with major equipment and ratings, microprocessor based drives maintenance	18

	schedules and practices, Relevant Codes and Manuals, RDSO SMIs and Modification Sheets, Power Car – Theory and practice of diesel engines, maintenance schedules, microprocessor based control, spare parts.	
9	**General Service** BEE Codes, I.E. Rules, ECBC Code, Energy Conservation Act, Information on star rated products, clean development mechanism and carbon credits, practicing energy conservation and management, Metering and tariff structures. Theory and practice of earthing, substation design and maintenance, transformer, switchgear, protection systems, transmission line maintenance, power distribution systems, illumination engineering, design of illumination systems for various indoor and outdoor applications, energy efficient lamps, drives with microprocessor control and motor selection and maintenance, and safety at workplace. Condition monitoring of transformer, transformer oil, cables and lead acid batteries. Design of water supply pumping installations, types of pumps their specifications and selection for various applications, energy conservation measures in water pumping installations and maintenance of pumps. Relevant codes, RDSO SMIs and Modification	36
10	**Traction Distribution-I** Basic concepts on Design, Operation and Maintenance interventions/activities related to Traction Power Supply Systems (25kv and 2X25 kv), Transmission Lines, Supervisory Control and Data Acquisition System (SCADA), Remote control system and Overhead Equipment (OHE). Familiarity with sectioning diagrams and Station Working Rules. ACTM to be followed.	24

11	**Traction Distribution-II** Design, selection, commissioning of foundation, structures, current collection system. Tower Wagon operation and maintenance issues. Safety issues related to TRD systems operation and maintenance. Precautions to be taken for working in electrified sections. Important actions to be taken during breakdowns and accidents – elaborate with interactive case studies Basic knowledge of interfaces – track, points and crossings, signalling systems. Bonds and earthing. Schedule of Dimensions. SEB/NTPC Tariff structures, energy conservation measures. Overview of Railway Electrification. Design operation, maintenance of Protection systems. Relay setting calculations. Microprocessor based solid state relays to be covered. Operation and maintenance of Circuit Breakers, Interruptors and manual switches.	24
12	**Traction Rolling Stock (Locomotive)** Basic Design aspects of Electric Locomotives – tractive effort, haulage capacity, adhesion, weight transfer, axle load. Types of electric locos and their characteristics and haulage capabilities. Power and control circuit description, working and trouble shooting. Description of mechanical systems and component – bogies, wheel sets, gears, gear cases, springs, snubbers, buffers, central buffer couplers, screw coupling etc. Pneumatic circuits and components including air dryers, Locomotive testing, maintenance and trouble shooting. Maintenance schedule of different types of locos. 3 phase locomotive – basic power and control circuit descriptions, Basic Operation and Maintenance of Power Converters, Auxiliary Converters, Transformers, Traction Motors, Vehicle electronics and diagnostics, brake equipments, motors, pantograph etc. Fault	36

	diagnostics. Working of regenerative feature. Basic of Crew management and training, Road learning, classification of drivers, systems of monitoring and counseling, trip shed and crew booking point management, statistical data preparation for loco operation (4 A Statement). Description of Interface issues related to carriage and wagon and track. Evidence collection during accidents and enquiries. Relevant Codes, ACTMs, RDSO SMIs and Modification sheets.	
13	**Electrical Multiple Unit** General description, equipment lay out, power and control circuit, pneumatic circuits etc. Basic Design aspects of EMUs. Power and control circuit description, working and trouble shooting. Description of mechanical systems and component – bogies, wheel sets, gears, gear cases, springs, subbers, buffers, central buffer couplers, screw coupling etc. Pneumatic circuits and components including air dryers. Locomotives testing, maintenance and trouble shooting, Maintenance schedules in main shed and trip shed. Basic operation and Maintenance of Transformers, Rectifiers, Traction Motors, brake equipments, motors, pantograph, electronics etc and testing and troubleshooting. Description of interface issues related to carriage and wagon and track. Evidence collection during accident and enquiries. Relevant Codes, ACTMs, RDSO SMIs and Modification sheets.	36
14	**Material Management** Introduction to material management and concept of supply chain management, organisation structure of material management organisation of IR, functions of material management – Planning and inventory management, purchase, Receipt and Inspection, Stocking and preservation, distribution, scrap disposal.	12

15	**Contract Management** Tenders & Contracts, Works Contracts, Arbitration Financial Management (Railway Accounting and Financing Procedures).	18
16	**Establishment** Rules relating to leave, passes, travel on duty, Railway accommodation and Staff Welfare. Industrial relations and role of trade unions. Discipline and Appear Rules, Conduct Rules. Basics of RTI and Disabilities Acts and our obligations and responsibilities. Labour Laws and hours of employment rules (HOER)	18
17	**Disaster Management** Disaster Management, First-aid and fire fighting, Safety Rules, Electrical accidents – precaution & prevention.	12
18	**Information Technology** How IT can be effectively deployed in improving design, planning, and monitoring of electrical systems. Theory and practical to gain proficiency in MS Office – Word, excel and power point, e-mail and web browsing. Introduction to Management Information Systems. Case studies on MIS developed for Loco sheds, TRD and crew management. Introduction to Decision Support Systems.	18
19	**Managerial Skills** Aspects of leadership, leadership theory and evolution, leadership vs management, Role of supervisors in providing effective leadership. Improving Communication, written and verbal, explain the purpose of communication, communication process, barriers to effective communication, ways to improve communication skills – writing, reading, speaking and listening. Basic in change management. Team work, Importance of team work in organisations particularly in Railways, how to become a better team player. Interactive	24

	...rcises in team work. Customer Satisfaction. Thinking from customer point of view – what are their needs/expectations and how can we best serve our customers. Innovation and quality management	
20	Presentation feedback & group discussions. Final Examination/Viva voce	24
	Total Sessions	**432**

Note (i) : - The number of sessions on the given subject are suggestive only. The Centralised Training Institute may make necessary adjustment in training programmes for various categories of Supervisors on need basis.

Note (ii) : Duration 24 weeks in two phases of 12 weeks each
Total Days allotted =144 days
Total Number of Sessions @ 3 sessions/day=432
1 session = 2 periods of 45 minutes each

Government of India (Bharat Sarkar)
Ministry of Railways (Rail Mantralaya)
(Railway Board)

RBE No. 81 /2011

No.E(MPP)2009/3/10

New Delhi dated 03.06.2011

The General Managers
All Indian Railways
including Production Units

The Director
Indian Railways Institute of
Mechanical & Electrical Engineering (IRIMEE)
Jamalpur

Sub: - Revised Training Modules for Supervisors of Mechanical Engineering Dept

In continuation of this office letter of even number dated 02.12.2010 (RBE No.172/2010), the Task Force constituted under the Human Resource Reforms Committee for reviewing the Training Modules has submitted their report in respect of initial/promotional courses of Supervisors of Mechanical Engineering Department.

2. The existing training modules provide for a training programme of 78 weeks duration for directly recruited Junior Engineer as well as those selected through Limited Departmental Examination. For those who were recruited directly at the level of erstwhile Section Engineer, a training programme of 52 weeks duration has been laid down. Similarly, technicians promoted to the rank of Junior Engineer through normal process of selection/suitability, a 22 weeks course was designed for imparting theoretical and practical training.

3. The Task force in consultations with the stakeholders has come up with the following revised stage-wise training for the Supervisors of Mechanical Engineering Department: -

Category	Initial Courses (in weeks)			Promotional Courses (in weeks)		
	C&W	Diesel	Workshop	C&W	Diesel	Workshop
Junior Engineer (RRB)	52	52	52			
Junior Engineer (Intermediate/LDCE)				52	52	52
Junior Engineer (Promotion through seniority)				26	26	26
Sr. Section Engineer	52	52	52			

4. The training modules/detailed course contents and guidelines for practical training for the above Supervisors are enclosed at **Annexure-I, II & III.** This has the approval of Board(MS) & (MM).

...2/-

A question bank consisting of 166 questions on various facets of Mechanical Engineering Department to be made available to the candidates is enclosed at **Annexure-IV**. The Principals of Supervisor Training Centre would be responsible for updating the question bank from time to time in view of system development/procedural or technological changes.

5. For practical training purposes: -
   a) The trainees should be provided with a detailed schedule / training module spelling out clearly the areas in which they will be trained, objectives, what they should learn etc.
   b) A booklet containing an overall view of field unit should be given to them with the necessary theoretical input.
   c) A copy of Manuals/other related study materials should also be given to the trainees so that they can use them for study, comparison and reference.
   d) A standardized Diary should be maintained, in which the trainee has to write the observations made during his practical training.
   e) Willing supervisors who are interested in imparting training in each section/shop should be identified and involved in imparting field training.
   f) The field training should be monitored regularly by an Asst. Officer and periodically by a senior scale officer in the field.

Kindly acknowledge receipt.

(Anil Wason)
Dy. Director(MPP)
Railway Board

Encl: Annexure I, II, III & IV

No.E(MPP)2009/3/17 New Delhi dated 3.6.2011

Copy to:
1. The General Secretary, AIRF, 4, State Entry Road, New Delhi, with 35 spares.
2. The General Secretary, NFIR, 3 Chelmsford Road, New Delhi, with 35 spares.
3. The Secretary General FROA, Room No.256-A Rail Bhavan New Delhi with 5 spares.
4. The Secretary General, IRPOF, Room No.268 Rail Bhavan New Delhi with 5 spares
5. All Members, Departmental Council and Secretary Staff side National Council 13-C, Ferozeshah Road, New Delhi with 90 spares
7. The General Secretary, AIRPF Association, Room No,256 Rail Bhavan New Delhi with 5 spares.
8. General Secretary, All India Scheduled Castes & Scheduled Tribes Railways Employees Association, 171/B-3 Basant Lane Railway Colony New Delhi (15 copies)

For Secretary/Railway Board

Copy to:
PS & **ED(PG)** to MR, MSR(A) & MSR(M)
PSO/PPS to CRB, FC, ML, MM, MS, MT,
PPS to DG(RHS), DG(RPF), AM(Budget), AM(CE), AM(C&IS), AM(Comml), AM(Elect), AM(Fin.), AM(Mech.), AM(Plg), AM(Project), AM(PU), AM(Sig), AM(Staff), AM(Rly Stores), AM(T&C), AM(Telecom), AM(Traffic), AM(Works), Adv.L(RS), Adv(Vig), Adv.Fin(Exp), Adv(IR), Adv(Safety), LA, OSD(MIS).
ED(Plg), ED(Accts), EDF(BC), EDCE(B&S), EDCE(G), EDCE(Plg), ED(Coaching), ED(CC), ED(C&IS), ED(E&R), EDEE(Dev), EDEE(G), EDE, ED(RRB), EDE(N), EDE(Res), EDF, EDF(E), EDF(S), EDF(B), EDF(RM), EDF(X)I, EDF(X)II, ED(H), EDLM, ED(MIS), EDE(GC), ED(T&MPP), EDME(Chg), EDME(Fr.), EDME(Tr.), EDME(TOT), EDME(Dev), EDME(W), ED(PC)I, ED(PC)II, ED(PP), ED(Project), ED(Project/DMRC, EDRE, ED(safety), JS, JS(C), JS(E), JS(G), JS(P), IG/RPF(Hqs), IG/RS, ED(Sig), ED(Stat & Econ), EDRS(C), EDRS(C), EDRS(G), EDRS(P), EDRS(S), EDRS(W), ED(TD), EDTT(M), EDT(MC), EDT(P), ED(T&C), EDCE(P), ED(PM), ED(PG), EDTC®, EDTC(FM), EDTT(F), EDTT(FM), EDTT(S), EDV(A), EDV(E), EDV(T), ED(W).

भारत सरकार
रेल मंत्रालय
(रेलवे बोर्ड) **आरबीई सं. 81 /2011**

सं.ई (एमपीपी)/2009/3/10 **नई दिल्ली, दिनांक: 3 .6.2011**

महाप्रबंधक
सभी भारतीय रेलें (उत्पादन इकाइयों सहित)

निदेशक
भारतीय रेल यांत्रिक एवं बिजली इंजीनियरी संस्थान (इरिमी)
जमालपुर

विषय: यांत्रिक इंजीनियरी विभाग के पर्यवेक्षकों के लिए संशोधित प्रशिक्षण मॉड्यूल

इस कार्यालय के दिनांक 02.12.2010 के समसंख्यक पत्र (आर बी ई सं. 172/2010) के क्रम में, प्रशिक्षण मॉड्यूलों की समीक्षा के लिए मानव संसाधन सुधार समिति के अंतर्गत गठित कार्यदल ने यांत्रिक इंजीनियरी विभाग के पर्यवेक्षकों के प्रारंभिक/पदोन्नति परक पाठ्यक्रमों के संबंध में अपनी रिपोर्ट प्रस्तुत कर दी है.

2. मौजूदा प्रशिक्षण मॉड्यूल में सीधी भर्ती किए गए जूनियर इंजीनियरों और उनके लिए जिनका सीमित विभागीय परीक्षा के माध्यम से चयन किया गया है, 78 सप्ताह का अवधि का प्रशिक्षण कार्यक्रम दिया गया है. उनके लिए जो पूर्ववर्ती सेक्शन इंजीनियर के स्तर पर सीधे भर्ती किए थे, 52 सप्ताह की अवधि का प्रशिक्षण कार्यक्रम निर्धारित किया गया है. इसी प्रकार, उन टैक्नीशियनों के लिए जो चयन/उपयुक्तता की सामान्य प्रक्रिया के जरिए जूनियर इंजीनियर के रैंक पर पदोन्नति हुए, सैद्धांतिक और व्यावहारिक प्रशिक्षण देने हेतु 22 सप्ताह का एक पाठ्यक्रम तैयार किया गया.

3. कार्यदल ने, स्टेकहोल्डरों के परामर्श से, यांत्रिक इंजीनियरी विभाग के पर्यवेक्षकों के लिए निम्नलिखित संशोधित चरण-वार प्रशिक्षण तैयार किया है:-

कोटि	**प्रारंभिक पाठ्यक्रम (सप्ताह में)**			**पदोन्नति परक पाठ्यक्रम (सप्ताह में)**		
	सीएंडडब्ल्यू	**डीज़ल**	**वर्कशॉप**	**सी एंड डब्ल्यू**	**डीज़ल**	**वर्कशॉप**
जूनियर इंजीनियर (रे.भ.बो.)	52	52	52			
जूनियर इंजीनियर (मध्यवर्ती/एलडीसीई)				52	52	52
जूनियर इंजीनियर (वरिष्ठता के जरिए पदोन्नति)				26	26	26
वरिष्ठ सेक्शन इंजीनियर	52	52	52			

4. उपर्युक्त पर्यवेक्षकों के व्यावहारिक प्रशिक्षण के लिए प्रशिक्षण मॉड्यूल/विस्तृत पाठ्यक्रम सामग्री और मार्ग-निर्देश अनुबंध -I, IIएवं III पर संलग्न हैं. इसे बोर्ड (सदस्य कार्मिक) एवं (सदस्य यांत्रिक) का अनुमोदन प्राप्त है. यांत्रिक इंजीनियरी विभाग के विभिन्न पहलुओं पर 166 प्रश्नों का प्रश्न बैंक उम्मीदवारों को उपलब्ध कराया जाना है, जो अनुबंध-IV पर संलग्न है. पर्यवेक्षक प्रशिक्षण केन्द्र के प्रिंसिपल प्रणाली

विकास/प्रक्रियात्मक या प्रौद्योगिकीय परिवर्तनों को ध्यान में रखते हुए समय-समय पर प्रश्न बैंक को अद्यतन करने के लिए उत्तरदायी होंगे.

5. व्यावहारिक प्रशिक्षण प्रयोजनों के लिए :-

क) प्रशिक्षणार्थियों को एक विस्तृत अनुसूची/प्रशिक्षण मॉड्यूल दिया जाए जिसमें उन्हें उन क्षेत्रों के बारे में स्पष्ट किया जाए जिनमें उन्हें प्रशिक्षण दिया जाएगा, उद्देश्य जिनके बारे में उन्हें पढ़ाया जाना है आदि.

ख) उन्हें आवश्यक सैद्धांतिक विषय-वस्तु के साथ एक पुस्तिका दी जानी है, जिसमें फील्ड यूनिट की संपूर्ण जानकारी हो.

ग) प्रशिक्षणार्थियों को मैनुअलों/अन्य संबंधित अध्ययन सामग्री भी दी जाए ताकि वे अध्ययन, तुलना और संदर्भ हेतु इसका उपयोग कर सकें.

घ) एक मानकीकृत डायरी रखी जाए जिसमें प्रशिक्षणार्थियों को व्यावहारिक प्रशिक्षण के दौरान टिप्पणी लिखनी होगी.

ड.) वे इच्छुक पर्यवेक्षक जो प्रत्येक सेक्शन/शॉप में प्रशिक्षण लेना चाहते हैं, उन्हें चिह्नित किया जाए और फील्ड प्रशिक्षण देने के लिए सम्मिलित किया जाए.

च) फील्ड में फील्ड प्रशिक्षण को एक सहायक अधिकारी द्वारा नियमित रूप से और एक वरिष्ठ वेतनमान अधिकारी द्वारा आवधिक रूप से मॉनीटर किया जाए .

कृपया पावती दें.

(अनिल वासन)
उप निदेशक (एमपीपी)
रेलवे बोर्ड

संलग्नः अनुबंध I, II, III, एवं IV

सं.ई (एमपीपी)/2009/3/17 नई दिल्ली, दिनांकः 3 .06.2011

प्रतिलिपिः

1. महासचिव, एआईआरएफ, 4 स्टेट एण्ट्री रोड, नई दिल्ली, 35 अतिरिक्त प्रतियों सहित.
2. महासचिव, एनएफआईआर, 3 चेम्सफोर्ड रोड, नई दिल्ली, 35 अतिरिक्त प्रतियों सहित.
3. महासचिव, एफआरओए, कमरा नं.256-ए, रेल भवन, नई दिल्ली, 5 अतिरिक्त प्रतियों सहित.
4. महासचिव, आईआरपीओएफ, कमरा नं.268, रेल भवन, नई दिल्ली, 5 अतिरिक्त प्रतियों सहित.
5. सचिव, आरबीएसएस ग्रुप ए ऑफिसर्स एसोसिएशन, कमरा नं.462, रेल भवन, नई दिल्ली.
6. सभी सदस्य, विभागीय परिषद् और सचिव स्टाफ साइड राष्ट्रीय परिषद्, 13-सी, फिरोजशाह रोड, नई दिल्ली, 90 अतिरिक्त प्रतियों सहित.
7. महासचिव, एआईआरपीएफ एसोसिएशन, कमरा नं. 256, रेल भवन, नई दिल्ली, 5 अतिरिक्त प्रतियों सहित.

कृते सचिव/रेलवे बोर्ड

प्रतिलिपिः

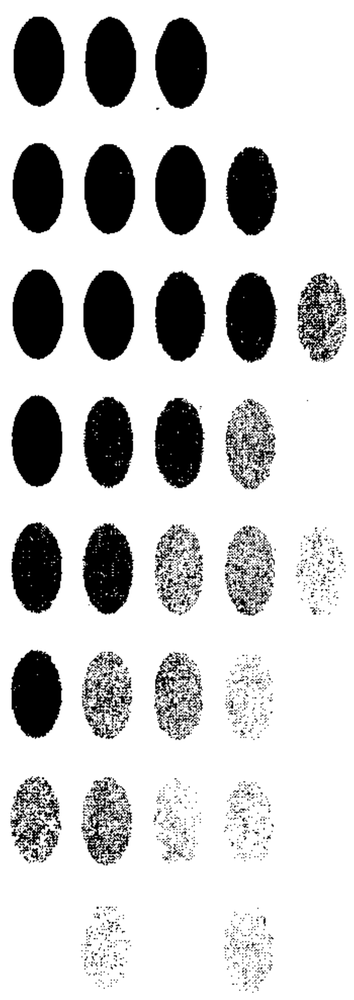
अध्यक्ष, रेलवे बोर्ड, वित्त आयुक्त, सदस्य बिजली, सदस्य यांत्रिक, सदस्य कार्मिक, सदस्य यातायात, महानिदेशक (रेल स्वास्थ्य सेवाएं), महानिदेशक (रेल सुरक्षा बल), अपर सदस्य (बजट), अपर सदस्य (सिविल इंजीनियर), अपर सदस्य (सीएंडआईएस), अपर सदस्य (वाणिज्य), अपर सदस्य (बिजली), अपर सदस्य (वित्त), अपर सदस्य (यांत्रिक), अपर सदस्य (योजना), अपर सदस्य (परियोजना), अपर सदस्य (उत्पादन इकाइयां), अपर सदस्य (सिगनल), अपर सदस्य (कार्मिक), अपर सदस्य (रेल भंडार), अपर सदस्य (टी एंड सी), अपर सदस्य

(दूरसंचार), अपर सदस्य (यातायात), अपर सदस्य (निर्माण), सलाहकार (एल आर एस), सलाहकार (सतर्कता), सलाहकार वित्त (व्यय), सलाहकार (आईआर), विधि सलाहकार, ओएसडी (एमआईएस) और रेलवे बोर्ड के अन्य अधिकारी एवं शाखाएं.

सत्यमेव जयते

APPROVED TRAINING MODULES FOR SUPERVISORS OF MECHANICAL ENGG. DEPARTMENT

JUNE 2011



MANAGEMENT SERVICES DTE
RAILWAY BOARD

Annexure – I

Abstract of Modules

Annex: I

ABSTRACT OF MODULES

Sl.No	Name of Post	Stream	Module No.	Page No
1	Sr. Section Engineer	C & W	MSE-C	2
2	Sr. Section Engineer	Diesel	MSE-D	3
3	Sr. Section Engineer	Workshop	MSE-W	4
4	Junior Engineer(RRB)	C & W	MJR-C	5
5	Junior Engineer(RRB)	Diesel	MJR-D	6
6	Junior Engineer(RRB)	Workshop	MJR-W	7
7	Junior Engineer(Intermediate)	C & W	MJI-C	8
8	Junior Engineer(Intermediate)	Diesel	MJI-D	9
9	Junior Engineer(Intermediate)	Workshop	MJI-W	10
10	Junior Engineer(Promotional)	C & W	MJP-C	11
11	Junior Engineer(Promotional)	Diesel	MJP-D	12
12	Junior Engineer(Promotional)	Workshop	MJP-W	13

Module Code

1. M Mechanical
2. SE Section Engineer
3. JR JE- RRB
4. JI JE-Intermediate
5. JP JE-Promotional
6. C C&W
7. D Diesel
8. W Workshop

Subject Code

1. M Module
2. R Railway
3. E Engineering
4. T Theory
5. C C&W
6. D Diesel
7. W Workshop

MODULE – MSE-C

Name of the Post/category	Sr. Section Engineer
Stream	C & W
Mode of appointment	Through RRB
Min. Qualification	Degree in Engg. (Mech / Elect /Electronics)

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT - 01	03	STC
		Role of Mechanical Dept.		MRT - 02	01	
		Rolling Stock Theory- Carriage		MRT - 03	03	
		Rolling Stock Theory - Wagon		MRT - 04		
		Rolling Stock Theory – Diesel Loco, DEMU, SPART		MRT - 05		
		Industrial Safety, First aid & Firefighting		MRT - 06	01	
	PRACT	Field Visit	Coach Production Unit		02	ICF/RCF
			Wagon Production Unit / RWF		01	Any wagon prod. unit / workshop /RWF
			Diesel Production Unit		01	DLW or DMW
			RDSO		01	RDSO
II	THEO	Tender & Contract		MRT - 07	01	STC
		Accident & Disaster management		MRT - 08	01	
		Supervisory Skills		MRT - 09	01	
		Stream specific theory		MCT - 01	04	
	PRACT	Field Visit	C & W Workshop		04	Respective Places
			Diesel Shed		01	
			CMT lab		01	
III	THEO	Stream specific theory		MCT- 02	07	STC
		Train operations with signaling		MRT- 11	03	ZRTI
	PRACT	Field Visit	C&W Depot		01	Parent Unit
			Stores		01	
			Drawing Office		01	CME Office
IV	THEO	Integrated Course		MRT-12	04	IRIMEE
	PRACT	Practical Training C & W Depot			06	Parent Unit
		On Job Training			02	
		Refreshing /Examination/Viva			01	STC
		TOTAL			52	

MODULE – MSE-D

Name of the Post/category	Sr. Section Engineer
Stream	Diesel
Mode of appointment	Through RRB
Min. Qualification	Degree in Engg. (Mech / Elect /Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT - 01	03	STC
		Role of Mechanical Dept.		MRT - 02	01	
		Rolling Stock Theory – Carriage		MRT - 03	03	
		Rolling Stock Theory – Wagon		MRT - 04		
		Rolling Stock Theory – Diesel Loco, DEMU, SPART		MRT - 05		
		Industrial Safety, First aid & Firefighting		MRT - 06	01	
	PRACT	Field Visit	Coach Production Unit		01	ICF/RCF
			Wagon Production Unit / RWF		01	Any wagon prod. unit / workshop /RWF
			Diesel Production Unit and RDSO		03	DLW, DMW and RDSO one week each
II	THEO	Tender & Contract		MRT -07	01	STC
		Accident & Disaster Management		MRT -08	01	
		Supervisory skills		MRT -09	01	
		Stream specific theory		MDT -01	04	STC/DTTC
	PRACT	Field Visit	C&W Depot		01	Respective Places
			C & W Workshop		01	
			Diesel POH shop		03	
			DEMU SHED		01	DEMU Shed
III	THEO	Stream specific theory		MDT – 02 M / E	07	STC/DTTC
		Train operations with signaling		MRT-11	03	ZRTI
	PRACT	Field Visit	Stores, CMT Lab, RDI, Power Control (LMS/FOIS/ICMS)		02	Respective Places
			Drawing Office		01	CME Office
IV	THEO	Integrated Course		MRT-12	04	IRIMEE
	PRACT	Practical Training in Diesel shed			06	Parent Unit
		On Job Training			02	
		Refreshing /Examination/Viva			01	STC
TOTAL					52	

MODULE – MSE-W

Name of the Post/category	Sr. Section Engineer
Stream	Workshop
Mode of appointment	Through RRB
Min. Qualification	Degree in Engg. (Mech / Elect /Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT - 01	03	STC
		Role of Mechanical Dept.		MRT - 02	01	
		Rolling Stock Theory- Carriage		MRT - 03	03	
		Rolling Stock Theory - Wagon		MRT - 04		
		Rolling Stock Theory – Diesel Loco, DEMU, SPART		MRT - 05		
		Industrial Safety, First aid & Firefighting		MRT - 06	01	
	PRACT	Field Visit	Coach Production Unit		02	ICF/RCF
			Wagon Production Unit / RWF		01	Any wagon prod unit / workshop /RWF
			Diesel Production Unit		01	DLW or DMW
			RDSO		01	RDSO
II	THEO	Tender & Contract		MRT -07	01	STC
		Accident & Disaster management		MRT -08	01	
		Supervisory skills		MRT -09	01	
		Stream specific theory		MWT -01	03	
	PRACT	Field Visit	C&W Depot		02	Respective Places
			Diesel Shed		01	
			C & W workshop		04	
III	THEO	Stream specific theory		MWT- 02	05	STC
		Trade specific theory at BTC		MWT- 04	02	BTC
		Train operations with signaling		MRT - 11	03	ZRTI
	PRACT	Field Visit	Stores		01	Respective Places
			CMT lab		01	
			Drawing Office		01	CME Office
IV	THEO	Integrated Course at IRIMEE		MRT-12	04	IRIMEE
	PRACT	Practical Training C & W workshop			06	Parent Unit
		On Job Training			02	
		Refreshing /Examination/Viva			01	STC
TOTAL					52	

MODULE – MJR-C

Name of the Post/category	Junior Engineer
Stream	C &W
Mode of appointment	Through RRB
Min. Qualification	Diploma in Engg. (Mech/Elect/Electronics)

Session	Type	Subjects		Subject code	Duration in weeks	Total duration
I	THEO	Railway Organization & Management		MRT - 01	03	STC
		Role of Mechanical Dept.		MRT - 02	01	
		Rolling Stock Theory - Carriage		MRT - 03	03	
		Rolling Stock Theory - Wagon		MRT - 04		
		Rolling Stock Theory – Diesel Loco, DEMU, SPART		MRT - 05		
		Industrial Safety, First aid & Firefighting		MRT - 06	01	
	PRACT	Field Visit	Coach Production Unit		02	ICF/RCF
			Wagon Production Unit / RWF		01	Any wagon prod. unit / workshop/ RWF
			Diesel Production Unit		01	DLW or DMW
			RDSO		01	RDSO
II	THEO	Tender & Contract		MRT - 07	01	STC
		Accident & Disaster management		MRT - 08	01	
		Supervisory skills		MRT - 09	01	
		Welding and Non Destructive Testing		MRT - 10	01	
		Stream specific theory		MCT - 01	04	
	PRACT	Field Visit	Diesel Shed		01	Respective Places
			C & W Workshop		04	
			CMT lab			
III	THEO	Stream specific theory		MCT - 02	07	STC
		Train operations with signaling		MRT - 11	03	ZRTI
	PRACT	Field Visit	C&W Depot		01	Respective Places
			Stores		01	
			Drawing Office		01	CME Office
IV	THEO	Practical Training in C & W depot			08	Parent Unit
	PRACT	On Job Training			04	
		Refreshing /Examination/Viva			01	STC
TOTAL					52	

MODULE – MJR-D

Name of the Post/category	Junior Engineer
Stream	Diesel
Mode of appointment	Through RRB
Min. Qualification	Diploma in Engg. (Mech/Elect/Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT - 01	03	STC
		Role of Mechanical Dept.		MRT - 02	01	
		Rolling Stock Theory- Carriage		MRT - 03	03	
		Rolling Stock Theory - Wagon		MRT - 04		
		Rolling Stock Theory – Diesel Loco, DEMU, SPART		MRT - 05		
		Industrial Safety, First aid & Firefighting		MRT - 06	01	
	PRACT	Field Visit	Coach Production Unit		01	ICF/RCF
			Wagon Production Unit / RWF		01	Any wagon Prod. unit / workshop /RWF
			Diesel Production Unit and RDSO		03	DLW, DMW and RDSO one week each
II	THEO	Tender & Contract		MRT -07	01	STC
		Accident & Disaster management		MRT -08	01	
		Supervisory skills		MRT -09	01	
		Welding and Non Destructive Testing		MRT -10	01	
		Stream specific theory		MDT - 01	04	STC/DTTC
	PRACT	Field Visit	C&W Depot		01	Respective Places
			Workshop		01	
			Diesel POH shop		03	
III	THEO	Stream specific theory		MDT – 02 M / E	07	STC/DTTC
		Train operations with signaling		MRT - 11	03	ZRTI
	PRACT	Field Visit	Stores, CMT Lab, RDI, Power Control (LMS, FOIS, ICMS)		02	Respective Places
			Drawing Office		01	CME office
IV	THEO	Practical Training in Diesel shed			08	Parent Unit
	PRACT	On Job Training			04	
		Refreshing /Examination/Viva			01	STC
TOTAL					52	

MODULE – MJR-W

Name of the Post/category	Junior Engineer
Stream	Workshop
Mode of appointment	Through RRB
Min. Qualification	Diploma in Engg. (Mech/Elect/Electronics)
Total Duration of Training Period	52 Weeks

Session	Type	Subjects		Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management		MRT - 01	03	STC
		Role of Mechanical Dept.		MRT - 02	01	
		Rolling Stock Theory- Carriage		MRT - 03	03	
		Rolling Stock Theory - Wagon		MRT - 04		
		Rolling Stock Theory – Diesel Loco, DEMU, SPART		MRT - 05		
		Industrial Safety, First aid & Firefighting		MRT - 06	01	
	PRACT	Field Visit	Coach Production Unit		02	ICF/RCF
			Wagon Production Unit / RWF		01	Any wagon Prod. unit / workshop /RWF
			Diesel Production Unit		01	DLW or DMW
			RDSO		01	RDSO
II	THEO	Tender & Contract		MRT- 07	01	STC
		Accident & Disaster management		MRT- 08	01	
		Supervisory skills		MRT- 09	01	
		Welding and Non Destructive Testing		MRT-10	01	
		Stream specific theory		MWT- 01	03	
	PRACT	Field Visit	C&W Depot		02	Respective Places
			Diesel Shed		02	
			C & W workshop		02	
III	THEO	Stream specific theory		MWT-02	05	STC
		Trade specific theory at BTC		MWT-04	02	BTC
		Train operations with signaling		MRT -11	03	ZRTI
	PRACT	Field Visit	Stores		01	Respective Places
			CMT Lab		01	
			Drawing office		01	CME Office
IV	THEO	Practical Training in C & W workshop			08	Parent Unit
	PRACT	On Job Training			04	
		Refreshing /Examination/Viva			01	STC
TOTAL					52	

MODULE – MJI-C

Name of the Post/category	Junior Engineer
Stream	C & W
Mode of appointment	Promotion Through LDCE
Min.Qualification	XII std / ITI
Total duration of training period	52 weeks

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Applied Mechanics	MET-01	09	
		Hydraulics	MET-02		
		Manufacturing Processes	MET-03		
		Engineering Drawing	MET-04		
		Electrical Engineering	MET-05		
II	THEO	Strength of Materials	MET-06	10	STC
		Heat Engines & Thermodynamics	MET-07		
		Theory of Machines	MET-08		
		Material science	MET-09		
		Machine Design & Drawing	MET-10		
		Introduction to Rolling stock (Coach, Wagon, Diesel Loco, DEMU, SPART)	MRT-13	03	
III	THEO	Industrial Engineering	MET-11	02	STC
		Industrial Safety, First aid & Firefighting	MRT-06	01	
		Tender & Contract	MRT-07	01	
		Accident & Disaster Management	MRT-08	01	
		Supervisory Skills	MRT-09	01	
		Computer Awareness	MRT-14	01	
		Stream specific theory	MCT-03	04	
	PRAC	Field Visit | C&W Workshop		02	C&W WS
IV	THEO	Stream specific theory	MCT-04	08	STC
	PRAC	Practical Training in C & W Depot		02	Parent unit
		On Job Training		02	Parent unit
		Refreshing /Examination/Viva		01	STC
TOTAL				52	

MODULE – MJI-D

Name of the Post/category	Junior Engineer
Stream	Diesel
Mode of appointment	Promotion Through LDCE
Min. Qualification	XII std / ITI
Total Duration of Training Period	52 Weeks.

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Applied Mechanics	MET-01	09	
		Hydraulics	MET-02		
		Manufacturing Processes	MET-03		
		Engineering Drawing	MET-04		
		Electrical & Electronics Engineering	MET-05		
II	THEO	Strength of Materials	MET-06	10	STC
		Heat Engines & Thermodynamics	MET-07		
		Theory of Machines	MET-08		
		Material science	MET-09		
		Machine Design & Drawing	MET-10		
		Introduction to Rolling stock (Coach, Wagon, Diesel Loco, DEMU, SPART)	MRT-13	03	
III	THEO	Industrial Engineering	MET-11	02	STC
		Industrial Safety, First aid & Firefighting	MRT-06	01	
		Tender & Contract	MRT-07	01	
		Accident & Disaster Management	MRT-08	01	
		Supervisory Skills	MRT-09	01	
		Computer Awareness	MRT-14	01	
		Stream specific theory	MDT - 01	04	STC/DTTC
	PRAC	Field Visit — Diesel POH Shop, Diesel Loco PU		02	D POH Shop, DLW/DMW
IV	THEO	Stream specific theory	MDT-03 M/E	04	STC/DTTC
		Stream specific theory	MDT- 04 M/E	04	
	PRAC	Diesel shed (Including one week EMD Shed)		02	Respective Places
		On Job Training		02	Parent Unit
		Refreshing / Examination/Viva		01	STC
TOTAL				52	

MODULE – MJI-W

Name of the Post/category	Junior Engineer
Stream	Workshop
Mode of appointment	Promotion Through LDCE
Min. Qualification	XII std / ITI
Total Duration of Training Period	52 Weeks

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Applied Mechanics	MET-01	09	
		Hydraulics	MET-02		
		Manufacturing Processes	MET-03		
		Engineering Drawing	MET-04		
		Electrical Engineering	MET-05		
II	THEO	Strength of Materials	MET-06	10	STC
		Heat Engines & Thermodynamics	MET-07		
		Theory of Machines	MET-08		
		Material science	MET-09		
		Machine Design & Drawing	MET-10		
		Introduction to Rolling stock (Coach, Wagon, Diesel Loco, DEMU, SPART)	MRT-13	03	
III	THEO	Industrial Engineering	MET-11	02	STC
		Industrial Safety, First aid & Firefighting	MRT-06	01	
		Tender & Contract	MRT-07	01	
		Accident & Disaster Management	MRT-08	01	
		Supervisory Skills	MRT-09	01	
		Computer Awareness	MRT-14	01	
		Stream specific theory	MWT-03	06	
IV	THEO	Trade specific theory	MWT-04	04	BTC
	PRAC	Practical Training in Workshop		06	Parent Unit
		On Job Training		02	Parent Unit
		Refreshing / Examination /Viva		01	STC
TOTAL				52	

MODULE – MJP-C

Name of the Post/category	Junior Engineer
Stream	C & W
Mode of appointment	Promotion through seniority
Min.Qualification	--
Total Duration of Training Period	26 Weeks

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Industrial Safety, First aid & Firefighting	MRT-06	01	
		Tender & Contract	MRT-07	01	
		Accident & Disaster Management	MRT-08	01	
		Supervisory Skills	MRT-09	01	
		Computer Awareness	MRT-14	01	
		Technical English	MRT-15	01	
		Manufacturing Process	MET-12	01	
		Industrial Engineering	MET-13	01	
		Mechanical Engineering Science	MET-14	02	
II	THEO	Stream specific theory	MCT-05	08	STC
	PRAC	C & W Depot		02	Parent Unit
		On Job Training		02	
		Refreshing /Examination/Viva		01	STC
TOTAL				26	

MODULE – MJP-D

Name of the Post/category	Junior Engineer
Stream	Diesel
Mode of appointment	Promotion through seniority
Min.Qualification	--
Total Duration of Training Period	26 Weeks

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Industrial Safety, First aid & Firefighting	MRT-06	01	
		Tender & Contract	MRT-07	01	
		Accident & Disaster Management	MRT-08	01	
		Supervisory Skills	MRT-09	01	
		Computer Awareness	MRT-14	01	
		Technical English	MRT-15	01	
		Manufacturing Process	MET-12	01	
		Industrial Engineering	MET-13	01	
		Mechanical Engineering Science	MET-14	02	
II	THEO	Stream specific theory(Common)	MDT-05	03	STC / DTTC
		Stream specific theory	MDT-06 M/E	05	
	PRAC	Diesel Shed		02	Parent Unit
		On Job Training		02	
		Refreshing /Examination/Viva		01	STC
TOTAL				26	

MODULE – MJP-W

Name of the Post /Category	Junior Engineer
Stream	Workshop
Mode of appointment	Promotion through seniority
Min. Qualification	--
Total duration of training period	26 Weeks

Session	Type	Subjects	Subject code	Duration in weeks	Activity Centre
I	THEO	Railway Organization & Management	MRT-01	03	STC
		Role of Mechanical Dept.	MRT-02	01	
		Industrial Safety, First aid & Firefighting	MRT-06	01	
		Tender & Contract	MRT-07	01	
		Accident & Disaster Management	MRT-08	01	
		Supervisory Skills	MRT-09	01	
		Computer Awareness	MRT-14	01	
		Technical English	MRT-15	01	
		Manufacturing Process	MET-12	01	
		Industrial Engineering	MET-13	01	
		Mechanical Engineering Science	MET-14	02	
II	THEO	Stream specific theory	MWT-03	06	STC
		Trade specific theory	MWT-04	04	BTC
	PRAC	On Job Training		02	Parent Unit
		Refreshing /Examination/Viva		01	STC
TOTAL				26	

Annexure – II

Subject wise detailed modules

Index

Index of subjects common to all streams

Appropriate lesson codes wherever necessary can be given by the System Training Schools

SUBJECT NAME	**RAILWAY ORGANISATION & MANAGEMENT**
SUBJECT CODE	**MRT – 01**
MODULE	**All modules**

SL NO.	LESSON CODE NO.	TOPIC	TIME IN HRS
1		Organisation of Indian Railways	03
2		Recruitment and training	03
3		General Conditions of service	03
4		Medical Attendance Rules	02
5		Leave Rules	03
6		Pass Rules	03
7		Conduct Rules	02
8		DAR	06
9		Payment of Wages Act	02
10		Minimum Wages Act	01
11		Workmen's Compensation Act	03
12		Hours of Employment Regulations	03
13		Factories Act	03
14		Industrial Disputes Act	03
15		PF, Pension & Other Retirement benefits	03
16		Welfare Measures	03
17		Organisation and objectives of Stores branch	02
18		Classification and Codification of Stores	03
19		Tenders & Contracts	03
20		Purchase Agencies	02
21		Procurement of stores – Non Stock	04
22		Recoupment of stores – Stock item	04
23		Drawal of Stores	03
24		Scrap disposal	03
25		Disposal of surplus stores	01
26		Inventory Control	03
27		Organisation and objectives of Accounts branch	02
28		Budgeting	03
29		Parliamentary control of Railways	02
30		Allocation Rules	03
31		Stock Verification	02
32		Delegation of Powers	01
33		M&P, Rolling stock and Works programme	06
34		Audit Paras	03
35		Yoga & meditation	06
36		REVIEW	06
		Total	**108**

SUBJECT NAME	**ROLE OF MECHANICAL DEPARTMENT**
SUBJECT CODE	**MRT – 02**
MODULE	**All modules**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Organisation and objectives of Mechanical Dept.	03
2		Types of Rolling stock- Production/Repair/Maintenance practices of same	02
3		Production units: Brief History, Activities	03
4		Workshops: Role of C&W Workshop, Objectives, Organisation, Layout, Activities of different shops	06
5		Workshops: Role of Diesel POH Workshop, Objectives, Organisation, Layout, Activities of different shops	05
6		C & W Depot: Role of C&W Depot, Objectives, Organisation, Layout, Activities of different sections	04
7		Diesel Sheds: Role of Diesel Sheds, Objectives, Organisation, Layout, Activities of different sections	06
8		Latest Development in Mechanical Dept. /Other Organizations- RDSO,IRIMEE,RITES,CONCOR,CAMTECH	02
9		Role of Supervisor in Mechanical Dept.	02
10		Review	03
		Total	**36**

SUBJECT NAME	**ROLLING STOCK THEORY**
SUBJECT CODE	**MRT – 03,04,05**
MODULE	**All modules**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Introduction	02
2		Rolling stock requirements & their codal life	01
3		Construction of body	02
4		Wheel set- wheel, axle & bearings	04
5		Suspension system	03
6		Couplings & buffers	06
7		Brake system-vacuum & air brake system	09
8		Safety & amenity fittings	03
9		Maintenance practice in coaching stock	03
10		Latest development in coaching stock – LHB coaches	03
11		Types of wagon stock	03
12		Types of bogies in wagon stock	03
13		Features of special wagons/latest wagons	03
14		Pattern of freight train examination	03
15		Diesel locomotives – types	03
16		Important systems in a diesel locomotive: Fuel oil, lube oil, cooling water, turbo supercharging & brake system	15
17		Electrical control system	06
18		Latest development in locomotives	06
19		DEMU: Power and Trailing cars, important features and systems	05
20		SPART- Introduction, Basic arrangements, importance.	01
21		Visit to a coaching/wagon depot/workshop & loco shed	18
22		Review	06
		Total	**108**

SUBJECT NAME	**INDUSTRIAL SAFETY,FIRSTAID & FIRE FIGHTING**
SUBJECT CODE	**MRT – 06**
MODULE	**All modules**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Causes of fire; Identification of unsafe conditions and unsafe acts;	02
2		Identifying and handling of various types of fire extinguishers;	04
3		Precautions to be taken while extinguishing fire;	02
4		Render first aid to the burn injuries; Render first aid to persons affected by suffocation; and Communication	02
5		Scope and Rules of first Aid; Structure and function of body;	02
6		General idea about circulation of blood; Wound & Hemorrhages; Dressing & Bandages;	02
7		Shock & its management; Asphyxia & Artificial respiration;	02
8		Injuries to bones & joints – fractures; Unconsciousness and General rules for the treatments of unconsciousness person;	02
9		Practical demonstration of Transport of injured persons, stretcher exercises, preparing and blanketing stretcher.	03
10		Principles Of Accident, Causation & Its Prevention . Unsafe Acts & Unsafe Conditions.	03
11		House Keeping & Material Handling	02
12		Safety on Small Tools and Electrical Appliances	02
13		Factories Act, WCA	03
14		Role of Supervisors on Safety, Accident Reporting & Investigations.	02
15		Review	03
		Total	**36**

SUBJECT NAME	**TENDERS & CONTRACT MANAGEMENT**
SUBJECT CODE	**MRT – 07**
MODULE	**All modules**

	Lesson Code No	Topic	Duration in Hours
1		Introduction on Estimate preparation to sanctioning and From Detailed Estimate to Entering into Contract Agreement	02
2		Overview of contract management.	02
3		Types of contracts, revenue contracts / work contracts, schedule of powers for approval of works, works programme.	03
4		Initiation of tenders, Types of tenders, Selection of tenders Sanction to float tender & Tender notice.	03
5		Preparation of tender documents, Elements of tender document General conditions of contract, Special conditions of contract & Tender rules and clauses.	03
6		Tender opening and processing , Opening of tenders, Tabulation statement & Briefing note.	03
7		Finalisation of tenders - Technical evaluation, Tender committee nomination, Tender committee deliberations and recommendations.	03
8		Awarding of Contract, Acceptance of tender, Issue of letter of acceptance & Starting of contract.	03
9		Execution of Contract- Fulfillment of contract obligations, Inspection of work, Record of work done, Payment to the contract & Monitoring of progress.	05
10		Vigilance angle to contracts Do's and Don'ts	02
11		Case Studies, cases in workshops, open line & Diesel Sheds.	04
12		Review	03
		Total	**36**

SUBJECT NAME	**ACCIDENT & DISASTER MANAGEMENT**
SUBJECT CODE	**MRT – 08**
MODULE	**All modules**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Rail wheel interaction	02
2		Permanent way parameters	03
3		Readings in permanent way	
4		Rolling stock parameters	04
5		Readings in rolling stock	
6		Signal aspects to be recorded at the accident site	02
7		Recording of track, rolling stock.	02
8		Role of supervisors at the accident site	02
9		Features Of Disaster Management	02
10		High level safety committee recommendations & Emergency provisions	02
11		Civil Defence & First-Aid	03
12		Duties Of Officials At Accident Site	02
13		Rescue Extrication Techniques & Fire Fighting	02
14		Rescue Techniques- Medical Relief	03
15		Duties of on board staff at accident site	02
16		Railway Safety Review Committee recommendations & Corporate Safety Plan	02
17		Review	03
		Total	**36**

SUBJECT NAME	**SUPERVISORY SKILLS**
SUBJECT CODE	**MRT – 09**
MODULE	**All modules**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Role of Supervisor in Mechanical Department	03
2		Leadership & Leadership styles	06
3		Motivation	03
4		Communication	06
5		Time Management	03
6		Stress management	03
7		Interpersonal Skills	03
8		Role of Vigilance	03
9		Energy Conservation	03
10		Review	03
		Total	**36**

SUBJECT NAME	**Welding and Non Destructive Testing**
SUBJECT CODE	**MRT – 10**
MODULE	**MJR**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Welding - Principle and applications in various fabrication work, types of welding process, weldability of material and welding metallurgy.	03
2		Arc welding process and principle. tools required for these, Setting welding current, voltage, Maintenance of welding machine.	06
3		Job preparation ,Electrodes, Electrode selection for difference welding work, Types of Joints,	03
4		Safety precautions, Defects & remedies in welding	03
5		Special Welding Techniques : CO2 welding. Method, precautions etc. C.I. welding, MIG & TIG welding work. seam welding, sub merged arc welding, flash butt welding.	06
6		Gas cutting -procedure and precautions.	03
7		Introduction to NDT, Various types of NDT method like LPT, Magna flux etc	04
8		Ultrasonic Flaw Detection.	03
9		Radiography	02
10		Review	03
		Total	**36**

SUBJECT NAME	**Train operations with signaling**
SUBJECT CODE	**MRT – 11**
MODULE	**MSE & MJR**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Organisation of Operating Department	
2		G & SR	
2		Safety rules	
3		Classification of stations	
4		Systems of working	
5		Essentials of Absolute automatic one train only system	
6		Signals of all types	
7		Working of control Organisation	
8		Abnormal working	
9		Line capacity & Important operating statistics	
17		Accident Management	
		Working of Commercial Department	
18		Customer Care	
20		Review	
		Total	***108**

*Total 108hrs – Exact distribution to be decided by ZRTI.

SUBJECT NAME	**Integrated Course at IRIMEE**
SUBJECT CODE	**MRT – 12**
MODULE	**MSE**

SL NO.	LESSON CODE NO.	TOPIC (*)	TIME in Weeks
1		Mechatronics	01
2		Reliability Engineering	01
3		Operation and Maintenance of Crane	01
4		Advancement in Rolling Stock Technology	01
		Total	**04**

(*): These topics are only illustrative. Exact course content and detailing would be done by IRIMEE.

SUBJECT NAME	**INTRODUCTION TO ROLLING STOCK**
SUBJECT CODE	**MRT – 13**
MODULE	**MJI**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Introduction	2
2		Rolling stock requirements & their codal life	1
3		Construction of body	3
4		Wheel set- wheel, axle & bearings	6
5		Suspension system	3
6		Couplings & buffers	6
7		Brake system-vacuum & air brake system	9
8		Safety & amenity fittings	3
9		Maintenance practice in coaching stock	3
10		Latest development in coaching stock – LHB coaches	3
11		Types of wagon stock	3
12		Types of bogies in wagon stock	3
13		Features of special wagons/latest wagons	3
14		Pattern of freight train examination	3
15		Diesel locomotives – types	3
16		Important systems in a diesel locomotive	3
17		Fuel oil, lube oil, cooling water, turbo supercharging & brake system	21
18		Electrical control system	6
19		Latest development in locomotives	6
20		Visit to a coaching depot/workshop & loco shed	12
21		Review	6
		Total	**108**

SUBJECT NAME	**COMPUTER AWARENESS**
SUBJECT CODE	**MRT – 14**
MODULE	**MJI & MJP**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Introduction to Computers and Application of Computers/Windows	06
2		MS Word	09
3		MS Excel	09
4		MS Power Point	06
5		Internet usage	03
6		Review	03
		Total	**36**

SUBJECT NAME	**TECHNICAL ENGLISH**
SUBJECT CODE	**MRT – 15**
MODULE	**MJI & MJP**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Communication Vocabulary	03
2		Grammar – Important terms	06
3		Common Errors	06
4		Précis writing, Expansion of given idea	03
5		Comprehension	03
6		Official Correspondence	03
7		Business Correspondence	03
8		Social Correspondence	03
9		General Report Writing	03
10		Technical Report Writing	03
		Total	**36**

SUBJECT NAME	**APPLIED MECHANICS**
SUBJECT CODE	**MET – 01**
MODULE	**MJI**

SL NO.	LESSON CODE NO.	TOPIC	TIME
1		Scalars and Vectors	01
2		Composition & resolution of forces	05
3		Equilibrium	03
4		Parallel forces & Couples	03
5		Plane motion.	05
6		Newton's laws of motion	05
7		Collision of Elastic bodies	04
8		Motion of connected bodies	05
9		Work, power and Energy	04
10		Friction	08
11		Motion of Rotation	04
12		Motion along circular path.	04
13		Simple Harmonic Motion	04
14		Simple lifting machines	05
15		Review	06
		Total	**66**

SUBJECT NAME	**HYDRAULICS**
SUBJECT CODE	**MET – 02**
MODULE	**MJI**

Sl.No	Lesson code no.	Topic	Duration in Hours
1		Introduction to Basic concepts	03
2		Fluid Pressure	04
3		Hydrostatics	03
4		Buoyancy & Floatation	06
5		Hydro Kinematics	03
6		Bernoulli's Theorem	04
7		Flow through Orifices & mouth pieces	05
8		Impact of jets	04
9		Water wheels	03
10		Impulse Turbines	03
11		Reaction Turbines	03
12		Performance of turbines	02
13		Reciprocating Pumps	03
14		Centrifugal Pumps	03
15		Performance of pumps	02
16		Pumping Devices	03
17		Review	06
		Total	**60**

SUBJECT NAME	**MANUFACTURING PROCESSES**
SUBJECT CODE	**MET – 03**
MODULE	**MJI**

Sl.No	Lesson code no.	Topic	Duration in Hours
1		Production of metals	06
2		Hot and cold working	05
3		Smithy and forging.	03
4		Foundry	03
5		Metal Joining.	12
6		Lathe	09
7		Drilling machine	06
8		Shaper and Planner	06
9		Grinding machine	04
10		Milling machine	06
11		Un-conventional machines	06
12		Review	06
		Total	**72**

SUBJECT NAME	**ENGINEERING DRAWING**
SUBJECT CODE	**MET – 04**
MODULE	**MJI**

Sl.No	Lesson code no.	Topic	Duration in Hours
1		Introduction about Engg. Drg.	01
2		Drawing Board, Instruments & its use	01
3		Lettering & Types of Lines	03
4		Dimensioning systems	03
5		Geometrical Constructions	03
6		Scales	06
7		Engineering curves	06
8		Principle of Projection - Projection of Points, Lines, Planes & Solids	18
9		Section of Solids	09
10		Isometric Projections of solids & M/C Components	08
11		Orthographic views of Solids & M/C Components	08
12		Review	06
		Total	**72**

SUBJECT NAME	**ELECTRICAL ENGINEERING**
SUBJECT CODE	**MET – 05**
MODULE	**MJI**

Sl.No	Lesson code no.	Topic	Duration in Hours
1		Current & Ohms Law	02
2		Simple DC Circuits	02
3		Network Analysis	04
4		Magnetism & Electromagnetism	04
5		Electromagnetic Induction	03
6		D.C. Generator	06
7		D.C. Motor	06
8		Batteries	03
9		Fundamentals of A.C	03
10		Single Phase A.C. Circuit	06
11		Three Phase A.C. Circuit	03
12		Basic Electronics	06
13		Review	06
		Total	**54**

SUBJECT NAME	**STRENGTH OF MATERIALS**
SUBJECT CODE	**MET – 06**
MODULE	**MJI**

Sl.No	Lesson Code No	Topic	Duration
1		Introduction about materials & its properties.	02.
2		Simple stress and strain	12
3		Elastic constants	06
4		Centre of gravity	03
5		Moment of inertia	07
6		Shear force & bending Moment of beams	20
7		Stresses in beams	08
8		Torsion of shafts	08
9		Review	06
		Total	**72**

SUBJECT NAME	**HEAT ENGINES & THERMODYNAMICS**
SUBJECT CODE	**MET – 07**
MODULE	**MJI**

Sl. No.	Lesson Code no.	Topic	Time In hrs.
1		Introduction .	03
2		Properties of Gases .	06
3		Thermodynamic process of perfect gases.	12.
4		Steam	06
5		Air cycles	09
6		Internal combustion engines	12
7		IC Engine Systems	06
8		Testing of IC Engine	06
9		Compressors	06
10		Reviews.	06
		Total	**72**

SUBJECT NAME	**THEORY OF MACHINES**
SUBJECT CODE	**MET – 08**
MODULE	**MJI**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Mechanisms	09
2		Brakes and dynamometers	08
3		Belt, rope and chain drive	08
4		Gears	09
5		Clutches	08
6		Governor	08
7		Flywheel and turning moment diagram	08
8		Balancing of masses	08
9		Review	06
		Total	**72**

SUBJECT NAME	**MATERIAL SCIENCE**
SUBJECT CODE	**MET – 09**
MODULE	**MJI**

SL NO.	LESSON CODE NO.	TOPIC	TIME in Hours
1		Introduction	02
2		Solid phases, phase diagrams and phase transformation	08
3		Iron carbon equilibrium diagram	06
4		Heat treatment	15
5		Types of alloy steels	04
6		Non-ferrous metals	04
7		Classification of railway materials	03
8		Review	06
		Total	**48**

SUBJECT NAME	**MACHINE DESIGN AND DRAWING**
SUBJECT CODE	**MET – 10**
MODULE	**MJI**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Introduction about Design principle.	03
2		Design of keys	03
3		Design & Drawing of screw thread	09
4		Design of coupling	09
5		Design of welded joints	03
6		Design & Drawing of cotter& knuckle joints	06
7		Design & Drawing of Riveted joint	09
8		Design & Drawing of CAM profile	12
9		Design of Coil springs	05
10		Design of Laminated springs	04
11		Limits, Fits & Tolerance	06
12		Orthographic & Isometric Drawing of machine components	06
13		Assembly Drg of Foot Step Bearing	03
14		Assembly Drg of Plummer Block	04
15		Assembly Drg of Screw Jack	04
16		Assembly Drg of Tail Stock	04
17		Review	06
		Total	**96**

SUBJECT NAME	**INDUSTRIAL ENGINEERING**
SUBJECT CODE	**MET – 11**
MODULE	**MJI**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Introduction	03
2		Method Study	09
3		Principle of Motion Economy	04
4		Plant Layout	05
5		Work Measurement	09
6		Network Techniques	12
7		Exercise on Network	09
8		Incentive Schemes in Railway Workshops	09
9		Job Evaluation and Merit Rating	06
10		Review	06
		Total	**72**

SUBJECT NAME	**MANUFACTURING PROCESSES**
SUBJECT CODE	**MET – 12**
MODULE	**MJP**

Sl.No	Lesson code no.	Topic	Duration in Hours
1		Production of metals	03
2		Hot and cold working	02
3		Smithy and forging.	02
4		Foundry	02
5		Metal Joining.	10
6		Lathe	06
7		Drilling machine	02
8		Shaper and Planner	02
9		Grinding machine	02
10		Milling machine	02
12		Review	03
		Total	**36**

SUBJECT NAME	**INDUSTRIAL ENGINEERING**
SUBJECT CODE	**MET – 13**
MODULE	**MJP**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Introduction	02
2		Method Study	05
3		Principle of Motion Economy	02
4		Plant Layout	03
5		Work Measurement	05
6		Network Techniques	05
7		Exercise on Network	04
8		Incentive Schemes in Railway Workshops	04
9		Job Evaluation and Merit Rating	03
10		Review	03
		Total	**36**

SUBJECT NAME	**MECHANICAL ENGINEERING SCIENCE**
SUBJECT CODE	**MET – 14**
MODULE	**MJP**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Plane motion, Laws of motion	6
2		Transmission of power	4
3		IC engines	5
4		Stress, Strain & Hooke's law	4
5		Properties of materials	3
6		Basic mathematics	6
7		Metrology	5
8		Review	3
		Total	**36**

SUBJECT NAME	**MECHANICAL ENGINEERING SCIENCE**
SUBJECT CODE	**MET – 14**
MODULE	**MJP**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Plane motion, Laws of motion	6
2		Transmission of power	4
3		IC engines	5
4		Stress, Strain & Hooke's law	4
5		Properties of materials	3
6		Basic mathematics	6
7		Metrology	5
8		Review	3
		Total	**36**

Index for stream wise subjects

SUBJECT NAME	**C & W THEORY - 01**
SUBJECT CODE	**MCT – 01**
MODULE	**MSE-C ,MJR-C**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Overview of C&W Organisation	06
2		Design & construction of Coaches	12
3		Wheels & its defects	06
4		Axles & bearings	06
5		Vacuum Brake System	06
6		Air Brake System	24
7		Bogie Mounted brake system	12
8		Passenger & Amenities fittings	06
9		Suspension system	06
10		Couplings & Buffers	12
11		Train Examination -Coaches	06
12		Repair & maintenance of Coaching Stock	12
13		Maintenance Manual – Coaching	12
14		IRCA Part IV	12
15		Review	06
		Total	**144**

SUBJECT NAME	**C & W THEORY - 02**
SUBJECT CODE	**MCT – 02**
MODULE	**MSE-C ,MJR-C**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Brake power rules	06
2		Train lighting & AC	06
3		Couplings in LHB, DEMU & Coaching stock	12
4		DEMU Air suspension	06
5		LHB Coaches	18
6		Design features of various wagons	06
7		New pattern of Train examination of goods stock-CC/Premium/End to End	06
8		Wagon manufacturing – use of hulk bolts	06
9		Stainless steel wagons, Aluminum wagons, Higher Axle load wagons	06
10		ODC	12
11		New pattern of Train examination of goods stock-CC/Premium/End to End	06
12		Container wagons-BLC Train operation and maintenance practice	06
13		IRCA Part III	12
14		Repair & maintenance of goods stock-ROH	12
15		Tank Wagons – repairs & maintenance	12
16		Brake Binding –Causes & remedies	12
17		Train Parting – Causes & remedies	12
18		Accident Relief Train	06
19		Derailment Mechanism	06
20		Accident Investigation	06
21		Disaster Management – Role of Supervisors	18
22		Prevention of accident on C&W account	12
23		ART.MFD maintenance	06
24		Layout of Coaching and goods stock yard and infrastructural facilities	12
25		WILD, Hot Box detector, Track side bogie monitoring system	06
26		Depot stores Management	06
27		Marshalling of trains	06
28		Role of Supervisors to Minimize sick figures/coach detachment/Ineffective %	06
29		Visit to major coaching depot	12
30		Visit to Major goods depot	18
31		Review	12
		Total	**288**

SUBJECT NAME	**C & W THEORY - 03**
SUBJECT CODE	**MCT – 03**
MODULE	**MJI-C**

Sl. No	Lesson Code No	Topic	Duration in Hours
1		Overview of C&W Organisation	06
2		Design & construction of Coaches	12
3		Wheels & its defects	06
4		Axles & bearings	06
5		Air Brake System	24
6		Bogie Mounted brake system	12
7		Vacuum Brake System	06
8		Passenger & Amenities fittings	06
9		Suspension system	06
10		Couplings & Buffers	12
11		LHB Coaches	18
12		DEMU Air suspension	06
13		Couplings in LHB, DEMU & Coaching stock	12
14		Train lighting & AC	06
15		Review	06
		Total	**144**

SUBJECT NAME	**C & W THEORY - 04**
SUBJECT CODE	**MCT – 04**
MODULE	**MJI-C**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Train examination pattern in Coaching stock	06
2		Maintenance Manual – Coaching	12
3		Repair & maintenance of Coaching Stock	12
4		IRCA Part IV	12
5		Visit to major coaching depot	12
6		Design features of various wagons –	06
7		Wagon manufacturing – use of hulk bolts	06
8		Stainless steel wagons, Aluminum wagons, Higher Axle load wagons	06
9		New pattern of Train examination of goods stock-CC/Premium/End to End	12
10		IRCA Part III	12
11		Container wagons-BLC Train operation and maintenance practice	06
12		Repair & maintenance of goods stock - ROH practices	12
13		Tank Wagons – repairs & maintenance	12
14		Brake power rules	06
15		ODC	06
16		Brake Binding Causes & remedies	12
17		Train Parting – Causes & remedies	12
18		Accident Relief Train	06
19		Derailment Mechanism	06
20		Accident Investigation	06
21		ART.MFD maintenance	06
22		Layout of Coaching and goods stock yard and infrastructural facilities	06
23		WILD, Hot Box detector, Track side bogie monitoring system	06
24		ISO in Depots	12
25		Disaster Management – Role of Supervisors	18
26		Prevention of accident on C&W account	12
27		Depot stores Management	06
28		Marshalling of trains	06
29		Role of Supervisors to Minimize sick figures/coach detachment/Ineffective %	06
30		Visit to Major goods depot	18
31		Review	12
		Total	**288**

SUBJECT NAME	**C & W THEORY – 05**
SUBJECT CODE	**MCT – 05**
MODULE	**MJP-C**

Sl. No	Lesson Code No	Topic	Duration in Hours
1		Overview of C&W Organisation	06
2		Design & construction of Coaches	06
3		Air Brake System	12
4		Vacuum Brake System	06
5		Bogie Mounted brake system	06
6		Maintenance Manual – Coaching	06
7		Couplings	06
8		Passenger & Amenities fittings	06
9		IRCA Part IV	06
10		Maintenance pattern for Coaches	06
11		Repair & maintenance of Coaching Stock	06
12		Brake power rules	06
13		Train lighting & AC	06
14		LHB Coaches	18
15		DEMU Air suspension	06
16		Visit to major coaching depot	12
17		Design features of various wagons	06
18		Wagon manufacturing – use of hulk bolts	06
19		Stainless steel wagons, Aluminum wagons, Higher Axle load wagons	06
20		Train examination of goods stock-CC/Premium/End to End	06
21		Container wagons-BLC Train operation and maintenance practice	06
22		WILD, Hot Box detector, Track side bogie monitoring system	06
23		Repair & maintenance of goods stock-ROH	06
		Tank Wagons – repairs & maintenance	06
24		IRCA Part III	06
25		ODC	06
26		Brake Binding Causes & remedies	06
27		Train Parting – Causes & remedies	06
28		Accident Relief Train	06
29		Derailment Mechanism	12
30		Accident Investigation	12
31		ART.MFD maintenance	06
32		Prevention of accident on C&W account	06
33		Layout of Coaching and goods stock yard and infrastructural facilities	06
34		Disaster Management – Role of Supervisors	06
35		Depot stores Management	06
36		Role of Supervisors to Minimize sick figures/coach detachment/Ineffective %	06
37		Marshalling of trains	06
38		Visit to Major goods depot	12
39		Review	12
		Total	**288**

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(Common) – 01**
SUBJECT CODE	**MDT – 01**
MODULE	**MSE-D,MJR-D,MJI-D**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Types of I.C. Engines and working, classification,	06
2		Traction Machine, Tractive effort-speed characteristics and co efficient of Adhesion	06
3		Supercharging principles, methods and various testing parameters.Air and Vacuum Brake system	06
4		Fuel system – components, function, defects and remedy, Fuel injector	06
5		Lub oil system - components, function, defects and remedy	06
6		Cooling water system - components, function, defects and remedy, Radiator fan – principle, operation and maintenance.	06
7		Layout of shop and shed and schedule of maintenance	06
8		Loco maintenance procedure, wheel specification, bearing fitment, suspension system	06
9		Anti Collision Device –Operation & Maintenance	06
10		GM Locos	12
11		Various types of Transmission, feature of an Ideal transmission in Diesel Loco, DC-DC,AC-DC,AC-AC transmission	12
12		Various rotating equipments such as TG, TM, EG, AG, DB Blower, CCEM, ECC, TACHO, Fuel booster motor – Description / Overhauling/Repair/Testing, common problems & remedy	18
13		Excitation systems , Dynamic brake system, Transition system – circuit analysis, defects and remedy	12
14		Microprocessor based controls	06
15		Types of governors, overhauling procedure, testing methods	12
16		Various safety devices and alarm fitted in Loco – working principles	12
17		Testing of Engines – Dry-n-Test, Blow bye test, Random test, Load Box testing, MU operation testing	06
Total			144

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(MECHANICAL)-02 M**
SUBJECT CODE	**MDT – 02 M**
MODULE	**MSE-D,MJR-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1		Power pack – Cylinder head, cylinder liner, connecting rod, cam shaft etc.	48
2		Supercharging principles, methods and various testing parameters Air and Vacuum Brake system	42
3		Air compressor/Exhauster, types, function and overhauling procedures	36
4		Fuel system – components, function, defects and remedy, Fuel injector	24
5		Lub oil system - components, function, defects and remedy	30
6		Cooling water system - components, function, defects and remedy, Radiator fan – principle, operation and maintenance.	30
7		Layout of shop and shed and schedule of maintenance	18
8		Loco maintenance procedure, wheel specification, bearing fitment, suspension system	48
9		GM Locos	12
Total			288

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(ELECTRICAL) – 02 E**
SUBJECT CODE	**MDT – 02 E**
MODULE	**MSE-D,MJR-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1		Various types of Transmission, feature of an Ideal transmission in Diesel Loco, DC-DC,AC-DC,AC-AC transmission	12
2		Various rotating equipments such as TG, TM, EG, AG, DB Blower, CCEM, ECC, TACHO, Fuel booster motor – Description/Overhauling/Repair/Testing, common problems & remedy	102
3		Excitation systems , Dynamic brake system, Transition system – circuit analysis, defects and remedy	108
4		Microprocessor based controls	42
5		Types of governors, overhauling procedure, testing methods	06
6		Various safety devices and alarm fitted in Loco – working principles	06
7		Testing of Engines – Dry-n-Test, Blow bye test, Random test, Load Box testing, MU operation testing	12
Total			288

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(Mechanical) – 03 M**
SUBJECT CODE	**MDT – 03 M**
MODULE	**MJI-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1		Power pack – Cylinder head, cylinder liner, connecting rod, cam shaft etc.	48
2		Supercharging principles, methods and various testing parameters Air and Vacuum Brake system	42
3		Air compressor/Exhauster, types, function and overhauling procedures	30
4		Fuel system – components, function, defects and remedy, Fuel injector	24
Total			144

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY (Mechanical) – 04 M**
SUBJECT CODE	**MDT – 04 M**
MODULE	**MJI-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1.		Lub oil system - components, function, defects and remedy	30
2.		Cooling water system - components, function, defects and remedy, Radiator fan – principle, operation and maintenance.	30
3.		Layout of shop and shed and schedule of maintenance	18
4.		Loco maintenance procedure, wheel specification, bearing fitment, suspension system	48
5.		GM Locos	18
		Total	144

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(Electrical) – 03 E**
SUBJECT CODE	**MDT – 03 E**
MODULE	**MJI-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1.		Various types of Transmission, feature of an Ideal transmission in Diesel Loco, DC-DC,AC-DC,AC-AC transmission	12
2.		Various rotating equipments such as TG, TM, EG, AG, DB Blower, CCEM, ECC, TACHO, Fuel booster motor – Description/Overhauling/Repair/Testing, common problems & remedy	102
3		Excitation systems ,	30
Total			144

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(Electrical) – 04 E**
SUBJECT CODE	**MDT – 04 E**
MODULE	**MJI-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1.		Dynamic brake system, Transition system – circuit analysis, defects and remedy	78
2.		Microprocessor based controls	42
3		Types of governors, overhauling procedure, testing methods	06
4		Various safety devices and alarm fitted in Loco – working principles	06
5		Testing of Engines – Dry-n-Test, Blow bye test, Random test, Load Box testing, MU operation testing	12
Total			144

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(Common) – 05**
SUBJECT CODE	**MDT – 05**
MODULE	**MJP-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1		Types of I.C. Engines and working, classification,	06
2		Traction Machine, Tractive effort-speed characteristics and co efficient of Adhesion	04
3		Supercharging principles, methods and various testing parameters.Air and Vacuum Brake system	04
4		Fuel system – components, function, defects and remedy, Fuel injector	04
5		Lub oil system - components, function, defects and remedy	04
6		Cooling water system - components, function, defects and remedy, Radiator fan – principle, operation and maintenance.	04
7		Layout of shop and shed and schedule of maintenance	04
8		Loco maintenance procedure, wheel specification, bearing fitment, suspension system	04
9		Anti Collision Device –Operation & Maintenance	04
10		GM Locos	12
11		Various types of Transmission, feature of an Ideal transmission in Diesel Loco, DC-DC,AC-DC,AC-AC transmission	09
12		Various rotating equipments such as TG, TM, EG, AG, DB Blower, CCEM, ECC, TACHO, Fuel booster motor – Description / Overhauling/Repair/Testing, common problems & remedy	12
13		Excitation systems , Dynamic brake system, Transition system – circuit analysis, defects and remedy	09
14		Microprocessor based controls	06
15		Types of governors, overhauling procedure, testing methods	9
16		Various safety devices and alarm fitted in Loco – working principles	09
17		Testing of Engines – Dry-n-Test, Blow bye test, Random test, Load Box testing, MU operation testing	04
Total			**108**

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY(Mechanical) – 06 M**
SUBJECT CODE	**MDT – 06 M**
MODULE	**MJP-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1		Power pack – Cylinder head, cylinder liner, connecting rod, cam shaft etc.	36
2		Supercharging principles, methods and various testing parameters ,Air and Vacuum Brake system	27
3		Air compressor/Exhauster, types, function and overhauling procedures	21
4		Fuel system – components, function, defects and remedy, Fuel injector	15
5		Lub oil system - components, function, defects and remedy	15
6		Cooling water system - components, function, defects and remedy, Radiator fan – principle, operation and maintenance.	15
7		Layout of shop and shed and schedule of maintenance	12
8		Loco maintenance procedure, wheel specification, bearing fitment, suspension system	27
9		GM Locos	12
Total			180

SUBJECT NAME	**DIESEL LOCOMOTIVE THEORY (Electrical) – 06 E**
SUBJECT CODE	**MDT – 06 E**
MODULE	**MJP-D**

Sl. No	Lesson Code No	Topic	Duration in Hours
1		Various types of Transmission, feature of an Ideal transmission in Diesel Loco, DC-DC,AC-DC,AC-AC transmission	09
2		Various rotating equipments such as TG, TM, EG, AG, DB Blower, CCEM, ECC, TACHO, Fuel booster motor – Description / Overhauling/Repair/Testing, common problems & remedy	54
3		Excitation systems , Dynamic brake system, Transition system – circuit analysis, defects and remedy	60
4		Microprocessor based controls	36
5		Types of governors, overhauling procedure, testing methods	06
6		Various safety devices and alarm fitted in Loco – working principles	06
7		Testing of Engines – Dry-n-Test, Blow bye test, Random test, Load Box testing, MU operation testing	09
Total			180

SUBJECT NAME	**WORKSHOP THEORY- 01**
SUBJECT CODE	**MWT - 01**
MODULE	**MSE-W,MJR-W**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Organization set up of Railway from Board to workshop.	03
2		Functions of each department in short.	03
3		Layout of workshop with important facilities for each shop functions.	06
4		Role of workshop , diff shops & its functions in brief	12
5		Role of supervisors in workshop & their responsibilities	03
6		Material handling methods & Equipments	06
7		Machinery & Plants Maintenance	12
8		Jigs, Fixture & Gauges	12
9		Quality management system (QMS) & TQM	12
10		ISO & EMS systems in workshop	12
11		Value engineering, types of needs and demands.	03
12		Production planning and scheduling.	06
13		Process inventory control.	06
14		Industrial safety requirement & procedure	06
15		Drawings usage, preparation, Modification & its record maintenance	03
16		Revision	03
		Total	**108**

SUBJECT NAME	**WORKSHOP THEORY- 02**
SUBJECT CODE	**MWT - 02**
MODULE	**MSE-W,MJR-W**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Work measurement techniques, procedures & analytical methods.	03
2		Work sampling methods.	03
3		Work sampling techniques & probability theory.	03
4		Incentive scheme, Rate Fixing, Normalizing & AT fixing.	06
5		Method study Definition, objectives & procedures.	18
6		Job evaluation & merit Rating.	03
7		Job costing.	06
8		Standardization, rationalization, specification etc.	03
9		Inspection & testing procedures DT & NDT methods.	03
10		CMT Lab functions.	06
11		POH procedure of carriages & wagons.	03
12		Corrosion Repair practice in Coaches & wagons.	06
13		Performance Indices.	06
14		Air Brake system & POH procedure & Testing methods.	03
15		Coach Body Repair	06
16		Modifications on coaches for crash worthy concept	06
17		Under gear systems & its POH procedure	03
18		Wheel shop	06
19		NTXR examination on coaches & wagons	09
20		Stores drawl procedure	03
21		Stocking application procedure for new stock item	03
22		Workshop manufacturing suspense	03
23		Work order system & procedure	03
24		On cost booking & methods to reduce on cost	06
25		Condemnation and return to stores	06
26		Machineries, plants & equipment used in workshops.	03
27		Painting schedule and types of paints used in C&W.	03
28		Welding process & welding technology.	06
29		Cost & Economy in welding process.	06
30		Electrical aspects of welding equipments.	06
31		Work shops visit	24
32		Revision	06
		Total	**180**

SUBJECT NAME	**WORKSHOP THEORY- 03**
SUBJECT CODE	**MWT - 03**
MODULE	**MJI-W,MJP-W**

Sl.No	Lesson Code No	Topic	Duration in Hours
1		Organization set up of Railway from Board to workshop.	03
2		Functions of each department in short.	03
3		Layout of workshop with important facilities for each shop functions.	06
4		Role of workshop , diff shops & its functions in brief	12
5		Role of supervisors in workshop & their responsibilities	03
6		Material handling methods & Equipments	06
7		Jigs, Fixture & Gauges	12
8		Quality management system (QMS) & TQM	12
9		ISO & EMS systems in workshop	12
10		Value engineering, types of needs and demands.	03
11		Production planning and scheduling.	06
12		Process inventory control.	06
13		Industrial safety requirement & procedure	06
14		Drawings usage, preparation, Modification & its record maintenance	03
15		Job costing.	06
16		Standardization, rationalization, specification etc.	03
17		Inspection & testing procedures DT & NDT methods.	03
18		CMT Lab functions.	03
19		POH procedure of carriages & wagons.	06
20		Corrosion Repair practice in Coaches & wagons.	06
21		Performance Indices.	03
22		Air Brake system & POH procedure & Testing methods.	03
23		Coach Body Repair	06
24		Modifications on coaches for crash worthy concept	06
25		Under gear systems & its POH procedure	03
26		Wheel shop	06
27		NTXR examination on coaches & wagons	06
28		Stores drawl procedure	03
29		Stocking application procedure for new stock item	03
30		Workshop manufacturing suspense	03
31		Work order system & procedure	03
32		On cost booking & methods to reduce on cost	06
33		Condemnation and return to stores	06
34		Machineries, plants & equipment used in workshops.	03
35		Machinery & Plants Maintenance	09
36		Painting schedule and types of paints used in C&W.	03
37		Work shops visit	18
38		Revision	06
		Total	**216**

SUBJECT NAME	**WORKSHOP TRADE THEORY - 04**
SUBJECT CODE	**MWT - 04**
MODULE	**MSE,MJR,MJI,MJP - W**

Note: To be trained in any one of the following subjects depending on the trade

Carriage Shop:

1. Layout , Organisation structure, Different sections of the shop
2. Salient features and constructional difference of Icoaches, repair practice at all stages of POH of different types of coaching stock. Modification to coaches for high speed running and precaution taken thereto.
3. Lifting of coaches- dismantling of bogies,wheels etc
4. Repair , Overhaul & testing of bogies frame, bogie components
5. Repair , Overhaul & testing of springs, draft gear, buffing gear
6. Repair , Overhaul & testing of Air brake components
7. Repair , Overhaul & Inspection of Wheel & Roller Bearings
8. Repair , Overhaul & testing of water tank
9. Body repairs
10. Carpentry work,
11. Lowering and Levelling of coaches
12. Corrosion repairs
13. Modifications done on coaching stock
14. Provision of safety fittings, provision of amenity fittings.
15. Painting of Coaches
16. NTXR examination
17. Train lighting

Wagon Shop:

1. Layout , Organisation structure, Different sections of the shop
2. POH procedure for different types of wagons like BOXN,BOXC etc
3. POH procedure of tank wagons.
4. POH procedure of Brake Van
5. POH of special wagons
6. Lifting & Lowering
7. Repair , Overhaul & testing of bogies frame, bogie components
8. Repair , Overhaul & testing of Air brake components
9. Repair , Overhaul & testing of springs, draft gear, buffing gear
10. Repair , Overhaul & Inspection of Wheel & Roller Bearings
11. Body Repairs
12. Corrosion Repairs
13. Modifications done on goods stock
14. Painting of Wagons
15. NTXR Examination

Wheel shop :

1. Layout , Organisation structure, Different sections of the shop
2. Design, construction, operation and maintenance of wheels of different types of rolling stock.

3. Repair procedure for Wheels & Axles
4. Repair procedure for Roller bearings
5. Wheel defects and repairs.
6. Machinery & plant required for wheel shop, their operation and maintenance
7. Inspection of wheel ,axles and bearings
8. Disposal of condemned tyres and axles. reclamation procedure in wheel shop.

Machine shop:

1. Layout , Organisation structure, Different sections of the shop
2. Lathes
3. Milling machines
4. Drilling & Boring Machines
5. Shaper ,Planer & Slotting machines
6. Grinding machines
7. Special types of machines
8. Tools & Cutters, tool diagrams
9. Limits,fits & tolerances, allowance & interchangeability, Jigs & fixtures,
10. Surface finish, various types of gauges and their use.
11. Cutting fluid their use in various machine.
12. Cutting speed, feed, depth of cut,
13. Manufacturing process of some major components for Rolling stock.

Mill Wright shop:

1. Layout , Organisation structure, Different sections of the shop
2. Transmission of Power-Belt, Chain, gear drive, clutches and couplings, Hydraulic system.
3. Design, construction and maintenance of EOT cranes and traverser and its subassemblies.
4. Design, construction and maintenance of Rail and Road cranes breakdown cranes furnaces
5. Design, construction and maintenance of various machine tools
6. Installation of machinery and plant (Foundation Engineering)
7. Design, construction and maintenance of hydraulic pressure, steam and pneumatic hammer, drop forging hammer, bolt and nut forging machine, wheel lathe, under pit lathe, Weigh bridges and weighing machine.
8. Design, construction and maintenance of compressor and Distribution of compressed air.
9. Design, construction and maintenance of Hydraulic pumps
10. Knowledge of hydraulic and pneumatic circuits.
11. Knowledge of logic circuits use in CNC machines.
12. Plant preventive maintenance
13. Overhaul and reconditioning of various types of plants and equipments.

Welding shop:

1. Layout , Organisation structure, Different sections of the shop
2. Welding - Principle and applications in various fabrication work, types of welding
3. process, weldability of material and welding metallurgy.
4. Arc welding process and principle. tools required for these welding current, voltage, Maintenance of welding machine.
5. Gas welding and the tools required its application and limitation. Flame cutting.
6. Electrodes - Electrode selection for difference welding work. Welding classification,
7. American standard, Indian Standard, IRS specification.
8. Special Welding Techniques : CO_2 welding. Method, precautions etc.
9. C.I. welding, MIG & TIG welding work. seam welding, sub merged arc welding flash butt welding.
10. Welding of important components, Corrosion Repairs, modifications
11. Precaution taken during welding, welding defects, reason and remedy.

Heat Treatment shop :

1. Layout , Organisation structure, Different sections of the shop
2. Various classes of steel, their composition, properties and uses in the Railways. Microscopic examination of specimen.
3. Iron carbon equilibrium diagram,
4. Physical test of materials, specification of ferrous and non-ferrous metals, effect of adding various elements like C, Si, Mn etc.
5. Maintenance & operation of furnace, burner, temperature control equipment's, Furnace oil distribution system. properties of quenching, oil, temperature measuring, recording and controlling devices.
6. Hardening, tempering, carbonising, Case hardening, flame hardening, surface hardening etc.
7. Annealing, stress relieving, normalising,
8. Heat treatment process laid down for important component
9. Heat treatment of tools

Foundry and Pattern shop :

1. Layout , Organisation structure, Different sections of the shop
2. Ferrous and non-ferrous metals, types, composition, Mech. properties, uses in railways, process of manufactures/extraction.
3. Casting - Centrifugal casting, chill casting, vertical casting, Die casting.
4. Foundry sand - Preparation, method of testing uses and various ingredients in sand.
5. Furnace - Cupola, construction, method of charging, capacity etc. Skelner, Reverboratory, pit fired, electric furnace, special purpose machine used in foundry.
6. Refractory - acid, Basic, neutral and their used in different furnaces.
7. Moulds - Types of moulds and their functions and utilities, design of mould and their problem, core and core making.
8. Detail study of manufacturing process of various important casting like cylinder, super heater header, axle box, saddles etc.
9. Pattern making : Types of ward used and use of various tools, allowance, special attention during pattern making process.

Smithy shop :

1. Layout , Organisation structure, Different sections of the shop
2. Various classes of steel, their composition, properties and uses in the Railways. grain structure
3. Iron Carbon diagram.
4. Furnaces used in the Smithy work.
5. Refractories - acid, basic and neutral their uses in different furnaces - correct combustion of fuel oil in oil fined furnace coal fired furnace, method of conserving furnace oil.
6. Operational principle of pyrometer thermocouple and their use in furnace temp. measurement.
7. Forging principle, tools used such as anvil, gauging tools, templates tongs, fullers, swages, Drifts, punches, Dies, Leg vice etc.
8. Forgeable quality of ferrous and non-ferrous forging methods.
9. Estimation of materials and use of reference table, preparation of operation table.
10. Forging defects and their precaution.
11. Drop stamping - Principle and operation, use of die-block, utilisation of various machines in Smithy shop
12. Selection of smithy shop machine as per job.
13. Spring - different types of spring and their manufacturing procedures, testing of different springs such as laminated, helical and coil spring.
14. Heat treatment of forged material - Quenching oil their property load testing of link, chains crag hook etc.

INDEX - GUIDE LINES FOR PRACTICAL TRAINING

GENERAL

1. General directions for field training

- The trainees will report to CI/BTC and meet Principal/BTC on first day in workshops and PU. In other units they have to meet the nominated Training In - charge.
- Nominated Instructor of BTC or supervisor should take around the premises on first day and will explain important areas of each sub unit.
- The detailed schedule of training will be given to the trainee with an awareness of organization, activities, products and technologies of the unit.
- Diaries should be meticulously maintained daily, based on observations made, and periodically systematized in form of summaries/ gist in organized manner. This will greatly assist in retention of knowledge gained, apart from being a mandatory requirement of training.

2. Broad guide lines for field training

During each field training the trainees are required to proceed from broad aspects to minor details as given below:

- Organization, Out turn, Layout, Flow of units and materials.
- Broad stages and processes of production /processes
- Detail of each stage and process.
- Important parameters of each process which affects quality.
- Critical look at "Actual practices" vis-a vis "Recommended" practices (Manual).
- Cycle time stage wise.
- Sketches and drawing in own hand for better understanding of assembly, component and processes.

3. The unit wise guidelines given below can be modified by unit in which training is imparted , to allow inclusion of other important areas considered relevant and exclusion of areas that may be redundant

I. TRAINING GUIDE LINES FOR ICF

1. DESIGNS

a) Study of various aspects of Railway passenger coach designs- conventional and special stock- salient features of 'integral' design.
b) Design of metro coaches.
c) Study of design aspects of air brakes in EMU etc.

2.SHEET METAL SHOP

a) Study of 1000 T and 800 T Hyd. Presses with special emphasis on CNC and Plasma turret press.
b) Shearing machine with special emphasis on CNC shearing centre.
c) Butt seam welding machines.
d) Spot welding machines.
e) Profile bending machines.
f) Notching machines.
g) Submerged arc welding machines.
   i. Side wall assembly.
   ii. End wall assembly.
   iii. Hot phosphating and cold phosphating procedures.

3. Study of following
   1. Roof assembly Jig.
   2. Underframe assembly jig.
   3. Body shell assembly jig and Universal jig for body.
   4. Bogie testing machines.

   Roof assembly and welding sequence.
   Under frame assembly and welding sequence.
   Camber setting.
   Assembly of under frame, side wall, end wall and roof in jig stage and welding sequence.
   Bogie frame Assy. and welding seq.
   Bogie frame straightening.
   Roller Bearing assembly.
   Bogie assy. & air spring.
   Bogie testing and final inspection.
   Stainless steel welding of trough floor.

4. Study of following:
   1. Grit blasting paint
   2. Airless spray painting equipment.

   Surface preparation and grit blasting
   Sequence of painting operations
   Wheeling of coaches
   Final assy. and Air Brake test.

5. SPRING MANUFACTURING

1. Bar peeling machines.
2. Bar straightening machines.
3. Spring coiling machines.
   Spring manufacture (various sequences)
   Spring testing
   Heat treatment of springs.

6. NEW BOGIE SHOP

1. Argon shield gas welding technique.
2. Photo mat gas cutting machines.
3. CO2 welding plants
4. CO2 welding techniques in comparison with other welding methods.
5. Argon shield gas techniques & advantages.

7. COMPONENT SHOP

1. Cam and Camless auto lathe.
2. Bekoma boring M/C.
   Copy turning lathes.

8. MILLWRIGHT

1. Gear hobbing machines.
2. Gear shaping machines.
3. E.O.T Cranes.
   Preventive maintenance and lubricating procedures.
   Procedure for procurement of plant and machinery.
   Procedure for condemnation and replacement.

9. TOOL ROOM

1. Jig boring machine
2. Die sinking machines
   Maintenance of 1000T and 800T press tools.
   Maintenance of pneumatic tools.
   Tool grinding and small tool maintenance.
   Manufacture of press tools, jigs and fixtures.
   Periodic maintenance of jigs and fixtures.

10. INSPECTION

Study of various standard inspection procedures

1. Details stage.
2. Sub assy. stage.

3. Major assy. stage.
4. Installation stage.
5. Final Inspection.
6. Issue of rolling stock certificate.

11. FURNISHING

Study of stage wise assembly of interior furnishing.
Preparation of laying of variculate, decolite mixing and coach flooring, roofing and roof wiring.
Interior paneling for sides and roof.
Plumbing and lavatory fittings.
Interior wiring, fitting of seats and berths, assembly of vestibule arrangements, fitting of windows etc.

Study of
a) Wood working techniques
b) Seasoning of timber.
c) Impregnation treatment.
d) Various paneling materials.
e) Manufacture of items with F.R.P

12. Study of
a) Window assy.
b) Vestibule assy.
c) Manufacture of aluminum water tank.

13. General study of trimming process.

14. Study of Air Brake arrangement for EMU, Metro & Rajdhani coaches.

15. Study of Electroplating and Anodizing process.

16. Planning Department
Study of
a) Work order system.
b) Planning for production
c) Preparation of design and drawings for new builds.
d) Process planning.
e) Maintenance of computer master files.
f) Release of production documents.
h) Accountal of shop manufactured items.

17. Production Control Department
Study of functioning of
a) Centralized P.C.D
b) Shop P.C.D

18. Data center : study of application of computer in production planning, Inventory control, preparation of wage bills, continuous monitoring of Production and stores position.

19. Material testing Department
    a) Non destructive and destructive testing of weld specimens.
    b) Gamma rays, Magnaflux, X-ray, Ultrasonic testing procedures and applications.
    c) Testing of Paints, Rubber items, Steel and Lubricants.
    d) Testing of timber, paneling and other furnishing materials.
    e) Testing of Electro Plates items.

II .GUIDELINES FOR RCF / KAPURTHALA

While visiting RCF/ Kapurthala , following items may be specifically looked into:

2) The production flow- Plant lay out, various stages of manufacturing of the coaches
3) Important Manufacturing techniques and machinery & plant
   a) Production machines/ Shops,
      Under water plasma cutting machines,
      Cold roll forming and cut to length machines,
      Laser FMC (Flexible Machine Centre),
      Plasma punch press,
      CNC pipe bending machine,
      Roll bending & 1000 ton press,
      3-D measuring machine
      Automated painting system for shell painting
   b) Material handling equipments:
      CNC Auto- stacker system
      Remote control- Overhead cranes
      Rail-Cum Road Vehicle,
      Rollbaw- Vacuum shop cleaning with scrubbers
      Palletisations
      Traversor for changing the line.
   b) Important jigs like Shell assembly, Side wall and roof

4) GAIT – A centralized computer centre having a mainframe & large no. of terminals.
   The software packages under use like Plant maintenance, Personnel STORM- Stores / Material management, Medical and finance management.
   Design Office, CAD/CAM work centers and other facilities.
   Important soft wares,
   Use of FEM analysis for developing new designs
5) Special features Shed design and construction
   - Double roofing with aluminum sheets.
   - Lightning systems
   - Ventilation and heating system

6) Certification of ISO 9001 in bogie shop
7) Energy conservation
   - Street lighting with timers
   - Solar water heaters
8) Visit to staff canteen & training school
9) Design, Fabrication & Furnishing of LHB Coaches
10) Design and Fabrication of FIAT bogies
11) Non- AC variants of LHB coaches
12) Adoption of LHB features on ICF design coaches

III.GUIDE LINES FOR RWF, BANGALORE

1. AXLE SHOP
   a) Features of pressure pouring
   b) Casting
   c) Quality control

2. WHEEL SHOP
   a) Features of pressure pouring
   b) Casting
   c) Quality control
   d) Environmental aspects and impact

3. CMT
   Destructive and Non Destructive testing methods of Wheels and axles.

4. AQUANTANCE OF ISO 9000, ISO 14000

IV. GUIDELINES FOR DLW TRAINING

- Organization and functioning of DLW.
- Study and Understand flowchart of engine assembly.
- System of work order, Rolling stock program and latest product mix for manufacturing of various types of locomotives.
- Welder qualification at TTS, DLW.
- Procedure for bulk import indent of diesel spares.
- Special features of new locomotives viz. WDP2, WDG2 and WDG4 locomotives.
- Study of various processes of manufacturing through following shops.

Light Machine Shop.

a) Important out turn/activity: Cylinder head, Cam shaft, Connecting rod, Gears, Statistical quality control of the processes involved.
b) Important machines: Cylinder head boring machine, Gear hobbing machine, Gear shaving machine, cam milling machine, cam grinding machine etc.

Heavy Weld Shop:

a) Important procedure: Submerged arc welding (Internal & External), 8 torch CNC flame cutting machine.
b) Important out turn: Cylinder block, Main base of engine, Turbo support.

Heavy Machine Shop:

a) Important out turn: Cylinder block, Main base of engine, Turbo support.
b) Important machine: Horizontal line boring machine (For crank shaft and cam shaft boring in cylinder block) , Special purpose Angular Boring machine(For middle and top deck boring), Serration milling machine, CNC End drill.

CNC & Rotor Shop

a) Important machine: CNC Chucker and Bar feeder, Horizontal machining centre.
b) Important Outturn: Fuel pump support, main casing turbo super charger, Intermediate casing BG turbo supercharger.

Sub Assembly Shop

a) Activity: Assembly of cylinder head, Water pump, Fuel oil pump, OSTA etc.

Chrome plating shop

a) Outturn: Chrome plated cylinder liners
b) Important Machine / Procedure: Plating bath, Etching baths, Honing machine, surface finish RMS measuring equipment,

Engine Erection shop: Engine Assembly

Engine Test Shop: Load Box Test

Loco Frame Shop:

Important activity: Under frame Fabrication
Important Machines: Fabrication jigs, Shearing, Bending and flame Cutting machines.

Traction assembly:

Assembly of traction motors: Control panel and control stand of locomotives

Loco Assembly Shop: Assembly of the locomotive

Loco Testing Shop:

Power pack with Traction Generator and control equipment testing, Pneumatic testing

Pre Departure Inspection:

- Understanding of various Inspection Checklist
- Vendor development system
- Marketing wing of DLW- Organization , Working etc, DG sets

V. GUIDELINES FOR TRAINING AT DMW, PATIALA

- Organization & Layout
- Out turn of DMW on the whole and of important shops like T.M shop, Cylinder plating shop, Carbon brush shop etc
- Rewinding of T.M armatures
- Reconditioning of Engine blocks
- Chrome plating of cylinder liners
- Procedure and steps of rebuilding
- Important assemblies and components replaced during rebuilding
- Important modifications during rebuilding (with special emphasis on fuel efficient kit)
- System of warranty of locomotive and components
- Important diesel components manufactured for all Indian Railways and procedure of manufacturing
- Carbon brush manufacturing:- Important characteristics of Carbon brush material.
- Electronics Lab: Maintenance of CNC machines
- Rail cum Road vehicle
- Hands on practice on CNC trainer machines

VI. GUIDE LINES FOR DIESEL SHED TRAINING

- Organization chart
- Shed layout
- Power plan, Outage and other Shed performance characteristics.
- Study schedule forms for minor and medium schedules (Mech. & Elec.)
- Study the history cards of locomotives and method or forecasting and planning their schedules.
- Yearly schedule- Details of activities, their PERT chart and execution.
- Attend one shift each with Shift in Charge (M), Shift in Charge (E) and observe their working.
- Observe load box test of Loco after major schedule and study the records. Plot control chart for some important characteristics.
- Study and observe the complete failure investigation of a Locomotive.
- Study the availability of staff, Infrastructure and M&P items in the shed and their adequacy.
- Study the system of receipt & issue of fuel oil and the details of various monthly statements sent to HQ
- Study the calculation of S.F.C (Loco wise and service wise) and shed consumption.
- Study schedule forms for various minor & medium schedules (Mech. & Elec.)
- Attend various maintenance section (Mech. & Elec.)- Study M.I s for the section and observe details of various checks and measurements.
- Study the system of Drawal of items from stores and their accountal.
- Study the system of procurement of various items (Imprest, Stock & Nonstock)
- Foot plate a Locomotive out from shed and observe the working of crew.
- Facilities- infrastructure, staff, training and M&P items- available & required
- Technical Cell – History cards. Failure investigation, Schedule planning, Performance indices, Technical instructions.
- Spares Cell – Systems of procurement of (a) imprest items, (b) Stock items & (c) Non stock items, System of drawal of items from Stores and their accountal.
- Fuel and statistical cell – System of receipt and issue of fuel oil, Calculation of S.F.C (Loco wise & Service wise) and Shed consumption, details of monthly statements.

VII . GUIDELINES FOR DIESEL POH WORKSHOP TRAINING

- Organization lay out of the shop and outturn.
- Facilities required of M&P etc.
- Unit spares requirement criteria and actual available.
- Various maintenance sections (Mech. & Elec.)- Study M.I.s for the section and observe details of various checks and measurements.
- Analyze critically at least three assembly overhauling (actual vs. ideal as given in manual) and prepare report after discussion with officer in charge of the section.
- Study various N.D.T methods in use and other lab activities like UST of axles.
- Observe load box test and study the records.
- Study the system of customer service (feedback failure of locomotive within one year of POH).
- Accompany a loco on field trial after POH.

VIII . GUIDELINE FOR CARRIAGE POH SHOP

1. Probationers have to go through Carriage manual and prepare correct procedure, layout, Flow of material vis-à-vis actual practices of the sheds. Reason for deviation and constraints
2. Wheel Shop: Process of wheel assembly, Disassembly, wheel press and other equipments
3. Roller Bearing section: Process of dismounting, Cleaning, Inspection, Rejection and Mounting.
4. Bogie Section: Trammeling of Bogie dashpot and rectification.
5. Air and Vacuum Brake Section: Specifically D.V overhaul, system of checking of alarm chain pull and brake rigging pay in and pay out of SAB.
6. Coach Body Repair Section: Corrosion prone areas and its repair, Over head tank overhauling, Roof testing, Cleaning and paint schedule of coach.
7. Important modifications: Use of compreg for coach flooring, FRP Windows etc.
8. MISC.: Heat treatment of hook, Draw bar, Springs, Screw couplings etc. NTXR passing, UIC vestibule.

IX . GUIDE LINE FOR WAGON POH

GENERAL

1. Preparation of Inspection Sheets.
2. Study of Incentive scheme with special emphasis on manpower planning in relation to revised allowed time of various operations.
3. Study of ISO-9000 areas like CTRB, SAB Brake Regulator & Air brake maintenance.
4. Method of receiving wagons for POH inside workshop.

WAGON

1. Types of wagons, a particular workshop handling.
2. Target of workshop.
3. Man hours required-Type wise.
4. POH cycle & wheel flow cycle.
5. Infrastructure available.
6. Safety involved with cleaning of tank wagons. Testing & adjustment of discharge valve and security fitting of safety valve.
7. Bogie repair
   - UIC
   - CASNUB
8. Air Brake equipment's overhauling with emphasis on Distributor valve and SAB Brake Regulator.
9. Overhauling of vacuum cylinder and draft gear.
10. Unit exchange practice.
11. Reprofiling of wheels and reaxling/rediscing of wheel sets.
12. Paint schedules.
13. Ultrasonic testing of Axle and testing of springs.
14. Neutral examination.

REPORT

1. Make a report showing the actual POH cycle of any air braked wagon POH ed at the workshop during your visit.
2. Make a report describing in detail on Reaxling/Rediscing of wheel sets in the workshop you visited.
3. Prepare a duplicate inspection sheet of any wagon and make network for POH cycle.

DO IT YOURSELF

1. Assemble traction unit on the adjuster tube of a SAB brake regulator.
2. Assemble cut off valve sub assembly of C3W type distributor valve.

Involve yourself in preparing inspection sheet.

X. GUIDELINE ON COACHING DEPOT/DIVISION WORKING

a) Understand

i) Organization structure of Mechanical department of the division
ii) Spread of division indicating C&W Loco facility & important features of the particular division.
iii) Contents of Sr. DME's stock position
iv) Analysis of loss of punctuality of Mail and Express trains.
v) Pit occupation chart
vi) Layout of coaching maintenance yard.
vii) Layout of sick line.
viii) Procedure for sending coaches for POH.
ix) Examination of date and sick marking of coaches.
x) Maintenance of Distributor valve.
xi) Maintenance of SAB Brake regulator.
xii) Maintenance of Brake gear.
xiii) Testing of air brake system.
xiv) Testing of vacuum brake system.
xv) Distribution of staff in sick line.
xvi) Function of batch in maintenance yard.
xvii) Replacement of primary spring.
xviii) Replacement of secondary spring.
xix) Foot plate inspection.
xx) Plants & equipment in maintenance yard and sick line.
xxi) Schedule maintenance of coaches.
xxii) Cleaning agents used in washing line.
xxiii) Provision in ART.
xxiv) Analysis of en route detachments.
xxv) Derailment enquiry.
xxvi) Corrosion prone areas of coaches.
xxvii) Marshalling in a rake for mixed 110V and 24V coaches.
xxviii) Rake links.
xxix) Study the system for maintenance of coach history cards and forecast of maintenance schedules to be done.

Do Yourself.

1. Replace MU washer, Connect & disconnect BP air hose.
2. Replace brake block particularly.....
3. Set "A" dimension, isolate DV.
4. Carryout Rolling in inspection of a passenger train followed by a detailed inspection of the rake at the washing lines. Attach a detailed report of your observations covering the coach interior furnishing, bath rooms and lavatories, lights and fans on the superstructure and wheels, roller bearings, springs, brake gear and draw and buffing gear on the under gear (attach report).
5. Examine a passenger train rake on vacuum; exhauster before issue of BPC. Note the vacuum cylinder found sticky or O/Due or defective and the taken to bring the brake power up to 100% covering the following, date, location, rake

no. train no. rake link, no. of cylinder overdue, no. of cylinder defective, repairs done, brake power.

6. Associate and supervise complete washing and cleaning of a rake, both internally and externally. Internally at the washing lines including bathrooms. Determine and personally check, efficiency of on-train; safaiwallah operation.
7. Associate and supervise complete pit line examination of a passenger rake along with the maintenance staff. Do you feel that the time, space, light, hand tools and other facilities are adequate to ensure safety land passenger amenities? Do you feel the work is going on all the time when a rake is on the pit cum washing lines? Determine whether maintenance of any rake is done on a non-pit line such as platform line or yard line. Can it be avoided?
8. Study the rake links for passenger trains originating on your railway and work out the average kilometer earning for each link taking into account the spare stock. Suggest revised rake links to improve the utilization without affecting maintenance.
9. Study the system of booking a due POH coach to be assigned workshop. Workout average time the coach actually remains ineffective on this account, the break up of effective time and your views regarding reducing the same. What precautions are being taken to avoid thefts during transit and whether any cannibalization is taking place and if so why? Determine extent of overdue POH running. Can it be avoided? (Attach sheets).
10. What is the allotment of spare stock your division? What system exists for you to ensure that stock belonging to your division and to your railway is with you and that the other divisions/ railways coaches are returned back to them? Are there any cases of under load running on your division due to non returning of coaches. What percentages of coaches in use on the division are over aged? Can their use be avoided?
11. Go through carefully the list of vital and safety spares required or coaching maintenance, their sources of supply and your system to ensure adequate stock. Carry out a similar exercise for passenger amenity fittings. Does the sanctioned imprest ally with the budgetary provision for maintenance?
12. Accompany (with permission) your Sr.DME during a routine inspection of coaching sick line or washing line.
13. Study the daily ineffective position of coaching stock and attach a report with your suggestions for bringing this down.

Prepare report

i) Summarize loss of punctuality of mail & express train for the last 6 months. Suggest methods to reduce loss of punctuality.
ii) Prepare report or overdue POH coaches of or coaching depot. Suggest methods to reduce overdue coaches in train's services.
iii) Prepare sick making of coaches for the last 6 months. Make Parches Paretos analysis and suggest methods to reduce coach ineffectiveness.
iv) Prepare report of sick making of coaches within 100 days of POH. Suggest to improve such incidents.

v) Prepare report on major plants and equipments of the coaching depot and highlight maintenance practice adopted and suggest any improvement on present method of maintenance practice.

vi) Prepare report on critical items of the coaching depot. Suggest methods to improve problem of "Stock out".

vii) Prepare a chart for the occupation of washing and pit lines.

viii) Attach a complete report of activities undertaken in your coaching sick line under different headings

ix) Write a failure report and your own analysis for two coaching stock failures resulting in detention and/ or detachments en route. (attach sheets).

XI. GUIDELINES OF ROH DEPOT

1. Observe lifting of body.
2. Observe stripping of bogie component.
3. Observe checking of frame alignment.
4. Observe repair of bogie and its reassembly.
5. Observe maintenance of distributor valve.
6. Observe maintenance of SAB brake regulator.
7. Observe air brake testing using SWTR.
8. Study interception of BOXN wagon for ROH
9. Study interaction with neutral control office.
10. Observe replacement of draft gear.
11. Observe replacement of CTRB.
12. Observe in-situ injection of CTRB.
13. Observe manual adjustment of brake rigging.
14. Study corrosion repair.

DO IT YOURSELF

i) Replace MV user.
ii) Isolate DV.
iii) Perform Take up/Pay out test.
iv) Connect Air Hose Pipe.

XII. GUIDELINES FOR TRAINING IN GOODS YARD

1. Examine one originating, one terminating and one by-pass goods train in each of the three shifts, from the stage of receipt of a train examination memo from the yard master till the issue of BPC or release memo. Write your observations about time taken ,defects noticed, inadequacy of tools, light, C&W duplicates and observations due to unclean yards with date, yard, shift, name of TXR, train no., event times etc.(attach sheets).
2. Perform a complete exhauster check on a train load in yard provided with vacuum exhauster. Note the sticky or defective cylinders, over due POH cylinders, leaky cylinders, repairs attended at site and the percentage of operative cylinders (Attach sheets).
3. Observe the functioning of NTXR flying squad if provided on your division and follow up the report of NTXR for its implementation.
4. Del with a clearance of ODC consignment fully and write a two page report. How it is important for a heavy consignment to be carefully loaded and why? How should shifting of a heavy consignment during run be prevented? (Attach sheets).
5. What are the pros and cons for a train examination being conducted on an originating train or a terminating train? What system is being followed on your division? How is it related to the yard operations?
6. Observe marshalling of two train loads on a hump yard, one from the hump cabin and one along with the staff. Write a report on the facilities provided, facilities used, humping speeds and impact speeds of the wagons, can you quantify the damages to the wagon stock on account of uncontrolled or rough shunting? Examine a load formed after hump marshalling and ready to leave and indicate the percentages of screw coupling on four wheeler stock not adequately tightened. What are the average figures of POH booking from your yards and how the figure is to be kept in check? Make a critical study over a 15 day period to access the wagons awaiting heavy repairs on your division to indicate whether it is showing an increasing trend. Do you consider the existing repair facilities on your division adequate for the load arising. Are there an original foundations in your work load arising (attach sheet).
7. Critically study detachments en route due to wagon defects. Analyze them cause-wise and write a report to suggest remedial action. Are there some seasonal variations?
8. What is the procedure adopted to clear way side detached wagons? What is the average detention at way side stations? What is the incidence of repeated detachment of such wagons? (Attach sheets).
9. Study the ineffective wagons lying on your division and categorize them according to the no. of days they have been lying ineffective. Propose a plan action to deal with the problem in two page report with facts and figures (Attach sheets).
10. What are the rules regarding booking of heavy repair NPOH wagons to shops? Examine the repair facilities provided on your division to deal with such heavy repairs arising if this work load is considered important.
11. Spend a full day at a major siding say FCI or an OIL siding or a trippler siding. Examine the records of placement and removal of loads, loading/unloading facilities, system of handing over and taking over for working out the damages and efficiencies and any other point of managerial interest (Attach sheets).

12. Study LPG loading/unloading facilities, if any provided on your division including the safety aspects.
13. Study the special precautions for loading/unloading or passing of POL rakes through your division including a personal examination of all the fittings of a petrol tank wagon on the diaphragm and the bottom discharge point. Examine the calibration, dipstick measurements and commercial aspects of POL traffic. Mention important observations (Attach sheets).
14. Inspect the complete provision in ARTs of different classes and ARMEs on your division and the complete system on pressing them into service incase of accidents. Study the monetary incentives to the break-down staff. Are these adequate, inadequate or contra productive?
15. Accompany a break-down special from beginning to end to attend (a) a yard derailment, (b) a mid section derailment and write your individual report for inadequacies observed, avoidable delays encountered, unsafe practices noticed and your suggestions for remedial action (Attach sheets).
16. Examine critically and attach your complete report in case of failure of (i) plain bearing axle box, (ii) roller bearing axle box, (iii) screw couplings etc (attach sheets).
17. Attend a case of train parting at site if possible or follow up a train parting enquiry case fully from first information to imposition of penalty to the staff held responsible.
18. Over a seven day period analyze the cases of sick marking cause-wise location-wise, type-wise and component-wise. Analyze also whether generation of sick marking for time based repair/replacement etc. is commensurate with your total wagon dealing (attach sheets).
19. Study in detail the material control system including the sanctioned imprested, their recoupment generation of timely alarms etc. Write your assessment of equipment of 50 most vital items and the system for ensuring continuous supply (attach sheets).
20. Study critically the following services available in your sick line and write descriptive brief with your suggestions for improvements (a) hand tools, (b) pneumatic tools, (c) compressed air supply, (d) welding plants, (e) industrial gases, (f) material handling equipments (attach sheets).

XIII.Training in drawing office

1. Familiarization with the drawing making procedure
2. Filing / storing of drawings, knowledge of various specifications, STRs / TSO etc.
3. Works programme/RSP/M&P section

XIV.Training in CMT laboratories

1. Familiarization with the various types of non-destructive and destructive testing, testing of paints, Acids, Polymers and rubbers with their specifications.
2. Testing of failed Rolling Stock components and their reporting. Statistical quality control.

XV.Training in stores organization

1. Receipt, dispatch and issue of Stores.
2. Storage of stock items, issue, method of accountable, ground and card balance, regularization of short supply.
3. Inventory control practice based on ABC analysis,
4.Storage procedure of Acid, Paints, Lubricants, oil, Rubber etc.
4.Processing of N.S items
5.Different sections like tally Board/Ledger, Progress, Tender etc

Annexure – III

EXAMINATION

SENIOR SECTION ENGINEER(MSE-C, MSE-D, MSE-W)

		C & W				DIESEL				WORKSHOP			
Session	Type	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total
I	Theory	I	MRT-01	75	100	I	MRT-01	75	100	I	MRT-01	75	100
			MRT-06	25			MRT-06	25			MRT-06	25	
		II	MRT-02	25	100	II	MRT-02	25	100	II	MRT-02	25	100
			MRT-03	25			MRT-03	25			MRT-03	25	
			MRT-04	25			MRT-04	25			MRT-04	25	
			MRT-05	25			MRT-05	25			MRT-05	25	
	Pract	III		50	50	III		50	50	III		50	50
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
II	Theory	I	MRT-07	35	100	I	MRT-07	35	100	I	MRT-07	35	100
			MRT-08	35			MRT-08	35			MRT-08	35	
			MRT-09	30			MRT-09	30			MRT-09	30	
		II	MCT-01	100	100	II	MDT-01	100	100	II	MWT-01	100	100
	Pract	III		50	50	III		50	50	III		50	50
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
III	Theory	I	MCT-02/ I	100	100	I	MDT-02/I	100	100	I	MWT-02	100	100
		II	MCT-02/II	50	50	II	MDT-02/II	50	50	II	MWT-04	50	50
		III	MRT-11	50	50	III	MRT-11	50	50	III	MRT-11	50	50
	Pract	IV		50	50	IV		50	50	IV		50	50
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
IV	Theory	I	MRT-12	100	100	I	MRT-12	100	100	I	MRT-12	100	100
	Pract	II		50	50	II		50	50	II		50	50
	Posting	III		100	100	III		100	100	III		100	100
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
	GRAND TOTAL				**1000**	GRAND TOTAL			**1000**	GRAND TOTAL			**1000**

Marks* : Showing the approximate weightage of subject topic in the examination paper.

JUNIOR ENGINEER (RRB)(MJR-C, MJR-D, MJR-W)

		C & W				DIESEL				WORKSHOP			
Session	Type	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total
I	Theory	I	MRT-01	75	100	I	MRT-01	75	100	I	MRT-01	75	100
			MRT-06	25			MRT-06	25			MRT-06	25	
		II	MRT-02	25	100	II	MRT-02	25	100	II	MRT-02	25	100
			MRT-03	25			MRT-03	25			MRT-03	25	
			MRT-04	25			MRT-04	25			MRT-04	25	
			MRT-05	25			MRT-05	25			MRT-05	25	
	Pract	III		50	50	III		50	50	III		50	50
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
II	Theory	I	MRT-07	25	100	I	MRT-07	25	100	I	MRT-07	25	100
			MRT-08	25			MRT-08	25			MRT-08	25	
			MRT-09	25			MRT-09	25			MRT-09	25	
			MRT-10	25			MRT-10	25			MRT-10	25	
		II	MCT-01	100	100	II	MDT-01	100	100	II	MWT-01	100	100
	Pract	III		50	50	III		50	50	III		50	50
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
III	Theory	I	MCT-02/I	100	100	I	MDT-02/I	100	100	I	MWT-02	100	100
		II	MCT-02/II	50	50	II	MDT-02/II	50	50	II	MWT-04	50	50
		III	MRT-11	50	50	III	MRT-11	50	50	III	MRT-11	50	50
	Pract	IV		50	50	IV		50	50	IV		50	50
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
IV	Pract	I		150	150	I		150	150	I		150	150
	Posting	II		100	100	II		100	100	II		100	100
	TOTAL				**250**	TOTAL			**250**	TOTAL			**250**
	GRAND TOTAL				**1000**	GRAND TOTAL			**1000**	GRAND TOTAL			**1000**

Marks* : Showing the approximate weightage of subject topic in the examination paper.

JUNIOR ENGINEER (INTERMEDIATE)(MJI-C, MJI-D, MJI-W)

		C & W				DIESEL				WORKSHOP			
Session	Type	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total	Paper	Subjects	Marks*	Total
I	Theory	I	MRT-01	75	100	I	MRT-01	75	100	I	MRT-01	75	100
			MRT-02	25			MRT-02	25			MRT-02	25	
		II	MET-01	100	100	II	MET-01	100	100	II	MET-01	100	100
		III	MET-02	100	100	III	MET-02	100	100	III	MET-02	100	100
		IV	MET-03	100	100	IV	MET-03	100	100	IV	MET-03	100	100
		V	MET-04	100	100	V	MET-04	100	100	V	MET-04	100	100
		VI	MET-05	100	100	VI	MET-05	100	100	VI	MET-05	100	100
	TOTAL				**600**	TOTAL			**600**	TOTAL			**600**
II	Theory	I	MET-06	100	100	I	MET-06	100	100	I	MET-06	100	100
		II	MET-07	100	100	II	MET-07	100	100	II	MET-07	100	100
		III	MET-08	100	100	III	MET-08	100	100	III	MET-08	100	100
		IV	MET-09	100	100	IV	MET-09	100	100	IV	MET-09	100	100
		V	MET-10	100	100	V	MET-10	100	100	V	MET-10	100	100
		VI	MRT-13	100	100	VI	MRT-13	100	100	VI	MRT-13	100	100
	TOTAL				**600**	TOTAL			**600**	TOTAL			**600**
III	Theory	I	MRT-06 07,08 ,09	25 EACH	100	I	MRT-06 07,08 ,09	25 EACH	100	I	MRT-06 07,08 ,09	25 EACH	100
		II	MET-11	50	50	II	MET-11	50	50	II	MET-11	50	50
		III	MRT-14	50	50	III	MRT-14	50	50	III	MRT-14	50	50
		IV	MCT-03	100	100	IV	MDT-01	100	100	IV	MWT-03/I	100	100
		-	-	-	-	-	-	-	-	V	MWT-03/II	100	100
	TOTAL				**300**	TOTAL			**300**	TOTAL			**400**
IV	Theory	I	MCT-04/I	100	100	I	MDT-03 M/E	100	100	-	-	-	-
		II	MCT-04/II	100	100	II	MDT-04 M/E	100	100	I	MWT-04	100	100
	Pract	III		50	50	III		50	50	II		50	50
	Posting	IV		50	50	III		50	50	III		50	50
	TOTAL				**300**	TOTAL			**300**	TOTAL			**200**
	GRAND TOTAL				**1800**	GRAND TOTAL			**1800**	GRAND TOTAL			**1800**

Marks* : Showing the approximate weightage of subject topic in the examination paper.

JUNIOR ENGINEER(PROMOTIONAL)(MJP-C, MJP-D, MJP-W)

		C & W				DIESEL				WORKSHOP			
Session	Type	Paper	Subjects	Marks *	Total	Paper	Subjects	Marks *	Total	Paper	Subjects	Marks *	Total
I	Theory	I	MRT-01	60	100	I	MRT-01	60	100	I	MRT-01	60	100
			MRT-02	20			MRT-02	20			MRT-02	20	
			MRT-06	20			MRT-06	20			MRT-06	20	
		II	MRT-07	20	100	II	MRT-07	20	100	II	MRT-07	20	100
			MRT-08	20			MRT-08	20			MRT-08	20	
			MRT-09	20			MRT-09	20			MRT-09	20	
			MRT-14	20			MRT-14	20			MRT-14	20	
			MRT-15	20			MRT-15	20			MRT-15	20	
		III	MET-12	30	100	III	MET-12	30	100	III	MET-12	30	100
			MET-13	30			MET-13	30			MET-13	30	
			MET-14	40			MET-14	40			MET-14	40	
	TOTAL				**300**	TOTAL			**300**	TOTAL			**300**
II	Theory	I	MCT-05/I	50	50	I	MDT-05	50	50	I	MWT-03	50	50
		II	MCT-05/II	50	50	II	MDT-06 M/E	50	50	II	MWT-04	50	50
	Pract	III		50	50	III		50	50	III		50	50
	Posting	IV		50	50	IV		50	50	IV		50	50
	TOTAL				**200**	TOTAL			**200**	TOTAL			**200**
	GRAND TOTAL				**500**	GRAND TOTAL			**500**	GRAND TOTAL			**500**

Marks* : Showing the approximate weightage of subject topic in the examination paper.

Annexure – IV

QUESTION BANK

Annex. IV

QUESTION BANK OF POSTING EXAM /INTERVIEW

A) C&W.

1. What is ROH meant for? What are the checks done on bogie? How are cracks checked? Which are the vulnerable locations where cracks are generally found? How is brake beam reclaimed during POH? How is Staffing done for ROH depot? Why is ROH of BOXN/BCN wagons done at a periodicity of 18 months? What are the major items which require attention after this period?
2. Why is there a plank in the Casnub bogie?
3. CC. Rakes are required to run for 4500 KMs before train examination. Do the brake blocks last for this distance?
4. What are the major causes of defects on coaches noticed at PM depots and how can they be reduced?
5. What are the reasons for biased wear on wheels?
6. In ICF Coach how is correct bogie height & the correct gap between bogie and under frame obtained?
7. Describe the shell construction of ICF Coach?
8. Reasons of waviness in ICF coach and remedies.
9. Various welding processes used in ICF. Advantages of CO2 and Argon welding.
10. ICF shell fabrication.
11. Painting ICF shell. Sole bar painting.
12. Use of choke in ACP and in Guard's van.
13. Steps in Bogie manufacture at ICF.
14. How sound insulation is provided in coaches.
15. Payload of BOXN rake.
16. What are mechanical and Electrical reasons of detachment and sick marking? Percentage of Electrical/Mechanical
17. What is C.C. rake and its B.P.C?
18. How much brake power is required for CC rake?
19. What is there in ICF? Any major problem being faced in ICF these days?
20. Is derailment possible due to breakage of spring?
21. Is there any CC rake and its B.P.C.?
22. What is Shatabdi's max. speed and in which section?
23. How the bogie of Swaran Shatabdi different from other bogies?
24. Why spring is larger for Swaran Shatabdi? How does it increase riding comfort?
25. Tell about IR-20 bogies.
26. What have you seen in coaching depot?
27. Can U.I.C rake be used as CC rake?
28. What is difference between passenger and goods outage?
29. What are reasons of train parting?
30. What is difference between single and twin pipe system?
31. Have you gone to RDSO? Have you seen Coaching Directorate?
32. What is the material of side wall panel in coach furnishings? (Sun mica). Don't you think it is too fragile?
33. Have you seen cartridge bearing? What type of rollers it have?

34. What is the shock bearing member inside buffer casing (destruction tube). How does it function?
35. What are reasons of sick marking?
36. Tell about any case of sick marking?
37. What are reasons of bias wear and flange wear?
38. How load is transferred in BOXN?
39. Why no cases of bias wear found in BEML coaches?
40. How high speed wagons are different from normal wagons?
41. What are reasons of spring breakage?
42. Where is dash pot located?
43. Types of Air Brake system, Explain.
44. Was twin pipe system used in Wagons? Why single pipe now?
45. Why waviness is coming in ICF coaches these days?
46. What are the problems faced in bogie welding? What are various radiographic defects?
47. What is difference between UIC and Casnub bogies? Why is bias wear found in Casnub bogie?
48. Have you seen BEML coaches?
49. What do you know about LHB coaches?
50. Tell about the differences between the maintenance practices of Shatabdi and normal trains?
51. What are different types of Casnub bogies and their differences?
52. What are the reasons of derailment of goods train?
53. What is cross trammeling? What is done to rectify the defect found during cross trammeling?
54. Mention various defects found in coaches.
55. Tell about suspension system of various coaches?
56. How is adjustment of side bearer done?
57. Have you seen the POH of dash pot is done?
58. How POH of dash pot is done?
59. What is loading line?
60. Which Rakes are being maintained in the Coaching depot you visited?
61. What is the difference in maintenance practices between Shatabdi & other coaches? What are RDSO guidelines for Shatabdi coach maintenance?
62. In the washing line, is there a list prepared for consumables required for each coach. What are the items in such list?
63. What were the salient features of the freight depot you visited?
64. What is the periodicity of ROH? What are the items of maintenance carried out in ROH?
65. What is the most corrosion prone area in BCN wagon?
66. Why are elastomeric pads fitted in BCN wagon?
67. What is secondary detachment of a coach? What are the causes of secondary detachment?
68. What is axle box canting? Why does it happen?
69. What is the periodicity of dash pot oil check? When is oil filled in the dashpots? What damage would occur if dash pot oil is less?
70. What sizes of wheel flat are allowed on coaches and freight stock? Why is the allowance higher for freight stock?

71. What are the composite brake blocks and what are their advantages and disadvantages?
72. In ROH of Casnub bogies, what attention is given to pedestals?
73. What are A, B and C classes of unloadable wagon repairs?
74. What are CC rakes? Can wagon of CC rakes be re-positioned within the same rake before return for maintenance?
75. What are the types of detachment for coaching stock?
76. What is the significance of sick marking of coaches within 90 days of POH?
77. Give details of project given to you at ICF?
78. If at ICF Coach is to be lifted by one crane only, how will you calculate the location of the lifting slings?
79. Describe bogie manufacture at ICF?
80. What is the quantum of rejection in radiographic testing of welds at ICF?
81. How stress is relieving carried out on bogie frame after fabrication/welding at ICF?
82. What is the maximum time given between primer application and painting on coach at ICF? What is the harm if this exceeded?
83. Describe the procedure for water tank fitment on a coach at RCF?
84. Why are cross sheets welded on the side of the shell of an RCF coach?
85. What is the reason for waviness on the skin of the shell of RCF and ICF coach?
86. How are CTRBs fitted on axles of RWF?

B. DIESEL LOCO

87. What is the most important item checked during trip schedule of Diesel Locomotive? What are the steps which has been taken for increasing schedule interval for diesel loco?
88. What are the main design feature of WDP2 locomotive and its speed potential? How and why is high adhesion obtained? How many coaches can be hauled by this loco?
89. Describe the bogies of WDG2? What is COCO and tri-mount?
90. Difference between WDM2 and WDG2.
91. Slip in WDG4.
92. Steps in loco POH.
93. Cleaning of crank shaft.
94. Functions of flasher light.
95. What are three tiers of pit line?
96. What do you know about dynamic braking principle?
97. Where have you seen pit line?
98. What is the difference between passenger and goods outage?
99. Where have you done divn. Training?
100. What is engine block manufacturing sequence?
101. What is flow meter?
102. Have you seen WDS4? Where does the POH of industrial WDS4's done? (Belonging to industries).
103. What are various types of side bearers?
104. What are various loco schedules?
105. Tell something about working of diesel shed.

106. What are trip schedule items of loco?
107. How GTKM is calculated?
108. What do you know about honey comb?(cylinder liner).
109. How is crank pin tightened? Why is it prestressed?
110. How is axle surface finish checked?
111. What do you know about UST testing of axles?
112. What are the problems faced in bogie welding? What are various radiographic defects?
113. How is goods loco outage calculated?
114. What are various types of side bearers? Why are they used?
115. What are the details of the transmission systems and power packs of various shunters used in IR?
116. What is done in DMW?
117. What is traction motor winding sequence?
118. What are activities of trip schedule?
119. How is adjustment of side bearer done?
120. In which schedule the turbo supercharger overhauled?
121. What are the features of a WDG4 locomotive?
122. What are the maintenance advantages of a WDG4 locomotive?
123. What are the differences between WDP4 and WDM2C locomotives?
124. How is speed controlled in a locomotive fitted with AC traction motors?
125. Will increase in Horse Power of a locomotive allow increase in hauling capacity?
126. How has adhesion been increased on the WDG4 locomotive?
127. What is an airflow indicator?
128. What is the difference between dynamic, rheostatic and regenerative braking?
129. In Diesel loco engine manufacture at DLW, how is stress relieving done and how is radiographic testing done?
130. What does power controller of the division do? How can the power controller help in controlling fuel consumption? How is requirement of crew worked out for goods train? What is the essential running room facilities required to be provided?
131. What is roster hour of driver?
132. Working hours of driver.
133. How much brake power is required for CC Rake?
134. What are functions of power controller?
135. What is Shatabdi's max. speed and in which section?
136. How the crew requirement calculated?
137. What are reasons for train parting?
138. What is ideal engine utilization figure?
139. How is crew booked?
140. How can you calculate and reduce O.T of crew?
141. What is crew balancing?
142. What is grand chord and its significance?
143. Delay in mid section, action needed regarding ART & ARME.
144. What is 10 hour rule?
145. What is BPC?
146. How is Loco utilization calculated in the divisions you have visited?
147. On foot plate, what indications have you observed for run through train being received on loop line at a 'B' class station?

148. What does the driver do in case of leakage indicated on air flow indicator?
149. What are the duty hours of a driver?
150. When can a driver ask for relief?
151. What are the roster hours of a driver?
152. How is payment of overtime to a driver to be avoided?
153. What will the driver do if there is brake binding after ACP?
154. Why does a wheel derail?

SIGNALLING

155. What is the status of advance starter, starter, home, distance when a train is required to run through the station?
156. Aspects of distant signal.
157. What is inner distant signal?
158. What are the signals at a 'B' class station?
159. In multiple aspect colour light signaling, what do 'yellow' and 'double yellow' indicate?
160. With multiple aspect colour light signaling at 'B' class station, for run through train coming at more than 100 KMPH speed, is one 'distant' signal adequate?
161. What is a 'calling on' signal?
162. What is VVF?

GENERAL

163. How will you decide the periodicity of a maintenance schedule?
164. What is demand 10?
165. What are the demands for grants for Mechanical Department?
166. What is operating ratio and what are the current figures for the different Rlys?