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) zones[81] consisting of eight Circle offices[82] under these zones. Under these eight Circle offices, there were 28 Divisional offices[83] 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

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[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 Institute[84] (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 projects[85] in 12 divisions[86] selected through random sampling with representation of all three geographic zones[87] of the State. Total 71 works[88] 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.

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[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).*

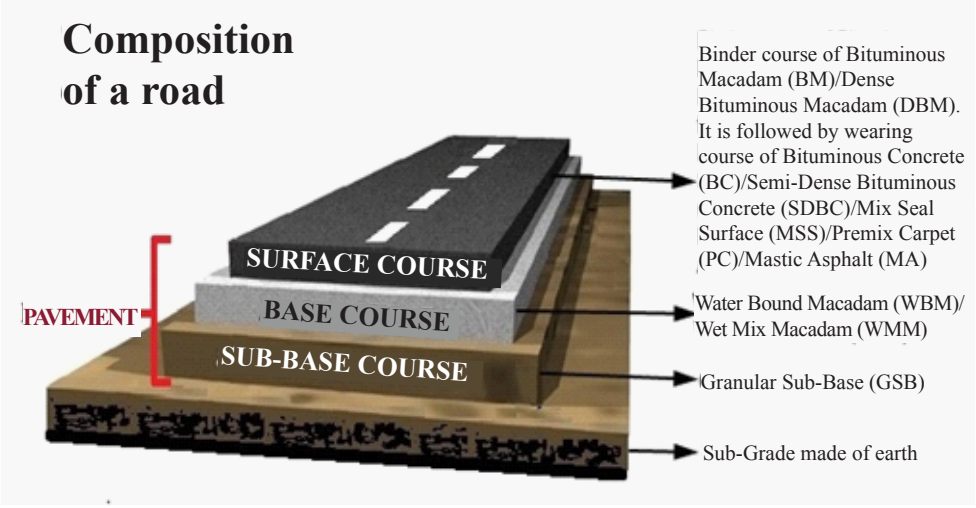
[86] *Purulia Highway (HW), Murshidabad HW– I , Coochbehar HW, Asansol HW, Bankura HW, Medinipur HW Division – I , Uttar Dinajpur HW, Malda HW, Nadia HW Division– 1, Howrah HW, Dakshin Dinajpur HW and Tamluk HW Division*

[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 Estimates[89] of works. As per the IRC guidelines[90] 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 guidelines[91], even for improving existing roads, survey is required to be done to remove inherent deficiencies with respect to plan and profile[92].

Audit noticed that out of the 50 selected projects[93] 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 road[94] under Howrah Highway Division, drainage layer[95] 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 guidelines[96], the topographical survey data was to be collected by the Departmental staff/private agency[97]. This data was to be checked for correctness by in-house staff not connected with the project/third party consultant[98] for an independent appraisal.

Audit observed that in nine W&S works[99] valued at ₹ 204.20 crore, though topographical surveys were conducted, survey data was not checked in

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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 works[100]. In remaining six works[101] 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 guidelines[102] 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 pavements[104] 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 work[105] 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)

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[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 siteshnagarghat 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 work[107] 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 Guidelines[108], 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 guidelines[109] 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 Tamluk 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 guidelines[110], for pavement construction for urban and rural roads, traffic census data is utilised for designing of pavements. The traffic census[111] 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 year[112];

(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 cansus 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 (MSA[114]) 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 work[115] 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] *Strenthening of Sagardighi-Muniagram-Gankar-Raghunathgunj Road 4 kmp to 5 kmp and 13 kmp to 17.8 kmp*

3.1.8.3 Departmental SOR 2008-09[116] 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 works[117] 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 guidelines[118] 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 works[119] 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.

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[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 guidelines[120] 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 works[121] 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 guidelines[122] and Departmental SORs, Divisions are required to perform quality checks[123] of the earth prior to the execution of the earthwork[124]. 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 work[125] valued at ₹ 51.63 crore was involved. Out of these, in 26 works[126] (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 m^3 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 Dhuliyan – 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 SORs[127] various tests[128] 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-57-2000[129], 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 items[130]. 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 traffic[131].

Departmental SORs stipulated various tests like Aggregate Impact Value (AIV), Combined Flakiness and Elongation (CF&E), Gradation[132], Water Absorption

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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 & Striping[133], Quality of Bitumen, Mix Design[134], Stability & Void Analysis[135] *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 items[136] 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 items[137].

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						
		AIV	F & E	Water absorption test	Coating & stripping	Quality of binder test	Stability and void analysis	Tests done (%)
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.

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[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 test[138], Density test[139] *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

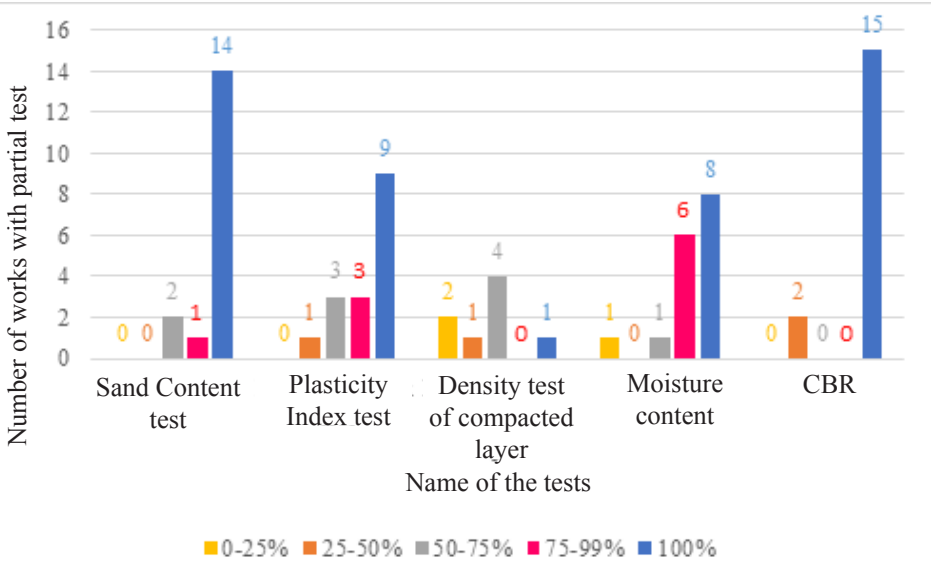
- No quality control tests were conducted during the execution of 22 works valued at ₹ 12.99 crore.

- 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 SORs[140] 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 tests[141] 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 done[142] 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 Asphalt[143] 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 tests[144] 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 investigation[145] report (September 2014) in respect of one W&S[146] 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

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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 work[147] 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 works[148] 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 work[149] 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 laboratories[150]. As per IRC specifications[151], the Department should have laboratories at central, regional (circle) and divisional levels. In this context, Audit observed the following:

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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 to28 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 Sagardhighi-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 specifications[152], 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 sites[153], 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*

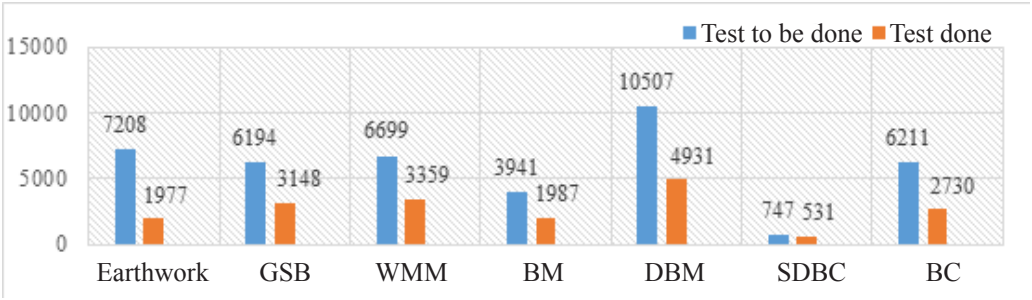
[153] *Widening & Strengthening of Temna-Hesla-Aarsha Road 11.00 kmp to 26.40 Kmp of Purulia Division and Improvement of Bindole- bhatole Road 0 kmp to 9.3 kmp of Uttar Dinajpur Highway division*

[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 three[156] works for which ₹ 2.86 crore was paid as supervisory charge, no such records were found in the Divisions[157].

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 Roads[158] 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.

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156 *Strengthening of Bengal to Bengal road 50 Km, W&S of Ranihati-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 works[159], 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 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 runways[160], 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 guidelines[161] 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.

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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 guidelines[162], 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 guidelines[163], 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 guidelines[164], 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.

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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 agreement[165], 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 guidelines[166], "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 guidelines[167], 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.

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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 categories[170], 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

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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. Seven[171] 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:

- Enterprise applies to GM, DIC for "Eligibility Cum Registration Certificate" (ECRC)
- Scrutiny of application and physical verification done by DIC regarding rejection/approval and issue the ECRC
- Eligible enterprise will submit requisite documents to qualify for the incentive
- If the incentive is approved, GM, DIC will place a requisition for funds to the Director, MSME
- On receiving the funds, it will be disbursed by the DIC to the enterprise

[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 enterprise[172] 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 Notification[173] *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 enterprises[174] 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.

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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 2007[175] *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 details[176]. 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 enterprise[177] 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.

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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 enterprise[178] 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 enterprise[179] 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:

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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-B[180] 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 five[181] 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 six[182] 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, Elegibility 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 order[183], 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 DICs[184], 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 2016[185]. 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 mm[186] 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 reaches[187] 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.

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[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

Lalgarh-Ramgarh Road under Midnapore Highway Division, designed with insufficient crust thickness, was damaged within the design life[188] of the road leading to wasteful expenditure of ₹ 2.89 crore.

According to Indian Roads Congress (IRC[189]) guidelines[190], the design of flexible pavements[191] involves the interplay of several variables like wheel loads, traffic, climate, terrain and sub-grade conditions. These guidelines[192] 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 guidelines[194] 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 awarded[195] (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 hairline[196] 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

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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 ₹ 2.89[197] 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 ₹ 0.61crore on MSS*

allowing any traffic over it. These were also reiterated in the Schedule of Rates (SOR) of Public Works (Roads) Department[198] (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 work[199] 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.

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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) guidelines[200] 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 (CBR[201]). 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 msa[202].

Scrutiny of records of the Executive Engineer, Asansol Division, in November 2016 showed that the Superintending Engineer, Western Circle–I[203] 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-á-vis actual execution

Pavement composition	Required as per IRC guidelines	Actual execution	Expenditure as per IRC guidelines	Actual Expenditure	Extra cost
			₹ *in crore*		
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 Congress[205] guidelines stipulate that for design of a road pavement, the strength of sub-grade[206] soil is to be assessed in terms of the California Bearing Ratio (CBR)[207]. It also stipulates[208] 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 Engineer[209] (SE, WC-I) awarded (July 2012) a work[210] 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 soil[212] 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).

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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 crore[213]. 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 Divisions[214] 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/ m^3. 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 money[216] 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 Yojana[217] (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 crore[218] (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 work[219]. 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 completion[220] 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.

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[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 crore[221]) 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.

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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 Rules[223] (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 crore[224] 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 crore[225].

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.

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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 crore[226].

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 two[227] 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.

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[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 strengthen[228] 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 services[229]. 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.

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[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 crore[230] 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 LED[231] 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.

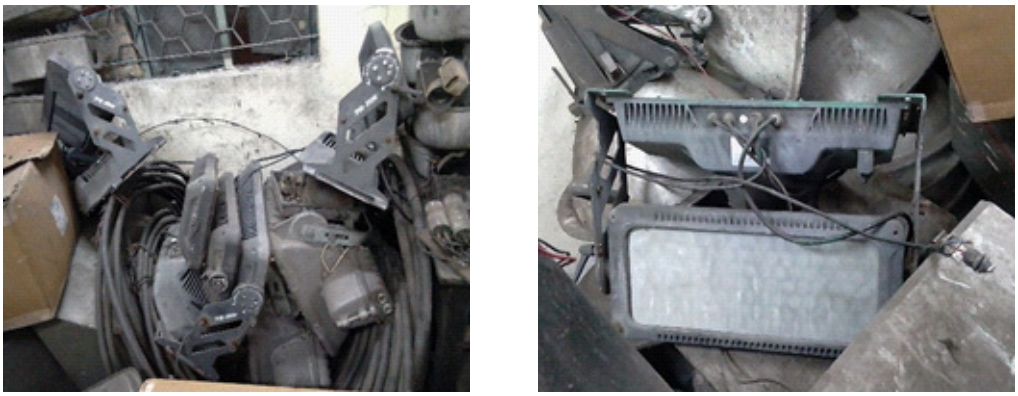

Figure 3.6: LED lights and projectors lying in defunct condition

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 lakh[232] 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.*