

**Minutes of the seventh National Committee on Dam Safety meeting held on 15 March 1991 at Central Water Commission, New Delhi.**

1.0 The seventh meeting of National Committee on Dam Safety (NCDS) was held on 15 March 1991 in Sewa Bhavan, R.K.Puram, New Delhi under the Chairmanship of Dr.C.D.Thatte, Vice-Chairman, NCDS in the absence of Shri V.B.Patel, Chairman, CWC and Chairman to NCDS.

1.1 List of members who attended the meeting is given in Annex I.

1.2 Dr.C.D.Thatte, Member (D&R) welcomed the members of National Committee and other participants.

**2.0 Confirmation of minutes of 6<sup>th</sup> meeting.**

2.1 The minutes of sixth meeting of NCDS held on 19.7.1990 at New Delhi were confirmed.

**3.0 Dam Safety Assurance and Rehabilitation project**

3.1 A "Dam Safety Assurance and Rehabilitation Project" has been formulated and posed for World Bank assistance. Four States Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu have been covered in this project. Main thrust of the project is on rehabilitation of selected dams. 33 dams have been identified for rehabilitation from four States, viz. Madhya Pradesh 8 dams, Orissa 9 dams, Rajasthan 7 dams and Tamil Nadu 9 dams at an estimated cost of Rs.195 crore. The State Government also covers institutional strengthening, upgrading basic facilities. The total estimated cost of the State Component is Rs.250 crore. This amount would undergo revision on finalization of the Staff Appraisal Report (SAR) by World Bank. The Central component involving institutional strengthening of the Dam Safety and Hydrology Organisation of CWC envisages expenditure of Rs.5 crore over a period of 5 years.

3.2 NCDS desired that dialogue may be started for Phase II of the project where other States are to be involved.

**4.0 Review of National Scenario**

4.1 The National Scenario particularly with reference to distress to dams, deficiencies, if any, in the structural and operational features and failure cases is to be reviewed by the NCDS, based on pre- and post-monsoon inspections by the States.

4.2 Director ("Dam Safety Assurance and Rehabilitation Project") intimated NCDS about the successful commissioning of ROV in November 1990 in Koyna Reservoir in Maharashtra.

4.3 Members attending the meeting reported the following:

- (a) BBMB : No distress and operational problem was reported. A brief note on the functioning of Bhakra Beas Complex for period ending February 1991 was handed over during the meeting. Regarding Bhakra dam, Shri S.N.Chaturvedi, Dy.Director General, GSI desired to know the status of sedimentation in Bhakra dam with particular reference to the changes in land use in the catchment area of Bhakra dam. Representative from BBMB intimated that by now the sedimentations in the reservoir has stabilized.
- (b) Karnataka : Representative from the State intimated that the seepage problem in Talakalale dam is being attended to. Amongst other alternates, a proposal for additional dam downstream of the Talakalale dam was under consideration.
- (c) Kerala : Representative from the State intimated to have identified 4 dams in distress during the last monsoon. A detailed report will be submitted.
- (d) Madhya Pradesh : Representative from the State indicated that the overall average rainfall this season had been normal with exceptional high intensity of rainfall in the first and second week of October 1990 in the Bhind and Morena districts. There were, however, no incidents of distress to dams.
- (e) Maharashtra : Representative from the State intimated that during the current monsoon season one minor irrigation project at Yelgaon in Buldhana district used for water supply had its freeboard encroached when the flood in its reservoir exceeded the design flood.
- (f) Orissa : Representative from the State intimated seepage observed in one water supply tank at Bolangir. The seepage was reduced by grouting. Hirakud dam continues to receive full attention of the "cracks review panel."
- (g) Tamil Nadu : Representative from the State reported neither distress nor any operational problems this monsoon.

- (h) NHPC : Representative from the Organisation intimated no distress or operational problem in Salal dam. The problem with the plunge pool, however, remains and repairs to prevent undercutting of the hill opposite the spillway are being carried out.

## **5.0 Implementation of the recommendations of "Report on Dam Safety Procedures."**

- 5.1 Since the publication of "Report on Dam Safety Procedures" in 1987, the States have been taking action to implement the recommendations. So far, 9 States, viz. Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, & West Bengal and BBMB have sent brief notes on the implementation of recommendations of "Report on Dam Safety Procedures." Other States may send the same at the earliest.
- 5.2 Members were also requested to send a brief note annually in November every year, containing latest information for review during the next meeting.
- 5.3 On receipt of information from all the States, CWC would prepare a note on issues where the States have found difficulty in implementation and the NCDS would be in a position to take decision on such issues.

(Action : States)

## **6.0 Criteria for selection and use of Dam Safety Review Panels for World Bank aided projects.**

- 6.1 A revised document from the World Bank on the procedures and criteria for selection and use of independent Dam Safety Review Panel was sent to all the member States in October 1990 for their comments. A copy of the same is appended in Annex II. Comments have been received from the States of Gujarat, Madhya Pradesh, Orissa, Rajasthan and West Bengal. Extracts of the comments are given in Annex III.
- 6.2 Document of the comments were discussed in great detail by members attending the meeting and the finalized version is enclosed at Annex IV.
- 6.3 It was noted by NCDS that appropriate provisions are required for resolving disagreements between Dam Safety Review Panel, States and Design consultants. Role of CWC as final technical authority has to be brought out and has to be agreed to by the World Bank.

## **7.0 Review of dam safety activities in India including the status report on the health of dams.**

7.1 The previous report on dam safety activities in India was published in April 1989. During the sixth meeting it was proposed to bring out next report on dam safety activities in 1991.

7.2 Member (D&R) requested the members to send two reports annually. He further requested the States to send the status report on dam safety activities for the period ending December 1990 by the end of April 1991.

7.3 So far, status reports from the following States have been received:

### 1. Andhra Pradesh :

(a) 1<sup>st</sup> status report (December 1985 to December 1987)

### 2. BBMB :

- (a) Bhakra Beas Complex dam safety activities and instrumentation (April 1988)
- (b) Bhakra Beas and Pandoh Status Report (November 1989)
- (c) Report of the Dam Safety Committee for Beas Dam and Pong Power Plant.
- (d) (Report of the Dam Safety Committee for Nangal Dam, Nangal Hydel Channel and Canal Power House (August 1989).

### 3. Gujarat :

- (a) 1<sup>st</sup> status report (July 1981 to September 1984)
- (b) 2<sup>nd</sup> status report (October 1984 to December 1985)
- (c) 3<sup>rd</sup> status report (January to June 1986)
- (d) 4<sup>th</sup> status report (July 1987 to December 1989)

### 4. Karnataka :

- (a) 1<sup>st</sup> status report (July 1988)
- (b) 2<sup>nd</sup> status report (March 1989).
- (c) 3<sup>rd</sup> status report (May 1990).

### 5. Madhya Pradesh :

- (a) 1<sup>st</sup> status report (for 1987-88).
- (b) 2<sup>nd</sup> status report (April 1988 – December 1989).

## 6. Orissa :

(a) Status Report (January 1989).

- 7.4 It was decided that the publication on health status of dams of National Importance will be published by CWC based on information received upto the end of April 1991. Those States that have not yet sent information so far are requested to expedite.

(Action : States)

## 8.0 **Formation of sub-committees to monitor safety aspects of inter-State dams.**

- 8.1 In pursuance of item 4 of the terms of reference of the NCDS, three sub-committees were set up for monitoring safety aspects of inter-State dams in the Parambikulam Aliyar System, Mahanadi System and Subarnarekha System in March 1990. NCDS had asked conveners of three sub-committees to act quickly.
- 8.2 For Parambikulam Aliyar System, the first meeting was scheduled by the end of April 1991. Representative from Orissa informed that meetings for Mahanadi System and Subarnarekha System will be held before monsoon of 1991.

(Action : States)

## 9.0 **Compilation of "Data Books."**

- 9.1 During the fourth meeting it was decided that "Data Books" for dams of National Importance only may be sent to CWC / DSO for record.
- 9.2 States have been sending "Data Books" for National Importance dams from time to time. So far, the position is as under:

### Andhra Pradesh:

- |                       |    |                  |
|-----------------------|----|------------------|
| 1. Nagarjunasagar dam | () |                  |
| 2. Sriramsagar dam    | )( | Received for all |
| 3. Srisaillam dam     | () |                  |

### Bihar :

- |                |    |                  |
|----------------|----|------------------|
| 4. Maithon dam | () |                  |
| 5. Panchet dam | )( | Received for all |

Gujarat :

- |           |   |                  |
|-----------|---|------------------|
| 6. Ukai   | ) | Received for all |
| 7. Kadana | ( |                  |

Himachal Pradesh (BBMB) :

- |               |   |                  |
|---------------|---|------------------|
| 8. Bhakra dam | ) | Received for all |
| 9. Beas dam   | ( |                  |

Jammu & Kashmir :

- |           |   |                        |
|-----------|---|------------------------|
| 10. Salal | ( | Not received from NHPC |
|-----------|---|------------------------|

Karnataka :

- |                      |   |                     |
|----------------------|---|---------------------|
| 11. Krishnarajasagar | ( |                     |
| 12. Tungabhadra      | ) |                     |
| 13. Bhadra           | ( |                     |
| 14. Linganamakki     | ) |                     |
| 15. Malaprabha       | ( | All received        |
| 16. Hidkal           | ) | except for Mani dam |
| 17. Narayanpur       | ( |                     |
| 18. Hemavathy        | ) |                     |
| 19. Supa             | ( |                     |
| 20. Mani             | ) |                     |

Kerala :

- |                |   |               |
|----------------|---|---------------|
| 21. Kakki      | ( |               |
| 22. Idukki     | ) |               |
| 23. Cheruthoni | ( | None received |
| 24. Kulamavu   | ) |               |
| 25. Idamalayar | ( |               |

Madhya Pradesh :

- |                 |   |                  |
|-----------------|---|------------------|
| 26. Gandhisagar | ) |                  |
| 27. Tawa        | ( | Pending for Tawa |

Maharashtra :

- |             |   |               |
|-------------|---|---------------|
| 28. Koyna   | ( |               |
| 29. Paithan | ) |               |
| 30. Ujjani  | ( | None received |
| 31. Isapur  | ) |               |

Orissa :

32.	Hirakud	()	
33.	Salandi	)(	
34.	Balimela	()	None received
35.	Rengali	)(	
36.	Upper Kolab	()	

Rajasthan :

37.	Ranapratapsagar	()	Not received
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Tamil Nadu :

38.	Mettur	()	
39.	Sholayar	)(	Received for all

Uttar Pradesh :

40.	Rihand	()	
41.	Ramganga	)(	None received
42.	Meja	()	

West Bengal :

43.	Kangsabati	()	Not received
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- 9.3 States were requested to send the complete information at the earliest preferably within the next two months.

**10.0 Safety inspection of barrages.**

- 10.1 During the fifth meeting of NCDS, members were requested to fill up a proforma titled "Performance Data on Barrages" in respect of barrages in their States to enable NCDS to take a decision on whether safety inspection of barrages would also be undertaken by States' Dam Safety Cells. A list of barrages in various States was also supplied to the States as an enclosure of the agenda of sixth meeting of NCDS.
- 10.2 So far, information has been received from the States of Andhra Pradesh for all four barrages, Gujarat has supplied information for 2 barrages out of 10, BBMB for both barrages, Madhya Pradesh for one barrage out of five, Tamil Nadu for two barrages out of five.

- 10.3 The State Dam Safety Cells have yet to take stock of the total number of important barrages that their respective States have under their charge. Director (DS) intimated that the list prepared and supplied to the States was based on information published by CBIP. He requested the States to first verify the list supplied by CWC and intimate to NCDS relevant information on the barrages from each State. Action will be taken by NCDS on receipt of full information from all the States.

(Action : States)

### **11.0 Safety status of dams of National Importance.**

(Dams with height 100 m or more or having storage of 1 km<sup>3</sup> or more)

- 11.1 States were requested to prepare and supply the safety status of 43 NIDs. Information has been received for 26 dams only. The position is as shown below:

#### Andhra Pradesh:

- |                       |    |              |
|-----------------------|----|--------------|
| 1. Nagarjunasagar dam | () |              |
| 2. Sriramsagar dam    | )( | All received |
| 3. Srisaillam dam     | () |              |

#### Bihar :

- |                |    |              |
|----------------|----|--------------|
| 4. Maithon dam | () |              |
| 5. Panchet dam | )( | All received |

#### Gujarat :

- |           |    |              |
|-----------|----|--------------|
| 6. Ukai   | )( | All received |
| 7. Kadana | () |              |

#### Himachal Pradesh (BBMB) :

- |               |    |              |
|---------------|----|--------------|
| 8. Bhakra dam | )( | All received |
| 9. Beas dam   | () |              |

#### Jammu & Kashmir :

- |           |    |              |
|-----------|----|--------------|
| 10. Salal | () | Not received |
|-----------|----|--------------|

#### Karnataka :

- |                      |    |  |
|----------------------|----|--|
| 11. Krishnarajasagar | () |  |
| 12. Tungabhadra      | )( |  |



13.	Bhadra	()	
14.	Linganamakki	)(	
15.	Malaprabha	()	All received
16.	Hidkal	)(	
17.	Narayanpur	()	
18.	Hemavathy	)(	
19.	Supa	()	
20.	Mani	)(	

Kerala :

21.	Kakki	()	
22.	Idukki	)(	
23.	Cheruthoni	()	None received
24.	Kulamavu	)(	
25.	Idamalayar	()	

Madhya Pradesh :

26.	Gandhisagar	)(	Not received for
27.	Tawa	()	Gandhisagar

Maharashtra :

28.	Koyna	()	
29.	Paithan	)(	
30.	Ujjani	()	All received
31.	Isapur	)(	

Orissa :

32.	Hirakud	()	
33.	Salandi	)(	
34.	Balimela	()	None received
35.	Rengali	)(	
36.	Upper Kolab	()	

Rajasthan :

37.	Ranapratapsagar	()	Not received
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Tamil Nadu :

38.	Mettur	()	
39.	Sholayar	)(	All received

Uttar Pradesh :

40.	Rihand	()	
41.	Ramganga	)(	None received
42.	Meja	()	

West Bengal :

43.	Kangsabati	()	Not received
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- 11.2 Member (D&R) requested the States to send the information expeditiously by the end of April 1991. NCDS will publish a booklet based on this information ending April 1991.

(Action : States)

**12.0 Dam Safety Legislation.**

- 12.1 So far, the States of Gujarat, Orissa & Tamil Nadu have shown their willingness to go in for legislation on the subject. BBMB have offered their comments on the draft act on legislation for dam safety. Since the comments were offered by the project, Member (D&R) requested the representative of BBMB to get comments of the Board and Ministry of Energy on the act and communicate the same to NCDS. Madhya Pradesh did not consider legislation necessary.
- 12.2 During the sixth meeting of NCDS, representatives from the States of Karnataka, Kerala, Maharashtra, Rajasthan, Uttar Pradesh & West Bengal intimated that the case was pending with their State Governments.
- 12.3 Member (D&R) informed the NCDS about the D.O. letters written by Secretary, Government of India, Ministry of Water Resources to Chief Secretaries of the Governments Andhra Pradesh, Bihar, Karnataka, Kerala, Maharashtra, Rajasthan & Uttar Pradesh requesting them to give concurrence / comments of their respective States on the draft bill on dam safety, so that the matter can be further processed.
- 12.4 Member (D&R) requested the members of NCDS to pursue with their respective Governments for an early reply.

(Action : States)

**13.0 Safety review of large dams.**

- 13.1 One of the recommendations in the "Report on Dam Safety Procedures" related to safety review of all large dams by an independent panel of experts once in ten years. This recommendation was accepted by Government of India in 1987 and as such one review by 1997 becomes due for all large dams.
- 13.2 Director (DS) informed the NCDS that such programme has been finalized by the State of Tamil Nadu. Representative from the State of Maharashtra informed of its difficulty to review all large dams with present strength of staff. Gujarat State has prepared a ten year programme of inspection of 197 large dams by the State DSO ending in 1997, pending the Government action to constitute an independent panel of experts.
- 13.3 Member (D&R) requested the members to finalise safety review programme at the earliest, and communicate the same to NCDS.

(Action : States)

#### **14.0 Dam Review Panels for all major irrigation projects.**

- 14.1 During the fifth meeting of NCDS, Chairman had indicated desirability of establishing independent Dam Review Panels (DRPs) for all major irrigation projects in the States (for projects other than those aided by the World Bank.
- 14.2 Member (D&R) desired that States should take action and report to NCDS.
- 14.3 In response to compliance of minutes of 6<sup>th</sup> meeting, the State of Andhra Pradesh intimated that investigation of new projects was being done by experienced engineers under Chief Engineer (Investigation), designs under Chief engineer (CDO) and execution under Chief engineer (Construction). All these organizations have well experienced officers. Hence no necessity of panel of experts. The State of Maharashtra intimated that the appointment of DRPs involve considerable financial implications. However, Government of Maharashtra is considering the proposal. Madhya Pradesh had already intimated that a proposal has been prepared and submitted to the State Government. General Manager, NHPC intimated that they have Technical Advisory Committee for their projects.
- 14.4 Member (D&R) desired the remaining States to take up the matter with the State Governments and intimate their concurrence to NCDS.

## **15.0 Undertaking emergency action downstream of dams and demarcation of flood zones.**

- 15.1 Director (DS) briefed the NCDS and requested to send status report on flood zoning and flood forecasting in their States. Representatives from Tamil Nadu and Madhya Pradesh intimated that proposals were under consideration of their State Governments.
- 15.2 Member (D&R) requested the States to work out modalities for undertaking emergency action planning for dams of National Importance in their States as a starting point. It can be extended to other large dams at a later date.

(Action : States)

## **16.0 National Register of Dams.**

- 16.1 A compilation titled "National Register of Large Dams" was published by CWC and released in April 1990. Copies were sent to all members of NCDS for examination of the register and intimate corrections required, if any.
- 16.2 So far, the States of Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Tamil Nadu (for irrigation projects) and BBMB have responded and sent information. Similar information had been supplied by the State of Maharashtra during 7<sup>th</sup> meeting of NCDS.
- 16.3 Other States are requested to do the needful and send information to NCDS at the earliest, so that revision of "National Register of Large Dams" can be taken up.

(Action : States)

## **17.0 Strengthening of DSOs / Cells in the States.**

- 17.1 Director (DS) briefed on the issue and a note titled "Strengthening Proposal of DSO in the States" was circulated. Four States were covered in the note, viz. Andhra Pradesh, Kerala (KSEB), Maharashtra & Uttar Pradesh. The details are in Annex 5.
- 17.2 Madhya Pradesh, Orissa, Rajasthan & Tamil Nadu have already intimated that strengthening proposal of their DSOs is covered under the DSARP posed for World Bank assistance.

Strengthening proposal for the States of Gujarat, Karnataka & West Bengal are under consideration of their respective Governments. These States may indicate present position.

- 17.3 Other States may indicate if they have formulated proposals for strengthening of their dam safety units.

(Action : States)

### **18.0 Setting up of hydrological unit in the State for review of hydrology of existing dams.**

- 18.1 Discussions during the meeting centered on conducting hydrology review of existing dams in the States. Representative from Madhya Pradesh intimated to have carried out such review for 22 dams. Representative from Maharashtra intimated that they have carried out interim review of 14 dams. The State of Gujarat has so far carried out hydrology review of 74 existing dams. Representative from NHPC intimated that the hydrology of Salal has been reviewed.
- 18.2 The States of Madhya Pradesh, Orissa, Rajasthan & Tamil Nadu are covered under the proposed DSARP posed for World Bank assistance. The proposal includes strengthening / creation of a hydrology unit and review of hydrology of all large dams in these States.
- 18.3 The remaining States / organizations may intimate action taken by them in setting up an independent unit for undertaking hydrology review of existing dams.

(Action : States)

### **19.0 Data on gated storages.**

- 19.1 To have updated data on gated storages for all large dams in the country, the States were requested to supply information on nine items as given below:
- (i) Average yield at dam site.
  - (ii) Gross Storage
  - (iii) Live storage
  - (iv) No. & size of gates
  - (v) Storage against gates
  - (vi) Maximum water level
  - (vii) Full reservoir level
  - (viii) Crest level of spillway
  - (ix) Dead storage level

19.2 This issue was discussed in detail during the seventh meeting of NCDS. The information received from the States is as under:

1. Andhra Pradesh	:	44 dams (storage against gates for 41 dams given)
2. BBMB	:	2 dams
3. Goa	:	1 dam
4. Gujarat	:	51 dams
5. Karnataka	:	42 dams (storage against gates for 38 dams given)
6. Madhya Pradesh	:	17 dams (storage against gates for 15 dams given)
7. Maharashtra	:	52 dams
8. Orissa	:	48 dams (storage against gates for 1dam given)
9. Rajasthan	:	23 dams (storage against gates not given)
10. Tamil Nadu	:	42 dams (storage against gates for 38 dams given)
11. Uttar Pradesh	:	30 dams (storage against gates for 24 dams given)

19.3 It was observed during deliberations that the States had not indicated the total number of gated dams under each State. It was, therefore, difficult to ascertain as to whether each State had supplied information in respect of all gated dams in the State or not. The State / members are requested to indicate the total number of gated dams in each State.

19.4 No response was received on this item from Bihar, Kerala and West Bengal. Members from these States were requested to send information on this item at the earliest.

19.5 Representatives of States who had supplied partial information were requested to supply balance information expeditiously as a publication on gated structures is to be brought out during the second half of this year.

(Action : States / CWC)

## **20.0 Preparation of completion report of large dams.**

20.1 Matter regarding preparation of completion report of large dams was discussed during the meeting. Member (D&R) opined that priority should be given to dams of National Importance followed by other large dams.

20.2 So far, information received from States is as under:

- |                 |  |
|-----------------|--|
| (a) BBMB        | Completion report on design and construction features of Bhakra dam have been completed. |
| (b) Gujarat     | Completion report for 8 dams aided by World Bank are nearing completion.                 |
| (c) Karnataka   | Completion report of 3 dams of National Importance and 5 large dams have been completed. |
| (d) Maharashtra | Completion report for 6 dams have been completed.  |
| (e) Orissa      | Completion report for 2 dams has been completed and for 3 dams under preparation.        |
| (f) Tamil Nadu  | Completion report for one dam has been done.   |

20.3 Director (DS) informed the NCDS that none of the States had so far sent a copy of the completion report prepared in their States. It is requested that they may send one sample copy of the same for any dam for information of NCDS.

(Action : States)

## **21.0 Preparation of Operation & Maintenance Manual.**

21.1 So far manuals as under have been received from the following States / Organisations:

### **1. Bhakra Beas Management Board**

- (a) Criteria for operation, Maintenance & Observations Vol.I – Pandoh reservoir.
- (b) Criteria for operation, Maintenance & Observations Vol.II (Part I, II & III) – Pandoh dam and Water conductor System.
- (c) Criteria for operation, Maintenance & Observations Vol.III (Part I & II) – Dehar Power Plant.
- (d) Criteria for operation, Maintenance & Observations Vol.I (Pong reservoir).
- (e) Criteria for operation, Maintenance & Observations Vol.II (Beas dam).
- (f) Criteria for operation, Maintenance & Observations Vol.III (Part I & II) – Pong Power Plant.

## 2. Gujarat

- (a) Reservoir Operation Manual of Karjan Project – Executive Summary, Vol.I & II)
- (b) Reservoir Operation Manual of Damanganga Project (Madhuban dam and reservoir ) – (Executive Summary, Vol.I & II).

## 3. Uttar Pradesh

- (a) Operation & Maintenance Manual (Vol.I – IV) for Yamuna Hydro Electric Project Stage II Part I.

21.2 Representative from the State of Maharashtra intimated that the Operation & Maintenance Manual for Paithon dam is under completion. During the sixth meeting, representative from West Bengal intimated that Operation & Maintenance Manual for Kangsabati and Mayurakshi dams have been prepared. They may send a copy of the same for anyone dam for presentation in the next meeting of NCDS.

21.3 Other States may take up the preparation of Operation & Maintenance Manuals and report to the Committee the progress achieve.

(Action : States)

## **22.0 Instrumentation for dams.**

22.1 During the sixth meeting of NCDS, members were supplied with a copy of "Report on Dam Safety Activities in India" and were requested to examine the information in Chapter III wherein details of instrumented dams in the country and types of instruments installed in about 40 dams were mentioned. They were requested to verify and update information and intimate on their mortality, performance, analysis of instrumentation data and conclusions drawn. Members were also requested to supply a copy of the structural behaviour report based on instrumentation data to Chief Engineer (DSO), CWC for consideration of NCDS.

22.2 Response from the States on this issue is inadequate. So far only Madhya Pradesh has supplied factual information for 9 dams and Tamil Nadu has supplied information for 6 dams and has also intimated that a majority of instruments are not functioning. BBMB has supplied information for 3 dams. Maharashtra supplied information for 46 dams during the seventh meeting of NCDS. Gujarat has sent information 25 dams and has supplied structural behaviour reports for 2 dams, viz. Ukai and Sukhi.



22.3 Rest of the States / Organisations are requested to send in the information and also supply a sample copy of the structural behaviour report for one major dam in their States for information of NCDS.

(Action : States)

### **23.0 Remote operated underwater vehicle (ROV).**

23.1 Director (DS) informed the members about ROV and its successful commissioning and testing of Koyna reservoir in November 1990. The ROV is under the custody of CSMRS. Members were requested to intimate DSO, CWC, their requirement for underwater inspection of dams, utilizing the ROV.

23.2 So far, the following States / Organisations have requested CWC to make the ROV available for underwater scanning of their dams:

BBMB	:	Bhakra
Gujarat	:	Ukai, Kadana, Dharoi, Karjan, Panam, Damanganga
Karnataka	:	Talakalale
Madhya Pradesh	:	Tawa, Gandhisagar
Orissa	:	Hirakud
Tamil Nadu	:	Periyar, Sholayar, Pechiparai,
Manimuthar		

23.3 The other States were requested to send their requisition, if any, to enable DSO of CWC to prepare a programme for underwater scanning of dams for the year 1991.

(Action : States / CWC)

### **24.0 Safety aspects of inter-State dams.**

24.1 To facilitate identifying inter-State dams, give general criteria were agreed upon during the sixth meeting of NCDS. The States were requested to prepare a list of such dams for compilation by DSO, CWC and for putting up the same to NCDS.

24.2 Replies received from the States of Tamil Nadu and Madhya Pradesh were circulated to the members of NCDS along with agenda notes for 7<sup>th</sup> meeting.

24.3 Other States may also send in their replies at the earliest, so as to prepare a consolidated report of inter-State dams by the DSO of CWC.

(Action : States)

## 25.0 Seismic status of dams of National Importance

25.1 It was discussed that many seismic instruments have been installed in the vicinity of large dams, particularly dams of National Importance, but there had been no laid down procedure for reporting the results of analysis of data obtained from those instruments. In line with the practice adopted by NCDS for reporting safety status of large dams, it is necessary that NCDS compiles the seismic status of large dams and publish it within the next six months, covering dams of National Importance in the first instance.

25.2 So far, information has been received from the States of Andhra Pradesh, Kerala, Gujarat, Madhya Pradesh, Tamil Nadu and Uttar Pradesh. The States of Karnataka, Orissa and West Bengal supplied the information during the sixth meeting of NCDS. The proforma is as below:

Sl.No.	Agency	No.of large dams		Total
		Completed	Under Const.	
1	2	3	4	5
1	Irrigation Department			
2	Electricity Board			
3	Power Corporation / Municipal Corporation			
4	Water Supply Department			
5	Privately owned			
6	Other (Please specify)			

Remaining States are requested to compile the information as per the proforma duly updated and send it to NCDS very early.

(Action : States)

## 26.0 Standardised meteorological and other observations

26.1 In order to obtain information on the meteorological and other observations being carried out at the dam sites and their vicinity by the States, a tentative list of "Standardised meteorological and other observations" was circulated to the members of NCDS in minutes of sixth meeting during September 1990. The items mentioned in the list are as under:

1. Rainfall (ordinary and self recording gauges)
2. Evaporation (pan-evaporimeter)

3. Wind velocity and direction (recorders)
4. Wave height (recorder)
5. Air temperature (maximum / minimum temperature)
6. Reservoir water temperature (thermometer)
7. Humidity (wet & dry bulb thermometer)
8. Atmospheric pressure (Barometer)
9. Sunshine (sunshine recorder)

26.2 So far, information has been received from the following States / Organisations :

- |                   |   |                                      |
|-------------------|---|--------------------------------------|
| 1. BBMB           | - | for 3 dams                           |
| 2. Andhra Pradesh | - | for 3 dams                           |
| 3. Gujarat        | - | for 53 dams                          |
| 4. Karnataka      | - | for 19 dams                          |
| 5. Maharashtra    | - | for 76 dams                          |
| 6. Orissa         | - | for 35 dams (incomplete information) |

26.3 States are requested to send complete information in respect of this item at the earliest.

(Action : States)