

ENGINEERING AND CONSTRUCTION WORKS

1.0 Track Renewals

During 2020-21, 465.37 kms of track renewals CTR units were carried out in East Coast Railway. The track renewals done and expenditure incurred are as under:

Year	Gross expenditure (Rs in Crore)	Renewal done (in kms) CTR UNIT	Year	Gross expenditure (Rs in Crore)	Renewal done (in kms) CTR UNIT
2003-04	193	215	2012-13	165	90.357
2004-05	232	234	2013-14	160	154.17
2005-06	192	123.51	2014-15	157	59.17
2006-07	210	115.31	2015-16	299.90	116.271
2007-08	178	117.44	2016-17	281.74	118.88
2008-09	200	83.145	2017-18	562.70	276.327
2009-10	146	54.775	2018-19	625.27	297.308
2010-11	188	36.381	2019-20	713.51	456.737
2011-12	167	44.319	2020-21	1003.66	465.37
			Total	5674.78	3058.47

2.0 During the year 2020-21, highest ever progress in comparison to the last 5 years has been recorded for the following items.

Item of work	Total progress during 2020-21	Previous best total progress in a year
CTR (CTRUnits)	465.37	456.737 (2019-20)
TSR (P) (Km)	192.062	191.572 (2018-19)
TSR (S) (Km)	19.241	7.757 (2019-20)
Deep screening of plain track (km)	645.888	498.027 (2019-20)
Shoulder Ballast cleaning (km)	633.561	628.929 (2018-19)
Renewal of channel sleeper (No)	4435	4119 (2018-19)
Destressing of LWR/CWR (Km)	1681.823	1146.14 (2019-20)
Toe load measurement (Km)	1397.93	1091.5 (2019-20)
Removal/Relaxation of PSR (Nos)	24	18 (2018-19)
Scrap Offered (MT)	65582.48	62972.67 (2019-20)
Rebuilding/Rehabilitation of bridges (No of Br)	123	105 (2019-20)
Output of BCM (Km)	459.45	320.76 (2017-18)
Tamping of Track (km)	7640.12	6182.52 (2016-17)
Output of FRM (km)	343.61	249.7 (2019-20)
Reduction of breakdown of Track Machines (no.)	65	96 (2019-20)
Track monitoring by OMS-2000 (km)	66541	43165 (2019-20)

3.0 Level Crossings:

As on 01.04.2020, there were 772 level crossings (Manned LC=772 & Unmanned LC=0) on ECoR. Following progress have been achieved during 2020-21:

Closure of Manned LCs: 30 manned level crossings were eliminated.

Upgradation of LCs: 35 nos. of manned LCs were upgraded from lower to higher class.

4.0 Track Modernization:

- Zonal IOH Track Machine depot at Khurda has been certified ISO-9001:2015, ISO 14001:2015 and ISO-45001:2018.
- Track Modernization relating to works done with Track Machines in 2020-21 is as follows:-
 - Total Plain track tamping:- **7640.12 Km.**
 - Total Turn out tamping:- **3200 T/Os.**
 - Total Track Deep screening by BCMs:- **409.95 Km.**
 - Total Turn out Deep screening by BCMs:- **66 T/Os.**
 - Total Track renewal by PQRS :- **36.44 Km.**
 - Total Turn out renewal by T-28:- **37 T/Os.** (28 nos for RVNL & Con.line + 09 nos for Open line)
 - Total turn out Correction by T-28:- **29 T/Os.**
 - Total track profiled by RGM: **1094.74 Grind Km**

5.0 Bridge

i. BRIDGES:

There are 37 important bridges, 977 major bridges and 10923 minor bridges i.e. total 11,937 bridges on ECoR as on 01.04.21. In 2020-21, 123 bridges were rehabilitated /rebuilt.

ii. ROB/RUB

To ensure safe running of trains and facilitate road users to make a safe crossing, the existing level crossings are being replaced with Road Over/ Road Under bridges in a phased manner. 03 nos of ROB have been commissioned during 2020-21. Railway portion of 04 nos of ROB have been completed. 01 Nos of RUB were completed on cost sharing basis.

iii) LHS

To replace the existing manned/ unmanned level crossings, Limited Height Subways are being constructed on Railway's cost. **28** nos such LHSs have been completed in 2020-21. Further **101** no.of Limited Height Subways (LHSs) sanction available which are at different stages of planning and execution.

6.0 Land Management

East Coast Railway owns about **23059.335** hectares of land, which is mainly used for operational infrastructure such as track, stations, workshops, staff colonies etc. The break-up of the land is as follows:-

Area (in Hectares)

S.N	Description	KUR	SBP	WAT	TOTAL
1	Track and structures including workshops, station, staff colonies etc.	4673.3660	5076.8240	9569.9100	19320.1000
2	Afforestation	256.0000	378.7720	373.9300	1008.7020
3	Grow more food scheme	19.6400	0.0000	158.8300	178.4700
4	Commercial licensing	72.7740	33.4120	79.9000	186.0860
5	Other uses like pisciculture	14.1600	0.0000	0.0000	14.1600
6	Under encroachment as 31.03.16	11.8930	0.0159	1.2398	13.1490
7	Vacant land	1211.4330	1015.5007	67.9202	2294.8539
8	Land under any other use	13.8468	21.9774	7.9900	43.8142
	TOTAL	6273.1128	6526.5020	10259.7200	23059.3351

7.0 Passenger Amenities:

Achievement during 2020-21

a) Provision of FOBs:

Additional foot over bridges/extension of FOBs have been provided at **28** stations.

6m wide FOB
at Bhubaneswar →



b) Additional Platform

Sheds: Additional platform sheds have been provided in 25 stations.



Nilakantheswar



Balangir Road

c) Improvement to Waiting

Halls at stations:- Waiting halls have been improved at **26** stations.



Sambalpur



Balugaon

d) Improvement to Circulating

Area at stations: Circulating areas have been improved at **24** stations.



Puri



Boinda

e) Provision of additional benches on platforms:

1933 numbers of additional benches have been provided at different stations.



Khurda Road



Kendujhargarh

f) Monumental Flags:

Monumental Flags have been provided at 23 no. of Railway Stations.



Puri



Vizianagaram

EAST COAST RAILWAY'S ANNUAL REPORT : 2020-21

- Lifts have been provided at 6 no. of stations viz. Bhadrak (BHC), Bhubaneswar (BBS), Brahmapur (BAM), Titlagarh (TIG), kotabommali (KBM) & Machkund Road (MKRD).
- Concreting of PF surfaces were done at **37 platforms** at different stations.
- Raising of Platforms to High level has been done at **27 no. of stations**.
- Divyang Friendly Toilets were provided at 47 no. of stations.
- 82 nos. (Ty-II : 78, Ty-III: 4) of staff quarters has been constructed at different stations.
- 3 no. of stations have been developed as Adarsh Stations viz. Sompeta (SPT), Salegaon (SQQ) & Araku (ARK).
- Ramps have been provided at entrances of 104 no. of Railway.
- Roof Top Rain Water Harvesting systems have been provided at 33 locations.
- Water Audit has been done at 8 major water consumption stations.
- Improvements to VIP lounge has been done at VSKP station (provision of modern amenities as part of Redevelopment of VSKP station). Improvements to entry arch at station have been done. Improvements to the gate no-2 roof ceiling & improvements to platform flooring have been done at VSKP station.

8.0 System Improvement during 2020-21

KUR DIVISION:-

Highest ever achievement (indicating previous best in the last 5 years)

Sl. No	Item	Total progress in 2020-21	Previous best total progress	Previous best in year
1	TSR(P) (Km)	66.423	50.93	2018-19
2	TSR by PQRS-Kms	27.13	24.32	2016-17
3	Deep Screening of plain track (Km)	322.73	183.81	2019-20
4	Deep screening of track by BCM m/c (Km)	223.33	112.71	2019-20
5	Deep screening of turnouts by BCM (Nos)	11	10	2017-18
6	Shoulder Ballast Cleaning-Machine-Kms	245.04	118.85	2018-19
7	Ballast insertion-Th.Cum	270.418	231.437	2018-19
8	Through Ballast Renewal-TBR-Kms	298.717	187.652	2017-18
9	Through Fittings Renewal-TFR-Kms	242.13	225.91	2017-18
10	AT welding to minimum extent-Nos	8546	8883	2016-17
11	Laying of channel sleepers-Nos	2681	2561	2016-17
12	Removal / relaxation of permanent speed restriction Nos	11	10	2018-19
13	Tie tamping-Kms	2589.6	2466.09	2016-17
14	Reduction in Rail fractures / weld failures - Nos	40	129	2016-17
15	Reduction in percentage of defective AT welds-Nos	1%	14%	2019-20
16	Destressing of LWR-Kms	801.77	429.96	2018-19
17	Toe-load Measurement of ERC (Kms)	634.22	468.51	2018-19
18	OMS-2000 recording-Kms	24453	17245.12	2019-20
19	Restriction free patches each of which more than 50 km length(% of total track length in the div. (Except KUR-PUI & JKPR-DTR & RJGR-BRAG sec) over the year)	36.38%	22.08%	2019-20
20	Water Audits of Major water consumption centers (No of stn)	6	2	2018-19, 2017-18
21	Prov. of additional FOB (No. of Stn.)	12	8	2017-18
22	Raising of PF (No of stn)	12	4	2017-18
23	Development of Adarsh stations (no of stns)	2	1	2019-20
24	Monumental flag in station circulating-Stn	13	2	2018-19

- Improvement in TGI values.

Route	Length	Last Average TGI value during 2020-21	Average TGI value during 2019-20	% Improvement over previous year	Weightage
B	838.63	112.55	106.22	6%	3
D'spl	430.16	149.71	104.49	43%	2
E	359.87	126.3	104	22%	2

- Percentage of Defective A.T welds have been reduced from 14% (2019-20) to 1% (2020-21).

EAST COAST RAILWAY'S ANNUAL REPORT : 2020-21

- Zero defective rails in 4 metre: USFD defects within 4 meter to be treated as IMR are Zero, as compared to 400 Nos existing as on 31.3.2020.
- Reduction in percentage of Rail failures: Rail fractures and weld failures have been reduced from 150 nos during 2019-20 to 40 this year.
- Drone survey of off track assets completed in KUR Division.
- eDAS (e Drawing Approval System) was implemented and all drawings are being now approved on this platform.
- e-office, IR-WCMS, IREPS was implemented in this Division.
- Travel Passes are being now issued to staff on HRMS only.
- Third party audit of 6 critical structures were completed.
- Water level measuring instrument was provided on 5 bridges.
- Removal / relaxation of Permanent speed restrictions.
- 4 manned level crossings were closed.
- Conversion 16 nos of stone slab bridges into RCC Box NRG-TLHR & KUR-PSA sections.
- Innovation in design, construction and maintenance practices including use of materials in buildings, quarters etc.

WAT DIVISION:-

Highest ever achievement (indicating previous best in the last 5 years):

Sl. No	Item	Previous best				Current year
		2016-17	2017-18	2018-19	2019-20	
1	CTR (CTR units)	46.687	88.969	115.184	173.077	200.417
2	TRR(P) (Km)	64.215	120.07	124.018	270.274	309.327
3	TSR(S) (Km)	0.925	0.155	2.134	5.05	15.504
4	Renewal of Glued Joints (nos)		810	731	1129	1377
5	Increase in sectional speed			65.385		77.358
6	Tie tamping (Km)	2366.37	2472.86	2021.76	2734.3	2742.83
7	Disposal of Scrap (MT)	14720.199	8687.449	21312.5	19363.116	26517.52
8	Sealing of liner contact area (Km)	426.741	412.859	277.003	331.414	633.129
9	Shifting of liner contact area by distressing (Km)	233.087	229.486	209.82	430.452	672.488
10	Anti corrosive painting of Rails (Km)	290.369	417.103	397.919	557.116	633.775
11	Toe Load Measurement (Km)	307.55	275.85	339.4	461.35	524.495
12	Closure of Manned L/C	10	17	19	12	19
13	Distressing (Km)	238.387	229.486	209.826	429.852	682.424
14	Bridge Painting (Thousand Sqm)	97	92	98.477	85.486	131.702

- 05 Nos of permanent speed restrictions have been cancelled thereby achieving a saving in running time.
- A new hand operated grease applying machine is developed by ADEN/Araku and SSE/W/Tunnel/ARK.
- Up gradation of 8 manned LC.
- 1361 nos of channel sleepers have been renewed.
- 23nos Major bridge approaches in Kottavalasa-Kirandul line have been strengthened.
- 8 nos of Foot Over Bridges have been provided.
- Raising of Platforms completed at 6 stations.
- Standard tectile flooring has been provided at 8 nos of stations.
- Concrete surfacing of platforms has been done at 7 stations.
- 532nos of additional seating arrangements (stainless steel benches) has been provided.
- Improvements to entry arch, improvements to VIP lounge & improvements to the gate no-2 roof ceiling has been done at Visakhapatnam Railway station.
- Oxygen supply pipeline provided for 43beds in Divisional Railway Hospital, Visakhapatnam.
- Improvements/upgradation of RPF barracks has been done at Marripalem/VSKP, and 4units of Type 1 Quarters have been renovated as RPF barracks at Araku.
- 7 nos of Monumental flags have been commissioned.

EAST COAST RAILWAY'S ANNUAL REPORT : 2020-21

- Improvements to facilities at Goods sheds completed at VNCW/VSKP, Kantakapalli, Srikakulam Road and Bobbili stations.
- 20 nos of Track Maintainers restrooms/ gang huts provided in the Division.
- Two Diamond crossings in Waltair Marshalling Yard which were existing on wooden layout have been converted to PSC layout thereby increasing the safety quotient, enhancing the asset reliability and ease in maintenance effort.
- 19 nos of manned level crossings are closed.
- Bridge rebuilding/rehabilitation of 49 nos of bridges completed.
- Performance of important Mission Items
 - Through Rail Renewal (Primary) of 309.327 TKm
 - Through Sleeper Renewal (Primary) of 61.997 Km.
 - Laying of 58 sets of TWS in Gr "B" route.
 - Ballast supply of 178834 cum. & Ballast insertion of 226410 cum.
 - Deep Screening of track – 367.450 Km (Plain Track (Manual): 72.550, BCM: 147.150 & Deep Screening of T/outs (Manual) 142nos, BCM 55nos)
 - Shoulder Ballast cleaning of 162.149 Kms.
 - Through fastening renewal of 87.192 km.
 - Through ballast renewal of 152.614 Km.
 - Through Turnout Renewal – 91.250 (wt.avg).
 - SEJ renewal = 68 nos.
 - Glued joint renewal = 1377 nos.
 - De-stressing of 682.424 Kms.
 - Tie tamping (Plain track) of 2742.830 Kms.
 - Tamping of 1261 nos of Turnouts with Unimat.

SBP DIVISION:-

- Total 71.159 KMs double line commissioned.
- Goods shed have been improved at Lapanga, Hiraakud, Barghar Road, Khariar Road & Belsonda.
- 8 nos. of PSR have been removed & annual target of 4 nos. has been achieved.
- 6 nos. of LHS & 50 nos. of bridge rebuilding have been done ensuring safety & precautions.
- 7 nos. of Manned LC have been eliminated.
- In SBP division all routes have been converted to CC+8+2. Rebuilding of old stone slab bridges is being done & 52kg track are converted to 60kg to increase axle load.
- 189km of distressing of LWR track have been done for safety.
- The sectional speed has been increased for a total length of 55.55kms.
- Speed of loop lines for 54.2 km in LJR-JNRD section is raised from 15 kmph to 30 kmph.
- Yard remodeling has been done at KPJG, BLGR, HSK, TRKR & HKG yard.
- Additional loop line provided at 4 stations i.e. at JRPD, HKG, HSK & TRKR.
- 47 nos of Ordinary switch have been replaced with Thick Web switch to increase Speed potential of loop lines to 50km.
- A total of 84.495TKMs electrification was commissioned.
- Contract Demand of different TSSs was enhanced to eliminate the probability of MD overshoot and imposition of penalty.
- LJR/TSS was commissioned with 132 KV AC supply from Bhawanipatna Grid substation.
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- Komakhan/SSP has been commissioned with 25 KV AC supply.
- Bhimkhoj /SSP has been commissioned with 25 KV AC supply.
- Tower wagon DETC- B-13, DETC- 200054 has been commissioned
- Kesinga TSS TR-05 bay from BC-01 (132 KV BC-i) to SPI/110 (25 KV SPI) with 21.6/30.24 MVA Power Transformer at 132/25 KV commissioned.
- Bissamcuttack TSS Feeder Bays CB-101 & CB-103 along with associated equipments and 3rd line Interrupters (2 nos.) including 25 KV Gantry at 132/27KV commissioned.
- During this period total 3842 nos. of tree branches trimming has been done in the SBP division to improve clearance from OHE.

Construction Organization

Following construction works are done during the financial year 2020-21.

1. **New Line**: Commissioned- Nil.
2. **Doubling Projects**: Sections Commissioned- 68.96 Km.
 - Paliba-Machkund Road (12.56 Km) Section of Kottavalasa – Koraput doubling project along with electrification commissioned on 06.08.2020.
 - Charamulakusumi-Khadapa (6.99 Km) section of Jagdalpur-Koraput doubling project along with electrification commissioned on 26.08.2020.
 - Khadapa-Dhanapur-Jeypore (13.71 Km) section of Jagdalpur-Koraput doubling project along with electrification commissioned on 28.08.2020.
 - Jarpada-Kerejanga (9.99 Km) section of Sambalpur-Talcher Doubling project along with electrification commissioned on 12.09.2020.
 - Kumarsodra-Kaklur (12.20 Km), section of Kirandul – Jagdalpur doubling project commissioned and opened for traffic on 08.12.2020.
 - Kerejanga- Angul (13.51 Km) Section of Sambalpur-Talcher Doubling project along with electrification commissioned on 10.01.2021.
3. **Ready for Commissioning/ CRS Inspection. (47.09 Km)**
 - Dabpal-Gidam (10.99 Km) section of Jagdalpur-Koraput doubling project is ready for commissioning. CRS application submitted.
 - Jujumura-Charmal-Rairakhol (31.9 Km) sectional works of Sambalpur-Talcher doubling project completed. Waiting for NI works. 13 sets of Points & X-ings in Jujumura yard & 12 sets in Charmal yard inserted.
 - Kapilas Road-Nergundi (4.2 Km) sectional works of Bhadrak-Nergundi 3rd line project completed. Waiting for Pre to PNI, Pre-NI & NI works.
4. **Road Over Bridges : 02 Nos. Commissioned**
 - ROB in lieu of Level Crossing No: ML-254 at Km. 525/33-35 in between Gangadharpur-Balugaon (Main line). ROB commissioned and opened to traffic in April 2020. Level Crossing was closed.
 - ROB in lieu of Level Crossing No: ML-309 at Km. 599/8-10 in between Jagannathpur-Berhampur (Main line). ROB commissioned and opened to traffic on 12.09.2020. Level Crossing was closed.
5. **Road Under Bridges (RUB)/Limited Height Subways (LHS) :**

Total 03 LHS are constructed in Jagdalpur-Koraput Doubling project, 01 RUB and 01 LHS in Kottavalasa-Koraput Doubling project and 04 Nos. RUB in Jarapada-Budhapank 3rd & 4th line project.
6. **Innovation:**
 - Drones are being used for monitoring progress of major works and for surveying/designing of tunnels in Koraput-Singapur Road doubling project.
 - IP based web cameras have been installed at 03 major bridge sites in the interior areas in Kottavalasa-Koraput doubling project.

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