



सत्यमेव जयते

**Report of the
Comptroller and Auditor General of India
on
Economic Sector
for the year ended 31 March 2017**



Government of West Bengal

Report No. 4 of the year 2018

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PREFACE

This Report for the year ended March 2017 has been prepared for submission to the Governor of West Bengal under Article 151 of the Constitution of India for being laid before the Legislature of the State.

The Report contains significant results of the Performance Audit and Compliance Audit of 27 Departments of Government of West Bengal under the Economic Sector.

The instances mentioned in this Report are those, which came to notice in the course of test audit for the period 2016-17, as well as those which had come to notice in earlier years but could not be reported in the previous Audit Reports; instances relating to the period subsequent to 2016-17 have also been included, wherever necessary.

The Audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Overview

OVERVIEW

This Report covers matters arising out of audit of State Government Departments and Autonomous Bodies under the Economic Sector.

There are 67 Departments at the Secretariat level headed by Additional Chief Secretaries/Principal Secretaries/Secretaries who are assisted by Directors/Commissioners/Chief Engineers and subordinate officers under them. This report covers the functioning of 27 Departments of the Economic Sector.

A summary of the important audit findings is presented in this overview.

Performance Audit

Implementation of Renewable Energy Programme in West Bengal

Power generated from Renewable Energy (RE) sources contribute to better air quality, reduce reliance on fossil fuels and curb global warming. In 2016, GoI revised the targets for RE capacity addition to 175 GW by 2021-22 in line with the commitments made in the Paris Accord. The Department of Power & Non-Conventional Energy Sources, GoWB implements the RE Programme through two nodal agencies and two other implementing agencies.

The Performance Audit was conducted between February and June 2017 covering the Audit period from 2012-13 to 2016-17.

Highlights of the important audit findings are given in the succeeding paragraphs:

- The Government assessed the RE potential arbitrarily and incorporated these in the RE Policy without actual on-ground verification/study. Lack of clarity on actual potential hampered the preparation of realistic targets and setting realistic goals for increasing the RE in the State.

(Paragraph 2.6.1)

- Only ₹ 417.47 crore (9.10 *per cent*) was allocated by the State Government for implementation of RE projects against the estimated requirement of ₹ 4610 crore in the State Action Plan for Climate Change during 2012-17. Out of this only 17.74 *per cent* was utilised as on March 2017.

(Paragraph 2.6.4)

- West Bengal Green Energy Development Corporation Limited failed to take any steps for promotion of private sector investment and its involvement in developing RE. It also failed to assist developers of RE projects in obtaining incentives.

(Paragraph 2.6.6.2)

- Only 35.18 MW (4.15 *per cent*) capacity of RE was added, against the target of 847 MW set in the RE policy, during the 12th Five Year Plan (FYP) period (2012-17).

(Paragraph 2.7.1)

- The RE policy, identified 450 MW of wind power potential in the State with a target of installation of 73 MW during 12th FYP period. There were no achievements against this target.

(Paragraph 2.7.1.1)

- The RE policy stipulated installation of 123 MW during 2012-17 in hydropower sector. However, no hydropower capacity was created during the period.

(Paragraph 2.7.1.2)

- Only three biomass projects and one ‘waste to energy’ project was planned during the 12th FYP period. No project was taken up in co generation¹. Thus, only two *per cent*² of targeted capacity was achieved from these three RE sources.

(Paragraph 2.7.1.3)

- West Bengal Renewable Energy Development Agency (WBREDA) diverted (between December 2015 and February 2016) ₹ 4.67 crore to four local bodies from the unspent funds meant for RE projects, without obtaining any sanction of the Department.

(Paragraph 2.8.2)

- Renewable Purchase Obligation (RPO)³ targets fixed by West Bengal Electricity Regulatory Commission (WBERC) were lower than that fixed in the National Action Plan for Climate Change. None of the distribution companies could even achieve this lower target. They were not penalised for this by WBERC.

(Paragraph 2.9.1)

- The State could avail only ₹ 7.89 crore (0.16 *per cent* of the total approved grant for all the States) as incentive grant by GoI due to poor achievement in capacity addition of RE (11.60 MW). It also failed to utilise the grant even after a lapse of 30 months from the date of receipt.

(Paragraph 2.9.3)

- The Department and its agencies have not evolved any separate monitoring mechanism to monitor and evaluate the implementation of different RE projects taken up during 2012-17 so as to fulfil the objectives and achieve the targets/goals set in the RE Policy.

(Paragraph 2.11.3)

In spite of huge potential of renewable energy in the State, the achievement was very poor. This was due to (i) deficiency in the policy and absence of suitable strategy to implement the policy objective; (ii) poor implementation; (iii) non-conducive Tariff and regulatory mechanisms relating to purchase and sale of RE; and (iv) inadequate monitoring.

Compliance Audit

Adherence to Quality Control norms in Road Works

The Schedule of Rates of the Public Works Roads Directorate provides a list of mandatory tests to be conducted prior to execution as well as during the execution of the work to ensure quality in road works. Public Works (Roads)

¹ Cogeneration means a process which simultaneously produces two or more forms of useful energy including electricity from a single fuel source.

² Achievement of 11.1 MW against the target of 553 MW (224+43+286) = 2 *per cent*.

³ RPO means obligation to purchase electricity from renewable and co-generation sources by a distribution company.

Directorate (PWRD) under the Public Works Department (PWD) is responsible for construction and repair of roads within the State.

Audit of the processes prescribed and compliance thereof to ensure quality in road construction was conducted between November 2016 and June 2017 covering a period of six years (2011-12 to 2016-17) in 12 selected divisions. On the basis of value of the work, 71 works worth ₹ 944.65 crore, executed under these divisions were selected for detailed audit.

The highlights of the audit findings are as follows:

- In respect of 40 works valued at ₹ 514.74 crore, topographical surveys, as required, were not done. This led to erroneous planning and designing of roads.

(Paragraph 3.1.6.1)

- In respect of 50 selected works, roads were designed without authenticated soil investigation data. Instances of premature damage of roads were found, indicating inadequate soil investigation prior to designing.

(Paragraph 3.1.6.2)

- Norms of traffic census were not followed in any of the 63 works where it was conducted. The reliability of the traffic census could not be ascertained as the Divisions failed to provide the field reports of the traffic count while designing the road in 61 works.

(Paragraph 3.1.7.1)

- Designing of roads were not as per the norms as required thickness of bituminous layers for strengthening was not assessed before taking up in respect of five works valuing ₹ 21.47 crore.

(Paragraph 3.1.9.1)

- Three road works valued at ₹ 8.73 crore were executed during March-August 2011. The same roads were strengthened again in April 2015, i.e., six years before completion of their design life, at a cost of ₹ 6.72 crore, without valid justification.

(Paragraph 3.1.9.2)

- Suitability of the soil to be used in the work was not ensured. In 26 works involving earthwork valued at ₹ 18.01 crore, the Division did not check the quality of the earth.

(Paragraph 3.1.10)

- Quality of the materials of the granular layers was not checked. In the selected works, where cost of granular items was ₹ 221.31 crore, none of the recommended tests were done to check the quality of the materials of the granular layers.

(Paragraph 3.1.11)

- Required quality checks of materials used in 152 bituminous items costing ₹ 444.58 crore, were conducted only in respect of 39 items. It was not conducted at all in respect of 29 items and in remaining 84 items the tests were conducted partially (52 per cent not done).

(Paragraph 3.1.13)

- Quality control during execution of bituminous works for 15 works valued at ₹ 15.14 crore was not ensured. Instances of early damage of these roads were found where required tests were not done resulting in wasteful expenditure of ₹ 126.90 crore.

(Paragraph 3.1.16)

- Infrastructure for proper quality control and monitoring was deficient. Road and Bridge Research Institute was not in a position to carry out its functions due to shortage of manpower. Site laboratories were not equipped with the required instruments to test the quality of bitumen.

(Paragraph 3.1.17)

- The divisions released payment against the running bills in respect of 52 works costing ₹ 543.85 crore without ensuring quality of implementation.

(Paragraph 3.1.19.5)

Quality control norms relating to topographical surveys, soil investigations, traffic survey and the design criteria were not followed. Quality of material viz. earth, stone aggregates and bitumen, used in works, was not ensured. Monitoring of the projects was weak and the infrastructure for quality testing was inadequate. Instances were noticed where roads were damaged within the design life and defect liability period. As such, the quality control system for ensuring durable roads within the resources available to the Department was found to be inadequate.

Implementation of West Bengal Incentive Scheme

Government of West Bengal introduced (June 2007) a scheme called West Bengal Incentive Scheme 2007 (WBIS-2007) with the objective of extending incentives for promotion of micro and small scale enterprises in the State. This scheme was valid till March 2013. With the aim to further focus on development of backward regions of the State, a new incentive scheme was sanctioned (February 2014) called West Bengal Incentive Scheme 2013 (WBIS-2013), valid till March 2018. West Bengal MSME Policy was also introduced in August 2013 to make the State emerge as the MSME leader in the country. Audit studied the implementation of the scheme for the period from 2012-13 to 2016-17.

Highlights of audit findings are as follows:

- DIC Siliguri disbursed (between February 2012 and March 2017) ₹ 4.22 crore to two enterprises as additional subsidy meant for enterprises wholly owned by women, whereas these enterprises were owned by male partners.

(Paragraph 3.2.3.1)

- Incentives of ₹ 92.51 crore were disbursed to 88 enterprises in excess of the limits prescribed in MSME Policy of the State.

(Paragraph 3.2.3.4)

- For the purpose of development of MSMEs through grant of incentives, the State was categorized in four zones (A, B, C and D) on the basis of the industrial development and backwardness. In the WBIS (both schemes) incentives disbursed for Zone C and D were less as compared to Zone A and B.

(Paragraph 3.2.4)

Grant of incentives violated the state policy/guidelines. Ineligible and closed enterprises were allotted incentives. Further, payments were made in excess of the limits prescribed in MSME policy. The schemes failed to attain the objectives of encouraging enterprises in the backward regions of the state as enterprises in the more developed areas were granted higher quantum of incentives.

Compliance Audit Paragraphs

Some important findings arising out of Compliance Audit (10 paragraphs) are featured in the Report. The major observations relate to failure of the departments to comply with rules and regulations, cases of expenditure without adequate justification and failure of oversight. Some of them are mentioned below:

- Midnapore Highway Division under Public Works Department (PWD) designed Lalgargh-Ramgargh Road with insufficient crust thickness owing to which the road was damaged within two and half years against the design life of ten years. This led to wasteful expenditure of ₹ 2.89 crore.

(Paragraph 3.4)

- Superintending Engineer, Western Highway Circle-I (PWD) failed to protect the newly laid BM surface of Saptagram-Tribeni-Kalna-Katwa Road with a wearing course⁴. This led to avoidable expenditure of ₹ 2.56 crore.

(Paragraph 3.5)

- Due to deficient soil tests of the subgrade level by Birbhum Division (PWD), the newly laid Granular Sub Base⁵ and Wet Mix Macadam⁶ layers of Suri- Sainthia road had to be removed and re-laid. This resulted in wasteful expenditure of ₹ 1.01 crore.

(Paragraph 3.7)

- West Bengal State Agricultural Marketing Board entered into a short-term non-renewable lease agreement with Kolkata Port Trust, for construction of a farmers' market. The objective of the project remained unachieved even after expiry of nine years of lease term, which resulted in unfruitful expenditure of ₹ 5.10 crore incurred on lease rent and construction of the market.

(Paragraph 3.9)

- Micro, Small and Medium Enterprises & Textiles Department did not ensure compliance to the General Financial Rules in execution of the project of setting up of a Common Facility Centre. Due to non-compliance and delay in execution, that project could not be completed. This resulted in blockage of funds of ₹ 4.97 crore.

(Paragraph 3.10)

⁴ The top layer of a road surface which is worn down by traffic.

⁵ Granular Sub base is the layer of aggregate material (crushed stone, crushed slag or concrete) laid on the subgrade (the soil base).

⁶ Wet Mix Macadam (WMM) is a commonly used process in road construction. The aggregates and binding material are mixed with water. This mix is laid and rolled for compaction.

- Hooghly River Bridge Commissioners (HRBC) decided to execute Rajarhat-Madhyamgram road work on intermittent stretches, without ensuring availability of required land. This imprudent decision led to unfruitful expenditure of ₹ 8.76 crore incurred on construction of unusable road including wasteful expenditure of ₹ 1.38 crore due to defective execution.

(Paragraph 3.11)

- Hooghly River Bridge Commissioners (HRBC) released the entire payment to the contractor without ensuring proper functioning of the newly installed illumination system. It also did not take any initiative to make the system operational after termination of the contract, which led to wasteful expenditure of ₹ 3.98 crore on the non-functional illumination system.

(Paragraph 3.12)

Chapter 1

Overview of Economic Sector

Chapter 1: Overview of Economic Sector

1.1 Introduction

This Report covers matters arising out of audit of State Government Departments and Autonomous Bodies under the Economic Sector.

For the purpose of administration in West Bengal, there are 67 Departments at the Secretariat level headed by Additional Chief Secretaries/Principal Secretaries/Secretaries who are assisted by Directors/Commissioners/Chief Engineers and subordinate officers under them. This report covers the functioning of 27 Departments of the Economic Sector listed in *Appendix-1.1*.

Of the total expenditure of ₹ 22779.48 crore incurred by these Departments, a major portion was incurred by Power and Non-Conventional Energy Sources (25.50 per cent), Public Works (19.54 per cent) and Irrigation & Waterways Department (7.56 per cent) during 2016-17.

1.2 Trend of expenditure

The comparative position of expenditure incurred by the Departments during the period 2014-15 to 2016-17 is given in **Table 1.1**.

Table No. 1.1: Trend of expenditure over last three years

(₹ in crore)

Sl. No.	Name of the Department	2014-15	2015-16	2016-17
1.	Agriculture	1255.87	2113.56	1665.40
2.	Agriculture Marketing	133.02	159.37	107.00
3.	Animal Resources Development	614.36	601.68	666.63
4.	Commerce and Industries	597.62	582.32	736.51
5.	Co-operation	215.72	399.52	492.49
6.	Fisheries, Aquaculture, Aquatic Resources and Fishing Harbours	264.51	284.15	287.17
7.	Forest	426.10	528.12	572.89
8.	Hill Affairs	796.67	618.65	660.44
9.	Information Technology & Electronics	107.03	181.69	161.96
10.	Irrigation and Waterways	1626.24	1504.35	1721.39
11.	Land and Land Reforms	844.22	822.64	857.78
12.	Micro Small and Medium Enterprises & Textiles	513.87	561.95	609.78
13.	North Bengal Development	281.52	450.91	423.02
14.	Paschimanchal Unnayan Affairs	204.52	324.46	298.21
15.	Power and Non-Conventional Energy Sources	1660.56	3290.79	5808.23
16.	Public Works	3752.42	4809.45	4450.00
17.	Sundarban Affairs	229.21	286.12	300.91
18.	Tourism	148.70	125.77	134.74
19.	Transport	1069.20	1264.41	1485.05
20.	Water Resources Investigation and Development	855.73	1036.15	963.13
21.	Seven other Departments ¹	229.47	368.12	376.75
	Total	15826.56	20314.18	22779.48

(Source: Appropriation Accounts of Government of West Bengal for the relevant years)

¹ Bio-Technology, Consumer Affairs, Environment, Food Processing Industries and Horticulture, Public Enterprises and Industrial Reconstruction, Science and Technology and Sericulture

1.3 About this Report

This Report of the Comptroller and Auditor General of India (CAG) relates to matters arising from audit of 27 Government Departments and 19 Autonomous Bodies under the Economic Sector (*Appendix-1.2*). Compliance Audit covers examination of transactions relating to expenditure of the audited entities to ascertain whether the provisions of the Constitution of India, applicable laws, rules, regulations and various orders and instructions issued by the competent authorities are being complied with. Performance Audit examines whether the objectives of the programme/ activity/ Department are achieved economically, efficiently and effectively.

1.4 Authority for Audit

The mandate for audit by the CAG is derived from Articles 149 and 151 of the Constitution of India and the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) (DPC) Act, 1971. The CAG conducts audit of expenditure of the Departments of Government of West Bengal under Section 13² of the CAG's (DPC) Act. CAG is the sole Auditor in respect of Autonomous Bodies which are audited under Sections 19(2)³, 19(3)⁴ and 20(1)⁵ of the CAG's (DPC) Act. In addition, the CAG also conducts audit of other Autonomous Bodies, under Section 14⁶ of CAG's (DPC) Act, which are substantially funded by the Government. Principles and methodologies for various audits are prescribed in the Auditing Standards and the Regulations on Audit and Accounts, 2007, issued by the CAG.

1.5 Planning and conduct of Audit

The primary purpose of this Report is to bring to the notice of the State Legislature important results of Audit. Auditing Standards require that the materiality level for reporting should be commensurate with the nature, volume and magnitude of transactions. The findings of Audit are expected to enable the Executive to take corrective action as also to frame policies and directives that will lead to improved financial management, thus contributing to better governance.

² *Audit of (i) all transactions from the Consolidated Fund of the State, (ii) all transactions relating to the Contingency Fund and Public Accounts and (iii) all trading, manufacturing, profit and loss accounts, balance sheets and other subsidiary accounts.*

³ *Audit of accounts of Corporation (not being companies) established by or under law made by Parliament in accordance with the provisions of the respective legislations*

⁴ *Audit of the accounts of Corporations (not being companies) established by or under law made by the State Legislature at the request of the Governor.*

⁵ *Audit of accounts of any body or authority on the request of the Governor, on such terms and conditions as may be agreed upon between the CAG and the Government.*

⁶ *Audit of (i) all receipts and expenditure of a body/ authority substantially financed by grants or loans from the Consolidated Fund of the State and (ii) all receipts and expenditure of any body or authority where the grants or loans to such body or authority from the Consolidated fund of the State in a financial year is not less than ₹ one crore*

The audit process starts with assessment of risks faced by various Departments of the Government based on expenditure incurred, criticality/ complexity of the activities, level of delegated financial powers, assessment of overall internal controls and concerns of the stakeholders. Previous audit findings are also considered in this exercise. Based on this risk assessment, the frequency and extent of audit are decided.

After completion of audit, Inspection Reports containing audit findings are issued to the heads of the Departments. The Departments are requested to furnish replies to the audit findings within one month of receipt of the Inspection Reports. Whenever replies are received, audit findings are either settled or further action for compliance is advised. Important audit observations arising out of these Inspection Reports are processed further for inclusion in the Audit Reports which are submitted to the Governor of the State under Article 151 of the Constitution of India. During 2016-17, 226 units of various Departments/ Organisations under the Economic Sector were audited and 216 Inspection Reports (including 18 of previous year and excluding 28 which were issued in 2017-18) containing 693 Paragraphs were issued.

1.6 Response to audit

1.6.1 Compliance Audit Observations and Performance Audit

Twelve compliance audit observations and one Performance Audit report on “Implementation of Renewable Energy Programme in West Bengal” were forwarded (between April and November 2017) to Additional Chief Secretaries/ Principal Secretaries/ Secretaries of the Departments concerned with the request to send their responses. Departmental replies in respect of eight compliance audit observations and the Performance Audit on “Implementation of Renewable Energy Programme in West Bengal” have been received. The replies have been incorporated in the Audit Report wherever applicable.

1.6.2 Follow-up on Audit Reports

After tabling of the Reports of the C & AG of India in the State Legislature, the State Government Departments are required to submit *suo motu* replies to the audit observations within one month. Though the Audit Reports for the year 1981-82 to 2015-16 were presented to the State Legislature between September 1983 and March 2018, replies on 90 paragraphs are yet to be received from various departments under Economic Sector. Status of the pending replies as on 31st December, 2017 is given in *Appendix-1.3*.

Action Taken Notes (ATNs) on the recommendations of the Public Accounts Committee (PAC) are required to be furnished within six months from the date of presentation of the PAC Report to the State Legislature. Action Taken Notes on 23 paragraphs contained in 20 Reports of the PAC, presented to the Legislature had not been submitted by nine⁷ Departments to the Assembly Secretariat as of December 2017. In these 20 Reports, the PAC had suggested recovery, disciplinary action, *etc.* A few significant cases are elaborated in *Appendix-1.4*.

⁷ Agriculture, Co-operation, Fisheries, Food Processing Industries & Horticulture, Irrigation & Waterways, Public Works & Public Works (Roads), Transport and Tourism.

1.6.3 Outstanding replies to Inspection Reports

The Accountant General (Economic and Revenue Sector Audit), West Bengal arranges to conduct periodical inspections of the Government Departments to test check transactions and verify maintenance of important accounts and other records as prescribed in the rules and procedures. These inspections are followed up with Inspection Reports (IRs) incorporating irregularities detected during the inspections and not settled on the spot, which are issued to the heads of the offices inspected with copies to the next higher authorities for taking prompt corrective actions. The heads of the offices/ Government are required to promptly comply with observations contained in the IRs, rectify defects and omissions and report compliance through replies. Serious financial irregularities are reported to the heads of the Departments and the Government.

Inspection Reports issued upto 31 August 2017 were reviewed and it was found that 2128 paragraphs relating to 804 IRs remained outstanding at the end of August 2017 (*Appendix-1.5*). The large pendency of IRs, due to non-receipt of replies, was indicative of the fact that the heads of the offices and the heads of the Departments did not initiate appropriate and adequate action to rectify defects, omissions and irregularities pointed out by Audit in the IRs.

Chapter 2

Performance Audit

Implementation of Renewable Energy Programme in West Bengal

Chapter 2: Performance Audit

Power and Non-Conventional Energy Sources Department

IMPLEMENTATION OF RENEWABLE ENERGY PROGRAMME IN WEST BENGAL

2.1 Introduction

Renewable Energy (RE) resources include energy of wind, solar, geothermal energy of water, biomass, waste *etc.* These energy resources (i) contribute to better air quality, (ii) reduce reliance on fossil fuels, (iii) curb global warming, (iv) add jobs to the economy and (v) protect environmental values. Harnessing renewable energy sources entails cleaner environment, energy independence and a stronger economy.

National Action Plan for Climate Change (NAPCC)⁸ was the first response of Government of India (GoI) to rising greenhouse gas emissions and climate change. It envisaged RE to constitute 15 *per cent* of the energy mix of India by 2020. All states had to draw up State Action Plans on Climate Change (SAPCC), to meet the targets envisaged in NAPCC. In August 2009, GoI made a commitment to UNFCCC⁹ to reduce its carbon emission intensity by 20 to 25 *per cent*. Further, in order to meet the commitments to the Paris Accord¹⁰ ratified in 2016, GoI planned to accelerate the development and deployment of RE in the country, by up-scaling of targets for RE capacity addition from 30 GW¹¹ by 2016-17 to 175 GW by 2021-22. This would have resulted in abatement of 326.22 million tons of CO₂ per year. Further, India is also committed to the Sustainable Development Goals¹² evolved by United Nations. Specifically, Goal Seven requires the governments to “ensure access to affordable, reliable, sustainable and modern energy for all”. Government of West Bengal introduced ‘Policy on Co-generation and Generation of Electricity from Renewable Sources of Energy’ in June 2012 to encourage the growth of RE in the State.

As per the report of Central Electricity Authority¹³, as of March 2017, against its potential of 8.97 lakh MW the installed capacity of the country from RE sources was 0.57 lakh MW. This constituted 17.52 *per cent* of the total installed

⁸ *India's first response to climate change issues, issued in 2008 by Government of India to deal with rising emissions and its effect on development.*

⁹ *United Nations Framework Convention on Climate Change*

¹⁰ *The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels. India ratified the Paris Agreement (on Climate Change) on 2nd October 2016*

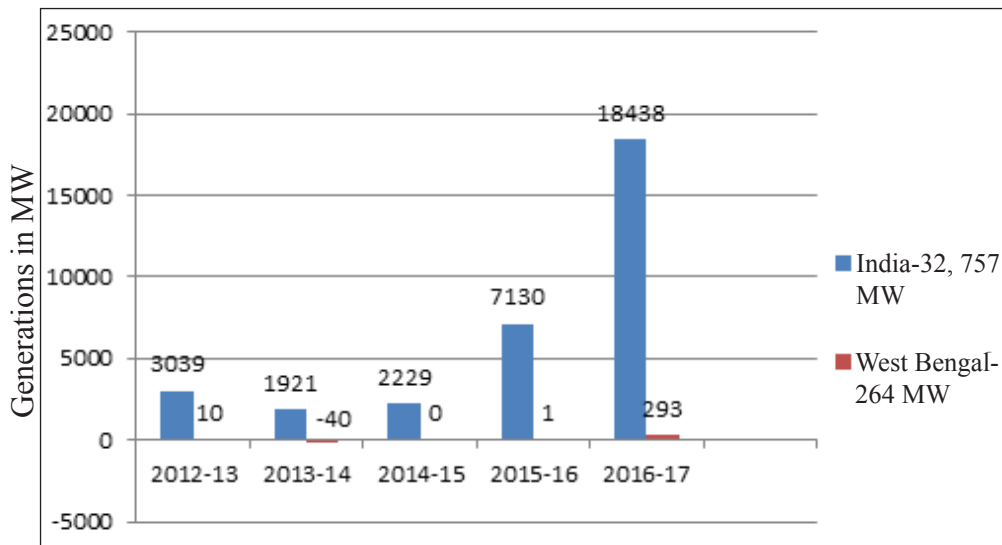
¹¹ *Giga Watt*

¹² *In 2015, all countries under the UN umbrella adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals.*

¹³ *A statutory organization, which plays a lead role in promoting the integrated operations of the regional power grids and the evolution of a national grid.*

capacity (3.27 lakh MW) from all sources¹⁴. Whereas, in West Bengal, against the potential of 7,222 MW¹⁵ the total installed capacity from RE sources was only 424.64 MW. This constituted 4.08 *per cent* of the total installed capacity (10,383 MW) from all sources and 0.13 *per cent* of the total installed capacity (3.27 lakh MW) of the country. Further, as per the report of the Central Electricity Authority during 2012-17, 264 MW capacity was created through RE sources in the State. Year wise addition/reduction in installed capacity of the Country *vis-à-vis* the State are depicted in the **Chart-2.1**.

Chart-2.1: Year wise addition/reduction in installed capacity of the Country vis-à-vis the State during 2012-13 to 2016-2017



However, as per records of WBREDA, only 35.18 MW was the capacity installed in the State during the period of five years which was 4.15 *per cent* of the target (847 MW) fixed in the Policy.

2.2. Organizational set up

The Department of Power & Non-Conventional Energy Sources (Department), Government of West Bengal (GoWB) has overall responsibility for co-ordination, implementation and monitoring of different projects under its RE Programme. The Department implements the RE Programme through two nodal agencies (West Bengal Renewable Energy Development Agency - WBREDA¹⁶, West Bengal Green Energy Development Corporation Limited - WBGEDCL¹⁷) and two implementing agencies (West Bengal State Electricity Distribution Company Limited - WBSEDCL¹⁸, West Bengal Power Development Corporation Limited - WBPDCCL¹⁹). Besides, West Bengal Electricity Regulatory Commission

¹⁴ Total 326849 MW from Thermal, Nuclear, Hydro and Renewable Energy Sources

¹⁵ As per MNRE report

¹⁶ Autonomous body established in 1993

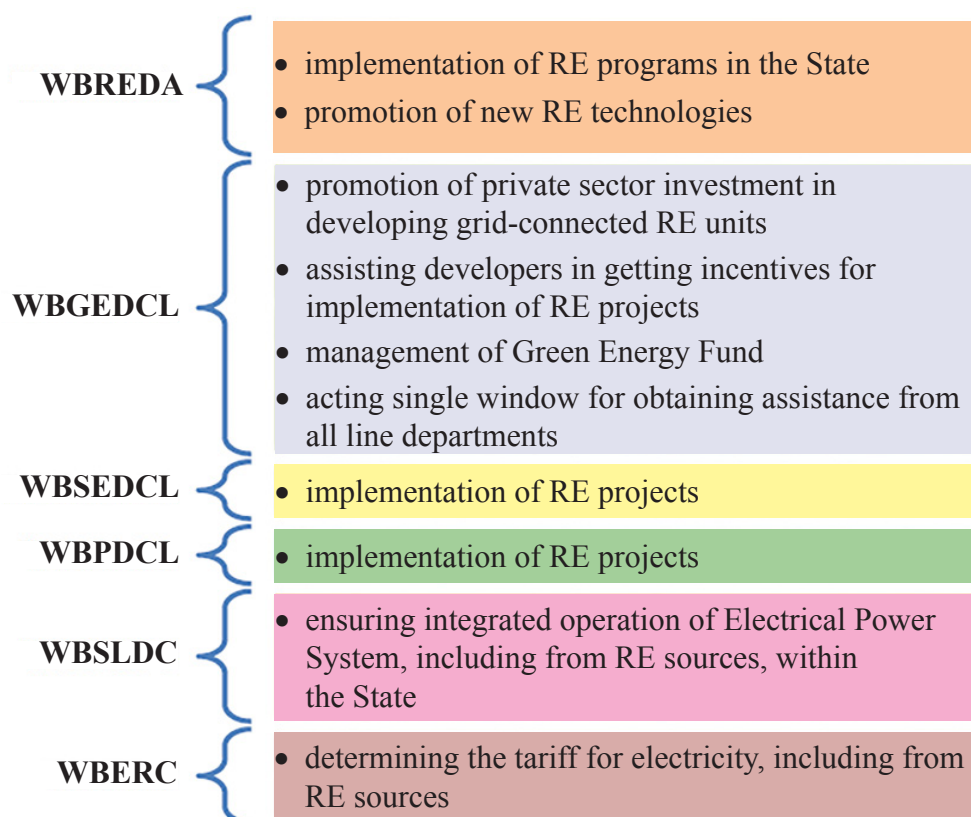
¹⁷ State PSU established in August 2007

¹⁸ State PSU established in March 2007

¹⁹ State PSU established in July 1985

(WBERC) and West Bengal State Load Despatch Centre (WBSLDC)²⁰ are functioning as regulatory authorities. Their respective jurisdiction is listed in the **Chart 2.2**.

Chart-2.2: Agency-wise jurisdiction



According to RE Policy, WBREDA was responsible for implementation of RE projects while WBGEDCL was to facilitate private investment, monitor projects and clear infrastructure bottlenecks for implementation of RE projects. However, apart from WBREDA, WBGEDCL, WBSEDCL and WBPDCCL also undertook implementation of RE projects.

2.3 Scope and methodology of Audit

The Performance Audit was conducted between February and June 2017. Besides the records of different projects under RE programme planned and implemented by the Department and its agencies²¹, the records of West Bengal Electricity Regulatory Commission (WBERC) and West Bengal State Load Despatch Centre (WBSLDC) for the years from 2012-13 to 2016-17 were examined. Audit methodology adopted was analysis of data/ documents available in the different audited entities and joint site inspection. An Entry Conference was held on 27 March 2017 where the audit objectives of this Performance Audit

²⁰ An Apex body established in April 2006

²¹ WBREDA, WBGEDCL, WBSEDCL and WBPDCCL

were discussed in detail with the Department and its implementing agencies. The Exit Conference was held on 19 January 2018 wherein the replies to audit observations and recommendations were discussed with the management. Their replies have been suitably incorporated into the report.

2.4 Audit Objectives

The objectives of this Performance Audit were to assess whether:

- Planning process and policy framework were focused on increasing the generation of renewable energy and achieving the Sustainable Developments Goals;
- Implementation of the planned schemes was effective to meet the targets envisaged in the RE Policy 2012;
- Fund allocation was adequate and financial resources were managed efficiently to harness the RE sources;
- Tariff and other regulatory mechanisms relating to purchase and sale of RE were conducive to development of RE and were adhered to by the agencies; and
- Monitoring, Internal Control and vigilance arrangements were effective.

2.5 Audit criteria

The audit criteria for this Performance Audit were derived from:

- West Bengal Policy on Co-generation and Generation of Electricity from Renewable Sources of Energy, June 2012 (RE Policy June 2012)
- National Action Plan on Climate Change (NAPCC) 2008 / State Action Plan on Climate Change (SAPCC) April 2011 and April 2012
- Sustainable Development Goals²² evolved by the United Nations
- Guidelines issued by the Ministry of New & Renewable Energy (MNRE)
- West Bengal Electricity Regulatory Commission (Cogeneration and Generation of Electricity from Renewable Sources of Energy) Regulations, 2013 of WBERC
- Mandate of West Bengal Green Energy Development Corporation Limited
- West Bengal Financial Rules, West Bengal Treasury Rules (WBTR)
- Electricity Act 2003

Audit findings

Audit findings related to planning, implementation and monitoring of RE projects in the State are discussed in the succeeding paragraphs.

²² *In 2015, all countries under the UN umbrella adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals.*

2.6 Planning process and policy framework adopted by the Department/ Nodal Agencies

In 2012, the Department introduced its first ever RE Policy on ‘Co-generation²³ and Generation of Electricity from RE Sources’. The objective was to achieve installed capacity of 1040 MW by March 2017 from an existing capacity of 193 MW from RE sources. Consequently, during 12th Five Year Plan (FYP) period (2012-17), 847 MW of capacity was to be created from RE sources. In this regard, audit observed the following:

2.6.1 Discrepancies in assessment of RE potential in different documents

Audit noticed wide variation in source-wise RE potential as assessed in three different documents viz. State Action Plan on Climate Change (SAPCC) - April 2012, RE Policy - June 2012 and Annual Reports of MNRE (pertaining to GoWB) for 2014-15 as shown in the **Table 2.1**.

Table 2.1: RE potential as per different documents

Source of Renewable Energy	RE Potential		
	SAPCC April 2012	RE Policy June 2012	MNRE Annual Report (2014-15)
	(in MW)		
Wind	450	450	22
Mini & Small Hydro	300 (Small Hydro)	394	396
Co-generation	Not mentioned	600	Not mentioned
Biomass	350	662	396
Waste to Energy	150	100	148
Solar	16,700	Under Preparation	6,260
Total	17,950	2,206	7,222

(Source: As per RE Policy, SAPCC and MNRE reports)

The figures of RE potential, which appeared in the three documents, were different, even though the inputs were provided by the Department. In reply, the Department accepted (December 2017) that it had not taken up any exclusive study to assess RE Potential in the State and considered various reports, research studies to refer RE potential in the State.

Thus, the varying source-wise RE potential in different documents, indicated that it was arbitrarily assessed and incorporated without actual on-ground verification or any study. Lack of clarity on actual potential hampered preparation of realistic targets for increasing RE in the State.

²³ Co-generation means a process which simultaneously produces two or more forms of useful energy including electricity from a single fuel source.

2.6.2 Deficiencies in framing Policy, Plan and Programme

One of the objectives of the RE Policy was to promote and facilitate the growth in generation of electricity from RE sources by optimal utilisation of the RE potential in the State. The Policy also aimed at removing constraints by providing a guiding framework for promotion and development of appropriate RE technologies. Audit noticed following deficiencies in the process of framing the policy, plan and programme by the Department:

- The Department failed to assess the potential of solar energy -one of the most important source of RE- in the State and to incorporate the same in the RE Policy till date (December 2017) as it was stated to be under preparation. As such, necessary directives for harnessing the actual RE potential of solar energy could not be framed in the policy.
- Comprehensive action plan and programme to achieve the targets of the RE policy were not delineated. As such, there was absence of a strategy or road map to translate the targets into action/ projects at ground level. This was evident from the fact that there was a wide gap between the targets (847 MW) in RE Policy and actual achievements (35 MW) during 2012-17 from RE sources. Even though GoWB had appointed nodal agencies for implementation of the plan, the Policy did not include any mandate for them to work out comprehensive action plans and programs to achieve the targets.
- As a part of the MNRE's plan for capacity creation of 175 GW from RE sources for the country, the State had been given (2016) a target of achieving the capacity of 5386 MW by 2022. In the RE Policy of the State, the target to be achieved was 2706 MW by 2022. The Department did not reset the targets in its RE Policy in accordance with the revised targets given by MNRE.

These deficiencies in framing the policy and setting out plans and programs for harnessing RE potential in the State led to non-achievement of the targets of the RE Policy.

The Department stated (December 2017) that the RE sector had undergone spectacular change during last 3-4 years with the introduction of newer technology and it had taken up a fresh exercise in framing a State Solar Policy. It also stated that action was being taken to frame State Energy Plan and State Energy Action Plan for taking holistic view and future action of power sector in the State. However, the Department had set no timelines or modalities regarding this exercise.

2.6.3 Strategy for implementing RE Policy

As per the RE Policy, WBGEDCL was to act as the State Nodal Agency to facilitate private investment and involvement in the RE sector of the State. WBREDA, was *inter alia*, responsible for promotion of new RE technologies through demonstration projects. The Policy defined the roles and responsibilities of WBREDA and WBGEDCL for promotion of green energy in the State. Further WBSGDCL and WBPDCCL were also to act as implementing agencies for creation of different RE projects in addition to their primary responsibilities in the conventional power sector.

Audit observed that the Department did not allocate responsibilities with timelines with regard to implementation of the RE Policy. It was also seen that, during the last five years (2012-17) WBREDA had not taken up any activities for (i) promotion of RE technologies (ii) disbursement of subsidy (iii) providing support to developers in formulation, design and proper implementation of off-grid²⁴ solar and biogas projects. It was seen that seven solar projects pertaining to the year 2012-13 to 2014-15 had not been taken up by WBREDA. The reasons for not taking up the project were non-identification of suitable site, lack of manpower *etc.*, which could have been resolved by strategic planning. As a result, ₹ 14.74 crore remained unutilised as of August 2017.

Accepting the Audit observation, the Department stated (December 2017) that the WBGEDCL was in the process of winding up and its activities would be taken up by WBREDA²⁵. However, fact remains that Department did not take any step to strengthen WBREDA in view of its poor performance.

2.6.4 Assessment of funds for different RE programmes not done

As per SAPCC, during the 12th FYP period (2012-13 to 2016-17) funds amounting to ₹ 4610²⁶ crore were required. However, the Plan did not stipulate the sources from which this funding requirement was to be met. Further, RE Policy (Para 10.2) stipulated that the budgetary allocation was to be done in such a way that separate fund reserves were created and kept for different RE technologies. However, it was observed that:

- No separate fund was created for different projects of RE technologies.

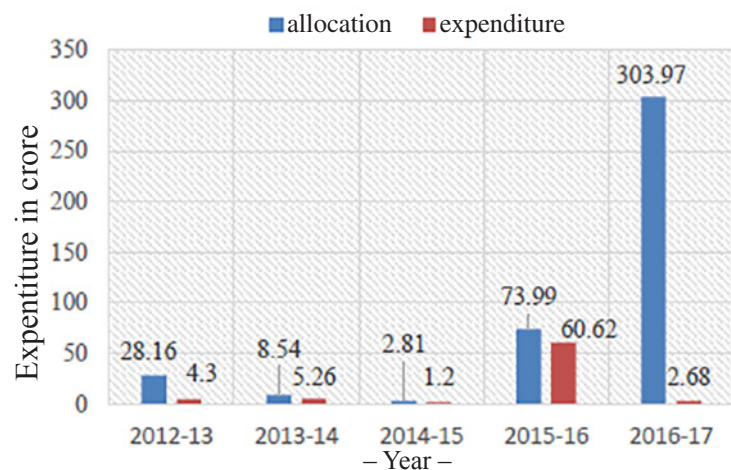
- Out of the estimated fund requirement of ₹ 4610 crore, as per SAPCC, during 2012-17, only ₹ 417.47 crore (9.10 per cent) was allocated. Out of this only ₹ 74.06 crore (17.74 per cent) was utilised as on March 2017 as outlined in

Chart 2.3.

- Neither the

Department nor the nodal/implementing agencies could provide any records indicating the efforts made for bringing in private investment for achieving the targets as planned under SAPCC.

Chart-2.3: Allocation vis-à-vis expenditure



(Source : As intimated by WBREDA, WBGEDCL, WBSIEDCL and WBPDCCL)

²⁴ Standalone power generation for local consumption.

²⁵ As per Department's order issued in November 2017.

²⁶ ₹ 2000 crore for 2000 MW from RE sources by 2021, ₹ 2500 crore incentives for Green Energy Producers, ₹ 110 crore for manpower development for installation, Operation and Maintenance.

In reply, the Department stated (December 2017) that unless additional support be extended, it would be difficult to achieve the target. The reply needs to be seen in view of low utilisation of allotted funds and its failure to create a separate fund for funding different projects of RE. Moreover, the Department was silent about bringing in private investment for harnessing of RE potential as planned in SAPCC.

2.6.5 Green Energy Fund not created

According to the RE Policy²⁷, WBGEDCL was responsible for creation and management of a Green Energy Fund (GEF) in order to finance various initiatives for development of RE in the State. GEF was to be created by equity contribution by the GoWB and contributions from international donor agencies. GEF was to be tapped from the charges collected from private developers to provide administrative support for obtaining statutory clearances and charges for project assessment *etc.*

Audit, however, observed that WBGEDCL did not take any initiative for creation of the fund. Neither any records relating to any effort made by WBGEDCL were made available for audit.

Accepting the audit observation, the Department stated (December 2017) that a draft Solar Policy was under preparation with a provision of GEF and fresh attempts would be made for creation of GEF.

The fact, however, remains that West Bengal failed to put in serious efforts for creation of GEF.

Good practice

Maharashtra Government, with the objective to implement various RE projects, created Green Cess Fund by levying tax at the rate of eight paise per unit of electricity sold to the industrial and commercial consumers. During 2007-08 to 2014-15, the State generated ₹ 2315 crore from this source.

2.6.6 Institutional mechanisms to plan and implement the RE projects

Achieving ambitious renewable energy targets requires the presence of enabling infrastructure like laws and codes to support the change from non-renewable to the RE sector. In this regard, audit observed:

2.6.6.1 Building codes not framed and bye-laws not amended

The RE Policy²⁸ stipulated that building codes should be framed to make it mandatory for the buildings of government establishments, business entities, schools, colleges, hospitals, housing societies, *etc.*, to install roof-top Photo Voltaic (PV) devices for generation of solar energy.

²⁷ Para 10.1 read with Para 14.2.1.vii

²⁸ Para 6.14, 6.17 and 6.18

All existing and upcoming commercial and business establishments having more than 1.5 MW of contract demand would be required to install solar roof top systems to meet at least two *per cent* of their total electrical load.

Those entities having a total contract demand of more than 500 KW would be required to install solar rooftop system to meet at least 1.5 *per cent* of their total electrical load.

Installation of PV plants across unused rooftop areas and vacant spaces in the premises of industrial infrastructures coming under the initiative of the State like growth centres, industrial parks *etc.*, was to be executed by 2017.

All these changes required a revision in the building bye-laws, under the administrative jurisdiction of the Municipal Affairs Department (MAD). It was observed that WBGEDCL approached (July 2012 and June 2013) the Municipal Affairs Department to issue necessary orders to make suitable changes in the bye-laws of the building code to bring them in conformity with the RE policy. WBGEDCL also submitted (February 2013) Draft bye-laws to the Department for onward transmission to MAD for getting the building bye-laws amended by them. However, as of December 2017, bye-laws of the buildings code had not been amended to facilitate the achievement of the initiatives laid down in the RE policy.

The Department stated (December 2017) that it had introduced West Bengal Energy Conservation Building Code 2016 (WBECBC) which was being amended in line with the Energy Conservation Building Code 2017 published by Bureau of Energy Efficiency, Government of India. It further stated that a draft amendment to building bye-laws in consultation with Urban Development Department and MAD was prepared and expected to be taken up for notification early. However, the fact remains that WBECBC is still to be amended by the Department and sent to Urban Development and Municipal Affairs Departments for incorporation of its provisions in the building bye-laws.

2.6.6.2 Deficiency in clearance mechanism of RE projects

The RE Policy²⁹ empowered WBGEDCL to act as a Single Window for obtaining clearances for different RE technologies, identifying all the documents required and for developing standard formats. All these standard formats were to be made available on the website of the Nodal Agency.

Audit, however, observed that WBGEDCL was yet to develop any standard format; as such, it could not function as a single window for speedy clearances for different RE technologies. The reasons for not developing the standard format till December 2017 were not furnished to Audit.

²⁹ Para 9.3

RE policy³⁰ also made WBGEDCL responsible for promotion of private sector investment and involvement in developing grid-connected RE units, assisting developers in getting different incentives for implementation of RE projects *etc.* Accordingly, the Board Meeting of WBGEDCL resolved (September 2012) that it would help the private parties with overall guidance, in line with the RE Policy.

Audit observed that 11 private developers proposed (between August 2011 and July 2014) setting up Grid Connected Solar PV Power Plants at different places in the State with the projected capacity of 233.30 MW. However, only one developer was able to commission a five MW Solar PV Power Plant at Durgapur in March 2013. The projects of other private developers for installation of remaining 228.30 MW could not be materialised due to reasons not on record.

The Department stated (December 2017) that the proposals could not be materialised as all the private developers sought land and higher tariff than that of prevailing rates. It further stated that in view of these constraints, suitable provisions were being proposed in the draft Solar Policy. However, fact remains that the Department had not taken any initiative to assist the private developers in the promotion of RE.

2.6.7 Incorporation of SDGs into Policy

To end poverty in all its dimensions and craft an equal, just and secure world by 2030, 17 Sustainable Development Goals (SDGs) were adopted (September 2015) in the UN General Assembly Summit. India, as a member of UN General Assembly is a signatory to the SDGs, which also have to be followed by all the states across India. In West Bengal, the State Government has put in place a process to implement the SDGs.

One of the goals (SDG-7) - 'Affordable and Clean Energy' was to ensure access to affordable, reliable, sustainable and modern energy for all. Two of the five targets set to be achieved under SDG-7 were to:

- ensure universal access to affordable, reliable and modern energy services; and
- increase substantially the share of RE in the global energy mix.

The SAPCC and RE Policy of the State were also not reformulated to achieve the objectives set out in the SDGs. In its absence, the generation of energy through RE sources did not get the attention and focus required as mandated by the SDGs.

Accepting the Audit observation, the Department stated (December 2017) that it had decided to frame Energy Plan and Energy Action Plan for the State to ensure access to affordable, reliable, sustainable, modern and clean energy.

³⁰ Para 14.2.1

2.7 Implementation to meet Policy Targets including Research and Development (R&D) Activities

2.7.1 Achievements vis-à-vis Targets

In order to meet the objectives of NAPCC (June 2008), GoWB set a target in SAPCC (April 2011) for creation of 2000 MW and 3000 MW grid connected installed capacity from RE sources by 2021 and 2031 respectively. SAPCC also proposed incentives for RE producers and facilitating R&D activities during the period of ten years, ending in 2021. Further, MNRE under ‘Power for all programme’³¹ envisaged (August 2016) the target for West Bengal, for creation of installed capacity of 5,386 MW from RE sources by 2022.

The Department, in the RE Policy of June 2012, set a target for additional installation of 847 MW³² of RE as short term goal for 12th FYP period. Further, it set a target for 13th FYP period to achieve installed capacity of 2706 MW of RE as a long term goal. However, Audit observed that during the 12th FYP period (2012-17) only 35.18 MW (4.15 per cent) capacity of RE was added as against the target of 847 MW, as detailed in **Table 2.2**.

Table 2.2: Targets vis-à-vis achievements

Source of RE	Existing Installed Capacity(in MW) as on June 2012	Target for 12 th Plan period (2012-17) (in MW)	Achievement (2012-17) (in MW)	Achievement (in percentage)
Wind Power	2	73	Nil	Nil
Mini & Small Hydro	97	123	Nil	Nil
Co-generation	69	286	Nil	Nil
Biomass	16	224	10.10	02.59
Waste to Energy	7	43	01.00	00.00
Solar	2	98	24.08	24.57
TOTAL	193	847	35.18	04.15

(Source: Records of WBREDA)

The very low achievement reflected deficiency in policy formulation and planning by the Department. Further, the approved projects were also ineffectively implemented and failed to meet the targets for installation of capacity of RE from different sources, as discussed in the succeeding paragraphs.

³¹ A joint initiative of GoI and GoWB

³² As in June 2012, the installed capacity was 193 MW which was to be increased to 1040 MW by the end of 12th FYP

The Department attributed (December 2017) the lower achievements to various factors like low solar insolation, higher land costs, low wind and hydel potential, commercial interests of the Distribution Companies (DISCOMs), etc. The reply was not tenable as the potential and targets were fixed in the RE Policy based on the conditions of the State and it was mandatory on the part of DISCOMs to fulfil the power purchase obligations. Moreover, the commercial interests of the DISCOMs were served by fixation of their sales tariff by WBERC after considering the effects of the Renewable Purchase Obligations (RPO)³³.

2.7.1.1 Implementation of Wind Power Projects

As per the RE policy, it was identified that 450 MW of wind power potential existed in the State. During the 12th FYP period, a target for additional installation of 73 MW³⁴ of energy from wind power was set. Audit observed that the actual achievement during the plan period was nil. Moreover, the existing 2.5 MW wind projects³⁵ had also stopped functioning and the three approved projects could not be taken up as detailed below:

(a) The wind power project at Ganga Sagar stopped functioning from November 2012 due to availability of conventional energy now in Ganga Sagar Island. The wind power project at Fraserganj had not been operational since May 2016 due to lack of maintenance. Due to dearth of work force in WBREDA, the Department decided (November 2015) to transfer the Wind Farm Project at Fraserganj to WBSEDCL from WBREDA, which was yet (December 2017) to be handed over. It was further observed that in February 2017, WBSEDCL forwarded an estimate amounting to ₹ 72.00 lakh to WBREDA for repair and maintenance of the project but no action was taken by WBREDA for allocating the required funds as of July 2017. Thus, the plant remained non-functional for more than one year due to lack of proper maintenance of the plant.

The Department stated (December 2017) that the existing 2 MW wind farm project at Fraserganj had re-started power generation from November 2017 after repairing. Audit, however, observed that out of total eight wind energy generators, only three with 0.75 MW capacity could be repaired and started operations. Further, due to delay in taking suitable action for repair and maintenance of the project, power generation remained suspended for more than one year (May 2016 to November 2017) which resulted in loss of power generation of 8.62 lakh Kwh³⁶.

³³ RPO means obligation to purchase electricity from renewable & co-generation sources by a distribution company.

³⁴ As in June 2012, the installed capacity was 2 MW from Wind Power which was to be increased to 75 MW by the end of 12th FYP

³⁵ Fraserganj (2 MW) and Ganga Sagar (500 KW). While fixing the targets for 12th FYP, the existing installed capacity of wind energy had been taken as 2 MW, in the RE Policy

³⁶ Calculated on the basis of the last five years' generation history of the plant.

(b) WBREDA proposed (December 2011) to the Department for setting up three grid connected Wind Power Projects³⁷ with total capacity of one MW at a total cost of ₹ 6.55 crore. WBREDA claimed³⁸ that the government land for the projects had already been taken into its possession. Accordingly, Department approved (March 2012 and February 2013) the projects for completion by six months. Audit observed that the projects could not be implemented till December 2017 as the land was not under possession of WBREDA. The Department stated (December 2017) that in anticipation of the availability of land, the project was sanctioned, but subsequently surrendered due to non-availability of land.

Thus, WBREDA not only failed to create any additional capacity in the area of power generation through wind projects but also failed to maintain generation of RE from the existing 2.5 MW wind projects at Ganga Sagar and Fraserganj. Discontinuation of RE generation at Ganga Sagar due to availability of conventional energy indicates that generation of RE and environmental concerns were not the priority of the Department. As of December 2017, only 0.75 MW of wind power project was functional in the State.

The Department stated (December 2017) that the wind power potential in West Bengal was only 22 MW. The reply was, however, unfounded as the wind power potential as per RE policy and SAPCC of the State Government was 450 MW. The Department was far from harnessing the full potential of wind power.

2.7.1.2 Implementation of Mini and Small Hydro Power Projects

RE policy stipulated the target of installation of 123 MW during 2012-17 in hydropower in addition to the existing capacity of 97 MW. However, no hydropower capacity was created during the period.

Failure to implement Pedong Small Hydel Project

The construction of Pedong Small Hydel Project of 3 MW capacity was taken up (December 2007) by WBSEDCL at an estimated cost of ₹ 24.77 crore. Audit observed that WBSEDCL identified 9.55 acres of land and applied (February 2009) to the concerned Land Acquisition (LA) Collector for acquisition. It was also seen that the LA collector informed (November 2011) WBSEDCL that Cabinet Approval was required to proceed with the acquisition of land. In April 2012, WBSEDCL made proposal to the Department for obtaining cabinet approval, which was accorded in September 2013. It was further seen that WBSEDCL could not acquire the land due to escalation in the cost of land as a result of time lapse. The project was dropped in June 2016 by WBSEDCL due to cost overrun by ₹ 22.42 crore³⁹.

³⁷ One at Beguakhali and two at Ganga Sagar Island

³⁸ In the project proposals.

³⁹ Project Cost increased to ₹ 47.19 crore in June 2016 minus Original Project Cost ₹ 24.77 crore in December 2007

Audit observed that though the project was approved in December 2007, the application for land for the project was made after more than one year, in February 2009. LA collector took 34 months to inform about the need of Cabinet approval for land acquisition. WBSEDCL and the Department took further 22 months to get clearance of the Cabinet for the acquisition of land and further three years for taking the decision to drop the project. Meanwhile, WBSEDCL incurred a total expenditure of ₹ 1.18 crore on pre-construction work⁴⁰.

The Department stated (December 2017) that the project, since inception, was fraught with difficulties like political disturbances, extreme remoteness of location, uncertainty in getting Clean Development Mechanism benefit, high market value *etc.* which ultimately made the project unviable. The reply was, however, not acceptable as Audit found prolonged delay at all levels in commencement of the work which led to increase in cost of the project. Further, without resolving the difficulties the project should not have commenced.

As a result, capacity of 3 MW could not be created, and the expenditure of ₹ 1.18 crore incurred on pre-construction work became infructuous.

2.7.1.3 Implementation of Biomass/Co-generation/Waste to Energy Projects

The RE policy set a target to make additions⁴¹ of 224 MW, 43 MW and 286 MW capacity from biomass⁴², waste-to-energy⁴³ and co-generation⁴⁴ sources respectively, during the period 2012-17.

As per the RE Policy⁴⁵, the nodal agency was required to (i) identify potential sites for establishment of biomass units on Public Private Partnership mode, (ii) classify high rice-producing areas ensuring smooth availability of feedstock, (iii) allocate projects in the pre-defined command areas and (iv) periodically review these projects.

In respect of 'waste to energy'⁴⁶, the Municipal Corporations were to identify the land for the projects. For waste to energy projects, promotion of garbage segregation at source was made mandatory for industries, large commercial complexes and large housing societies. Use of bio- degradable waste was to be encouraged for generation of electricity through waste-to-energy power projects as well as preventing soil degradation of the waste dumping ground.

Further, Co-generation Power⁴⁷ was targeted to be harnessed through co-generation facilities that were intended to be installed primarily in iron and

⁴⁰ Survey and investigation, preparation of DPR, advance to L&LR *etc.*

⁴¹ As in June 2012, the installed capacity was 16 MW(Biomass), 7MW (Waste to energy) and 69 MW (Co-generation) which was to be increased to 240 MW, 50 MW and 355 MW respectively by the end of 12th FYP

⁴² Rice husk is a primary feedstock for biomass projects. Feedstock availability and pricing are the critical determinants of success for biomass plants.

⁴³ Energy generated from municipal solid wastes or any other organic or inorganic waste.

⁴⁴ Process which simultaneously produces two or more forms of energy from single source.

⁴⁵ Para 6.4 and 6.5 of the RE Policy

⁴⁶ Para 6.9 to 6.11 of the RE Policy

⁴⁷ Para 6.12 of the RE Policy

steel, fertiliser and chemical industries having connected load of 2000 KVA and above. These were to produce at least 5 *per cent* of their requirement through captive power plants employing co-generation technology.

Audit, however, observed that only three biomass projects and one ‘waste to energy’ project were commissioned during the 12th FYP period with capacity of 10.1 MW and one MW respectively. No project was taken up in co-generation. Thus, only two *per cent*⁴⁸ of targeted capacity was achieved from these three RE sources.

The Department stated (July 2017) that the achievement was poor as the sale price of power from these RE sources, as fixed by WBERC, was not attractive. As a result, these projects were not viable for the producers. The reply is not tenable as the WBERC had fixed the tariff based on generation costs.

2.7.1.4 Implementation of Solar Power Projects

RE policy had set the target of additional installation⁴⁹ of 98 MW during the period of 2012-2017. However, only 37.20 MW⁵⁰ of solar energy was installed as of December 2017.

Further, MNRE fixed (April 2016) a target of 500 MW solar power projects to be achieved by the State during the year 2016-17. MNRE advised (May 2016) to plan for tendering of 2000 MW solar power projects during 2016-17 and 2017-18. Against this, audit observed that the achievement in tendering was for creation of only 33.31 MW of solar energy and only 11.18 MW was commissioned.

In reply, the Department stated (December 2017) that projects having installed capacity of 39.2 MW of solar power was installed, 148 MW under progress and 271 MW was upcoming. Thus, the Department failed to achieve the targets as envisaged in the RE Policy. Project-wise analysis of the under achievement is as follows:

(i) Solar Park at Mejia not set up

The RE Policy stipulated⁵¹ that where Government vested land was available, the permission for use of such land for setting up RE project would be given for 30 years or the project life, whichever was less. Vested land would be allocated and transferred to WBGEDCL, which would then lease the land to the RE developers for implementation of projects.

Audit observed that WBGEDCL conducted (September 2012) a field survey in Mejia block, Bankura district and identified 178.9 acres of vested land for setting up of solar power project. It submitted a pre-feasibility report to the

⁴⁸ Achievement of 11.1 MW against the target of 553 MW (224+43+286) = 2 *per cent*

⁴⁹ As in June 2012, the installed capacity of Solar energy was 2 MW which was to be increased to 100 MW by the end of 12th FYP.

⁵⁰ As of December 2017, total installed capacity of Solar energy was 39.20 MW, which means during the 12th FYP the addition in installed capacity was 37.20 MW.

⁵¹ Para 9.1 of the RE Policy

Department in September 2012. Based on the survey, the Department directed (September 2012) WBGEDCL to study the feasibility of grid connectivity and to put up a detailed proposal for developing a Solar Park. However, as of March 2017 WBGEDCL did not submit any proposal.

The Department stated (December 2017) that WBSEDCL had set up a 10 MW solar power project within the available land of 52 acres. However, the Department did not furnish any reasons for non-submission of detailed proposal by WBGEDCL for setting up of the solar park on the entire land of 178.9 acre of vested land.

(ii) Development of Solar Cities Programme not implemented

MNRE launched a programme (February 2008)⁵² on “Development of Solar Cities” for the 12th FYP period with the objective to promote the use of RE in urban areas. The programme was to be implemented by urban local bodies through nodal agencies. As per programme guidelines, a maximum of seven solar city projects were to be implemented in the State. MNRE sanctioned (between February 2013 and February 2014) three projects⁵³ for the State to be completed within three years. As of December 2017, none of the projects had been completed. Audit observed the following:

a) MNRE sanctioned (between February 2013 and February 2014) ₹ 50.00 lakh each for Howrah, New Town and Madhyamgram Solar City projects which were to be implemented by the concerned Municipalities/ Development Authority. MNRE released (between February 2013 and November 2015), ₹ 26.30 lakh each for Madhyamgram and New Town Solar City project and ₹ 4.31 lakh for Howrah for undertaking different preliminary activities like preparation of master plan, setting up solar city cell, etc., As per the programme guidelines, the state nodal agencies (WBREDA/ WBGEDCL) were to closely monitor the implementation of these activities.

It was seen that the Madhyamgram Municipality prepared a Master Plan only, at a cost of ₹ 4.15 lakh and submitted alongwith the Utilisation Certificates (UCs), to MNRE through WBREDA. No other activity was taken up and ₹ 22.15 lakh was neither surrendered nor utilised.

New Town Kolkata Development Authority (NKDA) had submitted UC of the full amount of ₹ 26.30 lakh.

Out of ₹ 4.31 lakh received (February 2013) from MNRE, WBGEDCL released (May 2013) ₹ 2.59 lakh to Howrah Municipal Corporation for preparation of master plan. As Howrah Municipal Corporation failed to submit any UCs, MNRE did not release any further funds.

Accepting audit observation, Department stated (December 2017) that (i) completion time had been extended upto December 2017 for Madhyamgram Municipality (ii) NKDA was still working on to fulfil the goal of solar city programme and (iii) Howrah Municipality was being continuously persued to complete the remaining activities.

⁵² Revised vide MNRE circular No. 5/4/2013-14/SC dated 17 January 2014

⁵³ Madhyamgram Municipality, Newtown Kolkata Development Authority and Howrah Municipal Corporation

b) Further, the Haldia Municipality had expressed (July 2009) its interest in developing a Solar City and conveyed its decision to appoint WBGEDCL as consultant for preparation of DPR for this project. However, it was observed that WBGEDCL did not take any initiative to include Haldia under the MNRE's Development of Solar Cities Programme, despite the fact that four more cities could have been included in the Programme.

Thus, due to failure in utilization of the released funds, MNRE did not release balance funds as of March 2017. As a result, the project could not be completed and thereby the intended benefits of the project could not be achieved as of December 2017.

(iii) Non-installation of rooftop solar PV power plants under Integrated Power Development Scheme (5 MW)

Power Finance Corporation (PFC), Government of India Undertaking, Ministry of Power, launched (December 2014)⁵⁴ Integrated Power Development Scheme (IPDS). The Scheme *inter alia* included installation of Rooftop Solar Photo Voltaic (RSPV) plants on the rooftops of government buildings. For West Bengal, PFC approved (between February 2015 and September 2016) installation of RSPV plants in 121 towns in 18 districts by WBSSEDCL. The individual power plant capacity was to be 5 KW or multiples of it, as per availability of roof area. GoI was to contribute 60 *per cent* of the project cost and the balance 40 *per cent* was to be met by WBSSEDCL. IPDS also stipulated an additional grant of 15 *per cent* to WBSSEDCL for timely completion of the project. WBSSEDCL took up (August 2016) the work of RSPV Projects of 5 MW under IPDS at a cost of ₹ 37.50 crore (₹ 75000 per KW) in two phases, during 2016-17 (2 MW) and 2017-18 (3 MW). The project deadline was August 2017. However, as of December 2017, even the tendering for the projects had not been finalised.

Audit observed that as per IPDS guidelines, the work had to be awarded within six months from the date of approval of the project. Since the first approval for installation of RSPV plants in 41 towns was issued in February 2015, work was to be awarded by August 2015. However, WBSSEDCL initiated the process and issued NIT after a delay of one year, *i.e.*, in August 2016. WBSSEDCL attributed the reasons for non-finalisation of tendering process to participation of insufficient bidders.

The Department stated (December 2017) that PFC had been requested to extend the project deadline. However, no communication had been received from PFC in this regard as of December 2017.

Thus, due to delay in tendering process, the first phase of solar projects of 2 MW capacity for 2016-17 could not be installed even after the lapse of project deadline. Besides, WBSSEDCL failed to avail the additional grant of ₹ 5.63 crore (*i.e* 15 *per cent* of the total project cost) for failure of timely completion of the project.

⁵⁴ GoI OM No. 26/1/2014-APDRP dated 3 December 2014

(iv) Poor achievement of grid connected Solar PV rooftop power plants for schools

The Department decided (December 2015) to implement a project for the installation of grid connected RSPV plants of 10 KW capacity each in 200 schools. The project was to be funded by the MNRE and the Department in the ratio of 30:70 and was to be implemented by WBSEDCL at an estimated cost of ₹ 15 crore.

WBSEDCL awarded (February 2016) the work to a private agency for installation and comprehensive maintenance (for 5 years), at a cost of ₹ 13.82 crore for completion by August 2016. As of December 2017, only 80 schools (out of 200) had been commissioned with the RSPV plants. Audit observed that the progress of the work was very poor. The contractor pointed out (August 2016) that WBSEDCL did not ensure the availability of requisite infrastructure⁵⁵ in the schools before awarding the work.

In reply, the Department stated (December 2017) that initially the project was delayed due to non-availability of funds and delay in conversion into three phase connection. The reply of the Department may be seen in view of the fact that even after receipt of funds in March 2017, only 80 plants could be installed against the targeted installation of 200 plants within six months.

Thus, due to failure of WBSEDCL in ensuring requisite infrastructure in the school, RSPV plants with total 1.20 MW (10 KW x 120) could not be installed in 120 schools even after 16 months from the stipulated date of completion.

(v) Mega Solar PV Projects at Santaldih not implemented

To give more emphasis on harnessing the solar energy potential of the State, the Department entrusted (September 2015) WBSEDCL with taking up three grid connected Solar PV projects (10 MW capacity each) at three locations⁵⁶. The Department accorded (January 2016) administrative approval at a total cost of ₹ 184.52 crore.

WBSEDCL awarded (September 2016) the projects to Bharat Heavy Electrical Limited (BHEL), a Central Public Sector Undertaking at a total cost of ₹ 168.73 crore for completion within 225 days from handing over of the sites. The project at Mejia commissioned in December 2017, whereas, the projects at Chharah and Santaldih were under progress as of February 2018 with the physical progress of 80 per cent and 50 per cent respectively.

The required land for the site of Santaldih project was within the township of WBPDC, which agreed to hand over the land. However, due to presence of some buildings/ quarters of WBPDC within the project site, clear site could not be handed over to BHEL to commence the work. Audit observed that WBPDC did not undertake demolition of the buildings on the site even after

⁵⁵ Adequate shadow free area, three phase connections, concrete roof instead of asbestos roof, Import-Export energy meter (net meter) etc.

⁵⁶ Mejia (Bankura), Santaldih (Purulia) and Chharah (Purulia).

WBSEDCL conveyed the matter to them in March 2016.

The Department stated (December 2017) that land issue had been resolved and the land had been handed over to BHEL in October 2017. It is stated that the project would be completed by June 2018. However, due to lack of co-ordination between the two companies within the same Department, the project commenced after two years of receiving administrative approval.

(vi) Non-implementation of the Scheme for Unemployed Youth and Farmers

MNRE approved (May 2015) a Scheme⁵⁷ for installation of 9500 MW grid-connected solar power projects in the country with the central subsidy of ₹ 4750 crore which included installation of 438 MW in West Bengal with the central subsidy of ₹ 219 crore. The scheme envisaged targeting the unemployed youth and farmers as beneficiaries. MNRE requested all states including West Bengal to send a letter of confirmation by July 2015; otherwise, reallocating the share to other states would be considered. The project was to be completed within seven years' period.

Audit observed that the Department did not communicate to MNRE whether it would accept the scheme; reasons for this were not on records. Due to not accepting the opportunity offered by MNRE, the State was not only deprived of the solar PV power projects of 438 MW capacity but also failed to avail the benefits of ₹ 219 crore of the Scheme for the unemployed youths and farmers in the State.

Accepting the audit observation, the Department stated (December 2017) that the Scheme could not be materialised due to shortcomings like (i) tariff determination mechanism taking into account business considerations of the DISCOMs, (ii) escalation of tariff every year upto 10 years, (iii) financial support to DISCOMs etc. and a modified proposal was under consideration. However, the concerned records indicated that no such contemplations were made for taking any decision as the proposal itself was submitted to the Chairman & Managing Director, WBSEDCL after expiry of the deadline.

(vii) Installation of Solar PV Power Plants in schools, health centres and colleges

Department of Environment, GoWB decided (June 2015) to install 100 Solar PV systems (SPV)⁵⁸ of total 570 KW capacity in different schools, Primary Health Centres and Rural Colleges. It was also envisaged that the 90 SPVs of 5 KW and 10 KW were to be grid-connected⁵⁹ with net metering⁶⁰ facility. The work was entrusted to WBGEDCL and an amount of ₹ 7.50 crore was sanctioned. WBGEDCL commissioned 100 solar PV systems⁶¹ of 545 KW between May 2015 and September 2016 at a cost of ₹ 6.10 crore. Audit observed that out

⁵⁷ Scheme for Unemployed Youths and Farmers

⁵⁸ 10 nos. 2 KW, 60 nos. 5 KW and 30 nos. 10 KW

⁵⁹ For sharing the surplus energy generated through SPVs

⁶⁰ Meter for quantifying the energy shared on the Grid

⁶¹ 10 nos. 2 KW, 75 nos. 5 KW and 15 nos. 10 KW

of 100 solar PV systems installed, grid-connectivity was not envisaged for 10 (2 KW capacity) solar PV systems as these were standalone systems, having a battery back-up. Out of remaining 90 SPVs, which were envisaged to be grid-connected with net metering, 76 systems (installed capacity of 455 KW) were not connected to grid. WBGEDCL stated that 15 SPVs (10 KW capacity) did not require to be connected as there was no surplus energy and the energy generated was consumed at the generation sites. Further, in respect to the 61 SPVs (5 KW capacity) it was observed that single phase net meters were not available with WBSSEDCL for grid-connectivity. However, WBGEDCL did not take any action for connecting these SPVs to the grid. As a result, the excess energy generated through SPVs remained unutilised.

In reply, the Department stated (December 2017) that pending receipt of the funds from MNRE for conversion from single phase to three phase, these 61 schools were availing solar power during daytime. The reply was, however, not tenable as there was no funds commitment from MNRE and funds required for this project were to be met from the State funds.

(viii) Electrification of remote villages of Sundarban areas under the RVE programme

MNRE accorded (February 2010 and February 2011) sanction to a project⁶² proposed by WBREDA, of rural electrification in 18 un-electrified remote villages in Sundarban areas with solar energy. The funding pattern was Central share of ₹ 31.27 crore, State share of ₹ 1.82 crore and the contribution of beneficiaries (villagers) was ₹ 3.68 crore. The project consisted of 26110 units of total 10.50 MW which included Solar PV Home Lighting System to 23845 households and 2265 Street Lighting Systems. The duration of the project was six months for 16 villages and one year for two villages from the date of sanction⁶³.

Records revealed that MNRE released ₹ 21.59 crore to WBREDA between February 2010 and June 2011 and the State released ₹ 1.22 crore to WBREDA in November 2010. However, despite receipt of funds WBREDA did not commence the project till June 2017. Audit observed that WBREDA invited (January 2012) tenders, but its finalisation was delayed by more than 20 months for no recorded reasons. Thereafter, due to introduction of e-tendering process, the Purchase Committee decided (March 2014) to cancel the tender and advised WBREDA to re-tender through e-tendering mode, however, no action on this was taken by WBREDA. Subsequently, in response to the communications of WBREDA (July 2015 and June 2016), WBSSEDCL confirmed (June 2016) that all the 18 villages were expected to be electrified through conventional sources by February 2017. Subsequently, WBREDA in May 2017, decided to close the RVE programme. Meanwhile, WBREDA incurred ₹ 15.97 lakh on finalization of beneficiary list, survey and organizing awareness camp and publicity of RVE programme.

⁶² *Under the Remote Village Electrification (RVE) Programme*

⁶³ *Two sanctions were issued in February 2010 (16 villages) and February 2011 (2 villages).*

Scrutiny of records further revealed that WBREDA submitted the UC of ₹14.44 crore to MNRE during 2012-13 and 2013-14 although no expenditure had been incurred out of MNRE fund. It was observed that as of July 2017, an amount of ₹ 22.65 crore was lying with the WBREDA.

Accepting the audit observation, WBREDA stated (August 2017) that UCs had been submitted even though no expenditure was incurred. The Department also stated (December 2017) that the Programme was abandoned. Thus, unutilised fund of ₹ 22.65 crore including MNRE funding of ₹ 21.59 crore remained blocked for more than seven years till June 2017.

(ix) Faulty implementation of Solar PV Power plant

WBGEDCL took up (February 2012) a work for construction of additional one MW of Solar PV Power Plant (Phase II) at an estimated cost of ₹ 8.80 crore. Phase-I of this Solar Plant (1.1 MW) at the same site at Jamuria, Burdwan District was commissioned in August 2009. The Phase-II plant was commissioned in March 2012 at a total cost of ₹ 8.68 crore.

Scrutiny of records revealed that the annual average generation of power during the period 2013-14 to 2016-17 was only 6.45 lakh kWh against the estimated generation of 12.50 lakh kWh.

In the 29th Board of Directors' meeting of WBGEDCL (February 2014), while discussing the performance of the Jamuria plant, it was observed that for proper installation of one MW Solar PV Power Plant, a minimum of four acres of land was required. The installation of additional one MW Plant at the same site had created a shadow effect⁶⁴. Since the project of Phase II was technically faulty, it was not possible to achieve full generation.

The Technical Committee, constituted by Board, in its report (February 2014) opined that it was technically not viable to accommodate 2 MW capacity projects in a land measuring 4.92 acres. Considering the available shadow free area in the existing land, the capacity of the project should be reduced to 1.3 MW for efficient generation.

The issue of insufficiency of land was also raised in the WBGEDCL meeting on this project with the executing agency (March 2012) but it was decided to execute the Phase II "for sake of survival of the project".

Thus, due to technically faulty planning of the project by WBGEDCL, there was an average loss of generation of 6.05 lakh kWh power per year during last four years.

In reply, the Department stated (December 2017) that alternative land to accommodate all the solar panels under Phase-II was still not available. However, the fact remains that the decision of taking up the project (Phase-II) without ensuring required shadow free land was faulty and led to loss of generation of solar-based power.

⁶⁴ *Shadow area created by existing plant, trees, buildings etc. could not get sufficient sun light*

(x) Non-creation of Centre of Excellence in contravention of RE Policy

The RE policy⁶⁵ made WBREDA responsible for creation and management of a Centre of Excellence in association with prominent institutions of the State for monitoring and development of advanced RE courses and Research and Development (R&D) work. The Centre of Excellence was also required to introduce new courses in the area of RE in Government Engineering Colleges besides providing training to the manpower employed in the RE sector and offering fellowships with advanced courses in the field of RE. Audit observed that as of July 2017, no such Centre of Excellence under WBREDA was created even after lapse of five years from issue of the RE Policy.

Instead of establishing a Centre of Excellence, a Memorandum of Understanding (MOU) was signed (February 2013) between WBREDA and Centre of Excellence of Green Energy and Sensor System (CEGESS)⁶⁶ with the objectives to strengthen R&D activities on RE in the State. The scope *inter alia* included various R&D activities like conducting training programmes in different RE sectors, establishing regional solar thermal testing centre, evaluation of PV system, conducting awareness programmes, R&D programmes in field of solar energy *etc.* Audit, however, observed that apart from conducting training programmes and field evaluation of PV systems, no other activities⁶⁷ as stipulated in the MOU were carried out. The MOU was also not renewed after its expiry in February 2016.

SAPCC envisaged a requirement of estimated funds amounting to ₹ 110.00 crore for R&D on improved green energy assessment and manpower development during 12th FYP period. The Department, however, released only ₹ 55.00 lakh in September 2014 to WBREDA for taking up one R&D demonstration project *viz.* ‘Smart Micro Grid’ through CEGESS. The project was on the verge of completion as of December 2017. Thus, activities related to R&D and implementation of newer technologies in RE sector were inadequate during last five years as no Centre of Excellence was established and the Department spent only ₹ 55.00 lakh against the plan of ₹ 110.00 crore during 12th FYP period.

In reply, the Department stated (December 2017) that need of Research and Development in RE Sector would be addressed in the draft Solar Policy which was under preparation.

2.8 Management of financial resources

2.8.1 Poor allocation and low utilisation of funds

Year-wise status of funds received and expenditure incurred in respect of implementation of RE programme in the State during 12th FYP period (2012-17) was as shown in the **Table-2.3**.

⁶⁵ Para 14.1.1 of RE Policy

⁶⁶ Established in 2009 under Indian Institute of Engineering Science and Technology, Shibpur formerly known as Bengal Engineering and Science University (BESU)

⁶⁷ (a) Framing/introduction of new courses on RE at engineering colleges, (b) Framing of Regional Solar Thermal Testing Centre, (c) Review of activities of the Centre of Excellence. (d) Submission of proposal to WBREDA for technical approval / feasibility / viability of any project for getting fund from WBREDA *etc.*

Table 2.3: Funds received vis-à-vis utilisation

Year	Funds received (₹ in crore)				Expenditure incurred (₹ in crore)	Utilisation of funds in per centage
	MNRE	State	Others ⁶⁸	Total		
2012-13	20.35	7.82	—	28.17	4.30	15.26
2013-14	0.26	8.25	0.04	8.55	5.26	61.52
2014-15	1.41	1.32	0.07	2.80	1.20	42.86
2015-16	11.35	56.03	6.62	74.00	60.62	81.92
2016-17	0.17	300.30	3.51	303.98	2.68	0.88
Total	33.54	373.72	10.24	417.50	74.06	17.74

(Source: Records of WBREDA, WBGEDCL, WBSEDCL and WBPDCCL)

It is evident from the table that allocation and utilisation of funds was very poor, as only ₹ 417.50 crore was allotted of which only ₹ 74.06 crore was utilised, against the requirement of ₹ 4610 crore as estimated in SAPCC during 12th FYP period. Only 17.74 per cent of total fund received was utilised during 2012-13 to 2016-17. Poor utilisation of funds was indicative of slow execution of RE schemes/projects. Reasons for such poor utilisation of funds were deficient planning and execution of different RE schemes as discussed earlier.

In reply, the Department stated (December 2017) that a sum of ₹ 115.50 crore was surrendered by WBREDA in September 2017 from the State Fund. Thus, the fact remains that the WBREDA refunded the amount as it had failed to execute the projects.

Moreover, some financial mismanagement/ irregularities were also noticed in the audit as illustrated in succeeding paragraphs.

2.8.2 Unauthorised diversion of fund by WBREDA

WBREDA had received funds amounting to ₹ 172.11 crore⁶⁹ from State Government during the period from 2010-11 to 2016-17 for development and promotion of RE in the State. Records of WBREDA revealed that ₹ 24.65 crore was utilised in different projects on RE and ₹ 147.46 crore remained unspent as of August 2017. Audit observed that WBREDA without obtaining any sanction of the Department, diverted (between December 2015 and February 2016) ₹ 4.67 crore from the unspent funds meant for RE projects, to four local bodies⁷⁰ for installation of high/mini mast LED lighting system run by conventional energy.

The diversion of ₹ 4.67 crore to the municipalities for lighting from conventional energy from the funds allotted for RE was unauthorised and irregular.

In reply, the Department stated (December 2017) that WBREDA was requested to reconcile the statement afresh and submit a comprehensive report by January 2018.

⁶⁸ Funds received from various institutions like municipalities, district libraries etc. for installation of solar PV

⁶⁹ Includes funds amounting to ₹ 132.31 crore received during 2016-17 for "Alo shree" (a programme of the State Government with the objective to install Grid Connected PV Systems in all government buildings within two years i.e. by 2017-18).

⁷⁰ Kolkata Municipal Corporation, Rajpur-Sonarpur and Mathabhanga Municipalities and South 24 Parganas Zilla Parishad

2.8.3 Non-recovery of interest from two co-operative societies

MNRE approved (March 2012) setting up of ten Micro Hydel Projects (100 KW each) in the Darjeeling District through two co-operative societies at a total cost of ₹ 22.60 crore⁷¹. The project was to be completed by March 2014. As per its approval, if 50 *per cent* of the project was not completed by the stipulated date of completion without any valid reasons, the central assistance had to be refunded, along with interest, at the rate of 10 *per cent* per annum depending on the merit of case.

Scrutiny of records revealed that MNRE released ₹ 4.45 crore (between March 2012 and September 2012) to WBREDA which released (between May and December 2012) ₹ 4.41 crore to the two co-operatives. It was further observed that the progress of the work was very poor since the beginning of the work. As of July 2017, only three projects were nearing completion. WBREDA instructed (August 2013) two co-operative societies to refund the unspent MNRE fund (₹ 1.73 crore) for seven non-started projects along with accrued interest. The co-operative societies refunded (between July 2014 and January 2015) ₹ 1.73 crore of MNRE fund but did not pay any accrued interest.

Thus, due to failure on the part of WBREDA in taking any further steps during last four years, interest amounting to ₹ 31.51 lakh remained unrecovered till December 2017.

In reply, the Department stated (December 2017) that notices were served to deposit the accrued interest.

2.9 Tariff and other regulatory mechanisms relating to purchase and sale of RE

2.9.1 RPO targets for distribution companies vis-à-vis achievement

To increase the share of electricity from non-conventional sources in the total electricity consumption, NAPCC (June 2008) set the Renewable Purchase Obligation (RPO⁷²) target to purchase RE of at least five *per cent* of total consumption of electricity in the area of supply by the distribution companies for the year 2009-10. This was to be increased by one *per cent* each year for next 10 years, till the target of 15 *per cent* was reached by 2020.

WBERC Regulation 2010 (August 2010) mandated RPO targets of two *per cent*, three *per cent* and four *per cent* for the years 2010-11, 2011-12 and 2012-13 respectively for the power distribution companies in West Bengal. From 2013-14 onwards the RPO target was to increase by one *per cent* each year till it reaches 10 *per cent*.

Audit observed that the RPO targets fixed in WBERC Regulations 2010 was below the RPO targets fixed in the NAPCC 2008. Moreover, WBERC had further reduced the RPO targets through WBERC Regulations 2013 as detailed in the **Table 2.4**.

⁷¹ Central Financial Assistance of ₹ 10.10 crore and ₹ 12.50 crore by the co-operative societies.

⁷² RPO means obligation to purchase electricity from renewable & co-generation sources by a distribution company.

Further, the achievements by the five distribution companies⁷³ were even less than the lower RPO targets fixed by WBERC 2013⁷⁴, as detailed in **Table 2.4**.

Table 2.4: Year-wise RPO targets vis-à-vis achievement by DISCOMS

(Figures in percentage)

Year	RPO Targets as per NAPCC 2008	RPO Targets as per WBERC Regulations 2010	RPO Targets as per WBERC Regulations 2013	Achievement by the distribution companies				
				WBSEDCL	CESC	DPL	DVC (WB)	IPCL
2012-13	8	4.0	4.0	2.68	0.00	0.00	NA	0.02
2013-14	9	5.0	4.0	3.88	0.80	0.31	0.13	0.09
2014-15	10	6.0	4.5	4.83	0.55	0.36	0.38	0.07
2015-16	11	7.0	5.0	5.48	0.51	0.32	0.23	0.07
2016-17	12	8.0	5.5	Information not available				

(Source: Information compiled from the data provided by WBERC)

WBERC attributed (January 2018) the fixing of lower RPO targets to higher cost of generation of solar power in comparison to the cost of generation of power from coal in the State. Reply is not acceptable since lower targets were in deviation of the NAPCC and the environmental concerns should have been given priority over the commercial aspects.

WBERC attributed (January 2018) non-fulfillment of RPO targets to lack of response from the RE generators. The reply was not tenable as the DISCOMS could fulfill RPO targets by other means as specified in the Regulation such as purchase of Renewable Energy Certificates (RECs)⁷⁵, self-generation *etc.*

As such, the objective to reduce dependency on conventional energy and increase the contribution of energy from RE sources into the energy mix could not be achieved. This also meant that CO₂ emissions released from conventional sources could not be reduced.

2.9.2 Non-imposition of penalty on distribution companies for not meeting RPO targets

As per the RE Policy⁷⁶, WBERC was to consider allowing the purchase of Renewable Energy Certificates (REC) to achieve the RPO targets by the obligated entities. If the distribution companies failed to comply with the RPO

⁷³ WBSEDCL (West Bengal State Electricity Distribution Company Ltd.), DPL (Durgapur Project Ltd.), IPCL (India Power Corporation Ltd.), DVC (Damodar Valley Corporation) and CESC (Calcutta Electricity Supply Corporation)

⁷⁴ Except WBSEDCL's achievement in 2014-15 and 2015-16

⁷⁵ Renewable Energy Certificate (REC) is issued to the RE developers by the Central Agency for contributing RE to the Grid. DISCOMS, can also fulfill their RPO by purchasing those certificates.

⁷⁶ Paras 11.2.5 and 11.2.6 of RE Policy

targets as provided in the Regulations during any year and failed to purchase the required quantum of RECs, WBERC would direct the companies to deposit a certain amount in the Green Energy Fund. This amount was to be determined by the Commission considering the shortfall of RPO targets. Section 142 of the Electricity Act, 2003 also provides for imposition of penalty on the distribution companies for any violation of the Regulations. As per the WBERC Regulations 2013⁷⁷, in case of non-fulfilment of RPO, the Commission may *suo-motu* or on the basis of any application, initiate proceedings as per the Electricity Act, 2003.

Audit, however, noticed that the Commission, never initiated any proceedings and did not impose any penalty on the defaulter distribution companies as per the provision of the Act.

WBERC stated (January 2018) that steps were being taken to review the entire situation to achieve the national aim of 175 GW by 2022. The draft Regulations were being framed for implementation after offering the necessary formalities as per Act.

Good practice

Maharashtra Electricity Regulatory Commission (MERC) in July 2013 directed all distribution companies to comply with the RPO targets and clear their backlog of previous years, failing which stiff penalties would be imposed on them. It had ordered over 90 entities, including distribution companies to meet their renewable purchase obligation of past four years cumulatively beginning from 2010-11 before 31 March 2014. MERC had also set up a commission for timely collection and review of data with regard to compliance of RPO. The panel set up by MERC would maintain a record of all open-access consumers and captive users and their REC trading.

2.9.3 Non-utilisation of incentive grant received for installing Grid Connected RE capacity

Thirteenth Finance Commission recommended incentive grant of ₹ 5000 crore for all the States for (i) strengthening DISCOMs for procuring RE, (ii) meeting the gap in RPO by procuring RECs, (iii) installing rooftop solar plants in Government buildings *etc.* The criteria for assessment of the quantum of grant was based upon the achievements by the States in capacity addition of RE during the period from April 2010 to March 2014. Accordingly, Ministry of Finance, GoI released (March 2015) a grant-in-aid of ₹ 7.89 crore as Incentive. Audit observed that during 2010-14, the State's achievement in capacity addition was only 11.60 MW which was very poor in comparison to the two neighbouring states *viz* Bihar and Odisha⁷⁸.

MNRE requested GoWB (March 2015) to issue necessary instructions for utilization of said incentive grant for the specified purposes. MNRE further requested (April 2015) GoWB to frame an Action Plan for utilisation of the incentive grant and to communicate the same by April 2015. Audit, however,

⁷⁷ Para 4.0 of WBERC Regulations 2013

⁷⁸ 59.52 and 50.83 MW respectively

observed that the Finance Department, GoWB, after a lapse of six months, requested (October 2015) the Department of Power & Non-Conventional Energy Sources GoWB to send a proposal for the release of the funds. As of July 2017, the Department had not sent any proposal to the Finance Department. As such, ₹ 7.89 crore released as incentive grant by GoI remained unutilized. Moreover, Action Plan as required by MNRE was not prepared and sent to it by the Department.

Thus, the State not only availed very meagre amount of grant (0.16 per cent of the total approved grant for all the States) due to poor achievement in capacity addition of RE but also failed to utilise the grant of ₹ 7.89 crore even after a lapse of 30 months from the date of receipt.

2.9.4 Incentives under West Bengal State Support for Industries Schemes

Department of Industries, Commerce and Enterprises, GoWB, introduced two incentive schemes⁷⁹ with a view to extend financial support to different units/agencies for promotion of large and medium – scale industries including units generating RE or producing any items required for generation of RE. However, as of September 2017, no incentives had been disbursed as per provisions of the said two schemes. Only one unit had so far been registered under WBSSIS 2008 for disbursement of incentives which was under process. This indicated that the Department of NES had not taken adequate measure to make private RE developers aware of these incentive schemes.

2.10 Action taken against commitments made in State Action Plan on Climate Change for promotion of Green Energy

2.10.1 Failure to translate SAPCC into action

State Action Plan on Climate Change (SAPCC), prepared in April 2011, (i) identified key concerns due to climate change, (ii) chalked out strategies to mitigate those concerns, and (iii) suggested steps towards energy efficiency and increasing RE mix with the estimated funds required for this in 12th and 13th FYP period.

The SAPCC envisaged that energy demand would increase by 2.5 times by 2021 and the electricity generation sector within the State would be a large contributor to Green House Gas (GHG) emissions. This would create an adverse impact on the environment due to change of climate. That can be mitigated through shift in generation from conventional sources to RE sources. In order to address the climate change concerns, SAPCC outlined the following measures:

- Increasing grid power generation of RE through Solar PV for large-scale power in Purulia and Bankura where wasteland or abandoned mine areas were available.
- Replacing use of grid power with low temperature solar thermal for certain end-uses, e.g., water heating.

⁷⁹ *The West Bengal State Support for Industries Schemes (WBSSIS) 2008 and the WBSSIS 2013 in the form of Fixed Capital Investment Subsidy, Interest Subsidy, Waiver of Electricity Duty, Addition Incentive on Generation of Employment, Industrial Promotion Assistance etc.*

- Reduction of anticipated energy and peak demand by promoting use of energy efficient devices through market incentives and other means.
- Risk mitigation of anticipated impacts from Climate Change.

The SAPCC outlined an Action Plan for 12th FYP (2012-13 to 2016-17) with a total estimated outlay of ₹ 4610 crore⁸⁰ for production of 2000 MW from RE sources by 2021 with incentives for Green Energy Producers and R&D for improved green energy assessment *etc.*

Audit, however, observed that initiatives taken by the Department along with its agencies were insufficient during the 12th FYP period, *vis-à-vis* the mitigation measures stipulated in the SAPCC as detailed below:

- Only 35.18 MW was created during the 12th FYP period through RE sources.
- Progress in creation of PV solar power in the waste land or abandoned mine areas in Purulia and Bankura was also very poor as only three projects of 30 MW were taken up as of September 2016. Of which, two were yet to be commissioned and one was yet to be commenced as of July 2017.
- Further, no incentive scheme specifically for promotion of RE was framed by the Department in line with the SAPCC to encourage developers for production of green energy. However, incentives were offered under WBSSIS 2008 and 2013 for the RE generation as commented upon in **Para 2.9.4.**

In reply, the Department stated (December 2017) that it was exploring the idea of utilising waste land/ uncultivable land/fallow land in the remote districts and was also in the process of installing Solar Water Heating System in Hotels. The fact remains that even after a lapse of six years of coming into force of SAPCC, the Department was yet to formulate any strategy to achieve the goals of SAPCC.

Thus, inaction of the Department and the nodal agencies led to possible exposure of risk and threat of increasing GHG emission in the State and its surrounding areas.

2.11 Monitoring, Internal Control and vigilance arrangements

2.11.1 Deficiency in monitoring mechanism and internal control

The RE Policy of June 2012 did not provide for formation and functioning of a Monitoring Cell for overall monitoring and evaluation of different projects. However, the Department, after lapse of three years constituted (September 2015) an RE Cell headed by the Joint Secretary to ensure speedy implementation of the RE policies and programmes of the Department. RE Cell was responsible for monitoring different RE programmes of the nodal agencies, reviewing the status of different sanctioned schemes/ projects and co-ordinating with MNRE and other agencies.

⁸⁰ ₹ 2000 crore for 2000 MW from RE sources by 2021, ₹ 2500 crore incentives for Green Energy Producers, ₹ 110 crore for R&D for improved green energy assessment and man power development for installation and O &M

2.11.2 Monitoring by RE Cell

As of March 2017, only seven meetings were held since constitution (September 2015) of the cell. The scrutiny of the minutes of the RE cell meetings revealed that no tangible results were yielded, as detailed below:

- In the first meeting (September 2015), an Energy Park over a land of about five acres near Eco Park, Newtown was decided to be set up by WBREDA. However, after lapse of more than one and a half year, WBREDA could not even procure the land from WBHIDCO to set up the Energy Park. Further, Handing over of the Wind Farm Project at Fraserganj to WBSIEDCL was to be completed by October 2015, but till June 2017 the handing over process had not been completed. The Department stated (December 2017) that land was being procured near Eco-Park. Regarding handing over of the wind farm project at Fraserganj to WBSIEDCL, it stated that the project was kept in abeyance as feasibility of a bigger wind project was being carried out. The reply indicated that ad-hoc decisions were being taken. The fact remains that even after two years, the Department could not arrange for the land required for the Energy park.
- Audit further observed that in the second meeting (October 2015), it was decided that WBREDA would submit a report on revival of “Sagar Wind Project” to the Department by November 2015. Again in the fifth meeting (April 2016), WBREDA was requested to submit a comprehensive report alongwith action plan for reviving the project or winding up, as the case may be, by 15th May 2016. However, in the subsequent two meetings held on 9th and 23rd November 2016, no reference was made in this regard. In reply, the Department stated (December 2017) that WBREDA had submitted a report which was being studied further for necessary action.

Thus, RE cell failed to perform its monitoring role and as a result, implementation of the projects suffered.

2.11.3 Lapses in Monitoring by the Department and the Nodal Agencies

- The Department and its agencies (WBREDA & WBGEDCL) did not evolve any Monitoring Mechanism to monitor and evaluate the workings of different RE projects taken up during last five years.
- Further, independent evaluation of the workings of the RE Projects was not done by engaging an authorised third party/ consultant by the Department or its agencies. In reply, the Department stated (December 2017) that the matter was noted for future guidance.
- An updated database of the installed RE system is an important tool for monitoring and taking appropriate action. However, the Department did not maintain any database of the same. In absence of any database, it was not possible to ascertain the updated status of the total installed RE systems and taking remedial action, if any. The Department accepted (December 2017) the audit observation and stated that it was noted for future guidance.
- No internal audit wing was in place to conduct the internal audit of the activities of the Department and its agencies.

As such, there were perceived weaknesses in the monitoring and evaluation mechanism. This affected achieving the targets in the long run.

2.12 Conclusion

In spite of huge potential of renewable energy in the State, the achievement was very poor. This was due to (i) deficiency in the policy and absence of suitable strategy to implement the policy objective; (ii) poor implementation; (iii) non-conducive tariff and regulatory mechanisms relating to purchase and sale of RE; and (iv) inadequate monitoring. During 2012-17, only 35.18 MW (4.15 *per cent*) of RE was installed against the target of 847 MW envisaged in the RE Policy. Potential of solar energy in the State was yet to be assessed, as such, necessary directives for harnessing the actual potential of solar energy could not be framed in the policy.

Assessment of gap in funding was not carried out to access private entities in this field for implementation of projects. The Department could not develop a single window system for facilitating clearance and also take any step for promotion of private sector investment. The Department and its Nodal Agencies did not take any initiative to make any policy, plan and programme and issue any orders and guidelines with a view to achieving the targets under SDGs.

Progress of the projects was also very poor due to unsatisfactory performance by the implementing agencies. In many solar projects, actual generation through RE could not be assessed as the installed plants were yet to be connected to grid. Activities related to R&D and implementation of new technologies in RE sector were inadequate. Only 17.74 *per cent* of allocation was utilised during 2012-13 to 2016-17.

The distribution companies in the State failed to achieve RPO targets. The Department and its agencies had not evolved an effective monitoring mechanism

2.13 Recommendations

- The Department needs to prepare a comprehensive action plan and devise appropriate strategy, with targets and timelines, after assessing the actual RE potential of the State after on-ground verification.
- The Department needs to create the Green Energy Fund by tapping various sources to finance projects for development of RE in the State.
- The Department needs to develop a single window system for facilitating clearance for promotion of private sector investment and also to assist the developers in getting different incentives for implementation of RE projects.
- The Department needs to take up the matter with WBERC to evolve an appropriate price and benefits for developers to make the projects of biogas, waste to energy and co-generation viable and achieve the targets set in the RE policy.
- In order to increase the share of electricity from non-conventional sources in the total electricity consumption, West Bengal Electricity Regulatory Commission should ensure strict compliance of the Renewable Energy Purchase Obligations by the distribution companies.

Chapter 3

Compliance Audit

Chapter 3: Compliance Audit

PUBLIC WORKS DEPARTMENT

3.1 Detailed Audit on “Adherence to Quality Control norms in Road Works under Public Works Department, Government of West Bengal”

3.1.1 Introduction

Quality Control (QC) in road construction involves compliance with prescribed standards of material and workmanship to ensure the performance of the road as per the design and specifications. This also involves a monitoring and supervision mechanism to ensure that the asset being created is of standard quality and workmanship.

To ensure quality in road works, the Schedule of Rates (SOR) of the Public Works Roads Directorate (PWRD), Government of West Bengal, provides a list of mandatory tests of materials that are to be conducted prior to their use in the work as well as during the execution of the work. Besides, Ministry of Road Transport and Highways (MORTH) specifications, Indian Road Congress (IRC) guidelines and the standard terms and conditions of contract (Form 2911) supplement the required checks that are mentioned in the SOR. These also specify the type of monitoring and supervision that are to be followed during the execution of road works to ensure quality. Non-compliance to the extant quality control norms is one of the reasons for short life of roads, which entail additional government expenditure on repairs and also cause inconvenience to the public apart from leading to accidents.

3.1.2 Institutional arrangements for Quality Control in Public Works (Roads) Directorate

Public Works (Roads) Directorate (PWRD) under the Public Works Department (PWD) was mainly responsible for construction and repair of roads and bridges within the State. The Directorate was divided into three (03) zones⁸¹ consisting of eight Circle offices⁸² under these zones. Under these eight Circle offices, there were 28 Divisional offices⁸³ which were to execute projects of State Highways (SHs), Major District Roads (MDRs), Other District Roads (ODRs) and Village Roads (VRs).

The Chief Engineers (CEs), Superintending Engineers (SEs) and Executive Engineers (EEs) were responsible for ensuring the Quality Control in all

⁸¹ North, South and West Zone. Each Zone headed by a Chief Engineer.

⁸² Southern Highway (HW) Circle, Central HW Circle, Resource Circle, Western HW Circle-I, Western HW Circle-II, South Western HW Circle, Northern HW Circle and North Bengal HW Circle.

⁸³ Darjeeling HW, Jalpaiguri HW, Alipurduar HW, Coochbehar HW, Uttar Dinajpur HW, Dakshin Dinajpur HW, Malda HW, South 24 Parganas HW, Diamond Harbour HW, Howrah HW, Barasat HW-I & II, Nadia HW-I & II, Murshidabad HW-I & II, Burdwan HW-I & III, Asansol HW, Birbhum HW-I & II, Hooghly HW-I & II, Bankura HW, Midnapur HW-I & II, Tamluk HW and Purulia HW divisions.

road works of the Directorate. Road and Building Research Institute⁸⁴ (RBRI) was to carry out, when required, checks for quality as and when called upon by the CEs or the SEs. There was also a division namely Quality Control Division at Siliguri under the jurisdiction of the RBRI. Some tests were also referred to Universities and Engineering colleges in West Bengal as and when required.

3.1.3 Audit objectives

Audit was conducted with a view to assess:

- Whether the work was undertaken after proper survey and investigation as required under IRC norms and other guidelines;
- Whether quality control norms were adhered to in respect of the material used and process adopted for the execution of the work; and
- Whether the internal control mechanism and monitoring was adequate to ensure quality of the road works.

3.1.4 Audit criteria

The criteria for audit were derived from the following sources:

- Schedule of Rates of PWRD-2008 and 2014
- Indian Road Congress Guidelines IRC- 9, 19, 27, 36, 37, 81, 94, 95, 109, SP 11,19 and 57.
- MORT&H Specification 2001 (Fourth Revision) and 2013 (Fifth Revision)
- Terms and conditions specified in standard Contract Agreement (WBPWD Form 2911).

3.1.5 Scope and methodology of audit

The Audit was conducted between November 2016 and June 2017 covering a period of six years (2011-12 to 2016-17). Audit analysed completed road projects⁸⁵ in 12 divisions⁸⁶ selected through random sampling with representation of all three geographic zones⁸⁷ of the State. Total 71 works⁸⁸ were selected for audit in these 12 divisions on the basis of value of the work. Of the 71 works selected, 50 works related to widening and strengthening of the pavements and 21 works related to only strengthening of the pavements. The total estimated value of all the selected works examined in audit was ₹ 944.65 crore.

⁸⁴ Road and Building Research Institute was set up under P. W. (Roads) Directorate for in-service training to the departmental engineers, testing of quality of work and conducting research works in building and road sectors.

⁸⁵ Related to Village Roads (VR), Other District Roads (ODR), Major District Roads (MDRs) and State Highways (SHs).

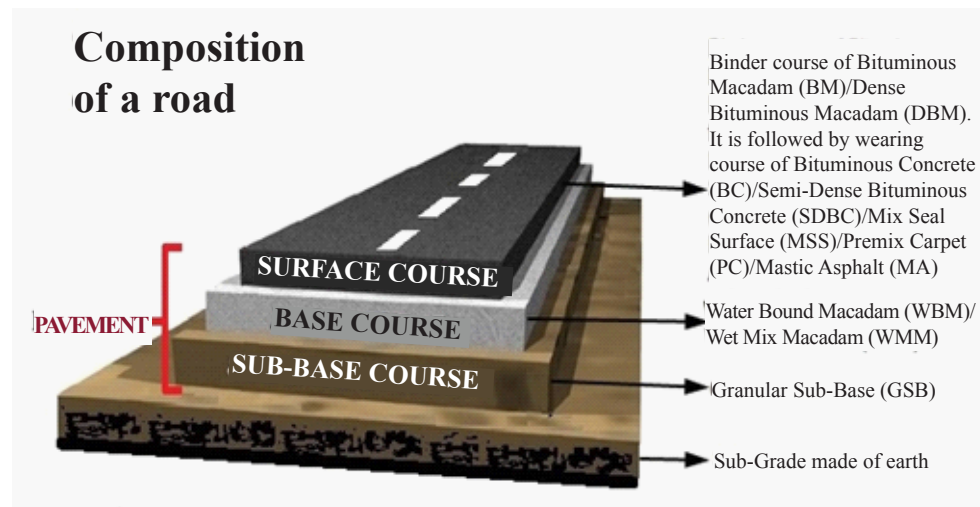
⁸⁶ Purulia Highway (HW), Murshidabad HW- I, Coochbehar HW, Asansol HW, Bankura HW, Medinipur HW Division – I, Uttar Dinajpur HW, Malda HW, Nadia HW Division– I, Howrah HW, Dakshin Dinajpur HW and Tamaluk HW Division

⁸⁷ North Zone, South Zone and West Zone

⁸⁸ One VR, 55 MDRs/ODRs and 15 SHs

A road is constructed in different layers with different kinds of materials. Various components of a road are shown in the **Figure 3.1**

Figure 3.1 : Composition of a road (pavement)



Audit Findings

During the course of audit of the selected works, deficiencies were noticed in (i) quality control process of the materials used in the works, (ii) designing road pavements, (iii) ensuring quality control in execution as well as (iv) following the quality control norms in supervision and monitoring. These are discussed in the succeeding paragraphs.

(A) Adherence to quality control norms

Adherence to quality control norms prior to taking up of a work consists of (i) preliminary investigations, (ii) designing as per guidelines and (iii) quality checks of materials to be used in the work. Some of the deficiencies noticed in the test checked cases are discussed in the following sub-paras:

3.1.6 Deficiencies in Preliminary Investigations

Preliminary investigation is the process of assimilation of data which are to be utilised in the preparation of the Detailed Project Report (DPR) and the Technical Estimates⁸⁹ of works. As per the IRC guidelines⁹⁰ on Quality control system for Roads, project preparation involves (i) data collection, (ii) selection of suitable option and (iii) preparation of project document. Preliminary investigations involve topographical survey, traffic survey and soil investigation. The adequacy and accuracy of data and survey affects the quality of the projects. Data from all these investigations are utilised for designing pavements.

⁸⁹ A report containing a brief history of the road, preliminary investigations report, design, quantity and rate analysis.

⁹⁰ IRC –SP-57-2000 Clause 2.7.2.4(A) and 3.3 Sl 13

3.1.6.1 Roads designed without topographical survey

As per IRC guidelines⁹¹, even for improving existing roads, survey is required to be done to remove inherent deficiencies with respect to plan and profile⁹².

Audit noticed that out of the 50 selected projects⁹³ involving widening and strengthening (W&S) of the roads valued at ₹ 750.91 crore, no topographical surveys were carried out in 40 works valued at ₹ 514.74 crore. Topographical surveys were conducted only in 9 works valued at ₹ 204.20 crore and no information about the survey, was made available in respect of one work valued at ₹ 31.97 crore.

(a) Non-conducting of topographical surveys leads to erroneous planning and designing. This further causes unnecessary expenditure on correctional measures taken later. Besides, future needs with respect to pavement, culverts, roads and any drainage requirement may have been overlooked.

In one case, where topographical survey was not conducted, Audit observed that in widening and strengthening work of a road⁹⁴ under Howrah Highway Division, drainage layer⁹⁵ was planned and constructed without taking into consideration the higher sub-soil water level. After spending ₹ 40.00 lakh it had to be abandoned as it could not drain the water seeping in from the sub-soil. This resulted in wasteful expenditure of ₹ 40.00 lakh. This could have been avoided if the topographical survey was conducted prior to taking up of the construction of the road.

The Department stated (February 2018) that divisional officers were instructed to consider all the aspects while preparing DPR. However, the Department remained silent on the issue of non-conducting of survey in respect of 40 works.

(b) As per the IRC guidelines⁹⁶, the topographical survey data was to be collected by the Departmental staff/private agency⁹⁷. This data was to be checked for correctness by in-house staff not connected with the project/third party consultant⁹⁸ for an independent appraisal.

Audit observed that in nine W&S works⁹⁹ valued at ₹ 204.20 crore, though topographical surveys were conducted, survey data was not checked in

⁹¹ SP-19-2001 clause 4.2

⁹² Site distance/visibility in horizontal and vertical plane, cross drainage structure, roadside drainage provisions as well as drainage consideration.

⁹³ 1 Village Road, 34 Other District Roads & Major District Roads and 15 State Highways

⁹⁴ W & S Ranihati Haridaspur Amta Road 0 kmp to 16.4 kmp

⁹⁵ A sub-base layer of porous materials laid above sub-grade to drain out the infiltrating moisture from the underlying soil (refer figure 3.1).

⁹⁶ IRC-SP-57-2000 Table 3.1 Sl. 1.3

⁹⁷ Departmental staff for ODRs and MDRs and private agency for SHs

⁹⁸ Departmental staff not connected with the project for ODRs and MDRs and third party consultant for SHs

⁹⁹ W & S Kasemnagar Natunhat Road 0 kmp to 10 kmp, W & S of Guskara Ausgram Chorapahari Road 0 kmp to 11 kmp, W & S of Kulgachia Bernia Road 0 kmp to 10.36 kmp, W & S of Krishnaganj Gobindpur Road 0 kmp to 9.35 kmp, W & S of Raniganj Agampur Road 0 kmp to 8.4 kmp, W & S of BhaduriaPara Dhanirampur Rd 0 kmp to 19 kmp, W & S of Bhagwangola-Lalgola-Sagardhigi via Siteshngarghat Rd from 2.30 kmp to 8.50 kmp, W & S of Chengrabhandha Mathabhanga Coochbihar Road 18 kmp to 50 kmp, W & S of Chegrabandha-Mathabhanga Coochbihar Road 50 kmp to 82 kmp

three works¹⁰⁰. In remaining six works¹⁰¹ the survey data were checked by the Assistant Engineer (AE) and EE connected with the project instead of the non-connected staff.

The Department replied (February 2018) that in-house staff and private agencies were deployed to cross check the survey data. However, no records in support of cross checking was made available to Audit either by the test checked divisions or by the Department.

3.1.6.2 Roads designed without authenticated soil investigation data

(a) IRC guidelines¹⁰² provide that the strength of the sub-grade soil is to be assessed in terms of California Bearing Ratio (CBR)¹⁰³ in most critical moisture conditions. CBR value of the sub-grade soil on which the road is to be constructed reveals the character of the soil. Any over-estimation of the CBR value would lead to construction of deficient pavements¹⁰⁴ and the road would not be able to bear the traffic load, leading to its deterioration. The concerned Executive Engineer was responsible for determination of CBR by taking the soil samples from the project sites and sending them to the Departmental/ Government Institutional laboratory for testing.

During the scrutiny of the 50 selected W&S works, laboratory reports based on which the CBRs were fixed, for designing the roads were not produced to Audit. Even Malda Highway Division which had its own divisional laboratory, could not provide any report of soil testing carried out by it for arriving at CBR. Hence, there were no means to determine whether the CBR had been correctly calculated, as illustrated in the succeeding paragraphs:

- In one case, audit observed that in a road work¹⁰⁵ with an estimated cost of ₹ 35.83 crore, a stretch of 1500 metres was damaged (June 2015 - July 2015) even before construction of the total length of road was completed. Audit observed from the investigation report that the stretch of the road was damaged due to consideration of higher CBR of five *per cent* against the actual of three *per cent*. Considering higher CBR of the sub-grade soil caused the deficiencies in the pavement design. Further, in the report it was also observed that the sub-grade soil was “*expansive in nature*”¹⁰⁶. As a result, the entire Wet Mix Macadam (WMM)

¹⁰⁰ W & S of Guskura Ausgram Chorpahari jungle road 0 kmp to 11 kmp, W & S of Bhaduriapara Dhanirampur Road 0 kmp to 19 kmp and W & S of Bhagwangola Lalgola Sagardhigi via sateshnagarghat Road 2.30 kmp to 8.50 kmp.

¹⁰¹ W & S of Krishnaganj Gobindapur Road 0 kmp to 9.35 kmp, W & S of Kulgachi Bernia Road 0 kmp to 10 kmp, W & S of Chengrabandha Mathabhanga Coochbehar Road 18 kmp to 50 kmp, W & S of Chengrabandha Mathabhanga Coochbehar Road 50 kmp to 82 kmp, W & S of Agampur Raniganj Road 0 kmp to 8.4 kmp and W & S of Kasemnagar Natunhat Road 0 kmp to 10 kmp

¹⁰² IRC 37-2001

¹⁰³ The load bearing capacity of the soil. Higher CBR value means the surface is strong enough to bear higher traffic load.

¹⁰⁴ Pavement means the constructed part of the road as shown in Fig.3.1.

¹⁰⁵ Construction of last mile stone connectivity of mega tourist hub at Gazoldoba

¹⁰⁶ Prone to large volume changes (swelling and shrinking) that are directly related to changes in water content

and Dense Bituminous Macadam (DBM) laid on that stretch of 1500 metres was damaged resulting in wasteful expenditure of ₹ 47.24 lakh.

- In another work¹⁰⁷ which *inter alia* included the items of Bituminous Macadam (BM) and Semi Dense Bituminous Concrete (SDBC) was completed (December 2014) at a cost of ₹ 5.27 crore. Records revealed that the road was damaged (August 2014) even before completion. Road and Building Research Institute (RBRI), which was assigned by the Department to find out the causes of failure of the road, attributed (September 2016) the damage to existence of multiple bituminous layers of old roads under the base course, which prevented the drainage of seepage water accumulating between the layers.

This indicated inadequate soil investigation and incorrect inputs of the existing pavement layer led to defective designing. The Department stated (February 2018) that all the Divisions were instructed (June 2017) to carry out CBR tests carefully and preserve laboratory data properly. Reply of the Department was not specific to the audit observation. However, the Department needs to fix the responsibility and take punitive action against the erring officials/agency.

(b) As per the IRC Guidelines¹⁰⁸, during the preparation of the DPR, the adequacy and reliability of the soil investigation data in case of Village Roads (VRs) was to be verified at local level within the organisation. In case of Other District Roads (ODRs) and Major District Roads (MDRs), the same was to be verified by the senior level authority and in the case of State Highways (SHs), it was to be verified by an external agency.

However, records and responses of the Department indicated that such system was not in place for verification of the preliminary data generated by means of soil investigation. In absence of such system of verification, the data used in the preparation of DPR itself could suffer from infirmities. This could result in avoidable deficiencies in the construction.

3.1.7 Violation of design norms

The IRC guidelines¹⁰⁹ stipulate that with rapid growth of traffic, pavements are required to be designed for heavy loads expressed as standard axles. Standard axles is the total weight felt by the roadway, for all wheels connected to axle. This is calculated by carrying out traffic survey and measuring axle loads to arrive at Vehicle Damage Factor (VDF), which is defined as equivalent number of standard axles per commercial vehicle. IRC guidelines have projected indicative VDF to be adopted by the Department while designing road pavements. Incorrect consideration of VDF would result in construction of a road with insufficient crust thickness which would cause deterioration of the road surface.

¹⁰⁷ *Strengthening of Egra-Ramnagar Road 0 kmp to 10 kmp executed by Tamaluk Highway Division.*

¹⁰⁸ *IRC-SP-57-2000 Table 3.1*

¹⁰⁹ *IRC 37-2001*

3.1.7.1 Norms of traffic census were not followed

Traffic census provides information of the volume and type of traffic plying on the road and provides data to determine the thickness of the pavement to be constructed. Any deficiency in the thickness would lead to the deterioration of the road, well before its designed life.

As per IRC guidelines¹¹⁰, for pavement construction for urban and rural roads, traffic census data is utilised for designing of pavements. The traffic census¹¹¹ should be conducted

- (i) at a point of the road away from the urbanised development and village areas;
- (ii) it should be held twice a year¹¹²;
- (iii) it should be segregated into up and down traffic; and
- (iv) it should be held at least for seven days with 24 hours each day.

Scrutiny of the records of 71 selected works revealed following irregularities in conducting traffic census:

- (a) Audit of the records revealed that traffic census was carried out in 63 cases out of the 71 works, as shown in **Table 3.1**.

Table 3.1 : Analysis of conducting of traffic census

Sl. No.	Highway Division	No. of works	Value (₹ in Cr)	Traffic census	Remarks
1.	Coochbehar	5	21.47	Not done	Estimates were prepared on the basis of CE's orders, without conducting the traffic census.
2.	Tamluk, Asansol and Purulia	3	46.35	Information not provided	Audit could not check if the DPRs were prepared as per prescribed norms.
3.	Eight Divisions ¹¹³	38	475.02	Conducted	The census was not done for the required number of seven days.
4.	Nadia-I	2	20.38	Conducted	The period covered in traffic census was not known. Hence, completeness of the process could not be vouched safe.
5.	All Divisions	23	381.43	Conducted	Defects noticed are discussed in the following points.
Total		71	944.65		

(Source: Records of the selected Divisions)

¹¹⁰ IRC37- 2001& 12 and IRC – SP-72-2007

¹¹¹ IRC-9-1972 Clause 3.1, 4.1 and 5.2

¹¹² Once during peak harvest season and other during the lean season.

¹¹³ Bankura, Medinipur-I, Uttar Dinajpur, Nadia-I, Howrah, Asansol, Malda and Dakshin Dinajpur.

(b) In 63 works where the traffic census was done it was noticed that:

- In all works it was done in one season only instead of two seasons (lean and peak).
- Segregated traffic count for up and down traffic was recorded for only nine works.
- In 61 works, the Divisions failed to provide the field reports of any of the traffic census that were reported to have been conducted while designing the road.

As such, the reliability of the traffic count could not be ascertained in Audit and the possibility of wrong traffic volume considered for pavement designing could not be ruled out. Divisions stated (November 2016 to September 2017) that the field reports were not readily available.

In reply, the Department stated (February 2018) that all the Divisions were asked (February 2017) to be more vigilant and to keep traffic census data in proper way while designing the road project.

3.1.8 Pavements designed with deficient crust thickness

3.1.8.1 Scrutiny of DPRs revealed that in 27 works valued at ₹ 311.11 crore, the concerned Divisions considered less VDF value (1.5 to 2.5) against the prescribed requirement (3.5 as per IRC guidelines). This led to construction of pavements with deficient thickness.

For instance, Audit observed that one Widening and Strengthening (W&S) work (Panskura Ghatal Road) was completed in January 2014 at a cost of ₹ 24.88 crore. This road was damaged within seven months from the date of completion.

A scrutiny of the design data with reference to the IRC guidelines, revealed that it was due to consideration of lower value (1.5 instead of 3.5) of VDF. Resultantly traffic volume (MSA¹¹⁴) had been understated which led to consideration of less crust thickness of the pavement than actually required.

The Department accepted (February 2018) that pavement should have been designed on the basis of proper VDF. However, the Department needs to fix the responsibility and take punitive action against the erring officials/agency.

3.1.8.2 A bituminous layer is laid for profile correction of uneven surface of the earlier course. As per Departmental SOR 2008, if such bituminous profile corrective course is <40 mm it is not to be considered as part of the designed pavement thickness.

Audit observed that in one work¹¹⁵ valued at ₹ 2.56 crore, the division laid a profile corrective course of 40 mm and considered it as a part of the pavement thickness, thereby resulting in construction of pavement with crust thickness less by 40 mm than the designed thickness. Records showed that the road was damaged within eight months from the completion of the work.

The Department did not reply. However, the Department needs to fix the responsibility and take punitive action against the erring person/agency.

¹¹⁴ Traffic volume expressed in terms of million standard axle (MSA).

¹¹⁵ Strengthening of Sagardighi-Muniagram-Gankar-Raghunathgunj Road 4 kmp to 5 kmp and 13 kmp to 17.8 kmp

3.1.8.3 Departmental SOR 2008-09¹¹⁶ prescribed the combinations and sizes of different materials like sand, moorum, gravel *etc.* for use in Granular Sub-Base (GSB) of the pavement.

Audit scrutinized the estimates/DPRs in respect of six W&S works¹¹⁷ which were completed between January 2014 and June 2014 at a total cost of ₹ 69.45 crore. Audit observed that in the estimates, GSB layers were planned to be constructed with sand alone or in combination with stone dust ranging from 150 to 200 mm. This GSB layers were constructed at a cost of ₹ 2.58 crore. Audit further observed that the layers of sand and sand *plus* stone dust were treated as a part of GSB layers whereas as per SOR, these were to be used in combination with other materials like gravel *etc.* Thus, the design of these roads remained deficient in crust thickness as the sand and sand-stone dust mix layers were part of the total designed thickness of the road.

The Department, accepting the audit observation, stated (February 2018) that the divisional officers were instructed not to treat sand layers measuring thickness 150 to 200 mm as a part of GSB. However, the fact remains that the divisional officers neither complied with these instructions nor followed the Departmental SORs.

3.1.9 Pavement design criteria was not followed in strengthening of road

3.1.9.1 Benkelman Beam Deflection test not done

As per IRC guidelines¹¹⁸ for strengthening of an existing road, the designed thickness is determined by conducting traffic census and Benkelman Beam Deflection (BBD) test.

Scrutiny revealed that out of the 21 strengthening works selected for audit, five works¹¹⁹ valued at ₹ 21.47 crore were executed by Coochbehar Highway Division during 2015-16. In these works, pavement was overlaid with 50 mm Bituminous Macadam (BM) layer without conducting any traffic census or BBD Test. As such, the design of the road was not as per the norms because the thickness of bituminous layers required for strengthening was not assessed before taking up of the works.

The Department stated (February 2018) that strengthening works were carried out by overlaying of 50 mm BM by the concerned division as per the directions of the Chief Engineer in respect of the situation raised at site.

¹¹⁶ Clause B-6.3 of PW(Roads) SOR 2008-09

¹¹⁷ W & S of Chapra Hridaypur Road 0 kmp to 12.07 kmp (Nadia Highway Division – I), W & S of Makdampur-Bhatole Road 0.00 kmp to 13.50 kmp & W & S of Bindol Bishnupur Road 0.00 kmp to 9.70 kmp (Uttar Dinajpur Highway Division), W & S of KRPB Road 0.00 kmp to 27.30 kmp, W & S of ISA Road 7 kmp to 14 kmp and W & S of Gangajal Saltora Road 0.00 kmp to 22 kmp (Bankura Highway Division).

¹¹⁸ As per IRC 81-1997 BBD test is required to be done to evaluate the requirement of additional bituminous layers in case of strengthening of an existing road.

¹¹⁹ Improvement of Rajarhat Mathabhanga Road 0 kmp to 3.4 kmp & 6.7 kmp to 14 kmp, Falakata Sildanga Road 4 kmp to 5 kmp, 8 kmp to 17 kmp, 18 kmp to 19 kmp & 22 kmp to 22.29 kmp, Tufanganj Balabhut Road 0 kmp to 12 kmp, Dewanhat Balarampur Road 0.20 kmp to 9.30 kmp, Kakina Road 0 kmp to 8.75 kmp (excluding 1 kmp to 2 kmp)

The reply was not tenable as the execution was done arbitrarily without abiding by the IRC guidelines for strengthening work. Thus, the requirement of additional bituminous layers was not evaluated through the required tests. As such, there remained the possibility of either compromise with the quality of the road or laying of a layer which was actually not required.

3.1.9.2 Strengthening of roads within design life

IRC guidelines¹²⁰ stipulate that while designing a pavement, the road has to be designed for a definitive time span called the design life. The design life is the period during which the pavement will be able to sustain the calculated traffic load. No strengthening during the design life would be required until and unless there is drastic increase in traffic load.

Audit observed that three works¹²¹ were completed by Dakshin Dinajpur Division, between March 2011 and August 2011 at a cost of ₹ 8.73 crore with the design life of ten years. These roads were strengthened again in April 2015, *i.e.*, six years before completion of design life of the road, at a cost of ₹ 6.72 crore. The justification provided for strengthening works during the design life was that the roads had developed cracks, depressions, ruts and ravelings. However, Audit noticed from the estimates of the works that there were no items of work included to rectify these defects. It indicated that the justification given for strengthening work didn't hold ground. Audit further observed from the traffic census done during the strengthening work that work was done despite the fact that the traffic count registered a lower traffic than the traffic count of the original works. Thus, the requirement of strengthening work was not assessed properly before its execution.

The Department did not offer any reply to the observation. However, the Department needs to fix the responsibility and take punitive action against the erring officials/agency.

(B) Quality check of materials prior to commencement of the work

Quality Control in construction involves compliance with minimum standards of materials to ensure that the materials used in the works conform to the required specifications.

3.1.10 Earthwork not checked for quality

As per IRC guidelines¹²² and Departmental SORs, Divisions are required to perform quality checks¹²³ of the earth prior to the execution of the earthwork¹²⁴. These checks are performed to determine that the earth is free from organic materials and that the soil does not easily deform when in contact with moisture.

¹²⁰ IRC: 37-2001

¹²¹ *W & S of Daulatpur Harirampur Dehaband 0 kmp to 7.5 kmp, W & S of Daulatpur Harirampur Dehaband 9 kmp to 13 kmp and W & S of Kushmandi-Mahipaldighi Road 0 kmp to 5.5 kmp*

¹²² IRC: 36-1970 (clause 3.8)

¹²³ *The deleterious content test, clay content test, liquid and plastic limit test, Dry Density-CBR- Moisture relationship, Highest Sub-Soil Level & Soil Water Level and Sieve Analysis*

¹²⁴ *The earthwork is executed through earth obtained from departmental borrows from the road side or borrows arranged by the contractors.*

Dry density value and Optimum Moisture Content (OMC) are also to be determined to assess the required level of compaction of the earth at optimum moisture level.

Scrutiny of records showed that out of the 71 road works, in 40 works, earth work¹²⁵ valued at ₹ 51.63 crore was involved. Out of these, in 26 works¹²⁶ (valued at ₹ 18.01 crore), the Division did not check the quality of the earth with reference to any of the parameters stated above. In the remaining 14 works (valued at ₹ 33.62 crore), it was noticed that only 30 per cent of tests of earth work were done as detailed in **Table 3.2**.

Table 3.2: Statement showing tests of earth work which were conducted partially

Sl No.	Name of the Test	Total number of tests in 14 works	Number of works where the test was performed	Achievement (Percentage)
1.	Deleterious Content Test	14	0	0
2.	Clay Content	14	2	14
3.	Liquid Limit	14	8	57
4.	Plasticity Index	14	8	57
5.	Dry Density –Moisture-CBR relation	14	5	36
6.	Highest Sub-soil level & soil water level	14	1	7
7.	Sieve Analysis	14	5	36
Total		98	29	30

(Source: Records of the selected Divisions)

Thus, the road works remained deficient as the Department did not ensure suitability of the soil before using it in the work which may cause failure of the road.

¹²⁵ involved volume of 3225124 m³ at a cost of ₹ 51.63 crore

¹²⁶ W & S of Englishbazar-Kotwali Road, W & S of Pukuria Ferryghat to Kumarganj Road, W & S Malatipur-Chandrapar Road, W & S of Agampur-Raniganj Road, Improvement of Plassey Betai Road, W & S of Bernia Chandraghat Road, W & S of Kulgachi-Bernia Road, Strengthening to Bengal to Bengal Road of length 58 km starting from NH-31 at Dhantala to NH-34 at Chaunagra, W & S Makdampur Bhatole, W & S Dhamurgachi Kharibari, W & S of Manbazar-Bandwan Road, W & S of Damda-Chakaltore-Daradi-kendri-Manbazar Road, W & S of Balrampur-Barabazar-Sindri Road, W & S of Sindri Manbazar Bansa Road, W & S of Manbazar-Bandwan Kuliapal Road, Improvement of Berhampore – Hariharpara – Amtala Road, W & S of Sagardighi B.D.O Office to Ratanpur (N.H. 34 More) Road, W & S of Dhuliyān – Farakka Road, W & S of Bhagawangola - Lalgola Road to Manikchakghat Road, W & S of Bishnupur-Kotulpur-Joyrambati-Kamarpukur Road, W & S of KRPB Road, W & S of Gangajalhati-Saltora Road, Improvement of Link road Bishnupur Sonamukhi, W & S of Jhapetapur Kahasijora Road, W & S of Galsi-Guhagram Road and W & S of Rasulpur Khandghosh Chakpurohit Road.

The Department stated (February 2018) that the divisional officers were being instructed to properly conduct different tests of earth before execution of the road work.

3.1.11 Quality of the materials of the granular layers not checked

The main ingredients of granular layers of the pavement, *i.e.*, Granular Sub Base (GSB), Water Bound Macadam (WBM) and Wet Mix Macadam (WMM) are stone aggregates and sand. These layers are important for the stability of a road as these layers withstand the vertical load of the traffic.

As per Departmental SORs¹²⁷ various tests¹²⁸ for aggregates and its mix have been prescribed.

In 71 selected works, 48 works had involved GSB, 15 works involved WBM and 55 works involved WMM. The total cost of these granular items was ₹ 221.31 crore.

Scrutiny revealed that none of the recommended tests were done to check the quality of the materials of the granular layers and its mix in 11 works with WBM items (valued at ₹ 8.04 crore) and 26 works with WMM items (valued at ₹ 51.00 crore).

Audit further observed that in the following works recommended tests were done partially as detailed below:

Number of works	Tests not carried out
Seven works (GSB item valued at ₹ 7.76 crore)	Water absorption test was not done in five works
	Atterberg limit test was not done in any of the works.
Four works having WBM item valued at ₹ 1.95 crore	Aggregate Impact Value (AIV) test was not done in one work
	Combined Flakiness and Elongation (CF&E) test not done in two works
	Plasticity test and water absorption not done in three works
	Liquid limit test was not done in any of the works
16 works having WMM items valued at ₹ 36.18 crore	AIV test was not done in one work
	CF&E was not done in five works
	Plasticity test of the screening materials was not done in six work
	Water absorption test for the aggregates was not done in fourteen works.

¹²⁷ SOR 2008 clause 7.2.1, 7.2.2, 7.2.3, 7.2.4, B-8.1-1, 3.1.1 and SOR 2014 Clause 2.11.2.2, 2.11.3.2, 2.14.2.4, 2.14.2.5, 2.15.2.1.1, 2.15.2.1.2

¹²⁸ Tests for GSB: water absorption test for aggregates, gradation test for mix, Atterberg limit and moisture content for screening materials.
Tests for WBM : Aggregate Impact Value (AIV), CF&E and water absorption test for the aggregates, liquid limit and plastic limit for the screening and binding materials.
Tests for WMM : AIV, CF&E and water absorption test for the aggregates and plasticity test for the screening materials.

Use of material without any/proper quality checks indicated compromise with the quality of road works.

The Department did not offer any reply to the observation. However, the Department needs to get all the cases investigated and fix the responsibility.

3.1.12 Quality of mix design of granular layers not ensured

Mix design is the combination of aggregates (for GSB and WMM) which ensures a durable pavement with sufficient strength to bear traffic load and allows for additional compaction by traffic.

As per the Departmental SOR 2008 and IRC-57-2000¹²⁹, such mix design is required to be prepared by the contractor to execute the works and is to be approved by the EE before the commencement of the work.

The concerned Divisions did not provide the approved mix design in respect of one work with GSB items and 13 works with WMM items¹³⁰. However, in response to audit queries, the Divisions intimated that mix design were prepared but those were not approved by the EEs as required. It indicated that the works were executed on the basis of the mix design prepared by the contractor. Thus, execution of works with the specifications decided by contractor showed lack of quality control in these road works.

The Department stated (February 2018) that the divisional officers were being directed to ensure optimum combination of aggregates to achieve desired standards of the granular layers before execution of the work. However, the Department did not respond to the issue of non-performance of assigned duty of approving the mix design by the concerned EEs.

3.1.13 Requisite tests for Bituminous Items of work were not done

The main constituents of bituminous items were stone aggregates and bitumen. Quality checks of these materials and its mix are required to ensure a durable pavement, with (i) sufficient strength to resist deformation under traffic in high temperature; (ii) sufficient air void in the compacted bitumen to allow the additional compaction by traffic; and (iii) sufficient flexibility to avoid premature cracking due to repeated bending by traffic¹³¹.

Departmental SORs stipulated various tests like Aggregate Impact Value (AIV), Combined Flakiness and Elongation (CF&E), Gradation¹³², Water Absorption

¹²⁹ Clause B-10.7.4(b) of SOR 2008 and clause 3.3 table 3.1 Sl.No 6.2 of IRC SP- 57-2000

¹³⁰ GSB items valued ₹ 35.36 lakhs and WMM items valued ₹ 18.97 crore.

¹³¹ As per "Lecture notes in Transportation Systems Engineering" dated 3.8.2009 of IIT Bombay.

¹³² Gradation test: aggregate gradation influence every important properties of the mix like stiffness, stability, durability, permeability, workability, fatigue resistance, skid resistance and resistance to moisture damage.

Test, Coating & Stripping¹³³, Quality of Bitumen, Mix Design¹³⁴, Stability & Void Analysis¹³⁵ etc., to ensure quality of bituminous works.

During the course of audit of 71 test checked works, records relating to prior quality checks on materials used in 152 bituminous items¹³⁶ costing ₹ 444.58 crore were analysed. Audit observed that

- a. Out of these 152 items, the required quality checks of materials were conducted in only 39 items.
- b. No quality checks of materials were conducted in 29 items¹³⁷.
- c. In remaining 84 items, quality checks of materials were done partially as detailed in the **Table 3.3**.

Table 3.3: Statement showing where bituminous tests were done partially

Name of items	Number of items where tests were done partially	Number of items where tests were not done						Tests done (%)
		AIV	F & E	Water absorption test	Coating & stripping	Quality of binder test	Stability and void analysis	
BM	46	27	25	16	2	15	Not required	37
DBM	9	8	8	9	3	5	9	78
SDBC	18	6	5	5	1	5	14	33
BC	5	5	4	5	1	4	4	77
MSS/OGPC	6	2	1	1	0	1	Not required	17
Total	84	48	43	36	7	25	27	48

(Source: Records of the selected Divisions)

From the above, it is observed that only 48 per cent of the required quality tests of the materials used in these items were done prior to execution of the work. Hence, the use of sub-standard materials in the works could not be ruled out which might lead to the premature failure of the pavement.

¹³³ Coating and stripping test: this test determines the property of the bitumen to adhere to aggregates in presence of water.

¹³⁴ Mix design: It is to obtain the optimum combination of aggregates and bitumen to ensure a durable pavement, sufficient strength to resist shear deformation under traffic under higher temperature, sufficient air void in the compacted bitumen to allow the additional compaction by traffic, sufficient workability to permit easily placement without segregation, sufficient flexibility to avoid premature cracking due to repeated bending by traffic.

¹³⁵ Stability and void analysis: This test determines the ability of the bituminous mix to resist excessive permanent deformation under traffic load.

¹³⁶ Bituminous binder courses like Bituminous Macadam (BM), Dense Bituminous Macadam (DBM), and wearing courses like Semi Dense Bituminous Macadam (SDBC), Bituminous Concrete (BC), Mastic Asphalt, Mix Seal Surface (MSS) and Open Graded Premix Carpet (OGPC).

¹³⁷ Seven BM, 11 SDBC, one Mastic Asphalt and 10 having MSS/OGPC items.

The Department stated (February 2018) that as per audit observations, efforts were being made to ensure correct use of bitumen content and accordingly, all divisional officers are instructed to maintain proper specification stipulated in departmental SOR.

(C) Quality control checks during execution of the works

Departmental SORs and MORTH specifications have recommended various quality control checks while executing different items of the road works. These tests are required to be done in order to check whether the approved materials were being used in the execution and also to ascertain whether the execution was as per the designed criteria. The types of tests and the frequency of such tests which are to be conducted have specifically been mentioned. The tests were to be conducted jointly by the Contractor in the presence of Divisional representatives while executing the works. Scrutiny of the selected works revealed the following:

3.1.14 Quality control during execution of the Earthwork

As per Departmental SORs (2008 and 2014), the divisions while executing the earth work has to conduct various tests multiple times at the prescribed frequency in addition to the tests that had already been done prior to execution of works viz., Grading test¹³⁸, Density test¹³⁹ etc. These tests were required to be conducted during the execution in order to ascertain whether the approved materials were being used and desired level of compaction of the earth had been achieved. Any compromise in the compaction of this base layer may lead to depression of the pavement.

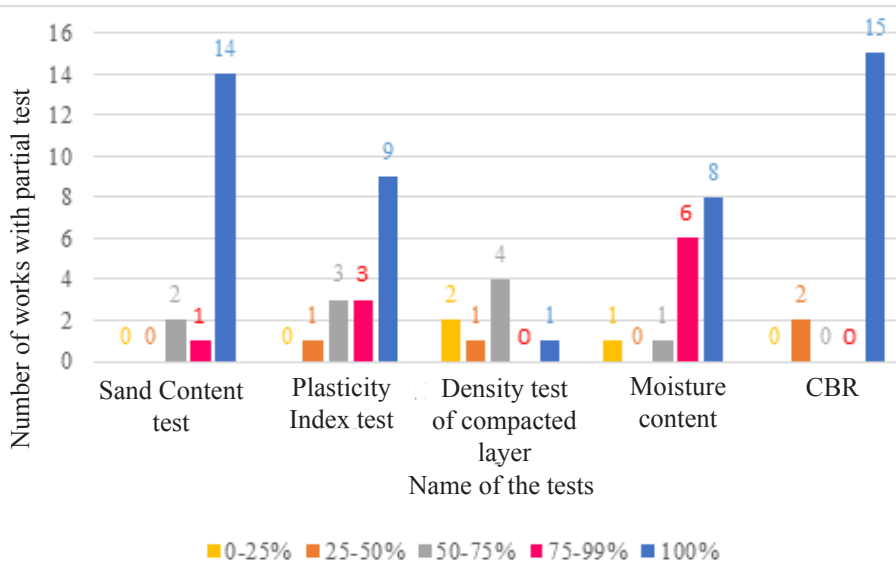
Out of the 71 test checked works, earthwork was executed in 40 works valued at ₹ 51.63 crore. Records relating to conducting of quality checks during the execution of earth work were scrutinised in audit and it was observed that

- No quality control tests were conducted during the execution of 22 works valued at ₹ 12.99 crore.
- In remaining 18 works, valued at ₹ 38.64 crore, quality checks were conducted partially as detailed in **Chart-3.1**.

¹³⁸ Grading test : it is an indicator of engineering properties- hydraulic conductivity, compressibility and shear strength

¹³⁹ Density test: it is done to determine the compaction level of the layer. Compaction is done to maximise the load bearing strength of the layer, avoid settlement of the structure during service and avoid permeability of water in the layer.

Chart-3.1: Shortfall in various tests to be done during execution of Earthwork



It is evident from the above chart that in most of the cases required percentage of tests were not done.

In absence of the stipulated tests during execution, Audit could not ascertain how the Department ensured execution in conformity with the approved materials and achieved the desired compaction level.

In reply, the concerned divisions stated (November 2016 to June 2017) that the stipulated tests could not be performed due to shortage of manpower. However, Department did not offer any response with reference to the quality and quantity of the materials to achieve the desired compaction level.

3.1.15 Quality control during execution of granular layers

Departmental SORs¹⁴⁰ stipulate carrying out of various tests of the materials used in execution of GSB, WBM and WMM items at prescribed frequency. The purpose of these tests is to ascertain whether the materials of the approved quality were being used and executed as per the approved design mix and compacted to achieve the desired level.

In this context, audit noticed that in 71 test checked works, there were 48 works with GSB items, 15 works with WBM items and 55 works with WMM items. Audit observed that:

- a. None of the quality control tests¹⁴¹ of GSB items valued at ₹ 1.70 crore were conducted in four works. Further, in 15 works with WBM items, quality control tests were not done¹⁴² in two works where the value of WBM was ₹ 41.90 lakh.

¹⁴⁰ Clause B-9.3.4 of SOR 2008-09 and Table 5 (Quality control tests for bases and sub-bases) in SOR 2014

¹⁴¹ Gradation, Atterberg limit of binder materials, Deleterious content test, moisture content, CBR and density

¹⁴² AIV, CF&E, gradation, Atterberg limit of binder and screening materials.

b. Audit also noticed that in 44 works having items of GSB, 13 works of WBM and in 55 works of WMM, there were shortfalls in conducting required quality control tests as per the IRC Guidelines (*Appendix 3.1*).

Thus, by not conducting the prescribed tests, the divisions did not ensure whether execution was done with the approved materials and as per the approved design mix and also achievement of the desired compaction level.

3.1.16 Quality control during execution of bituminous layers

Quality checks of materials used in bituminous layers ensure whether the approved materials, *i.e.*, stone aggregates and bitumen had actually been used and as per the approved design mix for a durable pavement. Departmental SORs stipulated various tests of the materials used in execution of the bituminous items and also to check the quality of execution of these items.

In this context, audit examined 71 works and noticed the following:

- a. Out of 61 works, quality control tests were not conducted at all for the BM item valued at ₹ 1.58 crore in one work.
- b. Out of 36 works, quality control tests were not conducted at all for SDBC item valued at ₹ 7.54 crore in six works.
- c. Out of eight works, quality control tests were not conducted at all for the Mastic Asphalt¹⁴³ item valued at ₹ 3.36 crore in five works.
- d. Out of 23 works, quality control tests were not conducted at all for the MSS/OGPC item valued at ₹ 2.66 crore in three works.

Scrutiny further showed that the stipulated 14 type of tests¹⁴⁴ in respect of BM, DBM, SDBC, BC, Mastic Asphalt and MSS/OGPC were done partially in 70 works. Shortfall in the requisite tests is detailed in the *Appendix 3.2*.

Some instances where effects of non-conducting of quality checks during execution of works were noticed are as follows:

- Audit observed in the investigation¹⁴⁵ report (September 2014) in respect of one W&S¹⁴⁶ work, that the BM layer was 38.30 mm instead of 50 mm with bitumen content of 2.5 *per cent* against the requirement of 3.4 *per cent*. Further, density was found to be 1.88 gm/cc against the requirement of 2.2 gm/cc and

¹⁴³ Mastic asphalt (MA) is a dense mixture consisting of coarse aggregate, and/or sand, and /or limestone fine aggregate, and/or filler and bitumen, which may contain additives (for example polymers, waxes). The mixture is designed to be of low void content.

¹⁴⁴ AIV, C F & E, Stripping and coating value, water absorption test, water sensitivity test, moisture susceptibility test, soundness test, quality of binder test, grading of mix, binder content test, density of compacted layers, hardness number, stability and void analysis test, temperature monitoring of the process

¹⁴⁵ Conducted by the Division as per direction of the Chief Engineer

¹⁴⁶ W&S of Saitanchak Tangrakhali 0 kmp to 11.8 kmp

the WMM was found to be 179 mm against 225 mm. The bituminous work was also not covered with any wearing course for a period of one year. As a result, the road was damaged leading to wasteful expenditure ₹ 1.27 crore. The contract was rescinded in April 2015 and fresh tender was invited in May 2015 for completion of the balance work.

- In another work¹⁴⁷ valued at ₹ 5.34 crore, it was observed that the bituminous layer of SDBC was completed and paid for despite deficiencies being noticed in the bitumen content, gradation and thickness of layer by the AE during a site inspection.
- Audit also observed that 14 works¹⁴⁸ which were completed between May 2013 and September 2015 at a cost of ₹ 112.10 crore were found damaged as per reports of the Division, within the defect liability period of three years.
- In one work¹⁴⁹ valued at ₹ 8.19 crore, the road was found damaged by the Division just after five months of the defect liability period.

In all these works, the required number of quality control tests were either not done or done far less than required.

(D) Infrastructure for quality control

For an effective system of quality control, well equipped laboratories are required at the divisional, circle and central levels. The contractor should also have trained staff and equipped laboratories for exercising quality control.

3.1.17 Deficiency in infrastructure

During the execution of the projects, quality control tests are to be done at the site laboratories established by the contractors. Joint tests are conducted in the site laboratory by the contractor in the presence of Departmental engineer. When the site laboratory is not capable to do the tests, the same are referred to 3rd party laboratories¹⁵⁰. As per IRC specifications¹⁵¹, the Department should have laboratories at central, regional (circle) and divisional levels. In this context, Audit observed the following:

¹⁴⁷ W & S of Bhagwangola Lalgola Sagardighi via Sitesnagarghat 2.3 k to 8 k

¹⁴⁸ W&S of Potashpur-Banguchak 0 kmp to 12 kmp and Improvement of Potashpur-Banguchak 12 kmp to 28 kmp, W&S of Kashemnagar Natunhat 0 kmp to 10 kmp, W & S of Dhulian Farraka 0 kmp to 8 kmp, W&S of Sadullahapur Meherpur road 0 kmp to 4.15 kmp, W&S of Udaipur Mahipaldhigi Road 0 kmp to 8 kmp, W&S of Panskura – Durgachak road 5 kmp to 25.45 kmp, W&S of Phulbari- Kumarganj Road 0 kmp to 9 kmp, 9 kmp to 20.30 kmp, 21.4 kmp to 26 kmp, W&S of Harirampur Dhumsadhigi Road 0 kmp to 10.8 kmp, W&S of Kumarpara Kumrail chingispur road 0.75 kmp to 3.8 kmp & 4.3kmp to 10.3 kmp, W&S of Teor Binsira Manik- Bangalipur Road 0 kmp to 8 kmp, Improvement of Beherampore – Hariharpara Amtala road 10 kmp to 32.5 kmp, Strengthening of Egra Bajkul Road 15 kmp to 30 kmp and strengthening of Balighai-Mohanpur Road 6 kmp to 12.5 kmp

¹⁴⁹ W&S of Sagardighi-Moniagram- Gankar- Raghunathganj 0 kmp to 22 kmp (work done in the stretch 0 kmp to 4 kmp, 5kmp to 13 kmp, 17.80 kmp to 22 kmp)

¹⁵⁰ Government institutions like Universities, Polytechnic and Engineering colleges

¹⁵¹ SP-11 “Handbook for quality control for construction of roads and runways”

a. The Department had only one central level laboratory viz RBRI. Records showed that RBRI had been engaged only with post work monitoring of projects when any complaint was received and also of works selected randomly by the Directorate. During the audit period (2011-12 to 2016-17), RBRI checked only two works for quality and four works as a part of special investigation. Furthermore, the vital key posts of RBRI viz, research officers, senior research assistants were lying vacant, although the laboratory was capable to conduct all the tests connected with pavement construction.

The Department stated (February 2018) that the matter of vacancy in the key posts was being brought to the notice of the appropriate level. Department's reply was not tenable as appointments against the sanctioned strength were within the purview of the Department.

b. As per MORTH specifications¹⁵², the site laboratory should be equipped so as to conduct the tests that are required for quality control during the execution of the road projects.

Joint site verifications by the audit team and Departmental staff of three site laboratories conducted between November 2016 and April 2017 revealed that in respect of two sites¹⁵³, the laboratories were not equipped with the required instruments to test the quality of bitumen.

(E) Lack of Supervision for ensuring control on quality

In order to ensure quality monitoring of the road projects, the Department decided (February and May 2014) to engage independent expert, designated as Highway Project Monitor (HPM)¹⁵⁴ and Supervision Consultants (SC)¹⁵⁵. The HPM was engaged for monitoring the works valued between ₹ 10.00 crore and ₹ 25.00 crore and SC for monitoring the works valued above ₹ 25.00 crore.

Out of the selected works, six works valued at ₹ 85.11 crore were monitored by HPM and six works valued at ₹ 285.69 crore were monitored by SC.

In this context, audit observed the following:

3.1.18 Supervision Consultant

Scrutiny of the tests reports of the six works supervised by the Supervision Consultant revealed that despite the appointment of the supervision consultant

¹⁵² Clause 120.2 of MORTH 2013

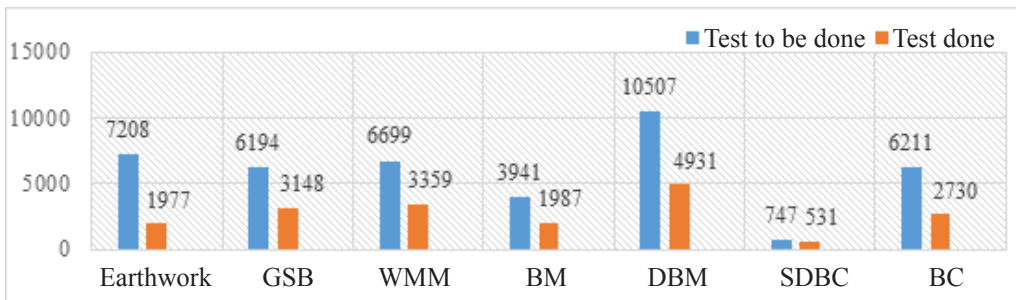
¹⁵³ Widening & Strengthening of Temna-Hesla-Aarsha Road 11.00 kmp to 26.40 Kmp of Purulia Division and Improvement of Bindole- bhatole Road 0 kmp to 9.3 kmp of Uttar Dinajpur Highway division

¹⁵⁴ The person eligible to be empanelled as HPM was required to have been retired from the post of SE with at least 10 years of experience in highway sector.

¹⁵⁵ Supervision consultants to be engaged were required to be empanelled by The West Bengal Highway Development Corporation Limited and Ministry of Road Transport and Highways.

at a cost of ₹ 7.20 crore, there were shortfalls (ranging from 16 to 100 per cent) in conducting of quality control checks as detailed in **Chart -3.2**.

Chart 3.2: Short fall in number of tests conducted in the six supervised works



Further, the supervision consultant was required to issue monthly and quarterly progress report of work, inspection and approval of all material sources nominated by the contractors and inspection reports of the plant and facilities of the contractors. The supervision consultant was required to maintain a daily diary of the work also, which was to record all the day to day events connected with the execution of the project.

Scrutiny of records showed that in three¹⁵⁶ works for which ₹ 2.86 crore was paid as supervisory charge, no such records were found in the Divisions¹⁵⁷.

As such, the objective of appointment of supervision consultant was defeated, as despite supervision, less number of tests were conducted and adequate documentation indicating the monitoring of these high value projects was also not maintained.

3.1.19 Monitoring by the Departmental officers

IRC guidelines for Quality System for Roads¹⁵⁸ provide that all the works have to be covered with full time supervision by the departmental staff irrespective of the type of road. Further, PWD Account Code stipulates inspection of various works within a Circle.

Scrutiny of records showed the following deficiencies in supervision by the Department:

3.1.19.1 In none of the 71 selected works, full time supervision was done by the departmental staff. As a result, the desired quality control checks could not be ensured by the Divisions.

Accepting the audit findings, the Department stated (February 2018) that efforts were being made to train the departmental officers for understanding methodology of tests in the environment of quality control system.

¹⁵⁶ Strengthening of Bengal to Bengal road 50 Km, W&S of Ranihat-Haridaspur-Amta Road 0 kmp to 16.4 kmp and W & S of Bishnupur- Kotulpur- Joyrambati- Kamarpukur Road (36 km)

¹⁵⁷ Uttar Dinajpur HW, Bankura HW and Howrah HW

¹⁵⁸ IRC – SP-57-2000 clause 3.3 table 3.1 Sl 4.4

3.1.19.2 As regards the supervision of the projects by Superintending Engineers, it was observed that, except in two works¹⁵⁹, in all the other 69 selected works, their visit was not recorded. As such, Audit was not in a position to determine the frequency or the number of their visits and monitoring performed by them in a particular work. This raises doubts regarding the effectiveness of monitoring by departmental officials other than the divisional personnel.

3.1.19.3 Furthermore, as per the stated guidelines, full time supervision is to be done by the Department for state highway construction in addition to the supervision by the consultant.

Of the six works supervised by the Supervision Consultant, four works were State Highways. Audit observed that full time supervision was not done in these cases though required.

The divisions, accepting the audit findings, stated (February 2017 and March 2017) that full time supervision was not possible due to the shortage of technical manpower.

The reply was not tenable as Audit noticed that in one of the Division there was no shortage of manpower and in another Division there was shortage of only three technical manpower against 14.

3.1.19.4 As per the hand book for quality control for construction of roads and runways¹⁶⁰, 70 per cent of the tests are to be carried out by the Sub-Assistant Engineer (SAE), 20 per cent by the Assistant Engineer and 10 per cent by the Executive Engineer.

However, scrutiny of the selected works revealed that in 39 works valued at ₹ 396.01 crore, 10 works valued at ₹ 86.20 crore and 13 works valued at ₹ 103.33 crore, the required number of tests were not done by the EEs, AEs and SAEs respectively. This indicated that the proper supervision and monitoring of the works for quality control was not exercised by the divisions.

3.1.19.5 IRC guidelines¹⁶¹ provide that the test results are required to be presented with every third running account bill so that the payment gets linked with the assured quality of work.

It was seen that in 52 works valued at ₹ 543.85 crore, the quality control test reports were presented only with the final bill. Thus, the divisions, without ensuring quality of implementation of the works, released payment against the running bills.

The divisions, accepting the audit observations, stated that henceforth the quality control reports would be submitted with the running account bills also. The Department did not offer any comment.

¹⁵⁹ W&S of ARD road 0 to 12 kmp and 12 to 22.85 kmp,

¹⁶⁰ IRC-SP-11-1984 clause 1.11

¹⁶¹ IRC-SP-11-1984 clause 1.11

3.1.19.6 As per the IRC guidelines¹⁶², the quality control reports will have to be sent to the concerned Superintending Engineer and Chief Engineer for the purpose of feedback.

However, it was seen that in all the selected works, quality control tests were not sent to any higher authority.

The Divisions replied that there was no system of forwarding the test reports to the higher authorities outside the division and the matter would be put up to the higher authorities for consideration.

The reply was not tenable as the Divisions were required to send the reports to SE and CE as per extant provisions.

The Department did not offer any reply to the observation.

3.1.19.7 As per IRC guidelines¹⁶³, Village Road projects should have an in-house surveillance team, the ODRs and MDRs should have the same backed by consultants team. In the case of State Highway projects there should be an independent quality assurance team in addition to in-house quality surveillance team.

However, it was observed that the Department did not have any such team in place to ensure that quality assurance measures were followed.

3.1.19.8 As per contract agreements, after completion of an item of work, the Contractor is to provide notice (not less than 5 days) in writing to the Engineer-in-charge and the next item shall only commence after the approval of the Department.

It was observed in 59 works valued at ₹ 748.74 crore, that no such intimation was made regarding completion of any item of work before commencement of next item of work. As such, the next item of work started without checking the quality of completed item of work. It indicated that there was no control exercised by the Department after completion of any item by the contractors.

The divisions replied that the process was done verbally with the Contractor.

The reply was not tenable as the Divisions should have documented the process of communication by the contractors and its approval for execution of the subsequent items of works. The Department did not offer any reply.

3.1.20 Tools for supervision and monitoring

3.1.20.1 As per IRC guidelines¹⁶⁴, it is required to maintain a daily diary to record the day-to-day operations, activities and events taking place at the site of each work such as equipment and manpower deployed, activities carried out, materials consumed and visits by senior level engineers and follow up of their instructions.

¹⁶² IRC-SP-11-1984 clause 1.3.3,

¹⁶³ SP-57-2000 clause 3.3 table 3.1 sl.4.2

¹⁶⁴ IRC-57-2000 clause 4.3.2(d)

Scrutiny of the selected projects showed that in none of the selected works, the daily diary was maintained.

3.1.20.2 As per standard tender agreement¹⁶⁵, the work order book is to be maintained by the concerned Sub-Divisional Officer. The instructions to the Contractor shall be provided through work order book and the Contractor shall regularly note the entry made in the work order book and also record thereon the action taken there against.

Scrutiny of the selected works showed that in 53 works, such work order books were not maintained. As a result, it could not be ensured as to whether the Contractors carried out the instructions of the Sub-Divisional Officer in these works.

3.1.20.3 As per IRC guidelines¹⁶⁶, “method statement” is a monitoring tool to be submitted by the Contractor before commencement of any work to ensure construction as per approved methodology and sequential constructional activities.

However, in 59 selected works, no such method statement was available. As a result, it could not be ensured by the divisions whether these works were executed as per approved methodology.

3.1.20.4 As per IRC guidelines¹⁶⁷, the Engineer-in-Charge and the Contractors shall have a quality assurance manual defining the general procedures and guidelines to be followed during execution of works.

Scrutiny showed that neither PWRD nor any of the contractors of the selected work maintained quality assurance manual. As a result, the division was not in a position to know the methodology of working, control of materials, level of calibration, control of workmanship aspects of the contractors before the commencement of the work.

3.1.21 Conclusion

Quality control norms relating to topographical surveys and soil investigations were not adhered to. Norms relating to traffic survey and the design criteria were not followed in strengthening of road. As such, pavements were designed with deficient crust thickness. Quality of the materials like earth, stone aggregates and bitumen used in the works was not ensured. Even during execution, the Department could not ensure implementation as per the approved quality specifications.

Monitoring of the projects was weak and the infrastructure for quality testing was inadequate, even after appointment of consultants. Instances were noticed where the roads were found to be damaged within the design life and defect liability period. As such, the quality control system for ensuring durable roads within the resources available to the Department was found to be inadequate.

¹⁶⁵ Form 2911 Clause C-14

¹⁶⁶ IRC – SP-57-2000 Cl.4.3.2 (a) and 4.5

¹⁶⁷ IRC-57-2000 clause 4.1

MICRO, SMALL AND MEDIUM ENTERPRISES & TEXTILES DEPARTMENT

3.2 Detailed audit on Implementation of West Bengal Incentive Scheme

3.2.1 Introduction

The Micro, Small and Medium Enterprises (MSME) Sector plays critical role in the industrial development of any State. These enterprises act as ancillary units and provide processed raw material to advanced industrial units.

Government of West Bengal (GoWB), with the objective of extending incentives for promotion of micro and small scale enterprises in the State, introduced (June 2007)¹⁶⁸ a new incentive scheme called West Bengal Incentive Scheme 2007 for Micro and Small Scale Enterprises (WBIS-2007). This scheme remained valid from April 2007 to March 2012. This scheme was later extended (March 2013) till March 2013. With the objective of further focusing on development of MSMEs in the backward regions of the State, a new incentive scheme was sanctioned (February 2014)¹⁶⁹ called West Bengal Incentive Scheme 2013 (WBIS-2013). This new scheme was valid from April 2013 to March 2018. In addition to these incentive schemes, GoWB had also approved (August 2013) West Bengal MSME Policy (2013-18) with a vision of (i) creating sustainable ecosystem in the MSME sector, (ii) for maximising the utilization of resources and (iii) to widen the area of operation to make the State emerge as the MSME leader in the country.

Incentives like (i) subsidies on capital investment, (ii) reimbursement of interest on term-loans (iii) electricity charges *etc.* were to be granted on demand to those enterprises that fulfilled the criteria specified in the incentive scheme. For the purpose of determination of type and quantum of incentives available under these schemes, the State was classified into four categories¹⁷⁰, based on level of backwardness. The objective was also to encourage the development of the MSME sector in the backward regions (categories C and D) of the State.

The Directorate of Micro, Small & Medium Enterprises (Directorate) under the Micro, Small and Medium Enterprises & Textiles Department was responsible for the growth and promotion of Micro, Small & Medium Enterprises in West Bengal. Implementation of these two schemes was also responsibility of the Directorate. The Directorate was headed by a Director assisted by Joint Directors and Deputy Directors. The District Industries Centres (DICs) were

¹⁶⁸ Notification No.319/MSET/O/C-III/15S-12/2005 dated 18 June 2007

¹⁶⁹ Notification No. 59-MSET(III)/155-07/2011 dated 3 February 2014

¹⁷⁰ Category A: Kolkata

Category B: North 24 Parganas, South 24 Parganas, Howrah, Hooghly, Burdwan, Nadia and Purba Medinipur

Category C: Murshidabad, Birbhum, Malda, Jalpaiguri and Darjeeling

Category D: Purulia, Bankura, Paschim Medinipur, Uttar Dinajpur, Dakshin Dinajpur, Cooch Behar and Sundarban area of South and North 24 Parganas.

the implementing units at District Level. In each DIC, there were groups of Managers in the rank of Asst. Director and Industrial Development Officers to assist the General Manager who was the organizational Head of the DIC.

3.2.2 Objectives, Criteria, Methodology and Scope of Audit

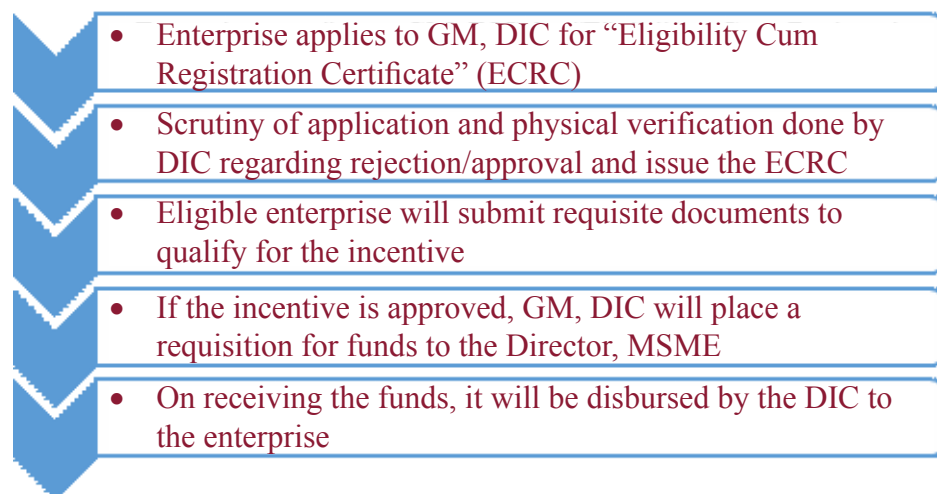
The objective of the detailed audit was to assess whether eligibility criteria envisaged in scheme guidelines and MSME policy were adhered to while releasing various incentives to the enterprises. It also sought to assess whether Department's vision of creating a sustainable ecosystem in MSME sector and widening the area of operation especially in the backward regions of the State was achieved.

The audit findings were benchmarked against criteria derived from (i) MSME Act, (ii) scheme guidelines of West Bengal Incentive Scheme 2007 and 2013, (iii) relevant orders and instructions issued by the Directorate as well as (iv) MSME Policy of the State. The scope of audit was to assess implementation of WBIS 2007 and 2013 during the period from 2012-13 to 2016-17.

There was one DIC at each of the 19 District Headquarters. Durgapur and Siliguri also had one Sub-DICs each. Seven¹⁷¹ DICs and Sub-DICs were selected through random sampling for detailed checking between February and June 2017. In addition, irregularities related to implementation of WBIS-2007 & WBIS-2013 of other DICs, which were noticed while conducting transaction audit during 2013-17 were also included in this report.

Audit Findings

As per Operational guidelines of WBIS-2007 & 2013, the entrepreneurs, desirous of availing the incentives, were to apply to the concerned General Manager, District Industrial Centre (DIC) or Officer-in-Charge, Sub-DIC. A flow chart representing the process of granting incentives is depicted as follows:



¹⁷¹ Hooghly, Durgapur and Nadia from Group B, Siliguri, Birbhum from Group C and Bankura and Uttar Dinajpur from Group D

Audit findings related to the implementation of WBIS are discussed in the succeeding paragraphs:

3.2.3 Violation of scheme guidelines/ MSME Policy

Regarding violation of WBIS-2007 & 2013 guidelines as well as non-adhering to the financial limits prescribed by the MSME policy, audit observed the following:

3.2.3.1 Disbursement of incentives to ineligible enterprises

With regard to disbursement of incentives, audit observed the following violations wherein incentives were provided to ineligible enterprises, as discussed below:

a) As per MSME Act, 2006, a small sector enterprise is defined as an enterprise with investment in plant and machinery more than ₹ 25 lakh and less than ₹ five crore. Incentives under WBIS 2007 could be granted only to micro and small-scale enterprises. Scrutiny of the balance sheet of one enterprise¹⁷² under DIC Howrah revealed that cost of plant and machinery of the enterprise exceeded five crore as on March 2012. This made it a medium scale enterprise and thus, ineligible to get any kind of incentive under WBIS 2007. Audit, however, observed that DIC Howrah, released ₹ 0.46 crore during 2012-13 and 2013-14 as incentives towards reimbursement of energy charges in violation of the MSME Act and WBIS guidelines 2007.

In reply, the Department (November 2017) stated that only the value of plant and machinery directly related with production of the enterprise came under the purview of WBIS 2007. The reply was not tenable as the status of the enterprise was changed from “Small” to “Medium” scale industry. Moreover, there was no mention in the WBIS 2007 guidelines regarding consideration of investment only in plant and machinery directly related with production.

b) Para 16.1 of WBIS, 2007 read with Notification¹⁷³ *inter alia* stipulates that small or micro enterprises are eligible for receiving 10 per cent additional subsidy, if the enterprise is wholly owned by women. Audit observed that the DIC Siliguri disbursed (between February 2012 and March 2017) ₹ 4.22 crore to two enterprises¹⁷⁴ as additional subsidy, on the consideration that these enterprises were owned by woman entrepreneurs. However, from the Memorandum and Article of Association submitted by these enterprises, it was revealed that these were owned by male partners who had appointed two female Directors in each enterprise.

¹⁷² ATR Malleable Casting Pvt. Ltd.

¹⁷³ Department of MSSE&T Memo No.589/SS/MSET/C-III/15S-12/2005 dated 17 September 2007

¹⁷⁴ M/s Sensitive Vanijya Pvt Ltd and M/s Maa Amba Infrastructure Pvt. Ltd.

In reply, the Department stated (November 2017) that the enterprises were treated as 100 *per cent* owned by women as two of the Directors of the company were women. The reply was not acceptable as these enterprises were not wholly owned by the female entrepreneurs.

c) The guidelines of WBIS 2007¹⁷⁵ *inter alia* stipulated that an enterprise was eligible for receiving subsidy on installation of Pollution Control devices, subject to a certificate from WBPCB regarding the actual installation. The amount of subsidy was specified to be 50 *per cent* of cost of pollution control device with a ceiling of ₹ 5.00 lakh.

Scrutiny of the records of DICs Siliguri and Uttar Dinajpur revealed that incentives of ₹ 12.91 lakh for installation of Pollution Control devices were disbursed (between March 2013 and March 2017) to three enterprises. However, these were disbursed without obtaining requisite certificates from WBPCB about actual installation of these devices. Hence, the eligibility of the enterprises was not ensured before disbursement. These industries were cement industries/ Husking mills that are highly polluting, as such, lack of pollution control devices would result in environment pollution.

In reply, the Department stated (November 2017) that there was no specific format for certification by WBPCB framed in WBIS 2007. During field enquiry, the inspecting officer of DIC certified those devices. The reply was not tenable as the rules clearly specified that for installation of pollution control devices, the certificate, from West Bengal Pollution Control Board had to be obtained and the ISI/ISO 9000/ISO 14001 certificate would contain all the necessary details¹⁷⁶. As such, the Department should have approached the WBPCB to devise such a format which met their needs, especially since the inspecting officers of the DICs were not experts in the field of pollution control.

3.2.3.2 Payment of incentives to closed enterprises

As per the Scheme document the prime objective of the incentive scheme was to extend fiscal incentives to micro/ small/ medium enterprises to develop the MSME sector and to maximize the utilization of resources. Audit, however, observed that the test checked DICs released incentives to enterprises without ensuring whether those were actually in a running condition.

Audit observed that one enterprise¹⁷⁷ received (December 2014) different kinds of incentives amounting to ₹ 2.67 lakh. A scrutiny of related records in the Directorate of Commercial Taxes revealed that the disbursement was made to the enterprise even after cancellation (June 2014) of its VAT registration.

¹⁷⁵ Para 14.1 read with para 14.3

¹⁷⁶ The name and address of the site/location certified, the scope of certification, certificate number, date of issue, period of validity/date of expiry, name, logo and number of the accreditation body/board.

¹⁷⁷ New life Retreads

In another case, Audit observed that DIC Uttar Dinajpur disbursed (December 2013) different kinds of incentives to one enterprise¹⁷⁸ amounting to ₹ 3.13 lakh even after the enterprise was reported (September 2013) to be closed by the Industrial Development Officer, during his inspection before disbursement of subsidy.

In reply, the Department stated (November 2017) that the agreement executed before disbursement of incentives did not have any clause regarding continuation of operation for five years. As such, there was no deviation from the scheme guidelines. The reply was not tenable as disbursement of incentive to closed enterprises would defeat the purpose of development of MSME sector in the State.

3.2.3.3 Irregular refund of VAT

Scheme guidelines of WBIS 2013 (Clause 7.1 read with Clause 16) stipulate that an enterprise, which is engaged only in manufacturing process, is eligible to get refund of 80 *per cent* of Value Added Tax (VAT), paid for eight years after commencement of commercial production. Scrutiny revealed that DIC, Purba Medinipur disbursed refund of VAT of ₹ 2.37 crore to one enterprise¹⁷⁹ during 2014-15 to 2015-16. Audit observed that the VAT registration certificate submitted by the enterprise was for manufacturing as well as for retailing activity. Thus, disbursement of refund of VAT to the enterprise engaged in retail activity was in violation of the scheme guidelines. The purpose of the incentive scheme was defeated as the prime purpose of the scheme was to encourage manufacturing activity not retailing.

In reply, the Department stated (November 2017) that the refund of VAT was approved on the basis of Payment Verification Report issued by Joint Commissioner, Commercial Taxes (JCCT) which denoted the incumbent enterprise as a manufacturer only. The reply was not tenable as the Payment Verification Report did not mention the enterprise as manufacturer only. Further, the Registration Certificate issued (May 2013) by the JCCT, which was available with DIC, clearly indicated the nature of business as both Manufacturer and Retailer.

3.2.3.4 Payment in excess of the limits prescribed in MSME policy

The MSME policy of the State, which came into effect from April 2013, redefined the eligibility criteria for availing different incentives by enterprises. It fixed the maximum amount allowed to an enterprise on account of different types of incentives. Audit noticed the following instances of excess payment of incentives to various enterprises:

¹⁷⁸ *Pragati Impex*

¹⁷⁹ *M/S Pioneer Polyplast Private Limited*

(a) As per the MSME policy 2013-18 (Clause 6.1), no micro/ small/ medium scale enterprise, except enterprises wholly owned by women, SC/ST and minority community were eligible to get incentives towards capital investment subsidy in Zone-B¹⁸⁰ area after April 2013. Audit, however, observed that 45 enterprises under Hooghly DIC (area under Zone-B) received (between January 2014 and March 2017) capital investment subsidy of ₹ 8.04 crore, even after April 2013. None of these enterprises were wholly owned by women, SC/ST and minority community. Hence, this was in violation of the policy, which provided undue advantage to these enterprises.

(b) As per the MSME policy 2013-18 (Clause 6.1), small-scale enterprises in Zone-C and Zone-D were eligible to get incentives towards capital investment subsidy of 15 and 30 *per cent* respectively. The maximum limit for this incentive was ₹ 50.00 lakh. Audit, however, observed that five¹⁸¹ test checked DICs disbursed (between January 2014 and May 2016) ₹ 9.16 crore to 13 small scale enterprises as capital investment subsidies against the prescribed limit of ₹ 6.50 crore (₹ 50.00 lakh X13). This resulted in excess payment of ₹ 2.66 crore in violation of the policy. Payment of subsidies in excess of the stipulated amount provided unfair advantage to these enterprises and deprived the other deserving enterprises of the benefits of the Scheme.

(c) As per the MSME policy 2013-18 (Clause 6.4), small scale enterprises were eligible for power subsidy, subject to a maximum of ₹ 20 lakh per year for five years. This implied that a particular unit is eligible to receive maximum power subsidy ₹ 1.00 crore over a period of five years. Audit, however, observed that 30 enterprises under six¹⁸² DICs received power subsidy between July 2013 and March 2017, in excess of the limits prescribed in the policy. These enterprises received combined subsidy of ₹ 111.81 crore, resulting in excess payment of ₹ 81.81 crore. This was not only a violation of the policy but also provided undue advantage to these enterprises.

In reply, the Department stated (November 2017) that all the cases were under the purview of WBIS 2007 that did not provide ceiling for approval of incentives. The reply was not tenable as the scheme guidelines should not override the Policy of the State, which had explicitly mentioned the quantum of maximum allowable incentives. It was also against natural justice as the enterprises registered under WBIS 2007 would continue to get the higher and unlimited benefits whereas the enterprises registered under WBIS 2013 will have limited support of the Government.

¹⁸⁰ In Clause 8 of the MSME Policy 2013-18, the state was categorized in different zones on the basis of backwardness for the purpose of grant of incentives.

¹⁸¹ Bankura, Birbhum, Siliguri, Uttar Dinajpur and Durgapur

¹⁸² Siliguri, Durgapur, Hooghly, Birbhum, Uttar Dinajpur and Bankura

3.2.4 Uneven distribution of funds

The objective of the WBIS as well as MSME policy was to focus on development of MSMEs in the backward regions of the State. For the purpose of development of MSMEs through grant of incentives, the State was categorized in four zones (A, B, C and D) on the basis of the industrial development and backwardness. In the WBIS (both schemes) incentives for Zone C and D were to be higher as compared to Zone A and B.

During 2012-13 to 2016-17, Department disbursed ₹ 537.67 crore as incentives to the MSMEs. Audit observed that during 2012-13 to 2016-17 the zone wise distribution of incentives was not even as shown in the **Table 3.4**.

Table 3.4: Zone-wise distribution of incentives during 2012-13 to 2016-17

	Incentives disbursed (₹ in crore)	Percentage (%)
Zone-A	0.84	0.16
Zone-B	256.40	47.69
Zone-C	141.21	26.26
Zone-D	139.22	25.89
Total	537.67	100

(Source: Record of MSME Directorate)

Audit observed that only 26 per cent of the total incentives were allotted to Zone C and D each, while these zones represented the industrially backward regions. Zone B, representing the comparatively more developed industrial region, was allotted with 48 per cent.

Audit further observed that enterprises in only three districts Burdwan, Howrah and Hooghly under group B received ₹ 217.16 crore during 2012-13 to 2016-17, which was 40 per cent of the total disbursement under the incentive scheme.

Thus, the Department mainly concentrated its activity in group B districts, which are comparatively more developed than Group C & D. This pattern of allotment defeated the objective of the scheme to focus on development of MSME sector in backward regions of the State.

In reply, the Department stated (November 2017) that entrepreneurs were free to set up enterprises in the developed areas or backward areas and there was no provision to discourage the entrepreneurs as per the scheme guidelines. The reply was not tenable as the objective of the schemes and MSME Policy 2013-18 was “to encourage entrepreneurs to set up MSMEs with a view to focusing on development of MSMEs in the backward region of the State”.

3.2.5 Monitoring and internal control

The WBIS guidelines did not provide for any monitoring mechanism, either at the Directorate or at DIC level for successful implementation of the scheme. However, the Department/Directorate issued some notifications to be followed

by the General Managers of DICs who were made wholly responsible for implementation of the schemes. Audit observed following lapses regarding monitoring as detailed below:

3.2.5.1 Disbursement of incentives to enterprises registered beyond validity of WBIS 2007

As per Clause 13 of the revised operational guidelines issued in April 2008, Eligibility cum Registration Certificate (ECRC) should be issued within a period not more than 30 days from the date of application.

In this regard, audit observed that 51 enterprises in six DICs were issued (April 2013 and July 2016) ECRC after a delay ranging between 54 days and 1679 days from their respective dates of applications, an analysis of the delay has been mentioned in **Table 3.5**.

Table 3.5: Time analysis of delay in processing of applications

Range of delay	Number of cases
One month to three months	10
Three months to six months	13
Six months to one year	14
One year to two years	9
More than two years	5
Total	51

(Source: Record of the selected DICs)

This indicated lack of monitoring in processing the applications received under the Scheme as against the prescribed time of 30 days. Majority of cases fell in the range of delay by three months to one year.

In reply, the Department stated that as most of the cases were received at the fag end of closure of the scheme, there were deficiencies of documents and it took considerable time span for compliance of the operational procedure and issuance of ECRC. Hence, this should not be treated as violation of scheme guidelines. The reply was not tenable as there were instances of abnormal delays of more than 1500 days against the norm of 30 days. Moreover, none of the reasons given in the reply were found in the concerned records.

3.2.5.2 Delay in allotment of funds for disbursement

As per the Departmental order¹⁸³, the time allowed for release of the funds for incentives from Directorate to DIC was 32 days. Audit scrutiny revealed that in respect of three selected DICs¹⁸⁴, 43 applications involving claims of ₹ 26.48 crore were sent (between August 2015 and October 2016) for allotment of funds to the Directorate. However, no allotment in these cases was received by DICs as of June 2017, nor the proposals were rejected. Audit observed that

¹⁸³ Memo no. 319/1(22)/12/2005 dated 28/04/2008

¹⁸⁴ Birbhum, Durgapur and Siliguri.

the Directorate did not adhere to the timeline of 32 days for disposal of these cases. However, Audit noticed that 13 enterprises received the incentives, though their cases were sent later (between August 2015 and November 2016) to the Directorate. Directorate may consider fixing the responsibility as possibility of such delays being intentional cannot be ruled out.

In reply, the Department stated (November 2017) that generally disbursements are completed in the same financial year. However, the fact remains that, in the said 43 cases, no disbursement has been made till June 2017.

3.2.5.3 Lack of key officials at Block level

Industrial Development Officers (IDOs) posted in the Blocks were the key officials for scrutinizing applications, checking of requisite supporting documents and physical verifications of the enterprises, before disbursement of subsidies. However, Audit observed that there was shortage of IDOs in the selected DICs. The manpower in IDOs cadre had always been short by 33 to 46 *per cent* during the last three years. Lack of key officials affected clearance of the incentive applications.

While accepting the audit observation, the Department stated (November 2017) that filling up of vacancies at the earliest was under active consideration of the Government.

3.2.6 Conclusions

Approvals for grant of incentives to enterprises were given in violation of extant guidelines/policy. Grant of incentives violated the State policy/guidelines. Ineligible enterprises were granted incentives, closed enterprises were allotted incentives, payments were in excess of the limits prescribed in MSME policy. The schemes failed to attain the objectives of encouraging enterprises in the backward regions of the State, as enterprises in the more developed areas were granted higher quantum of incentives.

PUBLIC WORKS (ROADS) DEPARTMENT

3.3 Doubtful expenditure

The execution of 75 mm bituminous macadam course laid in a road improvement project completed in May 2013 at a cost of ₹ 4.60 crore was doubtful as this layer was not found in the investigation done before taking up improvement work of the same road.

Audit scrutiny of the records of the Executive Engineer, Murshidabad Highway Division-I in February 2017 showed that Berhampur- Hariharpara- Amtala road was taken up for improvement twice, in June 2012 and November 2016¹⁸⁵. With regard to these two road improvement works, it was observed in audit that:

¹⁸⁵ *By the Superintending Engineer, State Highway Circle III (SE).*

- The first road improvement work (between the stretch 10.00 kmp to 32.50 kmp) was awarded to a contractor at a tendered cost of ₹ 13.03 crore to be completed in December 2013. The work was completed in May 2013 at a cost of ₹ 13.28 crore. As per the Detailed Project Report (DPR) for this work, the existing pavement structure was of 490 mm which included a 50 mm Bituminous Macadam (BM) layer. The planned road improvement work was taken up with design thickness of 590 mm determined as per Indian Road Congress Guidelines (IRC-37-2001). This addition of 100 mm included laying of 75 mm Bituminous Macadam (BM) course as base course and 25 mm Semi Dense Bituminous Concrete (SDBC) as wearing course. These two items were executed at a cost of ₹ 4.60 crore and ₹ 2.31 crore respectively.
- In November 2016, the Department had taken up the second improvement work (between the stretch 17.00 kmp and 24.00 kmp) at an estimated cost of ₹ 5.46 crore. The work was in progress and the agency was paid ₹ 3.34 crore as of June 2017. Before taking up this improvement work, in order to determine the existing pavement structure at that point of time, an investigation by cutting up of the road edge was conducted by the SE. The investigation report as incorporated in the DPR (November 2016) showed that the existing pavement *inter-alia* included only a layer of 50 mm BM. As such, laying of 75 mm BM in the first improvement work was doubtful because the investigation showed that only 50 mm BM existed as against the 125 mm¹⁸⁶ which should have been there (including 75 mm BM which was claimed to have been laid and for which payments of ₹ 4.60 crore had been made to the contractor by the Department).

In reply, the Department stated (December 2017) that the concerned SE inspected the said road in October 2017 and reported that the second improvement work was in progress and measurement of thickness of Bituminous layer of this stretch (from 17 kmp to 24 kmp) was not possible. However, the thickness of Bituminous layer beyond that stretch *i.e.*, 10 to 17 kmp & 24 to 32 kmp was found to be more than 100 mm. The SE further stated that during the first improvement work the existing 50 mm old bituminous layer was picked up and then 75 mm BM was laid. The reply was, however, not acceptable as picking up of the BM layer was done in only 3.75 kmp out of 22.5 km (covered under first improvement work) in various reaches¹⁸⁷ and the cutting up of the road edge for preparation of DPR of second improvement work was not conducted in these reaches. Hence, the thickness of the BM layer should have been 125 mm.

Thus, an expenditure of ₹ 4.60 crore in the first road improvement work on laying of 75 mm BM layer was doubtful in the light of the investigation report initiated for taking up second improvement project on the same road. The matter needs to be further investigated and responsibility to be fixed.

¹⁸⁶ 50 mm BM as original work plus 75 mm BM in improvement work

¹⁸⁷ 13th, 19th kmp and 1.33 kmp stretch in bridge and culvert portion.

3.4 Wasteful expenditure due to defective designing of road

Lalgharh-Ramgarh Road under Midnapore Highway Division, designed with insufficient crust thickness, was damaged within the design life¹⁸⁸ of the road leading to wasteful expenditure of ₹ 2.89 crore.

According to Indian Roads Congress (IRC¹⁸⁹) guidelines¹⁹⁰, the design of flexible pavements¹⁹¹ involves the interplay of several variables like wheel loads, traffic, climate, terrain and sub-grade conditions. These guidelines¹⁹² also stipulate that with heavy growth of traffic, pavements are required to be designed for heavy loads. This is calculated by carrying out axle load surveys and arriving at Vehicle Damage Factor (VDF)¹⁹³. IRC guidelines¹⁹⁴ have projected indicative VDF to be adopted while designing road pavements.

Scrutiny (June 2016) of records of the Executive Engineer, Midnapore Highway Division –II, Public Works (Roads) Department showed the following:

- Work related to ‘Widening and Strengthening of Lalgharh-Ramgarh Road from 0 to 7 kilometre point (kmp) under Midnapore Highway Division’ was awarded¹⁹⁵ (December 2011) to the L1 vendor, through an open tender. The tendered cost was ₹ 3.77 crore with completion date as June 2012. The work commenced in December 2011 and was completed in June 2013 at a cost of ₹ 3.86 crore, with a design life of 10 years and defect liability period of one year.
- Within two and a half years (*i.e.*, within design life of the road of 10 years) of the completion of Widening and Strengthening work, the entire road surface was damaged with formation of hairline¹⁹⁶ cracks. Some parts of the road had also sunk and formed depressions. This was noted in the report (August 2015) of the Superintending Engineer, South Western Highway Circle, Public Works (Roads) Directorate while proposing to undertake the special repair work.
- On the basis of this report, to prevent further damage to the road and to ensure the smooth plying of vehicles, special repair work on the same stretch was sanctioned (September 2015) by the Department at a tendered cost of

¹⁸⁸ The design life of a road is defined in terms of years arrived at by considering the cumulative number of standard axles (vehicles) that can be carried. On completion of design life strengthening of the pavement is necessary.

¹⁸⁹ The Indian Roads Congress (IRC) is the Apex Body of Highway Engineers in the country. It issues guidelines which are updated annually.

¹⁹⁰ IRC 37-2001

¹⁹¹ Flexible pavement can be defined as the one consisting of bituminous material and stone aggregates placed on a bed of compacted granular material to absorb the intensity of a load when transmitted downwards from the surface.

¹⁹² IRC 37-2001

¹⁹³ Is defined as ‘equivalent number of standard axles per commercial vehicle’

¹⁹⁴ IRC 37:2001

¹⁹⁵ By the Superintending Engineer, State Highway Circle-VI

¹⁹⁶ Fine cracks formed on the bituminous surface (hairline-cracks) due to shrinkage and brittleness of the binder.

₹ 3.22 crore. The same private agency was engaged (December 2015), after due tendering process, with a completion schedule of five months, *i.e.*, by May 2016. The work *inter alia* consisted of picking up of entire bituminous layer laid in the previous work along with laying of Wet Mix Macadam (WMM), 50 mm Bituminous Macadam and 25 mm Semi Dense Bituminous Macadam over the entire road surface. The work was completed in April 2016 and ₹ 3.97 crore was paid (May 2016) to the agency.

Audit observed that, as per traffic census report of the Widening and Strengthening work, the average number of commercial vehicles was 213 and corresponding VDF as per IRC 37-2001 was to be taken as 3.5. However, Audit noticed that the Department erroneously considered VDF to be 1.5 in the project report of the road and accordingly, a crust thickness of 450 mm was designed as against 555 mm, required under IRC 37-2001. Thus, construction of the road with insufficient crust thickness caused damage to the road surface within two and a half years. Defective designing led to wasteful expenditure of ₹ 2.89¹⁹⁷ crore incurred on WMM and bituminous works which were dismantled during the special repair work.

In response to the Audit query issued in June 2016, the Executive Engineer of the Division stated (November 2016) that, as per traffic census report, number of commercial vehicles per day was 161, *i.e.*, nearer to 150; hence the VDF was considered as 1.5. He further stated that repairing of road within the design life of the road was permissible. The reply was not tenable, as in the Detailed Project Report of the original work it was mentioned that the number was 213 and not 161 vehicles. Further, the Executive Engineer's statement about permissibility of undertaking repair work within the design life was incorrect. According to IRC guidelines, laying of BM layer within the design life, along the entire stretch, was tantamount to strengthening of the road (a new work) and not just repair work of an existing road.

The matter was reported (April 2017) to the Department; followed by a reminder (July 2017), reply was awaited till date (February 2018).

3.5 Avoidable expenditure due to non-observance of the IRC guidelines

Superintending Engineer, Western Highway Circle –I, failed to protect the newly laid BM surface with a wearing course which led to avoidable expenditure of ₹ 2.56 crore.

The Indian Roads Congress (IRC) specifications stipulate that the Bituminous Macadam (BM) shall be covered with either the next pavement course or wearing course within a maximum period of 48 hours. In case of any delay, the BM shall be covered by a temporary seal coat to protect the BM layer, before

¹⁹⁷ ₹ 0.89 crore on WMM, ₹ 1.33 crore on BM, ₹ 0.07 crore on prime coat and ₹ 0.61 crore on MSS

allowing any traffic over it. These were also reiterated in the Schedule of Rates (SOR) of Public Works (Roads) Department¹⁹⁸ (2008-09).

Audit scrutinised the records of the Executive Engineer, Burdwan Highway Division-I in February 2017. Records showed that the Superintending Engineer, Western Highway Circle-I awarded (April 2015) a widening and strengthening work¹⁹⁹ to an agency at a cost of ₹ 10.10 crore, for completion by November 2015. The scope of the balance works comprised of laying of wearing course with Semi Dense Bituminous Concrete (SDBC), profile correction with BM, etc. The original work order was rescinded in December 2013 due to poor progress of the work. The balance work was necessitated for ensuring the coverage of the BM layer with a wearing course. Further, no seal coat was applied over the constructed pavement, before allowing any traffic over it. The balance work was completed in February 2016 at a cost of ₹ 11.89 crore.

Audit observed the following:

- The original work was taken up in February 2009 at tendered amount of ₹ 53.49 crore and was stipulated to be completed by February 2011. Though the progress of the work was very poor from the beginning, the Department granted repeated extensions of time to the contractor upto December 2013. The contract was finally rescinded in December 2013, *i.e.*, 32 months after the stipulated date of completion after payment of ₹ 43.64 crore.
- The work of laying the wearing course had to be done in tandem with the laying of the BM over the entire stretch to ensure that the wearing course was in place within 48 hours. However, it was seen that the contractor completed (March 2012) the laying of BM over the entire stretch without in tandem execution of laying the wearing course. Laying of BM and wearing course were inter-related but the payment was released for the BM work without ensuring laying of wearing course. The original work was cancelled in December 2013 and the tender for balance work was invited (NIT) in August 2014, *i.e.*, after lapse of eight months from the date of termination of the original tender. The work order was issued only in April 2015, as such, the BM layers were left exposed for more than three rainy seasons (2012 to 2014), without any protective covering, in contravention to IRC's guidelines.
- Due to delay in executing the surfacing work over the BM layers, sub-grade failure occurred at different stretches of the road due to ingress of rainwater inside the road pavement. As a result, the road became damaged and repair of potholes as well as profile correction items needed to be included in balance work. This resulted in avoidable expenditure of ₹ 2.35 crore in executing these additional components.

¹⁹⁸ Clause 504.5 of IRC specifications for road and bridge works and clause B-10.4.8 of SOR 2008-09, PWRD

¹⁹⁹ 'Balance work of Widening and Strengthening of Saptagram-Tribeni-Kalna-Katwa Road from 33.88 kmp to 83.00 kmp'

- Further, the division also had to execute emergent pothole repair works in 2014-15 on this partly constructed road at a cost of ₹ 0.21 crore. Such repair and maintenance work would not have been required had the wearing course been laid over the BM course immediately, as per the provisions of the IRC/SOR.

Thus, failure of the Superintending Engineer, Western Highway Circle –I, to protect the newly laid BM surface, as required under extant provisions, resulted in damage to the newly constructed road. This led to avoidable expenditure of ₹ 2.56 crore. Responsibility of the SE needs to be fixed apart from recovering cost.

The matter was reported (June 2017) to the Department; followed by reminder (August 2017), reply is awaited till date (February 2018).

3.6 Extra expenditure due to adoption of incorrect specifications

The Department, in violation of Indian Roads Congress (IRC) guidelines, provided for insufficient granular sub-base layer and non-requisite layer of bituminous macadam which led to extra cost of ₹ 2.14 crore and also entailed a design deficiency.

Indian Roads Congress (IRC) guidelines²⁰⁰ for designing roads stipulate that thickness of road should be designed, after taking into account the soil or base on which it is to be built. This is expressed in terms of California Bearing Ratio (CBR²⁰¹). The road design should also take into account the projected traffic volume during the design life of the road (to be determined through traffic census). The traffic volume is expressed as msa²⁰².

Scrutiny of records of the Executive Engineer, Asansol Division, in November 2016 showed that the Superintending Engineer, Western Circle–I²⁰³ awarded (May 2015) the work of ‘Widening and Strengthening of Asansol-Barakar Road’²⁰⁴ to a contractor at a cost of ₹ 48.06 crore. The work was to be completed by December 2016. As of June 2017, the work was in progress and the contractor had been paid ₹ 53.42 crore.

Comparison of the pavement composition of the road (i) as per IRC 37-2012, on the basis of 5 per cent CBR and 34.42 msa and (ii) actual execution is mentioned in the **Table 3.6**.

²⁰⁰ IRC 37-2012.

²⁰¹ California Bearing Ratio is the parameter for evaluation of sub-grade strength of soil.

²⁰² Expressed in million standard axles (msa) and ESAL (Equivalent Standard Axle Load).

²⁰³ Public Works Department (SE, WC-I, PWD)

²⁰⁴ Widening from 455.10 kmp to 461.00 kmp and strengthening from 439.60 kmp to 461.00 kmp (excluding 445.00 kmp to 446.60 kmp, 447.559 kmp to 449.00 kmp, 449.423 kmp to 451.20 kmp) including construction of hard shoulder from 439.60 kmp to 455.10 kmp.

Table 3.6: Pavement composition required vis-à-vis actual execution

Pavement composition	Required as per IRC guidelines	Actual execution	Expenditure as per IRC guidelines	Actual Expenditure	Extra cost
Granular Sub-Base (Gr. V& I)*	150 mm + 150 mm	125 mm + 150 mm	3.76	3.44	(-) 0.32
Wet Mix Macadam*	125 mm + 125 mm	125 mm + 125 mm	3.43	3.43	0
Bituminous Macadam	Nil	50 mm	0	2.46	2.46
Dense Bituminous Macadam*	75 mm + 50 mm	75 mm + 50 mm	22.14	22.14	0
Bituminous Concrete	25 mm	25 mm	1.83	1.83	0
Total			31.16	33.30	2.14

(Source: Record of the Division)

* Two layers of same material with some time gap and/or compaction.

From the table above, audit found that deficient Granular Sub-Base (GSB Grade V) layer was provided, which was 25 mm less than that required under the guidelines. Further, audit noticed that a layer of 50 mm Bituminous Macadam (BM) was executed which was not required as per IRC Guidelines.

The lower layer of GSB forms the separation/filter layer to prevent intrusion of sub-grade soil into the pavement, so any compromise with the specification of this base layer would entail weakening of the road. Despite this, the Department provided for less GSB than required.

Further, for designing of any road pavement having a projected traffic of 5 msa or higher, the guidelines provide for laying of only Dense Bituminous Macadam as binder course. The design traffic of the road was 34.42 msa and the division had already provided for the required layers of DBM, as such laying of 50 mm BM additionally as binder course was not required as per the IRC specifications. No justification was recorded for laying such additional layer of BM. This resulted in an extra expenditure of ₹ 2.14 crore on an item which was not required as per IRC guidelines.

The matter was reported (April 2017) to the Department; followed by reminder (July 2017), reply is awaited till date (February 2018).

3.7 Wasteful expenditure due to defective soil testing

Due to deficiency in soil testing of the sub-grade level, the newly laid Granular Sub Base and Wet Mix Macadam layers of a road had to be removed and re-laid which resulted in wasteful expenditure of ₹ 1.01 crore. Further, in order to keep the value of the work within the sanctioned amount, the Department did not take up the widening and strengthening work on the first seven kilometres.

Indian Roads Congress²⁰⁵ guidelines stipulate that for design of a road pavement, the strength of sub-grade²⁰⁶ soil is to be assessed in terms of the California Bearing Ratio (CBR)²⁰⁷. It also stipulates²⁰⁸ that any unsuitable material occurring in the embankment foundation should be removed and replaced by approved materials, with the required degree of compaction.

Scrutiny of records of Executive Engineer, Birbhum Division, during March 2016, revealed that Superintending Engineer²⁰⁹ (SE, WC-I) awarded (July 2012) a work²¹⁰ to a contractor at a tendered cost of ₹ 11.62 crore for completion by June 2013. The road was to be widened from 5.50 metre to 7.00 metre. The pavement composition of the road was based on IRC: 37-2001 guidelines with the value of CBR arrived at 4 *per cent* (through soil test) as detailed below:

- **Widened portion** –200 mm of Granular Sub-Base (GSB) (Grade –II) and 100 mm GSB (Grade –III) to be provided.
- **Over the existing as well as the widened portion-** 200 mm Wet Mix Macadam (WMM), 50 mm Bituminous Macadam (BM), 50 mm Dense Bituminous Macadam (DBM) and 25 mm Semi Dense Bituminous Concrete (SDBC) to be provided.

During the site inspection by SE (WC-I) while execution of the work of WMM, signs of sub-grade failure were noticed (March 2013) within the stretch ranging between 13.6 kmp and 16 kmp. This caused lateral displacement and depression of the pavement. Consequently, an investigation (Dynamic Cone Penetration Test)²¹¹ was conducted (May 2013) by the concerned Assistant Engineer. This test was meant to measure the strength of sub-grade soil and the profile of sub-surface soil layers of the stretch. As per this investigation report, the value of CBR of the sub-grade soil was only 0.96 *per cent*, which was indicative of poor load bearing capacity of the sub-grade layer. The Department concluded (May 2013) that the sub-grade failure was due to the lateral displacement of plastic soil²¹² layer in between the boulder layer and the newly laid GSB and WMM layers under traffic load.

Consequently, the Department decided (May 2013) to remove the entire layers of newly laid GSB and WMM from the affected zone and provided an additional sand layer of 450 mm, after removing the unsuitable materials (*i.e.*, plastic soil).

²⁰⁵ Para 3.4.3 and 3.4.4 of Guidelines for the Design of flexible pavements of the Indian Road Congress (IRC: 37-2001)

²⁰⁶ Sub-grade is the native material underneath a constructed road. It is also called formation level. The term can also refer to imported material that has been used to build an embankment.

²⁰⁷ California Bearing Ratio is the parameter for evaluation of strength of sub-grade soil

²⁰⁸ Para 305.3.4 of Specifications for Road and Bridge Works (Fourth Revision).

²⁰⁹ Western Circle-I, Public Works Department

²¹⁰ 'Widening and Strengthening of Suri- Sainthia Road (0.00 kmp to 18.00 kmp)

²¹¹ Dynamic Cone Penetration Test (DCP) testing is used to measure the strength of in-situ soil and the thickness and location of subsurface soil layers.

²¹² Soil that can be moulded or deformed by moderate pressure without crumbling.

The Department also decided to treat the soil below the sand layer with lime for stabilisation to increase the value of CBR. Due to change in the scope of the work, the Department decided to limit the scope of work between 7.00 kmp and 18.00 kmp in order to keep the revised cost (₹ 13.34 crore) within the tendered amount. The work was finally completed with the revised scope and specification in January 2014 at a cost of ₹ 10.89 crore.

Audit observed that on the basis of the soil test report, the CBR was considered as four *per cent* at the time of preparation of estimate. Whereas the Dynamic Cone Penetration Test conducted subsequent to the sub-grade failure, revealed presence of plastic soil in sub-grade layer and CBR as 0.96 *per cent*. The mis-match in these two results indicate that the soil test conducted at the time of preparation of estimate was defective owing to which the sub-grade failed. If at the time of preparation of estimate, the test had been carried out correctly, the presence of the plastic soil layer would have been detected and the road pavement would have been designed accordingly.

Thus, the newly laid GSB and WMM layers were to be removed resulting in wasteful expenditure of ₹ 1.01 crore²¹³. Further, the intended objective of increasing the capacity of the district road was also not achieved as the Department restricted the scope of work from 0.0 kmp-18.0 kmp in original to 7.0 kmp -18.0 kmp in the revised work.

The matter was reported (April 2017) to the Department; followed by reminder (July 2017), reply is awaited till date (February 2018).

IRRIGATION & WATERWAYS DEPARTMENT

3.8 Undue advantage to the agencies for allowing excess fuel & lubricant cost

Superintending Engineer, Western Circle-II, Irrigation and Waterways Department provided undue benefit of ₹ 1.02 crore to different agencies on fuel and lubricants cost for disposal of excavated earth in various canal and river re-excavation works.

Three Divisions²¹⁴ under Superintending Engineer, Western Circle-II, Irrigation and Waterways Department (I&WD) had undertaken (between April 2012 and December 2014) 45 tenders for re-excavation works of various canals and rivers at a tendered cost of ₹ 211.41 crore. The works *inter alia* comprised of earthwork excavation by mechanical means, transportation and disposal of excavated material beyond 500 mts and up to 1500 mts by hydraulic tractors, dumpers *etc.* These works were completed (during July 2012 to June 2015) at a cost ₹ 170.20 crore.

²¹³ ₹ 101 lakh (Initial cost of laying of GSB and WMM layer in the distressed stretch + ₹ 4.63 lakh (labour of screening of excavated materials) + ₹ 11.46 lakh (carriage of the excavated materials)-₹ 15.53 lakh (cost of materials re-used)

²¹⁴ Contai Irrigation Division, East Midnapore Irrigation Division and Kaliaghai-Kapaleswari-Baghai Project Division

Audit scrutiny (between September 2015 and December 2016) of the records of the three divisions showed that the agencies were paid ₹ 1.02 crore extra due to inflated item rate for transportation and disposal of excavated material as detailed below:

- The estimates prepared by the Department, based on which tenders were floated and payments made, included allowable rate of transportation and disposal of the excavated material from the site, depending on distance (average 1100 metre).
- The rate was derived considering that a dumper can complete 1.6 trips per hour for the *to and fro* journey for disposal of earth at a distance of 1100 m.
- Audit, however, noticed that in the estimate while deriving the cost of fuel and lubricants required by the dumper, the trips performed by the dumper per hour was considered as 2 instead of 1.6. As such, the requirement of fuel and lubricants would also be more due to increase in the number of trips.

Thus, due to excess provision in the estimate for the cost of fuel and lubricant, the item rate for transportation and disposal of excavated earth was inflated by ₹ 3.00/ m³. Accordingly, payment was made for transportation of 34.11 lakh cum of earth at inflated rate in all the 45 works which resulted in extra payment of ₹ 1.02 crore.

Thus, by allowing inflated rate, the Department had extended undue benefit to the agencies for an amount ₹ 1.02 crore on the cost of fuel and lubricants required for disposal of excavated materials.

In reply, the Department stated (August 2017) that while deriving the transportation cost of excavated earth, when the movement was on pucca road, the number of trips of a dumper for an average *to and fro* journey of 1100 m has been taken as 1.6 trips/hour and fuel consumption of 1 litre/2 km was considered. It further stated that in the instant case (transportation of earth beyond 500 m), the dumper needs to ply on the river bed, slope of embankment, which require frequent use of clutches, brakes *etc*, and the fuel consumption including lubricant was almost 25 *per cent* more than that movement on pucca road. The reply was not acceptable as such higher fuel consumption was not considered for another similar two items. Further, the concerned Chief Engineer (South West Circle of I & WD) also stated (March 2016) that up to 500 m distance the terrain condition was difficult due to presence of embankment and ditches but the area beyond 500 m was almost flat which contradict the observation made by the Department.

AGRICULTURE MARKETING DEPARTMENT

3.9 Unfruitful expenditure on construction of Brace Bridge Farmers' Market

West Bengal State Agriculture Marketing Board, for construction of a farmers' market, entered into a short-term non-renewable lease agreement with Kolkata Port Trust, without assessing its capacity to pay the lease amount. The objective of the project remained unachieved even after expiry of nine years of lease term, which resulted in unfruitful expenditure of ₹ 5.10 crore incurred on lease rent and construction of the market.

Brace Bridge Market, a wholesale/retail market of agriculture produce existed on land belonging to Kolkata Port Trust (KoPT) for more than three decades. The market had grown and expanded in an unplanned manner over the years, causing problems in proper maintenance and drainage. The market also created problems in movement of traffic as some hawkers occupied a portion of Taratala Road at Brace Bridge.

Audit scrutiny of the records of the Chief Executive Officer, West Bengal State Agriculture Marketing Board (Board)²¹⁵ in May 2016, disclosed that the Agriculture Marketing Department (Department) decided (March 2008) to construct a market complex on the land of KoPT. Accordingly, Board entered into (March 2008) a lease agreement for the possession of land measuring 1500 square meter (occupied by the hawkers), with KoPT. This was for 15 years, without any option of further renewal, against the consideration money²¹⁶ of ₹ 5.54 crore to be paid over 15 years. The Board had to pay the consideration money for lease of the land from its own funds. The cost of construction of the market complex had to be funded from the Rashtriya Krishi Vikas Yojana²¹⁷ (RKVY) funds. For this purpose, the Department allotted ₹ 3.52 crore under RKVY during the years 2008-09 and 2010 11.

Audit scrutiny showed that:

- **Construction of Block A:** The Board obtained possession of the land after payment of ₹ 1.14 crore²¹⁸ (March 2008) to KoPT in September 2008. Consequently, the execution of the civil works of market complex comprising two blocks (Block A and B) of three-storied buildings was awarded (September 2009 and January 2011) to two separate contractors. The tendered cost was ₹ 1.49 crore and ₹ 1.72 crore and completion date was July 2010 and January 2012 respectively. For the construction of Block A, Department released

²¹⁵ An autonomous body under the Agriculture Marketing Department

²¹⁶ Total lease rent of ₹ 4.61 crore for fifteen years+ refundable security deposit of ₹ 0.21 crore +non-refundable premium of ₹ 0.72 crore

²¹⁷ A Central Government funded scheme for building rural infrastructure wherein 100% of the funds were to be in the form of grants to the State Government.

²¹⁸ Initial payment of ₹ 1.14 crore (₹ 0.72 crore as premium + ₹ 21.23 lakh as one-year advance annual rent +₹ 21.23 lakh as security deposit) in March 2008

₹ 1.50 crore from the RKVY funds. During the execution of civil work of Block A, the Board decided to increase the scope of work²¹⁹. This led to increase in the cost of that work. The tender for Block A was closed (September 2012) after making payment upto the estimated amount (₹ 1.49 crore) put to tender. Audit observed that cost increased due to change in scope of work resulted in non completion²²⁰ of civil work as envisaged in the tender.

- **Construction of Block B:** The Board, after payment of five instalments of annual lease rent amounting to ₹ 1.24 crore, stopped (September 2013 onwards) payment of rent to KoPT on financial grounds. The Board requested (April 2014) the Department for grant of funds. The Department, however, did not sanction any funds in this regard, hence, the Board also decided to stop the work. Accordingly, the tender of the civil work of Block B was terminated in February 2014 after payment of ₹ 1.23 crore to the contractor.
- Though the civil works of the market complex were almost completed for both the blocks, the same could not be put to use as some ancillary civil works viz., toilet blocks, removal of rubble/unused construction material etc., were still pending. Further, the electrical works were not initiated at all in respect of both the blocks, making the complex inoperative.

Audit observed that, the Board, without assessing its financial capacity, decided (February 2008) to pay consideration money for lease from its own funds. However, after making initial payment (₹1.14 crore) and five instalments of lease rent (₹1.24 crore), the Board, informed (April 2014) the Department that the annual rent fixed by KoPT was quite high and it was not possible for them to make any payment.

Audit also observed that the Board at the time of finalisation of the lease, was fully aware that the rent fixed by KoPT was 3.5 times higher than the prevailing market rate. As the lease was valid for a very short period, that is, 15 years, without the option of renewal, any funds expended on construction on land over which the Board had only temporary possession would be imprudent.

In spite of such high lease rent coupled with unfavourable terms of the lease, the Board decided to take possession of the land in order to utilise the funds from RKVY for construction of the market. This action indicated that, in order to avail funds under RKVY, the Board took the unjustified decision of entering into a short-term lease agreement with KoPT at a very high rate, without assessing its capacity to pay the lease amount from its own funds.

²¹⁹ Construction of one additional floor, kota stone in place of artificial stone in flooring, salballah pilling etc.

²²⁰ Balance work included construction of toilet blocks, outer boundaries, development of compound and some finishing items.

The Department, in July 2017, stated that the matter had been taken up with KoPT to extend the lease period with further agreement. Thus, even after nine years of non-renewable lease tenure of 15 years with KoPT, the market complex was yet to be fully completed and utilised, resulting in unfruitful expenditure of (₹ 5.10 crore²²¹) on the project.

MICRO, SMALL AND MEDIUM ENTERPRISES & TEXTILES DEPARTMENT

3.10 Blockage of funds

Failure of the Department in following General Financial Rules and non-completion of the project of setting up of the Common Facility Centre resulted in blockage of funds of ₹ 4.97 crore.

Government of India (GoI) accorded (October 2010) administrative approval of the project – ‘Setting up of a Common Facility Centre (CFC) in Re-rolling Mills Cluster, Howrah’²²². The cost of the project (₹ 15.56 crore) was to be shared by Government of India (₹ 10.50 crore), State Government (₹ 3.00 crore) and a Special Purpose Vehicle (₹ 2.06 crore) set up for this purpose.

As per scheme guidelines and Detailed Project Report, the project was to be implemented under public-private-partnership mode. For this purpose a Special Purpose Vehicle, namely M/s. HCCI Rolling Mills Cluster Private Limited, Howrah consisting of 25 member industries, was formed (December 2009) by Howrah Chambers of Commerce and Industries (HCCI). The source of funds of SPV was share capital of these 25 member industries.

The manufacturing process of CFC involved melting and re-rolling of steel into bars, rods and other structural sheets. The scope of the project *inter alia* included construction of (i) Machine Shop Facility, (ii) Testing Facility, (iii) Raw Material Processing Facility and (iv) Supply & installation of plant & machinery. Operation, maintenance and monitoring of the CFC was to be carried out by SPV.

At the State level, the project was to be implemented by Directorate of Micro, Small & Medium Enterprises (MSME) under Micro, Small and Medium Enterprises & Textiles Department, Government of West Bengal (GoWB). The CFC was to start functioning within a period of 24 months from the date of actual release of first instalment of GoI grant.

For implementation of the project, GoI released (March 2012 and March 2013) ₹ 6.15 crore, State Government released (March 2011 and February 2012) ₹ 3.00 crore and SPV contributed ₹ 2.06 crore from its own fund.

²²¹ ₹ 2.38 crore on land + ₹ 1.49 and ₹ 1.23 crore on construction of buildings

²²² Under Micro and Small Enterprises- Cluster Development Programme (MSE-CDP), a central Government scheme.

Audit scrutinised the records of the General Manager, District Industries Centre, Howrah (during June 2017) as well as the records of SPV (during August 2017). Audit observed that even after passage of nearly seven years from the approval of the project, the CFC could not be made functional as of August 2017. Following irregularities in implementation of the project were noticed.

(i) Violation of General Financial Rules

The approval issued by GoI had categorically mentioned that all General Financial Rules must be followed in respect of procurement of plants and machinery. General Financial Rules²²³ (GFR) stipulate that payments should be released only after the services have been rendered or supplies made. However, if it becomes necessary to make advance payments, it should not exceed 30 *per cent* of the contract value to private firms. GFR further states that while making any advance payment, adequate safeguards in the form of bank guarantee *etc.*, should be obtained from the firm.

A Purchase Committee headed by the Director, MSME was formed (November 2010) to monitor and ensure that all the purchases were made as per extant rules. Audit observed that GFRs were not followed in the purchase agreement for supply and installation of plants and machinery.

SPV issued (January 2011 and February 2012) work orders of ₹ 6.52 crore²²⁴ to a contractor for supply and installation of plants and machinery within nine months. These machines were to be used in Machine Shop Facility and Raw Material Processing Facility.

As per the terms of the contract, 30 *per cent* of the total purchase value amounting to ₹ 1.96 crore was released (June 2012) in favour of the contractor against a bank guarantee of the same amount. Further, an amount of ₹ 2.38 crore (equivalent to 70 *per cent* of the proforma Invoices of ₹ 3.39 crore) was released (February-September 2013) to the contractor.

Scrutiny revealed that machines worth ₹ 0.88 crore were delivered (June-November 2013) by the contractor against receipt of advance of ₹ 4.34 crore. The contractor failed to supply the remaining plants and machinery worth ₹ 3.46 crore for which advance was paid. As a result, SPV encashed (March 2015) the available bank guarantee of ₹ 1.70 crore²²⁵.

Further, scrutiny revealed that the credentials and past experience of the supplier were not checked before placing the work order to the supplier. It was also observed that the main activity of the supplier was spinning, weaving and finishing of textiles and not related to supply of such machinery.

²²³ Rule 159 (1)

²²⁴ ₹ 4.12 crore for Raw Materials Processing Facility and ₹ 2.40 crore for Machine Shop Facility

²²⁵ After deducting 30 *per cent* value of the material supplied, treating it as partial fulfilment of commitment against the advance {₹ 1.96 crore - ₹ 0.26 crore (30 % of ₹ 0.88 crore) = ₹ 1.70 crore}.

Moreover, one of the Directors of the company, which supplied the machinery, was also one of the Directors of the SPV, which created conflict of interest between contractor and the SPV.

Thus, in violation of GFR, the Department paid 67 per cent of the contract value to the contractor in advance whereas it had secured the bank guarantee equivalent to only 30 per cent of the contract value. This resulted in blockage of GoI fund of ₹ 1.76 crore. Further, the Department also did not initiate any action to recover the amount of ₹ 1.76 crore lying with the contractor.

(ii) Delay in making the CFC fully functional

GoI had approved the project on the condition that CFC should start functioning within a period of 24 months from the date of actual release of first instalment of GoI fund. Audit observed that GoI released the first instalment of ₹ 3.15 crore in March 2012 and the CFC should have started functioning by March 2014.

A joint site inspection by the Audit team alongwith the officers of MSME was carried out in July 2017. It revealed that only iron structure of the Raw Materials



Figure 3.2: Incomplete Raw materials Processing Facility



Figure 3.3: Coreless furnace lying in open field

Processing Facility shed was completed without any roof. Only one coreless furnace (along with its accessories) worth ₹ 1.44 crore was found lying under the incomplete structure, exposed to vagaries of sun and rain since January 2014.

In respect of Testing Facility and Machine Shop Facility, although the civil works were completed, electrical, sanitary & plumbing works remained incomplete as yet (June 2017). However, Machine Shop Facility was being run by SPV partially since February 2016 as 20, out of 28 machines supplied were running. As such, those facilities could not be commenced fully for operation although an expenditure of ₹ 3.21 crore was incurred on construction of buildings and procurement of furnace. Further, scrutiny revealed that the two companies, which were awarded the work of construction of CFC, were related to the same Director of the SPV whose company was involved in supply contract. This again created conflict of interest between contractors and the SPV.

In reply, the Department accepted (November 2017) that there was conflict of interest between the SPV and the Vendors, which was learnt later. It was also accepted that SPV acted contrary to the norms of Micro and Small Enterprises-Cluster Development Programme without cognition of the MSME Directorate.

The reply of the Department about ignorance of SPV's activities, needs to be seen in light of the fact that the Purchase Committee, approved by GoI, was headed by the MSME Director and the onus of necessary compliance of GFR lay with the Department/ Directorate. Department needs to fix the responsibility and take punitive action against the erring officials/agency.

Thus, failure of the Department in following GFR and non-completion of the project (August 2017) resulted in blockage of funds of ₹ 4.97 crore²²⁶.

TRANSPORT DEPARTMENT

3.11 Imprudent decision led to unfruitful expenditure

Hooghly River Bridge Commissioners (HRBC) decided to execute Rajarhat-Madhyamgram road work on intermittent stretches, without ensuring availability of required land. This imprudent decision led to unfruitful expenditure of ₹ 8.76 crore incurred on construction of unusable road including wasteful expenditure of ₹ 1.38 crore due to defective execution.

As per Public Works Department Code (Rule 258), except in case of emergent work such as repair of breaches, *etc.*, no work should be commenced on land which has not been duly made over by the responsible civil officers.

HRBC had taken up (April 2010) construction of a six-lane high speed corridor over a length of five kilometres at a cost of ₹ 39.10 crore. The work was to be completed within 12 months from the date of work order. The objective was to provide direct connectivity between New Town, Kolkata and the National Highway-34 at Madhyamgram. After seven years of commencement of the work, only 800 metres of the road in an intermittent manner had been completed, which hardly served the purpose of facilitating vehicular movement.

Scrutiny of records of Hooghly River Bridge Commissioners (HRBC) in November-December 2016 and joint inspection conducted in November 2016, revealed the following:

- At the time of commencement of work (April 2010), land for only 1.043 km of the projected road length, *i.e.*, one-fifth of the land required, was available with HRBC. The available land was not in contiguous stretch and was ridden with encroachments awaiting rehabilitation and resettlement. As per the availability of land, the scope of the work was restricted to initial one km of the road with only two²²⁷ non-bituminous layers at a cost of ₹ 6.50 crore. Only 800 meters of the road, that too in patches, could be completed at a cost of ₹ 3.78 crore.

²²⁶ ₹ 1.76 crore retained by the vendor without supply of plant and machinery plus ₹ 3.21 crore spent on building and equipment.

²²⁷ Laying of 50 mm sub-grade with silver sand and 250 mm of Granular Sub-Base (GSB) which was not fit for high speed traffic.



Figure 3.4: Encroachments on the land



Figure 3.5: Non-contiguous land

- The contract had to be closed (December 2012) midway as land for linking the constructed patches was not available. As such, the road built was not suitable for plying of vehicles and the expenditure of ₹ 3.78 crore did not serve the purpose.
- HRBC again decided (November 2013) to strengthen²²⁸ the same stretch of initial one kilometre out of which 800 meters was constructed in patches during the previous work. This was stated to be done to facilitate bus movement between the Rajarhat Road end and 91 bus route. HRBC, despite being fully aware of (i) unavailability of required land, (ii) the stretch of 800 meters was not continuous, awarded (January 2014) a contract to the same agency at a cost of ₹ 6.03 crore. The work was to be completed by June 2014.
- This contract also had to be closed (April 2015) midway as encroachment - free land was still not available and also due to non-removal of utility services²²⁹. An expenditure of ₹ 4.98 crore was incurred on the bituminous work on the same 800 metre in intermittent stretches. Once again, this work also did not serve any purpose, as the road still did not meet the objective of providing high-speed road connectivity.
- Further, Indian Road Congress specifications provide that the next bituminous binder course shall be overlaid immediately on granular sub-base (GSB) course. Audit, however, observed that the execution of GSB layer was completed in January 2012 under first tender. This GSB layer was left uncovered for two years and the subsequent bituminous course was overlaid in January 2014 under the second tender. There was no recorded reason for not covering the GSB layer as mandated by Indian Road Congress Guidelines. As the GSB layer remained unprotected for over two years, it was damaged in two rainy seasons (2012 and 2013) due to inundation of water, etc. As such, the payment under the second tender which *inter-alia* included executing GSB work once again at a cost of ₹ 1.38 crore was avoidable. The fact was also accepted (February 2017) by the Chief Project Manager (Works), HRBC.

²²⁸ Repairing of base layers and laying of 250 mm Wet Mix Macadam (WMM), 75 mm Dense Bituminous Macadam (DBM) and 25 mm Bituminous Concrete

²²⁹ Sewer, water and electric lines.

Thus, imprudent decision of HRBC in taking up a road work on intermittent stretches without ensuring availability of required land led to unfruitful expenditure of ₹ 8.76 crore²³⁰ including wasteful expenditure of ₹ 1.38 crore incurred for execution of GSB layer of the road again.

In reply, the Department stated (August 2017) that West Bengal Housing Infrastructure Development Corporation Limited and Housing Department were the nodal authorities for acquiring and demarcating the entire project land. For any encroachment lying within the project land, they would take all efforts to remove the same with the help of Land Acquisition wing under the Land and Land Reforms Department and local authorities. HRBC, being the implementing authority executed the work on the available land only. The reply was not tenable, as HRBC was required to commence the work only after ensuring availability of the entire land as per Public Works Department Code (Rule 258).

3.12 Wasteful expenditure on decorative illumination system of Vidyasagar Setu

Hooghly River Bridge Commissioners (HRBC) released the entire payment to a contractor without ensuring that the installed illumination system was functional. It also did not take any initiative to make the system operational after termination of the contract, which led to wasteful expenditure of ₹ 3.98 crore.

Hooghly River Bridge Commissioners (HRBC), a statutory organization under the Transport Department, Government of West Bengal, was established in 1969 for construction of Vidyasagar Setu. HRBC decided (2009) to replace the existing seventeen-year old sodium vapour lighting system with Decorative Illumination System (DIS) to meet the objectives of providing energy efficient illumination system as well as decorating Vidyasagar Setu. The DIS system, which employed LED²³¹ technology, was to be introduced to reduce the recurring cost of energy bills, attain near-zero maintenance and ensure no light pollution or negative impact on the night sky.

To meet these objectives, HRBC awarded (September 2010) the work of planning, design, supply, installation, testing and commissioning of DIS to a contractor at a tendered cost of ₹ 3.98 crore. The defect liability period prescribed in the contract was three years from the date of commissioning.

Audit scrutiny of the records of office of the Vice Chairman, (HRBC) between January 2017 and April 2017, showed that:

- The completed DIS was taken over in February 2013 with retrospective effect from the date of completion in June 2012. However, the contractor was paid the entire tendered amount of ₹ 3.98 crore by December 2012.

²³⁰ ₹ 3.78 crore in the first tender and ₹ 4.98 crore in the second tender.

²³¹ Light Emitting Diode

- HRBC while terminating the contract, wrote to the Contractor (November 2013) that it failed to run the DIS ever since its completion in June 2012 and despite repeated complaints since April 2013 the DIS was not rectified. However, the same officer had issued a certificate of satisfactory performance of DIS in April 2013.
- Termination of contract at this stage was against the interests of the project as it absolved the contractor of its responsibilities towards the defect liability period. Since the full payment had already been made to the contractor, HRBC could retain only the 50 per cent of the retention money (₹ 9.95 lakh).
- As per contract, if the contractor failed to carry out regular maintenance of the entire illumination system and its allied works during defect liability period, HRBC was entitled to employ any other agency for maintenance and the cost incurred on this was recoverable from the contractor. Audit, however, observed that during defect liability period and even after termination of the contract, HRBC did not engage any other agency to run the DIS although it had the operation manual submitted by the contractor. In reply, HRBC stated (May 2017) that because of requirement of huge amount, no other agency was engaged to run the system.
- Without exploring avenues for running the installed system, HRBC switched back to its older system of illumination of the bridge. To make the older system functional, HRBC had to incur an additional expenditure of ₹ 2.18 crore. This defeated the purpose of DIS to reduce the recurring cost and pollution impact.
- A joint site visit of Audit with Project Manager (Electrical) of HRBC in January 2017 revealed that most of the LED lights, projectors, computers *etc.* were found defunct and lying in condemned condition in the HRBC godown.

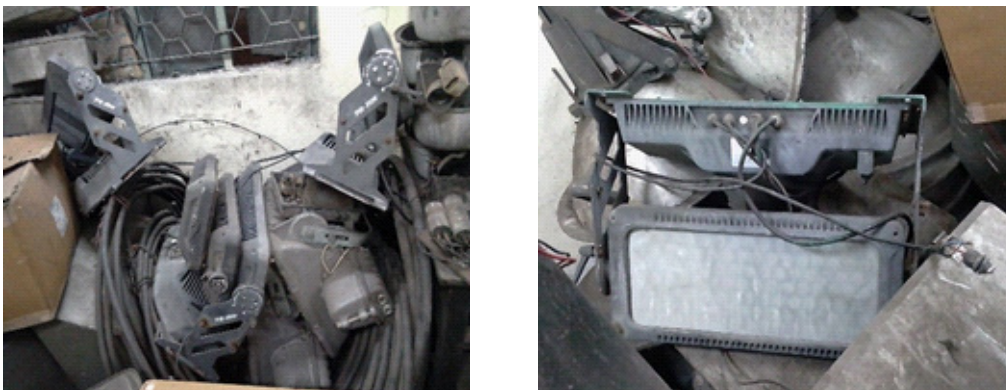



Figure 3.6: LED lights and projectors lying in defunct condition

In reply, the Department stated (September 2017) that the contractor completed the work and the system was working satisfactorily till March 2013 but due to poor maintenance after April 2013, HRBC was bound to terminate the contract. The Department further stated that considering high cost (₹ 2.00 crore) involved to make the system operational, HRBC reverted to the older system of illumination and the DIS was not officially abandoned till date and it was too early to say that the expenditure on DIS was wasteful.

Reply of the Department does not appear to be based on facts as in the letter of termination of contract, HRBC had clearly stated that the system was not working since its completion. Termination of the contract only facilitated the contractor to get relieved of the liability of annual maintenance expenditure of ₹ 47.76 lakh²³² by renouncing the claim over the retention money of ₹ 9.95 lakh only. It also deprived HRBC of taking any legal course against the contractor. Department's argument about the higher cost (₹ 2.00 crore) for making the system operational should be seen in the light of the fact that HRBC spent ₹ 2.12 crore for making the older illumination system functional instead of getting the DIS operational.

Thus, due to imprudent decision of HRBC to release the entire payment without ensuring that the installed illumination system was functional and lack of initiative to make the system operational, after termination of the contract, led to wasteful expenditure of ₹ 3.98 crore. Investigation to fix responsibility on the concerned officials for these grave shortcomings needs to be carried out.



(NAMEETA PRASAD)

Accountant General

(Economic & Revenue Sector Audit)
West Bengal

KOLKATA
The 13 JUNE 2018

Countersigned



(RAJIV MEHRISHI)

Comptroller and Auditor General of India

NEW DELHI
The 15 JUNE 2018

²³² Annual Maintenance Charges for three years' of defect liability period. Calculated at the rate agreed upon in the contract.

Appendices

Appendix-1.1

(Refer paragraph-1.1, Page-1)

Statement of list of Departments

Sl. No.	Name of the Department
1.	Agriculture
2.	Agriculture Marketing
3.	Animal Resources Development
4.	Bio-Technology
5.	Commerce and Industries
6.	Consumer Affairs
7.	Co-operation
8.	Environment
9.	Fisheries, Aqua-culture, Aquatic Resources and Fishing Harbours
10.	Food Processing Industries and Horticulture
11.	Forest
12.	Hill Affairs
13.	Information Technology & Electronics
14.	Irrigation and Waterways
15.	Land and Land Reforms
16.	Micro, Small and Medium Enterprises & Textiles
17.	North Bengal Development
18.	Paschimanchal Unnayan Affairs
19.	Power and Non-Conventional Energy Sources
20.	Public Enterprises and Industrial Reconstruction
21.	Public Works
22.	Science and Technology
23.	Sericulture
24.	Sundarban Affairs
25.	Tourism
26.	Transport
27.	Water Resources Investigation and Development

Appendix – 1.2

(Refer paragraph-1.3, Page-2)

Statement of list of Autonomous Bodies

Sl. No.	Name of the Department	Name of the Autonomous Bodies
1.	Agriculture Marketing	West Bengal State Marketing Board
2.	Animal Resources Development	West Bengal University of Animal and Fishery Science
		West Bengal Veterinary Council
		Paschim Banga Go-Sampad Bikash Sanstha
3.	Environment	East Kolkata Wetland Management Authority
		Institute of Environmental Studies and Wetland Management
		West Bengal Pollution Control Board
		West Bengal Bio-Diversity Board
4.	Forest	Compensatory Afforestation Fund Management and Planning Authority
5.	Hill Affairs	Gorkhaland Territorial Administration including Nurses Training School
6.	Micro Small and Medium Enterprises & Textiles	Food Craft Institute
		West Bengal Khadi and Village Industries Board
		West Bengal State Export Promotion Society
		Modern Mini Tool Room and Training Centre
7.	Power and Non-Conventional Energy Sources	West Bengal Renewable Energy Development Agency
8.	Public Works	Commissioners for the Rabindra Setu
9.	Science and Technology	West Bengal State Council of Science and Technology
10.	Transport	Hooghly River Bridge Commissioners

Appendix – 1.3
(Refer paragraph-1.6.2, Page-3)
Departments who did not submit suo-motu replies with number of
paras/reviews involved

Sl. No.	Name of the Department	Number of paras/reviews involved in reports for the years					
		Upto 1998-99	Upto 2012-13	Upto 2013-14	Upto 2014-15	Upto 2015-16	Total
1.	Agriculture	6	2	1	-	-	9
2.	Agriculture Marketing	-	1	-	-	-	1
3.	Animal Resources Development	-	3	-	-	-	3
4.	Commerce and Industries	-	1	-	-	-	1
5.	Consumer Affairs	-	-	-	2	-	2
6.	Co-operation	-	5	-	-	-	5
7.	Fisheries	-	1	-	1	-	2
8.	Forest	-	3	1	-	-	4
9.	Irrigation and Waterways	27	6	1	-	-	34
10.	Micro, Small and Medium Enterprises & Textiles	-	1	-	-	-	1
11.	Paschimanchal Unnayan Affairs	-	1	-	-	-	1
12.	Public Enterprises and Industrial Reconstruction	-	2	-	-	-	2
13.	Public Works	-	6	1	3	-	10
14.	Public Works (Roads)	-	3	2	1	-	6
15.	Power and Non-Conventional Energy Sources	-	4	-	-	-	4
16.	Transport	-	-	1	2	-	3
17.	Water Resources Investigation and Development	1	1	-	-	-	2
	Total	34	40	7	9	-	90

Appendix – 1.4

(Refer paragraph-1.6.2, Page-3)

Statement showing significant recommendations of PAC against which Action Taken Notes were outstanding from Departments

Year of Audit report with para number	PAC report number and year	Name of the department(s)	Gist of the Audit Para	Recommendations of PAC
4.3.3 of AR 2003-04	48 th PAC Report 2005-06	PWD and PWD (Roads)	Payment of price escalation by the Executive Engineers ignoring contract provision led to inadmissible payment of ₹ 5.47 crore to contractors.	The Department should make due efforts to recover the excess payments on account of price escalation from the contractors as quickly as possible and report to the Committee within six months positively.
4.9 of AR 2000-01 Vol-I	10 th PAC Report 2007-08	Public Works (Roads)	Though initial technical bid of March 1995 was cancelled and fresh technical bid was opened in August 1996, the EE, 24 Parganas Highway Division paid price escalation with reference to March 1995 (base month) resulting in excess payment of ₹ 62.29 lakh to the contractor	The Committee recommended that the department should investigate the matter thoroughly in order to find out the person/persons responsible for excess payment of ₹ 62.29 lakh and recover the same from the contractor
4.3.3 of AR 2002-03	15 th PAC Report 2007-08	Public Works (Roads)	Arbitrary recommendation made by the Chief Engineer, Public Works (Roads) Directorate for acceptance of abnormally higher rates than that quoted by the agency in the work of widening and strengthening of Calcutta-Basanti road at 53 KMP to 86 KMP (length 33 kms) of South 24 Parganas district resulted in undue benefit of ₹ 1.53 crore to the agency	Considering the gravity of the matter, the Committee recommended that the matter be referred without delay to the Vigilance Commissioner for thorough investigation. The Committee also desired that the Commission should be requested to leave no stone unturned to divulge the facts and thereby submit the report within in three months.

Year of Audit report with para number	PAC report number and year	Name of the departments(s)	Gist of the Audit Para	Recommendation of PAC
4.3.1 of AR 2006-07	4 th PAC Report 2012-13	Co-operation	The Co-operation Department incurred an additional expenditure of ₹ 50.68 crore towards payment of undue subsidy for extra financial benefits extended by BENFED to the millers, transporters <i>etc.</i> , against the procurement orders placed on it by F&S department.	The Committee recommended that the Department may take up the matters of field level verification and admissibility of the claims in respect whereof payments have been made to the BENFED as subsidy, with the food and Supplies Department and if any, over payment is detected, necessary steps may be taken for recovery thereof.
3.2.4.1 of AR 2009-10	9 th PAC Report 2013-14	Transport	The Department's failure to include a suitable clause in the agreement to enhance the consideration amount taking into account the annual growth of traffic is inexplicable. The undue favour thus extended to the toll operator resulted in loss of revenue to the extent of ₹ 12.69 crore till March, 2010.	<p>The Committee recommended that an immediate inquiry should be instituted to determine the role played by the Department in respect of the following:</p> <p>(i) Acceptance of tender price as offered by the agency at a price far below the reserve prices fixed by both the RITES Ltd. and Finance Department without putting in place any mechanism to crosscheck the agencies' own assessment of traffic growth for ascertaining the extent of projected annual traffic growth involved in the offer price meant for the entire period of contract before finalizing the Tender.</p> <p>(ii) Modification of NIT Clause in the Tender Document as regards mode of submission of financial offer without protecting the interest of the Government.</p> <p>(iii) Deficiency in the agreement which did not include any suitable clause for periodic revision of consideration amount on the basis of annual traffic growth.</p>

Year of Audit report with para number	PAC report number and year	Name of the departments(s)	Gist of the Audit Para	Recommendation of PAC
3.4.6 of AR 2010-11	10 th PAC Report 2014-15	Food Processing & Industries Horticulture and Commerce & Industries	Failure of the Corporation in ensuring temporary relocation of vendors, and lack of initiative, coordinated effort and ineffective monitoring on implementation of the project coupled with delay in obtaining clearances from the appropriate authorities resulted in idling of expenditure of ₹ 1.84 crore, while expenditure of ₹ 78.37 lakh became infructuous. Besides, the State Government incurred a liability of penal interest of ₹ 1.88 crore. The objective of creation of modern export infrastructure facilities for the flower market was not achieved.	The Committee recommended that the Department should take prompt and appropriate administrative and legal steps to find out the reasons behind the cancellation of the Mallickghat flower Market Project under the ASIDE Scheme by the Government of India and to fix up the responsibilities of the officials/functionaries of the Department, WBSFPDCL and other agencies concerned and take suitable disciplinary as well as penal measures against the defaulters so that such incidents may not recur.

Appendix – 1.5

(Refer paragraph-1.6.3, Page-4)

Statement of department-wise break up of outstanding IRs and Paras

Name of the Department	Number of IRs/Paragraphs pending as of 31 August 2017	
	IRs	Paragraphs
Agriculture	209	630
Agriculture Marketing	33	67
Animal Resources Development	64	148
Bio-Technology	1	7
Commerce & Industries	4	8
Consumer Affairs	6	11
Co-operation	44	111
Environment	4	9
Fisheries, Aqua-culture, Aquatic Resources and Fishing Harbours	38	83
Food Processing Industries & Horticulture	3	6
Forest	13	39
Hill Affairs	7	26
Irrigation and Waterways	56	147
Land and Land Reforms	24	70
Micro and Small Scale Enterprises & Textiles	54	131
North Bengal Development	3	27
Paschimanchal Unnayan Affairs	1	6
Power & Non-conventional Energy Sources	1	3
Public Enterprises and Industrial Reconstruction	10	20
Public Works	98	241
Public Works (Social Sector)	19	35
Public Works (Roads)	40	111
Science & Technology	4	8
Transport	11	50
Water Resources Investigation and Development	57	134
Total	804	2128

Appendix-3.1
(Refer paragraph-3.1.15, Page-51)

Statement showing shortfall in number of tests of Non-Bituminous items during execution of work.

GSB

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
Gradation test	5	7	4	-	2
Atterberg test (PI & LL)	1	-	2	1	35
Deleterious content test	-	-	-	-	40
Moisture content test	1	2	1	2	34
Density of compacted layer test	1	2	4	11	6
CBR test	-	-	-	-	40

WBM

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
AIV test	-	-	3	2	5
Grading test	1	1	5	-	1
CF & E Test	-	2	4	-	7

WMM

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
Gradation	4	14	14	10	2
CF & E test	1	6	7	7	27
Density of compacted layer	1	6	17	19	5
AIV Test	6	4	4	10	18

Appendix-3.2
(Refer paragraph-3.1.16, Page-51)

Statement showing Shortfall in number of tests of Bituminous items during execution of work.

BM

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
AIV Test	4	5	12	11	14
CF & E	3	3	8	12	20
Stripping and coating	-	-	-	-	48
Water absorption	-	-	-	-	45
Grading	4	3	11	4	4
Binder content	3	4	4	8	4
Temperature monitoring	-	-	-	-	29
Density of compacted layer	2	1	6	26	8
Water sensitivity test	-	-	-	-	14

DBM

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
AIV	-	2	2	5	2
CF & E	-	2	1	5	4
Water absorption	-	-	-	-	11
Stripping and coating	-	-	-	-	11
Grading	2	1	-	1	-
Stability and void analysis	-	2	1	2	5
Temperature monitoring	-	-	-	-	8
Density of compacted layer	2	1	4	4	1
Binder content	3	2	1	1	-
Quality of binder test	1	-	-	-	11

SDBC

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
AIV	-	1	1	1	18
CF & E	-	-	1	2	19
Water absorption	-	-	-	-	22
Coating and stripping	-	-	-	-	24
Stability and void analysis	-	-	2	-	22
Grading	1	4	3	1	5
Temperature monitoring	-	-	-	-	20
Binder content test	2	1	3	2	7

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
Density of compacted layer	3	2	2	5	12
Quality of binder test	-	-	-	-	22
Soundness test	-	-	-	-	6
Moisture susceptibility	-	-	-	-	6

BC

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
AIV	-	1	3	3	3
CF & E	-	1	2	3	4
Grading	1	-	2	-	1
Water absorption	-	-	-	-	9
Stripping and coating	-	-	-	-	9
Stability and void analysis	1	2	-	2	3
Temperature monitoring	-	-	-	-	6
Binder content test	-	2	3	1	-
Density of compacted layer	-	2	3	5	1
Quality of binder test	-	-	-	-	9

Mastic Asphalt

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
Stripping value	-	-	-	-	2
Grading	-	-	-	-	1
Temperature monitoring	-	-	-	-	1
Hardness number	-	-	-	-	1
Water sensitivity	-	-	-	-	2
Water absorption	-	-	-	-	1
Soundness test	-	-	-	-	2

MSS & OGPC

Name of the tests	Range of percentage of test not done				
	0-25	25-50	50-75	75-99	100
AIV	-	1	-	2	10
CF & E	-	1	2	2	10
Grading	-	-	4	3	7
Temperature monitoring	-	-	-	-	12
Water absorption test	-	-	-	-	13
Coating and stripping	-	-	-	-	15
Binder content test	1	-	1	6	5

Glossary

Glossary of abbreviations

Abbreviation	Full Form
AE	Assistant Engineer
AIV	Aggregate Impact Value
BBD	Benkelman Beam Deflection
BC	Bituminous Concrete
BHEL	Bharat Heavy Electrical Ltd
BM	Bituminous Macadam
CBR	California Bearing Ratio
CE	Chief Engineer
CEGESS	Centre of Excellence of Green Energy and Sensor System
CFC	Common Facility Centre
CF&E	Combined Flakiness and Elongation
CTO	Consent to Operate
DBM	Dense Bituminous Macadam
DIC	District Industries Centre
DIS	Decorative Illumination System
DISCOM	Distribution Company
DPR	Detailed Project Report
ECRC	Eligibility Cum Registration Certificate
EE	Executive Engineer
FYP	Five Year Plan
GEF	Green Energy Fund
GFR	General Financial Rules
GHG	Green House Gas
GoI	Government of India
GoWB	Government of West Bengal
GSB	Granular Sub-Base
HCCI	Howrah Chambers of Commerce and Industries
HPM	Highway Project Monitor
HRBC	Hooghly River Bridge Commissioners
IDO	Industrial Development Officer
IPDS	Integrated Power Development Scheme
IRC	Indian Roads Congress
JCCT	Joint Commissioner, Commercial Taxes
KoPT	Kolkata Port Trust
LA	Land Acquisition
LED	Light Emitting Diode
MAD	Municipal Affairs Department
MERC	Maharashtra Electricity Regulatory Commission
MDRs	Major District Roads
MNRE	Ministry of New & Renewable Energy

Abbreviation	Full Form
MoEF&CC	Ministry of Environment, Forest and Climate Change
MORTH	Ministry of Road Transport and Highways
MoU	Memorandum of Understanding
MSA	Millions of Standard Axles
MSME	Micro, Small and Medium Enterprises
MSS	Mix Seal Surfacing
NAPCC	National Action Plan for Climate Change
NES	Non-Conventional Energy Sources
NIT	Notice Inviting Tender
NKDA	Newtown Kolkata Development Authority
NOC	No Objection Certificate
ODRs	Other District Roads
OGPC	Open Graded Premix Carpet
OMC	Optimum Moisture Content
PFC	Power Finance Corporation
PPP	Public Private Partnership
PV	Photo Voltaic
PWRD	Public Works Roads Directorate
QC	Quality Control
RBRI	Road and Building Research Institute
R&D	Research and Development
RE	Renewable Energy
REC	Renewable Energy Certificate
RKVY	Rashtriya Krishi Vikas Yojana
RPO	Renewable Purchase Obligation
RSPV	Rooftop Solar Photo Voltaic
RVE	Remote Village Electrification
SAE	Sub-Assistant Engineer
SAPCC	State Action Plans on Climate Change
SC	Supervision Consultant
SDBC	Semi Dense Bituminous Concrete
SDGs	Sustainable Development Goals
SEs	Superintending Engineers
SHs	State Highways
SOR	Schedule of Rates
SPV	Solar Photo Voltaic
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
VDF	Vehicle Damage Factor
VRs	Village Roads

Abbreviation	Full Form
WBECBC	West Bengal Energy Conservation Building Code
WBERC	West Bengal Electricity Regulatory Commission
WBGEDCL	West Bengal Green Energy Development Corporation Limited
WBIS	West Bengal Incentive Scheme
WBM	Water Bound Macadam
WBHIDCO	West Bengal Housing Infrastructure Development Corporation
WBPCB	West Bengal Pollution Control Board
WBPDCCL	West Bengal Power Development Corporation Limited
WBREDA	West Bengal Renewable Energy Development Agency
WBSEDCL	West Bengal State Electricity Distribution Company Limited
WBSLDC	West Bengal State Load Dispatch Centre
WBSSIS	West Bengal State Support for Industrial Schem
WBTR	West Bengal Treasury Rules
WMM	Wet Mix Macadam
W&S	Widening and strengthening

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