



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

**MINUTES
OF
35th MEETING
(19th June, 2019)**



Secretariat

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

**MINUTES OF THE 35TH MEETING OF
NATIONAL COMMITTEE ON SEISMIC DESIGN PARAMETERS FOR RIVER VALLEY PROJECTS
HELD ON 19TH JUNE, 2019 AT CWC, NEW DELHI**

GENERAL

The 35th meeting of the National Committee on Seismic Design Parameters (NCSDP) for River Valley Projects was held on 19th June, 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. N.K. Mathur, Member (D&R), CWC and Chairman, NCSDP 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. This was followed by a brief introduction of the participants. Thereafter, Sh. Samir Kumar Shukla, Director (FE&SA), CWC and Member Secretary, NCSDP took up the agenda items for discussion.

Item 35.1 CONFIRMATION OF THE MINUTES OF THE 34TH MEETING

Member Secretary informed the Committee that the Minutes of the 34th Meeting of NCSDP held on 26th February, 2019 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 the committee that Sh. S. K. Sibal, Chief Engineer, Designs (N&W), CWC and Sh. Kayum Mohammad, Director, CMDD (NW&S), CWC have submitted their comments. These were circulated among members as Annex –A of the Agenda but no comments has been received from any of the members hence may be considered as accepted.

The Committee noted above and confirmed the Minutes of the 34th Meeting as circulated.

Item 35.2 AGENDA ITEMS CARRIED OVER FROM PREVIOUS MEETINGS

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

The Committee was informed that the site specific seismic study report of 18 projects was cleared in the previous meetings subject to submission of report on MEQ studies.

The site specific study report of Umngot HE Project was approved in 31st meeting on 23rd June, 2016 with the condition to submit the final report of MEQ studies by June, 2017. However, the committee in 34th meeting has decided to give extension till July 2019. The Project authorities were informed about the decision vide letter dated 19.03.2019. The project authorities have submitted the MEQ Study report vide their letter dated 18.04.2019. The report was circulated among the members vide this office letter dated 22.05.2019.

The Committee after brief discussion decided to accept the MEQ Study subject to its further examination by the members and comments if any, within a week's time for the Umngot H.E. 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.

Member Secretary informed the Committee that the site specific seismic study reports of remaining 17 projects which were cleared in the previous meetings subject to submission of report on MEQ studies are required to submit the same. The committee in 34th meeting has given extension till July 2019 for submission of the MEQ Study report to all the projects. The decision was communicated to all the Project Authorities vide letter dated 19.03.2019. Out of these, *Three (3) Project authorities namely of Ratle HE Project, Jammu & Kashmir, Bunakha H.E. Project, Bhutan & Sankosh H.E. Project, Bhutan have responded.*

Project authorities of Ratle H.E. Project vide their letter no. GVK/RHEPPL/D(PD)/2018/16 dated 02.04.2019 have informed that the critical issues including local disturbances at project area is yet to be resolved and the matter is now pending adjudication before the Arbitration Tribunal constituted by the Hon'ble high court of J&K. The committee may decide accordingly. It was informed by Sh. A. K. Sharma, General Manager, JKSPDC, J&K that now the joint Venture between NHPC and JKSPDC have taken a shape and hence forth NHPC will be looking after the project. Chairman, NCSDP directed to contact JKSPDC in this respect and get the factual position on record.

The Project authorities of Sankosh H. E. Project vide their letter dated 18.04.2019 has informed that the implementation of the project is under approval by Govt. of India. The project authorities have requested additional time of one and half year to conduct the studies. **The committee has accepted the request and gave the extension of time till December 2020 for the Sankosh HE project.**

It was brought to the notice of the committee that the Hydro Projects of Arunachal Pradesh namely Pauk H.E. Project, Kamala H.E. Project, Tato-II H.E. Project, Naying H.E.

Project, Talong Londa H.E. Project and Kalai H.E. Project are under review/revision under various stages.

Project authorities of Bunakha H. E. Project, Bhutan have informed vide their letter dated 18.04.2019 that the implementation of the project is under discussion with other Joint Venture partners and not yet finalized by Govt. of India. Also the Project Authorities of *Wangchu HE Project, Bhutan* had stated that there were some issues to be resolved before taking up the desired studies. Moreover the response from the Project authorities is awaited for a long time.

Therefore it was decided by the committee that the approval of the site specific study report in respect of these six (06) projects of Arunachal Pradesh (Pauk H.E. Project, Kamala H.E. Project, Tato-II H.E. Project, Naying H.E. Project, Talong Londa H.E. Project and Kalai H.E. Project) and two (02) Project of Bhutan (Bunakha HEP & Wangchu HEP) accorded by the committee in different meetings may be kept in abeyance till all the revision of the project is finalized or the MEQ studies is submitted by the Project Authorities.

For other six (07) projects namely Thana Plaun H.E. Project, Himachal Pradesh; Sawalkot H.E. Project, Jammu & Kashmi; Seli HE Project, Himachal Pradesh; Kirthai-I HE Project, J&K; Dugar HE Project, Himachal Pradesh; Chamkarchu (stage-I) H. E. Project, Bhutan; Puntsangchhu-I H.E. Project, Bhutan; the Committee decided that the project authorities who have cited that certain issues to be resolved before taking up the studies and those who have not yet responded, shall submit their compliance by December, 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.

35.2.2 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 34th 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. However, the committee in 34th meeting has decided to give extension till July 2019. The Project authorities were informed about the decision vide

letter dated 19.03.2019. Out of these, the Project Authorities of Dibbin H.E. Project, Arunachal Pradesh has informed that the Project is under revision due to various reasons. **They have requested for an extension of time till March 2020.**

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 till March 2020.***

It was also decided by the committee that the conditional clearance of the Detailed Project report (DPR) in respect of other projects namely Amochu H.E. Project, Bhutan Kolodyne H.E. Project, Mizoram accorded by the FE&SA Directorate with respect to Geological Investigations related to Foundation Engineering and Seismic Aspects may be kept in abeyance till the site specific Seismic study studies of the above two projects is submitted by the Project Authorities.

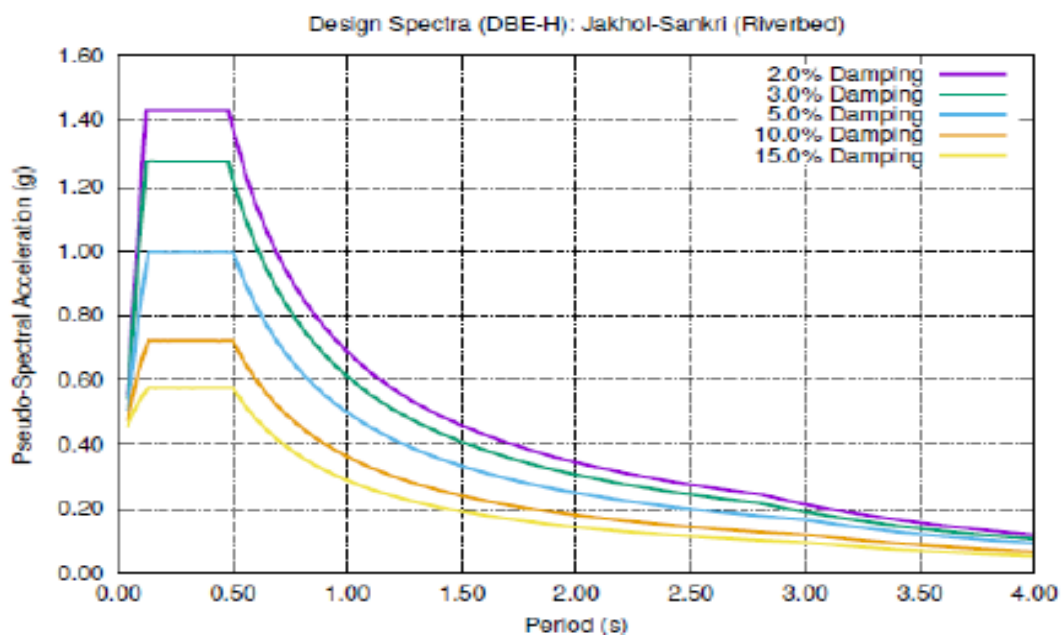
Item 35.3 PROJECTS CONSIDERED FOR APPROVAL OF THE COMMITTEE

35.3.1 Jakhol Sankari Hydro Electric Project, Uttarakhand

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 0.28 and 0.18 respectively.

After detailed deliberation, the Committee accorded approval to the study report of Jakhol Sankari Hydro Electric Project, Uttarakhand. The summarized seismic design parameters of the approved report are given below:

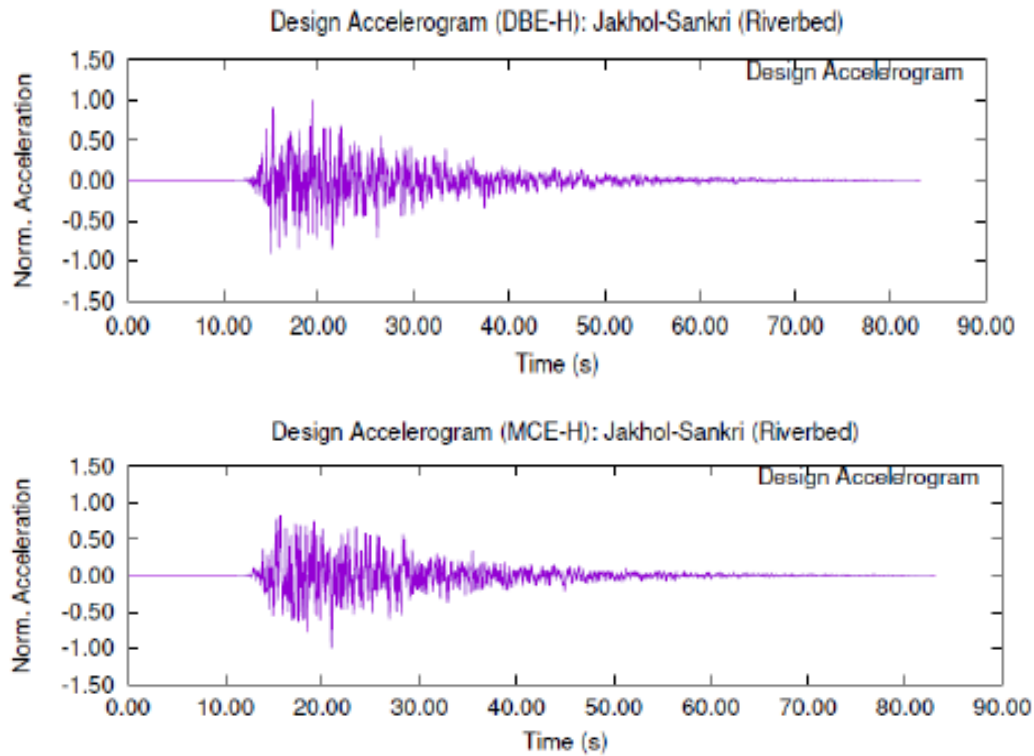
a) Response Spectra (DBE-H)



(b) Other seismic parameters

Max. Credible Earthquake	8.0	Horizontal distance to surface projection of fault (R_{JB}) (km)	15
Horizontal seismic co-efficient (α_h)	0.28	Vertical seismic co-efficient (α_v)	0.18
Strong motion duration (second)	14	Total duration (second)	71
Report reference	IIT Roorkee Report (EQ: 2019-20; Project No. EQD-6018/18-19, January, 2019)		

(c) Time History: As contained in the report for both DBE & MCE

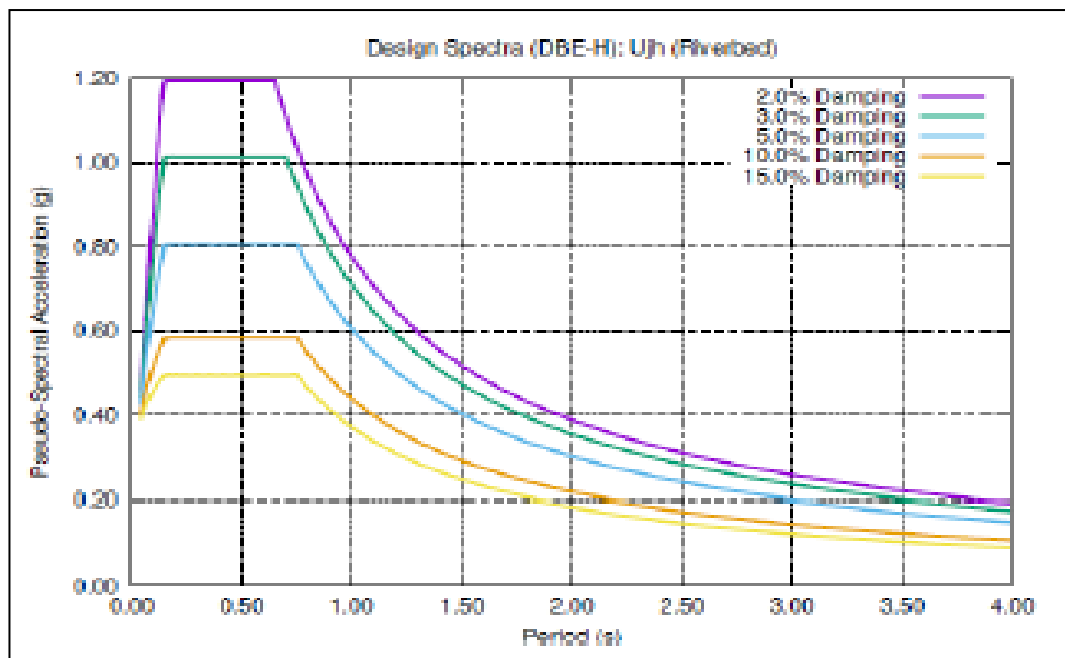


35.3.2 Ujh Multipurpose Project Jammu & Kashmir

A presentation on the study report was made by the project authorities. It was informed by the Project authorities that the MEQ Studies are being conducted by CW&PRS, Pune and would be submitted to the Committee as soon as it is completed. During discussions it was observed that the value of (α_h) has been given as 0.24 & (α_v) as 0.16 which corresponds to minimum values for Zone V whereas the project lies in Zone IV. Hence the values were corrected by IIT Roorkee i.e. the consultants of the project as (α_h) as 0.22 & (α_v) as 0.15.

After detailed deliberation, the Committee accorded approval to the study report of Ujh Multipurpose Project, Jammu & Kashmir subject to submission of the MEQ Studies. The summarized seismic design parameters of the approved report are as under:

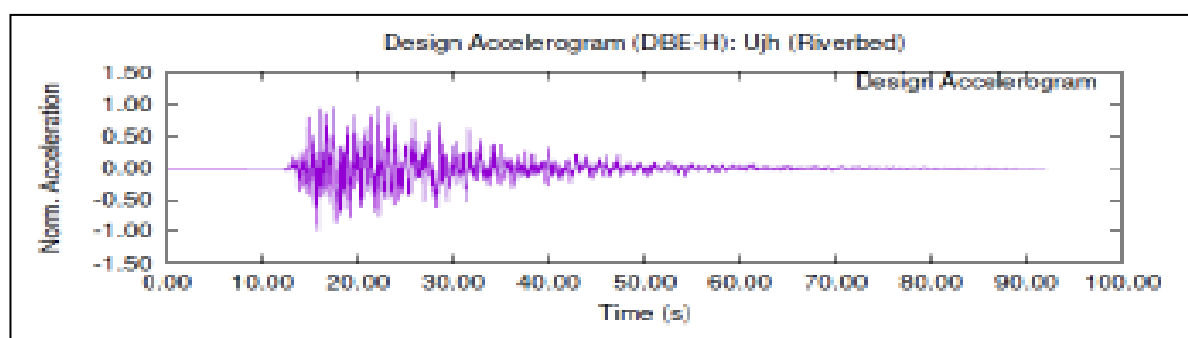
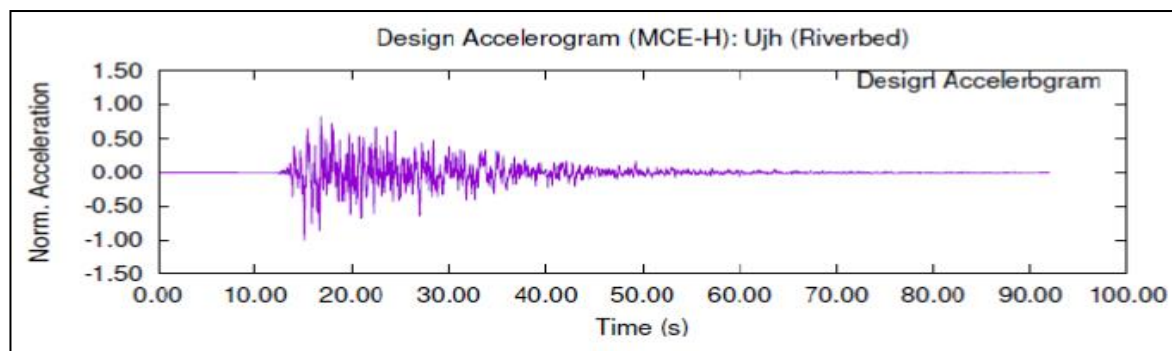
a) Response Spectra (DBE-H)



b) Other seismic parameters

Max. Credible Earthquake Magnitude	8.0	Closest distance from fault rupture plane (km)	15
Horizontal seismic co-efficient (α_h)	0.22	Vertical seismic co-efficient (α_v)	0.15
Strong motion duration (second)	16.9	Total duration (second)	84.6
Report reference	IIT Roorkee Report (EQ: 2019-01; Project No. EQD-6031/17-18, December, 2018)		

c) Time History: AS contained in the report for both DBE & MCE

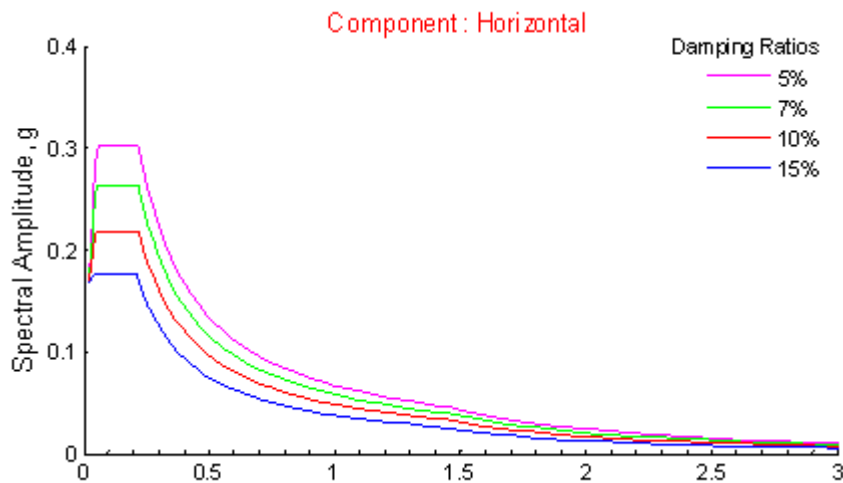


35.3.3 Gargai Dam Project, Maharashtra

A presentation on the study report was made by the project authorities. During discussions it was indicated by the members that CWPRS, Pune is using the IS code 1893 of 2016 and based on that the value of (α_v) has been given as 0.20 and value of (α_v) is given as 0.13. After detail deliberations, it was decided to review the value of (α_v) as 0.18 and value of (α_v) as 0.12

After detailed deliberation, the Committee accorded approval to the study report of Gargai Dam Project, Maharashtra. The summarized seismic design parameters of the approved report are as under:

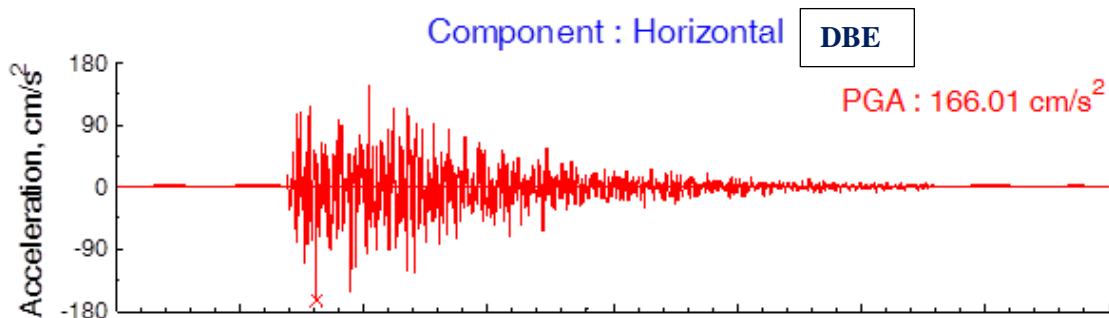
a) Response Spectra (DBE-H)

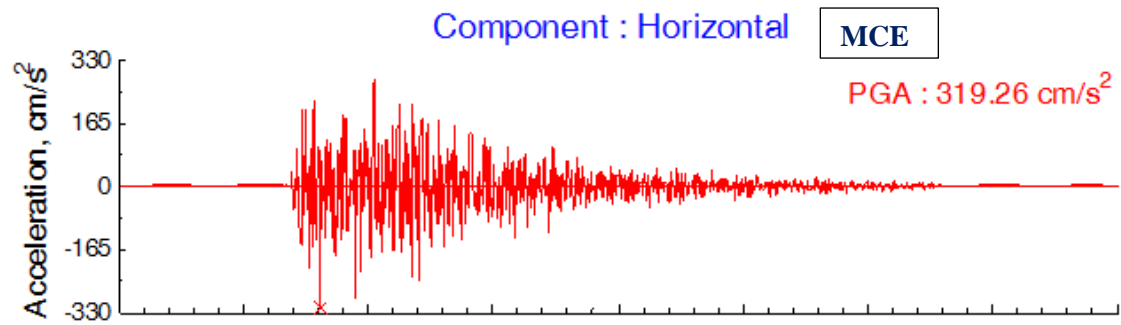


b) Other seismic parameters

Max. Credible Earthquake Magnitude	6.5	Closest distance from fault rupture plane (km)	18
Horizontal seismic co-efficient (α_h)	0.18	Vertical seismic co-efficient (α_v)	0.12
Strong motion duration (second)	3.41	Total duration (second)	39.62
Report reference	CWPRS Report [(Technical Report No. 5697 (May -2019))]		

c) Time History: AS contained in the report for both DBE & MCE



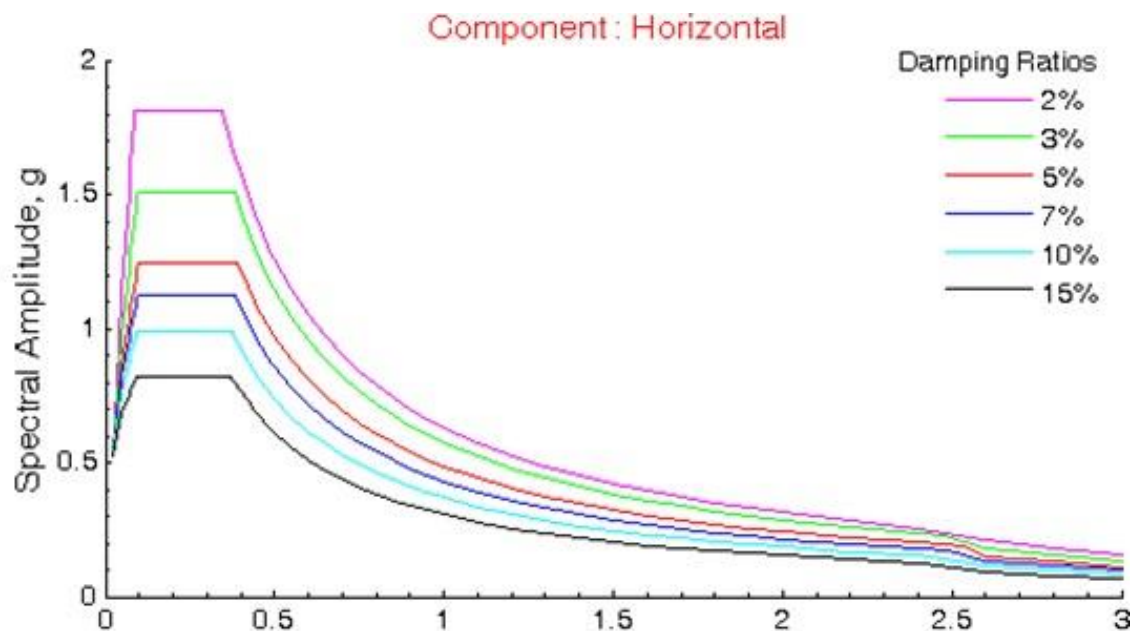


35.3.4 Phina Singh Medium Irrigation Project, Himachal Pradesh

A presentation on the study report was made by the project authorities. During discussions it was indicated by the CWPRS, Pune that in this project the IS code 1893 of 1984 was used and based on that the value of (α_v) has been given as 0.15 and value of (α_v) is given as 0.10. After detail deliberations, it was decided to review the value of (α_v) as 0.19 and value of (α_v) as 0.13

After detailed deliberation, the Committee accorded approval to the study report of Phina Singh Medium Irrigation Project, Himachal Pradesh. The summarized seismic design parameters of the approved report are as under:

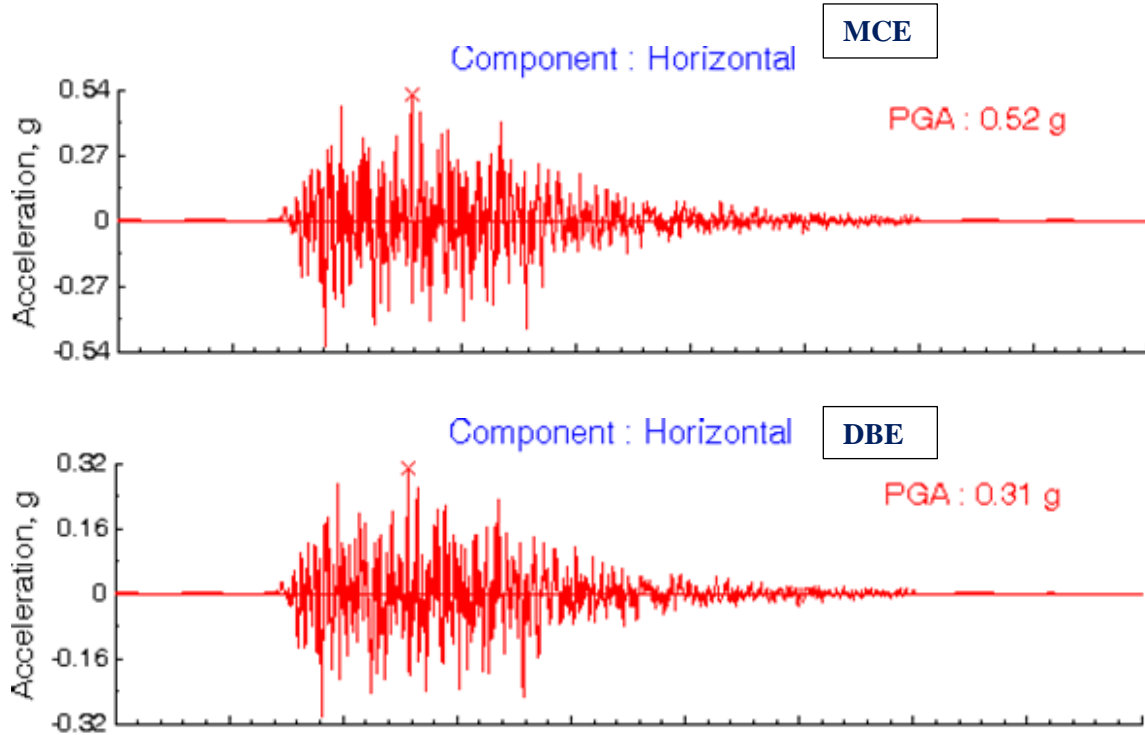
a) Response Spectra (DBE-H)



b) Other seismic parameters

Max. Credible Earthquake Magnitude	8.0	Closest distance from fault rupture plane (km)	18
Horizontal seismic co-efficient (α_h)	0.19	Vertical seismic co-efficient (α_v)	0.13
Strong motion duration (second)	6	Total duration (second)	42
Report reference	CWPRS Report [(Technical Report No. 5626 (September 2018))]		

c) Time History: AS contained in the report for both DBE & MCE



35.3 Review of NCSDP Guidelines

A Sub Committee was constituted with the approval of Chairman, NCSDP for review of NCSDP Guidelines so as to incorporate new insight/development in the subject domain. Accordingly, first meeting of the Sub Committee was held on 16.03.2019 under the Chairmanship of Chief Engineer (DS), CWC at New Delhi. In the first meeting it was decided that all committee members will review the NCSDP Guidelines (Para wise) and submit their inputs on it to NCSDP Secretariat in a month. But no comments received in the secretariat. After detail deliberation on the subject matter, it was decided by the committee that the second meeting of the Sub Committee may be called in the second week of July 2019 and matter may be discussed in detail there. Committee also requested Professor Manish Shrikhande, IIT Roorkee to prepare a draft of the revised NCSDP guidelines to discuss further in the Sub Committee Meeting. Professor Manish Shrikhande agreed for preparation the draft.

The committee was informed that IS: 1893 (Part-I)- 2016 has stated in its paragraph 1.5 that “The provision of this standard are applicable even to critical and special structures like Nuclear Power Plant, Petroleum Refinery Plants and Large Dams. For such structures, additional requirements may be imposed based on special studies, such as site specific hazard assessment. In such cases, the earthquake effects specified by the standard shall be taken as at least the minimum”.

In view of the reference to IS: 1893-1984 for specific coefficient values is incorrect. Rather, IS: 1893-2016 should be adopted with suitable modification to (I/R) ratio in the following formula stated in clause 6.4.2. For definition of parameters IS; 1893-2016 & clause 6.4.2 may be referred

$$A_n = (Z/2) (S_a/g) (I/R)$$

The committee decided that since seismic coefficient is generally provided for preliminary analysis and firming up of Dam dimension, the value of (I/R) ratio should be chosen in such a way that seismic demand on the structure to be prescribed as minimum, (supported by site specific seismic study) should not abnormally increase. After detail deliberations, it was decided that the value of (I/R) ratio can be adopted as 0.6. With this value the value of Z_h for direct zones comes out as follows:-

Zone	Z	S_a/g	I/R	A_n
II	0.10	2.5	0.6	0.075 or 0.08
III	0.16	2.5	0.6	0.12
IV	0.24	2.5	0.6	0.18
V	0.36	2.5	0.6	0.27

The above values of S_a/g correspond a damping of 5%

For higher damping values, the IS: 1893-2002 prescribe following multiplying factors

Damping (%)	0	2	5	7	10	15	20	25	30
Factors	3.2	1.4	1.00	0.90	0.80	0.70	0.60	0.55	0.50

The above multiplying factors (because of damping) and (I/R) values may be discussed further. However till they are finalized seismic coefficient parameters may be decided based on the above procedure. The seismic coefficient values for projects brought before the committee today were decided according to this procedure only.

35.5 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. In the 35th meeting it was brought to the notice of the committee that validation of the seismic coefficient for the projects already done by IIT Roorkee and approved by NCSDP could not be done from the Seismic Hazard Assessment Information System (SHAISYS) software. Professor Das, IIT Roorkee informed that size of zoning could be the possible problem. Committee asked IIT Roorkee to again check the Seismic Hazard Assessment Information System (SHAISYS) software and correct it accordingly so that validation could be done to an acceptable limit.

CWPRS has submitted its Inception Report and the same has already been circulated among members. CWPRS made a presentation of the methodology being adopted by them for conducting the study. The chairman, NCSDP directed all the members to give their comments on the report within 15 days.

The Committee noted above.

35.6 Any other items with the permission of the Chair

In the 34th Meeting of NCSDP held on 26th February, 2019 under the chairmanship of Member (D&R), CWC and Chairman of NCSDP, apart from other projects, 3 Nos. of projects namely Parwan Irrigation Project, Rajasthan, Navnera Barrage Project, Rajasthan & Battisha Nala Project, Rajasthan were considered for approval. The committee observed some discrepancies in the reports submitted by IIT, Roorkee in respect of Parwan Irrigation Project, Rajasthan in October, 2009 and in January, 2019. Further, committee observed that in respect of Navnera Barrage Project (both projects being in same seismic zone), the values for seismic coefficients have been taken as α_h & α_v as 0.11g & 0.07g respectively which are higher than those reported for Parwan (0.07g & 0.04g) in its revised report. After 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.

In light of above, the matter was taken up with IIT, Roorkee. It was informed by the IIT Roorkee that there were some mistakes in the above mentioned two reports at some places and the same have been rectified and clarified for adopting basis of the seismic parameters. It was also informed that an omission has been detected in the report of Battisha Nala Project and accordingly informed revised site specific seismic coefficient

values of α_h & α_v for the project as 0.12g & 0.08g respectively. The aforesaid response of IIT, Roorkee was forwarded to CWPRS, Pune as well as Design Units of CWC.

The matter was examined in CWC in light of comments received from CWPRS as well Design Units of CWC and it was decided by the Chairman, NCSDP that following values of site specific seismic coefficients for the projects may be considered for preliminary design of dam and the same will be placed in the next meeting of NCSDP. In this context, it is to state that for Zone II & III, the design target spectrum is to be obtained as the envelope of DSHA and PSHA DBE estimates (Clause 4.7 of NCSDP Guidelines 2014)

Sl No.	Name of Project	α_h	α_v
1	Parwan Irrigation Project	0.10g	0.067g
2	Navnera Barrage Project	0.10g	0.067g
3	Battisha Nala Project	0.12g	0.08g

The Committee noted and approved the above site specific seismic coefficients for the three projects mentioned above

Committee requested IIT, Roorkee to submit revised spectrum and time history for these projects corresponding to aforesaid seismic coefficients urgently.

The meeting ended with vote of thanks to the chair.

Central Dam Safety Organisation
National Committee on Seismic Design Parameters (NCSDP)
35th Meeting

Summary of the Decisions taken at the Meeting

Date of Meeting:	19.06.2019	Time: 11:00 h to 18:00 h	Venue: Conference Room, CWC 3 rd Floor, Sewa Bhawan, R K Puram, New Delhi-66	
Chairman:	Sh. N.K. Mathur, Member (D&R), CWC	Member Secretary:	Sh. Samir Kumar Shukla , Director, (FE&SA), CWC	
<u>Other Members and special Invitees, (Name, Designation, Organization):</u>				
A List of participants is placed at <i>Annexure-I</i>				
Item no.	Agenda Points / Decision	Responsibility	Achievement/ Progress	Remarks
35.1	Confirmation of the Minutes of the 33 rd meeting	-	Confirmed	-
35.2	Agenda items carried over from the previous meetings			
35.2.1	Conditionally cleared Projects - Submission of Micro Earthquake (MEQ) study	Concerned project authorities	Discussed and decided	-
35.2.2	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	-
35.3	Projects considered for approval of the Committee			
35.3.1	Jakhol Sankri Hydro Electric Project, Uttarakhand	Concerned project authorities	Cleared	-
35.3.2	Ujh Multipurpose Project , Jammu & Kashmir	Concerned project authorities	Cleared	-
35.3.3	Gargai Dam Project, Maharashtra	Concerned project authorities/ consultant	Cleared	--
35.3.4	Phina Singh Medium Irrigation Project, Himachal Pradesh	Concerned project authorities	Cleared	-
35.4	Review of NCSDP Guidelines	Informative	-	-
35.5	Seismic Hazard Assessment studies for Dam Rehabilitation Improvement Project (DRIP) dams	Informative	-	-
5.6	Any other items with the permission of the Chair. Projects discussed in 34 th Meeting and values revised	Committee Members	Cleared	-

**35th Meeting of National Committee on Seismic Design Parameters (NCSDP)
on River Valley Projects**

List of Participants on 19.06.2019

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. P.K. Champati Ray	Head Geosciences & Geohazards Deptt	IIRS, Dehradun	Member
4.	Prof. Pankaj Agarwal	Professor	DEQ, IIT Roorkee	Member
5.	Prof Manish SHrikhande	Professor	DEQ, IIT Roorkee	Representatives of IIT Roorkee
6.	Dr Josodhir Das	Professor	DEQ, IIT Roorkee	
7.	Dr. Babita Sharma	Scientist-E	NCS, IMD, New Delhi	Representatives of IMD
8.	Dr. Suman Sinha	Scientist 'B'	CWPRS, Pune	Representative of CWPRS
9.	Dr. G.D. Naidu	Scientist 'B'	CWPRS, Pune	
10.	Sh. Samir Kumar Shukla	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. M. Lal	Chief Engineer, Designs (NW&S)	CWC, New Delhi	CWC
14.	Sh. Anil Jain	Director, Embankment (NW&S)	CWC, New Delhi	CWC
15.	Sh. Vivek Tripathy	Director, CMDD (E&NE)	CWC, New Delhi	CWC
16.	Sh. Kayum Mohammad	Director, Designs (NW&S)	CWC, New Delhi	CWC
17.	Sh. Rajeev Singhal	Director, DSM	CWC, New Delhi	CWC
18.	Sh. P. Devender Rao	Director, Designs (N&W)	CWC, New Delhi	CWC
19.	Sh. A.P. Kandiyal	Dy. Director , FE&SA Directorate	CWC, New Delhi	NCSDP Secretariat
20.	Sh. Rohit Singh	Asst. Director, FE&SA Directorate	CWC, New Delhi	NCSDP Secretariat

III. Project Representatives and Consultants				
21.	Sh. Rakesh Sehgal	Senior AGM	SJVNL, Shimla	Jakhol Sankri Hydro Electric Project, Uttarakhand
22.	Sh. Revati raman	Senior Manager	-do-	-do-
23.	Sh Vinod Kumar	Manager	-do-	-do-
24.	Sh. A.K.Sharma	GM	JKSPDC	Ujh Multipurpose Project , Jammu & Kashmir
25.	B.K. Khajuria	Director, Geologist	-do-	-do-
26.	Sh. Surjeet Singh	GA	-do-	-do-
27.	Sh. Shrish Uchagaonkar		Municipal Corp. of Greater Mumbai	Gargai Dam Project, Maharashtra
28.	Sh. Saurabh Deshpande		-do-	-do-
29.	Sh. Manoj Nagar		WAPCOS	-do-
30.	Sh S. P.Abraham		-do-	-do-
31.	Sh. Saurabh Batwada		-do-	-do-
32.	Sh. Jeevan Prakash	EE	HP Irrigation & PH Dept.	Phina Singh Medium Irrigation Project, Himachal Pradesh
33.	Sh. Murali Gawande		-do-	-do-
34.	Sh. Tirath Singh		-do-	-do-