

Minutes of the seventeenth National Committee on Dam Safety meeting held on 21.1.97 at Central Water Commission, New Delhi.

The seventeenth meeting of the National Committee on Dam Safety (NCDS) was held on 21.1.1997 in CWC, New Delhi under the Chairmanship of Shri Ramesh Chandra, Chairman, CWC as well as NCDS. List of officers who attended the meeting is at Annex I. Shri E.Sundaraiya, Chief Engineer (DSO) took up the agenda items for discussion after a brief introduction of participants.

17.1.0 Confirmation of the minutes of the sixteenth meeting of NCDS.

17.1.1 The minutes of 16th meeting were circulated to all the members of NCDS and State Dam Safety Cells vide CWC Letter No.3/19/NCDS/93-DS/249-82 dated 8.10.1996. As there were no comments from any of the States, the minutes as recorded were confirmed.

17.2.0 Status of implementation of "Dam Safety Assurance and Rehabilitation Project" for information of the Committee

17.2.1 The progress on the works under the project was reviewed in MoWR in June 1996. A review meeting on progress of various activities of the Central component was held with the World Bank on 13.8.96. The World Bank once again emphasized the need to speed up progress particularly on components of remedial works as the project is closing on September 1997. As the works will not get completed by the current project closing date of 30.9.97, extension has been sought for at least 2 years, i.e. upto 30.9.99. The World Bank Review Mission proposed to carry out the review of progress from 29.1.97 to 11.2.97. The World Bank planned to visit the projects in Rajasthan and hold discussions with Rajasthan engineers from 29.1.97. The State officers of the other three States, viz. Madhya Pradesh, Orissa and Tamil Nadu have been called to Delhi for review of the progress under DSARP. The dates of review meeting were given to the State officers during the NCDS meeting and they were requested to speed up the work and to complete maximum work by the scheduled date so that the World Bank can be impressed upon to grant extension of the project by another two years.

17.3.0 Review of National Scenario.

17.3.1 The States have been requested to intimate fresh cases of distress in dams, structural and operational deficiencies noted during the monsoon and failure cases, if any, since the last meeting.

17.3.2 Rajasthan reported breach of 186 tanks during the flood of 1996. These were all of minor nature and immediately attended by them as reported in the Status Report. Madhya Pradesh also reported such incidents which were of minor nature. No other reports were received during the meeting. All the States / Organizations were requested for giving importance on informing such incidents of dam safety aspects to NCDS.

17.4.0 Progress of implementation of recommendations of the "Report on Dam Safety Procedures."

17.4.1 The States have been requested to implement the recommendations contained in the "Report on Dam Safety Procedures" circulated during 1987 and send a consolidated report indicating achievements on various issues and to highlight those recommendations, if any, which are difficult to implement.

17.4.2 The States of Andhra Pradesh, Karnataka, BBMB and NHPC have sent their reports during the previous meetings. The States of Gujarat, Madhya Pradesh, Maharashtra and Tamil Nadu have submitted latest progress achieved on implementation of the recommendations. The States of Bihar and Rajasthan submitted a brief report during the meeting but not point-wise status on the recommendation in the report on Dam Safety Procedures. Kerala, Uttar Pradesh and West Bengal have not submitted any report.

17.4.3 All the States have been requested to send a consolidated report, highlighting the achievements on the implementation of the recommendations of the "Report on Dam Safety Procedures" for information of the Committee. It was also decided that CWC will again write letters to State Governments reiterating importance of dam safety aspects.

17.5.0 Dam Safety Legislation

17.5.1 During the meeting, the Chairman stressed the importance and need to finalize the draft legislation. He desired that the States which have not so far agreed for bringing out the legislation must give their comments on the draft legislation.

The following States have already communicated their concurrence:

1. Andhra Pradesh
2. Bihar
3. Gujarat
4. Kerala
5. Maharashtra
6. Orissa
7. Rajasthan
8. Tamil Nadu

Comments offered by Gujarat, Maharashtra, Rajasthan and BBMB will be considered at the time of finalizing the legislation. Karnataka and Madhya Pradesh informed that they will send their views on the Dam Safety Legislation shortly. Since no representative had come from either Uttar Pradesh or West Bengal, it was decided to write to them to send their views at the earliest. It was also decided that the concerned State Governments / Organizations may give their views / comments on Dam Safety Legislation by the end of 1997. Otherwise it would be presumed that they have no comments to offer and further action with regard to Dam Safety Legislation will be taken. It was also decided that CWC will address letters to State Governments in this regard.

17.5.2 It was further suggested by the Chairman that all the State Governments / Organizations should keep at least 10% of their Water Resources / Irrigation Sector budget / funds for rehabilitation of old dams. In this regard, letters from Chairman, CWC will be written to Chief Secretaries of the State Governments.

17.6.0 Preparation of Emergency Action Plans and inundation maps for d/s area.

17.6.1 A decision for preparation of Emergency Action Plans for downstream areas of dams of National Importance by all the States was taken during the earlier meetings. It was also decided that the four participating States – Madhya Pradesh, Orissa, Rajasthan & Tamil Nadu – under the World Bank assisted Dam Safety Assurance and Rehabilitation Project (DSARP) may give priority to the 54 identified dams posed for rehabilitation for preparation of Emergency Action Plans in the first phase followed by Action Plans for the other remaining dams.

- 17.6.2 Maharashtra has reported that they have planned to hold a lecture-cum-computer demonstration on simplified Dam Break Analysis programme for preparation of Emergency Action Plan. So far, the dams where Emergency Action Planning reported to have been completed are: Rajasthan for Matrikundia dam and NHPC for Salal dam. During the meeting, Rajasthan further reported that they have completed this work for Gambiri, Alnia and Jawai dams.

The following States / Organizations have initiated work for taking up Emergency Action Planning for the dams as given below:

Gujarat	:	Karjan, Ukai, Kadana
Tamil Nadu	:	Sathanur, Kodaganar, Vidur, Gomukhi, Ponnaniar
Rajasthan	:	Rana Pratap Sagar, Jawahar Sagar

States of Andhra Pradesh, Bihar, Kerala (Irrigation Department), Madhya Pradesh, Orissa and West Bengal have not reported any progress in this regard.

Punjab Irrigation Department had agreed to take necessary action in respect of dams which are under the control of Bhakra Beas Management Board (BBMB) and downstream areas which lie in Punjab. However, no progress has been reported by the State authorities in this regard. NHPC has reported that data collection for Bairasul dam was under progress.

- 17.6.3 During the 16th meeting, the Chairman stressed the need to initiate and complete survey for downstream cross sections and collection of other pertinent data for finalizing hazard classification for each dam. All the States / Organizations were requested to start the work without any delay. They were also requested to give their views / comments on the hazard classification of dams as circulated by CWC so that the data can be consolidated and the standards / guidelines for hazard classification can be finalized and codified.

17.7.0 Compilation of "Data Books."

- 17.7.1 As per decision by the NCDS, "Data Books" for dams of National Importance were to be prepared by the States and sent to DSO, CWC for record / reference. Critical geological features of the dam are only to be highlighted in this report instead of giving detailed geological report.

- 17.7.1 Andhra Pradesh, Bihar, Gujarat, Karnataka, Rajasthan and Tamil Nadu and also BBMB & NHPC have submitted "Data Books" for dams of National Importance. Maharashtra has submitted "Data Book" for only Paithan dam out of 5 dams of National Importance in the State. Orissa has submitted "Data Books" for 17 dams.

Progress on preparation of "Data Books" is awaited from Kerala, Madhya Pradesh, Uttar Pradesh and West Bengal. All the States / Organizations were requested to finalize the preparation of "Data Books" and send them to DSO, CWC at the earliest.

17.8.0 Preparation of completion report of large dams

- 17.8.1 Completion reports of all large dams were to be prepared by the respective States giving priority in the first phase to dams of National Importance. Original geological reports were also to form part of the completion reports.

- 17.8.2 As per the information received from the States, the following States have prepared completion reports:

Karnataka	19 dams
Maharashtra	10 dams
Orissa	2 dams
Rajasthan	2 dams
Tamil Nadu	7 dams
Uttar Pradesh	6 dams
BBMB	3 dams

Rajasthan has initiated the work for 10 more dams and Tamil Nadu for another 7 dams. NHPC will be taking up the work for Salal and Chamera. No progress has been reported by any other State.

Completion reports are required to be prepared for all large dams. The progress on this front is quite discouraging and the State Governments / Organizations were impressed upon to pay more attention to this aspect, i.e. preparation of completion report on large dams within a time bound programme. Copies of these reports are also required to be given to DSO Unit of CWC for record / reference.

- 17.8.3 As completion reports are to be prepared for all the existing large dams, Chairman reiterated that the work could be better done by utilizing the services of the retired / serving officers who

were actually associated with the project. Many States requested to issue a guideline on engaging consultants for this purpose. As Tamil Nadu has already done this work, Chief Engineer (DSO) requested Tamil Nadu to intimate the procedure adapted by them to CWC. CWC can frame guidelines on engaging retired personnel for this work. This would help in early finalization of the completion reports.

17.9.0 Preparation of Operation & Maintenance Manuals

17.9.1 During the previous meetings, Chairman has been emphasizing that Operation & Maintenance Manual is an important document for operation and maintenance of the dams and this Manual should be available before commissioning of the each project. As O&M Manuals have not been prepared for most of the dams, this needs to be taken up without further delay and completed expeditiously by the States / Organizations owning the dams.

17.9.2 Present status on preparation of O&M Manuals is given below:

BBMB	All dams
Uttar Pradesh	All dams
Tamil Nadu	All dams
KSEB	All dams
NHPC	2 dams
Rajasthan	All dams of ungated spillway
Maharashtra	1 dam

17.9.3 During the 17th meeting the Chairman re-emphasized that all the remaining States and NHPC may take up the work of preparing O&M Manuals for all large dams and complete them expeditiously.

17.10.0 Periodical inspection of dams and the report on dam safety activities in the States.

17.10.1 The States / Organizations were requested to perform periodical inspection of dams and send a consolidated annual report on the status of dams and dam safety activities under the title "Health Status of Dams and Dam Safety Activities in the States" to DSO, CWC. As desired by the Chairman during the 15th meeting, a format has been circulated by DSO, CWC to all the States / Organizations and State DSOs to bring uniformity in reporting.

17.10.2 Rajasthan has submitted the latest status report for 1996. Maharashtra has submitted status report for 1994-95. Andhra

Pradesh had submitted the report for the period ending 1995. Orissa submitted the report for the period ending 1995. NHPC has submitted four inspection reports for Salal, Chamera, Bairasul and Tanakpur H.E. Projects and KSEB has submitted the report for the dams under them. Tamil Nadu submitted the report upto April 1995 and Gujarat upto December 1995. Bihar has submitted reports in respect of some dams in piecemeal. All the States have been requested to submit reports for all large dams under them in one report. To facilitate compilation of the consolidated reports, the format was circulated again during the 17th meeting.

- 17.10.3 No consolidated status report has been received format, Kerala (Irrigation Department) and West Bengal so far. All the States / Organizations were requested to maintain uniformity in the period of report also, i.e. covering the pre- and post-monsoon reports for the concerned year.

17.11.0 Safety review of large dams once in ten years.

- 17.11.1 In accordance with the recommendations contained in the "Report on Dam Safety Procedures (1987)", safety review of large dams which are more than 15 m in height or which store 60 million cubic metre or more of water, are to be carried out by an independent panel of experts once in ten years. For this purpose, Expert Committees comprising only those officers from the States who are not connected at any stage either with construction or maintenance of the structures are to be constituted.

- 17.11.2 The progress reported so far by the States / Organizations are as follows:

In the States of Bihar, Rajasthan, Madhya Pradesh, Uttar Pradesh and West Bengal constitution of the Experts' Panel is stated to be under active consideration of their respective Governments. Karnataka proposes to take up constitution of panel under the World Bank assisted DSARP as and when it is agreed. In Tamil Nadu, Phase I inspection has been completed for all large dams in the State and Dam Safety Review Panel (DSRP) constituted for the State. It has commenced the Second Phase I inspections giving priority to the dams under DSAR Project. In Andhra Pradesh, a Committee constituted under the Chairmanship of Engineer-in-Chief reviews large dams in the State and has already completed inspection of 6 dams. In

addition to this, an expert committee comprising of retired engineers has been constituted for major dams.

Orissa has completed review of 82 out of 137 dams. Gujarat has completed inspection of 195 out of 373 dams and inspection of balance dams shall be completed in two years. Maharashtra has not reported their progress. DSRP constituted under MCIP (III)(R) in Maharashtra State has carried out review work of 9 dams. Review of 27 more dams in the Latur and Osmanabad region is planned to be carried out by the Expert Committee headed by Shri V.R.Deuskar, and a Standing DSRP has also been proposed for the review of 753 identified large dams in the State. It was reported from the State that the work of region-wise committees (6 nos.) under the Chairmanship of regional Chief Engineers is under progress. Information from Kerala is still awaited. The States / Organizations who have not yet constituted a committee have requested that CWC must impress upon their Governments regarding the importance of structural review and constitution of expert committee. Also, it was agreed during the meeting that CWC is ready to provide the name of experts, if referred to. On a request from the States, the Chairman agreed to address the Chief Secretaries of the States to impress upon the importance for formation of a separate expert committee for safety review of large in the State.

- 17.11.3 In view of very large number of existing dams, progress in this regard has been very slow with reference to all the States. It was again emphasized that the States / Organizations should increase the number of experts / panels to complete inspection of all the large dams under their control by 1997.

17.12.0 Safety status of dams of National Importance.

- 17.12.1 The States have been requested to prepare safety status of 45 dams of National Importance in the prescribed proforma circulated by DSO, CWC.
- 17.12.2 Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal and BBMB & NHPC have submitted the report for the dams of National Importance, i.e. total for 40 dams.

Kerala Irrigation Department and KSEB have not yet furnished any information for the 5 dams under them. Similarly, DVC has not furnished any information on the dams under their control.

They were requested to expedite and send all the necessary information to CWC.

- 17.12.3 All the States / Organizations are requested to send the details of dams and the status report whenever any additions in the list of National Importance dams take place.

17.13.0 Monitoring of safety report of inter-State dams by sub-committees.

- 17.13.1 Three sub-committees were set up during March 1990 to monitor the safety aspects of inter-State dams in the Parambikulam Aliyar System (PAP), Mahanadi River System and Subarnarekha System.

- 17.13.2 Committee for Parambikulam Aliyar System (PAP) held two meetings in 1991 and 1992. Committee for Mahanadi River System held a meeting in 1992 and Committee for Subarnarekha River System has held only one meeting, i.e. during 1993. Subsequently no meetings took place.

- 17.13.3 As no progress is made even after a lapse of 4 years, Chief Engineer (DSO) requested the concerned States to report the difficulties encountered by them. The States of Bihar, Kerala, Madhya Pradesh, Orissa and Tamil Nadu were requested to send the report.

17.14.0 Setting up of hydrological units in the States for review of hydrology of existing dams.

- 17.14.1 Hydrology of existing dams is required to be reviewed by setting up or strengthening existing hydrology units in the States. Some States / Organisations have already initiated actions for strengthening / setting up of hydrology units and taken up review of hydrology of some of the dams.

On the basis of reports received, the State of Gujarat has completed the hydrological review of 154 major and medium dams. Bihar, Madhya Pradesh, Maharashtra, Orissa and Rajasthan have also taken up hydrology review of dams by their existing unit in their States. In Orissa two hydrology review divisions have been created and are functioning under the State DSO. Orissa has completed review work for 46 dams. Madhya Pradesh has completed review work of 35 dams and Tamil Nadu has completed for 20 dams. BBMB and NHPC have established separate unit in their organization for this purpose. In

Maharashtra, a separate unit has been created under CDO, Nasik. Andhra Pradesh, Karnataka, Tamil Nadu, Uttar Pradesh and West Bengal have informed that action for strengthening the existing hydrology unit / establishing a separate unit has already been initiated and review of hydrology of some of the dams has also been taken up. Kerala (Irrigation Department) has yet to send information in this regard. Copies of note on consultancy capability of NHPC received from the Organization has already been sent to all Dam Safety Cells of the States vide this office letter No.3/19/NCDS/96/DSM/1485-98 dated 9.12.1996. CWC organized a training course on Project Hydrology during 9-13 December 1996 and about 50 participants from various States attended the training. No officer from the State of Maharashtra attended the training course. Director, Hydrology (DSR), CWC stated that feedback from Maharashtra such as faculty strength, number of experts available, etc., need to be informed for conducting training in Maharashtra. The State of Rajasthan proposes to refer hydrology review of 16 dams to NHPC.

- 17.14.2 All the States / Organizations were once again impressed upon to set up hydrology units for taking up hydrology review of existing dams without further delay. The States were also requested to avail the services of CWC and NHPC to get the hydrology review completed for their dams. The States / Organizations were requested to give a list of total dams under their jurisdiction and the number of dams for which hydrological review has been carried out. The programme schedule for review of hydrology for balance of the dams should also be sent to CWC.

17.15.0 Instrumentation for dams.

- 17.15.1 NCDS had decided that the States may take stock of the status of instrumentation installed at the large dams to know the performance of instruments, their mortality rate, periodicity for analysis of data, referring the analysis to the designers for their evaluation, studies of structural behaviour reports and adequacy or otherwise of the staff engaged on the job. So far, information for some of the instrumented dams has been received from the following States / Organizations:

1. Andhra Pradesh
2. Gujarat
3. Karnataka

4. Kerala
5. Madhya Pradesh
6. Maharashtra
7. Orissa
8. Tamil Nadu
9. BBMB

Tamil Nadu has already given details of 6 instrumented dams. Piezometers have been provided in 11 of their dams by the end of December 1995. In Uttar Pradesh, micro-earthquake instrument have been installed on Ramganga dam. No progress has been reported by Madhya Pradesh regarding creation of a Central Instrumentation Cell proposed by them. As per the report received from Bihar, the instrumentation on existing dam is negligible. However, data is being collected. Rajasthan reported that an expert group formulation in the State is under process. Though Maharashtra and Rajasthan submitted latest status report on instrumentation of dams, the working condition was not reported. Some of the States reported that they have already submitted the report to CWC. They were requested that one copy may also be submitted to DSM, CWC.

17.15.2 All the remaining States / Organisations are requested to intimate the status of instrumentation in their dams to the Dam Safety Monitoring Directorate.

17.15.3 During the 17th meeting, the Chairman reiterated the need for quick analysis of instrumentation data to know the structural behaviour of dams and to send information DSO, CWC. For this purpose, the States were advised to constitute groups of specialists in this field to analyze the instrumentation data and prepare structural behaviour report for the dams.

17.16.0 Installation of Standard meteorological instruments.

17.16.1 All the States have been requested to supply detailed information on the type of meteorological instruments installed in the catchment areas and reservoirs of large dams for meteorological observations.

17.16.2 Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan & Tamil Nadu and BBHMB & NHPC have supplied information in respect of few dams. Orissa has informed that 15 dams covered under DSARP have been selected

for providing meteorological observation units at dam sites out of which weather stations have been installed on 5 dams. Uttar Pradesh has been requested to furnish details of meteorological instruments in the prescribed format. Bihar, Kerala and West Bengal have also been requested to expedite submission of information. All the States were requested to furnish the dam-wise information on the above item.

- 17.16.3 All the States / Organizations may carry out a drill before the monsoon season to see whether the instruments are in working order. The States may prepare a performance report for each project for the calendar year and submit to DSO, CWC.

17.17.0 Data on gated storages.

- 17.17.1 The Committee requested all the States / Organizations to furnish data on gated storages of large dams in a specified format. Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal and BBMB & NHPC have already submitted the information. Bihar has not sent any information so far. The Committee directed the Bihar State to furnish the data within one month time so that the data book could be published immediately thereafter.

17.18.0 Safety inspection of barrages.

- 17.18.1 During the 7th meeting of the Committee, it has been decided to collect State-wise information in respect of all barrages in a prescribed format and send to DSO, CWC for consolidation. The information has been received from most of the States except Bihar. Madhya Pradesh has submitted information for 6 barrages out of 7; Madhya Pradesh was requested to furnish information for the remaining one barrage, i.e. Birsingpur Barrage. Bihar has also to be addressed to submit data at the earliest as the data need to be published without further delay.
- 17.18.2 During the meeting, the Chairman reiterated that all the States may send aerial view photographs of barrages to DSO, CWC. BBMB has sent aerial photographs of Nangal dam and Pandoh dam. NHPC has also submitted some photographs of dams under their control. All other States / Organizations were requested to send the aerial photographs of size 30" x 45".

Chairman desired that the States / Organizations may give priority to photographs as there is a necessity of projecting the

development in the water resources sector through media for mass awareness. He also requested all the States to project Water Resources Development activities through TV programmes at prime times.

17.19.0 Seismic studies of dams

- 17.19.1 DSO, CWC has made available copies of documents "Guidelines for Inspection of Dams following Earthquake" to all the States / Organizations with a request to make use of these guidelines and report to the Committee safety status of dams immediately on occurrence of earthquakes. All States / Organizations were also requested to confirm non-occurrence of such incidents for every dam under their control. No reports have been received by DSO, CWC since the last meeting.

17.20.0 Need for Research and Development in dam safety.

- 17.20.1 All the members of NCDS were requested to suggest areas requiring research for development of projects and gadgets in the field of dam safety and send their suggestions to DSO, CWC. The Chairman, during the last few meeting had desired that the States may examine the areas / fields and undertake research on any subject of their choice. They may also prepare a project report on the scheme for research and send the same to CWC. It was noted that no project report has been received from any States / Organizations so far.
- 17.20.2 The Chairman during the meeting reiterated that the States / Organizations may consider this item actively and come forward specifying the areas for research & development of projects and dam safety activities. Chairman also suggested that if any of the States / Organizations require funds for such research and development works, CWC can arrange for funds, for useful schemes.

17.21.0 Proposal for rehabilitation of distressed dams in India during the IX Five Year Plan

- 17.21.1 An estimate on rehabilitation of dams under distress in 12 States, viz. Andhra Pradesh, Bihar, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal has been sent to the Ministry of Water Resources, Government of India for inclusion in the IX Five Year Plan. Provision has also been made for other States on lumpsum basis for the IX Five Year Plan. Total amount provided

in the estimate is Rs.693.8 crore. An abstract of the provision made in the IX Plan proposal for each State was enclosed as Annex II. All the States were requested to submit detailed estimates in respect of their States for rehabilitation of distressed dams. The provisions have been made as per the available data from some of the States with DSO, CWC. The States were requested to examine the proposal and to come out with detailed estimate for sanction by the Planning Commission / World Bank. On a question whether organizations like NHPC also can be included in such proposals, Chairman agreed to consider such proposals.

17.22.0 Guidelines and standards on assumptions to be made for potential gate malfunction, pre-flood reservoir level, free board and other relationships for routing the flood through the reservoir for the process of computing the inflow, outflow and storage.

17.22.1 Copies of these guidelines have been sent to all NCDS members and Dam Safety Cells in the States and other organizations by CWC vide letter No.3/10-A/DSM/Guidelines/1590-1625 dated 30.12.1996. Although these guidelines and standards existed on one form or the other, in the present form it will be more useful to various State Dam Safety and other organizations in the country. Suggestions for improvement in the content, coverage and presentation are required to be sent to DSO, CWC. During the meeting, all the States / Organizations were requested to send their comments, if any, for improvements.

17.23.0 Membership formulation for non member States / Organizations for NCDS.

17.23.1 Letters have been written to KSEB and DVC by the DSO, CWC for making formal requests by these States / Organizations to the Chairman of NCDS for becoming regular members of NCDS. All other States / Organizations who are not regular members of NCDS may kindly make a fresh formal proposal to Chairman, NCDS for inclusion as member of the NCDS, so that more fruitful exchange of information and views can be achieved. DVC have sent their formal request for becoming member of NCDS. Requisition from KSEB is awaited.

17.24.0 Shri E.Sundaraiya, Chief Engineer (DSO), CWC will be retiring on superannuation on 31.1.1997 after completing 33 years of meritorious Government service. The Chairman and members of the Committee appreciated the contribution of Shri Sundaraiya

in the effective development of dam safety aspects in the country.

The meeting ended with a vote of thanks to the Chair.