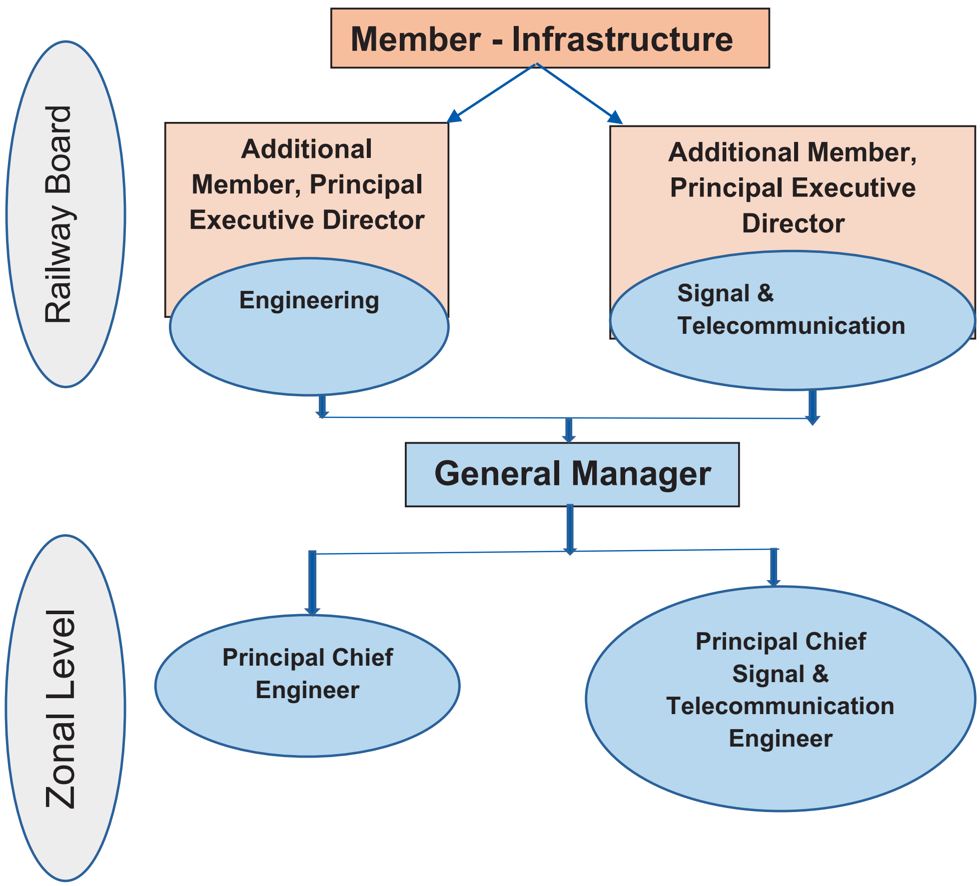
Chapter 3 - Infrastructure

Member (Infrastructure) at Railway Board is responsible for maintenance of all fixed assets of Indian Railways, such as, Tracks, Bridges, Buildings, Roads. In addition, he is responsible for construction of new assets, such as, new lines, gauge conversion, doubling and other expansion and developmental works. He is assisted by Additional Members and Principal Executive Directors.



At Zonal level, with the General Manager heading the Zone, the Engineering Department is headed by Principal Chief Engineer (PCE). He is assisted by various Chief Engineers for maintenance of Tracks, Bridges, Buildings, Roads *etc.* Each Zonal Railway also has a construction organization headed by a Chief Administrative Officer (Construction) who is responsible for major construction works of Zonal Railway. He is assisted by various Chief Engineers (Construction).

Member (Infrastructure) at Railway Board is also responsible for Signal & Telecom Departments of Indian Railways. The Signal & Telecom Directorate at Railway Board is responsible for all the issues regarding procurement, maintenance of Signal & Telecom Assets over Indian Railways. In the Railway Board, Member (Infrastructure) is assisted by Additional Member (Signal) and Additional Member (Tele).

At Zonal level, the Principal Chief Signalling and Telecom Engineer (PCSTE) is responsible for overall supervision and maintenance of S&T assets.

For enhancing efficiency and safety in train operation, modern signalling plays a very vital role. The Signalling Department handles induction and maintenance of signalling systems. The Telecom Department is responsible for telecommunication services in Railways.

In 2018-19, the total expenditure on repair and maintenance of assets[87] by Engineering Departments in Indian Railways was ₹ 22,931.84 crore[88]. Indian Railways also incurred an expenditure of ₹ 25,680.39 crore[89] on creation of new assets[90]. During the year, apart from regular audit of vouchers and tenders, audit of 1,876 offices of Engineering Department including Construction Organization was conducted.

The expenditure on repair and maintenance of plant and equipment of S & T Department during the year 2018-19 was ₹ 3,106.02 crore[91]. Capital expenditure of ₹ 1,537.78 crore was incurred on creation of S&T assets. During the year, apart from regular audit of vouchers and tenders, 389 offices of the S&T Department were inspected.

This Chapter includes a thematic para on 'Price Variation in Works Contracts in Indian Railways'. In addition, this Chapter includes nine individual paragraphs. These paragraphs highlight compliance issues that relate to construction and utilization of Limited Height Subways, land acquisition, delay in construction of Road Over Bridge, faulty planning in embankment work, wasteful expenditure due to award of signaling

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[87] Permanent way and works, bridges, tunnels, roads, sanitation and water supply *etc.* including plant and equipment

[88]Sub head 3002-3003 (02) - Repair and maintenance of Permanent Way and Works and Sub head 3002-3003 (05) - Repair and maintenance of Plant and Equipment - Appropriation Accounts for 2018-19

[89]Sub head 5002-5003 – Assets - Acquisition, Construction and Replacement – Appropriation Accounts for 2018-19

[90]New Line, Doubling, Gauge Conversion, Traffic facility works, Track renewal works, Bridge works, Level crossing and Passenger amenities works

[91]Minor Head 500, 600 and 700 of Sub head 3002 and 3003 (5) – Repair and maintenance of plant and equipment - Indian Railways Appropriation Accounts - 2018-19

contracts without finalization of Engineering Scale Plan and Signal Interlocking Plan *etc*.

3.1 Price Variation in Works Contracts in Indian Railways: All Zonal Railways

There was avoidable/excess payment of ₹ 1,172.04 crore and short payment of ₹ 8.76 crore towards price variation to the contractors in the works contracts test checked in audit. This was on account of violation of Ministry of Railways (MoR) periodic instructions on price variation by the Zonal Railways and non-adoption/incorporation of certain provisions of General Financial Rules in General Conditions of Contracts for Works Contracts by the MoR. Irregularities such as incorrect adoption of Base month and Quarter, incorrect application of percentages of components in Price Variation formula *etc.* were noticed in the Zonal Railways.

Extensions on railways' account were granted in a routine manner. Due to non-fulfillment of pre-requisites such as availability of clear sites, approved drawings and design *etc.,* railways paid significant amount towards Price Variation during the extended period of contract.

Cases of fraudulent payment of price variation to contractors in Northeast Frontier Railway were noticed.

Monitoring mechanism for checking of price variation bills by the Executive and the Accounts Department was weak.

3.1.1 Introduction

Price Variation Clause (PVC) constitute a crucial part of the contract conditions to safeguard against general inflation, linked to specified price indices for labour, materials and fuel. Ministry of Railways (MoR) decided (April 1980) that PVC should be provided in future contracts valuing ₹ 25 lakh and above[92]. The MoR also issued instructions that PVC should be included in the Special Conditions of Tenders while inviting tenders so that the tenderers are fully aware of the implications of PVC and factor the same before quoting their rates. For working out the price variation, percentage component of various items like material, labour, fuel *etc.* would be different for different types of works. Depending upon the type of the work, the percentages should be incorporated in the PVC before

[92] MoR's letter No.80/W1/CT/10 dated 25 April 1980. Monetary limit for applicability of PVC was revised to ₹ 50 lakh and above in December 2012 and ₹ 5 crore and above in February 2018.

including in the tender documents so that these are duly taken into account by tenderers while quoting their rates.

Formula for calculation of Price Variation prescribed by MoR[93] is as under:

$$\text{Labour (L)} = \frac{R \times (I - Io)}{Io} \times \frac{P}{100}$$

$$\text{Material (M)} = \frac{R \times (W - Wo)}{Wo} \times \frac{Q}{100}$$

$$\text{Fuel (U)} = \frac{R \times (F - Fo)}{Fo} \times \frac{Z}{100}$$

Where

P – Per cent of Labour Component, Q – Per cent of Material Component, Z – Per cent of Fuel Component

R - Gross value of work done by contractor as per on-account bill(s) excluding cost of materials supplied by Railway at fixed price

Io - Consumer Price Index Number for Industrial Workers - All India: Published in R.B.I. Bulletin for the base period

I - Consumer Price Index Number for Industrial Workers - All India: Published in Reserve Bank of India (R.B.I) Bulletin for the average price index of the three months of the quarter under consideration

Wo - Index Number of Wholesale Prices - All commodities - as published in the R.B.I. Bulletin for the base period

W - Index Number of Wholesale Prices - All commodities - as published in the R.B.I. Bulletin for the average price index of the three months of the quarter under consideration

Fo - Index Number of Wholesale Prices - Fuel - as published in the R.B.I. Bulletin for the base period

F - Index Number of Wholesale Prices - Fuel - as published in the R.B.I. Bulletin for the average price index of the three months of the quarter under consideration

Price Variation either upward or downward shall be applicable up to the stipulated date of completion of work including extensions granted to contractors. Extensions are granted under Clause 17-A due to administrative failure and under Clause 17 -B due to contractor's failure.

In December 2012, MoR, in supersession to all the previous instructions on PVC, issued a comprehensive clause (Clause 46 A) on price variation for incorporation in the General Conditions of Contract (GCC) applicable with prospective effect. This Clause was, however, included in the GCC in

[93] vide MoR's letter No. 2007/CE-I/CT/18 Pt.19 dated 14 December 2012

July 2014. In November 2018, MoR issued[94] the Revised Indian Railways Standard GCC.

3.1.2 Audit scope and objectives

The review covered a period of three years from 2016-17 to 2018-19. The objectives of the review were to assess whether Railway Administration**:**

i. complied with the provisions of the GCC regarding PVC and various other instructions issued by MoR in Works Contracts;

ii. ensured necessary prerequisites, such as, availability of clear site, funds, approved drawings and design, estimation of various items to be executed *etc.* before inviting the tenders;

iii. made payment towards PVC in accordance with the prescribed rules and regulations; and

iv. ensured the incorporation of all the relevant provisions of General Financial Rules (GFR) regarding PVC in GCC and also its compliance

3.1.3 Audit Criteria

Provisions of Indian Railways Code for Engineering Department; Indian Railways Standard GCC and Special Conditions of Contracts in Works Contracts; MoR's instructions issued from time to time; and GFR were the audit criteria.

3.1.4 Audit methodology and sample

Audit randomly selected 50 Works Contracts (Completed and On-going both) from each Zonal Railways during 2016-17 to 2018-19. Selection of Completed and On-going Works Contracts was made on the following basis:

(i) Completed Works Contracts during the period 2016-17 to 2018-19 wherein price variation was paid by the Railways.

(ii) On-going Works Contracts wherein expenditure of 50 *per cent* or more was incurred and price variation was paid by the Railways.

Thus, 886 Works Contracts[95] (569 Completed and 317 On-going contracts) in Construction Organization and Divisions across Indian Railways were selected for review.

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[94] MoR's letter No.2017/CE-I/CT/8/GCC/Committee dated 5 November 2018

[95] CR-58, SR-52, ECoR-50, ECR-50, ER-50, NCR-50, NER-50, NFR-50, NR-50, NWR-50, SCR-50, SECR-50, SER-50, SWR-50, WCR-50, WR-50, Metro Rly.-36, CLW-16, DLW-24. Out of 886 Works Contracts valuing ₹13,200.12 crore, Zonal Railways made

In order to verify the compliance of MoR's instructions by the Zonal Railways on inclusion of PVC in the Works Contracts, another 198 Works Contracts valuing below ₹ 50 lakh[96] and 123 Works Contracts below ₹ five crore[97] were randomly selected in the Zonal Railways.

For ascertaining the status of inclusion of provisions of GFR, 2017 in the GCC, another 164 Works Contracts (where tenders were invited after February, 2017) were randomly selected in the Zonal Railways.

Thus, overall 1,371 Works Contracts were selected for review. Details of cases selected in the Zonal Railways are given in **Annexure 3.1.**

3.1.5 Audit Findings

Audit findings are discussed in the succeeding paragraphs:

3.1.5.1 Adoption of 'Base month' for payment of Price Variation and 'Base month' in the event of holding negotiation in a tender

The MoR issued a comprehensive PVC Clause 46A-PVC to the GCC in December 2012[98]. As per Clause 46A.2, 'Base month' for PVC shall be the month of opening of tender, unless otherwise stated elsewhere. Earlier in March 1988, MoR had clarified that "if the rates quoted in negotiated tender are accepted, it is logical that the 'Base month' for PVC is the month in which negotiations are held". The MoR had also stated that this should be clarified in the tender conditions or during negotiations.

Audit observed that clarifications of March 1988 were included neither in the comprehensive Clause 46A of December 2012 nor in the GCC of July 2014 and November 2018. During review of Works Contracts in the Zonal Railways, audit observed that

- Out of 886 contracts, in 351 contracts, negotiations were held in the tenders. However, in 136 contracts (out of 351 contracts), month of opening of tender was adopted as 'Base month' for working out the price variation instead of the month of negotiation. Thus, MoR's instructions of March 1988 regarding adoption of the 'Base month' were not followed in these contracts. As a result,

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payment of price variation amounting to ₹1,023.24 crore in 858 contracts. No price variation was paid in 28 Works Contracts (till March 2019).

[96]As per MoR's instructions of December 2012, PVC shall be applicable only for tenders of value of ₹ 50 lakh and more irrespective of contract completion period i.e. PVC shall not be applicable for the tenders (contract agreement value) valuing less than ₹ 50 lakh.

[97]In February 2018[97], MoR removed the applicability of PVC in all the Works Contracts tender having value of less than ₹ five crore.

[98]MoR's letter No.2007/CE-I/CT/18 Pt.19 dated 14 December 2012

there was an excess payment of ₹ 20.26 crore in 93 contracts in 15 Zonal Railways and short payment of ₹ 4.31 crore in 35 cases in 11 Zonal Railways. In eight contracts, no payment towards price variation was made.

- In 212 contracts, month of negotiation was correctly adopted as ‘Base month’.
- In three contracts, details of payment of price variation were not available.

Thus, there was no uniformity in adoption of Base month in cases of negotiations in the Zonal Railways. Also, in all the 351 contracts where negotiations were held, clarification on adoption of ‘Base month’ was neither made in the tender documents nor during negotiations.

In the Exit Conference, Dy. Chief Engineer (G)/ECoR stated (November 2019) that contracts, where month of opening of tender was taken as Base month for PVC instead of month of negotiation will be examined for taking necessary action.

3.1.5.2 ‘Base month’ for PVC for extra items in Works Contracts

Items not included in the accepted Schedule of Rates (SOR), are termed as extra items *i.e.* non-scheduled items. As per Clause 39 of GCC, any item of work carried out by the contractor on the instructions of the Engineer, which is not included in the accepted SOR shall be executed at the rates set forth in the "Schedule of Rates of Railway". Procedure for determination of rates to be paid for any extra item of works was prescribed in the Clause ibid. However, MoR issued no specific instructions/orders for payment of price variation on extra items in works contracts.

In December 2013, CR Administration clarified[99] that the base month for the purpose of price variation for extra items shall be the month and year in which the administrative approval for operation of extra items was given by the competent authority.

Audit observed that in 49 contracts in nine Zonal Railways[100], extra items were operated. However, price variation was paid to the contractors by adopting the tender opening month as the Base month instead of the month in which administrative approval was accorded by the competent authority. This resulted in excess payment of ₹ 0.49 crore in 45 contracts

[99] Dy. CE (C) Works letter No. EW/187/R/465/PVC dated 30 December 2013

[100] CR-10, ECR-04, ER-17, NCR-02, NWR-05, SER-02, SWR-01, WCR-05, WR-03

and short payment of ₹ 0.01 crore in four contracts (CR-01, NCR-02 and WCR-01).

3.1.5.3 Adoption of the 'Quarter under consideration'

As per Clause 46-A.2 of GCC[101], the 'Quarter'[102] for applicability of PVC shall commence from the month following the month of opening of tender. Price variation shall be based on the average price index of the 'Quarter under consideration'.

Index for the 'Quarter under consideration' should be the Quarter of work done, supplies made, recording the measurement of works and date of completion for completed works for calculation of amount of price variation.

Audit observed that out of the 886 contracts, in 66 contracts, Zonal Railways incorrectly considered 'Quarter' while calculating the price variation. Quarter under consideration was not counted from the month following the month of opening of tender. Adoption of incorrect 'Quarter' for payment of price variation resulted in excess payment of ₹ 0.91 crore in 33 contracts[103] and short payment of ₹ 0.84 crore in 33 contracts.[104]

3.1.5.4 Inclusion and operation of PVC incorrectly in works contracts

In April 1980[105], MoR, on the recommendations of the Committee of Directors and Chief Engineers (Construction) issued instructions to provide PVC in the contracts valuing ₹ 25 lakh and above. In January, 1987[106], it was decided that PVC shall be applicable only in the contracts where stipulated period of completion is more than one year. In September, 2007[107], MoR, pursuant to the recommendations of Executive Directors Committee, decided that PVC shall not be applicable for tender value less than ₹ one crore irrespective of the contract completion period. In December 2008[108], the existing tender value limit of ₹ one crore for applicability of PVC was reduced to ₹ 50 lakh. In December 2012[109], MoR

[101]MoR's letter No.2007/CE-I/CT/18 Pt. 19 dated 14 December 2012
[102]Period of three months just following the Base month (Month of opening of tender/Month of negotiation, when negotiation held) is reckoned as Quarter. Quarter under consideration is a period of three months and not a calendar quarter. Average of the indices of the three months falling in the Quarter under consideration is taken into account for calculation of price variation.
[103]CR-05, ER-05, NER-01, NWR-04, SCR-18
[104]CR-04, NER-01, NWR-02, SCR-25, WR-01
[105]MoR's letter No. 80/WI/CT/10 dated 25 April 1980
[106]MoR's letter No. 85/WI/CT/7 dated 20 January 1987
[107]MoR's letter No. 2007/CE I/18 dated 28 September 2007
[108]MoR's letter No. 2008/CE I/CT/Con/7 (PCE/GM) dated 15 December 2008
[109]MoR's letter No.2007/CE-I/CT/18 Pt. 19 dated 14 December 2012

reiterated its instructions that PVC shall be applicable only for tenders of value of ₹ 50 lakh and more irrespective of the completion period. In October 2014[110], MoR clarified[111] that PVC shall be applicable only for contracts of value (contract agreement value) ₹ 50 lakh and above irrespective of the contract completion period. In February 2018[112], MoR, in order to simplify and enhance the pace of works, decided to remove the applicability of PVC in all the works contracts tender having value of less than ₹ five crore. Thus, the monetary limits for applicability of PVC in the works contracts was revisited and revised by the MoR from time to time.

Audit reviewed 198 contracts valuing below ₹ 50 lakh (where works contracts tenders were invited between January 2013 and February 2018) to verify the compliance of MoR's instructions by the Zonal Railways and observed the following:

- Out of 198 contracts[113] test checked, in 31 contracts[114] in six Zonal Railways, PVC was included in contravention of MoR's instructions.
- Out of 31 contracts, in two contracts (CR-01 and SER-01), ₹ 0.04 crore was paid towards price variation to contractors. In 27 contracts, no payment of Price Variation was made to the contractors till March 2019. In two works contracts, details of payment of price variation to contractors were not available.

Due to inclusion of PVC in 31 works contracts, Railways are liable for payment of price variation to the contractors.

Audit reviewed another 123 contracts in 15 Zonal Railways and one Production Unit, where the tenders were invited after February 2018 and the Contract Agreement value was less than ₹ 5 crore. Audit observed

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[110]MoR's letter No.2007/CE-I/CT/18/Pt.19 (FTS-8798) dated 15 October 2014
[111]MoR also clarified that decision to apply the PVC in the works contracts with contract agreement value below or above ₹ 50 lakh will be taken by the competent authority to accept the tender or Senior Administrative Grade Officer of the executive department, whichever is higher. The decision shall be taken with concurrence of associate finance and reasons shall be recorded in writing and taken before issuance of Notice Inviting Tender (NIT). This should be incorporated in Special Conditions of Contract (in tender document and contract agreement).
[112]MoR's letter No.2017/Trans/01/Policy dated 8 February 2018
[113]In 157 contracts, PVC was not included in the contract agreements. In 10 contracts (NR-03, SR-01, WR-06), PVC was included but with the condition that no price variation shall be paid for the contract agreement value below ₹ 50 lakh.
[114]CR-02, ECoR-02, ECR-10, NR-07, SER-03, SWR-07

that out of 123 contracts[115], in 23 contracts[116] in seven Zonal Railways, PVC was included disregarding the MoR's instructions of February 2018. No payment of price variation was made to the contractors in these contracts. However, due to inclusion of PVC in contravention of MoR's order, Railways are liable for payment of price variation in these contracts.

3.1.5.5 Payment of Price Variation during extended period of contract

Price variation either upward or downward shall be applicable up to the stipulated date of completion of work including the extended period of completion if such extensions were granted due to administrative failure under Clause 17-A of Indian Railway Standard GCC.

In case extension is granted due to contractor's failure under Clause 17-B of the GCC, the following procedures are adopted:

(i) if the indices increase above the indices applicable to the last month of original completion period, price adjustment shall be limited to the amount payable as per the indices applicable to the last month of the original completion period, or

(ii) till the extended period granted under Clause 17-A of the GCC.

In case, the indices fall below the indices applicable to the last month of original or extended period of completion granted under Clause 17-A of GCC, the lower indices shall be adopted for the price adjustment for the period of extension under Clause 17-B of the GCC[117].

The MoR had issued instructions that Zonal Railways should invite tenders only when they are fully prepared to hand over the site and supply the plans to contractors. The works contracts should not be awarded unless soil testing, site investigations *etc.* have been completed, all plans, drawings and estimates duly approved/sanctioned by the competent authority and that there was no hitch in handing over the site to the contractor.

During review of 886 contracts, audit observed that

- In 684 contracts, extensions were granted only on Railway's account (under Clause 17-A).

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[115] In 78 contracts, PVC was not included in the contract agreements. In 22 contracts (NR-05, SWR-07, WR-10), PVC was included with the condition that no price variation shall be paid for the contract agreement value below ₹ 5 crore.

[116] CR-01, ECoR-01, ECR-10, ER-03, Metro Rly.-03, NER-01, NR-04

[117] Clause 46-A.10 of Indian Railways Standard GCC

- In 21 contracts, extensions were granted only on contractor's account (under Clause 17-B).
- In 104 contracts, extensions were granted on both Railway's and contractor's account (under Clause 17-A and 17-B).
- In the remaining 77 contracts, no extension was granted.

During review of 886 contracts, audit observed that in 684 contracts, extensions were granted for completion of contracts on Railway's account under Clause 17-A of the GCC due to reasons exclusively attributable to Railway Administration. Extensions were granted to contractors due to reasons which could have been avoided such as failure in providing land/clear sites, delay in making available drawings and designs, change in scope of work *etc*. Railway Administration extended the contract period in a routine manner under Clause 17-A. Further, extensions were granted several times in single contracts for multiple reasons. The reasons beyond the control of Zonal Railways were attributed to power shutdown, monsoon/rain/water logging *etc*. Such reasons included delay in forest clearance, non-availability of sand/brick in the market, local agitation, security restrictions *etc*.

Granting extensions in a routine manner on reasons as mentioned above that are mostly foreseeable reflect the laxity/lack of preparedness on the part of Railways in execution of works contracts.

Owing to extensions granted on Railway's account, 634 works[118] suffered delay as shown below:

Delay in completion of work	No. of works contracts
Up to 6 months	91
6 months to 1 year	131
1 year to 2 years	215
2 years to 3 years	97
3 years to 5 years	71
More than 5 years	29

Due to granting extensions, Railway Administration had to make an avoidable payment of ₹ 187.51 crore to the contractors towards price variation in 514 contracts under Clause 17-A. In 67 contracts, there was short payment of ₹ 2.19 crore by the Railway Administration towards price variation. Financial implication was worked out in audit by freezing the indices on the original date (month) of completion. Payment of price

[118] In 50 contracts, the details were not available.

variation in 103 contracts during the extended period was yet to be made. This was undischarged liabilities of Railway Administration.

Audit further observed that out of 684 Works Contracts, where extensions were granted to the contractors on Railway's account, in 95 Works Contracts[119] in 16 Zonal Railways and one Production Unit, there was an excess payment of price variation amounting to ₹ 18.13 crore. This was due to incorrect adoption of Base month, index, component percentage *etc*. while making the payment of price variation to the contractors. This issue has also been commented upon separately in the paragraphs.

Thus, granting extensions on Railway's account led to delay in completion of works. Also, undue financial benefits were extended to contractors in the form of excess payment of price variation.

In 21 contracts, extensions were granted exclusively under Clause 17-B on contractor's' account. Railway Administration had to make an avoidable payment of ₹ 0.85 crore towards price variation in seven contracts. There was short payment of ₹ 0.15 crore in 10 contracts. Payment of price variation was not made in four contracts.

In 104 contracts, extensions were granted under both Clause 17-A and Clause 17-B. Railway Administration made avoidable payment of ₹ 18.52 crore towards price variation during extended period.

Thus, total avoidable expenditure of ₹ 206.88 crore was incurred by the Railways towards price variation during extended period of contact due to delays attributable on the part of Railways, contractors and both Railways as well as contractors.

Payment of price variation during extended period of contract due to non-fulfillment of various pre-requisites before awarding contracts was highlighted in Chapter-2-Management of Works Contracts in Indian Railways of Audit Report No.48 of 2015 (Railways). As a remedial action, MoR re-iterated (January 2018) that either the contracts for works should not be awarded without completion of pre-requisites such as site clearance, soil investigations and preparation of all drawings/designs/plans *etc.* or in case such an action was warranted for expeditious completion of the work, the requisite work should be completed in time to hand over the same to contractor immediately so that the progress of work was not hampered. The MoR also stated that

[119] CR-3, ECoR-3, ECR-5, ER-3, NCR-9, NER-11, NR-8, NWR-7, SECR-2, SER-7, SR-8, SWR-5, WCR-1, WR-7, SCR-12, NFR-2, CLW-2.

extensions of time for completion of contacts should not be granted in a routine manner.

However, the Zonal Railways failed to address these issues and ensure compliance of these instructions for timely completion of works.

3.1.5.6 Recovery from contractors due to de-escalation of Price Indices

Price Variation Clause is a tool to safeguard against the inflation/deflation linked to price indices. This is included in contracts to take care of the fluctuation in prices of raw materials in the market and to compensate both the Railways and the contractors from the fluctuation in rates. During review of works contracts, audit noticed that in some cases Zonal Railways ignored the downward trend in the indices.

Out of total 886 contracts, in 196 contracts[120] in 10 Zonal Railways and two Production units, de-escalation in the price indices was noticed. Audit observed that effects of lower indices/rates were adjusted in all the contracts except five contracts[121] in three Zonal Railways. This resulted into non-recovery of ₹ 0.38 crore from the contractors.

Failure to recover the amounts from contractors due to de-escalation of price indices indicated lack of monitoring by the Executive as well as Accounts Departments.

3.1.5.7 Application of Price Variation formula in works contracts

Clause 46-A of the GCC prescribed formulae to be used for works contracts. Separate percentages for labour, materials, fuel *etc.* according to type of works to be carried out are prescribed for calculation of price variation. Fixed components, specific payments made to consultants, materials supplied by Railways at fixed rate *etc.* are to be excluded from the gross value of the work for the purpose of payment of price variation.

Audit observed that in 68 contracts in 12 Zonal Railways and one Production Unit[122], price variation formula/components percentage/indices were applied incorrectly. It was observed that two different percentages of material components were adopted in a single contract. Price Variation was paid on 'material' component in contracts for transportation of materials. For price variation calculation on Ballast, Index of 'All commodities' was applied instead of 'Stone chips'. Fuel component was

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[120] CR-22, CLW-08, DLW-13, ECR-21, ER-43, Metro Rly.-13, NR-21, NWR-03, SECR-07, SER-01, SR-04, SWR-40

[121] CR-01, NWR-03, SER-01,

[122] CR-09, CLW-02, ECoR-03, NCR-01, NER-01, NFR-04, NWR-12, SECR-05, SER-03, SR-01, SWR-02, WR-01, NR-24

applied as 40 *per cent* instead of 15 *per cent*. Material component was taken as 40 *per cent* and 25 *per cent* in different quarters in a single contract.

Thus, incorrect application of price variation formula resulted into excess payment of ₹ 11.10 crore in 43 contracts[123] and short payment of ₹ 0.90 crore in 25 contracts[124]. Some of the cases have been discussed below:

- In NFR, two contracts were awarded (February 2013 and March 2015) for manufacturing and supply of machine crushed track ballast in respect of two projects namely Lumding - Silchar (LMG-SCL) and Kumarghat - Agartala (K-A) projects respectively. Machine crushed stone ballast was manufactured mechanically at the contractor's crushing unit without involving labour. In the GCC, for Ballast and Quarry products contracts, labour component was provided as 55 *per cent*. There was no provision in the GCC for allowing different percentages for machine crushed and hand crushed ballast. For 'Other Works Contracts', 30 *per cent* labour component was provided.

  Audit observed that labour component of 55 *per cent* was applied in calculation of price variation. As the works contract was not labour intensive, labour component should have been adopted as 30 *per cent* prescribed for "Other works contracts". Thus, incorrect application of labour component resulted in avoidable payment of price variation of ₹ 3.52 crore in two contracts.
- In SECR, one contract which was purely for transportation/loading/unloading of railway materials from one place to another, 'material' component was included incorrectly in the PVC formula. This resulted in excess payment of ₹ 0.08 crore towards price variation to contractor.
- In SECR, in four contracts for supply of ballast, price variation was paid based on the index of 'material' instead of index of 'stone chips'. This resulted in excess payment of ₹ 0.30 crore towards price variation to contractor.
- In NWR, there were 12 composite works contracts involving various types of activities viz. Earthwork, Ballast *etc.* In these contracts, price variation was calculated on the basis of prescribed percentage for components for individual activities viz. Earthwork, Ballast *etc*. The correct procedure was to adopt the percentages

[123]CR-07, CLW-02, ECOR-03, NCR-01, NER-01, NFR-04, NWR-06, SECR-05, SER-03, SR-01, SWR-01, WR-01, NR-08
[124]NWR-06, SWR-01, CR-02, NR-16

applicable in 'Other works contracts'. There was an excess payment of ₹ 0.30 crore in six contracts and short payment of ₹ 0.15 crore in six contracts.

- In CR, in eight contracts of "Ballast supply and stacking", index of 'All commodities' was adopted for calculation of price variation instead of 'Stone chip/slab' index. This resulted in excess payment of ₹ 0.10 crore in six contracts and short payment of ₹ 0.01 crore in two contracts.
- In Metro Railway/Kolkata, Labour Index of Kolkata was applied instead of All India labour Index. In reply to audit's observations, the Railway Administration stated that this was considered erroneously. However, there was no loss to Railways as this was lower as compared to All India Labour Index. Applying Kolkata Index in place of All India Labour Index was a violation of conditions of contract agreement and also GCC.
- In NFR, in one contract, Index for 'Material' was taken as 132 instead of 182 while making payment of price variation. Due to wrong adoption of index, Railway Administration made an excess payment of ₹ 6.24 crore to the contractor.

The above instances were indicative of lack of monitoring by the Executive and Accounts Departments while passing the PVC bills of the contractors. There was no provision in the GCC for allowing different percentages for machine crushed and hand crushed ballast.

3.1.5.8 Revision of instructions for PVC as per the provisions of GFR

Provisions of GFR, 2005 are applicable to all the Central Government Ministries/Departments. As per Chapter 8 Rule 204 (viii) of GFR, 2005, price variation was payable only in long term contracts where delivery period extends beyond 18 months. GFR, 2005 was revised in February, 2017 wherein the above provisions of GFR, 2005 were retained/continued in GFR, 2017. Audit observed that the rules/provisions of GFR for applicability of PVC in long term contracts were not incorporated in GCC for Works Contracts by MoR. It was observed that in the GCC for Services (issued by MoR in February/March 2018), the condition of applicability of PVC in long term contract where delivery period extends beyond 18 months was incorporated.

Audit reviewed the instructions issued by MoR on PVC and observed that earlier in January 1987[125] PVC was made applicable only in the contracts where the stipulated period of completion was more than one year. However, in September 2007[126], on the recommendations of the Executive Directors Committee, condition of minimum prescribed limit of one year for applicability of PVC was deleted. Thus, from September 2007, PVC was delinked with the completion period of the works contracts.

Review of 886 works contracts selected in the Zonal Railways revealed that in 775 contracts[127], PVC was included in contravention to the provisions of GFR although the completion period was 18 months or less. Out of 775 contracts, in 733 contracts[128], price variation of ₹ 893.09 crore was paid to the contractors. Railways, by incorporating the rules/provisions of GFR in the GCC, could have avoided payment of huge amount towards price variation to the contractors.

Audit further observed that MoR while issuing the Revised GCC for Works Contracts in November 2018 had also not taken into consideration the various provisions of Rule 225 of GFR, 2017 such as applicability of PVC in long term contracts, ceiling on price variation *etc.*

Audit randomly selected another 164 contracts in the Zonal Railways where tenders were invited after February, 2017. Out of 164 contracts, PVC was included in 137 contracts[129] in contravention of the provisions of GFR, 2017. In 27 cases, PVC was not included. Due to non-observance of the provisions of GFR, 2017, Railway Administration had to make avoidable payment of price variation of ₹ 19.94 crore to the contractors in 78 contracts[130]. In 59 contracts, no price variation was paid to the contractors till March 2019. However, Zonal Railways are bound by contractual obligation to bear the future liability of price variation in these works contracts due to inclusion of PVC in the contracts.

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[125] MoR's letter No.85/WI/CT/7 dated 20 January 1987

[126] MoR's letter No. 2007/CE I/18 dated 28 September 2007

[127] In 105 contracts, completion period of contracts was more than 18 months. In six contracts, details of Date of start of work and stipulated completion of work were not available.

[128] In 17 works contracts, price variation of ₹ 2.05 crore was recovered from the contractors due to de-escalation. In 25 works contracts, price variation was yet to be paid.

[129] Out of which, 36 contracts had been completed.

[130] CR-05, DLW-04, ECOR-02, ECR-01, ER-07, NCR-01, NER-06, NFR-01, NR-12, NWR-11, SCR-07, SECR-02, SER-02, SR-06, WCR-05, WR-06

Rules[131] of GFR of 2005 and 2017 provide that 'No price variation will be admissible beyond the original Scheduled Delivery Date for defaults on the part of the supplier'. However, GCC, 2014 provides for the payment of price variation under Clause 17-B for default on part of the contractor (*i.e.* extensions on contractor's account). Thus, rules/provisions of the GFRs were not included in the GCC by the MoR.

Audit observed that out of 886 contracts, Zonal Railways granted extensions under Clause 17-B for the delay on contractor's account which was in contravention of the provisions of GFR. Consequently, in 56 works contracts, price variation of ₹ 6.91 crore was paid to the contractors. Railways, by incorporating the rules/provisions of GFR in the GCC, could have avoided payments towards price variation to the contractors for delay on their part beyond the scheduled completion period of contracts.

3.1.5.9 Ceiling on Price Variation

As per the provisions of GFR, 2017, PVC should provide for a ceiling on price variations particularly where escalations are involved. It could be a percentage per annum or an overall ceiling or both.

Audit reviewed the instructions issued (April 1980) by MoR on ceiling on PVC and observed that no reimbursement/recovery due to variation in prices up to five *per cent* of the amount payable to the contractor was to be made. Price variation was to be made in excess of five *per cent* and was limited to 15 *per cent* of the amount payable to the contractor. The MoR removed (January 1987[132]) the maximum limit of price variation. In April 1996[133], MoR decided that for the contracts with completion period up to one year, no PVC shall be provided; for the contracts between one year to two years duration, price variation shall be limited to 10 *per cent* (15 *per cent* minus five *per cent* floor price) of the amount finally payable to contractor. For the contracts of more than two years' duration, price variation shall be limited to 20 *per cent* (25 *per cent* minus five *per cent* floor price) of the amount finally payable to contractor. The upper limit of PVC was deleted in September 2007 and lower limit of PVC of five *per cent* was also deleted in March 2008. Thus, with effect from March 2008, there was no ceiling on PVC in works contracts which was in contravention of GFR.

[131]Rule 204 (viii) (h) of GFR, 2005 and Rule 225 (viii) (h) of GFR, 2017
[132]MoR's letter No.85/WI/CT/7 dated 20 January 1987
[133] MoR's letter No. 85/WI/CT/7-Vol.I dated 4 April 1996

Audit observed that since the provisions of GFR were not included in GCC by MoR; price variation was being paid to the contractors without any ceiling. Percentage of price variation to total payments made to contractors (in 886 cases checked in audit) was as under:

Percentage of Price Variation to total payments made to contractors	No. of contracts
Less than 1 *per cent*	140
1 *per cent* to 5 *per cent*	481
5 *per cent* to 10 *per cent*	173
10 *per cent* to 20 *per cent*	65
More than 20 *per cent*	27

3.1.6 Irregularities noticed in payment of Price Variation in NFR

Audit noticed some important cases of irregularities in payment of price variation to contractors in NFR. These are discussed in the succeeding paragraphs:

3.1.6.1 Excess payment of Price Variation due to incorrect adoption of indices of Base month and Quarter under consideration

In NFR, audit observed that while calculating the price variation, the price indices of various components for the Base month and average index for the quarters were taken incorrectly. Due to adoption of incorrect indices of various components, NFR Administration made excess payment of ₹ 1.94 crore to the contractor in one contract.

3.1.6.2 Base month for payment of Price Variation in 'Two packet system of tendering' in works contracts

The MoR had introduced (1986) 'two packet system of tendering' for works tenders. MoR's circular of August 2012 *inter alia* stipulated that the tenderers shall submit their quotations/offers in two sealed envelopes with one cover containing the Technical and Commercial offers and the other cover containing the Financial bids. First packet shall be for the capability, possession of appropriate machinery and equipment, financial strength, experience *etc.* of the tenderer. After evaluation by Tender Committee, if the offers were found acceptable by the competent authority, second packet containing financial bids of the eligible bidders shall be opened and tenders shall be processed for finalization in the normal manner.

Review of records of Bhairabi-Sairang New Line project in NFR revealed that Railway Administration had executed several Contract Agreements of the project through 'two packets system of tendering'. However, while determining the Base period (month) for calculation of price variation, no standard practice was followed. For different contracts, different months were reckoned as base period arbitrarily. In some contracts, date of opening of Technical bid was taken as Base month while in some other cases, date of opening of Price bid was taken as Base month even when negotiation was held. In some cases, date of negotiation with the contractors was considered.

In absence of clear guidelines from MoR for adoption of Base month in 'two packet system of tendering', NFR Administration adopted different practices for reckoning Base month. The MoR needs to issue specific instructions/guidelines for adoption of Base month for payment of price variation in 'two packet system of tendering' in works contracts.

3.1.6.3 Incorrect payment of Price Variation on inflated value of work done

In NFR, five contracts were executed during the period July 2013 to November 2016 for Bhairabi-Sairang New Line Project. Audit observed that the value of work done in the price variation bills was inflated fraudulently in all the five contracts. For instance, Gross value of work done in the CC Bill No.XVIII of ₹ 7.24 crore was increased to ₹ 17.24 crore. The inflated figures were considered for calculating the price variation. This resulted into excess payment for price variation amounting to ₹ 9.54 crore in eight bills of the five contracts as shown below:

Sl. No.	CA No. and Date	CC Bill No.	Gross value of work done-actual (₹)	Inflated Gross value of work done (₹)	Difference (₹)	Excess price variation paid (₹)
1.	Con/B-S/1727 dt. 09.07.2013	XVIII	72429751.15	172429751.15	100000000	38119146.98
		XXVII	65464822.42	165464822.42	100000000	
2.	Con/B-S/1736 dt. 25.07.2013	V	36971040.60	136971040.60	100000000	21558892.13
3.	Con/B-S/2063 dt.05.11.2015	III	32463396.94	132463396.94	100000000	13615575.67
		VIII	20712144.58	120712144.58	100000000	
4.	Con/B-S/2280 dt.22.11.2016	III	29277457.06	129277457.06	100000000	15578084.16
		VIII	15623659.86	115623659.86	100000000	
5.	Con/B-S/2278 dt.22.11.2016	III	18032728.11	118032728.11	100000000	6618533.09
					Total	**9,54,90,232.03**

Submission of inflated PVC bills by the contractor and failure of the Northeast Frontier Railway (NFR) Administration to detect such cases during vetting at various stages was indicative of ineffective monitoring and weak internal control.

Principal Executive Director (Accounts)/MoR remarked (September 2019[134]) that PVC bills of a contractor on NFR were manipulated by the concerned Executive Department to make excess payment to contractor in several projects/contracts. This manipulation was not detected during

[134] MoR's letter No.2019/ACII/25/5 dated 23 September 2019

internal check. Considering the failure in internal checks of the PVC bills, Principal Executive Director (Accounts)/MoR issued instructions to Principal Financial Advisors of all the Zonal Railways to review their respective systems and ensure that such failure of internal check does not recur.

However, the fact remains that Executive and Accounts Departments did not exercise proper checks in processing the PVC bills preferred by the contactors. Further, Principal Executive Director (Accounts)/MoR's assertion that Executive Department of the Railway was involved in manipulation of the figures of PVC bills to make excess payment to contractor was indicative of collusion of Railway officials with the contractor.

3.1.7 Other cases - Change in Wholesale Price Index Base

Ministry of Commerce and Industry had revised Base year of the All India Wholesale Price Index (WPI) from 2004-05 to 2011-12 with effect from April 2017. Discontinuation of Indices with Base year 2004-05 rendered the existing price variation calculation with Base Index 2004-05 unworkable. In order to work out the price variation as per revised WPI 2011-12, MoR issued instructions in August 2018[135]. According to this instruction, Indices with Base year 2004-05 were to be used for price variation calculation up to January 2017. From February 2017 onwards, following method was to be used:

- Contract price shall be updated upto January 2017 with the price indices of 2004-05 series. The updated price shall be taken as Base price for applying the price variation on indices of January 2017 for 2011-12 series.
- Base price of January 2017 calculated above shall be further updated after January 2017 using price variation formula as per indices of 2011-12 series.

Audit observed that MoR's above instructions were followed correctly in nine Zonal Railways[136] and one Production Unit while calculating the amount of price variation payable to contractors. However, in eight Zonal Railways and one Production Unit[137], MoR's instructions were not being followed. The following was observed:

- In NER, PVC bills were being paid without updating the Contract price and Base price as per MoR's instructions.

[135] MoR's letter No. 2007/CE-I/CT/18/Pt.19 dated 28 August 2018
[136] ECoR, NEFR, NR, NWR, SCR, SECR, SR, WCR, WR, DLW
[137] CR, ER, ECR, NCR, NER, SER, SWR, CLW, Metro Rly.

- In NCR, Railway Administration was using Indices as per Base year 2011-12 while the Base month for these contracts was prior to January 2017. This was a clear violation of MoR's instructions of August 2018. There was an excess payment of ₹ 0.15 crore in seven contracts and short payment of ₹ 0.20 crore.
- In CR, WPI 2011-12 series was directly adopted for calculation of price variation instead of updating contract rates till January 2017 as provided in MoR's instructions. This resulted into excess payment of ₹ 0.07 crore in two contracts and short payment of ₹ 0.01 crore in five contracts. Audit observed that CR Administration had referred the matter to MoR in May 2019 with request to review the policy of August 2018. However, no reply was received from MoR on CR's above reference.
- In ER, audit observed excess payment of ₹ 0.37 crore in 10 contracts (eight completed and two on-going contracts) due to incorrect updation of Indices of Material, Fuel and Cement. There was short payment of ₹ 0.15 crore in another 10 contracts (eight completed and two on-going contracts).

3.1.8 Conclusion

Price Variation Clause (PVC) was incorporated in General Conditions of Contract (GCC) to safeguard against change in prices of labour, material, fuel and other components. The MoR had issued various instructions from time to time in this regard. In General Financial Rules (GFR), PVC was incorporated in respect of long-term contracts especially contracts of more than 18 months. In GFR, ceiling on payment of price variation either in terms of a fixed percentage or fixed amount was provided. However, the above provisions of GFR were not incorporated in GCC, 2014 and Revised GCC, 2018 by MoR resulting in avoidable payment towards price variation to the contractors in works contracts.

Irregularities such as incorrect adoption of Base month/quarter, incorrect percentage of components, incorrect adoption of labour index *etc*. were noticed in the Zonal Railways. In most of the works contracts, extensions were granted on Railway's account. This resulted not only in delay in completion of works but also led to payment of considerable amount towards price variation to the contractors.

Monitoring mechanism for checking of price variation bills was deficient. Inaccuracies in computation of price variation reflected that due diligence was not exercised by the Executive and Accounts Department. Audit observed cases of fraudulent payment of price variation to contractors in NFR due to failure in internal check of price variation bills.

Computerised database of works contracts (with PVC and without PVC) were not found to be maintained in the Zonal Railways. Maintaining the database could have enabled the concerned authorities to ensure compliance of MoR's instructions on application of PVC in works contracts.

There was avoidable/excess payment of ₹ 1,172.04 crore and short payment of ₹ 8.76 crore towards price variation to the contractors in the works contracts test checked in audit.

3.1.9 Recommendations

- ***Ministry of Railways needs to revisit GCC w.r.t Works Contracts and incorporate the provisions of GFR relating to applicability of PVC in long term contracts (more than 18 months) and a ceiling on PVC amount payable to contractors.***
- ***Ministry of Railways should issue clear instructions relating to contract matters such as adoption of the Base month in case of negotiation and 'two packets system of tendering', percentage of labour to be reckoned for machine crushed ballast etc.***
- ***Ministry of Railways may direct the Zonal Railways to maintain computerized database of all the works contracts (with PVC and without PVC) to avoid incorrect inclusion of PVC in the contracts below the stipulated contract agreement value.***

The matter was taken up with MoR in October 2020; no reply was received (February 2021).

3.2 Unproductive expenditure on construction of Limited Height Subways: Northern Railway

Limited Height Subways (LHSs), in lieu of Unmanned Level Crossings (UMLCs), constructed on Rohtak-Panipat section of Delhi Division, were submerged and remained unutilized rendering whole expenditure of ₹ 16.19 crore unproductive. The main objectives for elimination of Unmanned Level Crossings *i.e.* to prevent loss of human lives and road accidents apart from better traffic movement could not be achieved due to LHS remaining unusable.

Level Crossings (LCs) facilitate smooth running of traffic in a regulated manner. However, they pose a major challenge in the operation of safe running of trains. The maximum fatalities in Railways occur due to accidents at Unmanned LCs (UMLCs). As per Indian Railways Vision 2020, nearly 70 *per cent* of the fatalities in railway mishaps take place at UMLCs. Thus, LCs are vulnerable points for accidents. Railways remove

UMLCs by constructing Road Over Bridges (ROBs), Road Under Bridges (RUBs), Limited/Normal Height Subways (LHSs/NHSs) *etc.*

Para 2 of Special Conditions of Work of Elimination of LC by providing LHS stipulates that the work will mainly be executed at the location given for the LC. However, the location of work can be changed within the jurisdiction of Senior Divisional Engineer/Divisional Engineer, if the need arises. No extra claim of payment shall be entertained in this regard. Railway reserves the right for change of such locations. Further, as per Para 41 of General Conditions of Contract, in the event of any of the provisions of the contract is required to be modified after the contract documents have been signed, modification shall be made in writing and signed by the Railway. Thus, the Competent Authority can change location of LCs for construction of LHSs, after tendering and awarding of contract, through written orders.

Audit reviewed the contracts for construction of LHSs, in lieu of LCs, on Rohtak-Panipat Section[138] over Delhi Division of Northern Railway and the following irregularities were noticed:

(a) Contract for construction of LHSs at LC Nos. C-13 and C-23 on Rohtak-Panipat Section

Contract[139] for construction of LHSs in lieu of UMLC Nos.C-13[140] and C-23 on Rohtak - Panipat Section was awarded in February 2013 with the date of completion by June 2013. In respect of LC No. C-23, audit noticed that the local public[141] informed the Railway Administration about high water level at LC No.C-23 and requested (May 2017) for construction of road near LC No. C-24 instead of construction of LHS at LC No.C-23. However, Railway Administration did not take any cognizance of the issues raised by the local public and took no action to stop the work at LC No. C-23. The work was completed[142] by the contractor at a cost of ₹ 1.06 crore.

[138]under Assistant Divisional Engineer/Rohtak, Delhi Division, Northern Railway

[139]Construction of LHS in lieu of UMLC No.C-13 at km 12/5-6 and C-23 at km 22/4-5 on Rohtak-Panipat Section by Cut and Cover Method (In this method, traffic block of six hours is required and complete track is dismantled, excavation of embankment to the desired level is done and insertion of precast RCC segments is done) awarded to M/s B.S. Sangwan/Sonepat (Haryana)

[140]Due to high water table, execution of work at the site of C-13 was not feasible and location was changed to C-27.

[141] Sarpanch of Village

[142]at a cost of ₹ 2.12 crore (₹ 1.06 crore on each LHS)

Audit conducted joint inspection with the Railway Officials on 6 March 2019 of the site C-23. In the joint inspection, the LHS was found submerged and not functioning as shown in Figure 3.1.

Figure 3.1: LHS at LC No. C-23 (Photograph taken on 6 March 2019)

(b) Contract for construction of LHSs at LC Nos. C-17, C-18 and C-19 on Rohtak-Panipat Section

Contract[143] for construction of LHSs in lieu of UMLC No.C-17, C-18 and C-19 on Rohtak - Panipat Section was awarded in February 2014 at a cost of ₹ 4.33 crore with the date of completion by February 2015. The contractor started the work in May 2014. However, date of completion of work was extended (on seven occasions) up to January 2019. High water table and difficulty in de-watering were amongst the reasons for granting the extensions. While the work was in-progress, the contractor informed (January 2016, June 2017 and December 2017) the Railway Administration that the ground water level at LC Nos. C-18 and C-19 was very near to ground level and thus, construction of LHSs was very difficult. The Railway Administration changed the location of LC Nos. C-18 and C-19 to LC No. C-10[144]. These LHSs (at LC Nos. C-17 and C-10) were also covered with water but the work was not stopped. Audit noticed that no Corrigendum to the Contract for change of site was issued. The work was completed at a cost of ₹ 6.49 crore.

Audit conducted joint inspection of the LHSs with the Railway Officials on 18 September 2018 (C-17) and 6 March 2019 (C-10). In the joint

[143]Construction of LHS in lieu of UMLC Nos. C-17 at km 18/7-8, C-18 at km 19/7-8 and C-19 at km 20/4-5 on Rohtak - Panipat Section by Cut and Cover Method awarded to M/s Pushpraj Enterprises/Bihar
[144]near Makroli Station

inspection, both the LHSs were found submerged with water and not functioning as shown in Figures 3.2 and 3.3 below:

Figure 3.2: LHS at LC No.C-10 (Photograph taken on 6 March 2019)

Figure 3.3: LHS at LC No. C-17 (Photograph taken on 18 September 2018)

(c) Contract for construction of LHSs at LC Nos. C-12, C-15 and C-38 on Rohtak-Panipat Section

Contract[145] for construction of LHS in lieu of UMLC No. C-12, C-15 and C-38 on Rohtak - Panipat Section was awarded in February 2014 at a cost of ₹ 4.27 crore with date of completion by February 2015. Date of completion of work was subsequently extended up to February 2019 due to increased scope of work.

During execution of work, the contractor informed the Railway Administration that due to high water level at LHS No. C-15, construction work could not be completed in time. Due to high water table and agitation by the villagers, location of the two UMLC Nos.C-12 and C-38 was changed to C-22 and C-82 and work was completed at a cost of ₹ 6.36 crore.

Audit conducted joint inspection of the LHS at C-15 with the Railway Officials on 6 March 2019. In the joint inspection, the LHS was found submerged and not functioning as shown in the Figure 3.4 below:

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[145] Construction of LHS in lieu of UMLC No. C-12 at km 12/3-4, C-15 at km 16/4-5 and C-38 at km 41/2-3 on Rohtak - Panipat Section by Cut and Cover Method awarded to M/s KSC Construction Company/Bhiwani (Haryana)

Figure 3.4: LHS at LC No. C-15 (Photograph taken on 6 March 2019)

Payment of ₹ 2.12 crore (approx.) was made to the contractor for LHS at C-15.

(d) Contract for construction of LHS on LC Nos. C-32, C-33 and C-36 on Rohtak-Panipat Section

Contract[146] for construction of three LHSs in lieu of UMLCs Nos.C-32, C-33 and C-36 on Rohtak - Panipat Section over Delhi Division was awarded in May 2014 at a cost of ₹ 4.37 crore with the date of completion by May 2015. In June 2014, the Assistant Divisional Engineer, citing some unavoidable circumstances, changed the location of LC Nos. C-32, C-33 and C-36 to LC Nos. C-83 and C-84 on Delhi- Batinda section. From the records, it could not be ascertained whether any formal approval of the Competent Authority[147] for altering the sites for construction of LHSs was obtained. The contractor was instructed for construction of LHSs at the changed sites. No corrigendum to the contract for the change of site was issued.

Audit noticed that in the Measurement Books[148], name of the work was mentioned as construction of LHS at LC No.C-32, C-33 and C-36 on Rohtak - Panipat Section and location of the work was shown as LC Nos. C-83 and 84, which was incorrect. Also, the Completion Certificate for the work was issued incorrectly for the original sites *i.e.* LC Nos. C-32, C-33 and C-36 instead of the actual constructed sites. Construction work at the

[146]Construction of LHS in lieu of UMLC No.C-32 at km 34/0-1, C-33 at km 35/2 and C-36 at km 40/6-7 on Rohtak - Panipat section by 'Cut and Cover Method' awarded to M/s Hari Om Construction Company/Panipat (Haryana). In Cut and Cover Method, traffic block of about six hours is required in which complete track is dismantled, excavation of embankment to the desired level is done and insertion of precise Reinforced Concrete Cement (RCC) segments is done. After that, filling of gaps and linking of track is done.

[147]Senior Divisional engineer-IV/Northern Railway/New Delhi in Delhi - BTI section

[148]Measurement Book is a continuous record of measurements of work done by the contractor against a contract entrusted by the Railway Administration.

changed sites (*i.e.* C-83 and C-84) was completed at a cost of ₹ 6.52 crore. Audit observed that LHSs constructed at the changed sites could not be put into use/functioning as both LHSs were submerged and local public were unable to use these LHSs. Though the contractor had informed (August 2014) the Assistant Divisional Engineer/Rohtak that the water level at LC Nos. C-83 and C-84 was very near to ground level, Railway Administration did not take any action to stop the work.

Audit conducted joint inspection with the Railway Officials on 18 September 2018 (C-84) and 6 March 2019 of the sites (C-83). In the joint inspection, these LHSs were found submerged and thus, not functioning as shown in the Figures 3.5 and 3.6 below:

Figure 3.5: LHS at LC No. C-83 (Photograph taken on 6 March 2019)

Figure 3.6: LHS at LC No. C-84 (Photograph taken on 18 September 2018)

Due to non-functioning of LHS, Railway Administration deployed two Gatemen at UMLC (No. C-84) from October 2017 entailing additional expenditure on their Pay and Allowances. A sum of ₹ 0.31 crore (up to August 2020) was incurred on Pay and Allowances of these Gatemen.

From the above, it was evident that in all the cases (except LC Nos.15, 17 and 23) where location/sites of LHSs were changed, no formal approval of the Competent Authority was obtained. No Corrigendum to contract for change in location of the works was issued. The Assistant Divisional Engineer/Rohtak stated (August 2019) that locations were changed verbally by the Competent Authority due to high water table and agitation by villagers. However, even after change of sites, the LHSs at LC Nos. 10, 83 and 84 and LHSs at original sites LC No. 15, 17 and 23 remained submerged in water. No reports relating to Site survey or Soil test was available in the records of the Railway Administration. This indicates lack of due diligence in creation of crucial public facilities.

The main objective of construction of LHSs (in lieu of UMLCs) was to prevent loss of human lives and vehicles due to accidents apart from providing smooth traffic movement. However, these LHSs, being submerged in water, could not be used by the local public/road users. Thus, the objective of construction of LHSs could not be achieved and whole expenditure of ₹ 16.19 crore incurred on construction of these LHSs was unproductive.

The matter was taken up with MoR in September 2020; no reply was received (February 2021).

3.3 Loss due to indecision of Railway Administration in the matter of land acquisition: East Central Railway

Delay in payment of ₹ 3.20 crore for acquisition of land from State Authorities resulted in avoidable additional expenditure of ₹ 134.21 crore due to revision in Land Acquisition Act.

Ministry of Railways (MoR) sanctioned the work of Hajipur - Sagauli New Line in 2003-04 with Abstract estimate of ₹ 324.66 crore. In October 2007, MoR sanctioned the Detailed estimate of ₹ 528.65 crore. In January 2019, a Revised Estimate-cum-Material Modification amounting to ₹ 2,066.78 crore was sanctioned for the project. This was a new line project, land acquisition was an important element of the cost.

In the Detailed estimate (October 2007), there was provision of ₹ 115.16 crore for land acquisition of 2,043.96 acre. However, in the Revised Estimate-cum-Material Modification (January 2019), the requirement of land was pruned down from 2,043.96 acre to 1,812.84 acre at a cost of ₹ 999.24 crore.

Audit reviewed the progress of land acquisition in East Champaran[149]. The Railway Administration in July 2005 requested Collector/East Champaran to expedite the land acquisition of 962.59 acre (involving 49 Villages) for the construction of Hajipur - Sagauli New Line. In response, the Collector/East Champaran submitted (February 2006) an Estimate for ₹ 58.76 crore. Afterwards several requests were made from State authorities to Railway Administration for immediate deposit of ₹ 58.76

[149] District East Champaran (Acquisition of Land km 38.4 to km 149.83), Estimated land requirement: 802.050 acre, Rate per acre: ₹ 99.28 lakh, Estimated amount: ₹ 796.28 crore, Land actually acquired: 227.18 acre, Amount paid: ₹ 797.44 crore.

crore (in April, May, July and October 2006) so that land acquisition process may not stop. However, the Railway Administration did not deposit the same and considered demand of ₹ 58.76 crore for acquisition of 962.59 acre land being too high.

On enactment of Bihar Land Acquisition, Resettlement and Rehabilitation Act, 2007, State Authority/Champaran revised (March 2007) the cost of land to ₹ 98.72 crore (962.59 acre). Railway Administration deposited ₹ 17 crore (31 March 2007). In May 2007, Railway Administration requested State Authority/Champaran to put on hold payment to land losers and declaration of award until the issue of cost is resolved. However, after seven months, Railway Administration requested (December 2007) Collector/East Champaran to make payment to land losers but no further payment was made by it to State authority till 31 January 2012.

District Magistrate/East Champaran submitted (January 2012) again a Revised Estimate of ₹ 350.84 crore for 49 villages. A demand of ₹ 333.84 crore (₹ 350.84 crore minus ₹ 17 crore) which included the remaining amount of ₹ 3.20 crore for 28 villages was made. In the Revised Estimate, the estimated cost of 28 villages was still ₹ 20.20 crore. The possession of these land had already been provided to Railways as per sub section 3 (a) of section 17 of Land Acquisition Act, 1894.

Railway Administration again requested (February 2012) the District Magistrate/East Champaran to review the amount of demand for 21 villages where land acquisition was yet to be made. No action was taken to make payment of ₹ 3.20 crore. However, the Dy. Chief Engineer/Con/II/HJP had sent (March 2012) a proposal to Chief Engineer/CON/North/MHX for making payment of balance amount of ₹ 3.20 crore (*i.e.* balance amount of 28 villages) to District Authorities. In this letter, it was clearly mentioned that fund was available during current financial year (2011-12) under Pink Book Item No.12 and the reasonability of rates for these 28 villages were also accepted. Again in February 2013, the District Magistrate/East Champaran demanded ₹ 3.20 crore for 28 villages which was already acquired by Railway Administration. However, no payment was made.

In January 2016, District Magistrate/East Champaran revised the cost of entire 49 villages as per Central Government Revised Land Acquisition Act, 2013 which was effective from 1 January 2014. Under Section 109 of this Act, Bihar Government also revised earlier Act w.e.f. 27 October 2014. Resultantly, the estimated cost of all 49 villages escalated to

₹ 796.28 crore (₹154.41 crore for 28 villages for which land acquisition was already made and ₹ 641.87 crore for remaining 21 villages) *i.e.* about eight times the estimated amount in the year 2007 (*i.e.* ₹ 98.72 crore).

Railway Administration paid the entire amount of ₹ 796.28 crore (₹ 17 crore on 31 March 2007, ₹ 365 crore on 18 August 2016 and ₹ 414.28 crore on 18 October 2017) demanded by State Authorities. Railway Administration did not address the payment issue in right earnest for the land already possessed (land of 28 villages). Railway Administration did not make payment of ₹ 3.20 crore {₹ 20.20 crore minus ₹ 17 crore (which was already paid for 28 villages)} on priority basis which resulted in cost enhancement for acquisition of land for 28 villages (227.55 acre) to the tune of ₹ 154.41 crore from earlier valuation of ₹ 20.20 crore.

Railway Administration had to incur an additional expenditure of ₹ 134.21 crore which could have been avoided, provided Railway Administration had paid the balance amount of ₹ 3.20 crore on time.

The matter was taken up with Zonal Railway Administration in June 2019. In their reply, Railway Administration stated (November 2019) that ₹ 3.20 crore as balance 20 *per cent* of 28 villages was not paid at the appropriate time of demand due to paucity of funds/allotment. Further, award (Punchat) of 28 villages was not declared by East Champaran District Authorities even after payment of 80 *per cent i.e.* payment of ₹ 17 crore.

Reply of Railway Administration was not acceptable as the fund was available during the financial year under Pink Book Item No. 12. Further, District Collector, East Champaran vide letter dated 19 February 2013 clearly stated that due to non-deposit of balance amount of 28 villages, the award could not be made. Land acquisition policy was changed in 2014 and Railway Administration had sufficient time of about seven years for paying the balance amount of ₹ 3.20 crore.

Thus, lack of a prudent decision from Railway Administration resulted in avoidable extra expenditure of ₹ 134.21 crore on acquisition of land of 28 villages.

The matter was taken up with MoR in August 2020; no reply was received (February 2021).

3.4 Avoidable excess expenditure and blocking of capital with National Highway Division of Government of Odisha: East Coast Railway

As per the Memorandum of Understanding between Ministry of Railways (MoR) and Ministry of Road Transport & Highway (MORTH), there shall be no levy of supervision charges, departmental charges, maintenance charges, *etc*. in respect of construction of Road Over Bridge (ROB) where Railway track crosses National Highway. In contravention, East Coast Railway Administration paid these charges for which demands were raised by NH Division of Government of Odisha for construction of ROB No. 70 on Khurda Road - Bolangir new line. This resulted in avoidable expenditure of ₹ 6.92 crore.

Ministry of Railways (MoR) and Ministry of Road Transport & Highway (MORTH) signed a Memorandum of Understanding (MoU) in November 2014 for replacement of all Level Crossings on National Highway (NH) corridors by Road Over Bridges (ROBs)/Road Under Bridges (RUBs) in next five years subject to availability of fund. For construction of ROB where new railway line/gauge conversion lines cross NH, Clause A (4) of the MoU prescribe that MORTH/NHAI shall not levy supervision charges, departmental charges, maintenance charges and land lease charges. However, the MoU was silent on the ownership of the asset created in New Lines/Gauge Conversions and future revenue sharing, if any.

In Khurda Road - Bolangir New Broad Gauge (BG) Railway line which crosses NH-57, a provision of ROB No. 70 was made in the Detailed estimate at ₹ 1.03 crore in January 2007. MoR sanctioned the Detailed estimate in January 2011. Accordingly, East Coast Railway (ECoR) prepared a General Arrangement Drawing (GAD) in October 2013 for ROB No. 70 for approval by MORTH. While approving the GAD in April 2015, MORTH mentioned that the work would be executed as per the MoU of November 2014 signed between MORTH and Railway. The work would be executed by State Public Works Department as per NH standard/MORTH guidelines as a deposit work. The work was to be completed within two years (*i.e*. by 2017).

Subsequently, NH Division of Government of Odisha prepared a Detailed estimate of ₹ 48.72 crore[150] for construction of the ROB and forwarded

[150] ₹ 33.46 crore of civil engineering work, ₹ 5 crore for land acquisition, ₹ 3.09 crore as nine *per cent* agency charges and remaining ₹ 7.18 crore included one *per cent* quality control charge, 2.8 *per cent* of contingencies, 1.5 *per cent* for work charged establishment and five *per cent* per annum cost escalation *etc.*

(September 2015) to ECoR for countersignature and placement of fund. The estimate included an item 'Land Acquisition' - ₹ five crore. Without verifying the Detailed estimate of ₹ 48.72 crore, Finance Department of ECoR in November 2015 proposed release of fund in three phases[151]. However, in December 2015 the entire amount of ₹ 48.73 crore was deposited with the Executive Engineer, NH Division in anticipation of completion of the ROB work by 2018.

Audit collected the status of the ROB work from NH Division - Bhubaneswar, Government of Odisha and observed the following:-

- As of May 2019 (*i.e.* after a lapse of 3.5 years) out of total ₹ 48.73 crore deposited, the total expenditure was only ₹ 7.57 crore[152] and the financial progress of the work was only 16.8 *per cent*. ECoR justified[153] the one-time deposit of fund instead of phase wise release of fund stating that it would facilitate completion of ROB by 2018. ECoR gave the concurrence for depositing the full amount with NH Division as was being done by Railways for executing deposit works of other Departments. This resulted in blocking of Railway's capital of ₹ 41.16 crore with NH Division of Government of Odisha. It was further observed that in respect of deposit works, the NH Division of Government of Odisha follows the Central Public Works Department (CPWD) Manual procedure for levy of various charges towards cost of establishment. It charged ECoR 'departmental charges' and 'quality control charge'. However, Clause A (4) of the MoU signed between MOR and MORTH stipulates that, departmental charges and supervision charges are not payable by Railway. ECoR made the payment of these charges as demanded by Government of Odisha as agency charges, quality control, cost of work charge establishment, *etc.*
- Out of the total requirement of 3.295 acres of land, 2.032 acres (62 *per cent*) had already been acquired by NH Division of Government of Odisha in their own name at a cost of ₹ 1.46 crore. Thus, remaining 1.263 acre of land (38 *per cent*) would cost around ₹ one crore. Hence, the estimation of ₹ five crore for land acquisition was unrealistic and there was excess expenditure of about ₹ 2.5 crore on account of land.

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[151] In November 2015, Finance Department had not justified the release of full amount of ₹ 48.72 crore in view of interest (dividend) component. Instead, they viewed the release of fund as 30 *per cent* each in 2015-16 and 2016-17 and the balance 40 *per cent* in 2017-18 considering the completion of ROB by March 2018.

[152] ₹ 6.07 crore of civil work, ₹ 1.47 crore of land acquisition and ₹ 3.15 lakh of contingency

[153] The work may get delayed on the context of partial deposit of the fund as the executing department may not be in a position to holistically plan the entire ROB citing inadequacy of available fund.

Moreover, Railway was not the owner of the land purchased and ECoR failed to claim its right on the asset created from its fund. Ownership issue was not clearly spelt out in the MoU.

- As per records maintained by NH Division, Odisha, the estimate was revised with a downward variation of ₹ 0.47 crore. The Revised estimated figure was reduced to ₹ 48.26 crore from ₹ 48.73 crore. The excess amount of ₹ 0.47 crore was not returned by NH Division to ECoR.

The matter was brought to the notice of MoR in November 2019. MoR, in its reply, stated (December 2020) that demand was made by NH Division for agency charges and not the departmental charges and supervision charges. It was further stated that payment of charges for quality control and establishment were not clearly spelt out in the MoU. However, NH Division has been requested (18 November 2019) to refund ₹ 6.92 crore deposited with them.

Reply of MoR is not convincing. As per CPWD Manual, agency charges and departmental charges are one and the same. Quality control as a process is embedded in the execution itself. There was no provision in the estimate for the quality control/ agency charges *etc*. ECoR failed to scrutinize the estimate submitted by NH Division and accepted the same. This resulted in avoidable payment of ₹ 6.92 crore (including land acquisition cost). Though ECoR had raised the issue with NH Division in November 2019, NH Division has not refunded/ agreed to refund the charges as demanded by ECoR.

3.5 Avoidable extra expenditure due to faulty planning in embankment work: South Eastern Railway

South Eastern Railway took up the work of embankment as part of doubling in Andul - Baltikuri section without following codal provisions and guidelines of Research, Designs and Standards Organisation (RDSO). This resulted in embankment failure and bulging/slippage at different locations with consequential extra expenditure of ₹ 14.08 crore on rehabilitation work.

In order to obtain a fair idea[154] of the soil classification and characteristics on the proposed routes/route, the fieldwork during Preliminary Survey should cover a soil survey by sampling at suitable intervals. Further,

[154] Para 409 and 425 of the Indian Railways Code for the Engineering Department

during Final Location Survey detailed subsoil exploration[155] is necessary to check stability of structure against failure and to predict anticipated settlement[156].

As per Para 2.1 of Annexure –III of “guidelines for earthwork in Railway projects” (July 2003), the required minimum factor of safety should be greater than 1.40 for embankment construction. Moreover, soil with high plasticity[157] is prohibited in top three meter of embankment as per para 5.1.1. of Research, Designs and Standards Organisation (RDSO) guidelines No GE:G-I of July 2003.

A contract was awarded by South Eastern Railway (SER) in June 2015 for execution of earthwork[158] and other miscellaneous works at a cost of ₹ 24.35 crore in connection with the Andul - Baltikuri doubling work (length 1.4 Km between Ch: 2750 and Ch:4190). The entire length of the proposed work was adjacent to a stagnant/slow moving water body (pond). The target date of completion of work was December 2016. The work was completed in March 2018 and final bill for the work was passed in December 2018 for an amount of ₹ 0.66 crore with total contractual payment of ₹ 29.60 crore.

The drawing for the construction of retaining wall was approved by the Chief Engineer/Construction, in November 2015 (after award of the contract in June 2015). Contrary to codal provisions, no soil testing and slope stability analysis was carried out before award of the contract. In the approved drawing, it was specifically mentioned that “No Soil report is available”.

Audit noted that the following failures occurred in the embankment:

(1) On 14 October 2017, the entire stretch of embankment constructed with retaining wall but without pile foundation (length 280 meter between Ch:3910 and Ch:4190) failed.

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[155]Para 3.4.3, 4.4.3 and 5.1.1 of the Research, Designs and Standards Organization (RDSO)’s Guidelines for earthworks in Railway Projects

[156] Settlement means soil movement in the vertical direction typically induced by stress changes/ decrease in depth of embankment.

[157] Inorganic clays of CH type.

[158] Blanketing, major bridge, minor bridges, retaining wall, S&T relay room, end-goomties (Goomty is often used for small covered shelter. A small cabin, as for the guard at a level-crossing or even any small structure covering a lever frame or other fixed equipment).

(2) Subsequently, there were incidences of failure (August 2018) of the newly constructed goomty[159] between Ch: 2750 and Ch: 2890 and at two locations (Ch: 2890 and Ch: 3340) of the embankment (September 2018). Both incidences occurred in the stretch where embankment was provided without retaining wall. The primary cause of failure was differential settlement of the foundations supporting the structures.

RDSO was requested to investigate the cause of failure and suggest remedial measures (November 2017). RDSO, in their report (December 2017) identified the following lapses leading to failure of the embankment:

(i) The subsoil (foundation soil) was highly compressible in nature and of poor strength characteristics. No ground improvement work was done before undertaking embankment work.

(ii) CH type soil with high plasticity was used in the failed stretch which was not permitted as per RDSO guidelines.

(iii) Railway had not carried out any slope stability analysis before construction of embankment. In contravention of RDSO's Guidelines, factor of safety was 0.428, which was much lesser than the prescribed minimum factor of 1.40. However, the failed stretch (without pile foundation) had a factor of 0.428 only.

RDSO suggested a host of remedial measures for the failed embankment which included construction of retaining wall of 2.7 meter height with pile foundation and providing side slope of 3.75: 1 in the entire failed stretch.

On the basis of RDSO's recommendations, SER Administration took up the following rehabilitation works:

(i) Reconstruction of the embankment with pile foundation at Ch: 3910 to Ch: 4190. The work was awarded in March 2018 and completed in August 2019, an amount of ₹ 7.29 crore was paid to the contractor till March 2020.

(ii) Reconstruction of the failed goomty and two locations of the embankment between Ch: 2890 and Ch:3340. Pile foundation was used at both the failed locations. The work was awarded in May 2019 at a cost of ₹ 10.86 crore.

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[159] Goomty is often used for small covered shelter. A small cabin, as for the guard at a level-crossing or even any small structure covering a lever frame or other fixed equipment.

The Railway Administration had to take up the above two rehabilitation works due to improper soil survey and absence of prescribed slope stability analysis, prescribed in RDSO's guidelines. This resulted in incurring avoidable extra expenditure of ₹ 14.08 crore[160]. This included ₹ 4.55 crore extra expenditure on rehabilitation of first failed location and ₹ 9.53 crore extra expenditure on rehabilitation of embankment and re-construction of failed goomty.

The matter was taken up with the Railway Administration in August 2019. In reply, Railway Administration stated (January 2020) that to avoid any delay in execution of work, tendering process was initiated simultaneously along with finalisation of drawing/ design. Where height of embankment was more than two meter retaining wall on pile foundation was provided. At locations where the height of embankment was less than two meter, the retaining wall was constructed without pile foundation.

Railway's reply was not acceptable because they did not consider soil report at the time of finalization of the drawing for retaining wall. Railway's decision to undertake embankment work by providing retaining wall without pile foundation between Ch:3910 and Ch:4190 was incorrect since initial embankment failure occurred only in this particular stretch. This was further substantiated from the fact that length of bank having retaining wall with RCC pile foundation was not affected. RDSO's failure report also indicated that CH type of soil was used, which was not permissible as per RDSO's Guidelines. No slope stability analysis was conducted to achieve minimum factor of safety.

The matter was taken up with MoR in August 2020; no reply was received (February 2021).

[160] (i) The cost of providing pile foundation at the first location of failure was assessed at ₹ 2.74 crore. Thus rehabilitation work resulted in extra expenditure of ₹ 4.55 crore (₹ 7.29 crore (-) ₹ 2.74 crore). (ii) For reconstruction work of failed goomty and two locations of embankment, contract was awarded at ₹ 10.86 crore (inclusive of piling work for ₹ 1.33 crore, which is an essential component). This resulted in extra expenditure of ₹ 9.53 crore (₹ 10.86 crore minus ₹ 1.33 crore).

3.6 Abnormal delay in construction of Road Over Bridge at Gudur leading to prolonged public inconvenience: South Central Railway

Road Over Bridges (ROBs) are built to facilitate safe movement of public by eliminating Level Crossings (LCs). Construction of ROB in lieu of LC was delayed on account of finalization of General Arrangement Drawing (GAD). Revision of GAD led to increase in cost as well as extra liability of ₹ 15.40 crore on the Railway Administration which should have been borne by the State Government. Construction of ROB was yet to be completed and the LCs were still in operation. Thus, the provision of ROB to the public is yet to fructify even after 20 years from the date of initial sanction.

Level Crossings (LCs) are potentially unsafe locations, which besides being operational bottlenecks for Railways, also are congestion points for road users. To overcome this, Railways build Road Over Bridge (ROB)/Road Under Bridge (RUB) with the participation of State Governments either on cost sharing or on deposit terms. In terms of Para 1816 of Engineering Code, cost of construction was to be shared between the Ministry of Railways (MoR) and State Government @ 50:50.

Gudur Junction is a busy junction station on the High Density Network connecting Vijayawada - Chennai and Vijayawada - Renigunta. The line branches into two on the Chennai side. Two LCs are situated on these two lines which connect East and West portions of Gudur Town as also the industrial area situated between these two lines.

Government of Andhra Pradesh requested for a ROB across the tracks for the benefit of public. Hence, MoR sanctioned (2001) the construction of ROB on cost sharing basis at an anticipated cost of ₹ 7.36 crore (Railway's Share ₹ 3.27 crore and State Government share ₹ 4.09 crore). During the joint survey, Railway Administration stated (August 2000) that there was no connection provided to the Industrial area between Chennai and Renigunta lines. Accordingly, the State Government may have to take necessary steps to provide this connection as deemed fit.

A General Arrangement Drawing (GAD)[161] is usually prepared initially which must be approved by all the parties concerned. There was delay from the State Government in approving the GAD. The GAD was finally

[161] GAD present the overall picture of the structure to be constructed.

approved (August 2006) without the connection between the Industrial area between Chennai and Renigunta lines (3rd Arm[162]).

During a joint inspection (November 2007), it was stated that a Detailed survey is to be conducted by Railways to study the feasibility of providing 3rd Arm. This survey was necessitated because in the original proposal the 3rd Arm was not covered. In the joint inspection, State Government officials requested Railways for provisioning a 3rd Arm. Based on the revised proposal, a revised GAD was prepared with provision of 3rd Arm which was approved by State Government in July 2010. Further, the SCR Administration prepared (2012) a Detailed estimate and submitted to MoR for sanction. MoR sanctioned (2012) the combined Detailed estimate at a cost of ₹ 43.09 crore which included the cost of 3rd Arm and Railway's total share was ₹ 18.67 crore.

Para 1815 of the Engineering Code stipulate that if the construction of a bridge is found necessary otherwise than in pursuance of Railway's liability under the Railway Act, its cost will be borne by the Railway if its necessity has arisen from railway requirements. In case, necessity has arisen from the growth of road traffic or other requirements of the Road Authority, the cost of additional facilities would be borne by Road Authority.

The work on the bridge portion and part of 3rd Arm was taken up by the Railways (January 2013) and completed by March 2015. Approach portion on the East side was taken up by the Government of Andhra Pradesh and completed but not connected to the bridge proper. The work on the West side was yet to be taken up (March 2019).

Figure 3.7: East Side (approach was completed but not connected to bridge proper-May 2020)

Figure 3.8: West Side (Approach work yet to be taken up - May 2020)

[162]It is the bridge portion that is required to be constructed to the industrial area situated between the two lines *i.e.* Vijayawada-Renigunta and Vijayawada - Chennai lines

MoR, while giving directions to address the inordinate delay in the ROB/RUB, had also stated (September 2011) that the sponsoring authority will give an undertaking in case of any increase in cost due to subsequent changes in the approval of GAD, the extra cost would be borne by the party initiating the change.

Audit observed that on account of abnormal delay by the Government of Andhra Pradesh in fixing the alignment and subsequent revision of

Figure 3.9: West Side (as on May 2020) 3rd Arm

proposal to include the 3rd Arm, there was delay in commencement of the work by a decade. The cost of the work increased from ₹ 7.36 crore (2001) to ₹ 43.09 crore (2011). Railway's share increased by ₹ 15.40 crore from ₹ 3.27 crore to ₹ 18.67 crore. Till date, only one approach on East side and part of 3rd Arm was completed and the remaining approach portion on West side was yet to be taken up by the Government of Andhra Pradesh on account of litigation issues. Therefore, the LCs could not be closed and is in operation at MoR's cost.

Thus, due to delay in fixation of alignment and subsequent revision of GAD, the provision of ROB to the public could not be built till date. In addition, the extra liability of 3rd Arm as well as increase in cost of the estimates by ₹ 15.40 crore is a liability to MoR. This extra liability should have been borne by the Government of Andhra Pradesh. The cost of operation and maintenance of LCs due to the above factors was an additional liability, which must be borne by the Government of Andhra Pradesh. Thus, an important public service of providing safe passage to general public is yet to fructify. The State Government's aim of providing road connectivity to the industrial area between Chennai and Renigunta lines remains unachieved.

The matter was taken up with MoR in June 2020; no reply was received (February 2021).

3.7 Damage to Track: North Western Railway

Assurance was given by the Ministry of Railways in 2014 to Public Accounts Committee (PAC) that suitable action has been taken to eliminate the problem of damage to tracks. However, North Western Railway Administration failed persistently to properly plan the movement of loaded rakes by providing locomotives of suitable capacity and Banker locos in the sections having steep gradients. This led to damage to track in Ajmer Division and consequential avoidable expenditure of ₹ 6.96 crore on replacement/reconditioning of rails.

Each Railway Station is governed by the Station Working Rules (SWRs) for that particular station. The SWRs *inter-alia* mention gradients in the yard and the adjacent block sections along with the locations and any gradient which are steep enough to warrant special precautions in operations. The Section Controller is responsible for planning and running of goods trains through the best possible path. Depending on the load, a suitable loco is to be provided for its haulage by the Loco Controller.

The issue regarding loss due to damage to track in Ajmer Division of NWR was earlier reported through Paragraph 3.7 of Audit Report No. 34 of 2010-11 (Railways). It was reported that the track was damaged in certain stretches with steep gradients in Ajmer Division due to stalling/wheel burns/scabbing by excessive tractive effort applied by the locomotives to negotiate such gradients.

In the Action Taken Note, Ministry of Railways (MoR) stated (March 2014) that use of a single locomotive of higher horsepower (WDG4) equipped with latest technology had practically wiped off the problem of damage to track. It was further stated that a Joint Procedure Order (JPO) was issued in December 2009 based on the problem faced due to haulage of heavier loads by single locomotive to reduce and eliminate stalling and thereby damage to track. It was also stated that due to technological up-gradation in the locomotives, the wheel slipping and track damage due to stalling had also been practically eliminated.

The position of damage to track in Ajmer Division was reviewed (March 2019) afresh to evaluate the progress on assurance given by the MoR that damage to track was a short lived problem and it had been eliminated.

Review of records of Engineering Branch of Ajmer Division revealed that during August 2014 to August 2018, four contracts at a cost of ₹ 3.13 crore were awarded for the work of reconditioning of wheel burnt rails by Spray - Powder technique in Madar - Palanpur section including one contract catering to Ajmer - Chittaurgarh section. These works were justified on the grounds of excessive wheel burns/scabbing of rails due to sudden application of brakes, wheel slips in steep gradient, absence of banking power *etc*. Due to these wheel burns, cupped weld joints and scabbed rails, there was a problem of frequent loose packing in 52 kg rails rendering the track prone to fracture and consequent problems in maintenance of track parameters. An expenditure of ₹ 3.77 crore was incurred against these four contracts on reconditioning of rails (up to July 2019).

Scrutiny further revealed that the cases of damage to track due to wheel burn/scabbing occurred frequently. The rails damaged due to wheel burn/scabbing amounting to ₹ 3.19 crore were replaced departmentally during 2015 to 2019. Excessive tractive effort applied by the Loco pilot to negotiate the gradient led to damage to track on account of wheel burns/scabbing. The damaged rails were not only being frequently attended to/repeatedly replaced but speed restrictions were also imposed in the sections where damage to track occurred. This was leading to excess fuel consumption and loss of earning capacity.

Audit also observed that goods trains were not being operated on right powering in Ajmer Division. In response to audit, Operating Department, Ajmer confirmed (June 2019) non-plying of goods trains with right powering arrangement because of non-availability of high capacity locomotives.

The issue regarding loss due to damage to track was taken up with General Manager/NWR in August 2019. In reply, Senior Assistant Financial Adviser/NWR, Jaipur stated (October 2019) that upgraded locos were being provided to trains as per the JPO. With the improved locomotives, the incidences of damage to track had been practically wiped off. The cases of stalling had been substantially reduced after issuance of JPO in December 2009. Due to technological inputs in the locomotives, the wheel slipping and damage to track had also been practically eliminated.

The reply of Railway Administration was not acceptable. Execution of four contracts for re-conditioning of rails (justified on the grounds of excessive wheel burns/scabbing of rails) departmentally at a cost of ₹ 6.96 crore (during 2014 to 2019) amply proved that the damage to track occurred on a continuous basis. Wheel slipping and damage to track had not been practically eliminated as claimed by Railway Administration in their ATN as well as in the current reply.

Thus, Railway Administration failed to properly plan the movement of loaded rakes in the sections having steep gradients by providing locomotives of suitable capacity and Banker locomotives in the section warranting requirement. Hence, the problem of wheel slipping/burns/stalling of trains/scabbing of rails persisted for the last 12 years even after assurance given by MoR that this being a short-lived problem had been practically eliminated.

The matter was taken up with MoR in September 2020; no reply was received (February 2021).

3.8 Change in design and location of a bridge resulted in its abandonment and consequent infructuous expenditure: South East Central Railway

For the construction of a major bridge, contract conditions stipulated that soil test of the site was to be carried out by the contractor. However, Railway Administration conducted the soil test and handed over the report to the contractor. During execution, it was observed that the condition of the soil was not the same as was reported in the Railway's soil test report. Adverse soil condition prevented the contractor from completing the work. A new contract was awarded with a change of design and location of the bridge (Bridge No. 182) between IB and Brajrajnagar stations. This led to wasteful expenditure amounting to ₹ 6.73 crore incurred on the incomplete bridge, which was later on abandoned by the Railways.

Ministry of Railways (MoR) in August 1980[163]/October 2006[164], instructed that contracts for work should not be awarded unless soil test and site investigation have been completed. All plans, drawing and estimates should be duly approved/ sanctioned by the competent authority. The entire prerequisites may be completed in time before awarding of contracts.

[163] MoR's letter no. 80/W-2/3/33 dated 29 August 1980.
[164] MoR's letter no. 2005/BC/AP/3.3.12/2003-04 dated 17 October 2006.

A contract for construction of foundation, sub-structure, *etc.*[165] for a major bridge (Bridge No.182) between IB and Brajrajnagar station[166], was awarded (28 July 2010) to a contractor for ₹ 12.30 crore. The work was to be executed by well foundation and completed by 27 October 2012. As per the Schedule "A" of the contract, geotechnical investigation (soil test) of the site was to be carried out by the contractor. However, Railway Administration[167] did not allow the contractor to undertake the geotechnical investigation on the plea of infructuous expenditure and to save time. Railway Administration conducted the geotechnical investigation and handed over soil test report to the contractor for use in design of the bridge foundation.

Audit observed that in the geotechnical investigation conducted by Railway, the strata from bore hole A1 to P5 was found to be a mix of hard and soft black coal. For such conditions, well foundation was recommended. However, during execution of the work, it was observed by the contractor that the strata condition at site was hard rock.

The contractor could not complete the work within scheduled time as well sinking in hard rock had created a deadlock in progress of the work. After granting two extensions, the contract was finally terminated on 5 March 2014 after incurring an expenditure of ₹ 7.42 crore on this incomplete bridge.

After termination of the contract in March 2014, South East Central Railway (SECR) Administration engaged (January 2015) a consultant for soil investigation work and designing of bridge No.182. The suggestion of the consultant for a pile foundation on new alignment was accepted by the Railway Administration in July 2015.

Accordingly, a tender was floated in November 2015 for construction of bridge No. 182 at new location with pile foundation. The work was completed in May 2019 at a cost of ₹ 17.69 crore.

[165] Approaches including allied and miscellaneous works
[166] In connection with 3rd line between Champa-Jharsuguda
[167] Chief Engineer, Construction-I, Bilaspur.

Figure 3.10: Abandoned bridge constructed with Well foundation	*New bridge constructed with Pile foundation*

The matter regarding change in design as well as location of the Bridge No.182 between IB and Brajrajnagar station was brought to the notice of Railway Administration in August 2019. Railway Administration in October 2019 stated that as the geotechnical investigation was available and was part of GAD, there was no point in doing it again. There are always difficulties in well sinking encountered during construction work, which had to be rectified and for which provisions in the schedule were available. The decision of providing the well foundation had been taken by studying the geotechnical investigation report. Based on the advice of the consultant, decision was taken to go for pile foundation in place of well foundation. It was a technical decision to select appropriate option based on site/ time constraints.

The reply of Railway Administration was not acceptable because Railway's own soil investigation report was not conclusive (strata from bore hole A1 to P5 was a mix of both hard and soft black coal). However, during execution of the work, it was observed by the contractor that the strata condition at site was hard rock. Well sinking was a problem in the site due to presence of hard coal. Moreover, Railway Administration's reply was totally silent on the expenditure incurred on the unfinished bridge.

The fact remains that the work executed by the first contractor (₹ 7.42 crore) was abandoned and the work of construction of bridge was awarded to another contractor at new/nearby location with pile foundation. There was a lapse in the decision making process and hence responsibility should be fixed.

Thus, change in design from well foundation to pile foundation as well as location of the Bridge No. 182 between IB and Brajrajnagar stations led to wasteful expenditure of ₹ 6.73 crore[168] on the incomplete abandoned bridge No.182.

The matter was taken up with MoR in May 2020; no reply was received (February 2021).

3.9 Non-implementation of Ministry of Railways directives resulted in non-realization of penalty from the contractors: South Central and East Coast Railways

Failure of Railway Administration to enforce the Ministry of Railways directives led to lack of coordination amongst the various agencies/departments resulting in non-realization of penalties.

Engineering works in connection with gauge conversion/doubling/third line require extensive digging work near the running track, in close vicinity of the working Signalling and Telecommunication (S&T) cables as well as electrical cables. While carrying out these works, cable cuts occur due to Joseph Cyril Bamford (JCB) machines moving along the tracks or by the digging works done by the contractors carrying out the Civil Engineering works. Such cable faults result in the failure of vital signal and telecommunication circuits and electrical installations.

Ministry of Railways (MoR) issued a Joint Procedure Order (JPO) in December 2004 for execution of works in the vicinity of working signal and telecommunication cables.

In order to minimize and control cable cuts while carrying out digging works near existing S&T and electrical cables, MoR issued (June 2013) a revised JPO[169]. The JPO stipulated, inter-alia, the following:

- S&T Department, RailTel and Electrical Departments shall provide a detailed cable route plan. The cable route plans shall be made

[168] The first contract was terminated on 5 March 2014. The work executed by the first contractor was abandoned after incurring ₹ 7.42 crore. Out of ₹ 7.42 crore, Railway Administration has recovered ₹ 61,53,350 (Bank Guarantee) and ₹ 7,28,300 (Security Deposit) as on 14 January 2020. Total recovery = ₹ 61,53,350 plus ₹ 7,28,300 = ₹ 68,81,650 or ₹ 0.69 crore. Hence, wasteful expenditure = ₹ 7.42 crore minus ₹ 0.69 crore = ₹ 6.73 crore.

[169] Telecom Circular No. 17/2013

available to the Divisional officers of the Engineering Department for circulation of the same down the line.

- Concerned Engineering Department has to take permission in writing from the S&T/Electrical department for any digging activity. Written permission and cable plan was to be issued to the contractor by the Engineering officials for commencement of work.
- In case, if damage was caused to Optic Fiber Cable (OFC)/quad cable during execution of the work, the contractor was liable to pay a penalty of ₹ one lakh to ₹ 1.5 lakh (depending on type of cable)per location for damaging the cable.
- If a cable was cut by an agency that was not permitted to execute any work, First Information Report (FIR) should be lodged with Railway Protection Force (RPF).
- No new OFC or quad cable shall be laid close to the existing track. It shall be laid close to the Railway Boundary on one side of the railway track to the extent possible to avoid any interference with the future works.

Review of records of S&T Department of South Central Railway and East Coast Railway for the period April 2013 to 2019 revealed the following:

South Central Railway

Cables were found damaged at 586 locations by the private contractors engaged by the Engineering Department while undertaking digging works. S&T Department had informed the concerned Departments for levying the penalty of ₹ 6.63 crore. No follow up action was taken to recover the amount due to lack of coordination among the Departments. Audit observed that cable plans were provided by the S&T Department to Engineering Department but the details of circulation of the same to the field units were not available on record. It was also observed that details of permission sought for/granted by Divisional Officers were not available on record and written permissions along with cable plans were not handed over by the engineering officials to the contractors. Contact numbers of the persons involved in the digging works were not made available by the engineering control to the test room. In respect of digging works executed without permission, no FIRs were lodged with the RPF.

Thus, non-implementation of MoR's orders resulted in non-realization of penalty of ₹ 6.63 crore.

East Coast Railway

The number of cable cut incidences in East Coast Railway during the period May 2015 to December 2019 was 498. Although MoR reiterated on minimizing the cable cuts, due to lack of coordination between S&T Department and executing Departments, there was no appreciable improvement in reducing the cable cuts. During May 2015 to November 2017, for 206 cases S&T Department raised bills for ₹ 2.47 crore with the Engineering Department and other agencies. However, only ₹ 0.12 crore was realized as penalty. Further during December 2017 to December 2019, 292 cable cuts occurred and penalty of ₹ 3.61 crore was raised against the concerned authorities. Even though the bills were raised, these were not followed up for realization of penalties. Thus, in ECoR, penalty amount of ₹ 5.96 crore was not recovered as stipulated in the MoR's orders.

The issue was raised with the Railway Administration in February 2020. The remarks were yet to be furnished by the Railway Administration.

Thus, non-implementation of MoR's directives resulted in non-realization of penalties from the various Departments/agencies in SCR and ECoR. An amount of ₹ 12.59 crore was still outstanding for recovery in 1,084 cases.

The matter was taken up with MoR in August 2020; no reply was received (February 2021).

3.10 Wasteful expenditure due to award of contracts for signaling works without finalization of Engineering Scale Plan and Signal Interlocking Plan: Western Railway

Injudicious decision of Railway Administration in awarding two signaling contracts without finalization of Engineering Scale Plan (ESP) and Signal Interlocking Plan (SIP), in violation of provisions of Indian Railway Code for Engineering Department led to wasteful expenditure of ₹ 4.78 crore.

Para 604 of Indian Railway Code for Engineering Department states that 'in case of yard re-modeling, line capacity works *etc*. estimates should be based on plans approved and signed by the concerned Departments'. Ministry of Railways (MoR)'s instructions[170] enjoin that detailed drawings and estimate should be available with the Executive. Adequate field data

[170] Ministry of Railways instructions dated 21 September 1972, 29 August 1980 and 22 February 1985

should be collected in time as accurately as possible for preparation of these drawings and plans before inviting tenders.

A work[171] was sanctioned (August 2006) by MoR at a lump sum cost of ₹ 15 crore. Revised estimate for ₹ 24.31 crore was sanctioned (October 2009) on account of cost escalation and change in scope of the work. This revised estimate included cost of related signaling work for which provision of ₹ 7.51 crore was made in the estimate.

Audit observed that two signaling contracts[172] were awarded in connection with the above work. The works of Phase-I were successfully commissioned in February 2011. M/s Siemens commenced supply of S&T material on 7 July 2010 and completed supply of 82 *per cent* of quantity by 25 October 2013. In respect of the other contract by M/s D.N.S.V Ramana Gupta, 78 *per cent* of work was executed till 20 September 2013 as per the contract agreements.

Engineering Scale Plan (ESP) is primarily used for yard plans exhibiting the track as a single line, showing all running lines, loop lines, other yard lines, sidings etc. Signal Interlocking Plan (SIP) is used for placing the signal apparatus on the track at appropriate places. SIP is prepared based on ESP. The Phase-II work could not be commenced due to non-finalization of the plans. Extensions on Railway account without levy of liquidated damages were repeatedly granted to both the contractors citing the reason 'Non-clarity of work due to non-finalization of ESP' and 'only tentative plan received'.

The contractors commenced their work from 7 July 2010 and 3 March 2010 respectively without finalization of ESPs and SIPs.

Finally, proposal for short closure of the contract awarded to M/s D.N.S.V Ramana Gupta was approved by the Dy. CSTE/C/BRC on 20 September 2013 on the grounds that 'ESP & SIP had not been finalized'. The contract awarded to M/s Siemens Ltd was approved for short closure by CAO/C/CCG on 24 September 2016 citing the reason 'plans not yet finalized and contract for indoor signaling work was very old and yard work was not feasible'.

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[171] Phase- I Providing platform and line No. 7 and Phase – II Conversion of line No. 2 as UP main line and line No. 4 as DN main line at Vadodara (BRC) (P)

[172] One contract for indoor signaling works awarded (November 2009) to M/s Siemens Ltd at a cost of ₹ 4.97 crore. Another contract for outdoor signaling work awarded (December 2009) to M/s D.N.S.V Ramana Gupta at a cost ₹ 1.96 crore.

Audit also noted that Railway Administration transferred (May 2017) material worth ₹ 2.01 crore supplied[173] by M/s Siemens Ltd to another work. This material was meant for a Route Relay Interlocking (RRI) work, while the work to which it was transferred was an Electronic Interlocking (EI) work. Thus, there was no possibility to use the transferred material. Further, cable worth ₹ 2.24 crore (supplied by Railway Administration) was laid in the yard but remained unutilized due to non-commissioning of RRI work. An amount of ₹ 0.52 crore paid to the contractor for outdoor work was unfruitful as the work remained incomplete due to short closure of the tender.

Thus, award of two signaling contracts without ensuring availability of the final ESP and SIP in violation of provisions contained in Para 604 of Indian Railway Code for Engineering Department and MoR's directives issued from time to time led to wasteful expenditure of ₹ 4.78 crore.

The matter was taken up with MoR in July 2020; no reply was received (February 2021).

[173] Material Received between 7 July 2010 and 25 October 2013