

ROLE OF CIVIL ENGINEERS & TECHNICIANS IN DAY TO DAY SAFE RUNNING OF TRAINS

Presented by

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CIVIL ENGINEERING IN RAILWAYS

1. Permanent Way
2. Bridge
3. Works

Railway Network

Gauge	Route Km	Running Track Km	Total track KM
BG	49,820	71,015	93,386
MG	10,621	11,487	13,412
NG	2,886	2,888	3,198
Total	63,327	85,390	1,09,996

Bridges & Level Crossings

- Total Bridges in IR - 1,27,768
- Important Bridges - 637
- Major Bridges - 10,453
- Minor Bridges - 1,16,678
- Manned Level crossings - 16,286
- Un-manned Level Crossings - 18,173
- Total level crossings - 34,459

Land Management

IR owns 4.31 lakh hectares of land.

Activity	Area in lakh Hectares
Track & Structures	3.26
Afforestation	0.45
Grow more food scheme	0.06
Commercial licensing	0.03
Other uses like pisciculture	0.04
Encroachment	0.02
Vacant land	0.45

DUTIES OF PERMANENT WAY INSPECTOR/ENGINEER

Responsibility of Vast network Reset with Civil Engineers.

- The above vast network of Indian Railways are directly handled by civil Engineers.
- These Engineers are installers and maintaining personals of P.Way, Bridge and all station and service buildings.
- Their Duties, Responsibilities and Accountabilities are higher in order and second to non.
- Duties, Responsibilities and Accountabilities of these cadre were explained briefly.

Main Duties & Responsibilities

1. Maintenance and inspection of track in a satisfactory and safe condition for traffic.
2. Efficient execution of all works incidental to track maintenance, including track relaying works.
3. Accounting and periodical verification of stores and tools in his charge.
4. Maintenance of land boundaries between stations and at unimportant stations as may be specified by the administration.

Knowledge of rules and regulations

PWI have in his possession up to date copies of

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

Knowledge of staff has to be ensured

- PWI should be familiar with the rules, regulations and procedures concerned to his work and duties mentioned in the above mentioned codes and manuals.
- He should update the orders and circulars issued by higher authorities from time to time and efficiently act upon them.
- He shall ensure that all staff working under him are well acquainted with the relevant rules and working methods and efficiently perform their duties

COORDINATION

- The Permanent Way Inspector should keep close co-ordination with the Works, Bridge, Signalling and Electrical Staff, when they are required to work jointly

SAFE CUSTODY FOR OPEN STORES

- The Permanent Way Inspector shall see to the security of rails, chairs, sleepers and other materials in his charge and ensure that unused materials are stacked properly clear of the line, so as not to interfere with the safe running of trains

Important records

1. Working Time table
2. Permanent way diagrams of section and yard.
3. Section register.
4. Results of Track recording / oscilligraph runs.
5. Creep and Gap Survey Register.
6. Curve Register.
7. Points and crossing register.
8. SEJ/Buffer Rail register.
9. List of temporary and permanent speed restrictions.
10. List of work and other details.
11. Inspection notes of higher officials with compliance notes.

Instruments for Inspection

1. Gauge cum Level.
2. Flangeway gauge.
3. Wooden mallet.
4. Tap.
5. Fishing cord.
6. Tap, Metric Scale, Tapered Gauge.
7. Magnifying glass and mirror.
8. Versine measuring equipment
9. Inspection Hammer.

Check on Running Quality of Tracks

- Travel on foot plate of the Engine of fast trains, twice in a month
- Rear brake van or the last vehicle once in a month to find out bad running KM and get them rectified.
- Accompany the track recording / oscillograph car runs over his section.
- Observe the behaviour of track under passing trains.

Routine Inspection

- Inspection of Ganges. Travel in Trolley at least once in fortnight.
- Level crossing Inspection.
- Point and crossing Inspection.
- Curve Inspection.

Inspection of Ganges

- Work done by the gang earlier.
- Further programme for Gang.
- Instruction to gang in methods of maintenance.
- Record the details of track maintenance.
- Importing safety rules with every gang men.

Level crossing Inspection

- Level crossings should be opened once in a year to check the conditions of rails, sleepers & fasteners – Defects should be rectified.
- Necessary stop Board, whistle board, and other equipments has to be ensured.
- Equipments available with Gateman has to be checked once a month.
- Gateman's Knowledge on safety rules has to ensured periodically.
- Census of all level crossings as per the schedules.

Point and crossing Inspection

- The Permanent Way Inspector in overall charge and his Assistant should carry out the inspection of points and crossings in passenger running lines once in three months by rotation and on other lines once in six months by rotation

Curve Inspection

- Should carry out checks of versions and super-elevation of each curve once in six months by rotation.
- For Group A & B routes in B.G. where the check should be conducted once in every four months.
- Action to correct the curve where ever necessary.

Safety of Track-Direct Responsibility

- The Permanent Way Inspector is directly responsible for the safety of the track. He shall be vigilant to locate faults in the Permanent Way and promptly remedy them.
- Track defects which are beyond his power to rectify should be intimated to higher authority immediately.
- Trees likely to foul the track during storm should be felled.

Permanent Way Patrolling

- Has to arrange patrolling of track by deputing suitable men from gangs.
- Supply necessary patrol books and equipment needed.
- Check on the night petrol man.

Execution of works affecting tracks

- Ensure possession of necessary materials and tools before the commencement of work.
- Ensure Engineering signals are exhibited at specified distance.
- Detailed accounts on materials received and issued.
- Frequent check on quality and quantum of work

Action on Emergency

- On receiving the information of the occurrence of an accident affecting any part of track, restricting free passage of train.
- Proceed to the site by quickest available means.
- On the way collect the information regarding the damage, men and material requirement.
- Arrange the materials and movement of men and materials to site for restoration.

Still more

- Inspection and maintenance of LWR/CWR Track.
- Measurement of Ballast.
- Maintenance of station yards.
- Witnessing Payment to Staff.

Responsibilities in Establishment matters

- Ensure periodical medical examination for Staff including casual labours.
- Service cards and leave account for staff working under him.
- To ensure relevant provision of payment and wages act, workmen's compensation act, Hours of employment regulation etc are complied with.
- Ensure proper training for staff working under him at appropriate time.
- Carry out selection for Gateman and Petrolman from the existing gang man and importing training in their duties.
- Arrange prompt filling up of vacancies.

Duties of Mates, Keymen and Gangmen

Duties of Mates, Keymen and Gangmen

- Should have the correct knowledge of
- Hand and detonating signals.
- Protecting the work in an emergency and during work affecting the track.
- Method of fixing and safety range of detonators.
- Action to be taken when the train is parted.
- Safety first rules.
- Action to be taken where sabotage is suspected and patrolling in emergencies.
- Ensure the signals supplied to the gangs are in good order, ready for use and the men in gang has the correct knowledge.

More Duties for Mates

- Mate shall see that his length of line is kept safe for the passage of trains. Kilometrages needing urgent attention shall be picked up without waiting for orders from the Permanent Way Inspectors .
- Mate shall ensure that the following tools and equipments are with him at the site of work.
- Level-cum-gauge, square, hemp cord, meter stick, keying and spiking hammer, fish bolt spanner, 2 sets of hand signal flags, 12 detonators, marking chalk, Rail thermometer and 2 hand signal lamps.
- Sufficient number of shovels, beaters, cow bars, ballast forks, mortars pans or baskets, and wooden mallets.
- Tool box and other equipments as prescribed.

- Possession of muster and gang charts / Diary books.
- Observance of sleeper packing during passage of first and last trains in working hours.
- Tidiness of section.
- Responsible for Safe custody of tools.
- "Proceed with Caution" or to "Stop" signal as necessity may require, if any defect noticed in the P.way.
- Patrolling during Abnormal Rainfall.
- Preventing trespass and theft of P.Way fittings.

Keyman's daily inspection

- The keyman shall inspect by foot his entire beat once a day, both the tracks and bridges, and return along the opposite rail to that taken on his outward journey in case of single line.
- On double line, keyman will carry out one round of inspection in morning hours by going along, up line and then returning along down line or vice-versa.

Equipment of keyman

- The keyman shall carry with him on his rounds
- Two red flags, and green flag,
- Ten detonators,
- A flangeway gauge if required, for unmanned level crossings,
- A keying and spiking hammer,
- A fish bolt spanner, and two fish bolts, spare fittings
- A rail closure of 30mm size.
- For the work of greasing of elastic rail clips wherever applicable, keyman shall carry
- A wire brush, emery paper, a duster and grease

Duties of Keyman

- While walking over his length should look for defects such as
 - Loose fish bolts
 - SEJ fittings in switches and crossings
 - Fittings on girder bridges
 - Broken sleepers
 - Broken plates or tie bars

Should attend to the defects as necessary.

- Reoccurring defects should be intimated to PWI.

- Special watch on the rails and welds marked for observation.
- Should notice any condition of danger such as broken rail, broken weld, wash away ballast, theft of fittings.
- At unmanned level crossings shall maintain flange ways between the check and running rails clear of abstraction.
- For PRC sleepers in addition to tightening of fittings greasing of ERC has to be done at 20 sleepers a day.
- Special duties and responsibilities in LWR/CWR territories.

- Report to PWI if an unauthorized structure or encroachment on Railway land.
- Assist the mate in day's work.
- Materials such as dynamo belts, engine tools and personal articles of passengers are found on line keyman should collect them and hand over to station master.
- Will remain incharge in the absence of the Mate.
- The keyman should maintain the book upto date wherein all special work done, missing fittings and their recoupment with location and date are to be entered

Duties of Works Engineer

(IOW)

Most Essential Duties

- Inspection and maintenance of
- Service Buildings
- Staff Quarters
- Other Structures
- Approach Roads
- Water supply
- Drainage and sewage system
- Inspection of Bridge works as assigned

- Execution of all new buildings / other structural works
- Accountal and periodic verification of stores and tools in his charge.
- Maintenance of land boundaries.
- Removal of encroachments in his jurisdiction.
- Afforestation and other horticulture work.
- Ensure proper training modules for the staff working under him.

Knowledge of Rules and regulations

- Should be in possession of manuals, code books, etc
- Should be well acquainted with the rules, regulations and procedures contained in these books concerning his work.
- Should ensure that all staff working under him are well acquainted with relevant rules and working methods and efficiently perform their duties.

Co-ordination

- Should co-ordinate effectively with
- Permanent Way
- Bridge
- Signalling
- Electrical, etc
- Where ever required.

Comparison with
CENTRAL PUBLIC WORKS
DEPARTMENT
(CPWD)

*A Department
that cares for its Engineers.*

Functions of CPWD

- The Central P.W.D. is the premier agency of the Central Government operating throughout the country for construction, maintenance and repairs of all works and buildings financed from civil works, budget, except few departments who have their own Engineering Units or may get the works executed through private agencies.

Pay Scales of CPWD Engineers. (Termed as Field Engineers)

Desg	Pre - revised	Revised
JE	5000-8000	PB-2, 9300-34800, GP- 4200
AE	6500-10500 Gr-B, Gazetted	PB-2, 9300-34800, GP- 4600
AEE	8000-275-13500, Group-A, Entry	PB-3, 15600-39100, GP- 5400
EE	10000-325-15200	PB-3, 15600-39100, GP- 6600

Career Progression (ACP) in CPWD

- At Present two ACP available to CPWD Engineers in pre revised scale.
- Junior Engineers get their First ACP to the scale of Assistant Engineer, Rs.6500-10500.(PB-2, GP-4600)
- They get their second ACP to the scale of Executive Engineer, Rs 10000-325-15200. (PB-3, GP-6600)
- The scale for Group-A entry (AEE) Rs. 8000-275-13500 (PB-3, GP-5400) bypassed.
- If modified ACPS is implemented they will get another financial upgradation to PB-3, GP-7600.
- In the modified ACPS Railway JE will get 1st ACP to PB-2 GP-4600, 2nd ACP to PB-2 GP-4800 & 3rd ACP to PB-2 GP-5400. A great injustice.

Travel Eligibility for CPWD Engineers & Staff

Pay Range (Pre-revised)	Shatabadi Express	Rajdhani Express	Other Trains
Rs.16,400 and above	Executive Class	AC First class	AC First class
Rs. 8,000 to Rs.16,399	AC Chair Car	AC 2 tier	AC 2 tier
Rs. 4,100 to Rs. 7,999	AC Chair Car	AC 3 tier	First class AC 3 tier/AC Chair car
Below Rs. 4,100	Not entitled	Not entitled	Sleeper Class

Transparent administration of
CPWD

made open appeal to the
SIXTH CENTRAL PAY COMMISSION

To end the
Apathy shown by the govt. towards the
Genuine aspirations of Engineers.

- The importance of the engineering profession in nation building has been appreciated by all the leaders in the country and the govt. is also focusing on creation of world class infrastructure in the country but the engineering professionals in premier engineering organizations like CPWD are suffering because of apathy shown by the govt. towards their genuine aspirations. It would be appreciated that if the Govt. has to attract bright engineers and architects in its fold it has to offer them prospects better than what they may expect in the private domain or in other non technical services. These will not only be in terms of pay but also in terms of recognition of service and reward by ensuring timely promotions. We have noted, with concern, that young engineers have started migrating to the private domain as it offers better remuneration and perks and there is tremendous shortage of experienced engineers in the country. In case the Govt. does not take steps now to redress the genuine aspirations of engineers this trend could intensify and cause irreparable loss

Railways let down its Engineers & Technicians

What Railway Administration
Asked for it's Engineers?

It is to anybody's guess.

Does it have any vision to retain the
talented Engineers in Railways?

An administration not pride of it's own staff
will not bring any glory.

STAFF ASSOCIATIONS IN CPWD

The recognized Services Association may represent the service interest of their members, as a group, before the Director General of Works but may not take up the individual cases of any their members. They shall approach the Ministry of Urban Development only if they fail to secure redress from the Director General of Works.

List of the recognised Staff Association

1. Central Engineering Services (Class I) Direct Recruits Association.
2. Central Engineering Services (Class II) Direct Recruits Association.
3. Central P.W.D. Engineers Association.
4. Central P.W.D. Junior Engineers Association (India) New Delhi (with branches at Bombay, Calcutta, Madras and Guwahati).
5. The Graduate Junior Engineers' Association.
6. The AMIE Junior Engineers' Association.
7. Central P.W.D. Engineering & Drawing Staff Association.

8. Central PWD Staff Association (Eastern Zone).
9. Central PWD Non-Gazetted Staff Association.
10. Central PWD Class IV Association (Eastern Zone).
11. CPWD Architects' Association, Nirman Bhawan.
12. All India CPWD Sch.Caste/Tribes Association.
13. Central PWD Workers Union.
14. Central PWD Mazdoor Union.
15. All India CPWD Employees' Union.

Injustice done to SSE scale In Indian Railways

In Group-D&C, increase in SSE was minimum between III and VI Pay commissions

III CPC	IV CPC	V CPC		SCPC	III to IV	IV to V	V to VI	IV to VI	III to VI
Min	Min		Min	Min	Min	Min	Min	Min	Min
196	750	S1	2550	6050	3.83	3.4	2.37	8.1	30.9
200	775	S2	2610	6260	3.88	3.37	2.40	8.1	31.3
210	800	S3	2650	6580	3.81	3.31	2.48	8.2	31.3
225	825	S4	2750	7330	3.67	3.33	2.67	8.9	32.6
260	950	S5	3050	7780	3.65	3.21	2.55	8.2	29.9
260	975	S6	3200	8060	3.75	3.28	2.52	8.3	31.0
330	1200	S7	4000	9840	3.64	3.33	2.46	8.2	29.8
380	1350	S8	4500	11170	3.55	3.33	2.48	8.3	29.4
425	1400	S9	5000	13500	3.29	3.57	2.70	9.6	31.8
550	1640	S10	5500	14430	2.98	3.35	2.62	8.8	26.2
650	2000	S12	6500	16290	3.08	3.25	2.51	8.1	25.1
840	2375	S13	7450	18460	2.83	3.14	2.48	7.8	22.0

IF CALCULATED BY INCLUDING THE DA SSE SCALE GOT MINIMUM INCREASE

- With reference to the Ref: G.I, M.F. (Dept of Exp.) O.M.No.1(5)/96-E.11(B) dated 20.03.1996.
(On IV CPC scale at time of V CPC implementation)

Pay range	Rate of DA
Basic pay up to Rs.3500 per month	148% of Basic Pay
Basic pay above Rs.3500 p.m and upto Rs.6000 p.m	111% of pay
Basic pay above Rs.6000 p.m	96% of pay

IV CPC with DA	V CPC	V CPC with DA	SCPC	IV to V	V to VI	IV to VI
1110	S1	4743	6050	4.27	1.28	5.5
1147	S2	4855	6260	4.23	1.29	5.5
1184	S3	4929	6580	4.16	1.33	5.6
1221	S4	5115	7330	4.19	1.43	6.0
1406	S5	5673	7780	4.03	1.37	5.5
1443	S6	5952	8060	4.12	1.35	5.6
1776	S7	7440	9840	4.19	1.32	5.5
1998	S8	8370	11170	4.19	1.33	5.6
2072	S9	9300	13500	4.49	1.45	6.5
2427	S10	10230	14430	4.21	1.41	5.9
2960	S12	12090	16290	4.08	1.35	5.5
3515	S13	13857	18460	3.94	1.33	5.3

	IV CPC with DA	V CPC	V CPC with DA	SCPC	IV to V	V to VI	IV to VI
	3515	S13	13857	18460	3.94	1.33	5.3
	4029	S16	16740	22140	4.15	1.32	5.5
	2919	S17	16740	22140	5.73	1.32	7.6
	3497	S18	19205	25810	5.49	1.34	7.4
	3330	S19	18600	25200	5.59	1.35	7.6
	3552	S20	19809	26410	5.58	1.33	7.4
	4107	S21	22320	29920	5.43	1.34	7.3
	4385	S22	23715	31320	5.41	1.32	7.1
	4107	S23	22320	29920	5.43	1.34	7.3
	4551	S24	26598	46100	5.84	1.73	10.1
	5328	S25	28086	48390	5.27	1.72	9.1
	5661	S26	30504	48590	5.39	1.59	8.6
	5661	S27	30504	48590	5.39	1.59	8.6
	4995	S28	26598	47400	5.32	1.78	9.5
	6549	S29	34224	54700	5.23	1.60	8.4
	7008	S30	41664	63850	5.95	1.53	9.1
	7008	S31	41664	75500	5.95	1.81	10.8
	7296	S32	44733	77765	6.13	1.74	10.7
	7680	S33	48360	80000	6.30	1.65	10.4
	8640	S34	55800	90000	6.46	1.61	10.4

JUSTIFIED PAY SCALES

Designation	Pay Scales Demanded
JE	PB-2, Rs 9300-34800, Grade Pay-4600.
AE (Pre-revised SE & SSE shall be re-designated)	PB-3, Rs.15600-39100, Grade Pay – Rs.5400.

Mr. Ram Constructed a House

- He paid Rs.300 per day to a Mason who did general construction work.
- He paid Rs.400 a day to a Mason who laid floor tiles.
- He paid Rs.180 per day to a helper who can lift 50kg cement bag alone.
- He paid Rs.150 per day to a helper.
- He paid Rs.500 per day to a Carpenter.
- He paid Rs.250 per day to a Carpenter helper.
- He paid Rs.300 per day to a painter.
- He paid Rs.120 per day to a painter helper

Mr. Pandian Constructed a House

- He asked the qualifications of Mason
- He paid Rs.400 to a SSLC passed Mason
- He paid Rs.300 to a SSLC failed Mason
- He paid Rs.200 to a 8th Standard passed helper.
- He paid Rs.150 to a 5th Standard passed helper.
- He followed the same pattern for carpenter and painter also

Now, Mr. Krishna started constructing a house

- He didn't bother to correct the mistake made by Mr. Pandian.
- But increased the payment of Painter helper more than that of Manson ignoring the work content of Mason.
- Equalized the payment of carpenter helper to that of Mason.
- Mason left the job of Mr. Krishna to work under wise persons like Mr. Ram.
- Now, Motivated carpenter, painters are available with Mr. Krishna.
- But no building is available for them to work.
- **House of Railways will be deserted by the Technocrats one day if this apathetic attitude continues.**