

4.1 Introduction

The safety of dams is an important issue that needs to be continuously monitored for ensuring public safety, protection of downstream areas from potential hazard and ensuring continued accrual of benefits from the assets created. As of December 2012, there were 1,913¹⁰¹ large¹⁰² completed dams in the State. GoM had prescribed schedule for inspection of dams to ensure their maintenance and safety and constituted (March 1985) a Dam Safety Organisation¹⁰³ (DSO) for dam safety monitoring. For quality assurance in dam construction, Quality Control Organisation and Maharashtra Engineering Research Institute (MERI) were established.

4.2 Inspection of dams

GoM issued (February 1962) detailed instructions which were reiterated in January 1982 for inspection of all the completed irrigation projects by the Executive and Superintending Engineers at Division and Circle levels to ensure requisite standards of maintenance and safety. It was also instructed (February 1962) that repairs and improvements indicated through such inspections should be attended to at the earliest. As per the Government instructions, inspection reports are to be submitted by EE and SE to the regional CE with a copy to the SE, DSO by 31 December each year. On the basis of these inspection reports and regular test inspections carried out by DSO, an annual Health Status Report¹⁰⁴ (HSR) of the dams is prepared. The responsibilities of the DSO are as under:

- Test inspections of large dams, scrutiny of pre and post-monsoon inspection reports received from field offices and to suggest remedial measures for significant and important deficiencies;
- Monitor the periodical inspection of dams carried out by the field officers;
- Prepare annual HSRs of dams in the month of March for submission to Central Water Commission (CWC) and GoM;

¹⁰¹ As per the latest Health Status Report of 2012

¹⁰² Large dam: Having height above 15 m from the lowest portion of the general foundation arc to the crest above or if a dam having height of 10 to 15 m it should satisfy at least one of the conditions viz. (a) length of the crest not less than 500 m; (b) reservoir capacity not less than one million cubic meter (c) flood discharge capacity not less than 2,000 cubic meter per second; (d) dam having specially difficult foundation problem and (e) unusual design

¹⁰³ 'Dam Inspection and Safety Services' established in October 1980 was renamed as 'Dam Safety Organisation' in March 1985

¹⁰⁴ An annual report to be prepared by the DSO in March every year and to be sent to the Regional Chief Engineers and concerned Superintending and Executive Engineers in-charge of dams, State Government and Dam Safety Monitoring Unit of Central Water Commission, New Delhi

- Carry out the analysis of instrumentation data received from the field and prepare Instrumentation Analysis Report (IAR) for inclusion in the HSR; and;
- Prepare inventory of the register of large dams and compilation of district- wise registers of small dams.

Audit scrutiny revealed delays in inspection of dams and non-compliance to the deficiencies pointed out in the HSR. The same are discussed below.

4.2.1 Dams not inspected for more than 10 years

Large dams were classified (December 1988) by the DSO as Category I, II and III for the purpose of conducting periodical inspections based on the parameters as given in **Table 4.1**.

Table 4.1: Classification of dams

Sr. No.	Category	Parameters			
		Height over lowest foundation (metres)	Gross storage (Million cubic metre)	Spillway capacity (cum/Sec)	Type of spillway
1	Category I	More than 30	More than 60	More than 3000	Gated
2	Category II	15 to 30	15 to 60	2000 to 3000	Un-gated
3	Category III	10 to 15	1 to 15	2000 to 3000	Un-gated

Source: Information furnished by DSO

The DSO on the basis of pre and post-monsoon inspection reports received from field officers and test inspections of Category I and II dams conducted, prepares an annual consolidated HSR of Category I and II dams. The HSR also suggests remedial measures to be taken for the deficiencies pointed out in the report. The status of inspection of dams conducted by the DSO is given in **Table 4.2**.

Table 4.2: Test inspection of dams by DSO

Year	Number of category I and II dams	Number of dams test inspected by DSO	Percentage of inspection
2007	1679	191	11.38
2008	1713	180	10.51
2009	1762	155	8.80
2010	1763	178	10.09
2011	1878	174	9.27
2012	1913	168	8.78

Source : Health Status Reports

The above table reveals that the number of dams inspected decreased from 11.38 *per cent* in 2007 to 8.78 *per cent* in 2012¹⁰⁵.

Audit observed that GoM did not issue any instructions fixing the frequency of inspection for each dam by the DSO as also the methodology for selection of dams for test inspection by the DSO. However, DSO while preparing the annual inspection programme, selected a dam by adopting three criteria *viz.* dams not inspected for the last 10 years, demands of CEs of field offices to conduct inspection of dams under their jurisdiction and dams having Category I deficiency¹⁰⁶ in the previous year.

¹⁰⁵ Health Status Report prepared up to the year 2012 only

¹⁰⁶ Categories of the deficiencies defined by DSO: Category I deficiencies: Deficiencies which may lead to failure of dam; Category II deficiencies: Major deficiencies requiring prompt remedial measures; and Category III deficiencies: Minor deficiencies which are rectifiable during the year

However, audit noticed that the DSO did not follow the above criteria for selection of dams for test inspection. At the end of March 2013, there were 348 dams (29.72 *per cent*) which were not inspected for more than 10 years, as detailed in **Table 4.3**.

Table 4.3: Dams not inspected for more than 10 years

Sr. No.	Region	Number of dams		Total	Number of dams not inspected for last 10 years		Total dams not inspected	Percentage of dams not inspected for last 10 years		
		Category I	Category II		Category-I	Category-II		Category I	Category II	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) (6/3) <i>per cent</i>	(10) (7/4) <i>per cent</i>	(11) (8/5) <i>per cent</i>
1	Konkan	41	131	172	08	84	92	19.51	64.12	53.49
2	Pune	69	205	274	00	29	29	--	14.15	10.58
3	Nashik	65	179	244	07	56	63	10.77	31.28	25.82
4	Auranga-bad	15	212	227	03	102	105	20.00	48.11	46.26
5	Amravati	20	155	175	03	56	59	15.00	36.13	33.17
6	Nagpur	19	60	79	0	0	0	0	0	0
Total		229	942	1171	21	327	348	9.17	34.71	29.72

Source: Data furnished by DSO

From the above table it may be seen that nine *per cent* of Category I and 35 *per cent* of Category II dams were not inspected for more than 10 years. Further, 52¹⁰⁷ dams which were originally identified in the annual inspection programmes approved by the Director General, DTHRS¹⁰⁸ during the period 2007-08 to 2010-11, were neither inspected nor included in the subsequent annual inspection programmes. The deviation from annual inspection programmes was also not approved in the subsequent annual meetings of Director General, DTHRS.

There was thus, a need to fix the frequency or periodicity of inspection of each dam and also formulate a suitable selection criteria for inspection of dams based on age, size and the potential risk they may pose to life and property in case of failure.

The Government stated (August 2013) that dams which were originally identified in the annual inspection programme but not inspected have been incorporated in the annual dam inspection programme for 2013-14. Verification of inspection programme for 2013-14 revealed that out of the 52 dams not inspected during 2007-11, 44 dams were included in the inspection programme for 2013-14.

4.2.2 Poor compliance to deficiencies pointed out in health status report of dams

The field offices are responsible for taking remedial measures on priority basis before onset of monsoon and submit compliance reports on the deficiencies to the DSO before preparation of succeeding year's Health Status Report.

¹⁰⁷ Includes one dam *viz.* Ambit which was identified twice for inspection during 2009-10 and 2010-11, but not inspected

¹⁰⁸ Design, Training, Hydrology, Research and Safety

Audit analysis of the HSRs for the years 2007 to 2012 revealed that the HSRs prepared by the DSO excluded the status of 90¹⁰⁹ dams, as pre and post-monsoon inspection reports had not been received. Thus, the annual HSRs did not reflect the true health of Category I and II dams.

While Category I deficiencies were not noticed in any dams, the status of compliance to Category II deficiencies pointed out in earlier years, as per HSRs, is indicated in **Table 4.4**.

Table 4.4: Status of compliance to Category II deficiencies

Year of HSR	Number of dams with category II deficiencies	Number of dams for which compliance received till finalisation of succeeding year HSR	Compliance percentage
2007	450	3	0.67
2008	459	47	10.24
2009	583	71	12.18
2010	508	50	9.84
2011	522	101	19.35
2012	493	216	43.81

Source: Health Status Report of dams of respective years

As can be seen, compliance was low and ranged between less than one *per cent* and 43.81 *per cent* during 2007-12.

Audit also observed that compliance reports of Category II deficiencies mentioned in the HSRs for the year 2007 to 2012 were not received from Marathwada region as a result in Marathwada region non-compliance to Category II deficiencies increased progressively from 52 in 2007 to 68 in 2012. Some of the deficiencies for which compliances were pending are shown in **Appendix 4.1**.

A few instances where lack of action resulted in aggravation of deficiencies are given below:

- In five¹¹⁰ dams, the rate of seepage in gallery and leakage of water noticed during initial inspection in 2007 increased from three *per cent* to 130 *per cent* during 2012.
- At Manjara dam, the cross drains¹¹¹ and toe drains¹¹² were blocked in 2007 but by 2011 the cross drains and toe drains were de-shaped.
- At Mun dam, the right and left side guide bunds¹¹³ required rectification in 2007 but due to non-rectification, the earthwork of guide bund and pitching at river distance 210 m to 300 m was washed out in 2011.

The DSO stated (October and November 2012) that follow up was done through correspondence with the field offices at all levels and the matter was also discussed in the annual meeting of Regional Chief Engineers under the

¹⁰⁹ 2007: 17 dams; 2008: 22 dams; 2009: 13 dams; 2010: 10 dams; 2011: 16 dams and 2012: 12 dams

¹¹⁰ Kolkewadi – 3 *per cent*; Tillari Main Dam, Dhamne (G) – 51 *per cent*; Bhatsa – 66 *per cent*; Awashi – 67 *per cent* and Wagh – 130 *per cent*

¹¹¹ Cross drain is to collect seepage from the longitudinal drain and collect it in the toe drain

¹¹² Toe drain is a trench with filter material laid along the down stream toe of the dam to collect seepage from horizontal filter or inner cross drain and take it to natural drain

¹¹³ Guide bunds are provided for the purpose of guiding the river flow past the diversion structure without causing damage to it and its approaches

Chairmanship of Director General, DTHRS. The fact remains that despite the correspondence and meetings, the Category II deficiencies remained unattended thereby compromising the safety of the dams.

The Government stated (August 2013) that a system would be put in place to rectify the reported deficiencies for ensuring proper accountability.

4.3 Quality checks by Maharashtra Engineering Research Institute

MERI was established in April 1959 at Nashik for research, investigation, testing of material and consultancy in various disciplines of civil engineering. MERI is headed by Director General, DTHRS, who is assisted by CE, SE and nine Ees. Audit findings are discussed in the succeeding paragraphs.

4.3.1 Absence of mechanism to ensure testing as per norms

Material Testing Division (MTD) of MERI conducts various tests on the samples of material such as cement, core of colgrout masonry¹¹⁴ etc. received from dam construction divisions and results are intimated to the concerned dam divisions. As per the norms fixed (April 1993) by GoM, the dam divisions were required to get one cement test done by Quality Control Divisions (QCD) of WRD for every 50 tonnes of cement used in the work. Further, from April 2000 onwards, minimum 10 *per cent* samples of cement were required to be tested by MERI. In five¹¹⁵ test-checked projects, audit scrutiny revealed that against 44 samples to be sent for testing to MERI during 2007-13, only four samples were sent by the construction divisions.

The Government stated (August 2013) that a system already exists in the Department to ensure that the required number of samples are received and tested as per norms.

However, in view of the shortfalls in testing noticed in audit, the Department needs to ensure adherence to the prescribed norms so that necessary quality norms are adhered to.

4.3.2 Failure of colgrout masonry samples during quality test conducted by MERI

The test to be conducted on colgrout masonry is prescribed in the PWD hand book whereby for every 10,000 cum of colgrout masonry constructed during the season, the dam divisions should get one core tested from MERI. After receipt of samples from the project divisions, tests are carried out and results are communicated to the divisions.

Scrutiny of test reports of colgrout masonry works conducted by MTD during the period 2007-2013 revealed that samples in respect of 12 out of 15 projects failed. The results in respect of the nine projects are shown in **Table 4.5**.

¹¹⁴ Colgrout masonry is a new technique where the masonry is the result of injection of mortar consisting of mixture of cement, fine aggregate and water and additives, if any, mixed at high speed in a colgrout double drum mixer in pre-packed stones

¹¹⁵ Dendonwadi, Hetwane, Korle-Satandi, Nardave and Roshni

Table 4.5: Results of colgrout core tests

Sr. No.	Name of the project	No. of samples			
		Received	Passed	Failed	Percentage of failure
1.	Rankala Minor Irrigation Project, District Nandurbar	02	01	01	50
2.	Bembala Project, District Yevatmal	04	00	04	100
3.	Uppar Mannar Project, District Nanded	03	01	02	66.67
4.	Kalu Minor Irrigation Project, District Ahmednagar	04	00	04	100
5.	Gul Project, District Jalgaon	02	01	01	50
6.	Lower Panzara Project, Akkalpada, District Dhule	11	06	05	42.86
7.	Urmodi Project, District Satara	02	01	01	50
8.	Uppar Pravara Project Nilwande 2, District. Ahmednagar	48	34	14	29.16
9.	Tarali Project Patan, District Satara	60	14	46	76.67
10.	Pimpalgaon Dhole Project, Taluka Barshi, District Solapur	05	02	03	60.00
11.	Lower Tapi Project, Taluka Pedalse, District Jalgaon	02	00	02	100.00
12.	Hatnur Project, Taluka Bhusaval, District Jalgaon	09	07	02	22.22

Source: Test report of MTD

The failure of samples tested ranged between 22.22 per cent and 100 per cent.

On being pointed out in audit, the Superintendent Engineer, Central Design Organisation (CDO), Masonry Dam Circle confirmed (December 2012) that the low strength of the colgrout masonry works may lead to reduction in the strength of the dam to sustain load or stress in future.

4.3.3 Non-functional dam safety instruments

Various types of instruments¹¹⁶ are installed in dams having more than 30 m height to monitor their health and ensure proper diagnosis for implementation of remedial measures. Instrumentation Research Division (IRD) of MERI looks after the procurement, installation and repairs of dam safety instruments.

Scrutiny of instrument analysis report in the HSR for the year 2007-12 revealed that a large number of instruments were not functioning. The status of the instruments installed on earthen and masonry dams for the period 2007-12 is shown in **Table 4.6**.

Table 4.6: Instruments installed and their functional status

Year of HSR	Type of dam	Instruments		
		Installed	Functioning	Not functioning (Percentage)
1	2	3	4	5
2007	Earthen	2378	1238	1140 (47.94)
	Masonry	1410	913	497 (35.25)
2008	Earthen	2378	1225	1153 (48.49)
	Masonry	1617	1103	514 (31.79)
2009	Earthen	2396	1113	1283 (53.55)
	Masonry	1572	1114	458 (29.13)
2010	Earthen	2396	1098	1298 (54.17)
	Masonry	1650	1140	510 (30.91)

¹¹⁶ Stress meter, strain meter, thermometer, piezometers, plumb bobs, seismic instruments, micro earthquake recorder, strong motion accelerograph etc.

1	2	3	4	5
2011	Earthen	2048	898	1150 (56.15)
	Masonry	1595	916	679 (42.57)
2012	Earthen	2669	1510	1159 (43.42)
	Masonry	1667	943	724(43.43)
Source: HSRs prepared by DSO for the period 2007-12				

As seen from the table above, the overall percentage of the instruments installed and not functioning ranged between 29 and 56 *per cent*. The percentage of non-functioning instruments installed in earthen dams showed a consistent increase of 47.94 *per cent* in 2007 to 56.15 *per cent* in 2011. In respect of masonry dams, though the percentage of non-functioning instruments decreased from 35.25 *per cent* in 2007 to 29.13 *per cent* in 2009, but thereafter continued to increase sharply and was 43.43 *per cent* in 2012.

- An inverted plumb bob (IPB) provides an effective, simple and quick method of measuring the relative displacement between two reference points of dam structure. Audit scrutiny revealed that IPB in Pench (Totaladoh) dam and Manikdoh dam were not working since June 2010 and September 2011 respectively. The IRD prepared estimates of ₹ 1.79 lakh for Pench project and ₹ 2.06 lakh for Manikdoh project and forwarded them to the project authorities concerned for remitting the cost of repairs. However, the instruments could not be repaired by IRD due to non remittance of funds by the Manikdoh construction division (October 2013). Similarly, DG, MERI, Nashik intimated (February 2008) SE, North Konkan Irrigation Circle, Thane that the inverted plumb bob installed in Bhatsa dam was not functioning. Though an estimate of ₹ 3.13 lakh was prepared by MERI Nashik in March 2010 for the repairs, this could not be carried out due to non remittance of funds by Bhatsa construction division (October 2013). Due to non-functional IPB, the tilt in dams could not be measured and monitored.

The Government stated (July 2013) that funds available for maintenance of dams was limited and hence, repairs were done after due prioritisation. It further stated that repairs/replacements of all the defective instruments would be undertaken if special arrangements for funds are made, either by the Central Government or from any other sources. As the cost of repairs of these non-functioning IPB is very small compared to the huge revenue expenditure made annually, Government may ensure that these defective instruments are repaired at the earliest to allow the monitoring of the health of the dams which could lead to disaster if unattended to at the earliest.

4.4 Quality checks through Quality Control Organization

WRD created a separate Quality Control Organization (QCO) with three Quality Control Circles (QCC) at Pune (1979), Aurangabad (May 1999) and Nagpur (August 2009) for testing of material used in dam construction, concrete/cement mortar cubes for compressive strength and field density and moisture content tests for embankment. The EEs of the Construction Divisions (CD) were to send copies of the technical specifications of the accepted tenders and work orders (issued to the contractors) to the respective quality control engineers before the start of work so that the programme for quality

tests could be prepared accordingly by the QCD. A system of OK Card/Green Card was also introduced for works valuing more than ₹ three crore where the height of canal embankment was more than three metres and the cost of canal structures was more than ₹ one crore.

Senior officers visiting the construction sites were to scrutinize the works and point out discrepancies / errors through ‘Inspection Notes’ (INs). During inspection, if the deficiencies noticed were such as could be rectified before start of work, the QC officer would issue ‘Yellow Inspection Slip’ (YIS). If the deficiencies were of serious nature and it was not desirable to continue the work, the Deputy Engineer, QC was to issue ‘Red IS’ (RIS) with remarks. On receipt of RIS from QC, the work was to be stopped by the Construction Deputy Engineer (CDE) and necessary rectification carried out immediately. On rectification of the deficiencies raised in RIS, OK card is issued.

Audit scrutiny revealed that though the system was well defined, there were weaknesses in its implementation. Audit findings are discussed below.

4.4.1 Failure to obtain construction programme and execution of work without OK card/Green card

Every year the QCD requests the construction divisions to send the schedule of construction for that particular construction year (October to September) so that the programme for quality tests could be prepared by the QCD. Scrutiny of records of SE, QCC, Aurangabad, Nagpur and Pune in October 2012 revealed that 42 *per cent* CDs failed to furnish construction programme as detailed in **Table 4.7**.

Table 4.7: Shortfalls in sending construction programmes

Year	Name of the circle	Number of CDs		
		under the jurisdiction of Circle	which sent the construction programme	which failed to send the construction programme (<i>per cent</i>)
2009-10	Aurangabad	68	39	29 (43)
	Nagpur	49	35	14 (29)
	Pune	49	24	25 (51)
2010-11	Aurangabad	68	40	28 (41)
	Nagpur	54	30	24 (44)
	Pune	71	51	20 (28)
2011-12	Aurangabad	68	37	31 (46)
	Nagpur	51	27	24 (47)
	Pune	73	48	25 (34)
2012-13	Aurangabad	68	35	33(49)
	Nagpur	51	31	20(39)
	Pune	66	33	33(50)
Total		736	430	306 (42)

Source: Information furnished by QCCs

In the absence of the construction programme, the QCD could not prepare programme for quality tests.

4.4.2 Completion of works despite issue of “Red IS”

Out of 2,807 works in the three Quality Control Circles (Aurangabad, Nagpur and Pune) for which construction programme were received during 2009-13,

in 2,532 works YIS were issued and in 81 works RIS were issued. Out of 81 works for which RIS were issued, 30 works were continued without obtaining OK cards.

Scrutiny of records of the EE, Minor Irrigation Division (MID), Satara further revealed that SE, QCC, Pune issued (June 2011) RIS to Kalgaon dam work in view of poor quality of earthwork (hearting and casing), non-execution of compression work (hearting and casing) *etc.* EE, MID, Satara submitted (September 2011) the compliance but it was not accepted (July 2012) by the SE, QCC. However, recordings in the measurement book (between 28 November 2011 and 30 January 2013) and bills paid (between December 2011 and February 2013) to the contractor indicated that the work was executed contrary to the instructions that work should not continue. The continuation of work and release of payment after the issue of RIS defeated the very purpose of quality control measures put in place.

In the exit conference, Principal Secretary stated (July 2013) that instructions would be issued for strict compliance to RIS.

4.4.3 Non-compliance to inspection notes issued by QCO

The WRD issued (September 1988) instructions to the construction divisions to comply with the technical remarks raised by QCO and to keep record of the compliances. The WRD also instructed (January 1998) that the Construction Superintending Engineer shall call the Executive Engineer, Quality Control for monthly meeting with the Construction Executive Engineer for speedy settlement of objections contained in the inspection notes.

Scrutiny of records of the SE, QCCs at Aurangabad, Nagpur and Pune revealed that out of 5,991 inspection notes issued during 2009 to 2013, 2,411 inspection notes were outstanding (40 *per cent*) as shown in **Table 4.8**.

Table 4.8: Outstanding inspection notes

Year	Name of the circle	No. of IN issued	Compliance received	Pending compliance	Pending compliance in <i>per cent</i>
1	2	3	4	5	6
2009-10	Aurangabad	501	268	233	47
	Nagpur	667	341	326	49
	Pune	142	89	55	39
	Total	1310	698	614	47
2010-11	Aurangabad	576	270	306	53
	Nagpur	645	382	263	41
	Pune	228	139	100	44
	Total	1449	791	669	46
2011-12	Aurangabad	824	361	463	56
	Nagpur	823	734	89	11
	Pune	186	91	109	59
	Total	1833	1186	661	36

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1	2	3	4	5	6
2012-13	Aurangabad	632	342	290	46
	Nagpur	639	539	100	16
	Pune	128	59	77	60
	Total	1399	940	467	33
Grand total		5991	3615	2411	40
Source : Information furnished by QCO					
Note: Compliance received also includes compliance for the inspections notes issued in the previous years					

It was further observed that in Pune Circle, meetings for speedy settlement of objections, as envisaged in the Government circular of January 1998, were not held till August 2011. Thereafter, 16 meetings were held till September 2013. The fact that timely meetings were not held and the high pendency of the inspection notes indicated poor monitoring by the QCO. The SE, QCC, Pune stated (October 2012) that though pursuance was done at all levels through discussions, the compliances received from the construction divisions were vague and incomplete.

The high pendency of inspection notes and the reply of SE, QCC indicates that the field construction offices did not give due importance to quality control during the construction of the dams.

4.4.4 Shortfalls in inspections

Inspection norms for SEs, EEs *etc* as per the Manual prepared by Pune QCC are given in **Table 4.9**.

Table 4.9: Norms for conducting inspection (in numbers)

Designation	2007	2008	2009	2010	2011	Since November 2011
Superintending Engineers	12	12	20	25	25	35
Executive Engineers	14	16	22	30	30	40
Sub Divisional Engineers	30	30	30	30	30	40
Assistant Engineers II/Sectional Engineers	300 slips/sub-division	300 slips/sub-division	300 slips/sub-division	300 slips/sub-division	400 slip/sub-division	100 slip/sub-division
Source : Information furnished by the Department						

Shortfall noticed in audit with reference to the above norms in Pune Circle during 2007-13 is detailed in **Table 4.10**.

Table 4.10: Shortfall noticed in inspections under Pune Circle during 2007-13

Designation	Audit observation
Executive Engineers	The shortfall ranged between 6.25 <i>per cent</i> in Shirur division (2008) and Kolhapur division (2007) and 33.33 <i>per cent</i> in Shirur Division (2007).
Sub Divisional Engineers	Shortfall ranged between 3.33 <i>per cent</i> (2007) in Nasrapur Sub Division under Kolhapur Division and 86.66 <i>per cent</i> (2007) in Mohol Sub-Division under Shirur Division.
Asstt. Engineers/Jr Engineers/Sectional Engineers	Shortfall ranged between 1.5 <i>per cent</i> (2011) in Sub division No.2 Satara and 91.33 <i>per cent</i> (2008) in Mahuli (Vita) Sub-Division, Satara.
Source : Information furnished by the Department	

SE, QCC, Pune attributed the shortfall to fund problem and shortage of technical staff.

In Nagpur and Aurangabad QCCs, it was observed that the Manual stipulating the inspection schedule was not prepared by the respective QCCs. However, as per GoM instructions of August 2002, the SEs, QCCs was required to carry out average 10 days inspections of works per month (*i.e.*, 80 days of inspections *per annum* excluding four months of monsoon) subject to availability of ongoing works. The status of inspections carried out by SEs, QCCs during 2009-10 to 2012-13 against the norms specified is given in **Table 4.11**.

Table 4.11: Details of inspection carried out by SEs, QCCs

Sr. No.	Year	No. of days of inspection to be carried out by SE, QCC	Actual no. of days of inspections carried out by SE, QCC	
			Aurangabad	Nagpur
1.	2009-10	80	84	34
2.	2010-11	80	62	38
3.	2011-12	80	66	40
4.	2012-13	80	53	49

Source : Information furnished by the Department

The SE, QCC, Nagpur stated (October 2012) that the inspection were carried out as per progress of works and there were no specific targets. The SE, QCC, Aurangabad stated that shortfall in inspection was due to vast jurisdiction *i.e.* 12 districts of Marathwada. The replies are not acceptable as the GoM directives stipulated minimum days of inspection which the SEs, QCCs did not follow.

4.5 Man power shortage

Details of sanctioned strength (SS) and men in position (MIP) in the three QCCs during 2009-10 to 2012-13 are given in **Table 4.12**.

Table 4.12: Details of MIP vis-à-vis sanctioned strength

Name of Circle	2009-10		2010-11		2011-12		2012-13	
	SS	MIP (per cent)	SS	MIP (per cent)	SS	MIP (Per cent)	SS	MIP (Per cent)
Aurangabad	303	227 (74.92)	303	217 (71.62)	303	232 (76.57)	303	249 (82.18)
Nagpur	403	169 (41.94)	403	210 (52.11)	403	205 (50.87)	478	322 (67.36)
Pune	628	529 (84.24)	678	533 (78.61)	678	514 (75.81)	678	519 (76.55)

Source : Information furnished by the Department

The manpower shortage in Nagpur was 32.64 *per cent* and that in Aurangabad and Pune was 17.82 and 23.45 *per cent* respectively during 2012-13.

The position of technical posts under the SE, QCC, Aurangabad, Nagpur and Pune as of March 2013 was as shown in **Table 4.13**.

Table 4.13: Shortage of technical staff

Sr. No.	Post	Pune			Nagpur			Aurangabad		
		SS	MIP	Percentage Shortfall	SS	MIP	Percentage Shortfall	SS	MIP	Percentage Shortfall
1.	Sub-Divisional Engineer	27	23	15	19	13	32	12	12	0
2.	Assistant/ Section/ Junior Engineer	155	106	32	108	61	44	68	54	20.59
3.	Civil Engineer Assistant	63	54	14	42	21	50	27	26	3.70
4.	Laboratory Assistant	63	46	27	42	28	33	27	18	33.33

Source: Information furnished by the Department

The shortfall in technical posts in Pune and Nagpur ranged between 14 and 32 *per cent* and 32 and 50 *per cent* respectively.

The Government stated (August 2013) that sizeable number of vacancies have been filled up in 2012-13 while the proposal for filling up the remaining posts are under consideration and would be filled up on approval by the concerned authorities. Verification by audit in three QCCs revealed that the overall vacancies in the post of AE/JE increased from 18.48 *per cent* in March 2010 to 33.23 *per cent* in March 2013. The vacancies in the post of AE/JE in Pune and Aurangabad QCCs increased from 2.78 to 31.61 *per cent* and from 4.41 to 20.59 *per cent* during 2010-13 respectively. The vacancies in the post of Laboratory Assistant in Pune QCC also increased from 15 to 26.98 *per cent* during 2012-13. Thus, shortage of manpower continued to hamper regular inspections and quality testings.