

## **CHAPTER – II (*Economic Sector*)**

### **PERFORMANCE AUDIT**

#### **2.1 CONSTRUCTION AND MAINTENANCE OF BRIDGES IN MAHARASHTRA BY PUBLIC WORKS DEPARTMENT AND MAHARASHTRA STATE ROAD DEVELOPMENT CORPORATION**

## CHAPTER II

### PERFORMANCE AUDIT

#### PUBLIC WORKS DEPARTMENT

##### 2.1 Construction and Maintenance of Bridges in Maharashtra by Public Works Department and Maharashtra State Road Development Corporation

###### *Executive Summary*

State of Maharashtra has constructed large number of bridges on various roads and the pace of construction was intensive particularly in the last two to three decades. The Public Works Department and Maharashtra State Road Development Corporation under Government of Maharashtra are responsible for the construction and maintenance of bridges in the State of Maharashtra.

A performance audit on 'Construction and Maintenance of Bridges in Maharashtra by the Public Works Department and Maharashtra State Road Development Corporation' for the period 2014-15 to 2018-19 revealed that Road Development Plan 2001-2021 was approved in April 2012. The bridges constructed during 2014-19 had no co-relation with it. Works were lying incomplete for many years resulting in blockage of funds besides non-achievement of connectivity.

There was absence of financial planning at the apex level of the department and the allotment and expenditure incurred were not related to the actual requirement. Short release of funds left many works untackled which required urgent repairs.

Vital records viz. bridge register, masonry register were not maintained. Shortfall in prescribed inspections of bridges was also noticed which may lead to non-detection of unsafe bridges putting life of commuters at risk.

###### 2.1.1 Introduction

All weather transport network is very important for overall social and economic development of any nation as well as state. The development of any region is not possible without adequate road infrastructure. Bridge is a vital element in connectivity of road network. State of Maharashtra has constructed large number of bridges on various roads and the pace of construction was intensive particularly in the last two to three decades. Maintenance of health of bridge deserves high priority for its life and reliability. Lack of proper and timely maintenance leads to structural deterioration which may culminate into collapse of bridge and loss of life.

The Public Works Department (department) and Maharashtra State Road Development Corporation (corporation) under Government of Maharashtra (Government) are responsible for the construction and maintenance of bridges in the State of Maharashtra. State Government under Road Development Plan 2001-2021 formulated vision document (April 2012) with a target of increasing existing (April 2012) road length of 2,41,712 km to 3,36,994 km by

2021. As of March 2018<sup>1</sup>, there were 18,279 bridges constructed and maintained by department and five<sup>2</sup> projects with flyovers/bridges were constructed and maintained by corporation.

### 2.1.2 Organisational Set up

Public Works Department is headed by Additional Chief Secretary and functions are controlled by Secretary (Roads) and Secretary (Works). Secretary (Roads) controls the overall works of roads and bridges. The implementation of various works of roads and bridges in Public Works Regions is carried out under the technical control of seven<sup>3</sup> Chief Engineers (CEs). The CEs are assisted by Superintending Engineers (SE) at circle level and Executive Engineers (EEs) at division level under the control of SEs. The divisions are responsible for construction, repairs and maintenance of roads and bridges.

MSRDC was incorporated (August 1996) under Companies Act 1956, with the main objective to implement road infrastructure projects through Public Private Partnership and to arrange funds for the project. The management is vested with the Board of Directors (seven) comprising Chairperson and Co-Chairperson appointed by the State Government. The organisational set up of department and corporation is detailed in *Appendix 2.1*.

### 2.1.3 Financing Pattern

The sources of fund for construction and maintenance of bridges are (i) State Budget, (ii) loans from National Bank for Agriculture and Rural Development, (iii) grants-in-aid from Central Road Fund, (iv) loans from Housing and Urban Development Corporation Limited, (v) deposit works of other departments and (vi) borrowings from open market.

The overall financial position (construction and maintenance/repairs) in respect of roads and bridges in department for the period from 2014-15 to 2018-19 is depicted in **Table 2.1.1**.

**Table 2.1.1: Details of funds available and expenditure incurred**

(₹ in crore)

Year	Available funds	Expenditure incurred
2014-15	4,023.71	3,708.91
2015-16	4,856.19	4,512.04
2016-17	4,524.07	4,369.52
2017-18	6,862.10	4,983.55
2018-19	8,092.63	7,965.20
<b>Total</b>	<b>28,358.70</b>	<b>25,539.22</b>

Source: Information furnished by Department

In case of corporation, no grant in respect of road and bridge works was received from the State Government for the period from 2014-15 to 2018-19. The financial position of corporation in respect of construction and

<sup>1</sup> The information of total number of bridge as of March 2019 was awaited (February 2020) from Department

<sup>2</sup> Mumbai flyover, Rajiv Gandhi Sea Link Project, Mumbai Pune Expressway Limited., Satara Kagal NH4 and Thane Ghodbunder Project

<sup>3</sup> Amravati, Aurangabad, Konkan, Mumbai, Nagpur, Nasik and Pune

maintenance of bridges for the period from 2014-15 to 2018-19 was called for; the same is awaited.

#### 2.1.4 Scope, Methodology and Audit Sampling

In order to have a regional representation, two circles from each region<sup>4</sup> and one district from each selected circle were selected for detailed scrutiny by ‘Random Sample Selection’ method. From the total available list of major and minor bridges in selected districts, a sample selection of 25 per cent of major and 10 per cent of minor bridges<sup>5</sup> was made on judgmental basis.

The test check of records was carried out at Mantralaya and in six<sup>6</sup> regional, 12 circle and 30 divisional offices as shown in *Appendix 2.2*.

In the corporation, one ongoing construction work and two maintenance works of bridges were selected for scrutiny on judgmental basis.

Out of 4984 bridges in 30 divisions, detailed scrutiny was done between June 2019 and December 2019 of records of 674<sup>7</sup> bridges constructed and maintained during 2014-15 to 2018-19 by department and corporation.

Entry conference with the department was held on 31 May 2019. Audit findings were communicated to Government in February 2020 for their comments, however, response was awaited (June 2020).

#### 2.1.5 Audit Objectives

The performance audit was conducted to derive an assurance that:

- construction and maintenance activities of bridges in Maharashtra were carried out efficiently and effectively with due consideration to economy; and
- an effective monitoring and internal control mechanism was in place during construction of bridges and further to safeguard the assets thus created.

<sup>4</sup> Out of seven regions of PWD, there was no work of construction and maintenance of bridge in Mumbai region

<sup>5</sup> Minor bridge-with length between the abutments faces less than 30 metre but more than six metre;

Major bridge-with length between the abutments faces 30 metre or more but less than 250 metre; and

Long bridge-with length between the abutment faces of 250 metre or more

<sup>6</sup> Amravati, Aurangabad, Konkan, Nagpur, Nashik and Pune

<sup>7</sup> 672 bridges maintained by PWD and two bridges maintained by MSRDC

## 2.1.6 Audit Criteria

Audit findings are based on criteria derived from

- Maharashtra Public Works Manual (Sixth edition 1984)(MPWM)
- Maharashtra Public Works Account Code (Reprint 1990)(MPWA Code)
- Indian Road Congress (IRC) specifications issued by Ministry of Road Transport and Highways (MoRTH)
- Guidelines for Bridges issued under Central Road Fund (CRF)
- Resolutions and orders issued by Government for construction and maintenance of bridges and contract records.
- Annual Accounts of the MSRDC and Statutory Auditors Reports of the Review period
- Minutes of Board meetings, Agenda for the respective years.

## Audit Findings

### 2.1.7 Planning

#### ➤ Planning for Construction of New Bridges

##### 2.1.7.1 Delay in approval of Road Development Plan and absence of planning for its implementation

Government of India (GOI) published (2001) Road Development Plan Vision: 2021 and recommended parallel action by the states. Accordingly, taking into consideration the recommendations of IRC, the Government initiated the preparation of Road Development Plan (RDP) for the period 2001-2021 for construction and maintenance of roads and bridges in the state. However, the said RDP was finalised and approved in April 2012 for implementation from May 2012. In RDP 2001-2021, Government targeted the construction of 801 major bridges, 23,426 minor bridges and widening of 1,492 bridges.

The department did not submit any specific reasons for the abnormal delay in preparation and approval of the RDP 2001-2021.

In selected 12 circle offices, seven<sup>8</sup> circles submitted that no target was set by department/region/circle level authorities for construction/widening of bridges in relation to RDP 2001-2021. In remaining five<sup>9</sup> circles, though targets for construction of new bridges and widening of existing bridges were fixed, it could not be ascertained from the records that those works were identified as per the requirement of RDP, as no records are available either at department or at circle level.

Further, for effective implementation of the RDP, it was necessary to prepare periodic action plan and give specific target to the executing authorities at various levels. On enquiry, the department stated (January 2020) that the

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<sup>8</sup> Amravati, Akola, Aurangabad, Kolhapur, Nanded, Nashik and Ratnagiri

<sup>9</sup> Chandrapur, Dhule, Gadchiroli, Satara and Thane

district-wise or region/circle/division wise information regarding target assigned as per the RDP cannot be given as it pertains to the year 2001 and not available due to dislocation of files at the time of Mantralaya fire of June 2012.

The reply was not acceptable because the base data for preparation of RDP was of 2010 and hence was relevant for drawing up targeted plans for implementation in the field.

### **2.1.7.2 Inadequate planning in construction of individual bridge**

As per paragraph 141 of Maharashtra Public Works Manual (MPWM), the estimates should state in clear terms the object to be gained by the execution of the work estimated for, and explain any peculiarities which require elucidation, including where necessary the reasons for the adoption of the estimated project or design in preference to others. Necessary drawings showing the proposals should accompany the “estimate” and should be in sufficient detail to enable the entries in the estimates to be followed. It is further enumerated that estimate should always be prepared in sufficient detail to ensure that the responsible officer has given proper consideration to the requirements of the work, and is in possession of as much information as is possible.

Further paragraph 141(13) of MPWM states that while framing the plans and estimates, it should be ensured that the topography and other aspects of the site are also taken into account and that a mention to that effect be made in the general description of the estimate.

Paragraph 255 of the MPWM prescribes that no work shall be begun, except under special orders of the Government, unless a properly detailed design and estimate have been sanctioned.

The details of construction of major, minor and rail over bridges (RoB) during 2014-15 to 2018-19 in the entire state and in selected circles were requisitioned but not furnished to Audit. Macro level data was not being maintained in the department.

The deficiencies observed in planning in respect of construction of selected sample of 674<sup>10</sup> bridges resulting in non-completion, excess expenditure as well as non-achievement of intended objectives of smooth road connectivity to the commuters are enumerated below:

#### **(i) Non-implementation of National Programme of Connectivity for remote villages**

The Government directed (February 2018) department to construct immediately 100 Bailey bridges<sup>11</sup> for connectivity to 209 remote villages in naxal affected Gadchiroli district under National programme. The bridges were to be completed before May 2019. The Government directed (April 2018) Nagpur region to submit a project report immediately. Accordingly, Gadchiroli circle invited (May 2018) a firm (a MINI RATNA Public Sector Undertaking under Ministry of Defence) which had vast

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<sup>10</sup> Major including RoB and long bridges-257 and Minor bridges-417

<sup>11</sup> A bridge made of pre-fabricated panels that can be rapidly assembled

experience<sup>12</sup> of construction of more than 5300 Bailey bridges, for presentation and thereafter submitted (July 2018) proposal to Government for construction of Bailey bridges with specification of 4.25 metre in width. A draft Memorandum of Understanding (MoU) with the firm was prepared (August 2018) by Gadchiroli circle for manufacturing and erection of 100 Bailey bridges of above said specification with stipulated period of completion of three calendar months. The Government also provided (November 2018) funds of ₹ 2.88 crore in Supplementary Statement of Expenditure 2018-19 for seven bridges. However, it was observed that though the firm was ready to supply bridges as per specification within the delivery schedule, the department changed (March 2019) the width of Bailey bridge to 5.30 metre and invited global tenders for construction of seven quick launch bridges.

Audit observed (August 2019) that the department neither executed MoU with the firm nor finalised any other agency for the above work till date. The department stated (January 2020) that tenders for five bridges were finalised and two were under finalisation.

On being asked (August 2019) the reasons for change in width of bridge, department did not submit any reply and further stated that only seven bridges were approved in 2018-19 budget and would be completed by December 2019.

However, till date not even a single Bailey bridge was constructed against the target given for construction of 100 Bailey Bridges by May 2019. This shows lack of planning in prioritization of work in spite of specific directives and resulted in non-implementation of National programme. Further, 209 remotely located naxal affected villages of Gadchiroli district continue to be isolated.

**(ii) Non-acquisition of forest land resulted in construction of bridge remaining incomplete**

Paragraph 251 of MPWM stipulates that no work should commence on land which has not been duly handed over by the responsible civil officer and in case tender for work is accepted prior to acquisition of the land required for the work then the time which should be allowed for the acquisition of the land should be ascertained from the concerned authority before issuing the work orders.

The Forest department accorded (August 2007) in principle approval to allotment of required forest land admeasuring 4.79 hectare on the condition of obtaining final clearance from Ministry of Environment & Forests (MoEF) for conversion of forest land into revenue land. Accordingly, the work of construction of major bridge<sup>13</sup> across river Udai and across Bodhi nalla was administratively approved (June 2012) by the Government for ₹ 23.50 crore for establishing connectivity of a tribal village Bilgaon with Savaryadigar. Pending final approval from MoEF, the Public Works (PW) Division, Shahada awarded (November 2013) the work for ₹ 20.51 crore to a contractor with a stipulated period of completion of 18 months.

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<sup>12</sup> For Indian Army, Border Roads Organisation *etc.* and Government of Orissa, Chhattisgarh and Uttarakhand also executed MoU with M/s GRSE for construction of Bailey bridges

<sup>13</sup> on Bilgaon Savaryadigar road, taluka Dhadgaon, district Nandurbar

Scrutiny revealed that the division made the payment of ₹ 5.27 crore to the contractor in respect of work executed up to March 2015. In March 2015 the Forest division, Shahada directed that work be stopped as required final approval from MoEF was not obtained. Thereafter, the division made penal compensatory afforestation payment of ₹ 47.56 lakh to CAMPA<sup>14</sup> in July 2017. The office of the Principal Conservator of Forest, Dhule allowed (July 2017) the PW division to restart the work in forest area.

Audit further observed that PW Region, Nashik granted extension for completion of work up to March 2020 and submitted (July 2018) a proposal to the Government for grant of revised administrative approval (RAA) for ₹ 31.85 crore, as the cost of work increased. The sanction to RAA was still awaited. The work was in progress and completed up to substructure level. The financial progress (September 2019) was only 51.12 per cent (₹ 16.45 crore) of the revised cost.

In reply, the division stated that in the High Power Committee meeting held on 06 September 2011 to monitor Sardar Sarovar Project, it was decided to complete the work within one year on war footing. PW Circle, Dhule (July 2013) instructed to start the road work by September 2013 and bridge work by October 2013. Accordingly, the work was commenced by division.

The reply is not acceptable, as this work was started prior to possession of forest land which had resulted in halting of work for more than two years after incurring an expenditure of ₹ 16.45 crore and the purpose of establishing the connectivity of tribal villages was not yet achieved, as the work is still under progress.

**(iii) Defective estimates resulting in additional cost**

In lump sum contract, a contractor shall complete work with all its contingencies in accordance with the drawings and specification for a fixed sum. In order to regulate fixed sum due to addition and alterations not included in the contract except when the design is altered, payment shall be made at the rates provided in the schedule of rates.

The Government administratively approved (January 2014) a work of improvement to road<sup>15</sup> including RoB for ₹ 27.40 crore. PW Circle, Nashik accorded (May 2015) technical sanction for ₹ 18.34 crore. The work order for lump sum contract was awarded (September 2015) to a contractor by PW Division, Nashik for ₹ 15.15 crore with stipulated period of completion of 18 months. The work was to be executed by contractor based on designs made available by the department. During execution, the design of the RoB was changed, as actual soil bearing capacity was found lower than estimated earlier and length of approaches to RoB was increased due to high gradient slope on site. The extension for completion up to January 2019 was sanctioned.

Audit observed that there was an increase in cost of work by ₹ 9.53 crore due to increased depth of piers and length of approaches. The work is still in progress and contractor had executed the work costing ₹ 23.19 lakh which was paid to him in March 2019.

<sup>14</sup> Compensatory Afforestation Fund Management and Planning Authority

<sup>15</sup> Bhagur Lahvit Vanjarwadi Mudhgaon Road (MDR-21) at km 0/00 to 5/00



In reply, division stated (September 2019) that initial bore was taken for estimation purpose but at the time of actual execution, hard strata was not achieved at expected level.

This shows deficient estimation by the department which resulted not only in additional cost of ₹ 9.53 crore but also the intended benefit of smooth connectivity could not be achieved till date due to non-completion of the work.

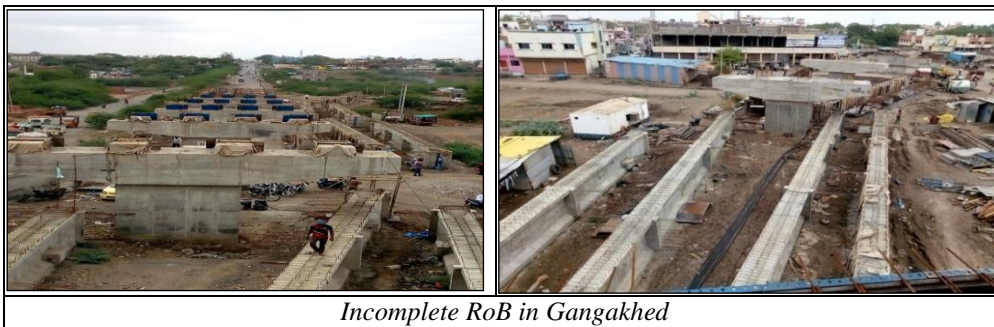
**(iv) Non-approval to design before commencement of work**

To overcome traffic congestion at railway crossing of commercial vehicles which used to get held up for long periods of time due to two sugar factories around village Gangakhed, the Government accorded (December 2013) administrative approval to work of construction of RoB<sup>16</sup> on Parali-Gangakhed-Palam-Loha-Nanded Road (MSH-16) for ₹ 22 crore. On receipt of approval to technical estimates from PW Circle, Nanded in January 2014, PW Division, Parbhani issued work order (January 2016) to the contractor for accepted tender cost of ₹ 15.93 crore with stipulated period of completion of 24 months.

Scrutiny revealed (June 2019) that the work was executed up to cap level of piers only and remaining construction work was under progress. It was further observed that for want of sanctioned drawings of pier caps and retaining wall, the contractor could not execute further work as per schedule since December 2017. Division requested (December 2017) for extension up to December 2018 due to delay in handing over of the design to the contractor. The payment of ₹ 9.37 crore was made (March 2019) to the contractor till date.

Audit observed that necessary sanctioned drawing was not handed over to the contractor till date (March 2019).

The physical verification of site by Audit (June 2019) revealed that the work was in very initial stage and most of the work remained incomplete in spite of expiry of 48 months from issue of work order.



Division stated (June 2019) that work was executed up to cap level and construction was under progress. Further, the approval to revised General Arrangement Drawings which was submitted to PW Region, Aurangabad in August 2018 was still awaited.

The commencement of work before obtaining necessary approval to designs not only resulted in abnormal delay in construction of bridge work and

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<sup>16</sup> at level crossing No. 16

creation of liability on account of price-escalation but also did not achieve the objective of reducing congestion of heavy vehicular traffic at railway crossing.

**(v) Delay in construction of bridge due to indecisiveness**

In the absence of road connectivity, 23 villages situated in remote and hilly areas on western side of Koyana dam were cut off with eastern side and other places of Mahabaleshwar *tahsil* in district Satara.

Thus, the work of construction of High Level Bridge<sup>17</sup> across Koyana Dam backwater (with approaches, culvert, retaining wall) was administratively approved (March 2017) for ₹ 75 crore.

Technical sanction for part of the work *i.e.* construction of bridge approaches, cross drainage works and retaining wall was sanctioned (November 2017) by PW Circle, Satara for ₹ 1.33 crore and work was awarded (February 2018) to a contractor for accepted cost of ₹ 1.16 crore. The work was to be completed with a period of 12 months. As on March 2019, contractor executed the work costing ₹ 64 lakh and work of approaches was still in progress.

Audit observed that as per the directives of State Government, PW Circle, Pune prepared and submitted (December 2019) a detailed revised estimate for Cable Stayed Bridge with viewing gallery costing ₹ 175 crore to Government for grant of new administrative approval with request to cancel earlier work which was approved for ₹ 75 crore in March 2017. The decision of the Government was awaited (February 2020).

Scrutiny revealed that work orders for remaining items of work such as bridge proper *etc.* were not issued till date even after the lapse of more than three years after the approval of the work. The work of approaches under execution was completed to the extent of only 55 *per cent* till date though stipulated to be completed by February 2019.

In reply, the PW (West) Division, Satara stated (December 2019) that new proposal for construction of advance type stay cable bridge costing ₹ 175 crore was submitted to Government for approval and sanction was awaited.

The reply of the division is not acceptable, as the Design Circle, Mumbai recommended (June 2017) to consider construction of innovative type bridge like suspension bridge/cable stayed bridge in view of tourist potential of the location. However, the same was not considered and execution of conventional type bridge was started in February 2018 as per administrative approval of March 2017. Presently, the status of work is uncertain as the department proposed (December 2019) to cancel earlier work and requested to approve new work for ₹ 175 crore. The decision of the Government was awaited (February 2020).

The indecisiveness on the part of the department resulted not only in delay in completion of bridge but also deprived the benefit of connectivity to the remote villages.

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<sup>17</sup> on Kumbharoshi Kalamgaon Tapola Ahir Road MDR 17 @ km 55/900, from Tapola to Ahir

**(vi) Blocking of funds due to payment of deposit to railway authorities before administrative approval**

The Government decided (July 2009 and February 2010) to construct RoB on level crossings (LC) on priority basis where the Train Vehicular Unit (TVU)<sup>18</sup> is high.

Accordingly, a work of RoB on Aahwa-Raipur-Khandbara-Dhanora road was administratively approved (October 2009) by the Government for ₹ 10.00 crore under Nashik Development Programme. However, during joint inspection of the site by department and railway authorities in August 2015, it was decided to construct Rail under Bridge (RuB) instead of RoB due to non-availability of land.

Accordingly, PW Circle, Nashik submitted (February 2017) a revised proposal to Government for construction of RuB. Meanwhile PW Division, Nandurbar deposited ₹ 4.99 crore<sup>19</sup> with railway authorities as per their demand. However, no progress was observed in this matter thereafter.

In reply, the division stated (September 2019 and February 2020) that the Government approval to revised proposal for construction of RuB was awaited.

The payment to railways prior to approval to the work resulted in blocking of funds amounting to ₹ 4.99 crore.

➤ **Planning for Maintenance of Bridges**

Bridges are key elements in the road network connectivity. Large numbers of bridges were constructed in the recent past and some of them are having complex structural arrangement. Thus, it has become necessary to carry out inspections of these bridges at a sufficiently higher technical level. Department issued (March 1988) a detailed technical circular on inspection of bridges detailing the requirements of routine inspections as well as comprehensive inspections including the frequency of inspection and the level at which these are to be carried out. To achieve intended objectives of smooth and safe connectivity, particular attention must therefore be given to the systematic inspection of bridges ensuring the protection of capital invested and life safety of road users by timely and economical planning of the preventive maintenance and repair works.

Audit examined the adequacy and effectiveness of the planning with respect to maintenance and repairs of bridges in selected units. Audit findings in this regard are given in the following paragraphs:

**2.1.7.3 Absence of planning for maintenance and repairs of existing bridges**

In detailed technical circular (March 1988), the Government reiterated the need of minimum inspection of every bridge at least twice a year (pre-monsoon and post-monsoon).

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<sup>18</sup> TVU means traffic density movement on a particular level crossing = number of train units x number of road vehicle units passing through that level crossing in 24 hours period

<sup>19</sup> ₹ 1.58 crore (March 2017) and ₹ 3.41 crore (October 2017)

In August 2016, a major bridge on Savitri river near Mahad on Mumbai Goa NH-66 collapsed due to flood leading to huge loss of 41 lives. Thereafter, the Government issued (August 2016) revised guidelines for inspection of all bridges and directed that (i) inspection of all bridges should be conducted within one month, (ii) circle office should conduct pre and post monsoon inspection of all bridges under their jurisdiction (iii) conduct structural audit of bridges which have outlived their life span in order to identify serious structural defects.

There were 16085 bridges (14003-minor, 1998-major and 84- long bridges) in the State as on September 2016. The department stated (December 2018) that initial inspections of 196 bridges were yet to be conducted. Further, out of 657 bridges which either outlived their life span or were severely damaged, the structural audit of 554 bridges was conducted leaving 103 bridges yet to be structurally audited.

In reply, the department did not submit any specific reasons for non-conduct of initial inspection as well as for non-conduct of structural audit as mentioned above.

The shortcomings/distresses in 103 bridges which were not inspected, remained unnoticed which may result in grave mishaps.

This shows the absence of planning and lackadaisical approach towards maintenance and repairs of the existing bridges.

The irregularities noticed in maintenance of existing bridges in test checked works are as under:

#### **2.1.7.4 Inadequate planning leading to bridges left unrepaired**

##### **➤ State level**

Post Savitri river incident (August 2016), the department identified that 2635 bridges were in urgent need of repairs which required outlay of ₹ 1218.94 crore. However, repairs of only 363 bridges were completed (January 2020) with an expenditure of ₹ 43.55 crore. The department (January 2020) stated that current information regarding status of the repair works of these 2635 bridges are not available with them.

##### **➤ Circle level**

Similarly, in 11 test checked circles, it was observed that works of maintenance of 1267 bridges with required outlay of ₹ 367.92 crore were proposed during 2014-15 to 2018-19, but the department sanctioned only 996 works with outlay of ₹ 181.57 crore. PW Circle, Thane did not submit required information till date (February 2020). Thus, 271 bridges were left untackled.

The department did not submit specific reasons for non-approval of these works till date.

Thus, though the bridges were identified for urgent repairs and maintenance, department did not prioritise these works and plan for required funds. Absence of timely preventive measures may result in further deterioration of these bridges making them more vulnerable to accident and loss of life of

commuters. Following case studies detail absence of irregularities in planning for repairs/maintenance:

**Case study 1: Reconstruction of minor bridge on Kannad-Bharadi-Sillod road**

A 40 year old minor bridge which connects World Heritage Ajanta caves on Kannad Bharadi Sillod Road in taluka Sillod collapsed in September 2016. The work of reconstruction of minor bridge was awarded by PW Division, Aurangabad to contractor (November 2016) for ₹ 53.76 lakh with stipulated period of completion of six months.

Audit observed that (June 2019) an expenditure of ₹ 36.59 lakh was incurred but the reconstruction of the bridge was not completed by the contractor till date.

In reply, division did not submit any reason for delay and stated that the concerned officials have been suspended due to negligence on their part (June 2019). Reply of department was awaited (June 2020).

**Case study 2: Non-approval to repair works of structurally audited bridge**

A structural audit of a bridge on Wardha river on Chandur-Bazar-Morshi-Simbhora road on SH-292 at chainage km 60/800 was conducted (December 2016) and consultant suggested various repair works viz. grouting, anti-crash barrier, Non-Destructive Tests for slabs, pointing for piers. Accordingly, PW Region, Amravati submitted (August 2018) an estimate of ₹ 1.57 crore to the department. However, approval of the department was awaited (July 2019).

**Case study 3: Non-approval to proposal of repairs to bridge since 2014-15**

A structural audit of a major bridge<sup>20</sup> constructed on Krishna river was conducted (February 2016) and consultant submitted observations that well foundations of pier footings were poor. He further recommended non-destructive tests, as the superstructure of bridge had deteriorated. Thereafter, PW Region, Pune conducted comprehensive inspection in February 2017 and directed to (i) install crash barrier on both sides of bridge, (ii) widen both sides of bridge, (iii) underwater inspection and jacketing of pier, (iv) filling up of cavities of pillars and (v) cleaning of expansion joints and replacement of bearings of bridge.

Audit observed that PW (West) Division, Satara was demanding funds of ₹ 35 lakh for repair work under *Gat 'C'*<sup>21</sup> every year since 2014-15. However, sanction for the same was still awaited (December 2019). Audit visited the bridge on 16 December 2019 and found that barriers to restrict plying of heavy vehicles were installed on both sides of the bridge. Further, it was observed

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<sup>20</sup> Bridge no 94/1 at highway Dicholi Navja Helwak Morgiri Sajur Tambve Wing Wathar Rethre Shenoli station road SH 148 at Ch (Bridge near Rethare BK village) Ch. 94/200

<sup>21</sup> *Gat 'C'* is for specialised works to be undertaken and sanctioned by respective CEs primarily for strengthening of weak bridges, repairs of small drain and all weather road connectivity for villages

that most of the plasters of bridge deck were peeled off and rusted bars were hanging out. The bridge deck was sagging at one point and there was spalling<sup>22</sup> of concrete in bridge spans.



PW Circle, Satara stated (December 2019) that under *Gat 'C'* programme, a job amounting ₹ 35 lakh was sanctioned. An estimate of ₹ 62 lakh for repairs of substructure was also submitted by division. As the amount of estimate was exceeding the sanctioned job amount, new estimate was under preparation. It was further stated that the bridge was closed for heavy vehicles since December 2019 and repair work would be taken up shortly.

Thus, non-approval of repairs to bridge for more than five years which had resulted in restriction of heavy vehicle traffic and public inconvenience shows the lack of required timely action on the part of the department towards upkeep and maintenance of bridges.

### 2.1.8 Funding

As per List of Major and Minor heads prescribed by Controller General of Accounts (CGA) of India and also as incorporated in Civil Budget Estimates (White Book) of Government of Maharashtra, there is a separate minor head of account *i.e.* “102- Bridges” and “101-Bridges” under Major Head (MH)-5054- Roads and Bridges (Construction) and MH-3054- Roads and Bridges (Maintenance) of the department, respectively.

The scrutiny of records revealed following audit observations:

#### 2.1.8.1 Non-operating of the budgetary head meant for bridge work

Audit observed that Government is booking the demand, allotment and expenditure related to construction of bridge along with road works under MH-5054 and relating to maintenance of bridge along with road works under MH-3054 under only one minor head *i.e.* “337- Road works” instead of minor

<sup>22</sup> As per IRC SP-40 Spalling of concrete is generally recognized to be a serious defect as it can cause local weakening, expose reinforcement, impair riding quality of deck and with time can cause structural failure. Spall is a depression caused by separation and removal of surface concrete

heads “101 and 102-Bridges” which have been separately allotted for bridge works.

On being asked the reasons for non-operation of separately allotted minor head meant for bridges, the department did not submit any specific reason and stated that the bridge is treated as an integral part of the road.

The reply is not tenable as there is a separate minor head prescribed by CGA for allotment and expenditure relating to bridges. This violation of prescribed procedure resulted in non-availability of separate information in respect of funds demanded, allotted and expenditure incurred relating to construction as well as maintenance of bridges separately at a glance. Thus, audit could not assess the correctness of assessment of demand of funds, availability and its utilisation by the department in respect of bridge works. Also, the department is deprived of disaggregated data on bridges needed for monitoring.

### **2.1.8.2 Absence of assessment for requirement of funds for construction and maintenance works**

As per provision of MPWA code, each division/circle/region was required to prepare an annual plan identifying the works and their requirement. Accordingly, demand for funds is to be placed before the Government.

However, audit observed that department did not prepare any annual plan to assess the demand. The grant is being sanctioned by the Government and accordingly, thereafter the works are being identified and executed as per the demand of local representatives and as per sanction accorded.

#### ➤ **State**

The details of funds demanded, allotted and expenditure incurred during 2014-15 to 2018-19 in respect of construction of roads and bridges by the department were called for. However, department submitted following information only in respect of allotment of grant and expenditure there from as shown in **Table 2.1.2:**

**Table 2.1.2: Details of funds in respect of construction of roads and bridges**

(₹ in crore)

Year	Grant allotted	Expenditure incurred	Unspent grant	Percentage of expenditure with allotted grant
2014-15	2,277.96	1,963.16	314.80	86
2015-16	3,173.50	2,844.35	329.15	90
2016-17	2,914.74	2,914.74	0	100
2017-18	5,172.32	3,462.73	1,709.59	67
2018-19	6,334.35	6,334.35	0	100

*Source : Information submitted by department*

Note: The fund position includes allotment and expenditure for roads and bridges, as there is no separate budgetary allocation for construction of bridge alone.

Similarly, the details of funds demanded, allotment and expenditure incurred during 2014-15 to 2018-19 in respect of maintenance of roads and bridges was as shown in **Table 2.1.3:**

**Table 2.1.3: Details of funds in respect of maintenance of roads and bridges**  
(₹ in crore)

Year	Demand	Budget allotted	Expenditure incurred	Percentage of Budget allocation with respect to Demand	Percentage of expenditure with allotted funds
2014-15	6,665.63	1,745.75	1,745.75	26	100
2015-16	7,257.83	1,682.69	1,667.69	23	99
2016-17	6,441.95	1,609.33	1,454.78	25	90
2017-18	6,121.90	1,689.78	1,520.82	28	90
2018-19	5,294.22	1,758.28	1,630.85	33	93

*Source: Information submitted by department*

Note: The fund position includes roads and bridges as there is no separate budgetary allocation for maintenance of bridges alone.

As seen from above, no demand was assessed by department for construction activity and expenditure was incurred on the basis of funds made available. Similarly, the allotment for maintenance activity was not as per the actual requirement. This shows the absence of financial planning at the apex level of the department.

#### ➤ Selected districts

The funds demanded, sanctioned and expenditure incurred for construction and maintenance of roads and bridges in selected divisions were as shown in **Table 2.1.4:**

**Table 2.1.4: Details of funds in respect of construction and maintenance of roads and bridges**  
(₹ in crore)

Year	Construction			Maintenance		
	Grant Demanded	Grant Sanctioned	Expenditure	Grant Demanded	Grant Sanctioned	Expenditure
2014-15	699.48	500.57	500.57	120.35	50.85	50.85
2015-16	525.91	422.43	422.43	97.02	46.37	46.37
2016-17	554.19	405.32	401.92	93.23	38.81	38.81
2017-18	402.28	353.03	352.91	80.97	61.02	61.02
2018-19	484.05	427.49	414.95	92.39	64.22	64.22
<b>Total</b>	<b>2,665.91</b>	<b>2,108.84</b>	<b>2,092.78</b>	<b>483.96</b>	<b>261.27</b>	<b>261.27</b>

*Source: Information furnished by test checked divisions.*

Note: The fund position includes roads and bridges as there is no separate budgetary allocation for bridge alone.

As seen from the table above, against demand of ₹ 2,665.91 crore for construction works, the Government had sanctioned funds of ₹ 2,108.84 crore (79 per cent); however, against demand of ₹ 483.96 crore for maintenance works, only ₹ 261.27 crore (54 per cent) was sanctioned. The short release of funds for maintenance works resulted in many works remained untackled and the bridges requiring urgent repairs remained unsafe for commuters as observed by Audit in selected circles where maintenance works of 271 bridges could not be taken up leaving the bridges open to further deterioration (as mentioned in **paragraph 2.1.7.4**). Thus, it is evident that department had neglected the maintenance works and compromised the safety of commuters.

Department accepted (January 2020) that there was inadequate provision for maintenance.



### 2.1.8.3 Stoppage of Nilwandi Bridge after incurring expenditure of ₹ 14 lakh due to paucity of fund

Paragraph 255 of MPWM envisages that no work shall begin except under special riders of the Government unless allotment of funds has been made. Similarly, no liability may be incurred in connection with any work until an assurance has been received from the authority competent to provide funds that such funds will be allotted before the liability matures.

The Nashik collectorate under Minimum Needs Programme (MNP) accorded approval (March 2013) to the work of construction of Nilwandi bridge<sup>23</sup> for ₹ 90 lakh. Accordingly, the PW (North) Division, Nashik awarded (April 2015) the work to a contractor at tendered cost of ₹ 66 lakh with stipulated period of nine months for completion.

Audit scrutiny revealed that the contractor had executed the work of ₹ 14.40 lakh only which was paid in March 2018. The contractor stopped the work since 2016. The work of bridge was completed upto pier level only.



*Incomplete approaches and deck slab of Nilwandi Bridge due to fund shortage*

In reply, the division stated that MNP was closed in 2015 and further required funds were not made available. Hence, contractor stopped the work for want of funds.

The reply is not acceptable as the work was approved in March 2013 under MNP. The scheme (MNP) was closed in 2015. Thus, division was required to execute the work prior to closure of MNP.

The delay on the part of the division resulted in unfruitful expenditure of ₹ 14.40 lakh on incomplete bridge work.

### 2.1.8.4 Non-completion of Bridge/Road over Bridge works due to pending Revised Administrative Approval.

Paragraph 134 of MPWA Code envisages that when the expenditure on a work exceeds or is found likely to exceed the amount administratively approved by more than 10 per cent or ₹ one crore, the Revised Administrative Approval (RAA) should be obtained from the authority competent to approve the revised cost.

Position of pending cases of RAA awaiting approval from the Government in respect of selected circles as on January 2019 was as shown in **Table 2.1.5**:

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<sup>23</sup> on Nilwandipade road VR-89 in taluka Dindori, district Nashik

Table 2.1.5: Details of works held up for want of RAA from department

(₹ in crore)

Sl. No.	Name of the Circle	Name of the district	Name of the work	Original AA cost and date of sanction	Revised cost	Expenditure incurred till date
1.	Nagpur	Nagpur	Construction of Major bridge across Aam river in km 1/00 on Veltur-Channa-Kujaba road Tq. Kuhi District Nagpur	1.44 04.02.1999	2.72	0.24
2.	Nashik	Dhule	Construction of ROB on Sukdev-Shindkhed-Chimthana road @ km 12/200 District Dhule	10.00 31.10.2009	14.95	0.00
3.	Pune	Sangli	Widening of road on ROB of Peth-Sangli-Miraj-Mhaisal to State border of Sangli district	3.00 20.3.2010	18.56	0.20
4.	Auranga- bad	Jalna	Construction of Major bridge across Purna river in km 55/700 on Buldana-Dhad-Mahora road Tq. Bhokardan District Jalna	4.00 20.10.2008	5.78	4.72
5.	Auranga- bad	Auranga- bad	Construction of missing length of bridge on Aurangabad-Lasur-Vaijapur road (SH-30) from km 34/660 to 35/460 near Hadas-Pimpalgaon in talukaVaijapur	4.35 31.10.2009	7.66	4.96
<b>TOTAL</b>					<b>49.67</b>	<b>10.12</b>

As seen from above, for want of RAA, these works are still incomplete for many years.

Department did not submit any specific reply for delay.

Thus for want of RAA, these five works remained incomplete resulting in non-achievement of desired benefit of connectivity to the commuters for more than ten years.

#### 2.1.8.5 Central Road Funds spent on inadmissible items

As per rule 7(8) and 8(3) of Central Road Funds Rules 2007, (CRF) the works involving acquisition of land and shifting of utility services should not be sponsored under CRF. The executing agency shall render a certificate stating that the land is available, is in its possession and removing of utilities (if any) has been completed and not financed from CRF.

However, in three test checked divisions, irregular expenditure on shifting of utilities using CRF was observed as shown in **Table 2.1.6:**

**Table 2.1.6: Details of irregular expenditure on shifting of utilities from CRF**

(₹ in crore)

Sl. No.	Name of the division	Name of the work	Expenditure	Expenditure on shifting of utilities and land acquisition
1	PWD II, Chandrapur	Construction of major bridge across Uma river in km 8/00 on Petgaon Usrala Maroda Mul Bhejgaon road	8.51	0.57
2	PWD, Amravati	Improvement to Amravati-Badnera Road including widening of minor bridges	28.38	2.91
3	PWD, Nashik	Improvement to Bhagur Lahvit Vanjarwadi Mudhgaon Road MDR-21 km 0/00 to 5/00 including Railway-Over-Bridge	23.19	0.12
<b>Total</b>			<b>3.60</b>	

In reply, PW Division, Amravati (July 2019) and Nashik (September 2019) stated that there was a provision in the sanctioned estimate, hence payment was made from CRF. However, PW Division, Chandrapur stated (August 2019) that the work was of urgent nature and to complete the bridge work and approaches, the payment had been made from the CRF.

This resulted in irregular expenditure of ₹ 3.60 crore contrary to the provisions of CRF.

## **2.1.9 EXECUTION**

### **2.1.9.1 Non-acquisition of required land before commencement of work**

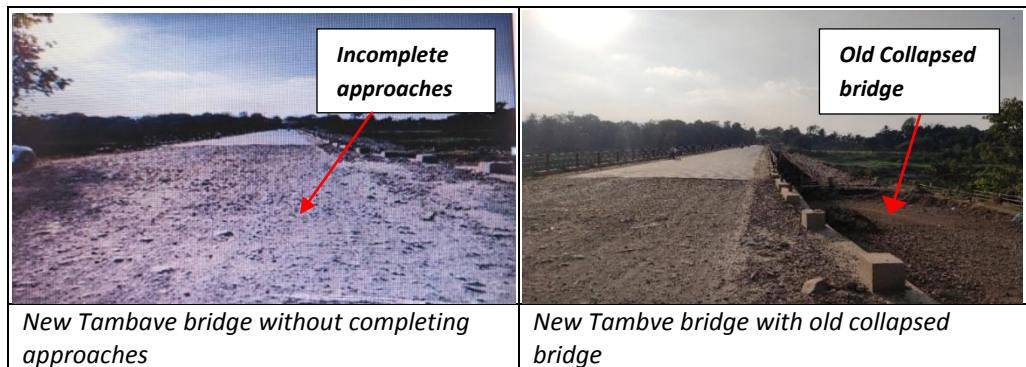
Paragraph 251 of MPWM stipulates that no work shall commence on land which has not been duly handed over by the responsible civil officer and in case tender for work is accepted prior to acquisition of the land required for the work then the time which should be allowed for the acquisition of the land should be ascertained from the concerned authority before issuing the work orders. In test-check of records of selected divisions, the following omissions were observed:

#### **(i) Inordinate delay in construction of new Tambave bridge**

A work of construction of major submersible bridge across Koyna river on Sakurdi-Tambave-Ambavade-Jinti Road along with its approaches and retaining wall was awarded (March 2016) by the PW (West) Division, Satara to a contractor for accepted cost of ₹ 9.49 crore with stipulated period for completion of 24 months.

It was observed that the work could not be completed in stipulated period due to land acquisition problem. Thus, PW Region, Pune granted (March 2018) the extension up to 31 December 2018. The contractor executed most of the works of bridge proper and approaches and submitted VIII<sup>th</sup> running account bill for ₹ 9.11 crore in March 2019. The division again proposed (October 2019) for extension up to 31 December 2019 which was awaiting approval from the region.

During physical inspection (16 December 2019), Audit observed that the work of granular sub base, water bound macadam and black topping on the surface of the bridge proper and approach roads from both the sides of the bridge as well as construction of retaining wall to the approaches was not done.



Further, as per paragraph 5.1.2 of IRC: SP: 52-1999, it was necessary to remove the debris of old bridge which may cause blockage to the waterways of river to avoid damage to newly constructed bridge. However, during said physical inspection, Audit observed that the debris of old Tambave bridge which collapsed in August 2019 was lying in the riverbed causing imminent danger to the newly constructed bridge.



On being pointed out (December 2019), the division replied that work of bridge proper was completed and remaining work would be completed. The division further stated that debris would be removed immediately.

The reply was not acceptable, as the work was initially delayed by 33 months due to land acquisition problem and extension was accordingly granted up to December 2018. But, the contractor failed to complete the works in extended period also. No further extension was granted. However, division failed to take appropriate action against the contractor as per the provisions of the contract.

Thus, in spite of lapse of nearly four years period and expenditure of ₹ 9.11 crore, the bridge was not ready for smooth traffic for want of proper roads with retaining walls to approaches and railings for the bridge. This depicts casual attitude of the department towards execution of works in violation of manual provisions endangering the life of commuters.

**(ii) Blocking of ₹ 6.95 crore on construction of major bridge on Krishna river**

The work of construction of major bridge on Krishna river at village Sukhwadi of *tahsil* Palus, district Sangli was administratively approved (July 2013) for (i) construction of bridge proper, (ii) approaches, (iii) land acquisition and (iv) miscellaneous items. PW Region, Pune accorded (June 2014) technical sanction for ₹ 11.98 crore. PW Division, Miraj awarded (September 2014) work at accepted cost of ₹ 10.76 crore with stipulated period of completion of 18 months.

However, due to non-acquisition of land on both the banks, the contractor did not start the work in 2014. Acquisition of land on only one side *i.e.* Sukhwadi side was done and work started from October 2017. The contractor executed the work to the extent of 64.65 *per cent* mostly relating to bridge proper and payment of ₹ 6.95 crore was made (September 2019). Thereafter, there was no record to show that the work had progressed further. The extensions were granted from time to time, the last one till September 2019 (February 2018). However, it was observed that contractor requested (November 2019) to finalise the contract on 'where is and as it is' basis. The land acquisition process for other side *i.e.* Tung village side was still under progress (December 2019).

Audit observed that the work could not be completed even after expiry of 64 months as against the stipulated 18 months. The work of approaches on other side (Tung village side) was not initiated till date for want of required land.

In reply, the division stated that the process of land acquisition though started very early could not be completed due to problems from land owners. The division further stated that land acquisition was in the final stage.

The reply was not acceptable as the execution of work was started without having the required land in possession. This resulted in blocking of expenditure incurred apart from the liability of excess expenditure on account of price-escalation. Further, the proposed benefit of smooth road connectivity is not assured till date for want of acquisition of land on Tung village side.

**(iii) Idle expenditure of ₹ 7.84 crore on construction of major bridge near village Kalashi**

A work of construction of major bridge<sup>24</sup> in Amravati district under Deposit Head<sup>25</sup> was awarded<sup>26</sup> (January 2017) to a contractor at an accepted cost of ₹ 8.04 crore with stipulated period of 24 months. The scope of work included a bridge proper and its approaches.

It was observed that payment of ₹ 7.84 crore was made to the contractor for the works executed mostly relating to bridge proper only. The land required for approaches was not available, hence the contractor requested to finalise the contract on 'where is and as it is' basis in May 2019.

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<sup>24</sup> in km 9/200 on Ganeshpur- Gaiwadi- Amla road MDR-13 near village Kalashi (Wadhadi Irrigation Project) in taluka Daryapur

<sup>25</sup> Deposit from VIDC

<sup>26</sup> by Special Project (PW) Division II, Daryapur

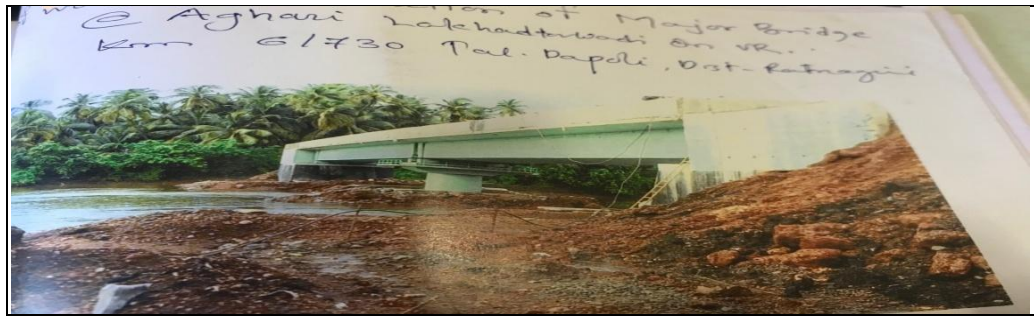
In reply, division stated that the required land was handed over and the work had started. But later on the land owners created problems for the user department, hence delay occurred.

The reply was not acceptable as division did not submit any records to substantiate their submission.

Non-availability of land resulted in delay in completion of work as well as liability of excess expenditure on account of price-escalation apart from deferment of desired benefit of road connectivity.

**(iv) Blocking of ₹ 4.22 crore on construction of bridge at Aghari Lakhadtarwadi**

The Government approved (February 2014) the work of construction of 70 meter long bridge with approach road of 800 metre on Village Road 18 at Aghari Lakhadtarwadi, district Ratnagiri for ₹ 4.98 crore. Technical sanction was accorded by PW Region, Mumbai in July 2014 for ₹ 5.05 crore (₹ 4.33 crore for bridge and ₹ 72 lakh for approaches). PW Division, Chiplun awarded (February 2015) the work of construction of bridge portion only to a contractor at accepted cost of ₹ 4.21 crore. The work of construction of bridge work was completed in August 2016 with an expenditure of ₹ 4.22 crore.



Major bridge at Aghari Lakhadtarwadi on VR 18 @ km 6/730

Audit observed (December 2019) that the work of construction of approach road to this bridge was not taken up till date due to non-acquisition of required land for approaches on one side of the bridge.

Division accepted (December 2019) that the work of approaches was held up due to land-acquisition problem and further submitted that as soon as the land is acquired, tendering for the said work would be done.

The reply of the division confirms the non-compliance of the MPWM provisions. Non-availability of approaches resulted in blocking of funds of ₹ 4.22 crore on construction of bridge proper since last 42 months.

**(v) Blocking of ₹ 1.03 crore on construction of major bridge on Utavali river**

PW Division, Akola awarded (March 2015) a work of construction of major bridge along with approaches on Utavali river on Pimpalkhuta-Adgaon VR-65 to a contractor at accepted cost of ₹ 1.68 crore with stipulated period of completion of 18 months.

Audit observed (July 2019) that the construction of bridge proper to the extent of 95 per cent was completed in August 2016 and payment of ₹ 1.03 crore was made (March 2017) to the contractor. However, the contractor intimated

(April 2017) the non-availability of land required for the work of approaches due to stiff opposition from the farmers and requested to finalise the work.

In reply, the division stated (July 2019) that in anticipation of land acquisition, the work was started. However, due to protest by farmers, there was difficulty in procuring land. The matter was in progress and after procurement of land, the approaches would be completed soon.

The reply is not acceptable, as the work was commenced in anticipation of acquisition of land contrary to the codal provisions. This resulted in blocking of ₹ 1.03 crore on incomplete bridge work.

### **2.1.9.2 Wasteful expenditure on abandonment of bridge work**

The work of construction of a minor bridge<sup>27</sup> on Ajintha river was administratively approved for ₹ 2.00 crore. The PW Division, Aurangabad awarded (January 2011) the work to a contractor at an accepted cost of ₹ 2.41 crore with stipulated period of 18 months. However, the execution of work got delayed abnormally. Till May 2015, the contractor had completed the work up to pier level only costing ₹ 2.51 crore which was paid in March 2018. The work of deck slab (super-structure) of the bridge was not yet completed. The reasons for abnormal delay in execution of work were not available on record.

Audit observed (February 2019) that consequent upon declaration of this road as national highway vide GoI notification (January 2017), the said incomplete work was transferred 'as it is' (May 2017) to National Highway Division (NHD) Aurangabad. This rendered the expenditure incurred on the executed work amounting to ₹ 2.51 crore as wasteful. Further, the irregularity of incurring excess expenditure on this work over and above the amount of administrative approval by 25.5 per cent was also not regularized.

In reply, the division submitted that (February 2019) the design of bridge and its approaches were changed during execution and construction of deck slab remained untackled considering the cost of AA.

The reply is not tenable as the excess expenditure over AA was not regularised till date and handing over of the same work to NHD resulted in wasteful expenditure of ₹ 2.51 crore on incomplete bridge work. Had the work been completed in time, it would have been possible to take the completed work into account for planning the National Highway route/design.

### **2.1.9.3 Unfruitful expenditure of ₹ 1.48 crore on incomplete work of construction of a major bridge across Wan River**

In order to establish connectivity of villages Sonpeth with village Nathra, the PW Division, Parbhani awarded (September 2013) the work of construction of a major bridge across Wan river in Parbhani district to a contractor at accepted tendered cost of ₹ 1.60 crore with stipulated completion period of 12 months. The scope of work included the construction of bridge as well as its approaches. The work could not be completed in stipulated time due to acute shortage of water and paucity of required funds. Thus, PW Circle, Nanded

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<sup>27</sup> on Aurangabad-Jalgaon Road MSH-8 at Ch.91/200

granted extension to complete the work from time to time. The last extension was granted up to August 2017.

Audit observed that the contractor executed the work relating to bridge proper and deck slab only costing ₹ 1.48 crore up to July 2017 which was paid in March 2018. Thereafter, the contractor stopped the work and did not execute remaining works<sup>28</sup> from July 2017.

Site visit (June 2019) of bridge by Audit revealed that though the bridge proper was completed, the same was not put to use due to non-construction of its approaches from either side.



*Incomplete bridge proper and approaches*

The division accepted the fact and stated (June 2019) that action of recovery of penalty from the contractor would be taken.

The reply is not acceptable as inspite of lapse of more than 70 months and spending more than 92.5 per cent of tendered cost, the work remained useless for want of construction of approaches and other required works. Further, there were no records to show that any action has been planned against the contractor for not executing the balance works.

The non-execution of approaches to bridge not only rendered expenditure of ₹ 1.48 crore unfruitful but also the objective of providing connectivity to villages Sonpeth and Nathra could not be achieved even after six years.

### 2.1.10 Inspection and Monitoring

#### State

Periodic inspection and adequate monitoring provides reasonable assurance for smooth and safe road network. The manner and periodicity of inspection of the bridges and documentation thereof at different levels in the department are specified in the Technical Circular issued (March 1988) by Government. Chapter 2 of IRC SP-18 prescribes for maintenance of a bridge register in every division. One bridge register may include the records of several bridges. However, for each bridge, there must be two reports *viz.* (i) original bridge report giving the general details of the bridge such as name, location, hydraulic particulars, lower water level, loadings, soil particulars, details of span, design details and drawings, diagrammatic sketch, date of completion *etc.* and (ii) inspection reports containing the details of inspection such as date of inspection, authority which conducted the inspection and observations and recommendations of inspecting officer. Audit observed that the circular and

<sup>28</sup> Works relating to construction of approaches and other works like providing rubble filling behind abutments, RCC railings, cement concrete work of balance walls, curves *etc.*



manual provisions were not followed by the division/circle offices, thereby maintenance and repair works were not taken up in a timely manner to maintain the life span of the bridge and minimise the cost of maintenance.

#### **2.1.10.1 Non-maintenance of bridge register**

The bridge register should provide complete up to date history of each bridge from start of its execution till completion and various inspections done thereafter. It should be maintained by division concerned and made available to inspecting officers.

However, Audit observed that in 15<sup>29</sup> divisions, bridge register was not maintained.

In reply, it was stated that prescribed bridge register would be maintained properly in future.

Due to non-maintenance of bridge register, Audit could not get required information for scrutiny in the selected divisions. Also in the absence of such a basic record, the divisions could not have carried out necessary inspections for maintenance.

#### **2.1.10.2 Non/improper maintenance of masonry registers**

Masonry register is a vital record required to be maintained at circle level for long bridges, at division level for major/long bridges and at sub-division level for minor/major bridges for notings of routine inspection and its follow up action. In masonry register, the details of the bridge such as name, location, construction year, cost and details of inspection such as date of inspection, authority which conducted the inspection and observations and recommendations and maintenance of bridge were to be recorded. The notes of routine inspections were required to be recorded in masonry register.

Scrutiny in 12 selected circles revealed that masonry register was not maintained in six<sup>30</sup> circles in respect of 34 long bridges. Similarly, in two<sup>31</sup> out of 30 selected divisions, masonry register in respect of 39 major/long bridges was not maintained. In another 20 test checked divisions, Audit observed that all required details were not recorded in masonry registers of 251 major bridges (out of test checked 255) and 417 (out of 417 test checked) minor bridges. Remaining eight divisions found to have maintained masonry registers properly.

In reply, four PW circles<sup>32</sup> accepted the fact while two<sup>33</sup> circles did not furnish any specific reply. Similarly, two<sup>34</sup> divisions stated that the masonry register would be maintained.

This goes to show that the department was not paying sufficient attention to the important function of inspections. In the absence of up to date registers

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<sup>29</sup> PWD–Achalpur, Akola, Amravati, Aurangabad (West), Malegon, Nandurbar, Nashik (North), Palghar, Sahada, PWD I Chandrapur, PWD II Chandrapur, PWD I Gadchiroli, PWD II Gadchiroli, SPD Amravati, SPD II Daryapur

<sup>30</sup> Aurangabad (1), Chandrapur (11), Gadchiroli (3), Nashik (4), Ratnagiri (12) and Thane (3)

<sup>31</sup> Chandrapur II (14) and Jawhar (25)

<sup>32</sup> Aurangabad, Chandrapur, Gadchiroli and Thane

<sup>33</sup> Nashik and Ratnagiri

<sup>34</sup> Chandrapur and Jawhar

with records of inspections done and recommendations, no follow up action was possible. Hence the inspections done had become unfruitful.

This resulted in non-compliance to the Government directives in respect of maintenance of records of the bridges. Further, Audit could not assess whether the required inspections of bridges were done timely by the respective authorities.

### 2.1.10.3 Inspection of bridges

Technical Circular (March 1988) prescribes the type, manner and periodicity of inspection of bridges and documentation thereof at different levels. There are three types of inspection *viz.* routine inspection, comprehensive inspection and special inspection. A calendar of inspection shall be prepared by each responsible inspecting officer.

**Routine inspection:** Routine inspection is relied mainly on visual assessment using conventional standard tools and methods. The purpose is to report the fairly obvious deficiencies which might lead to traffic accidents or cause high maintenance and repairs costs if not treated promptly. It is desired that routine inspection twice in a year (pre-monsoon and post-monsoon) of long and major bridges should be conducted by division and sub-division is responsible for major and minor bridges coming under their jurisdiction. Also, circle should conduct routine inspection of all long bridges once in a year. Technical circular prescribed a proforma for recording the notes of such inspections in masonry register to be maintained at respective levels.

**Comprehensive inspection:** Comprehensive inspection is a closer visual assessment supplemented by standard instrumented aids for intensive and detailed inspection of the elements of the structure. Comprehensive inspection of each bridge is envisaged after six months of its completion. Thereafter, minimum frequency for comprehensive inspection shall be as given in **Table 2.1.7:**

**Table 2.1.7: Frequency of comprehensive inspection for different types of bridges**

Type of bridge	Level of Inspecting Officer	Frequency
Minor bridge with slab drains	Division	Once in 5 years
Major bridge in moderate environment	Circle	Once in 5 years
Major bridge in severe environment		Once in 3 years
Long bridge in moderate environment	Region	Once in 5 years
Long bridge in severe environment		Once in 3 years

**Special inspection:** Special inspections are undertaken in the event of unusual occurrence such as earthquakes, accidents, passage of unusual loads or flood. Such inspections require supplementary testing and structural analysis and will invariably require detailed involvement of design organisation and experts in the relevant field.

Audit test checked the records of 255 major (out of 892) and 417 minor (out of 4,092) bridges in the selected 30 divisions. The deficiencies noticed are detailed below:

**(i) Deficiency in routine inspection**

In 20 divisions, 2,550 inspections pertaining to 255 major/long bridges were required to be carried out during the period 2014-19. However, only 1,230 inspections were carried out resulting in shortfall of 1,320 (51.76 per cent). Similarly 4,170 inspections pertaining to 417 minor bridges were required to be carried during the period 2014-19. However, only 1,964 inspections were carried out resulting in shortfall of 2,206 (52.90 per cent).

On being pointed out, 11 divisions stated that the regular inspections would be carried out in future. Remaining nine divisions did not submit specific reply in this respect.

**(ii) Deficiency in comprehensive inspection**

**Regional level:** Out of six regions, it was observed that Konkan region did not conduct any comprehensive inspection pertaining to 19 long bridges during 2014-19.

In reply, it was stated that inspections would be conducted between December 2019 and January 2020. Further progress was awaited (June 2020).

**Circle level:** Out of 12 test checked circles, seven<sup>35</sup> circles did not conduct comprehensive inspection in respect of 392 bridges out of 593 major bridges during last five years.

In reply, two circles<sup>36</sup> stated that only those bridges, where damages/lapses during routine inspections were noticed, were taken up for comprehensive inspection. Chandrapur circle stated that comprehensive inspection of bridges (30-60 metre) is to be carried out by divisions concerned as per Government circular of August 2016 and divisions concerned would be instructed to maintain comprehensive inspection report in pro-forma of IRC SP-18. Ratnagiri circle stated that the remaining bridges would be inspected during next year. Kolhapur circle stated that reply would be furnished shortly. Gadchiroli circle did not submit any reply. Amravati circle stated that remaining bridges would be inspected before October 2019.

Replies are not acceptable as technical circular of 1988 stipulates that comprehensive inspection of all major bridges should be conducted by the circles concerned and inspection reports were required to be maintained in pro-forma of IRC SP-18. Further progress of comprehensive inspections by the selected circle offices was awaited (June 2020).

**Division level:** In all 30 test checked divisions, Audit observed that comprehensive inspection of selected minor bridges was not conducted during 2014-19 except five minor bridges of PW (West) Division, Sangli and 18 minor bridges of PW (North) Division, Ratnagiri.

In reply, 13 divisions stated that the comprehensive inspections of minor bridges would be carried out as per norms in future. Remaining divisions did not submit any specific reasons.

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<sup>35</sup> Akola (97/101), Amravati (111/117), Chandrapur (37/77), Gadchiroli (35/41), Kolhapur (30/117), Ratnagiri (30/56) and Satara (52/84)

<sup>36</sup> Akola and Satara

Non-conduct/huge deficiency in conduct of comprehensive inspections of bridges shows the casual approach of the department towards compliance of inspection guidelines which further may result in delayed identification of serious defects. This defeats the purpose of timely and economic planning of preventive maintenance and also assurance of safety to road users.

**(iii) Deficiency in special inspection:**

Audit observed that no special inspection of any of the bridge was conducted in any of the test checked divisions. PW circle, Dhule stated that all long bridges were found in good condition during regular inspection. Amravati and Nanded circle stated that special inspection was not required and Gadchiroli circle submitted nil information. Remaining eight circle offices did not submit any response.

**(iv) Non-preparation of Calendar of Inspection**

During test check of selected offices, Audit observed that none of the test checked regions, circles, divisions and sub-divisions had prepared calendar of inspection for routine and comprehensive inspections as envisaged in the technical circular.

In reply, none of the authorities submitted any specific reason for non-preparation of calendar of inspection.

**2.1.10.4 Non-formation of dedicated circle offices for inspection and maintenance of bridges**

After the incidence (August 2016) of Savitri river, department decided (September 2016) to form dedicated circle offices at Mumbai, Aurangabad and Nagpur for detailed inspection and maintenance of bridges.

In Madhya Pradesh, this type of arrangement of dedicated offices for maintenance and control of bridges is in existence.

However, Audit observed (November 2019) that no such dedicated offices for inspection and maintenance of bridges were formed at any circle level.

On being requested by Audit to furnish the relevant records, the department stated (January 2020) that the file was not traceable and further submitted that the idea to have separate wing for bridge was abandoned.

This shows lackadaisical approach of the department towards maintenance of bridges resulting in shortfall in conducting required types of inspections as pointed out in previous paragraphs.

In MSRDC, inspection and monitoring of the works of construction and maintenance of projects awarded to concessionaire are carried out through appointment of Independent Engineers (IE). IE submits inspection reports on monthly and quarterly basis as per the terms of the agreement. IE recommends various routine/periodical maintenance of components of project viz. road, bridges and flyovers in inspection reports and ensures its compliance by the concessionaire. MSRDC further exercises the necessary checks/monitoring on these works of the project.

**Case study: Operation and Maintenance of Securitization of toll at five entry points in Mumbai with maintenance of 27 flyovers and allied structures**

The work of Securitization of toll at five entry points in Mumbai with maintenance of 27 flyovers and allied structures was awarded to a concessionaire in November 2010 for a period of 16 years. The scope of concession agreement included:

- i) operation and maintenance of five entry points of Mumbai consisting of flyovers and allied structures on Sion-Panvel Highway, Western Express Highway Corridor, Eastern Express Highway Corridor, Lal Bahadur Shastri Marg Corridor and Airoli Bridge Corridor for concession period of 16 years.
- ii) capacity augmentation of Mulund (EEH), Mulund (LBS) and Vashi toll plaza; and
- iii) collection of toll at toll plazas on five entry points of Mumbai.

For inspection and monitoring of the above work, an Independent Engineer was appointed by MSRDC.

Audit observed that, the regular toll collection and works of maintenance was being done by the concessionaire and the work of concessionaire was being monitored by IE. Monthly reports to that effect were being submitted by IE to MSRDC. Audit further observed that these works were monitored by MSRDC authorities who also exercised the necessary checks on the maintenance/repairs work executed by the concessionaire.

**2.1.11 Conclusion**

There was no evidence of strategic planning for bridge development and maintenance. Construction of bridges was done as per proposals from the divisions. There was abnormal delay in approval of the RDP 2001-2021. Periodic targets were not fixed for the implementation of RDP. Due to lack of planning in prioritization of work to construct Bailey bridges, 209 remotely located naxal affected villages of Gadchiroli district remained isolated. Inadequate planning for acquisition of land, estimation, approval of design and indecisiveness resulted in inordinate delay and extra cost in construction of bridges. Planning for maintenance of bridges was ineffective as reflected in non-conduct of initial/routine inspections and structural audits leading to non-approval of maintenance works of bridges which are in urgent need of repairs.

Non-operation of separately allotted minor head meant for bridges resulted in non-availability of separate information at a glance in respect of funds demanded, allotted and expenditure incurred relating to construction as well as maintenance of bridges and also deprived the department of disaggregated data on bridges needed for monitoring. There was absence of financial planning at the apex level of the department as the allotment and expenditure incurred were not related to the actual requirement placed by the divisions. There was irregular expenditure from CRF of ₹ 3.60 crore on inadmissible items.

Works remained incomplete as acquisition of required land was not completed prior to commencement of works. There was unfruitful expenditure due to incomplete work of super structure, non-execution of approaches to bridge.

Inspection and monitoring was deficient as reflected from non-maintenance of bridge registers, non/improper maintenance of masonry registers, shortfall in conduct of routine, special and comprehensive inspections and non-preparation of calendar of inspection. In the absence of preventive maintenance, cost of maintenance would increase drastically besides putting the life of commuters at risk.

### **2.1.12 Recommendations**

The Government may:

- prepare yearly plan and ensure fixing of targets for construction works;
- ensure strict following of the prescribed inspection schedule;
- ensure acquisition of required land and approval to designs prior to commencement of work;
- ensure assessment and allotment of funds as per the plan and targets identified;
- operate budgetary head meant for bridge works; and
- expedite revision of administrative and financial approvals for completion of pending works.