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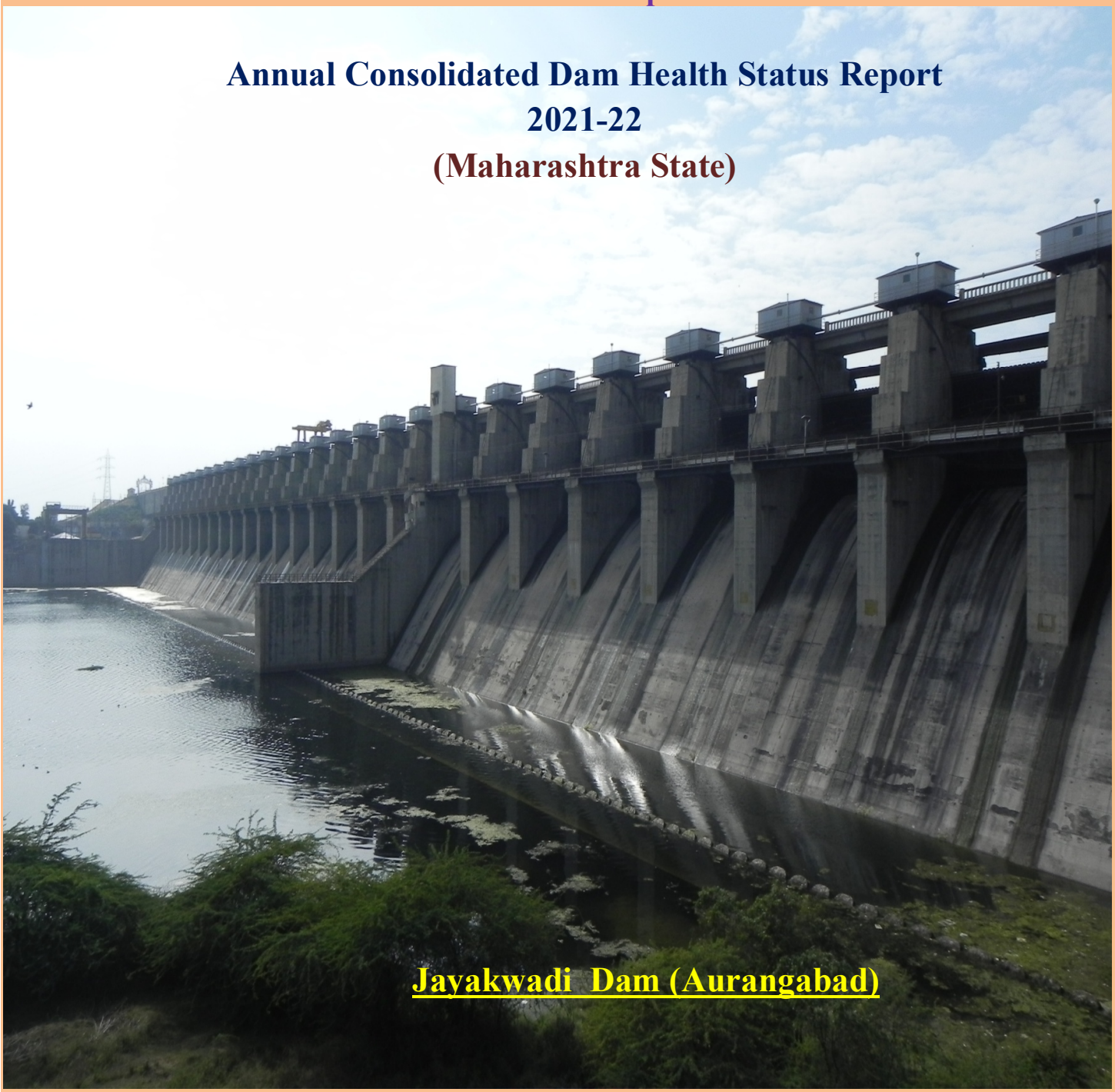
Government of Maharashtra

Water Resources Department

Annual Consolidated Dam Health Status Report 2021-22 (Maharashtra State)



Jayakwadi Dam (Aurangabad)

Superintending Engineer
Dam Safety Organisation
Nashik

Chief Engineer
Hydrology & Dam Safety
Nashik

Superintending Engineer
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सत्यमेव जयते

महाराष्ट्र शासन,
जलसंपदा विभाग
Government of Maharashtra
Water Resources Department

अधीक्षक अभियंता,
धरण सुरक्षितता संघटना,
दिंडोरी मार्ग, नाशिक - ४२२ ००४.
दूरध्वनी (ऑ.): ०२५३ - २५३००३०
फॅक्स : ०२५३ - २५३००३०.
ई-मेल : damsafetyse@gmail.com

No.DSO/DSD-3/ ACDHSR 2021-22/ 1458 /2022 Date -22/11/ 2022

To,

The Chief Engineer (DSO),
Central Water Commission,
Dam Safety Monitoring Directorate,
New Delhi-110 066

Sub: Annual Consolidated Dam Health Status Report of Maharashtra State Year 2021-22(ACDHSR 2021-22)

Ref : Dam Safety Monitoring Directorate, Central Water Commission, New Delhi vide letter No. 3/19/NCDS/HS/DSM/2001/627-56 Dated- 28/08/2002.

Annual Consolidated Dam Heath Status Report (Maharashtra State) for Year 2021-22 based on Pre & Post monsoon 2021 Inspection Reports, covering dam safety activities, is prepared and furnished herewith for information.

Encl. :- ACDHSR 2021-22

(M.S.Amale)
Superintending Engineer
Dam Safety Organization
Nashik

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Government of Maharashtra
Water Resources Department

Annual Consolidated Dam Health Status Report 2021-22 (Maharashtra State)

Superintending Engineer
Dam Safety Organisation
Nashik

Chief Engineer
Hydrology & Dam Safety
Nashik

Director General
Design, Training, Hydrology, Research and Safety,
MERI, Nashik

FOREWORD

1.0 Annual Consolidated Dam Health Status Report (ACDHSR) 2021-22 of Class-I & Class-II Dams is prepared based on the Inspection Reports (Pre and Post Monsoon 2021 received from field offices and test inspections carried out by Dam Safety Organisation (DSO), Nashik during Year 2021-22.The period of the report is from April 2021 to March 2022.

2.0 This Report comprises of following Parts.

Part	Description
Part-1	General Information
Part-2	Action Taken Report (ATR)
Part-3	Annual Dam Health Status Report (ADHSR) of Pre & Post Monsoon 2021
Part-4	Annual Performance Report of Dam Instruments
Part-5	Annual Performance Report of Meteorological Instruments
Part-6	National Committee on Dam Safety (NCDS) Documents
Part-7	Dam Health and Rehabilitation Monitoring Application (DHARMA)
Part-8	Health Status of Gated Dam (As per Mechanical Organisation)

Part-1 & Part-6 to 8 are envisaged by DSO, Nashik & Part-2 to 5 are in the format provided by Dam Safety Monitoring Directorate, Central Water Commission, New Delhi vide letter No. 3/19/NCDS/HS/DSM/2001/627-56 Dated 28/08/2002.

2.1 Part-1: Covers General Information viz. Time schedule of Inspection, Classification of Dams, Inspection Authorities, Preparation of ADHSR for Class-I & Class-II Dams, Categorization and Standardization of Deficiencies, NRLD updation, which will be helpful to field officers. Inspecting officers are requested to follow the suggestion given in 'Part-1' while carrying out forthcoming Pre/Post Monsoon inspections of dams.

2.2 Part-2: Covers Action Taken Report (ATR) on Deficiencies pointed out in last Year ADHSR 2020-21 & Status of poor efforts taken by field office.

2.3 Part-3: Covers condensed summary of Dam deficiencies noticed during inspection carried out by field officer and Dam safety Organisation in the Year 2021-22**.**

2.4 Part-4: Covers details of Instrumentation provided in or on Dams & its Functionality. Prepared by Instrumentation and Research Division, Nashik.

2.5 Part-5: Covers details of Metrological Instrumentation provided at Dam Site & its Functionality. Prepared by Instrumentation and Research Division, Nashik.

2.6 Part-6: Covers status of Documents (EAP, ROS & GOS, Data Book, O & M Manual, Record Drawing, Completion Report) recommended by National Committee on Dam Safety.

2.7 Part-7: Covers Progress of updation of Dam Information filled in DHARMA Web Portal.

2.8 Part-8: Covers status of Action Taken Report on Deficiencies pointed out in ADHSR- 2020-21 & Deficiencies observed in ADHSR- 2021 of Mechanical Organisation for Gated Dams.

3.0 This report covers Dam Health Status of 261 Class-I & 992 Class-II Dams owned by WRD and Also covers 23 Class-I & 33 Class-II Private Owned Dams inspected by DSO twice in the year.

4.0. There are total 1025 Dams, Out of expected 2050 Inspection Reports, this ACDHSR is based on 2310 Inspection Reports received in DSO, Nashik.

Status of Receipt of Inspection Report 2021-22
(Ref. Table- 3.1 & 3.2)

Dam Owner	Expected Inspection Report in DSO			Inspection Report Received in DSO			Inspection Report Not Received in DSO		
	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total
WRD	522	1984	2506	478	1763	2241	44	221	265
Private	46	66	112	20	55	75	26	11	37
Total	568	2050	2618	498	1818	2316	80	232	302

Dams having Deficiencies
(Ref. Table- 3.4)

Dam owner	No. of Dams								
	Class of Dam		Total	Class-I dams having Deficiencies			Class-II dams having Deficiencies		
	I	II		Cat-I	Cat-II	Cat-III	Cat-I	Cat-II	Cat-III
W.R.D	261	992	1253	0	139	254	0	298	957
Private	23	33	56	0	12	17	0	28	33
Total	282	1025	1309	0	151	271	0	326	990

Category wise Deficiencies
(Ref. Table- 3.5)

Dam owner	No. of Deficiencies								
	Category–1			Category-2			Category-3		
	Class		Total	Class		Total	Class		Total
	I	II		I	II		I	II	
W.R.D	0	0	0	868	765	1633	3017	6267	9284
Private	0	0	0	42	80	122	122	303	425
Total	0	0	0	910	845	1755	3139	6570	9709

Deficiencies in Class-1 Gated Dams (As per Mechanical Organization)
(Ref. Table- 8.1)

Dam owner	Number of Gated Dams	No. of dams inspected	Number of Deficiencies		
			Category		
			Category-1	Category-2	Category-3
W.R.D	164	164	0	2795	9473

5.0: The responsibility of Health and Safety Monitoring of Class-III dams lies with the respective Chief Engineers. Hence for Class-III Dams based on periodical inspection reports, Annual Dam Health Status Report should be prepared & published by concerned Field Chief Engineers with submission to Government & forwarded to DSO, Nashik for record.

6.0: The deficiencies shown in the present report are based on the Pre/ Post Monsoon Inspections of the Dams carried out by the field officers and reports of them received by this organization. As such, the deficiencies and action taken thereof is the sole responsibility of the field officers.

7.0 Conclusions :

7.1 Action Taken Report of Class-I & Class-II Dams (Government owned & Private)

	Category	Total Dam				ATR received				Physically fully completed						Physically partly completed					
	Class	I		II		I		II		I		II		%		I		II		%	
	No. of	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency
	Category 1 Dificiency																				
1	WRD	Nil																			
2	Private																				
	Category 2 Dificiency																				
3	WRD	116	686	241	656	44	50	110	31	2	50	34	36	10	6	22	40	43	31	18	5
4	Private	13	37	18	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	129	723	259	707	44	50	110	31	2	50	34	31	9	5	22	40	43	31	17	5

Sr. No.	Expected Inspection Report in DSO	Received in time in DSO		Even after rigorous follow up by DSO		ATR were not received	
		Number	%	Number	%	Number	%
1	388	0	0	159	40.97	229	59.02

7.1.1) Out of 388 ATR, 229 ATR are not received in DSO. Hence, in true spirit this ACDHSR does not represent actual Health Status of Dams in the State.

7.1.2)Concerned Chief Engineer should monitor and instruct field Superintending Engineer & Executive Engineer regarding submission of ATR to DSO, Nashik to reflect exact status of Dam Safety works. Otherwise whole execercise of publishing ACDHSR will be futile.

7.1.3)Concerned Dam owner should give serious attention regarding submission of ATR to DSO, Nashik to reflect exact status of Dam Safety works. Otherwise whole execercise of publishing ACDHSR will be futile.

7.2 Health Status of Class-I & Class-II Dams (Government & Privet owned)

Sr. No.	Category	Total Dams		Reports received in DSO				Cat 1				Cat 2				Cat 3			
	Class	I	II	I		II		I		II		I		II		I		II	
	No. of			Pre	post	Pre	post	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency
1	WRD	261	992	244	236	921	842	0	0	0	0	139	868	298	765	254	3017	957	6267
2	Private	23	33	5	17	17	25	0	0	0	0	12	42	28	80	17	122	33	303
	Total	282	1025	249	253	938	881	0	0	0	0	151	910	326	845	271	3139	989	6570

7.2.1) A Graphical Representation of Deficiencies attended, Submission of Pre/Post Monsoon Reports, Category wise Deficiencies, Class wise of Deficiencies is appended in Annexure-I.

7.2.2) Points of Attention :

Sr. No.	Expected Inspection Report in DSO	Pre & Post Monsoon Inspection Report Received in time		Pre & Post Monsoon Inspection Report Not Received in time		Pre & Post Monsoon Inspection Report Not Received	
		Number	%	Number	%	Number	%
1	2624	474	18.06	1845	70.31	305	11.62

7.2.2.1) This overview provides condensed summary of deficiencies noticed in the Pre & Post Monsoon Inspection Reports Received in DSO & also during test inspection conducted by DSO Officials. Field Officers / Owners of the Dams are required to pay attention to Deficiencies pointed out in ACDHSR to maintain Dams in Safe condition.

7.2.2.2) The Chief Engineers are requested to flag this issue and compel all Superintending Engineer & Executive Engineer of concerned Dams to carry out periodic inspections and submit report to D.S.O. in time. Otherwise the whole exercise done by Dam Safety Organisation tends to become futile.

7.2.3 Deficiencies in Class-1 Gated Dams ((As per Mechanical Organization)

Deficiencies in Class-1 Gated Dams (As per Mechanical Organization)
(Ref. Table- 8.1)

Dam owner	Number of Gated Dams	No. of dams inspected	Number of Deficiencies		
			Category		
			Category-1	Category-2	Category-3
W.R.D	164	164	0	2795	9473

8. Points of Attention:

8.01: It is mandatory that Pre Monsoon Inspection Report must be submitted to DSO, Nashik by 30th June & Post Monsoon Inspection Report must be submitted to DSO, Nashik by 31st December every Year.

8.02: As per Dam Safety Monitoring Directorate, Central Water Commission, New Delhi Annual Dam Health Status Report (ADHSR) must be submitted in the month April every Year.

8.03: It is highly regretted that only out of 2624 Pre & Post Monsoon Reports only 474 (18.06%) Reports received in stipulated period & 1845 (70.31%) reports received only after rigorous follow up by DSO officials & 305 (11.62%) reports were not received at all.

8.04: ATR expected for 388 No. of Dams (1430 Cat-2 Deficiencies). However ATR was received for 159 No. (81 Cat-2 Deficiencies) of Dams i.e. only 5.66 % of Cat-2 Deficiencies fully addressed.

8.05: Concerned Chief Engineer should monitor and instruct field Superintending Engineer & Executive Engineer regarding submission of ATR to DSO, Nashik to reflect exact status of Dam Safety works.

8.06: The Chief Engineers should compel all Superintending Engineer & Executive Engineer of concerned Dams to carry out periodic inspections and submit report to D.S.O. in time. Brain storming of field officer regarding Dam Safety aspect is must otherwise the whole exercise done by Dam Safety Organisation tends to become futile.

8.07: High level review of Painting of structural steel to avoid further deterioration where ever required is to be done & particular attention for uprooting of trees on the earthen embankment to keep Dam embankment in safe condition is must.

8.08: Being the dam owner, safety of the dam is the prime responsibility of the concerned field Executive Engineer. In order to ensure safety of dam/dams in his jurisdiction, he shall initiate The procedures for removal of deficiencies noticed in the Pre-Post Monsoon Inspection as well as pointed out in this ADHSR by following due procedure of approval.

8.09: Higher authorities i.e. Superintending Engineer and Chief Engineer shall accord timely sanction to most economical and sustainable technical work required for Deficiency removal.

8.10:Executive Director of the corporation are requested to make required funds available to the Deficiency removal and monitor the progress periodically. This will help in keeping the Dam safe.

8.11: As per Marathi Government Resolution Misc. 2016/(88/16)/IM(W) Dtd.- 09/05/2016, Responsibility of Approval of M & R Work's Procurement List & Prioritisation of execution of work & its implementation is entrusted to Superintending Engineers. And Responsibility of Review & monitoring is entrusted to Chief Engineers.

8.12: Hence, It is expected that Superintending Engineers should verify whether Works of removal of Deficiencies are proposed to address Deficiencies pointed in ACDHSR while approving Procurement List of the M & R works of the Project.

8.13: Gist of report is that though inspection of Dams are carried out & Reports are published however status of ATR depict that despite of M & R expenditure extreme poor performance of removal deficiency is observed. Field officers should take serious note of this.

I hope this report will serve desired expectations expressed by Dam Safety Monitoring Directorate of C.W.C. New Delhi. Any error, discrepancies omissions if any may please kindly by brought to the notice. So that it can be taken into consideration in the next report.

The efforts taken by the Superintending Engineer, Dam Safety Organisation, Nashik and his team, for completion of this report are highly appreciated.

-sd/-

Place: Nashik

Date: 17/11/ 2022

(S. R. Tirmanvar)
Director General
Design, Training, Hydrology,
Research and Safety,
MERI, Nashik

INDEX

Part-1

General Information

Part-1 General Information

1.01 Introduction:

As per National Register of Large Dam (NRLD) published by CWC, New Delhi, Maharashtra has the distinction of having largest numbers of dams in the country.

A separate Organisation called Dam Safety Inspectorate, Nashik was functioning in the State since 20/10/1980. Its status is upgraded as Dam Safety Organisation, Nashik from 01/05/1985.

The organization consists of a circle level unit headed by Superintending Engineer under which six Divisions are working Headed by Executive Engineer as follow.

1. Dam Safety Division No.1, Nashik (Kokan & Pune Region)
2. Dam Safety Division No.2, Nashik (Amravati & Nagpur Region)
3. Dam Safety Division No.3, Nashik (Nashik & Aurangabad Region)
4. Canal Safety Division, Nashik (Entire Maharashtra State)
5. Dam Safety Unit (DRIP), Nashik (World Bank Assisted Work)
6. Instrumentation Research Division, Nashik (Entire Maharashtra State)

1.02 Inspection of Dams :

The Government of Maharashtra has delegated powers of Pre and Post Monsoon Inspection to competent authority for Pre and Post Monsoon Inspection of the Dams vide G.R Dtd.23/08/1998.

Dam Safety Organization, Nashik carries out scrutiny of the inspection reports received from field offices for Class-I & II Dams. Significant & Serious deficiencies observed during scrutiny are immediately intimated to Field Offices to carry out Remedial Measures.

The “Annual Dam Inspection Programme” is sanctioned by Director General, DTHRS MERI Nashik. Test inspections are carried out by Dam Safety Organization as a third party inspection to crosscheck the inspections carried out by Field Offices.

Maharashtra State comprising 2068 Dams Government owned Completed Dams (includes 6 National Important Dams, 13 Century old Dams & 29 Dams under Construction Dams) & 53 private Dams & 3 Private Dams From Himachal Pradesh.

1.03 Region wise and class wise break up of number of Dams :

Revenue Region	Class- I Dams	Class- II Dams	Class- III Dams	Grand Total
Kokan`	49	118	3	170
Pune	76	203	112	391
Nashik	70	233	151	454
Aurangabad	37	247	283	567
Amravati	28	160	135	323
Nagpur	21	64	78	163
Total	281	1025	762	2068

1.04 Time Schedule of Inspections :

The Government of Maharashtra has designed systematic approach for monitoring each and every dam. The periodical inspection of dams must be completed as per following schedule.

Type of Inspection	Last dates for	
	Completion of Inspection	Sending of Inspection reports to concerned authorities.
(1) Pre Monsoon	15th May	30th June
(2) Post Monsoon	30th November	31st December
(3) Special inspection before the first filling (Report need not be sent to Dam safety Organization)	30th April	31st May
(4) Special inspection after the first filling	Within one week after the lake attains the intended storage level.	Within one week from the date of inspection.
(5) Special inspection after a severe distressing event or accident or incident.	Immediately after the event is noted.	Within one week form the date of inspection?

1.05 Classification of Dams :

The dams are categorized into three types based on their component and features as below.

SR No	Type of Dam	Height from general level of deepest foundation in m.	Impounded gross storage capacity Up to FRL in M Cum	Spillway capacity	Type of spillway
1	2	3	4	5	6
1	Class-I Dam	Above 30 m	Above 60 M Cum	Above 3,000 Cumecs	Gated Spillway
2	Class-II Dam	15 m to 30 m	15 M Cum upto 60 MCum	2,000 to 3,000 Cumecs	Ungated Spillway
3	Class-III Dam	10 m.to15m	1.0 M Cum upto 15 MCum	2,000 to 3,000 Cumecs	Ungated Spillway

Note :

1) All dams more than 15 meters in height will be classified under “Large Dam” Irrespective of other parameters.
2) All dams less than 10 meters in height will be classified as “Small Dam” irrespective of other parameters.
3) In order to determine the exact category of “Large Dam” following procedure shall be followed. The category of dam as per (I) Height (II) Storage Capacity & (III) Spillway Capacity shall be worked out individually. The highest of category shall be appropriate category of dam
4) Apart from above following additional parameters shall be considered for deciding the category of the dams between 10 to 15 m. in height.
   a) Dams having length of crest more than 2000 m. OR
   b) Dams having specially difficult foundation problems OR

c) Dams with unusual design shall be classified under “Large Dams (Class-II)”

d) Dams having length of crest more than 500 meters but less than 2000 meters Shall be classified as “Large Dams (Class-III)”

1.06 Field Inspection Authorities :

The designated inspection authority for periodical inspection of dam depending upon the classification of type of dam is as below

Sr. No.	Type of Dam	Inspection authority	Inspection Reports to be sent to	Test Inspection
1	2	7	8	9
1	Class-I Dam	Superintending Engineer/ Administrator	1) Chief Engineer 2) Superintending Engineer Dam Safety Organization.	Test Inspection by the Regional Chief Engineer/ Chief Administrator for the dams having height more than 60 m or storage capacity more than 1000 MCum or spillway capacity 10000 Cumecs or more
2	Class-II Dam	Executive Engineer	1) Superintending Engineer/ Administrator 2) Superintending Engineer, Dam safety Organization	
3	Class-III Dam	Deputy Engineer	1)Superintending Engineer/ Administrator 2) Executive Engineer	

1.07 Preparation of Annual Dam Health Status Reports of Class-I & class-II Dams :

Dam safety Organization carried out scrutiny of the periodical inspection reports of Class-I & Class-II dams received from field offices and significant deficiencies are immediately communicated to concern authorities to carry out remedial measures.

Based on all periodical inspection reports from Field Offices and Test Inspections carried out by DSO, Nashik, Region wise Annual Dam Health Status Report is published by DG, DTHRS, MERI, Nashik and submitted to Government, CWC and circulated to all concerned Field Offices.

1.08 Preparation of Annual Dam Health Status Report of Class-III Dams :

The responsibility of Health and Safety Monitoring of Class-III dams lies with the respective Chief Engineer. Hence for Class-III Dams based on periodical inspection reports, Annual Health Status Report of Class-III dams should be prepared by concern Field Chief Engineers and forwarded to DSO, Nashik for record.

1.09 Guidelines Regarding Preparation of Annual Dam Health Status Report :

ADHSR is prepared in DSO, Nashik as per Central Water Commission New Delhi’s Guidelines received vide letter Dtd. 28/08/2002. As per this letter it is intimated that all States / Organizations should submit the Annual Dam Health Status Report (ADHSR) in the month of ‘April’ every year.

Part-1 & Part-6 to 8 are envisaged by DSO, Nashik & Part-2 to 5 are in the format provided by Dam Safety Monitoring Directorate, Central Water Commission, New Delhi vide letter No. 3/19/NCDS/HS/DSM/2001/627-56 Dated 28/08/2002.

1.09.1 Categorization of Deficiencies

The deficiencies observed are categorized as per CWC, New Delhi's letter Dtd. 28/08/2002 as below

Category	Action to be taken
Category-1	Dams with Major deficiencies which may lead to dam failure.
Category-2	Dams with Major rectifiable deficiencies needing immediate attention.
Category-3	Dams having Minor/ No deficiencies.

For further detailing of deficiencies based on the nature and priority of deficiency, DSO, Nashik has standardized all the three types of deficiencies.
These standardized deficiencies are as follows

1.09.2 Category-1 Standard Deficiencies :

Sr. No.	Deficiencies	Category identifier
1 E - Earthen Dam		
1	Seepage water has created an open pathway or pipe through dam, which may lead to failure of dam by piping.	1E.1
2	Heavy seepage with muddy or turbid water is observed through any part of dam.	1E.2
3	Seepage water flooding from a boil in the foundation or from relief well on downstream side of dam.	1E.3
4	Outlet well / Head regulator well and hoisting structure is collapsed/completely damaged.	1E.4
5	Outlet pipe in the body of the dam is damaged/failed and uncontrolled outlet-releases eroding Toe of dam.	1E.5
6	Debris stuck under gate or gate leaf is cracked / failed resulting uncontrolled flow through outlet.	1E.6
1 M Masonry Dam		
1	Downstream movement or tilting of dam.	1M.1
2	Differential movement of dam blocks/monoliths.	1M.2
3	Vertical Displacement with visible cracking in the body of dam.	1M.3
4	Spillway gate damaged / not working.	1 M.4

1.09.3 Category-2 Standard Deficiencies :

Deficiency Cat II (A)	Deficiency Cat II (B)
Earthen Dam	
A.1: Boil/leakage/ seepage/ wet patches/ slushiness in Earthen Dam.	**B 1:** Dam section is not as per design
A 2: Standing pool / Ponding / Water Logging / Slushy condition on D/S of Dam	**B 2:** Cross and toe drains not working properly/ drains silted or vegetated causing stagnant pool of water.
A 3 : Leakages in vicinity of junction between earthen dam & masonry dam portion.	**B 3:** Considerable settlement of embankment / Rock toe/Pitching/ U/S & D/S slops, bulging/concavity of slopes.
A 4 : Major leakages through outlet conduit/pipe joints/Gates.	**B 4**: Longitudinal / Transverse cracks/ low area/sink holes/gully formation on top side slope

Deficiency Cat II (A)	Deficiency Cat II (B)
	of earthen dam.
A 5 ; Relief wells not functioning properly./ Abnormal rise in water level in wells.	**B 5:** Outlet gates not functioning properly. Stem rod is bent(Service gate/Emergency gate/Stop log gate/sluice gate)
A 6 : Outlet well is damaged/not in good condition /cracks observed/jets of water in well.	**B 6:** Approach to dam through all weather road not constructed/maintained properly.
A 7 : Retrogression /scouring in tail channel.	**B 7:** Waste weir/waste weir bar not in good condition/coping damaged/leakage through waste weir.
Masonry / Concrete Dam	
A 8 : Drainage gallery inaccessible/No adequate lighting./ No dewatering arrangement or failure.	**B 8:** Pointing on U/S face of dam not in good condition./deterioration spalling of concrete surface.
A 9 : Foundation drains / holes/ porous pipes/chocked/ no seepage through foundation drain holes.	**B 9:** Instruments not in working condition.
A 10 : Heavy leakages through porous pipes/ through dam body in gallery /monolith joints.	**B 10:** Leakages through River sluice.
A 11 : Sweating / seepages through D/S of masonry dam	
A 12 : Excessive considerable leaching from seepage water.	
A 13 : Swelling / minor cracking observed on body of dam.	
A 14 : EDA / Stilling basin damaged/Hydraulic performance not good.	
A 15 : Leakages through spillway /piers//junction of flank wall.	
A 16: Damages / foundation erosion/ scour/undermining observed in vicinity of flank walls/ guide walls/ junction walls/return walls.	
A 17 :End weir not in good condition / scouring noticed on immediate D/S.	
Spillway gates	
A 18 :Wire ropes of hoist not in good condition/hoisting structure damaged/cracked.	**B 11**: Surface paint/steel surface of spillway gates deteriorated.
A 19 : Alternative power system Generator for gate operation not working properly.	**B 12** : Damage to Rubber seals/ considerable Leakages through gates.
A 20 : Operation of gates not smooth needs repair.	
Other structures	
	B 13 : Heavy vegetation/big trees on embankment top/slope making dam portion not accessible.
	B 14 : Deck bridge slab/ pier / damaged cracked/ alignment disturbed.
	B 15 :Major portion of Pitching damaged/washed away.

1.09.4 Category-3 Standard Deficiencies :

Sr. No.	Deficiencies	Category identifier
1	Profuse growth of bushes and trees over dam portion.	3.1
2	Guard stones/ chainage stones and parapet wall not provided /damaged.	3.2
3	Growth of aquatic weeds in reservoir of dam is observed.	3.3
4	Ant hills or crab holes/holes made by rodents/animals.	3.4
5	Minor undulation/ settlement/slightly less top width/ Rain cuts / pot holes observed on dam top & slopes.	3.5
6	Access road/Dam top road surface/ slab joints damaged needs repair.	3.6
7	Pitching on embankment of dam is dislocated /disturbed at some places.	3.7
8	Breaching section is not accessible/ Instruction board showing operation of breaching section is not available.	3.8
9	Section of Toe drain/cross drain/ out fall drain/rock toe damaged at some places. Pitching of drains disturbed. Some weed, vegetation growth/ siltation in nalla/drains. Nalla needs regradation.	3.9
10	Surface drain/ Catch water drains for berms are silted /damaged	3.10
11	Electric cable & wiring are damaged/not in good condition.	3.11
12	Minor leaching in the gallery/ body of dam.	3.12
13	V – notches/ measuring devices are not in working condition/ silted /damaged/ not provided.	3.13
14	Mosquito net door is to be provided to avoid entry of reptiles in the gallery.	3.14
15	Damage to natural slope protection works,guniting damaged/washed out. Wire mesh exposed.	3.15
16	Guide wall/Divide wall/Guide bund/End Sill wall damaged/ Pointing is not in good condition/weep holes not functioning. At some places w.w bar/coping is damaged.	3.16
17	Provision of access to stilling basin/ladder not provided.	3.17
18	EDA ponding with water not possible to Inspect.	3.18
19	Minor erosion/ Scouring/Retrogression/ pot holes in tail channel. Ponding, standing Water in EDA / Tail channel.	3.19
20	Lubrication/painting/minor repairs required for parts of Gates / hoisting Structure/Rubber seal damaged/ replacement.	3.20
21	Approach bridge to intake well / spillway gates railing /flooring plates damaged / need repairs. Need of ladder for inspection well/EDA.	3.21
22	Minor leakages through river sluice/outlet/ gates.	3.22
23	Air vent not periodically cleaned./damaged/closed.	3.23
24	EAP / ROS /GOS /Record drawings/ not provided / not prepared at dam site.	3.24
25	The record of periodical measurements of leakage discharge from dam / relief well is not maintained.	3.25
26	Street light on dam top is not provided/not working.	3.26
27	Security / CC TV camera/entry gate not provided/not working.	3.27
28	Sufficient staff arrangement is not available for security ,instrument readings and measurements and maintenance on dam site.	3.28
29	Fencing around dam is not provided/ damaged due to which unauthorized trespassers are seen.	3.29
30	Communication facilities like mobile wireless, warning devices, telephone is not available at dam site.	3.30
31	Sufficient stock of spares/stationary required is not available at dam site. Storage arrangement not provided at site.	3.31
32	Minor leakages through masonary/ concrete dam body/gallery of dam/outlet well.	3.32

Sr. No.	Deficiencies	Category identifier
33	Security cabin at dam entrance/Irrigation outlets not provided/damaged/needs repair.	3.33
34	Approach channel silted. Trash rack need to be cleaned/ damaged/not provided.	3.34
35	Minor damages to spillway / masonary/ concrete portion of dam/outlet well.	3.35
36	Porous pipes/foundation drains / holes not periodically cleaned.	3.36

1.10 Special Deficiencies

Director general, DTHRS, Nashik has circulated a circular of special deficiencies dated 21/07/202 (सं.प्रा.ज.सं.सु./म.अ.सं.सं./प्रशा/अधि/88/सन 2020) to all field offices to attend the above special deficiencies along with periodical inspection report

Statement No-1

Special Attention Deficiencies (Civil), Attached with Pre- Post monsoon Inspection Reports

(Availability of Compulsory Manpower & Documents at dam Site)

Deficiency category	Deficiency
Sp-1	Whether Emergency Action Plan is kept at dam site or not ?
Sp-2	Whether Approved Reservoir Operation Schedule is kept at dam site or not ?
Sp-3	Whether Latest approved gate Operation Schedule is to be kept at dam site or not ?
Sp-4	Whether Record Drawings sets are kept at dam site / section / Sub Divn. office or not ?
Sp-5	Whether Standard Operating Procedure copy with Updated contact numbers of all concerned authorities are kept at dam site or not ?
Sp-6	Whether Chart showing location of rain gauges / river gauges on U/s catchment & approximate travel time of discharge is maintained & displayed at dam site.
Sp-7	If CCTV is established, how observations are done round the clock & who is responsible person to observe these.
Sp-8	Whether Sufficient arrangement of staff is available or not. Engineers / Operators / Electrician / Watchmen / Security etc. and also staff for instrument reading, measurement & maintenance.They may be Govt. employee or through outsourcing. This staff is especially compulsory during monsoon period.
Sp-9	Whether Communication facilities like mobile, wireless, warning devices, telephone are available at dam site, or otherwise.
Sp-10	Whether The record of periodical measurements of leakage discharge from dam / relief well etc. is maintained or not.
Sp-11	Is there any profuse growth of bushes or trees over any portion of dam ?

Statement No-2

Special Attention Deficiencies (Mech & Elect), Attached with Pre- Post monsoon Inspection Reports

(Compulsory Minimum repairs, For Spillway Gates & Gallery)

Deficiency category	Deficiency
Sp-12	Whether Wire ropes of hoist are in good condition/hoisting structure damaged/cracked ?.
Sp-13	Whether Alternative power system- Stand by two Generators for gate operation are working properly or not ?
Sp-14	Whether the **o**peration of all gates is smooth or needs repair ?.
Sp-15	Whether Lubrication/ painting/ minor repairs for parts of Spillway Gates and Hoisting structure are carried out or not ?.
Sp-16	Whether Rubber seals of gates are damaged or needs replacement ?.
Sp-17	Due date of painting of each part should be displayed on dam site as per mechanical maintenance schedule
Sp-18	Whether Electric cable / wiring / lights etc are in working condition are not ?
Sp-19	Whether gallery is having excessive leakages ?

1.11 Standard Procedure For Confirmation And Removal of Category-1 Deficiency of Dams

A systematic approach and working methodology is very essential to monitor the safety aspects of the dams.

During the scrutiny of Pre and Post Monsoon report or during DSO test Inspection whenever it is found that the deficiency is of Category-I, it will be immediately communicated to concern SE and CE.

Concerned SE /CE should immediately visit the dam and should satisfy himself that the deficiency pointed out is a major deficiency which may lead to failure of dam and should confirm to the DSO, Nashik regarding the classification of deficiency as per his opinion.

After conformation from Field Chief Engineer it will appear in ADHSR.

Remedial Measures for Category-I deficiency removal shall be undertaken immediately. And after completion of physical work of deficiency removal, Concern Chief Engineer should communicate status to DSO, Nashik immediately.

1.12 National Register of Large Dams (NRLD) :

Dams having Height above 10 meter are classified as per the norms of International Commission on Large Dams (ICOLD).

NRLD is consists of information of Large Dams as per 20 columns proforma covering information regarding salient features.

NRLD is updated in every January. Hence Field offices need to submit the information of new dams every year to DSO by December to incorporate it in NRLD. The response regarding submission of NRLD information from field offices is very poor, it is always observed that DSO officials has to take rigorous follow up to obtain requisite information.

1.13 Point of Attention :

General	Details
Inspection details	1) The periodical inspection reports of all the dams shall be sent in original instead of carbon or xerox copy. (Signed copy shall be emailed in advance to DSO. 2) Ambiguous or incomplete replies shall be avoided. It is necessary to check point wise replies, which should clear and self explanatory. 3) The deficiencies observed frequently since long shall be deleted after verification of rectification work. 4)The inspecting officer is advised to write the word “special attention” in inspection report against all such items wherever immediate attention is necessary from concerned field officer in charge of dam from safety point of dams and life & property on the downstream & would be useful for identifying categorization of deficiencies in Dam Safety Organization, Nashik. 5) The information in Appendix II (Performance of meteorological instruments installed) and Appendix III (performance of taking observation of instruments installed in large dams) shall be filled properly and complete. 6) The compliance of rectification work of deficiencies of each dam mentioned in status report shall be communicated to Dam Safety Organization, Nashik every year so that this can be included in the Action Taken Report Part-I of status report.
Salient features	1) Due care shall be taken while filling the salient features of dam and information regarding N.C.D.S. documents. 2) Date of inspections is not mentioned in some Pre / Post Inspection Reports. This is mandatory since it will reflect in the Annual health status report.
Dam and Dam reach (Embankment)	1) If the existing dam section is found under section as compared to the design section during inspection then the work of re-sectioning shall be carried out and opinion of inspecting officer shall be stated in inspection report. 2) The extent of embankment settlement shall be furnished with its measurement & Reduced Distance (R.D.) and it shall be with compared designed cross section.
Gallery / Shaft Drainage (Concrete / Masonry)	The monolith wise quantum of leaching in galleries and all type of leakages in dam shall be noted in inspection report.
Spillway and Energy Dissipation Structure	The quantum of retrogression/scouring in tail channel shall be given in inspection report.
Hydro-Mechanical Component and Turbine/Pump	The trial of spillway gates shall be carried out before monsoon every year &observed condition shall be mentioned in inspection report.
Instrumentation	It is observed that the information regarding number of instruments installed does not tally for pre & post monsoon inspection report of the same dam. In some cases it is observed that the list of instruments given in previous year do not appears in the current year. These discrepancies should be avoided.

Part-2

Action Taken Report

Part-2: Action Taken Report (ATR)

2.1 General :

Annual Dam Health Status Reports (ADHSR) of Dams for Year 2020-21 was published by Director General, DTHRS, MERI, Nashik in May 2021 and submitted to Govt. of Maharashtra and also circulated to all Field Offices ranging from Divisions to Corporations for information and carrying out remedial measures.

It is expected that Field Officers should go through the Status Report scrupulously and attend remedial measures on priority basis and submit Action Taken Report (ATR) for reflecting necessary repairs & attention given for maintaining safety of Dams in the ADHSR.

2.2 ATR Submitted by Field Offices :

In Maharashtra State there are Government owned 261 Class-I & 992 Class-II Dams & Private owned 23 Class-I & 33 Class-II Dams

As per ACDHSR 2020-21 Action Taken Report was expected from Government owned 116 Class-I & 241 Class-II Dams & Private owned 13 Class-I & 18 Class-II Dams.

However Action Taken Report were received from Government owned 44 Class-I & 110 Class-II Dams & Private owned 00 Class-I & 00 Class-II Dams. [Ref. Table 2.1, 2.2]

2.3 Action Taken Report of Class-I & Class-II Dams (Government owned & Private)

	Category	Total Dam				ATR received				Physically fully completed						Physically partly completed					
	Class	I		II		I		II		I		II		%		I		II		%	
	No. of	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency
	Category 1 Dificiency																				
1	WRD	Nil																			
2	Private																				
	Category 2 Dificiency																				
3	WRD	116	686	241	656	44	50	110	31	2	50	34	36	10	6	22	40	43	31	18	5
4	Private	13	37	18	51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	129	723	259	707	44	50	110	31	2	50	34	31	9	5	22	40	43	31	17	5

2.4 Conclusions :

Out of 388 ATR, 229 ATR are not received in DSO. Hence, in true spirit this ACDHSR does not represent actual Health Status of Dams in the State.

2.5 Points of Attention:

A) Government Owned Dams :

Sr. No.	Expected Inspection Report in DSO	Received in time in DSO		Even after rigorous follow up by DSO		ATR were not received	
		Number	%	Number	%	Number	%
1	388	0	0	159	40.97	229	59.02

1. ***Concerned Chief Engineer should monitor and instruct field Superintending Engineer & Executive Engineer regarding submission of ATR to DSO, Nashik to reflect exact status of Dam Safety works. Otherwise whole execercise of publishing ACDHSR will be futile.***

2. ***Concerned Dam owner should give serious attention regarding submission of ATR to DSO, Nashik to reflect exact status of Dam Safety works. Otherwise whole execercise of publishing ACDHSR will be futile.***

Table - 2.1

Consolidated Abstract of Status of Compliance of Category-1 Deficiencies in ADHSR-2021-22

Sr. No	Agency	Dams & Deficiencies						Status of Deficiencies removal as per compliance report received in DSO, Nashik																					
		Class-I Dam		Class-II Dam		Total		Physically fully completed						Physically partly completed						Administrative action initiated						Compliance report not received in DSO					
								Class-I Dam		Class-II Dam		Total		Class-I Dam		Class-II Dam		Total		Class-I Dam		Class-II Dam		Total		Class-I Dam		Class-II Dam		Total	
		No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1	No. Of Dams	No. of Def. Cat -1
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
----------NIL----------																															

Table - 2.2

Consolidated Abstract of Status of Compliance of Category-2 Deficiencies in ACDHSR 2021-22

Sr. No	Revenue Region	Dams & Deficiencies						Status of Deficiencies removal as per compliance report received in DSO																					
		Class-I Dam		Class-II Dam		Total		Physically fully completed						Physically partly completed						Administrative action initiated						ATR Not Received in DSO					
								Class-I Dam		Class-II Dam		Total		Class-I Dam		Class-II Dam		Total		Class-I Dam		Class-II Dam		Total		Class-I Dam		Class-II Dam		Total	
		No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2	No. Of Dams	No. of Def. Cat -2
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Government Owned Dams																															
1	Kokan`	31	138	50	99	81	237	0	5	5	10	5	15	4	8	17	17	21	25	0	14	13	41	13	55	27	111	15	31	42	142
2	Pune	54	445	69	147	123	592	1	43	1	1	2	44	17	31	1	1	18	32	7	109	3	7	10	116	29	262	64	138	93	400
3	Nashik	8	33	39	161	47	194	0	0	28	19	28	19	0	0	22	5	22	5	3	11	28	92	31	103	5	22	11	45	16	67
4	Aurangabad	5	19	31	88	36	107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Amravati	9	27	39	129	48	156	1	2	0	0	1	2	1	1	2	8	3	9	3	11	6	26	9	37	4	13	31	95	35	108
6	Nagpur	9	24	13	32	22	56	0	0	0	1	0	1	0	0	1	0	1	0	2	7	3	10	5	17	7	17	9	21	16	38
Total		**116**	**686**	**241**	**656**	**357**	**1342**	**2**	**50**	**34**	**31**	**36**	**81**	**22**	**40**	**43**	**31**	**65**	**71**	**15**	**152**	**53**	**176**	**68**	**328**	**72**	**425**	**130**	**330**	**202**	**755**
Private Owned Dams																															
7	Kokan`	6	24	4	10	10	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	24	4	10	10	34
8	Pune	6	8	5	10	11	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	8	5	10	11	18
9	Nashik	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	2
10	Aurangabad	0	0	04	14	04	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	04	14	04	14	0	0
11	Amravati	0	0	2	7	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	2	7
12	Nagpur	1	5	2	8	3	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	2	8	3	13
Private Total		**13**	**37**	**18**	**51**	**31**	**88**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**17**	**51**	**18**	**51**	**27**	**74**
Grand Total		**129**	**723**	**259**	**707**	**388**	**1430**	**2**	**50**	**34**	**31**	**36**	**81**	**22**	**40**	**43**	**31**	**65**	**71**	**15**	**152**	**53**	**176**	**68**	**328**	**89**	**476**	**148**	**381**	**229**	**829**

Part-3

Dam Health Status Report of Pre & Post Monsoon 2020

Part-3: Dam Health Status Report of Pre & Post Monsoon 2021

3.1 General :

Dam Safety Divisions under Dam Safety Organization, Nashik excersies compilation of Annual Pre & Post Monsoon Inspection Reports of Dams submitted by Field Offices as well as Test Inspection Reports of Selected Dams, carried out by Dam Safety Organization, Nashik in the form of Annual Consolidated Dam Health Status Report (ACDHSR).

3.2 Inspection Reports submitted by Field Offices :

In all there are 1253 Government owned Dams & 56 Private owned Dams are monitored by Dam Safety Organization, Nashik from safety point of view.

1253 Government owned Dams constitute 261 Class-I & 992 Class-II Dams. 56 Private owned Dams constitute 23 Class-I, 33 Class-II Dams.

Government owned Dams : Out of 1253 Dams inspection reports, 1165 Pre Monsoon Reports & 1078 Post Monsoon Reports were received in DSO, Nashik. 88 Pre Monsoon Reports & 175 Post Monsoon Reports were not received in DSO, Nashik. *[Ref. Table 3.1]*

3.3 Test Dam Inspection by Dam Safety Organisation :

Test Inspection Programme for Test Inspection of selected Dams is approved by Director General, DTHRS, MERI, Nashik.

As per approved Annual Test Dam Inspection Programme, Class-I Dams are inspected by SE, DSO along with EE, DSD & Class-II Dams are inspected by EE, DSD, Nashik.

On similar lines in case of Private owned Dams, full fledged inspection of Class-I Dam is carried out by SE, DSO along with EE, DSD & Class-II Dam is carried out by EE, DSD, Nashik.

Despite of Covid-19 Pandemic 100% Dams (39 Class-I, 151 Class-II & century old Class-III) Including 3 Dams from Himachal Pradesh as proposed for test inspection out of 3, 1 No. of dam were inspected by team of Dam Safety Organization, Nashik. *[Ref. Table 3.3]*

Following team of officers have taken efforts to prepare this report.

1) *Shri A.S.Amle, Superintending Engineer Dam Safety Organization, Nashik*
2) *Shri P.S.Patare,, Executive Engineer, Dam Safety Division No.3, Nashik*
3) *Shri R.P.Aradwad, Sub Divisional Officer, Dam Safety Division No.3, Nashik*
4) *Shri.A.V.Mendgule, Sub Divisional Engineer, Dam Safety Division No.3, Nashik*
5) *Smt. P.P.Bhoye, Junior Engineer, Dam Safety Division No.3, Nashik*

3.4 Health Status of Class-I & Class-II Dams (Government owned)

This report excerpts details of Deficiencies received from Pre & Post Monsoon Inspections Reports based on detailed inspections carried out by concerned field Superintending Engineer for Class-I Dams & Executive Engineer for Class-II Dams.

And it also covers test inspection carried out by team of officers from Dam Safety Organization, Nashik.

Sr. No.	Category	Total Dams		Reports received in DSO				Cat 1				Cat 2				Cat 3			
	Class	I	II	I		II		I		II		I		II		I		II	
	No. of			Pre	post	Pre	post	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency	Dam	Deficiency
1	WRD	261	992	244	236	921	842	0	0	0	0	139	868	298	765	254	3017	957	6267
2	Private	23	33	5	17	17	25	0	0	0	0	12	42	28	80	17	122	33	303
	Total	282	1025	249	253	938	881	0	0	0	0	151	910	326	845	271	3139	989	6570

3.5 A Graphical Representation of Deficiencies attended, Submission of Pre/Post Monsoon Reports, Category wise Deficiencies, Class wise of Deficiencies is appended in Annexure-I.

3.6 Conclusions :

3.6.1 Frequent Deficiencies Class-I Dams

1. **B 9:** Instruments not in working condition.(72 Dams)
2. **A-14:** EDA / Stilling basin damaged/Hydraulic performance not good. (35 Dams)
3. **A 11 :** Sweating / seepages through D/S of masonry dam. (34 Dams)
4. **A 4**: Major leakages through outlet conduit/pipe joints/Gates. (32 Dams)
5. **A 2 :** Standing pool / Ponding / Water Logging / Slushy condition on D/S of Dam. (29 Dams)

3.6.2 Frequent Deficiencies Class-II Dams

1. **B 5:** Outlet gates not functioning properly. Stem rod is bent (Service gate / Emergency gate / Stop log gate/sluice gate) (99 Dams)
2. **B 7** : Waste weir/waste weir bar not in good condition/coping damaged/leakage through waste weir. (79 Dams)
3. **B 3** : Considerable settlement of embankment / Rock toe/Pitching/ U/S & D/S slops, bulging/concavity of slopes. (72 Dams)
4. **A 6 :** Seepage noticed around the conduit.. (70 Dams)
5. **A 1 :** Boil leakage/ seepage/ wet patches/ slushiness,in Earthen Dam. (57 Dams)

3.7 Points of Attention :

Sr. No.	Expected Inspection Report in DSO	Pre & Post Monsoon Inspection Report Received in time		Pre & Post Monsoon Inspection Report Not Received in time		Pre & Post Monsoon Inspection Report Not Received	
		Number	%	Number	%	Number	%
1	2624	474	18.06	1845	70.31	305	11.62

1) This overview provides condensed summary of deficiencies noticed in the Pre & Post Monsoon Inspection Reports Received in DSO & also during test inspection conducted by DSO Officials. Field Officers / Owners of the Dams are required to pay attention to Deficiencies pointed out in ACDHSR to maintain Dams in Safe condition.

2) The Chief Engineers are requested to flag this issue and compel all Superintending Engineer & Executive Engineer of concerned Dams to carry out periodic inspections and submit report to D.S.O. in time. Otherwise the whole exercise done by Dam Safety Organisation tends to become futile.

Table 3.1

Status of Receipt of Pre & Post Monsoon Inspection Reports 2021-22 (Government Owned)

Sr. No.	Revenue Region	Expected Inspection Report in DSO			Pre Monsoon Inspection Report Received in time (By 30th June)			Pre Monsoon Inspection Report Not Received in time (By 30th June)			Pre Monsoon Inspection Report Not Received			Post Monsoon Inspection Report Received in time (By 31st Dec)			Post Monsoon Inspection Report Not Received in time (By 31st Dec)			Post Monsoon Inspection Report Not Received		
		Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	Kokan`	40	111	151	9	45	54	29	37	66	2	29	31	11	2	13	29	109	138	0	0	0
2	Pune	69	193	262	15	14	29	54	176	231	0	3	3	00	18	18	63	146	211	4	29	33
3	Nashik	69	225	294	12	42	54	50	172	222	07	11	18	00	00	00	63	209	272	06	16	22
4	Aurangabad	37	243	280	0	48	48	29	184	213	8	11	19	0	20	20	24	170	194	13	53	66
5	Amravati	26	158	184	16	91	107	10	63	73	0	4	4	0	40	40	25	79	104	1	39	40
6	Nagpur	20	62	82	14	18	32	6	31	37	0	13	13	1	14	15	18	35	53	1	13	14
	Total	**261**	**992**	**1253**	**66**	**258**	**324**	**178**	**663**	**842**	**17**	**71**	**88**	**12**	**94**	**106**	**222**	**748**	**972**	**25**	**150**	**175**

Table 3.2

Status of Pre & Post Monsoon Inspection 2021 by DSO, Nashik (Private Owned)

Sr. No.	Revenue Region	To be Inspected by DSO			Pre Monsoon Inspection in time (By 30th June)			Pre Monsoon Inspection Not in time (By 30th June)			Pre Monsoon Not Inspected by DSO			Post Monsoon Inspection in time (By 31st Dec)			Post Monsoon Inspection Not in time (By 31st Dec)			Post Monsoon Not Inspected by DSO		
		Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Private Owned Dams in Maharashtra																						
1	Kokan`	9	7	16	3	0	3	0	0	0	6	7	13	8	6	14	0	1	1	1	0	1
2	Pune	7	10	17	0	0	0	0	4	4	7	6	13	4	10	14	0	6	6	3	2	5
3	Nashik	1	8	9	0	0	0	1	7	8	0	0	0	0	0	0	1	8	9	0	0	0
4	Aurangabad	0	4	4	0	3	3	0	0	0	0	1	1	0	3	3	0	0	0	0	0	0
5	Amravati	2	2	4	0	0	0	0	0	0	2	2	4	2	2	4	0	0	0	0	0	0
6	Nagpur	1	2	3	0	2	2	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0
	Total	**20**	**33**	**53**	**3**	**5**	**8**	**1**	**11**	**12**	**15**	**16**	**31**	**14**	**21**	**35**	**1**	**18**	**19**	**4**	**2**	**6**
Private Owned Dams out of Maharashtra																						
7	Himachal Pradesh	3	0	3	0	0	0	0	0	0	3	0	3	1	0	1	0	0	0	2	0	2
	Total	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**	**1**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**2**
	Grand Total	**23**	**33**	**56**	**3**	**5**	**8**	**1**	**11**	**12**	**18**	**16**	**34**	**15**	**21**	**36**	**1**	**18**	**19**	**6**	**2**	**8**

Table 3.3

Performance of Field Offices & DSO, Nashik against targeted Inspections

Sr. No.	Revenue Region	Field Offices							DSO, Nashik						
		Target			Achievement			Performance (%)	Target			Achievement			Performance (%)
		Class-I	Class-II	Total	Class-I	Class-II	Total		Class-I	Class-II	Total	Class-I	Class-II	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Kokan`	80	222	302	78	193	271	89.73	5	12	17	5	12	17	100
2	Pune	138	386	524	134	352	486	92.74	8	20	28	6	20	26	92.85
3	Nashik	138	450	588	125	423	548	93.19	9	25	34	9	25	34	100
4	Aurangabad	74	486	560	53	422	475	88.84	6	29	35	6	29	35	100
5	Amravati	52	316	368	51	273	324	88.04	3	24	27	3	24	27	100
6	Nagpur	40	124	164	39	98	137	83.53	4	9	13	4	9	13	100
	Total	**522**	**1984**	**2506**	**480**	**1761**	**2241**	**89.42**	**25**	**116**	**151**	**33**	**119**	**152**	**100**
7	Himachal Pradesh								3	0	3	1	0	1	33.33
	Total								**3**	**0**	**3**	**1**	**0**	**1**	**33.33**
	Grand Total	**522**	**1984**	**2506**	**480**	**1761**	**2241**	**89.42**	**38**	**116**	**154**	**34**	**119**	**153**	**100.00**

Table 3.4

Deficiency Classification (No. of Dam wise)

Sr. No	Revenue Region	Total Number of Dams			Number of Dams (Class-I)			Number of Dams (Class-II)		
		Class-I	Class-II	Total	Cat-1	Cat-2	Cat-3	Cat-1	Cat-2	Cat-3
	Government Owned Dams									
1	Kokan	40	111	151	0	39	40	0	75	111
2	Pune	69	193	262	0	65	68	0	111	191
3	Nashik	69	225	294	0	9	68	0	33	214
4	Aurangabad	37	243	280	0	5	32	0	23	234
5	Amravati	26	158	184	0	9	26	0	40	158
6	Nagpur	20	62	82	0	12	20	0	16	49
	Total	**261**	**992**	**1253**	**0**	**139**	**254**	**0**	**298**	**957**
	Private Owned Dams									
7	Kokan`	9	7	16	0	6	9	0	5	7
8	Pune	7	10	17	0	4	4	0	7	10
9	Nashik	1	8	9	0	1	1	0	8	8
10	Aurangabad	0	4	4	0	0	0	0	4	4
11	Amravati	2	2	4	0	0	2	0	2	2
12	Nagpur	1	2	3	0	1	1	0	2	2
	Private Total	**20**	**33**	**53**	**0**	**12**	**17**	**0**	**28**	**33**
	Grand Total	**281**	**1025**	**1306**	**0**	**151**	**271**	**0**	**326**	**990**

Note - 1. Out of 1253 Government owned Dams, Only 1165 Dams Pre & Only 1078 Dams Post Monsoon Report were received in DSO and 88 Pre & 175 Post Monsoon Report were not received in DSO.

Table 3.5

Deficiency Classification (No. of Deficiency wise)

Sr. No	Revenue Region	No. of Dams having Deficiencies						Number of Deficiencies								
		Cat-1		Cat-2		Cat-3		Category–1			Category–2			Category–3		
		Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Total	Class-I	Class-II	Total	Class-I	Class-II	Total
	Government Owned Dams															
1	Kokan	0	0	39	75	40	111	0	0	0	226	173	399	544	890	1434
2	Pune	0	0	65	111	68	191	0	0	0	469	187	656	996	1645	2641
3	Nashik	0	0	9	33	68	214	0	0	0	47	166	213	631	1391	2022
4	Aurangabad	0	0	5	23	32	234	0	0	0	58	80	138	431	1211	1642
5	Amravati	0	0	9	40	26	158	0	0	0	27	114	141	276	881	1157
6	Nagpur	0	0	12	16	20	49	0	0	0	41	45	86	139	249	388
	Total	**0**	**0**	**139**	**298**	**254**	**957**	**0**	**0**	**0**	**868**	**765**	**1633**	**3017**	**6267**	**9284**
	Private Owned Dams															
7	Kokan`	0	0	6	5	9	7	0	0	0	32	14	46	73	50	123
8	Pune	0	0	4	7	4	10	0	0	0	5	17	22	18	62	80
9	Nashik	0	0	1	8	1	8	0	0	0	1	25	26	10	107	117
10	Aurangabad	0	0	0	4	0	4	0	0	0	0	10	10	0	61	61
11	Amravati	0	0	0	2	2	2	0	0	0	0	7	7	16	17	33
12	Nagpur	0	0	1	2	1	2	0	0	0	4	7	11	9	6	15
	Private Total	**0**	**0**	**12**	**28**	**17**	**33**	**0**	**0**	**0**	**42**	**80**	**122**	**126**	**303**	**429**
	Grand Total	**0**	**0**	**151**	**326**	**271**	**990**	**0**	**0**	**0**	**910**	**845**	**1755**	**3143**	**6570**	**9713**

Note -1. No. of Deficiencies are from 1165 Pre Monsoon Reports (Class-I /244 + Class-II /921) and 1078 Post Monsoon Reports (Class-I /236 + Class-II /842) Received in DSO.

Table 3.6

Category-1 Deficiency in Class-I & II Dams

Sr. No	Deficiency	Kokan		Pune		Nashik		Aurangabad		Amravati		Nagpur		Total	
		Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II
---------- NIL ----------															

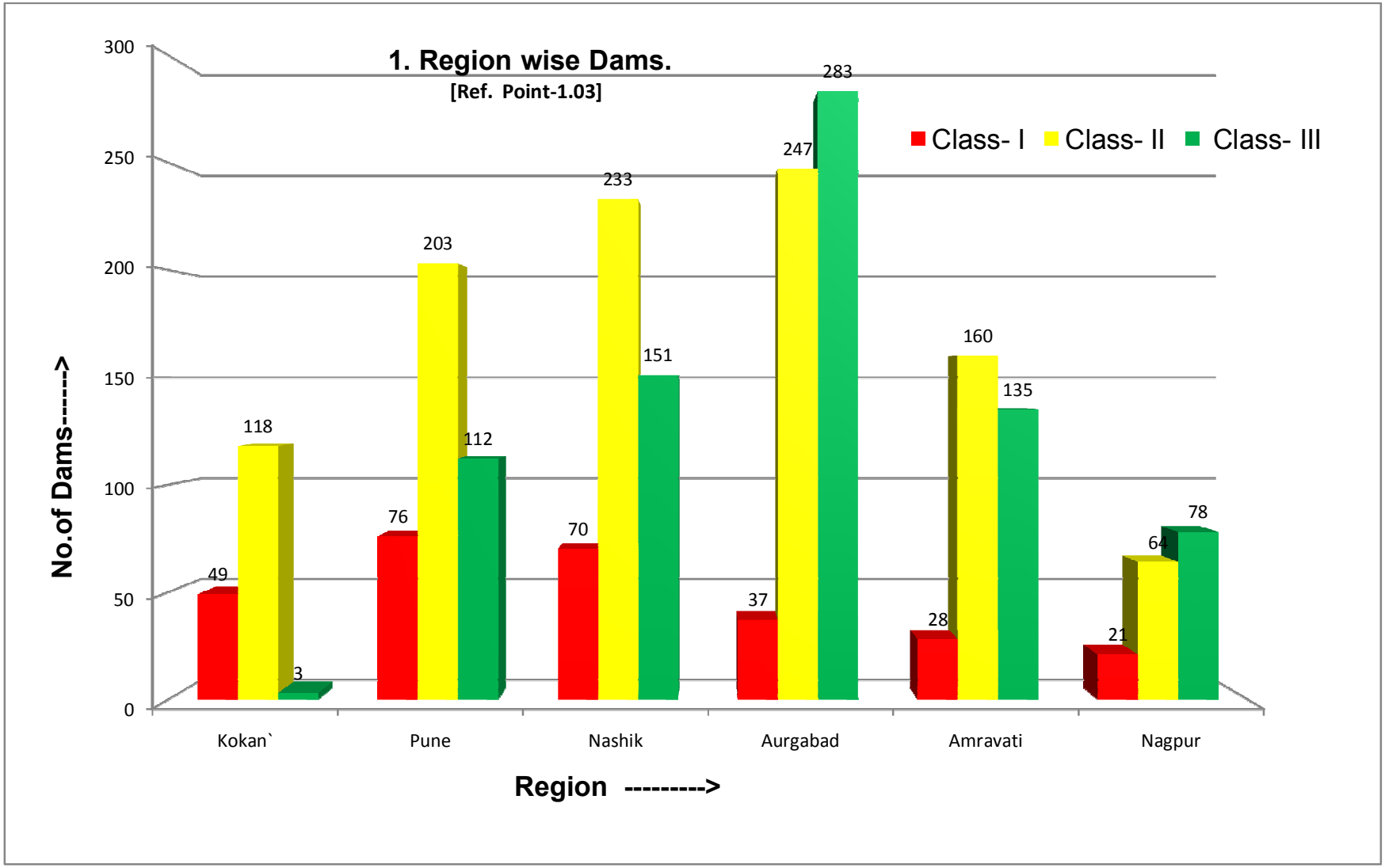
Table 3.7

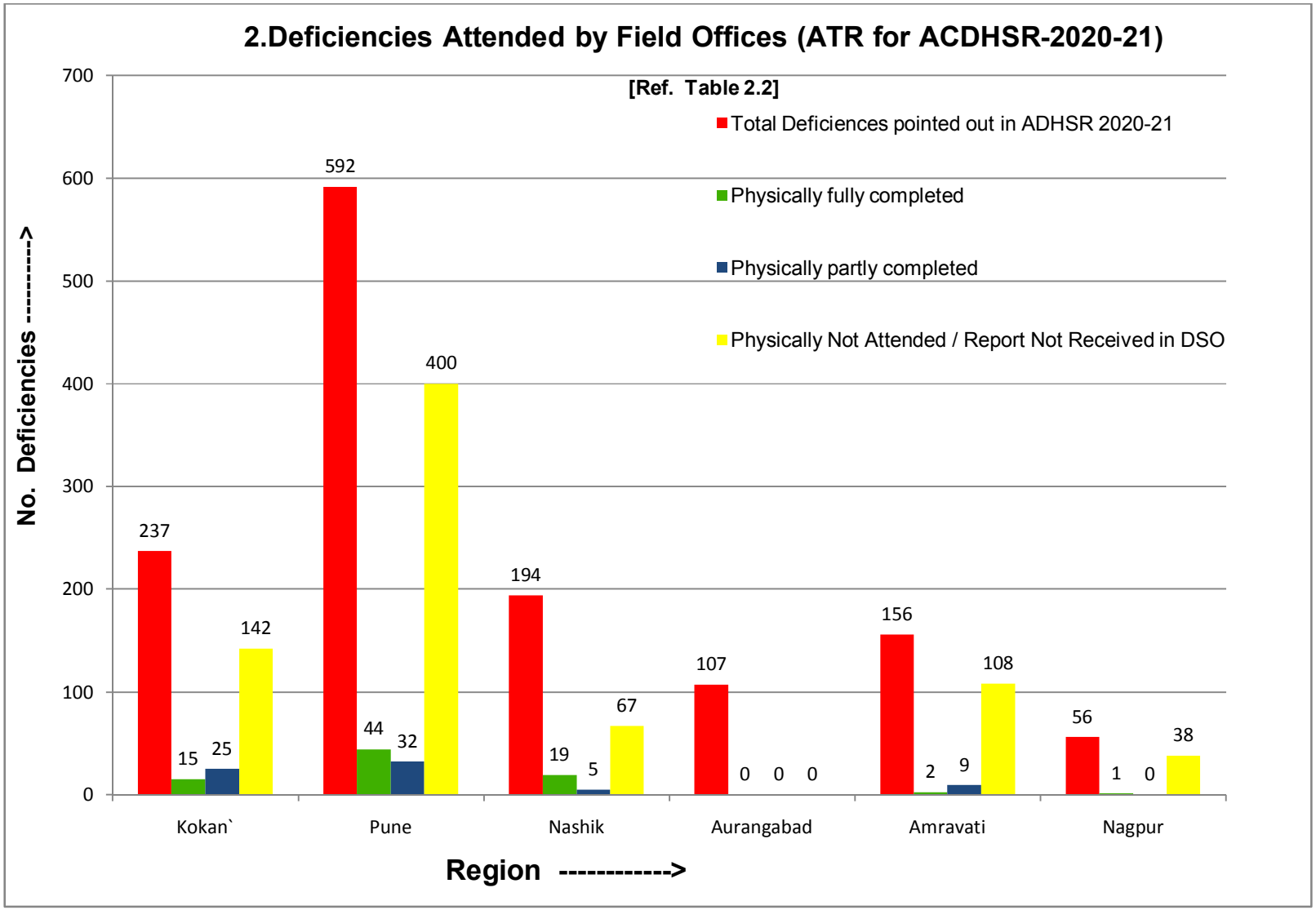
Category-2 Deficiency in Class-I & II Dams

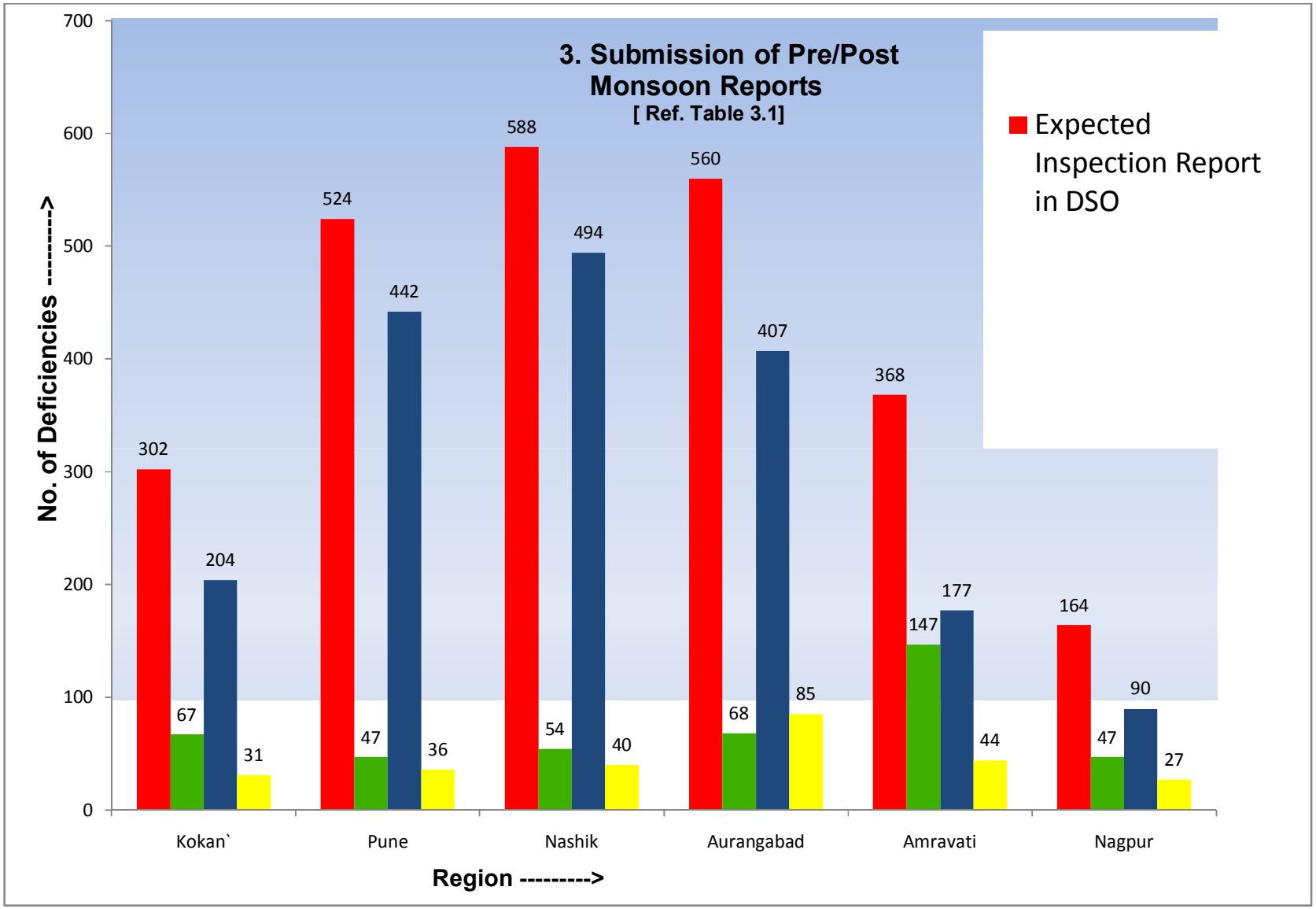
Sr. No	Deficiency	Kokan		Pune		Nashik		Aurangabad		Amravati		Nagpur		Total	
		Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II
1	**A.1:** Boil leakage/ seepage/ wet patches/ slushiness,in Earthen Dam.	8	21	4	15	2	5	2	3	-	10	-	3	16	57
2	**A 2**: Standing pool / Ponding / Water Logging / Slushy condition on D/S of Dam	12	6	8	17	2	9	1	1	1	6	5	5	29	44
3	**A 3 :** Leakages in vicinity of junction between earthen dam & masonry dam portion.	8	7	3	2	0	1	0	2	0	2	0	0	11	14
4	**A 4** : Major leakages through outlet conduit/pipe joints/Gates.	15	12	13	5	1	14	0	0	2	6	1	1	32	38
5	**A 5** ; Relief wells not functioning properly./ Abnormal rise in water level in wells.	0	0	6	6	0	0	1	3	3	0	3	0	13	9
6	**A6:** Seepage noticed around the conduit.	6	29	3	18	0	11	0	2	0	9	1	1	10	70
7	**A 7 :** Retrogression /scouring in tail channel.	1	4	2	8	1	12	1	4	1	12	4	6	10	46
8	**A 8 :** Drainage gallery inaccessible/No adequate lighting./ No dewatering arrangement or failure.	5	0	16	0	2	0	0	0	1	0	1	0	25	0
9	**A 9 :** Foundation drains / holes/ porous pipes/chocked/ no seepage through foundation drain holes.	6	0	15	0	0	0	0	0	2	0	5	1	28	1
10	**A 10 :** Heavy leakages through porous pipes/ through dam body in gallery /monolith joints.	5	0	16	0	2	0	1	0	0	0	0	0	24	0
11	**A 11** : Sweating / seepages through D/S of masonry dam	5	2	22	0	3	0	2	0	0	0	2	1	34	3
12	**A 12** : Excesssive considerable leaching from seepage water.	6	0	13	0	0	0	2	0	0	0	7	0	28	0
13	**A 13:** Swelling / minor cracking observed on body of dam.	1	0	0	0	0	0	0	0	0	0	0	0	1	0
14	**A 14** : EDA / Stilling basin damaged/Hydraulic performance not good.	12	0	18	0	1	6	0	2	1	5	3	3	35	16
15	**A 15** : Leakages through spillway /piers//junction of flank wall.	10	2	9	0	0	0	1	0	1	0	3	0	24	2
16	**A16** : Damages / foundation erosion/ scour/undermining observed in vicinity of flank walls/ guide walls/ junction walls/return walls.	10	03	10	4	0	1	0	4	2	5	5	1	27	148

Sr. No	Deficiency	Kokan		Pune		Nashik		Aurangabad		Amravati		Nagpur		Total	
		Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II
17	**A 17** :End weir not in good condition / scouring noticed on immediate D/S.	6	0	16	0	0	0	0	0	3	8	2	0	27	8
18	**A 18** :Wire ropes of hoist not in good condition/hoisting structure damaged/cracked.	3	0	8	0	2	0	2	0	0	0	1	0	16	0
19	**A 19:** Alternative power system Generator for gate operation not working properly.	6	0	6	0	1	0	0	0	0	0	0	0	13	0
20	**A 20:** Operation of gates not smooth needs repair.	3	0	10	0	0	0	0	0	0	0	0	0	13	0
21	**B 1** Dam section is not as per design	7	17	0	19	0	18	0	5	0	5	0	7	7	71
22	**B 2:** Cross and toe drains not working properly/ drains silted or vegetated causing stagnant pool of water.	3	0	4	1	0	0	0	0	0	0	0	0	7	1
23	**B3 :** Considerable settlement of embankment / Rock toe/Pitching/ U/S & D/S slops, bulging/concavity of slopes.	8	15	6	3	0	25	0	9	1	10	0	1	15	63
24	**B 4:** Longitudinal / Transverse cracks/ low area/sink holes/gully formation on top side slope of earthen dam.	1	0	0	8	0	4	0	3	0	1	0	0	1	16
25	**B 5 :** Outlet gates not functioning properly. Stem rod is bent(Service gate/Emergency gate/Stop log gate/sluice gate)	18	15	20	55	2	21	2	11	3	4	2	8	47	114
26	**B 6:** Approach to dam through all weather roads not constructed/ maintained properly.	7	9	7	1	0	0	0	0	1	1	0	0	16	11
27	**B 7:** Waste weir/waste weir bar not in good condition/coping damaged/leakage through waste weir	9	16	10	20	0	20	0	11	0	11	1	1	20	79
28	**B 8 :** Pointing on U/S face of dam not in good condition./deterioration spalling of concrete surface.	7	3	10	0	0	0	0	2	0	2	0	0	17	7
29	**B 9:** Instruments not in working condition.	16	0	48	0	0	0	0	0	0	0	7	0	71	0
30	**B 10:**Leakage through river sluice.	0	0	4	0	0	0	0	0	1	0	2	0	07	0
31	**B 11**: Surface paint/steel surface of spillway gates deteriorated.	7	0	12	0	0	0	0	0	0		2	1	21	1
32	**B 12**: Damage to Rubber seals/ considerable Leakages through gates.	4	0	9	0	3	4	1	0	3	1	1	3	21	8

Sr. No	Deficiency	Kokan		Pune		Nashik		Aurangabad		Amravati		Nagpur		Total	
		Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II	Class-I	Class-II
33	**B 13 :** Heavy vegetation/big trees on embankment top/slope making dam portion not Accessible	5	2	4	0	0	0	0	0	1	0	0	1	10	3
34	**B 14 :** Deck bridge slab/ pier / damaged cracked/ alignment disturbed.	3	0	1	0	0	0	0	0	0	0	0	2	4	2
35	**B 15**: Major portion of Pitching damaged/washed away.	3	0	2	0	0	0	0	0	0	0	0	0	5	0

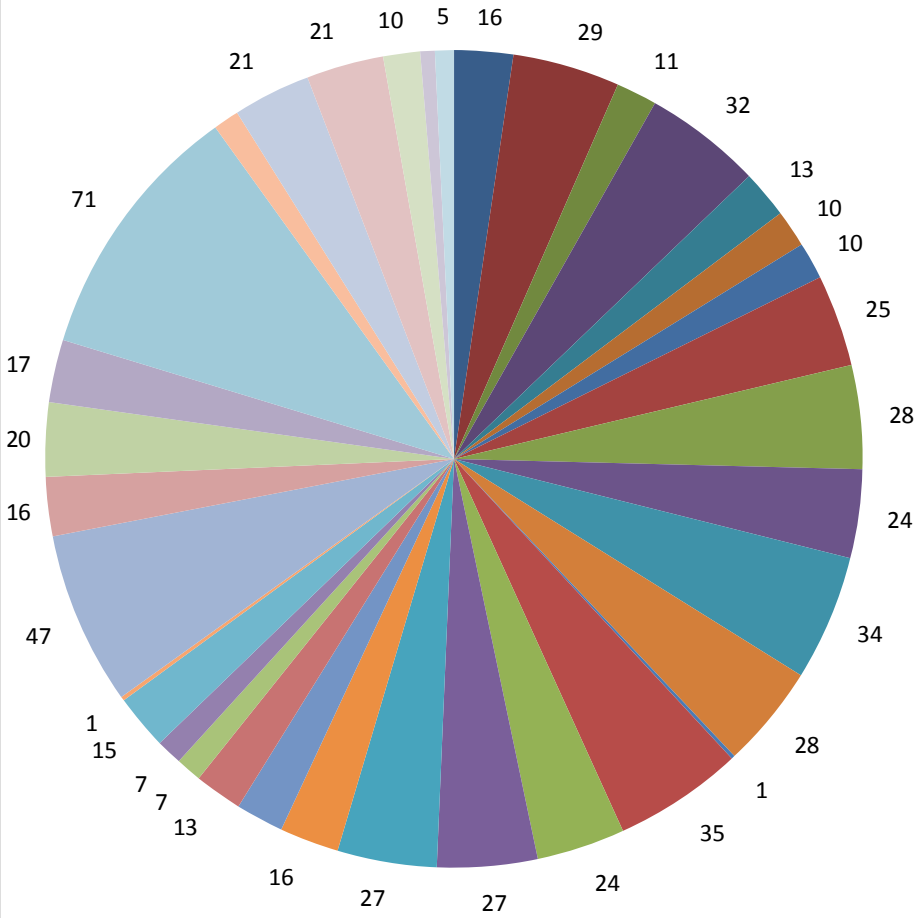

1. Region wise Dams.
[Ref. Point-1.03]
Class- I
Class- II
Class- III
No.of Dams------>
Region --------->
300
250
200
150
100
50
0
Kokan`
Pune
Nashik
Aurgabad
Amravati
Nagpur
49
118
3
76
203
112
70
233
151
37
247
283
28
160
135
21
64
78


2.Deficiencies Attended by Field Offices (ATR for ACDHSR-2020-21)
[Ref. Table 2.2]
Total Deficiences pointed out in ADHSR 2020-21
Physically fully completed
Physically partly completed
Physically Not Attended / Report Not Received in DSO
No. Deficiencies ---------->
Region ---------->
Kokan`
Pune
Nashik
Aurangabad
Amravati
Nagpur
237
15
25
142
592
44
32
400
194
19
5
67
107
0
0
0
156
2
9
108
56
1
0
38
0
100
200
300
400
500
600
700


3. Submission of Pre/Post Monsoon Reports
[Ref. Table 3.1]
Expected Inspection Report in DSO
No. of Deficiencies --------->
Region --------->
700
600
500
400
300
200
100
0
Kokan`
Pune
Nashik
Aurangabad
Amravati
Nagpur
302
67
204
31
524
47
442
36
588
54
494
40
560
68
407
85
368
147
177
44
164
47
90
27

4.No .of Dams Class-I Dams having Sub-Category wise Deficiencies

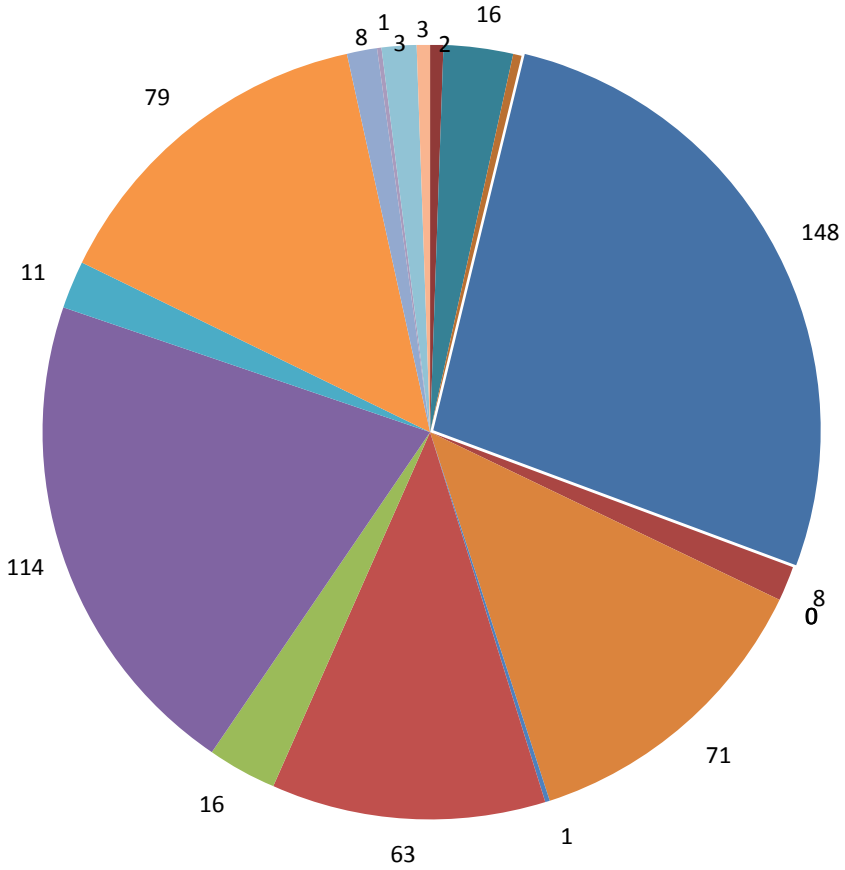
[*Ref Table 3.7*]



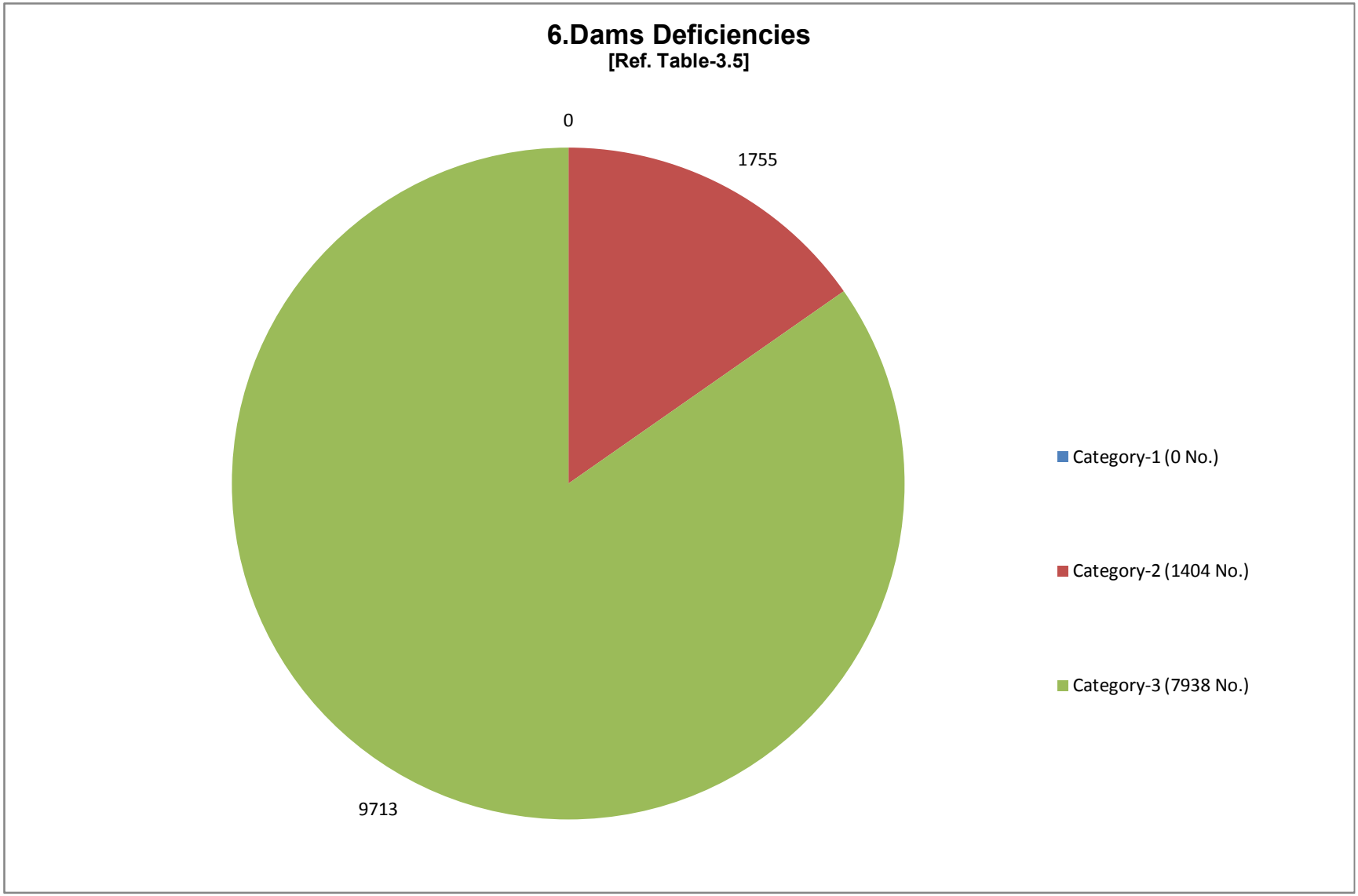
- A.1: Boil leakage/ seepage/ wet patches/ slushiness,in Earthen Dam.(21 Dams)
- A 2: Standing pool / Ponding / Water Logging / Slushy condition on D/S of Dam. (21 Dams)
- A 3 : Leakages in vicinity of junction between earthen dam & masonry dam portion.(1 Dams)
- A 4 : Major leakages through outlet conduit/pipe joints/Gates. (11 Dams)
- A 5 ; Relief wells not functioning properly./ Abnormal rise in water level in wells.(10 Dams)
- A6: Seepage noticed around the conduit. (2 Dams)
- A 7 : Retrogression /scouring in tail channel. (8 Dams)
- A 8 : Drainage gallery inaccessible/No adequate lighting./ No dewatering arrangement or failure. (19 Dams)
- A 9 : Foundation drains / holes/ porous pipes/chocked/ no seepage through foundation drain holes. (21 Dams)
- A 10 : Heavy leakages through porous pipes/ through dam body in gallery /monolith joints. (19 Dams)
- A 11 : Sweating / seepages through D/S of masonry Dam. (25 Dams)
- A 12 : Excesssive considerable leaching from seepage water. (24 Dams)
- A 13: Swelling / minor cracking observed on body of Dam. (1 Dams)
- A 14 : EDA / Stilling basin damaged/Hydraulic performance not good. (24 Dams)
- A 15 : Leakages through spillway /piers//junction of flank wall.(8 Dams)
- A16 : Damages / foundation erosion/ scour/undermining observed in vicinity of flank walls/ guide walls/ junction walls/return walls. (13 Dams)
- A 17 :End weir not in good condition / scouring noticed on immediate D/S. (14 Dams)
- A 18 :Wire ropes of hoist not in good condition/hoisting structure damaged/cracked. (15 Dams)
- A 19: Alternative power system Generator for gate operation not working properly. (5 Dams)
- A 20: Operation of gates not smooth needs repair. (8 Dams)
- B 1 Dam section is not as per design. (1 Dams)
- B 2: Cross and toe drains not working properly/ drains silted or vegetated causing stagnant pool of water. (8 Dams)
- B3 : Considerable settlement of embankment / Rock toe/Pitching/ U/S & D/S slops, bulging/concavity of slopes. (4 Dams)
- B 4: Longitudinal / Transverse cracks/ low area/sink holes/gully formation on top side slope of earthen dam. (4 Dams)
- B 5 : Outlet gates not functioning properly. Stem rod is bent(Service gate/Emergency gate/Stop log gate/sluice gate) (31 Dams)
- B 6: Approach to dam through all weather road not constructed/ maintained properly. (16 Dams)
- B 7: Waste weir/waste weir bar not in good condition/coping damaged/leakage through waste weir. (9 Dams)
- B 8 : Pointing on U/S face of dam not in good condition./deterioration spalling of concrete surface. (12 Dams)
- B 9: Instruments not in working condition. (29 Dams)
- B 10:Leakage through river sluice. (6 Dams)
- B 11: Surface paint/steel surface of spillway gates deteriorated.(9 Dams)
- B 12: Damage to Rubber seals/ considerable Leakages through gates. (18 Dams)
- B 13 : Heavy vegetation/big trees on embankment top/slope making dam portion not Accessible. (5 Dams)
- B 14 : Deck bridge slab/ pier / damaged cracked/ alignment disturbed.
- B 15: Major portion of Pitching damaged/washed away. (2 Dams)

5.No .of Dams Class-II Dams having Sub-Category wise Deficiencies

[*Ref Table 3.7*]



- A.1: Boil leakage/ seepage/ wet patches/ slushiness,in Earthen Dam.(45 Dams)
- A 2: Standing pool / Ponding / Water Logging / Slushy condition on D/S of Dam.(29 Dams)
- A 3 : Leakages in vicinity of junction between earthen dam & masonry dam portion.(9 Dams)
- A 4 : Major leakages through outlet conduit/pipe joints/Gates.(34 Dams)
- A 5 ; Relief wells not functioning properly./ Abnormal rise in water level in wells. (10 Dams)
- A6: Seepage noticed around the conduit. (50 Dams)
- A 7 : Retrogression /scouring in tail channel. (63 Dams)
- A 11 : Sweating / seepages through D/S of masonry Dam (1 Dams)
- A 14 : EDA / Stilling basin damaged/Hydraulic performance not good.(21 Dams)
- A16 : Damages / foundation erosion/ scour/undermining observed in vicinity of flank walls/ guide walls/ junction walls/return walls. (16 Dams)
- A 17 :End weir not in good condition / scouring noticed on immediate D/S. (14 Dams)
- B 1 Dam section is not as per design (50 Dams)
- B 2: Cross and toe drains not working properly/ drains silted or vegetated causing stagnant pool of water. (3 Dams)
- B3 : Considerable settlement of embankment / Rock toe/Pitching/ U/S & D/S slops, bulging/concavity of slopes. (40 Dams)
- B 4: Longitudinal / Transverse cracks/ low area/sink holes/gully formation on top side slope of earthen dam. (13 Dams)
- B 5 : Outlet gates not functioning properly. Stem rod is bent(Service gate/Emergency gate/Stop log gate/sluice gate) (57 Dams)
- B 6: Approach to dam through all weather road not constructed/ maintained properly. (2 Dams)
- B 7: Waste weir/waste weir bar not in good condition/coping damaged/leakage through waste weir. (66 Dams)
- B 8 : Pointing on U/S face of dam not in good condition./deterioration spalling of concrete surface. (4 Dams)
- B 11: Surface paint/steel surface of spillway gates deteriorated. (1 Dams)
- B 12: Damage to Rubber seals/ considerable Leakages through gates. (7 Dams)
- B 13 : Heavy vegetation/big trees on embankment top/slope making dam portion not Accessible. (5 Dams)
- B 14 : Deck bridge slab/ pier / damaged cracked/ alignment disturbed.(1 Dams)
- B 15: Major portion of Pitching damaged/washed away. (2 Dams)


6.Dams Deficiencies
[Ref. Table-3.5]
0
1755
9713
Category-1 (0 No.)
Category-2 (1404 No.)
Category-3 (7938 No.)

Part-4

Annual Performance Report of Dam Instruments

Part-4 : Annual Performance Report of Dam Instruments

4.1 General :

The main purpose of instrumentation in dam is to warn of any changes that could in danger the safety of a dam, as well as to provide a confirmatory check in design assumptions and methods of computation.

Instruments embedded in or installed at the surface of the dam keeps a constant watch over the performance and indicate the distress spots for which remedial measures may be taken. Thus, instruments play an important role in monitoring and evaluating the performance of the dams during the construction as well as operation.

In general it is observed that Dam Instrumentation is somewhat neglected part in Dam maintenance. Instruments are installed in or on the Dam Body. However due to poor Maintenance they are not functioning. It is must for field officers to recognize importance of data derived from instruments and its analysis to upkeep of Dams in safe condition.

4.2 Instrumentation in Earthen Dams :

1. Pore Pressure Meter :

They are installed in bore holes drilled below the foundation or through already completed embankment. Hence cannot be repaired or replaced.

2. Casagrande /Standpipe Piezometers :

These are used for measuring pore water pressure in soil. These instruments can be installed at any time at desired location after completion of construction of the dam.

1. Twin Tube Piezometers :

These are also used for measuring pore water pressure in earthen dam. These are installed in foundation and embankment during construction of dam. If PVC pipes are found chocked due to leached material then it can be cleaned with CuSo4. If pipes are cut / broken then it cannot be replaced as those are in body of dam. Outside measuring assembly can be repaired. Periodical maintenance, reading and calibration are of utmost important.

4. Earth Pressure Cells :

These are installed in the foundation. The cables which are outside the body can be replaced if damaged. The sensor cannot be repaired or replaced.

5. Settlement Gauges (Surface Settlement Gauges/Vertical Cross Arms) :

These are used for measuring settlement in earth fill dam, rock fill dam and high embankment. Initially when the dam is under construction these instruments are installed. Settlement of dam is more in initial period, which gradually decreases and it is almost nil after certain period. As such these gauges also do not show settlement after few years.

6. Slope Indicator :

This is installed in foundation with one end at bottom and other at top of the dam. It measures horizontal and vertical movement of the dam. This can be replaced.

4.3 Instrumentation in Concrete / Masonry Dams :

1. Stress meters :

The stress meters measure stresses inside the dam body. These instruments are embedded in concrete/masonry during construction stage hence cannot be repaired or replaced.

2. Strain Meter/ No Stress Strain Meter :

The strain meters measures the deformation in the structure at the particular location due to strain, creep, temperature etc. The main purpose is to determine the stress distribution in the concrete dam during and after construction of dam. Since instrument is installed in the body of the dam it cannot be repaired or replaced.

3. Uplift pressure cells

The bowl type uplift pressure cells are provided in the foundation of dam. Uplift pressure cell is used for monitoring uplift pressure of water in the foundation of dam and concrete structure. The pressure cell pipes can be cleaned if choked. The pressure gauges can be repaired or replaced.

4. Plumb Bob /Co-Ordimeter :

Conventional / Inverted Plumb Bob is used to measure deflection of the dam body. It measures the horizontal displacement in dam's foundation and abutment. Plumb bob can be repaired or replaced.

5. Thermocouples/ Thermometers :

These are used to measure the temperature variations in the body of concrete dam. These are installed in layers at various levels and can not be replaced or repaired after construction.

6. Long Gauge Extensometer :

It is used to measure the deformation/displacement in the foundation of the concrete dam. Once it fails to function can not be repaired.

7. Joint meters :

The joint meters measure the open

ing of the joints across which they are embedded. As such they are located near the joints.

4.4 Status Of Dam Instrumentation In The Region :

Considering the fact that most of the instruments were non-functional from many years, Govt. of Maharashtra appointed a committee to study these instruments. The recommendations of the committee were accepted and incorporated in G.R. धसुसं २०१४(६२१/१४)/ सिं.व्य. (कामे) Dated. 31/12/2015. Accordingly to every dam owner, it is informed by Dam Safety Organization to update the list of instruments at the dam site. In this report the updated details of instruments are considered.

The status of dam instrumentation is given in table No.4.1.

4.5 Observations

1) Various instruments numbering 4373 have been installed. Out of which 907 were working and 3466 were not working i.e. 79.26 % instruments are in non working condition.

2) The observations of the instruments should be taken regularly and need to be sent to D.S.O. Nashik for analysis.

Table No 4.1
Status of instruments Mortality

Sr. No.	Type of Instruments	Number Of Instruments																											
		Konkan				Pune				Nashik				Aurangabad				Amravati				Nagpur				Maharashtra State			
		Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
(A)	**Earth Dams**																												
1	Casagrande / Stand pipe piezometers /Vibrating	**66**	**15**	**51**	**77.27**	**235**	**68**	**167**	**71.06**	**109**	**5**	**104**	**95.41**	**68**	**00**	**68**	**100**	**172**	**22**	**150**	**87**	**67**	**4**	**63**	**94**	**717**	**104**	**613**	**85.50**
2	Twin tube piezometers	**413**	**48**	**365**	**88.38**	**657**	**78**	**579**	**88.13**	**343**	**0**	**343**	**100**	**135**	**18**	**117**	**86.67**	**65**	**0**	**65**	**100**	**4**	**0**	**4**	**100**	**1617**	**243**	**1374**	**84.97**
3	Horizontal/Vertical device / Cross arm surface settlement plug	**86**	**7**	**79**	**91.86**	**158**	**0**	**158**	**100**	**10**	**0**	**10**	**100**	**2**	**2**	**0**	**00**	**0**	**0**	**0**	**0**	**0**	**-**	**-**	**-**	**256**	**9**	**247**	**96.48**
4	Earth pressure cells	**27**	**3**	**24**	**88.89**	**52**	**0**	**52**	**100**	**4**	**-**	**4**	**100**	**0**	**-**	**-**	**-**	**0**	**0**	**0**	**0**	**0**	**-**	**-**	**-**	**83**	**3**	**80**	**96.39**
5	Slope indicator	**0**	**NA**	**NA**	**NA**	**0**	**NA**	**NA**	**NA**	**-**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**
	Total (A)	**592**	**73**	**519**	**87.67**	**1102**	**146**	**956**	**86.75**	**466**	**5**	**461**	**98.93**	**205**	**20**	**185**	**90.24**	**237**	**22**	**215**	**90**	**71**	**4**	**67**	**94**	**2673**	**270**	**2403**	**89.90**
(B)	**Masonry Dams**																												
6	Pore pressure meters	**60**	**36**	**24**	**40**	**71**	**0**	**71**	**100**	**-**	**-**	**-**	**-**	**16**	**0**	**16**	**100**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	147	36	111	75.51
7	Stressmeter	**60**	**36**	**24**	**40**	**8**	**0**	**8**	**100**	**-**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	100	36	64	64
8	Strainmeter/ No stress-strain meter	**60**	**36**	**24**	**40**	**31**	**0**	**31**	**100**	**-**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**1**	**0**	**4**	**100**	92	36	56	60.87
9	Uplift pressure cells	**115**	**21**	**94**	**81.74**	**291**	**29**	**262**	**90.03**	**18**	**2**	**18**	**100**	**63**	**0**	**63**	**100**	**91**	**0**	**91**	**100**	**40**	**0**	**40**	**100**	618	52	566	91.59
10	Plumb bob/ Inverted Plumb Bob / co-ordimeter	**10**	**2**	**8**	**80**	**13**	**6**	**7**	**53.85**	**3**	**0**	**3**	**100**	**2**	**-**	**2**	**100**	**6**	**1**	**5**	**83**	**5**	**1**	**4**	**80**	39	10	29	74.36
11	Long Gauge extensometer, Multiple Bore hole	**0**	**NA**	**NA**	**NA**	**0**	**NA**	**NA**	**NA**	**-**	**-**	**-**	**-**	**0**	**-**	**-**	**-**	**-**	**-**	**-**		**0**	**-**	**-**	**-**	0	-	-	-

Sr. No.	Type of Instruments	Number Of Instruments																											
		Konkan				Pune				Nashik				Aurangabad				Amravati				Nagpur				Maharashtra State			
		Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	extensometer																												
12	Thermometers	639	428	211	33.02	19	0	19	100	-	-	-	-	0	-	-	-	-	-	-		0	-	-	-	658	428	230	34.95
13	Jointmeters / Dial Gauge	42	24	18	42.86	34	17	17	50	-	-	-	-	0	-	-	-	-	-	-		0	-	-	-	76	41	35	46.05
14	Tiltmeter	0	NA	NA	NA	2	0	2	100	-	-	-	-	0	-	-	-	-	-	-		0	-	-	-	2	0	2	100
	Total (B)	**986**	**583**	**403**	**40.87**	**469**	**52**	**417**	**88.19**	**21**	**00**	**21**	**100**	**81**	**-**	**81**	**100**	**97**	**1**	**96**	**98.97**	46	1	45	97.83	**1700**	**637**	**1063**	**62.53**
	Total	**1578**	**656**	**922**	**58.43**	**1571**	**198**	**1373**	**87.40**	**487**	**5**	**482**	**98.97**	**286**	**20**	**226**	**93.01**	**334**	**23**	**311**	**93.11**	**117**	**5**	**112**	**95.73**	**4373**	**907**	**3466**	**79.26**

Part-5

Annual Performance Report of Meteorological Instruments

Part-5 : Annual Performance Report of Meteorological Instruments

5.1 General :

Hazard potential of dam depends upon the possible hazard it poses to population on the downstream during flood. In case of gated spillways, generally flood is considered to impinge when reservoir is at F.R.L. If flood forecasting and warning systems are in place, flood impingement can be considered at lower when F.R.L. considering prior depletion.

The establishment of hydro-meteorological stations in the vicinity of every Class-I dam and rain gauge network in its catchments assumes vital importance due to its role in flood forecasting and warning. The hydro-meteorological station shall be capable of recording data relating to, among other parameters, rainfall, atmospheric pressure, maximum & minimum temperature and humidity, wind speed, wind direction, height of waves and reservoir water temperature. It is important that a representative proportion of the rain gauge network is linked to flood forecasting and warning control centre by telemetry.

5.2 Observations :

From Pre/Post Monsoon Reports it is seen that the ANNEXURE-IV which is "**Checklist of Various Meteorological Instruments installed on Dams**" is not filled properly and quantity of number of instruments varies from year to year. As this status of instruments is submitted to C.W.C., New Delhi. Field authorities need to make sure that correct information is filled. Table 5.1 gives the Dam wise status of the meteorological instruments Installed.

1. It is seen that 893 various meteorological instruments installed on dams out of which 638 are functioning and 255 are non functioning. The non-functioning should be repaired/replaced on priority.
2. As per the government circular CDA-1013/(207/13)/CAD(works)/ August-2013. It is mandatory to install **Pan Evaporimeter** to measure evaporation on all major and medium projects.

Efforts should be taken by field officers to establish automatic flood warning systems which will help in saving lives, livestock and property and will invariantly contribute to lessening of the overall impact of floods.

Table No. 5.1
Status of Meteorological instruments Mortality

Sr. No.	Type of Instruments	Number of Instruments																											
		Konkan				Pune				Nashik				Aurangabad				Amravati				Nagpur				Maharashtra State			
		Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28	29	30	31
1	Rain gauge on dam (ordinary)	103	78	25	24.27	80	68	12	15.00	70	61	09	12.85	43	34	09	20.93	67	52	15	22.38	53	42	11	20.75	416	335	81	19.47
2	Rain gauge on dam (Self recorder)	12	03	09	75.00	12	8	4	33.33	0	0	0	0	11	03	08	72.73	4	1	4	25.00	2	1	1	50.00	41	16	25	60.98
3	Rain gauge in catchment (ordinary)	21	16	05	23.80	23	23	0	0.0	65	50	15	23.07	35	27	08	22.85	12	10	2	16.67	15	6	9	60.00	171	132	39	22.81
4	Rain gauge in catchment (Self recorder)	12	08	04	33.33	15	14	1	6.66	0	0	0	0	15	09	06	35.71	11	8	3	27.27	1	1	0	0.0	54	40	14	25.93
5	Pan Evapometer	17	05	12	70.58	20	16	4	20.00	29	20	09	31.03	12	09	06	35.71	23	7	16	69.56	8	4	4	50.00	109	61	48	44.04
6	Wind Velocity recorder	09	03	06	66.66	6	4	2	33.33	03	02	01	33.33	01	00	01	100.0	3	3	-	0	1	1	0	50.00	23	13	10	43.48
7	Wind direction recorder	08	04	04	50.00	7	4	3	42.85	02	01	01	50.00	03	01	02	66.67	1	1	-	0	1	1	0	0.00	22	12	10	45.45
8	Thermometer for air jump	0	0	0	0	3	2	1	33.33	0	0	0	0	0	0	0	0	-	-	-	-	1	0	1	100.0	4	2	2	50.00
9	Wet/dry bulb thermometer	07	02	05	71.43	4	3	1	25.000	03	02	01	33.33	02	00	02	100	1	1	-	0	-	-	-	-	17	8	9	52.94
10	Thermometer for reservoir water temp.	-	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	-	-	-	-	3	1	2	66.66	3	1	2	66.66
11	Water stage recorder	-	-	-	-	-	-	-	-	04	04	04	0.0	05	02	03	60.00	1	1	-	0	-	-	-	-	9	6	3	33.33
12	Wave height recorder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	100	-	-	-	-	1	0	1	100.0
13	Barometer	01	00	01	100	1	1	0	0.0	-	-	-	-	01	00	01	100.0	-	-	-	-	-	-	-	-	3	1	2	66.67
14	Sun shine recorder	01	00	01	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	100
15	Automatic level recorder	02	00	02	100	-	-	-	-	-	-	-	-					-	-	-	-	1	1	0	0.0	3	1	2	66.67

Sr. No.	Type of Instruments	Number of Instruments																											
		Konkan				Pune				Nashik				Aurangabad				Amravati				Nagpur				Maharashtra State			
		Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)	Total	Working	Non-Working	Mortality (%)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28	29	30	31
16	Digital Water level recorder	-	-	-	-	1	1	0	0.0	-	-	-	-	-	-	-	-	-	-	-	-	1-	0	1	100	2	1	1	50.0
17	Other Meteorological Instruments	-	-	-	-	6	6	0	0.0	-	-	-	-	6	2	4	66.67	-	-	-	-	-	-	-	-	12	8	4	33.33
18	Posta Corder earth quack recorder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	100.0	1	0	1	100.0
Total		**193**	**119**	**74**	**38.34**	**178**	**150**	**28**	**15.73**	**176**	**140**	**36**	**20.45**	**134**	**87**	**47**	**35.07**	**124**	**84**	**40**	**32.25**	**88**	**58**	**30**	**34.09**	**893**	**638**	**255**	**25.56**

Part-6

National Committee on Dam Safety (NCDS) Documents

Part- 6 National Committee on Dam Safety (NCDS) Documents

Importance of National Committee on Dam Safety (NCDS) Documents:

Central Water Commission (CWC) has laid down various guidelines covering the standardized dam safety practices-essentially guiding the dam owners in preparation of Emergency Action Plans, Periodical Dam Safety inspections, comprehensive dam Safety evaluation and appropriate institutional framework for dam safety. Their implementation is emphasized during the meetings of National Committee on Dam Safety (NCDS) and through the communications sent in this regard.

During the 34th meeting held at Chennai in March 2015 it was requested to all the Dam owners to take necessary steps for preparation of EAPs & other documents & report to NCDS Secretariat about the number of Dams for which EAPs & other documents have been prepared, along with the target dates for the preparation of EAPs & other documents for the remaining Dams.

The documents to be prepared as per National Committee on Dam Safety are as under & these shall be properly maintained and kept up to date by including latest information available.

1. EAP
2. R.O.S & G.O.S.
3. Data Book
4. O & M manual
5. Record Drawing & Completion Report

1. EAP : Emergency Action Plan:

An Emergency action plan is a formal plan that identifies potential emergency conditions at a dam prescribes the procedures to be followed to minimize property damage and loss of life. The EAP contains procedures and information to assist the dam owner in taking necessary actions in time to moderate or alleviate the problems, in addition to issuing early warning & notification messages to responsible emergency management authorities,viz.,District Magistrate/Collector, Armed Forces, Paramilitary forces, Project Authorities & other Central/State Agencies. It also contains inundation maps to show the emergency management authorities of the critical areas for necessary relief and rescue actions in case of an emergency. In a nutshell, it outlines “who does, what, where, when and how” in an emergency situation or unusual occurrence affecting the Dams. The Emergency Action Plan has to be prepared as per CWC Guidelines are available on official website

https://damsafety.in/ecm-includes/PDFs/Guidelines_Developing_EAP_Dam.pdf

2. R.O.S. (Reservoir operation schedule) & G.O.S. (Gate operation schedule):

It is very necessary to lay down operating procedures of all storage reservoirs with the objective to limit the flood stages in the river downstream and with maximum feasible utilization of the flood capacity of the river channel downstream of reservoirs, consistent with the safety of the dam. A proper reservoir operation schedule should be in place.

For this purpose a schedule of opening and closing the gates to limit the reservoir levels to preset gauges should be laid down. Schedule for the dam as per operation & maintenance manual should be strictly adhered. The entire capacity of reservoir is used for active conservation. When the reservoir rises above active conservation, operation will be in accordance with the standing operation procedures. Inflow forecasting arrangement should be made for easy operation of gates. The Engineer in charge should inform immediately to the flood maintenance engineer downstream and flood –fighting center of the releases from the reservoir.

3. Data book:

Proper assessment of dam safety involves a thorough review of design, construction and performance records prior to conducting a field examination. The Data Book is an unpublished document which is prepared before the initial safety inspection of each dam. This book is abbreviated, convenient source of information, summarizing all pertinent records and history related to the safety of a dam and is a reference for the evaluation team. This Data Book should answer most questions about the dam. A list of reference is included if additional information is needed. Continual updating of the Data Book will be required as future inspections are made, new problems arise, new investigations are undertaken and remedial treatments performed. Documentation of all projects may be done in the Data Book format which is the primary data base for the team evaluating the safety of a dam. (Guidelines on standardized Data Book format are available at http://www.cwc.gov.in/ Dam_safety.html)

4. O & M Manual:

It is desirable that a separate manual is available with the officers .The officers Incharge of such works are requested to personally go through the manual and maintain the records from time to time in such a manner as to give their successors complete and correct idea of the state of each of the several storage works in their charge and the different standing orders on all matters concerning the works. This will enable them to tackle problems as they arise, by quickly referring to the manual as far as possible without having to depend on the office to give information. The complete set of manual for each of the storage works should be personally handed over to successor by each concerned officer.

Copies of the maintenance manual shall be maintained at all offices right from sectional office to Circle office.

It is also necessary that the manuals are inspected at the time of inspection by the superior officers. Record of handing over and inspection should be maintained.

5. Record Drawing & Completion Report :

The importance of record drawings & completion report as an archival data need not be emphasized. All efforts should be made by field engineers to prepare Record Drawing & Completion Report and store them for future reference.

Table - 6.1 Status of NCDS

Sr. No.	Revenue Region	EAP			GOS			ROS			Remark
		Total	Received	Not Received	Total	Received	Not Received	Total	Received	Not Received	
1	Kokan`	48	14	34	21	11	10	21	12	9	All EAP & ROS must be updated as per CWC guide lines 2016. Hard & Soft copy of EAP & ROS should be made available to DSO.
2	Pune	76	29	47	40	30	10	40	35	5	
3	Nashik	68	34	34	34	27	7	33	27	6	
4	Aurangabad	37	9	28	37	11	26	37	13	24	
5	Amravati	23	19	4	17	15	2	17	17	0	
6	Nagpur	21	13	08	14	10	04	14	13	01	
7	Maharashtra State	**273**	**118**	**155**	**163**	**104**	**59**	**162**	**117**	**45**	

Part-7

Dam Health & Rehabilitation Monitoring Application (DHARMA)

Part-7 DHARMA: Dam Health and Rehabilitation monitoring Application

Introduction :

Dam health & Rehabilitation Monitoring application (DHARMA) is a web based asset management software to support the effective collection and management of authentic asset and health data for all large dams in India and address key dam safety challenges of

i) Insuring Completeness of information.

ii) Bring stake holders together

iii) Effectively managing asset inventory.

iv) Assess soundness of Dam health.

Design and Development :

DHARMA software consist of seven modules.

i) Project features

ii) Project portfolio

iii) Engineering features.

iv) Asset health.

v) Asset rehabilitation.

vi) Stake holders and

vii) Document library.

The first three modules (i to iii consist of mostly static data, to be enter once and rarely undergo a change where as modules iv) and v) will be dynamic and requires regular updating with information associated with inspections investigations, instrumentation and rehabilitation works. Modules vi) and vii)contain information useful for reference.

All field EE's are required to fillup attached two forms (Dam Data Manager & Dam Health Engineer) for each Dam in their jurisdiction by 15th July 2021 & its review will be taken by Hon. DG, MERI, Nashik by 15th Aug 2021.

Region wise Class-I Dam's detail status of DHARMA Information updation is as per following Table .

Kokan Region

Status of DHARMA Information updation

Sr. No.	Name of dam	NRLD registration number	Dharma data filling status (%)
Kokan Region			
A) Chief Engineer, Water Resources Department, Kokan			
I) Superintending Engineer, Thane Irrigation Circle Thane			
1) Executive Engineer, Bhatsa Dam Management Dn.1, Bhatsanagar			
1	Bhatsa	MH09HH1011	33
2	Upp.VaitarnaAlwandi	MH09MH0384	10
2) Palghar Irrigation Division, Manor,Dist.Palghar			
3	Dhamni	MH09HH1173	09
3)Thane Irrigation Division,Thane			
4	Domihira (UG)	MH09HH1851	09
5	Ghatghar (Upper) *	MH09MH1643	11
6	Ghatghar (Lower)(UG)	MH09HH1670	11
4) Executive Engineer, Raigad Irrigation Division,Kolad			
7	Bhira Pick up	MH09MH1132	11
8	Bhira forebay (UG)	MH09MH0539	11
II) Superintending Engineer, Ratnagiri Irrigation Circle, Ratnagiri			
1) Executive Engineer, Ratnagiri Irrigation Dn. Ratnagiri			
9	Barewadi (UG)	MH09HH0912	11
10	Natuwadi	MH09HH1058	11
11	Pimpar (UG)	MH09HH1065	11
2) Executive Engineer, Irrigation Project Construction Dn. Ratnagiri			
12	Arjuna (UG)	MH09HH1855	10
13	Muchkundi(UG)	MH09HH1875	09
14	Berdewadi (UG)	MH09HH1579	11
15	Panhale (UG)	MH09MH1567	11
16	Sakharpa (UG)	MH09HH1566	11
17	Tide(UG)	MH09HH1878	09

Sr. No.	Name of dam	NRLD registration number	Dharma data filling status (%)
3) Executive Engineer, Irrigation Project Construction Dn. Chiplun			
18	Awashi (UG)	MH09HH1503	11
19	Bholawali (UG)	MH09HH1564	11
20	Gadgadi (UG)	MH09HH1590	10
21	Gadnadi (UG)	MH09HH1565	**Not Registered**
22	Kondiwali (UG)	MH09HH1360	11
23	Pimpalwad(Dubi)	MH09HH1565	11
24	Shil (UG)	MH09HH1404	03
25	Tangar (UG)	MH09MH1361	32
26	Kakyewadi	MH09HH1856	11
27	Shelarwadi(Waki) (UG)	MH09HH1857	11
III) Superintending Engineer, North Kokan Irrigation Project Circle, Thane			
1) Executive Engineer, Hetawane Medium Project Division. Kamarali, Raigad			
28	Hetawane	MH09HH1551	10
29	Amboli (UG)	MH09HH1854	11
2) Executive Engineer, Raigad Irrigation Division No 2, New Mumbai.			
30	Pali Bhutawali (UG)	MH09HH1716	11
3) Executive Engineer, Palghar Irrigation Project Construction Division, Suryanagar			
31	Wagh (UG)	MH09HH1580	11
IV) Superintending Engineer, South Kokan Irrigation Project Circle, Sindhudurgnagari			
1) Executive Engineer, Sindhudurg Irrigation Project Construction Division, Sawantwadi			
32	Tillari(Forebay)	MH09MH1071	11
33	Tillari(Main)	MH09HH1134	61
34	Tillari(Interstate)	MH09HH0945	11
2) Executive Engineer, Medium Project Division, Ambadpal			
35	Deoghar (UG)	MH09HH1648	09
36	Tarandale (UG)	MH09HH1669	11
3) Executive Engineer, Minor Irrigation Division, Sindhudurgnagari			
37	Korle Satanadi (UG)	MH09HH1858	10
38	Nadhawade(UG)	MH09HH1881	11

Sr. No.	Name of dam	NRLD registration number	Dharma data filling status (%)
39	Otav (UG)	MH09MH1698	11

Private Dam			
1) Chief Engineer MIDC HQ			
I) Superintending Engineer MIDC, Dombivali, Thane			
1	Barvi(AG)	MH09HH0738	05
2	Ransai (AG)	MH09HH0213	10
II) Superintending Engineer MIDC, Mahad, Raigad			
3	Savitri	MH09HH1521	10
2)**Superintending Engineer, Dairy Const.Circle, Worli**			
4	KurzeDapcheri	MH09MH0151	10
3) New Mumbai Municipal Corporation, New Mumbai			
5	Morbe	MH09HH1662	03
4) Municipal Corporation of Greater Mumbai, Mumbai			
6	Tansa (AG)	MH09HH0020	11
7	Modaksagar	MH09HH0068	11
8	Middle Vaitarna	MH09VH1852	11
9	Pise	MH09LH2386	11

Pune Region

Status of DHARMA Information updation

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)	Remarks
[A]Chief Engineer(W.R.)Water Resources Department Pune				
(1)Superintending Engineer, Pune Irrigation Circle, Pune				
(a)Executive Engineer , Pune Irrigation Division, Pune				
1.	Jadhavwadi	MH09HH1587	10	
2.	Nira devghar	MH09HH1554	10	
3.	Bhatghar	MH09HH0048	41	
4.	Vadivale	MH09MH1517	11	
5.	Andravalley	MH09HH1622	11	
6.	Kasarsai	MH09MH1373	11	
(b)Executive Engineer ,Chaskaman Irrigation division, Pune				
7.	Aralakalmodi	MH09HH1672	9	
8.	BhamaAskhed	MH09HH1559	10	
9.	Chaskaman	MH09HH1522	10	
(c)Executive Engineer , Lift Irrigation Management Division, Pune				
10.	Nazare	MH09MH0453	10	
d) Executive Engineer ,Khadakwasala Irrigation Division, Pune 11				
11.	Panshet	MH09HH0310	10	
12.	Khadakvasal	MH09HH 0013	11	
13.	Warasgaon	MH09HH0592	10	
14.	Pawana	MH09HH0311	10	
(e)Executive Engineer, Nira Right Bank Canal Division, Phaltan ,Dist. Satara				
15.	Veer	MH09HH0116	10	
(2)Superintending Engineer, Pune Irrigation Project Circle, Pune				
(a) Executive Engineer, BhamaAskhed dam division, pune				
16.	Temghar	MH09HH1544	10	
(c)Executive Engineer, Niradevghar Project Division, Sangavi(Bhatghar),Tal.Bhor,Dist.Pune				
17.	Gunjavani	MH09HH1552	11	

(3)Superintending Engineer Sangli Irrigation circle, Sangli				
(a)Executive Engineer ,Sangli Irrigation Division, Sangli				
18.	Morna (Shirala)	MH09HH1101	11	
(b)Executive Engineer ,Tembhu Lift Irrigation Project Management Division, Ogalewadi				
19.	Yevati masoli	MH09HH1218	10	
(c)Executive Engineer ,Takari Pump House Division No.1, Devrashtre				
20.	Satpewadi barrage	MH09MH2406	07	
(4)Superintending Engineer Kolhapur Irrigation Circle,Kolhapur				
(a)Executive Engineer , Medium Project Division No2, Kolhapur				
21.	Ghatprabha(Phatakwadi	MH09HH 1900	11	
22.	Chikotra	MH09HH1582	10	
23.	Jangamhatti	MH09MH1366	10	
24.	Keloshi Bk.	MH09HH1935	09	
25.	Jambre	MH09HH1921	11	
(b)Executive Engineer, Kolhapur Irrigation Dn.(North) Kolhapur				
26.	Kadavi	MH09HH1541	10	
27.	Kasari	MH09HH1245	11	
28.	Kumbhi	MH09HH1671	10	
29.	Paleshwar	MH09HH1546	11	
30.	Tulashi	MH09HH0726	03	
31.	Upwade	MH09HH1385	03	
32.	Radhanagari	MH09HH0067	10	
33.	Warana	MH09HH1542	14	
34.	Dudhaganga	MH09HH1226	10	
(c)Executive Engineer, Kolhapur Irrigation Dn.(South) Kolhapur				
35.	Patgaon	MH09HH1242	10	
36.	Ambewadi	MH09HH1899	11	
37.	Chitri	MH09HH1586	11	
38.	Kitwad-2	MH09HH1902	11	
39.	Kondoshi	MH09HH1533	10	
40.	Lakikatti	MH09HH1538	11	
41.	Megholi	MH09HH1536	10	

42.	Phaye	MH09HH1629	11	
(5)Superintending Engineer Satara Irrigation Circle, Satara				
a)Executive Engineer, Koyna Irrigation Division Koynanagar				
43.	Koyna	MH09VH0100	50	
44.	Kolkewadi	MH09HH0527	27	
(b)Executive Engineer, Satara Irrigation Division Satara				
45.	Dhom	MH09HH0655	56	
46.	Dhombalkawadi	MH09HH1665	10	
(c) Executive Engineer, Krishna Irrigation Division, Satara				
47.	Urmodi	MH09HH1594	08	
48.	Kanher	MH09HH1141	50	
[B]Chief Engineer(S.P.) Water Resources Department Pune				
(1)Superintending Engineer Kukadi Irrigation Circle Pune				
(a) Executive Engineer, Kukadi Irrigation Div. 1 Narayangaon				
49.	Wadaj	MH09HH1006	11	
50.	Yedgaon	MH09MH0658	11	
51.	Manikdoh	MH09HH1060	51	
52.	Pimpalgaonjoge	MH09MH1520	11	
53.	Dimbhe	MH09HH1558	52	
(b) Executive Engineer, Kukadi Irrigation Div.2 Shrigonda				
54.	Ghod	MH09MH0117	11	
c) Executive Engineer ,Kukadi Irrigation Division No. 2, Shrigonda				
55.	Sina	MH09MH1142	11	
(d) Executive Engineer, Dimbhe Dam Div. Manchar				
56.	Chilewadi	MH09HH1553	11	
(2)Superintending Engineer Satara Irrigation Project Circle, Satara				
(a)Executive Engineer , Minor Irrigation Division, Satara				
57.	Uttarmand	MH09HH1591	10	
58.	Morna(Gureghar)	MH09HH1664	11	
59.	Nagewadi	MH09HH1518	11	
60.	Kalgaon	MH09HH2411	07	
61.	Kusawade	MH09HH2416	09	

(b)Executive Engineer ,Kanher Canal Division No.2, Karwadi,Karad.				
62.	Tarali	MH09HH1666	09	
(c)Executive Engineer, Dhom Canal Division No.2,Satara				
63.	Mahu	MH09HH1588	10	
64.	Hatgeghar	MH09HH1568	11	
65.	Pangare	--	--	NRLD Updation is Pending
(3)Superintending Engineer & Administrator, C.A.D.A. Solapur				
(a) Executive Engineer, Solapur Irrigation Division Solapur				
66.	Bori	MH09MH1650	11	
67.	Ekrukh	MH09MH0007	11	
(b)Executive Engineer, Ujjani Dam Management Division Bhimanagar Dist. Solapur				
68.	Ujjani	MH09HH0843	66	
(4)Superintending Engineer Osmanabad Irrigation Circle Osmanabad				
(a)Executive Engineer, Sinakolegaon Project Division Paranda Dist.Osmanabad				
69.	Sinakolegaon	MH09HH1673	55	

Nashik Region

Status of DHARMA Information updation

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
1	2	3	4
[1] Chief Engineer , NMR, Nashik			
(1) Superintending Engineer & Adm., CADA, Nashik			
(a) Executive Engineer, NID, Nashik			
1	Bhojapur	MH09HH0313	11
2	Gangapur	MH09HH0113	22
3	Mukane	MH09MH1380	11
4	Waldevi	MH09HH1376	10
5	Kashyapi	MH09HH1479	11
6	Gautami Godavari	MH09HH1778	11
7	Bhavali	MH09HH1789	11
8	Darana	MH09MH0037	27
9	Karawa	MH09MH1444	27
(b) Executive Engineer, PID,Nashik			
10	Ozarkhed	MH09HH0943	23
11	Punegaon	MH09MH1486	11
12	Waghad	MH09HH0797	12
13	Palkhed	MH09HH0532	11
14	Karanjwan	MH09HH0454	09
(C) Executive Engineer, AID,Ahamadnagar			
15	Adhala	MH09HH0594	11
16	Kothale	MH09MH1938	10
17	Titavi	MH09HH1941	11
18	Shirpunje	MH09HH1940	11
19	Ghoti Shilwandi	MH09HH1937	11
20	Padoshi	MH09HH1939	11
21	Kalu(Bruhat)	--	00
22	Bhadardara	MH09HH0013	60
23	Balthan	MH09MH1936	11

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
1	2	3	4
24	Nandurmadhmeshwar	--	--
25	Pimpalgaon khand	--	--
26	Waki	--	--
(d) **Executive Engineer,** MID,Malegaon			
27	Kelzar	MH09HH0896	11
28	Bhegu	MH09HH1540	11
29	Haranbari	MH09HH0842	11
30	Chankapur	MH09HH0028	25
(e) **Executive Engineer,** MID,Ahamadnagar			
31	Mula	MH09HH0316	03
2) Superintending Engineer & Adm., CADA, Ahamadnagar **a) Executive Engineer Upper Pravara Dam div, Sangamner**			
32	Nilwande	MH09HH1942	11
33	Bham	MH09HH1761	10
[2]CE, TIDC, Jalgaon **(1) Superintending Engineer, DIPC, Dhule** **(a) Executive Engineer, NMPD 2, Nandurbar**			
34	Susari	MH09MH1950	10
35	Dara	MH09HH1797	11
36	Shivan Virchek	MH09MH1748	11
37	Kordinala	MH09MH1094	11
(b) Executive Engineer DMPD, Dhule			
38	Wadi Shewadi	MH09HH1815	11
39	Sulwade Barrage	MH09MH1814	11
40	Nagan	MH09MH1791	11
41	Akkalpada	MH09HH1795	11
(c) **Executive Engineer** GRVPD, Nashik			
42	Manikpunj	MH09HH1786	11
43	Punand	MH09MH1820	11
(2) **Superintending Engineer & Adm**, CADA, Jalgaon (a) **Executive Engineer** DID, Dhule			
44	Amravati	MH09MH1644	10
45	Sarangkheda Barrage	MH09HH1770	03

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
1	2	3	4
46	Prakasha Barrage	MH09HH1810	11
47	Burai	MH09HH1009	11
48	Karwand	MH09HH0226	11
49	Panzara	MH09MH0385	11
50	Ranipur	MH09HH1481	11
51	Aner	MH09HH0741	82
52	Sonwad	MH09MH1487	11
53	Jamkhedi	MH09MH1593	11
(b) Executive Engineer, JID, Jalgaon			
54	Suki	MH09HH0656	10
55	Bhokar	Not Available	00
56	Bahula	MH09MH1445	00
57	Mor	MH09HH1619	11
58	Hatnur	MH09MH0948	11
(c) **Executive Engineer,** GID, Jalgaon			
59	Girana	MH09MH0196	10
60	Manyad	MH09HH0387	16
61	Bori	MH09MH0659	11
(3) Superintending Engineer,JIPC,Jalagon			
(a) Executive Engineer, MID,Jalgaon			
62	Waghzira	MH09HH1659	10
63	Nimbadevi	MH09HH1660	11
64	Borkheda	MH09HH1658	11
65	Haripura	MH09HH1956	11
(b) Executive Engineer,JMPD 1,Jalgaon			
66	Anjani	MH09MH1954	10
67	Gul	MH09HH1955	11
(c) Executive Engineer,Waghur Dam Div,Jalgaon			
68	Waghur	MH09LH1750	10

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
[3]CE,WR,Kokan ,Mumbai (1) Superintending Engineer, TIC, Thane (a) Executive Engineer,MID,Nashik			
69	Shrimant	MH09HH2037	11

Aurangabad Region

Status of DHARMA Information updation

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
1	2	3	4
[A] Chief Engineer & Chief Administrator (CADA), Aurangabad			
I) Superintending Engineer, CADA, Aurangabad			
1) Executive Engineer, JID, Nathnagar (North), Paithan			
1	Paithan (Jayakwadi)	MH09HH0597	48
2	Mangrul H.L.Barrage	MH09MH2127	11
3	Rajatakli H.L.Barrage	MH09MH2128	11
4	Jogladevi H.L.Barrage	MH09MH2125	11
5	Loni savangi H.L. Barrage	MH09MH2126	11
6	Apegaon H.L.Barrage	MH09MH2123	11
2) Executive Engineer, NMID, Vaijapur			
7	Bor dahegaon	MH09MH1491	25
8	Narangi	MH09MH1490	31
3) Executive Engineer, JID, Jalna			
9	Lower Dudhna	MH09MH2089	11
II) Superintending Engineer, CADA, Beed			
1) Executive Engineer, MID, Parali (V)			
10	Majalgaon	MH09HH1174	10
III) Superintending Engineer, CADA, Latur			
1) Executive Engineer, LID-1, Latur			
11	Lower Terna	MH09MH1228	11
12	Manjra	MH09MH1585	09
13	Masalga	MH09LH1408	11
14	Khulgapur H.L. Barrage	MH09MH2181	11
15	Bindgihal Latur Type Barrage	MH09MH2183	09
16	Sai H.L. Barrage	MH09LH2131	11

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
1	2	3	4
17	Takalgaon Devla Latur type Barrage	MH09MH2135	11
18	Shivni H.L. Barrage	MH09MH2132	09
19	Hosur Barrage	MH09MH2420	11
20	Gunjarga K.T. Weir	MH09MH2421	10
21	Rajegaon K. T. Weir	MH09MH2248	11
22	Dhanegaon H.L. Barrage	MH09MH2129	10
23	Karsa Pohregaon Barrage	MH09MH2246	11
B) Chief Engineer (WR), Aurangabad			
I) Superintending Engineer, Aurangabad Irrigation Circle, Aurangabad			
1) Executive Engineer, MID-1, Aurangabad			
24	Shivna takli	MH09MH1651	66
II) Superintending Engineer, Nanded Irrigation Circle, Nanded			
1) Executive Engineer, NID, South, Nanded			
25	Lower Manar	MH09MH0170	11
26	Upper Manar	MH09HH1806	11
2) Executive Engineer, NID, North, Nanded			
27	Balegaon HL Barrage	MH09MH2117	09
28	Vishnupuri	MH09LH1254	11
29	Digras H.L. Barrage	MH09HH2116	10
30	Babhali H.L. Barrage	MH09MH2118	11
31	Amdura H.L. Barrage	MH09HH2119	09
3) Executive Engineer, UPPD-1, Nanded			
32	Isapur (UPP)	MH09HH0947	34
4) Executive Engineer, PID, Basmatnagar			
33	Yeldari	MH09HH0171	37
34	Siddheshwar	MH09HH0172	46
5) Executive Engineer, MID,Parbhani			
35	Mudgal HL Barrage	MH09MH2121	11

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
1	2	3	4
36	Dhanegaon HL Barrage	MH09MH2129	10
III) Superintending Engineer, BIPC, Paral (V)			
1) Executive Engineer, BID, Beed			
37	Upper Kundalika	Proposed to be included in NRLD	--

Amravati Region
Status of DHARMA Information updation

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
A) Chief Engineer (WR) Amravati			
I) Superintending Engineer.Yavatmal.Irrigation.Circle.(M), Yavatmal			
1) Executive Engineer, Yavatmal Irrigation Division, Yavatmal.			
1	Lower Pus	MH019MH1012	11
2	Pus	MH09HH0268	11
2) Executive Engineer,Arunavati Pro.Dn. Digras.			
1	Adan	MH09HH0660	11
2	Arunavati	MH09MH1343	11
3) Executive Engineer Bembla Projet Division, Yavatmal			
1	Bembla	MH09MH2138	10
II) Superintending Engineer, Upper Wardha Irrigation, Circle, Amravati			
1) Executive Engineer, Medium & Minor Irrigation Projrct Division, Achalpur.			
1	Shahnoor	MH09HH1212	11
2	Chandrabhaga	MH09HH1801	78
3	Chargad	MH09HH1621	10
4	Purna	MH09HH1803	42
2) Executive Engineer, Amravati Medium Project Division, Amravati.			
1	Sapan	MH09HH2139	10
3) Executive Engineer, Upper Wardha Dam Division Amravati			
1	Upper Wardha	MH09HH1319	62
B) Chief Engineer (SP) Amravati			
I) Superintending Engineer.Akola.Irrigation.Circle, Akola			
1) Executive Engineer, Akola Irrigation Division, Akola.			
1	Katepurna	MH09MH455	17
2	Dagadparwa	MH09LH2184	11
3	Wan(Akola)	MH09HH1560	51
2) Executive Engineer, Buldana Irrigation Division, Buldana.			
1	Nalganga	MH09HH0152	13
2	Gyanganga	MH09HH0267	56
3	Dongarshewali	MH09MH2136	11

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
4	Pentakli	MH09MH1624	26
5	Mun	MH09HH1492	11
6	Khadakpurna	MH09HH2137	11
3) Executive Engineer, Minor Irrigation Project, Akola.			
1	Khirkund	MH09HH1516	11
2	Popatkhed	MH09HH1656	10
II) Superintending Engineer.Amravati.Irrigation.Project.Circle, Amravati			
1) Executive Engineer,Irrigation Project & Water Resorce Investigation Department			
1	Ghungshi Barrage	MH09MH2217	08

Nagpur Region
Status of DHARMA Information updation

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
A) Chief Engineer, Water Resources Department, Nagpur			
I) Superintending Engineer & Adm., C.A.D.A., Nagpur			
1) Executive Engineer, Wardha Irrigation Division, Wardha			
1	Bor	MH09HH0115	15%
2	Dham	MH09HH1143	11%
2) Executive Engineer, Nagpur Irrigation Division (North), Nagpur			
3	Khekaranalla	MH09MH1197	11%
4	Kolar	MH09HH1061	18%
3) Executive Engineer, Nagpur Irrigation Division (South), Nagpur			
5	Lower Wenna (Nand)	MH09MH1253	10%
6	Lower Wenna (Wadgaon)	MH09MH1446	11%
4) Executive Engineer, Pench Irrigation Division, Nagpur			
7	Totaladoh	MH09HH1229	12%
8	Kamti khairy	MH09HH0596	14%
9	Ramtek	MH09MH0033	11%
II) Superintending Engineer, Chandrapur Irrigation Circle, Chandrapur			
1) Executive Engineer, Chandrapur Irrigation Division, Chandrapur			
10	Asolamendha	MH09MH0040	11%
11	Dina	MH09MH0451	16%
12	Lalnalla	MH09LH1663	11%
13	Chinchdoh Barrage	-	-
III) Superintending Engineer Bhandara Irrigation Circle, Bhandara			
1) Executive Engineer, Bagh Itiadoh Irrigation Division, Gondia			
14	Itiadoh	MH09MH0227	10%
15	Sirpur	MH09MH0228	16%
16	Kalisarar	MH09MH1198	11%
17	Pujaritola	MH09MH0229	25%
B) Chief Engineer, Gosikhurd Project, Water Resources Department, Nagpur			
I) Superintending Engineer, Nagpur Irrigation Circle, Nagpur			

Sr. No	Name of Dam	NRLD registration number	Dharma data filling status (%)
1) Executive Engineer, Lower Wardha Project Division, Wardha			
18	Lower Wardha	MH09MH1811	11%
II) Superintending Engineer, Gosikhurd Project Circle, Nagpur			
1) Executive Engineer, Gosikhurd Dam Division, Pavani			
19	Gosikhurd	MH09MH1817	36%
III) Superintending Engineer, Gosikhurd Lift Irrigation Circle, Ambadi			
1) Executive Engineer, Lift Irrigation Project Division,Tirora			
20	Dhapewada Barrage	MH09HH2251	9%
CE, General (O&M) Super Thermal power station Urjanagar, Chandrapur			
SE, Civil Maintains Unit, Chandrapur			
21	Erai (Private)	MH09HH1010	10%

Part-8

Health Status of Gated Dam (As per Mechanical Organisation)

Part- 8 Health Status of Gated Dam

(As per Mechanical Organisation)

8.1 General

As per G.R. No. ID/1078/23/8/IMP/2 Dtd.10/09/1980, Dam Safety Organization has been established by Government of Maharashtra for effective monitoring the safety aspects of dam.

As per Maharashtra Government Guidelines and regulation, Chief Engineer (Mechanical), Water Resources Dept. Nashik assigned Dams gate Inspection work to Superintending Engineer, Mechanical Circle, Nashik to assure proper operation and maintenance of Dam gates

Under Superintending Engineer, Mechanical Circle, Nashik Executive Engineer, Inspection unit, Aurangabad and Executive Engineer, Sluice Gate Mfg. Division, Dapodi, Pune are looking after all the inspection works.

Division offices Conduct all pre monsoon & Post Monsoon Gate Inspection work of Government, Semi Government, & Private Dams and send Reports to related authorities for same.

After Inspection work the observed points or deficiencies are classified into various categories as given below.

Def. Category-1	Dams with Major Deficiencies which may lead to dam failure	Very Serious Defects
Def. Category-2 (2 A)& (2B)	Dams with rectifiable Deficiencies needs immediate attention	Serious Defects (2A)
		Require immediate attention (2B)
Def. Category-3	General Defects	General Defects

In the year of 2020 Pre and Post Monsoon inspection of total 171 gated dams have been carried out by Mechanical Organization. It is to be noted that Chief engineer (Mechanical) W.R.D Nashik, prepares independently the detail Health status Report of all the gated dams inspected by mechanical Organization. This report is published and submitted to WRD and circulated to all Concern Chief Engineers.

In this Health Status Report, only the Dam wise number of deficiencies noted by mechanical Organization are given in this part of AHSR. For details regarding the actual deficiencies Health Status Report circulated by Mechanical Organization shall be referred.

8.2 Overall Health Statues of Gated Dams

169 Class-I gated dams in Maharashtra State are inspected by Mechanical Organization. Category -1 deficiency is not observed on any dam. Total 2432 Category -2 deficiencies are observed on 155 Dams and total 8951 Category-3 deficiencies are observed on the 169 Dams in Maharashtra State.

Table 8.1

Status of Deficiencies

Sr. No.	Revenue Region	Number of Gated Dams as per Dam Class			Class-I Dams Deficiencies		
		Class-I	Class-II	Total	Cat-1	Cat-2	Cat-3
1	2	3	4	5	6	7	8
1	Kokan	18	00	18	00	346	953
2	Pune	40	00	40	00	863	2149
3	Nashik	36	00	36	00	655	1726
4	Aurangabad	37	00	37	00	567	2456
5	Amravati	19	00	19	00	201	1204
6	Nagpur	14	00	14	0	163	985
	Maharashtra State	164	00	164	00	2795	9473

Kokan Region

Status of Deficiencies

Sr. No.	Name of Dam	Number of Gated Dams as per Dam Class			Report Taken Into Account	Class-I Dams Deficiencies		
		Class-I	Class-II	Total		Cat-1	Cat-2	Cat-3
1	2	3	4	5	6	7	8	9
1	Surya	1	0	1	Yes	0	10	29
2	Bhatsa	1	0	1	Yes	0	19	75
3	Ghatghar (Upper)	1	0	1	Yes	0	4	49
4	Vaitarana	1	0	1	Yes	0	9	23
5	Tevan Medhe Dam Tillari	1	0	1	Yes	0	26	78
6	Tillari Interstate Project	1	0	1	Yes	0	35	73
7	Tillari Main Dam Dhamane	1	0	1	Yes	0	16	46
8	Tillari Forebay Dam	1	0	1	Yes	0	33	73
9	Hetwane	1	0	1	Yes	0	38	71
10	Natuwadi	1	0	1	Yes	0	24	58
11	Pimpalwadi	1	0	1	Yes	0	16	75
12	Gadgadi	1	0	1	Yes	0	11	18
13	Bhira	1	0	1	Yes	0	53	139
14	Morabe	1	0	1	Yes	0	6	15
15	Savitri	1	0	1	Yes	0	25	85
16	Vaitarana (Middle)	1	0	1	Yes	0	6	16
17	Modaksagar	1	0	1	Yes	0	5	10
18	Dapcheri	1	0	1	Yes	0	10	20
	TOTAL	18	0	18		0	346	953

Pune Region

Status of Deficiencies

Sr. No.	Region & Name of Dam	Number of Gated Dams as per Dam Class			Report Taken Into Account	Class-I Dams Deficiencies		
		Class-I	Class-II	Total		Cat-1	Cat-2	Cat-3
1	2	3	4	5	6	7	8	9
1	Kasarsai	1	0	1	Yes	0	32	105
2	Wadivale	1	0	1	Yes	0	49	83
3	Bhataghar	1	0	1	Yes	0	9	29
4	Niradevghar	1	0	1	Yes	0	19	56
5	Khadakwasla	1	0	1	Yes	0	44	105
6	Pawana	1	0	1	Yes	0	22	33
7	Varasgaon	1	0	1	Yes	0	37	94
8	Panshet	1	0	1	Yes	0	27	59
9	Bhama Askhed	1	0	1	Yes	0	41	56
10	Chasakaman	1	0	1	Yes	0	42	66
11	Gunjawani	1	0	1	Yes	0	10	31
12	Veer	1	0	1	Yes	0	26	27
13	Ghod	1	0	1	Yes	0	16	46
14	Mula	1	0	1	Yes	0	27	56
15	Kumbhi	1	0	1	Yes	0	20	37
16	Warna	1	0	1	Yes	0	39	78
17	Tulshi	1	0	1	Yes	0	14	41
18	Radhanagari	1	0	1	Yes	0	20	38
19	Kasari	1	0	1	Yes	0	22	67
20	Dudhganga	1	0	1	Yes	0	38	125

Sr. No.	Region & Name of Dam	Number of Gated Dams as per Dam Class			Report Taken Into Account	Class-I Dams Deficiencies		
		Class-I	Class-II	Total		Cat-1	Cat-2	Cat-3
1	2	3	4	5	6	7	8	9
21	Chikotra	1	0	1	Yes	0	11	49
22	Koyana Dam	1	0	1	Yes	0	30	13
23	Kolakewadi	1	0	1	Yes	0	23	62
24	Dimbhe	1	0	1	Yes	0	31	61
25	Manikdoh	1	0	1	Yes	0	23	60
26	Wadaj	1	0	1	Yes	0	12	28
27	Pimpalgaon Joge	1	0	1	Yes	0	3	50
28	Yedgaon	1	0	1	Yes	0	10	29
29	Chilhewadi	1	0	1	Yes	0	14	37
30	Dhom	1	0	1	Yes	0	15	46
31	Dhom balakawadi	1	0	1	Yes	0	8	29
32	Kanher	1	0	1	Yes	0	13	45
33	Urmodi	1	0	1	Yes	0	9	44
34	Mahu	1	0	1	Yes	0	10	57
35	Tarali	1	0	1	Yes	0	13	56
36	Uttarmand	1	0	1	Yes	0	5	35
37	Morna gureghar	1	0	1	Yes	0	8	45
38	Ujani	1	0	1	Yes	0	52	71
39	Bori	1	0	1	Yes	0	14	65
	Private Dam							
40	Mulashi	1	0	1	Yes	0	5	35
	Total	40	0	40	--	**0**	**863**	**2149**

Nashik Region
Status of Deficiencies

Sr. No.	Name of Class-1 Gated Dam	Category wise Identified Deficiencies			Remarks
		Cat-I	Cat-II (2A)&(2B)	Cat-III	
1	2	3	4	5	6
A) Chief Engineer (NMR)					
(1) Superintending Engineer & Adm., CADA, Nashik					
(a) Executive Engineer, NID, Nashik					
1	Gangapur	0	11	14	
2	Darana	0	11	13	
3	Kadwa	0	00	13	
4	Mukane	0	07	24	
5	Kashyapi	0	05	20	
6	Gautami Godawari	0	09	17	
7	Nandur Madhameshwar	0	17	43	
b) **Executive Engineer, PID, Nashik**					
8	Karanjvan	0	06	33	
9	Punegaon	0	09	21	
10	Palkhed	0	03	16	
c) **Executive Engineer,AID,Ahemadnagar**					
11	Bhandardara	0	07	17	
d) **Executive Engineer,Mula ID,Ahemadnagar**					
12	Mula	--	--	--	Not Inspected
e)Executive Engineer, MID,Malegaon					
13	Chanakapur	0	04	23	
2) **Superintending Engineer & Adm., Ahemadnagar**					
a) **Executive Engineer**Upper Pravara Dam div, Sangamner					
14	Nilvande	--	--	--	Not Inspected
b)Executive Engineer, Nandurmadhmeshwar Project Div, Nashik					

15	Waki	0	00	08	
B)	**CE, TIDC, Jalgaon**				
1) Superintending Engineer&Adm, CADA, Jalgaon					
1) Executive Engineer, GID, Jalgaon					
16	Bori	0	25	74	
2) **Executive Engineer,JID,Jalgaon**					
17	Hatnur	0	42	148	
18	Bahula	0	16	60	
19	Mor	0	29	40	
3)Executive Engineer,GID,Jalgaon					
20	Girna	0	12	69	
4)Executive Engineer,DID,Dhule					
21	Amrawati	0	43	----	
22	Aner	0	29	----	
23	Sonwad	0	42	82	
24	Prakasha Barage	0	16	40	
25	Sarangkheda Barage	1	34	43	
2) **Superintending Engineer, JIPC, Jalgaon**					
1) **Executive Engineer, JMPD, Jalgaon**					
26	Anjani	0	17	86	
27	Gul	0	35	86	
2)Executive Engineer Waghur Dam Div Jalgaon					
28	Waghur	0	38	154	
3)Superintending Engineer,DIPC,Dhule					
1) **Executive Engineer, NMPD No 2, Nandurbar**					
29	Susri	0	25	45	
30	Shivan	0	27	63	
2) **Executive Engineer, DMPD, Dhule**					
31	Nagan	0	18	92	
32	Wadishewadi	0	26	101	
33	Akkalpada (Lower Panzra)	0	19	125	
34	Sulwade Barage	0	26	35	

3) **Executive Engineer, GRVP Div, Nashik**					
35	Punand	0	43	113	
Private Dam					
1) Comissioner, Nashik Municipal Corporation Nashik					
36	Chehadi Barrage Private Dam (Class-II)	0	04	---	
	Total -	**36**	**655**	**1726**	

Aurangabad Region
Status of Deficiencies

Sr. No.	Region & Name of Dam	Dam Class - I						
		Defficiencies						
		2020-21			2021-22			Remarks
		Cat-1	Cat-2 (2A)&(2B)	Cat-3	Cat-1	Cat-2 (2A)&(2B)	Cat-3	
1	2	3	4	5	6	7	8	9
A) Chief Engineer, CADA, Aurangabad								
I) S.E & Admn, CADA, Aurangabad								
1)Executive Engineer, JID, Nathnagar (North), Paithan								
1	Jayakwadi	0	55	102	0	78	129	
2	Apegaon	0	18	43	0	19	44	
3	Mangrul	0	30	34	0	14	53	
4	Raja Takli	0	13	57	0	11	82	
5	Jogladevi	0	14	44	0	11	54	
6	Lonisawangi	0	21	103	0	12	118	
2) Executive Engineer, NMID, Vaijapur								
7	Bordahegaon	0	59	81	0	38	116	
8	Narangi	0	43	76	0	19	130	
3) Executive Engineer, JID, Jalna								
9	Lower Dudhna	0	17	145	0	66	112	
II) S.E.& Admm, CADA, Beed								
1) Executive Engineer, MID, Parali(V)								
10	Majalgaon	0	14	137	0	41	118	
III) S.E.& Admm, CADA, Latur								
1) Executive Engineer, LID-1, Latur								
11	Lower Terna	0	02	136	0	04	126	
12	Manjara	0	13	137	0	31	128	
13	Masalga	0	11	114	0	11	111	
14	Khulgapur Barrage	0	01	59	0	5	57	
15	Bindagihal Barrage	0	01	34	0	7	31	
16	Sai Barrage	0	2	58	0	22	59	

Sr. No.	Region & Name of Dam	Dam Class - I						
		Defficiencies						
		2020-21			2021-22			Remarks
		Cat-1	Cat-2 (2A)&(2B)	Cat-3	Cat-1	Cat-2 (2A)&(2B)	Cat-3	
1	2	3	4	5	6	7	8	9
17	Takalgaon-Devla Barrage	0	2	42	0	9	40	
18	Shivni Barrage	0	1	52	0	09	56	
19	Hosur Barrage	0	0	34	0	02	32	
20	Gunjaraga Barrage	0	1	32	0	06	29	
21	Rajegaon Barrage	0	0	35	0	02	6	
22	Dhanegaon Barrage	0	0	60	0	02	68	
23	Karsa-Poharegaon Barrage	0	0	59	0	08	64	
B) Chief Engineer, (WR), Aurangabad								
I) S.E, A.I.C, Aurangabad								
1. Executive Engineer, MID-1, Aurangabad								
24	ShivnaTakli	0	63	74	0	20	172	
II) S.E, N.I.C, Nanded								
1) Executive Engineer, NID(South), Nanded								
25	Upper Manar	0	10	93	0	30	79	
26	Lower Manar	0	0	0	0	0	0	Not inspected
2) Executive Engineer, NID(North), Nanded								
27	Balegaon HL Barrage	0	0	0	0			Not inspected
28	Vishnupuri	0	15	105	0	41	87	
29	Digras Barrage	0	0	44	0	09	48	
30	Babhali Barrage	0	0	29	0	02	35	
31	Amdura HL Barrage	0	0	0	0			Not inspected

3) Executive Engineer, UPPD-1, Nanded								
32	Isapur	0	0	0	0	0	0	Not in List of Dams Inspected by Mechanical Org
4) Executive Engineer, PID, Basmatnagar								
33	Yeldari	0	17	118	0	38	100	
34	Siddheshwar	0	11	75	0	23	67	
5) Executive Engineer, MID,Parbhani								
35	Mudgal HL Barrage	0	1	52	0	10	48	
36	Dhalegaon HL Barrage	0	5	40	0	06	23	
III) S.E, BIPC, Parali (V)								
1. Executive Engineer, BID, Beed								
37	Upper Kundalika	0	2	91	0	20	86	
	Total	**0**	**442**	**2395**	**0**	**567**	**2456**	

Amravati Region

Status of Deficiencies

Sr. No.	Name of Class-1 Gated Dam	Categoriwise Identified Deficiencie			Remarks
		Cat-I	Cat-II (2A)&(2B)	Cat-III	
1	2	3	4	5	6
A) Chief Engineer (WR) Amravati					
I) Superintending Engineer.Yavatmal.Irrigation.Circle.(M)					
1) Executive Engineer,Arunavati Pro.Dn. Digras.					
1	Aadan	--	05	50	
2	Arunavati	--	17	99	
2) Executive Engineer, Bembla Pro.Dn.Yavatmal.					
3	Bembala	--	12	75	
3) Executive Engineer, Yavatmal Irrigation Division, Yavatmal.					
4	Lower Pus	--	16	76	
5	Shahanoor	--	07	49	
II) Superintending Engineer, Upper wardha Irrigation Circle, Amravati.					
1) Executive Engineer, Amravati Medium Project Division, Amravati.					
6	Sapan	--	09	45	
1) Executive Engineer, Medium & Minor Project Division, Achalpur.					
7	Chandrabhaga	--	10	40	
8	Purna	--	16	74	
1) Executive Engineer, Upper Wardha Dam Dn. Amravati.					
9	Upper Wardha	--	16	82	
B) Chief Engineer (SP) Amravati					
I) Superintending Engineer.Akola Irrigation Circle.					
1) Executive Engineer, Buldana Irrigation Division, Buldana.					
10	Nalganga	--	04	44	
11	Khadakpurna	--	20	91	
12	Pentakali	--	09	100	
13	Man	--	04	145	
1) Executive Engineer,Akola Irrigation Division,Akola.					
14	Katepurna	--	05	32	
15	Dagadparawa	--	08	46	
16	Wan	--	21	77	
17	Popatkhed	--	10	64	
18	Lower Mun	--	08	57	
19	Paras	--	04	58	
	Total -	**0**	**201**	**1204**	

Nagpur Region

Status of Deficiencies

Sr. No.	Name of Dam	Number of Gated Dams as per Dam Class			Report Taken Into Account	Class-I Dams Deficiencies		
		Class-I	Class-II	Total		Cat-1	Cat-2	Cat-3
1	2	3	4	5	6	7	8	9
1	Lalnala	1	0	1	Yes	0	9	79
2	Shirpur	1	0	1	Yes	0	22	56
3	Kalisarar	1	0	1	Yes	0	18	52
4	Pujaritola	1	0	1	Yes	0	14	51
5	Khekranala	1	0	1	Yes	0	2	52
6	Nand	1	0	1	Yes	0	6	75
7	Wadgaon	1	0	1	Yes	0	9	89
8	Totladoh	1	0	1	Yes	0	5	92
9	Pench	1	0	1	Yes	0	26	137
10	Bor	1	0	1	Yes	0	14	65
11	Gosikhurd	1	0	1	Yes	0	9	65
12	Lower Wardha	1	0	1	Yes	0	16	92
13	Dhapewada	1	0	1	Yes	0	2	47
14	Irai	1	0	1	Yes	0	11	33
	Total	**14**	**0**	**14**	**0**	**0**	**163**	**985**

Jui Dam (Jalna)