National Committee on Seismic Design Parameters (NCSDP) for River Valley Projects

MINUTES OF 34th MEETING (26th February, 2019)

Secretariat

Foundation Engineering & Special Analysis (FE&SA) Directorate
Central Water Commission
New Delhi

MINUTES OF THE 34TH MEETING OF
NATIONAL COMMITTEE ON SEISMIC DESIGN PARAMETERS FOR RIVER VALLEY PROJECTS
HELD ON 26TH FEBRUARY, 2019 AT CWC, NEW DELHI

GENERAL

The 34th meeting of the National Committee on Seismic Design Parameters (NCSDP) for River Valley Projects was held on 26th February, 2019 at Central Water Commission, New Delhi under the chairmanship of Sh. N.K. Mathur, Member (D&R), CWC. The list of Members, invitees and project representatives who attended the meeting is given at ***Annexure I***.

At the outset, Sh. Gulshan Raj, Chief Engineer (DSO), CWC welcomed the participants and invitees to the meeting. Highlighting the importance of the NCSDP, he briefly summarized the various Agenda items to be considered by the Committee. Sh. N. K. Mathur, Member, (D&R), CWC & Chairman, NCSDP also welcomed the members and invitees and emphasized the importance of NCSDP. This was followed by a brief introduction of the participants. Thereafter, Sh Goverdhan Prasad, Director (FE&SA), CWC and Member Secretary, NCSDP took up the agenda items for discussion.

Item 34.1 CONFIRMATION OF THE MINUTES OF THE 33RD MEETING

Member Secretary informed the Committee that the Minutes of the 33rd Meeting of NCSDP held on 25th April, 2018 were circulated to the Members of the Committee. He also informed that relevant extracts from the Minutes of Meeting were sent to the concerned project authority for information. He further informed no comments have been received from any of the member and as such called for confirmation of the minutes.

The Committee noted above and confirmed the Minutes of the 33rd Meeting as circulated.

Item 34.2 AGENDA ITEMS CARRIED OVER FROM PREVIOUS MEETINGS

34.2.1 Conditionally cleared Projects - Submission of Micro Earthquake (MEQ) study

The Committee was informed that the site specific seismic study report of 19 projects was cleared in the previous meetings subject to submission of report on MEQ studies.

- The MEQ study report of the **Kwar H E Project, J&K** was took up for discussion in 33rd meeting. Sh Sachin Khupat, CWPRS, Pune made the following observations:

  (i) Formulae used in for computation of magnitude may be provided along with constants.

  (ii) As per text and Annexure-II, within 50 km radius of the project site, 83 earthquakes were recorded but fig. 30 on page 33 of the report shows 91 recorded events. This may be verified and confirmed.

  (iii) Further, In Annexure-II, Column 3 (S Phase- P phase) and column 9 (Distance from Kwar station) are not matching. The same may be clarified.

  The project authorities have submitted their compliance via their letter dated 13.09.2018 which was circulated to all the committee members vide this office letter dated 01.10.2018. In response Dr. Champati Ray, Group Head (GDMS), Indian Institute of Remote Sensing, Dehradun vide letter dated 15.10.2018 informed that the compliance submitted by the Project Authorities had adequately addressed the queries raised by CWPRS. No other response was received.

  The Committee after discussion decided that the replies submitted by the Project Authorities are satisfactory and no further observation was raised by any of the member. It was decided to accept the report in compliance to the conditional clearance of the site specific seismic study of the project. The site specific study report of the project has already been approved by the committee in its 31st meeting held on 23.06.2016.

34.2.1.1 Member Secretary informed the Committee that the site specific seismic study reports of remaining 18 projects which were cleared in the previous meetings subject to submission of report on MEQ studies are required to submit the same. Out of these, One (1) project namely *Umngot HE Project, Meghalaya have informed that IIT Roorkee has completed the study and submitted to the Project Authorities. The same will be submitted to NCSDP shortly. Two (2) P*roject authorities namely *of Thana Plaun HE Project, Himachal Pradesh and Sawalkot H.E. Project, Jammu & Kashmir* had requested for extension of time till July 2019. Three (3) project authorities namely of *Ratle HE Project, J&K; Pauk HE Project, Arunachal Pradesh and Wangchu HE Project, Bhutan* had stated that there were some issues to be resolved before taking up the desired studies. The responses from remaining twelve (12) project authorities namely of *Kamala HE Project Arunachal Pradesh;*

Sankosh H E Project, Bhutan; *Seli HE Project, Himachal Pradesh; Kirthai-I HE Project, J&K; Bunakha HE Project, Bhutan; Dugar HE Project, Himachal Prades; Tato-II H. E. Project, Arunachal Pradesh; Chamkarchu (stage-I) H. E. Project, Bhutsn; Naying H. E. Project, Arunachal Prades; Puntsangchhu-I H.E. Project, Bhutan; Talong Londa, Arunachal Pradesh and Kalai-II H.E. Project* were yet to be received.

The issue was discussed and keeping the status of project/study in view, ***it was decided that the extension of time for submission of the desired compliance may be given to the project authorities considering their request. The Committee was of the opinion that the timeline given to the project authorities for submission of the requisite study report shall be adhered to. The Committee also decided that the project authorities who have cited that certain issues to be resolved before taking up the studies and those who have not responded, shall submit their compliance by July, 2019. The Committee members were of the opinion that the concerned project authorities shall resolve their issues as early as possible and complete the desired MEQ studies and submit the same within the stipulated time as above.***

34.2.2 Non-submission of site specific seismic study reports for NCSDP approval in respect of projects whose DPRs were conditionally cleared:

The Member Secretary apprised the Committee that until last meeting there were in total three projects for which site specific seismic study report was required to be submitted by the concerned project authorities as compliance to the conditional clearance of the DPR. However, Reports of all the three (3) projects namely *Dibbin H E Project, Arunachal Pradesh, Amochu H E Project, Bhutan and Kolodyne H E Project, Mizoram were awaited. Out of which Dibbin H E Project, Arunachal Pradesh* had requested for time extension till ***June, 2019***. The response for other two projects namely *Amochu H E Project, Bhutan and Kolodyne H E Project, Mizoram was* awaited from the concerned project authorities.

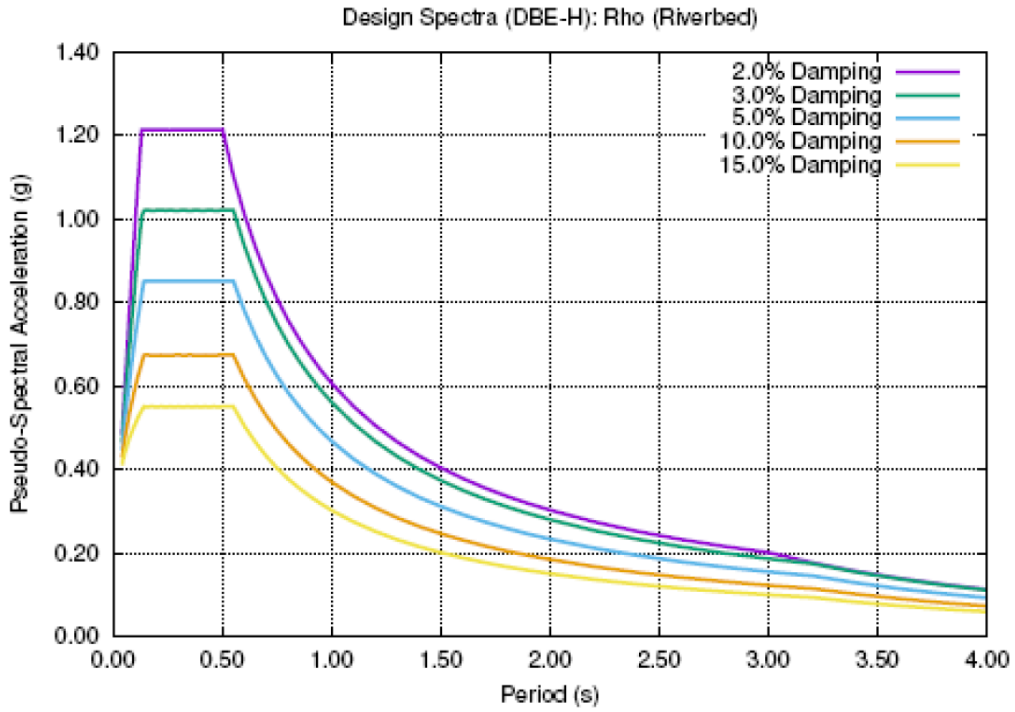
The issue was discussed and keeping the status of project/study in view, ***it was decided that extension of time for submission of site specific seismic study report in respect of Dibbin H E Project, Arunachal Pradesh may be given. The Committee was of the view that the project authorities who have not responded, shall submit their compliance by July 2019. The Committee also suggested that Central Electricity Authority (CEA) may be requested to take up the matter of conducting the site specific study with the project authorities.***

34.2.3 Rho Hydro Electric Project, Arunachal Pradesh

The site specific seismic study for the project has been carried out by IIT Roorkee. A presentation on the study report was made by the project authorities in the last meeting. During discussion at that time, Dr Sandip Kumar Som, GSI mentioned that the Geological map of the project site appended with the report is not complete. Further, he also mentioned that the Geological map of Arunachal Pradesh also needs to be reviewed as it appears that the map is prepared by any other Agency and not by GSI. He also informed the Committee that Geological maps required for such type of reports are readily available with GSI without any cost and project authorities should utilized these maps prepared by GSI. In response, the project authorities have submitted the compliance vide letter no. SEL/RHEP/T/2018/152 dated 20.11.2018. The compliance was then forwarded to all members of NCSDP vide letter of even no dated 27.12.2018. In response, the observation to the compliance as received from GSI has been forwarded to the project authority vide this secretariat's email dated 05.02.2019. Also, project authorities vide their letter no. SEL/RHEP/T/2018/154 dated 17.12.2018 have informed the secretariat that according to IIT Roorkee no re-analysis is required as there is no change in bed rock type.

After detailed deliberation, the Committee accorded approval to the study report of Rho Hydro Electric Project, Arunachal Pradesh. *The summarized seismic design parameters of the approved report are given below:*

(a) Response Spectra (DBE-H)



(b) Other seismic parameters

Max. Credible Earthquake	8.0	Horizontal distance to surface projection of fault (R_{JB}) (km)		5
Horizontal seismic co-efficient (α_h)		0.24	Vertical seismic co-efficient (α_v)	0.16
Strong motion duration (second)		11	Total duration (second)	55
Report reference		IIT Roorkee [Technical Report no. EQ: 2011-28(R); Project No. EQD-3002/10-11, EQD-3007/11-12 Modified (April-2017)]		

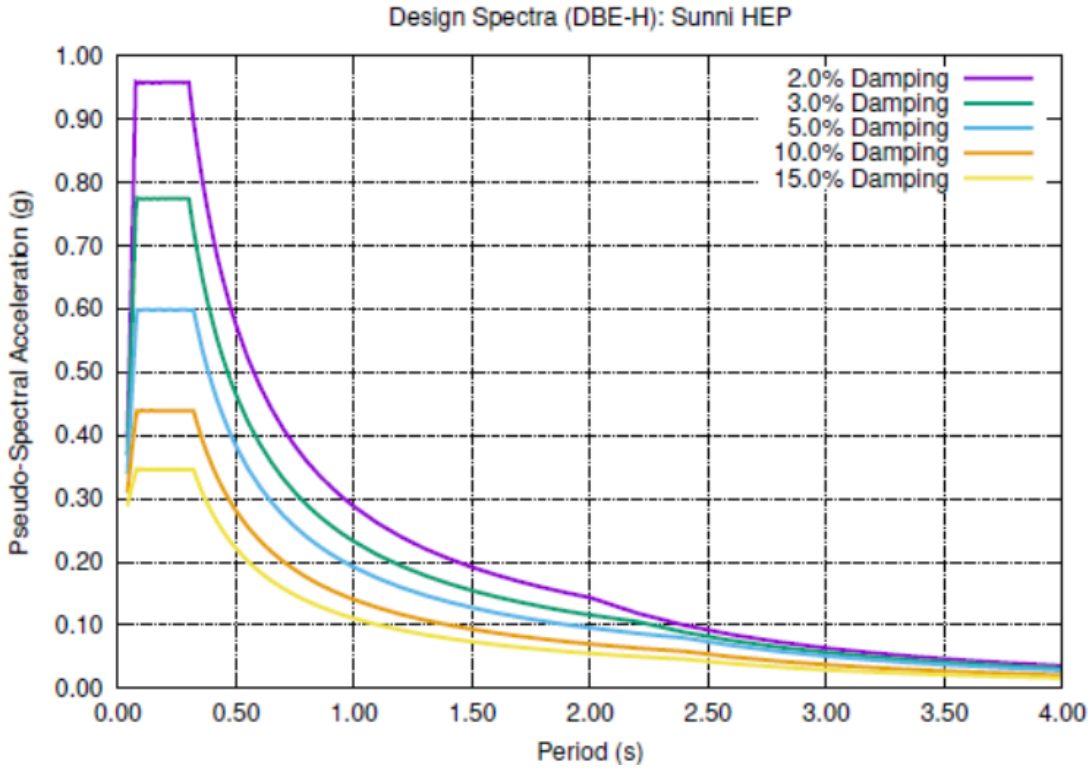
Item 34.3 PROJECTS CONSIDERED FOR APPROVAL OF THE COMMITTEE

34.3.1 Sunni Dam Hydro Electric Project, Himachal Pradesh

The Member Secretary informed the Committee that the project authorities have submitted the copy of the study report incorporating the seismic co-efficient (α_h & α_v) as 0.24 and 0.16 respectively. Accordingly, a presentation on the study report was made by the project authorities. During discussion, Sh. S.K. Sibal, Chief Engineer, CWC was of the opinion that co-relation of the values of IS codes is not being done while carrying out the site specific seismic study. Reduction factor is required to be indicated in the study report. It was also discussed that till the NCSDP guidelines are revised, the present practice may continue to be adopted and the dam may be checked for MCE condition also. The matter may be discussed in the separate meeting of Sub-Committee for revision of guidelines and these guidelines may be finalized in 3 months and same will be put up in next meeting of NCSDP.

After detailed deliberation, the Committee accorded approval to the study report of Sunni Dam Hydro Electric Project, Himachal Pradesh. *The summarized seismic design parameters of the approved report are given below:*

a) Response Spectra (DBE-H)



(b) Other seismic parameters

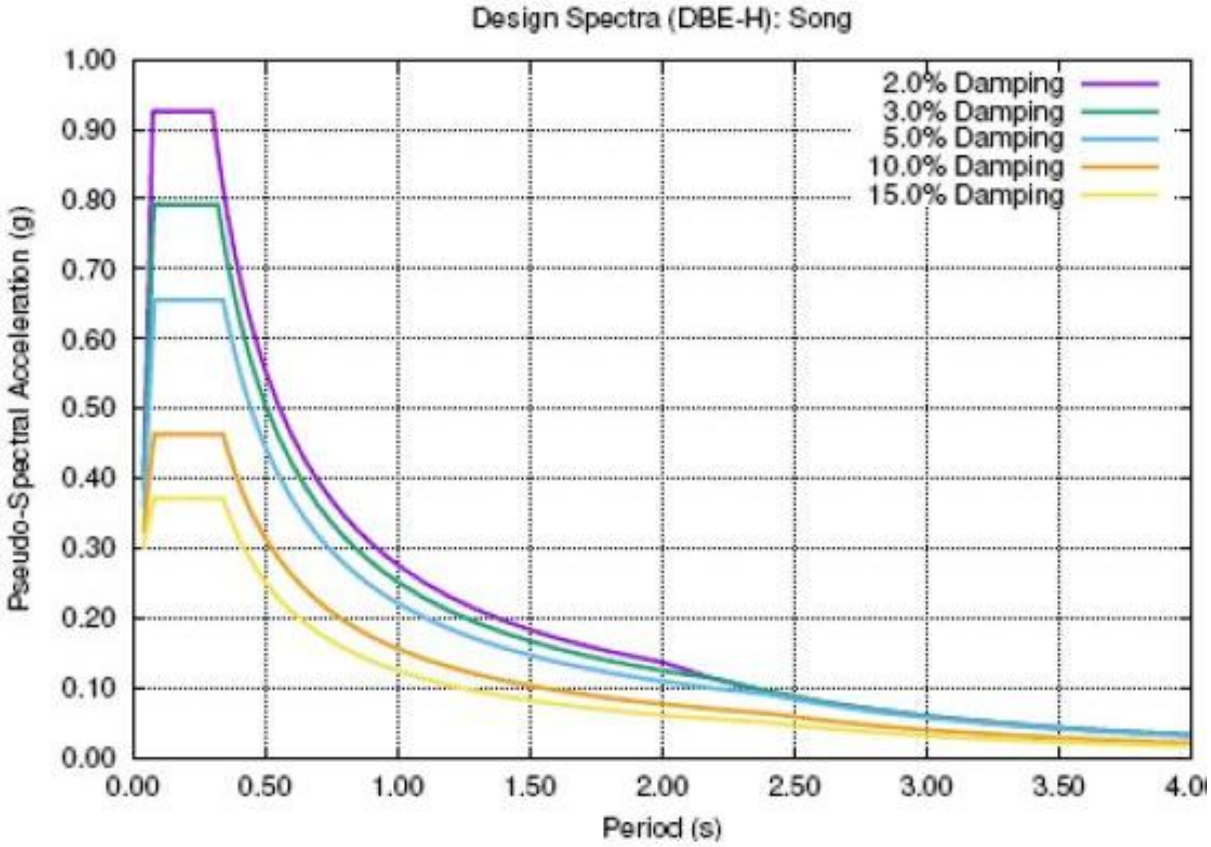
Max. Credible Earthquake	8.0	Horizontal distance to surface projection of fault (R_{JB}) (km)		5
Horizontal seismic co-efficient (α_h)		0.24	Vertical seismic co-efficient (α_v)	0.16
Strong motion duration (second)		9.6	Total duration (second)	48
Report reference		IIT Roorkee Report (EQ: 2018-21; Project No. EQD-6035/17-18, October, 2018)		

34.3.2 Song River Drinking Water Project, Uttarakhand

A presentation on the study report was made by the project authorities. Chairman, NCSDP suggested that for design, the MCE conditions should also be checked. Project authorities have agreed to do the analysis for MCE condition and highest load.

***After detailed deliberation, the Committee accorded approval to the study report of Song* River Drinking Water Project, Uttarakhand.** *The summarized seismic design parameters of the approved report are as under:*

a. Response Spectra (DBE-H)



(b) Other seismic parameters

Max. Credible Earthquake Magnitude	8.0	Closest distance from fault rupture plane (km)		5	
Horizontal seismic co-efficient (α_h)		0.18	Vertical seismic co-efficient (α_v)		0.12
Strong motion duration (second)		11	Total duration (second)		55
Report reference	IIT Roorkee Report (EQ: 2018-03; Project No. EQD-6036/17-18, March, 2018)				

34.3.3 Parwan Major Multipurpose Project, Rajasthan

A presentation on the study report was made by the project authorities. During discussions it was indicated by the members that in the Table-II on page no. 21 of the report, the values of Maximum Acceleration have been reported based on the source "Lineament Lc1" i.e. with magnitude of 5.5 as 0.418 and 0.243 for MCE and DBE respectively. The reported values of PGA for MCE and DBE in revised study (for horizontal) are 0.193 and 0.117 and the values of seismic coefficients αh & αv for the are 0.07g & 0.04g.

However, in the previous site specific studies of the same project site conducted by the same institution, the Maximum Acceleration was reported, based on the source "Lineament L1" i.e. with magnitude of 6.5, as 0.24.

The reported values of PGA for MCE and DBE in revised study (for horizontal= 0.193 and 0.117) and the earlier one (0.24 and 0.12) differ a lot. The reason for excluding the seismogenic source of higher magnitude and reduced value of PGAs in the revised study in comparison to the earlier one need to be clarified.

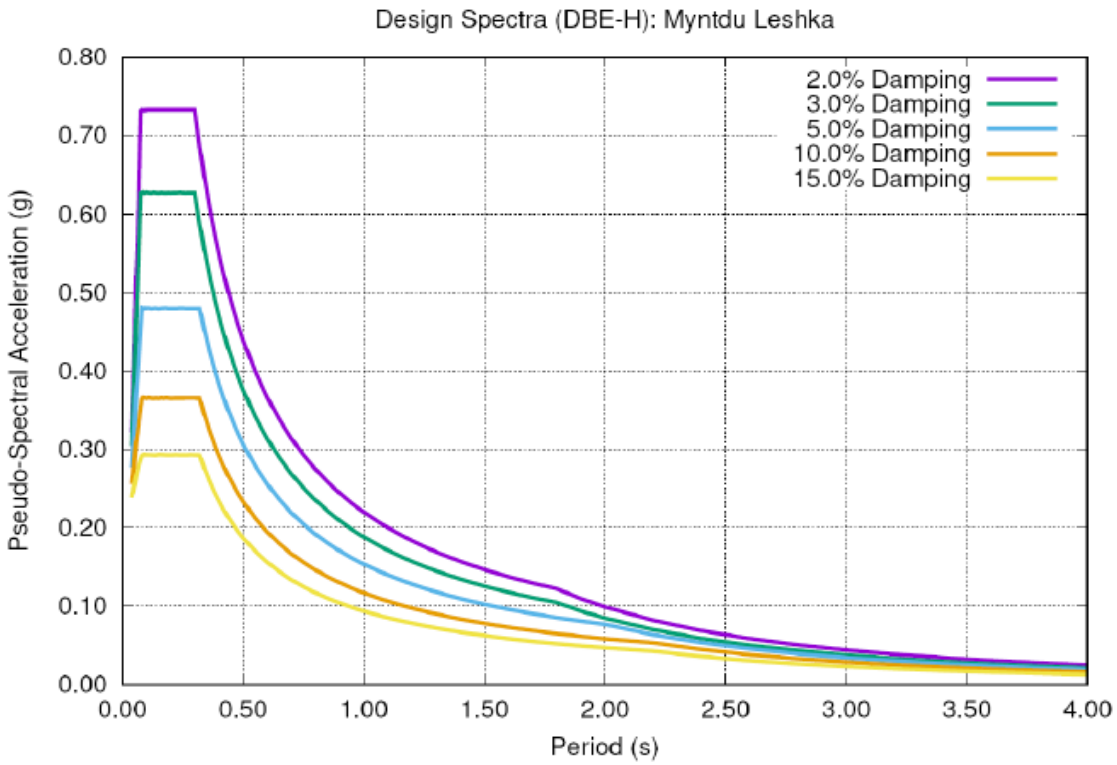
After brief deliberation, the Committee directed that the facts may be reconciled by the IIT Roorkee and the basis/data for arriving at seismic parameters may be provided to CWPRS, Pune within a week. After that the results may be brought to the knowledge of the committee through the Secretariat.

34.3.4 Myntdu-Leshka Stage-II H.E. Project, Meghalaya

A presentation on the study report was made by the project authorities.

***After detailed deliberation, the Committee accorded approval to the study report of* Myntdu-Leshka Stage-II H.E. Project, Meghalaya.** *The summarized seismic design parameters of the approved report are as under:*

a) Response Spectra (DBE-H)



b) Other seismic parameters

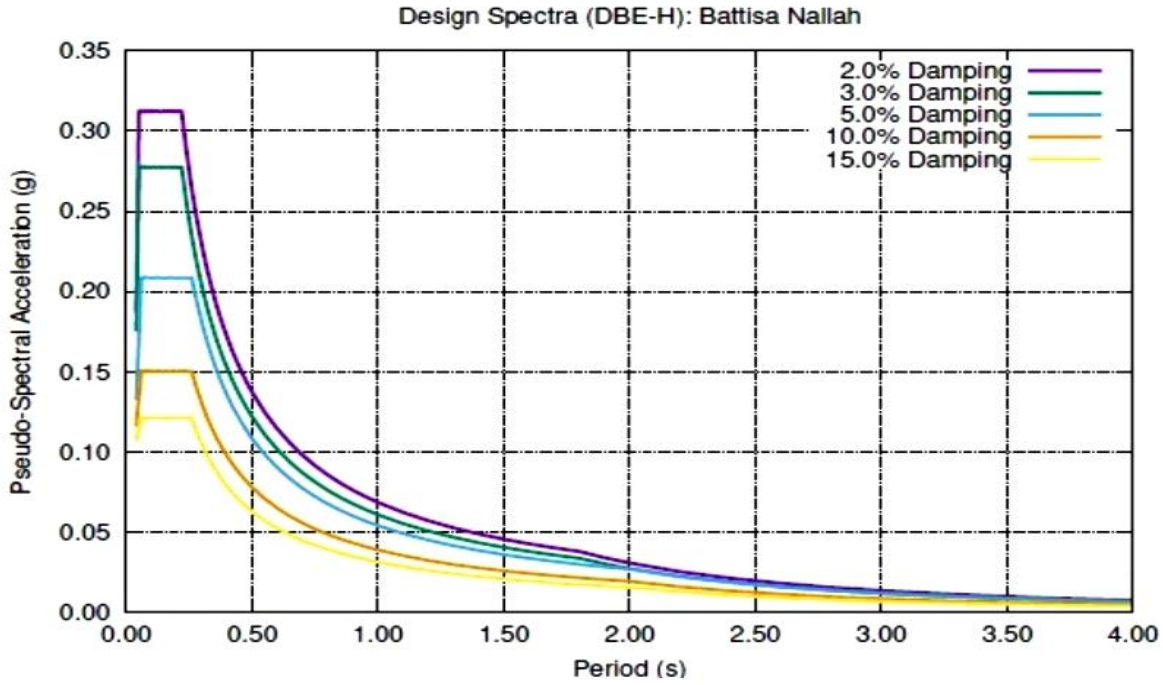
Max. Credible Earthquake Magnitude	8.0	Closest distance from fault rupture plane (km)		9	
Horizontal seismic co-efficient (α_h)		0.24	Vertical seismic co-efficient (α_v)		0.16
Strong motion duration (second)	10		Total duration (second)	51	
Report reference	IIT Roorkee Report (EQ: 2018-09; Project No. EQD-6029/17-18, May, 2018)				

34.3.5 Battisa Nallah Minor Irrigation Project, Rajasthan

A presentation on the study report was made by the project authorities.

***After detailed deliberation, the Committee accorded approval to the study report of* Myntdu-Leshka Stage-II H.E. Project, Meghalaya.** *The summarized seismic design parameters of the approved report are as under:*

a) Response Spectra (DBE-H)



b) Other seismic parameters

Max. Credible Earthquake Magnitude	6.0	Closest distance from fault rupture plane (km)		12	
Horizontal seismic co-efficient (α_h)		0.06	Vertical seismic co-efficient (α_v)		0.04
Strong motion duration (second)		6	Total duration (second)		30
Report reference	IIT Roorkee Report (EQ: 2019-04; Project No. EQD-6023/18-19, January, 2019)				

34.3.6 Navnera Barrage Project, Kota, Rajasthan

A presentation on the study report was made by the project authorities. It was indicated by the members of the committee that Navnera Barrage Project, Kota, Rajasthan having same Maximum Acceleration values of 0.418g/0.243g for MCE/DBE respectively, the reported values of PGA for MCE & DBE (for horizontal) are 0.0.271 & 0.18 respectively and the values for seismic coefficients α_h & α_v as 0.11g & 0.07g are higher than those reported for Parwan (0.07g & 0.04g). The variations in PGAs and

seismic coefficients for two projects having same maximum acceleration need to be clarified.

After brief deliberation, the Committee directed that the facts may be reconciled by the IIT Roorkee. After that the results may be brought to the knowledge of the committee through the Secretariat.

34.4 Review of NCSDP Guidelines

A Sub-Committee was constituted with the approval of Chairman, NCSDP for review of NCSDP guidelines so as the incorporate new insight/development in the subject domain. Accordingly, first meeting of the sub- Committee was held on 16.03.2018 under the chairmanship of Chief Engineer (DSO), CWC at New Delhi.

In the aforesaid meeting, it was decided that all committee member will review the NCSDP guidelines (para wise) and submit their inputs on it to the NCSDP Secretariat in a month.

The Committee noted the above and directed all the members to send their comments/observations within a month. After receipt of the comments from members, the same will be discussed in the Sub-Committee Meeting for finalization of the NCSDP Guidelines within three months..

34.5 Seismic Hazard Assessment Studies for Dam Rehabilitation Improvement Project (DRIP) dams

Members Secretary apprised the Committee that the work of "Seismic Hazard Assessment for South India region" was awarded to IIT Roorkee by Central Water Commission in March, 2016. He informed that IIT Roorkee had submitted an Interim Report to CWC. The Seismic Hazard Assessment Information System (SHAISYS) software being developed as a part of works was demonstrated by IIT Roorkee before an Expert Group on 1st May, 2017 and discussions were held in detail for further improvement.

As a follow up of the Expert Group meeting held on 1st May, 2017 at CWC, New Delhi, a meeting was held on 16th March 2018, at Central Water Commission, New Delhi under the Chairmanship of Sh. N. K. Mathur, Member (D&R), CWC to discuss and review the further progress of development of Seismic Hazard Assessment of South India by IIT Roorkee and another study being done by CWPRS Pune for North and North East India.

Sh. Pramod Narayan, Director, DRIP, CWC informed the Committee that CWPRS has submitted its Inception Report and the same has already been circulated among members. The chairman, NCSDP directed all the members to give their comments on the report within a week. Director, DRIP, CWC also informed that a separate meeting to discuss this topic would be called in the month of March 2019.

The Committee noted above.

34.6 Any other items with the permission of the Chair

The committee discussed regarding Nos. of Strong Motion Accelerographs and Broadband Siesmographs as per request received from the Executive Engineer, Investigation Division, CWC, Phuentsholing, Bhutan and decided that 6 Nos. of Strong Motion Accelerographs and 6 Nos. Broadband Siesmographs shall be sufficient at different sites for the Sankosh Multipurpose Project.

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The meeting ended with vote of thanks to the chair.

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Central Dam Safety Organisation

National Committee on Seismic Design Parameters (NCSDP)

34th Meeting

Summary of the Decisions taken at the Meeting

Date of Meeting:	26.04.2019	Time:	10:30 h to 16:00 h	Venue:	Committee Room, CWC 3rd Floor, Sewa Bhawan, R K Puram, New Delhi-66
Present Chairperson:	Sh. N.K. Mathur, Member (D&R), CWC			Member Secretary:	Sh. Goverdhan Prasad Director (FE&SA), CWC
Other Members and special Invitees, (Name, Designation, Organization): A List of participants is placed at ***Annexure-I***					

Item no.	Agenda Points / Decision	Responsibility	Achievement/ Progress	Remarks
34.1	Confirmation of the Minutes of the 33rd meeting	-	Confirmed	-
34.1	Agenda items carried over from the previous meetings			
34.2.1	Conditionally cleared Projects - Submission of Micro Earthquake (MEQ) study	Concerned project authorities	Discussed and decided	-
34.2.2	Non-Submission of site specific seismic study reports for NCSDP approval in respect of projects whose DPRs were conditionally cleared	Concerned project authorities	Discussed and decided	-
34.3	Projects considered for approval of the Committee			
34.3.1	Sunni Dam Hydro Electric Project, Himachal Pradesh	Concerned project authorities	Cleared	-
34.3.2	Song River Drinking Water Project Multipurpose Project , Uttarakhand	Concerned project authorities	Cleared	-
34.3.3	Parwan Major Multipurpose Project, Rajasthan	Concerned project authorities/ consultant	Clarification to be given by IIT Roorkee	Clarification to be given by IIT Roorkee
34.3.4	Myntdu -Leshka Stage-II H.E.P. ,Meghalaya	Concerned project authorities	Cleared	-
34.3.5	Batttisa Nallah Minor Irrigation Project, Rajasthan	Concerned project authorities	Cleared	-
34.3.6	Navnera Barrage Project Kota, Rajasthan	Concerned project authorities	Clarification to be given by IIT Roorkee	Clarification to be given by IIT Roorkee.

34.4	Review of NCSDP Guidelines	Informative	-	-
34.5	Seismic Hazard Assessment studies for Dam Rehabilitation Improvement Project (DRIP) dams	Informative	-	-

Annexure -I

34th Meeting of National Committee on Seismic Design Parameters (NCSDP) on River Valley Projects

List of Participants on 26.02.2019

Sl. No.	Name & Address	Designation	Deptt./Org.	Status/ Representative
I. Committee Members				
1.	Sh. N.K. Mathur	Member (D&R)	CWC, New Delhi	Chairman, NCSDP
2.	Sh. Gulsan Raj	Chief Engineer (DSO)	CWC, New Delhi	Member
3.	Dr D Srinagesh	Head, Seismology Observatory, Chief Scientist	NGRI, Hyderabad	Member
4.	Dr. Sandip Kumar Som	Director, Geodynamics, GSI	GSI, New Delhi	Representative of GSI
5.	Dr. P.K. Champati Ray	Head Geosciences & Geohazards Deptt	IIRS, Dehradun	Member
6.	Dr. G Suresh	Scientist-F	NCS, IMD, New Delhi	Member
7.	Dr B.K. Maheshwari	Professor	DEQ, IIT Roorkee	Representatives of IIT Roorkee
8.	Dr Josodhir Das	Professor	DEQ, IIT Roorkee	
9.	Dr. Suman Sinha	Scientist 'B'	CWPRS, Pune	Representative of CWPRS
10.	Sh. Goverdhan Prasad	Director, FE&SA	CWC, New Delhi	Member-Secretary NCSDP
II. Special Invitees and other officials				
11.	Sh SK Sibal	Chief Engineer, Designs (N& W)	CWC, New Delhi	CWC
12.	Sh. T. K. Sivarajan	Chief Engineer, Designs (E&NE)	CWC, New Delhi	CWC
13.	Sh. Kayum Mohammad	Director, Designs (NW&S)	CWC, New Delhi	CWC
14.	Sh. Samir Kumar Shukla	Director, DSM	CWC, New Delhi	CWC
15.	Sh. Sachin Khupat	Scientist 'B'	CWPRS	CWPRS
16.	Sh. A.P. Kandiyal	Dy. Director , FE&SA Directorate	CWC, New Delhi	NCSDP Secretariat
17	Sh. Ankit Kumar	Dy. Director , FE&SA Directorate	CWC, New Delhi	NCSDP Secretariat
18.	Sh. Rohit Singh	Asst. Director, FE&SA Directorate	CWC, New Delhi	NCSDP Secretariat

III.	**Project Representatives and Consultants**			
19.	Sh. Ankit Prabhakar	Sunni Dam Hydro Electric Project, Himachal Pradesh	Sunni Dam Hydro Electric Project, HP	Sunni Dam Hydro Electric Project, Himachal Pradesh
20.	Sh. Akshay Acharya	-do-	-do-	-do-
21.	Sh Sanjeev Gupta	-do-	-do-	-do-
22.	Sh. Mukesh Sharma	-do-	-do-	-do-
23.	B.K. Pandey	Song River Drinking Water Project Multipurpose Project , Uttarakhand	Song River Drinking Water Project Multipurpose Project , Uttarakhand	Song River Drinking Water Project Multipurpose Project , Uttarakhand
24.	Sh. H.K. Katiyar	-do-	-do-	-do-
25.	Sh. Ashok Kr. Singh	-do-	-do-	-do-
26.	Ms. Hemlata Gupta	-do-	-do-	-do-
27.	Ms. Pratika Preeti	-do-	-do-	-do-
28.	Sh. Mukesh Kumar	-do-	-do-	-do-
29.	Sh. Deepak Gosh	-do-	-do-	-do-
30.	Sh. Dharminder Singh	Myntdu -Leshka Stage-II H.E.P. ,Meghalaya	Myntdu - Leshka Stage-II H.E.P. ,Meghalaya	Myntdu -Leshka Stage-II H.E.P. ,Meghalaya
31.	Sh. Korbarlawg Thangkhiew	-do-	-do-	-do-
32.	Sh. Manish Parihar	Batttisa Nallah Minor Irrigation Project, Rajasthan	Batttisa Nallah Minor Irrigation Project, Rajasthan	Batttisa Nallah Minor Irrigation Project, Rajasthan
33.	Sh. Prakash Chandra	-do-	-do-	-do-
34.	Sh. Rajeev Chowdhary	Navnera Barrage Project Kota, Rajasthan	Navnera Barrage Project Kota, Rajasthan	Navnera Barrage Project Kota, Rajasthan
35.	Sh. Sabir Hussain	-do-	-do-	-do-
36.	Sh. R. K. Jaming	-do-	-do-	-do-
37.	Sh. Anil Yadav	-do-	-do-	-do-
38.	Sh. M.M. Verma	-do-	-do-	-do-
39.	Sh. Aditya Kanwar	-do-	-do-	-do-
40.	Sh. Jayprakash N	Rho Hydro Electric Project, Arunachal Pradesh	Rho Hydro Electric Project, Arunachal Pradesh	Rho Hydro Electric Project, Arunachal Pradesh
41.	Sh. V. R. Sharma	-do-	-do-	-do-
42.	Sh. Rajeev Chowdhary	Parwan Major Multipurpose Project, Rajasthan	Parwan Major Multipurpose Project, Rajasthan	Parwan Major Multipurpose Project, Rajasthan
43.	Sh. Ajay Kumar	-do-	-do-	-do-
44.	Sh. Pradeep Kumar Gupta	-do-	-do-	-do-
45.	Sh. H.N. Singh	-do-	-do-	-do-