

CED 39
Earthquake Engineering Sectional Committee

57th Meeting
MINUTES

31 July 2024
14:00 – 17:30 hours
Hybrid



Bureau of Indian Standards
9 Bahadur Shah Zafar Marg
New Delhi

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CED 39 Earthquake Engineering Sectional Committee

57th Meeting

31 July 2024

14:00-17:30 in Hybrid Mode

Minutes

The following were present at the meeting:

S.No.	Affiliation	Person
Chairperson		
1	Indian Institute of Technology Madras, Chennai	C. V. R. Murty
Member-Secretary		
2	Bureau of Indian Standards, New Delhi	Jitendra Kumar Chaudhary
Members		
(a) Academia		
3	Indian Institute of Technology Bombay	Manish Kumar (C, WG)
4	Indian Institute of Technology Bhubaneswar	Suresh Ranjan Dash (C, WG)
5	Indian Institute of Technology Madras	A. Meher Prasad
6	Indian Institute of Technology Gandhinagar	Manish Kumar
7	Indian Institute of Technology Roorkee	Yogendra Singh
8	Malaviya National Institute of Technology, Jaipur	S. D. Bharti (C, WG)
9	National Institute of Technology Goa	O. R. Jaiswal (C, WG)
10	IIT, Hyderabad	R. Pradeep Kumar (C, WG)
(b) Practitioners		
11	<i>In Personal Capacity</i>	L. K. Jain (C, WG)
12	<i>In Personal Capacity</i>	A. K. Mittal
13	<i>In Personal Capacity</i>	Indrajit Chowdhury
14	<i>In Personal Capacity</i>	I. D. Gupta
15	Atomic Energy Regulatory Board, Mumbai	A. D. Roshan
16	Bharat Heavy Electricals Limited, New Delhi	Sushil K. Mahato
17	B&S Engineering Consultants PL, New Delhi	Alok Bhowmick
18	Central Public Works Department, New Delhi	Dinesh Kumar Ujjainia
19	Central Water Commission, New Delhi	S. K. Sharma
20	Creative Design & Engineering Consultants PL, Ghaziabad	Aman Deep
21	Geological Survey of India, Kolkata	Snehasis Bhattacharya
22	CSIR Structural Engineering Research Institute, Chennai	R. Sreekala
23	CSIR Central Building Research Institute, Roorkee	Ajay P. Chourasia
24	Indian Concrete Institute, Chennai	Debashish Bandopadhyay
25	<i>R. S. Mandrekar Associates, Mumbai</i>	Jaswant N. Arlekar (C, WG)
26	CSIR National Geophysical Research Institute, Hyderabad	Prantik Mandal
27	Engineers India Limited, New Delhi	G. G. Srinivas Achary
28	Tata Consulting Engineers Limited, Mumbai	C. R. Arjun
29	DDF Consultants, New Delhi	Pratima Rani Bose
30	Research Design and Standards Organization, Lucknow	Mohit Verma
31	Steel Authority of India Limited, Ranchi	K. K. Singh
32	Tandon Consultants PL, New Delhi	Vinay Gupta
33	National Thermal Power Corporation Limited, New Delhi	Praveen Khandelwal
34	National Centre for Seismology, New Delhi	Himangshu S. Mandal
35	Nuclear Power Corporation of India Limited, Mumbai	Rajiv Ranjan
36	Indian Society of Earthquake Technology, Roorkee	Vasant Matsagar
37	Indian Association of Structural Engineers, New Delhi	Manoj Mittal
38	VMS Consultants PL, Mumbai	Alpa R. Sheth (C, WG)
(c) Manufacturers		
	None	-

Invitees		
39	<i>In Personal Capacity, Hyderabad</i>	D. Srinagesh (C, WG)
40	Indian Institute of Technology Madras	S.T.G. Raghukanth (M, WG)

In the above list, unless otherwise stated, C refers to *Convener*, M to *Member* and WG to *Working Group*.

57.0 OPENING REMARKS

57.01 Member-Secretary

On behalf of the BIS, the *Member-Secretary* welcomed the *Chairperson* and *Members* to the 57th Meeting of CED 39 held in Hybrid mode. He requested them for their kind involvement and active participation in the discussions of the meeting. Also, he requested the *Conveners* of the various *Working Groups* under CED 39 to accord higher priority to the work of development of *earthquake safety standards*.

Further, he made a short presentation on the process of reforms undertaken in standardization activity by BIS, and informed *Members* of their roles and responsibilities, when participating in the meetings of the *Technical Committee* and contributing towards standards development. He informed that providing technical comments on the draft standards under circulation is *mandatory* for all members of the *Technical Committees*, which will help in enhancing the efficiency index of the *Committee*. He reiterated the request to *Members* to contribute proactively in the review of various existing *Indian Standards*.

57.02 Chairperson

The *Chairperson* welcomed *Members* and *Invitees* to the 57th Meeting of CED 39. He gave an overview of the *Agenda Items* of the meeting, and requested *Members* to share their valuable inputs on the *Agenda Items* of the meeting. Also, he requested the *Working Groups* (who have not started their work yet) to give priority to the harmonization work, and propose draft *Table of Contents* and thereafter *drafts of the standards* of their respective subjects in line with the revised earthquake hazard.

In addition, he mentioned that it is important to complete the task with utmost priority of *harmonization of earthquake design standards* based on the revised hazard. He recalled the status of the three series of codes (namely IS 1893, IS 13920 and IS 13935), and sought to enhance the pace of drafting of revisions and formulations of the standards. With these introductory remarks, he requested the *Member-Secretary* to take up the *Agenda Items* for discussion.

The *Earthquake Engineering Sectional Committee* (CED 39) discussed the *Agenda Items* and took the following decisions:

57.1 MINUTES OF PREVIOUS MEETING

57.11 Confirmation of Minutes of the 56th Meeting

Since no comment was received, the *Committee* confirmed the *Minutes* of the 56th Meeting as circulated, with an editorial change mentioned by a *Member* (TCE, C. R. Arjun) to reverse the labels of categories of industrial structures.

57.2 NEW STANDARDS
57.21 None
57.3 REVISION
<p>57.31 Working Draft of IS 1893 (Part 5) IS 1893 Design Earthquake Hazard and Criteria for Earthquake Resistant Design of Structures Part 5: Industrial Structures</p> <p>The Committee considered the working draft of <i>IS 1893 Design Earthquake Hazard and Criteria for Earthquake Resistant Design of Structures Part 5 Industrial Structures</i> aligned in line with the revised earthquake hazard presented by Member of WG, C. R. Arjun (TCE).</p> <p>After detailed discussion, the following were decided:</p> <ol style="list-style-type: none"> (1) Definition of primary and secondary systems should be improved for clarity. (2) Clause 1.2 should be modified as “<i>Provisions for earthquake resistant design of equipment and piping (including the seismic qualification of equipment) also shall be done as per this standard.</i>” (3) All points mentioned as <i>notes</i> anywhere in the standard should be placed as clauses. (4) Under clause 8.3.1, the statement “<i>Increase in the net allowable bearing pressure on soils and pile capacities for the different load combinations</i>” should be reviewed by the WG on <i>Geotechnical Aspects</i> and to be shifted to IS 1893 (Part 1). (5) Definition of <i>Equipment</i> should be provided in <i>terminology</i>. (6) Values of <i>R</i> of <i>Equipment</i> should be specified. (7) <i>R</i> in stack-like structures could be taken as 2.0 where compression failure is not permitted, and as 1.5 when compression failure is permitted. The WG should discuss this and make its recommendation. (8) Elevated frame foundation systems should be elaborated. (9) The damping ratio for structural design should be taken as 5 percent of critical damping for all structural actions, and specific other values as specified for select materials and components. Hence, the WG should re-examine the damping values to be used in structural analysis. <p>Based on the above, the Committee requested the WG 11 to consider the above suggestions, revise the working draft, and present the changes in the next meeting of CED 39.</p>
57.3 REVISION
<p>57.32 Working Draft of IS 1893 (Part 8) IS 1893 Design Earthquake Hazard and Criteria for Earthquake Resistant Design of Structures Part 8: Dams (Section 1: Concrete and Masonry Dams)</p> <p>The Committee considered the Working Draft of <i>IS 1893 Design Earthquake Hazard and Criteria for Earthquake Resistant Design of Structures Part 8 Dams (Section 1 Concrete and Masonry Dams)</i> submitted by WG 14 and presented by S. D. Bharti (C, WG). After brief discussions, the following were decided:</p> <ol style="list-style-type: none"> (1) Return Periods (given in Table 1) should be reviewed based on available literature and all return periods should be specified keeping in mind load combinations, damping values, factors of safety on material strengths, and permissible stresses.

- (2) Details should be provided on the Finite Element Modelling.
- (3) The Scope should clarify whether the standard is applicable to the design of RC components other than the dam structure.
- (4) In clause 6.3.1 on Equivalent Static Analysis: (a) method of estimation of natural periods sloshing and convection modes should be provided; and (b) and fluid soil dam interaction to be also considered to address filled reservoir case.

Based on the above, the Committee requested the WG 14 to consider the above suggestions, revise the working draft, and present the changes in the next meeting of CED 39.

57.3 REVISION

57.33 Revised Draft of IS 13935

IS 13935 Earthquake Safety Assessment and Retrofitting of Structures Part 1 General Provisions

The Convener of the Working Group WG 2 informed that the suggestions on the draft standard provided in the last meeting of CED 39 were editorial in nature and were incorporated in the present draft. He requested all Members of the Committee to examine the draft and make any further correction and/or improvement.

57.3 REVISION

57.34 Revised Draft of IS 13935

IS 13935 Earthquake Safety Assessment and Retrofitting of Structures Part 2 Buildings

The Convener of the Working Group WG 2 presented the revised Working Draft of IS 13935 Part 2. He requested all Members of the Committee to examine the draft and make any further correction and/or improvement. The Member of the Committee made the following suggestions:

- (1) Guidance should be provided on how to address assessment and retrofitting of *hybrid buildings* (such as stone and brick masonries).
- (2) A *note* should be added in the FOREWORD about the sustainability of carrying out retrofitting. Member (CBRI; Ajay P. Chourasia) agreed to provide a draft of the same.
- (3) In Table 14 on *Economic Loss Inducing Factors*, an additional index for buildings which cannot be retrofitted should be included. Also, when determining the action to be taken based on *Earthquake Feature Index*, the word '*at least*' should be added in all three cases. For example, when the EFI is 95%, the guidance should be to perform at least level 2 assessment.
- (4) The cost implications of retrofit should be provided based on total project cost and not the structural cost.

In view of the above and since the draft was tabled during the meeting, the Committee requested all Members to examine the draft standard and provide their feedback within 14 days so that the Working Group can consider the suggestions along the ones provided above for revising the draft. All Members agreed to the same.

57.4 R&D PROJECTS

57.41	None
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57.5 COMMENTS AND SUGGESTIONS	
57.51	None received
57.6 PROGRESS OF WORKING GROUPS	
No reports were provided by WGs.	
57.7 WORK PROGRAMME	
57.71	Review of Work Program – List of Existing Standards and those under Publication
The Committee noted the details of <i>Work Program</i> indicating the status of published standards and those under publication as referred to under the <i>Agenda Item</i> and given at Annexure 57.06 of the Agenda Papers of this meeting.	
57.72	International Standardization
The Committee noted the details regarding international standardization as given in agenda of the meeting.	
57.8 COMMITTEE MATTERS	
57.81	Review of Existing Technical Committee & Request for New Membership
The Committee noted the Guidelines for participation in the Technical Committee Work of BIS as given at Annexure 57.07 of the agenda of this meeting. The Committee noted the composition of CED 39 as given in Annexure 57.08 to the Agenda Papers of this meeting.	
57.82	Review of Existing Panels
The Committee noted the composition of existing <i>Panels</i> under CED 39 (given in <i>Annexure 57.09</i> of the Agenda Papers of this meeting).	
57.83	Review of Existing Working Groups
The Committee noted the revised composition of <i>Working Groups</i> under CED 39 given in Annexure 57.10 of the Agenda Papers of this meeting in line with the process reforms of BIS made under standardization. The Members are requested to examine the composition of the Working Group and provide suggestions (if any) in writing to the Member-Secretary, CED39.	
57.9 CLOSING COMMENTS	
57.91	Any Other Item from Members
None	
57.92	Member- Secretary
The <i>Member-Secretary</i> thanked all <i>Members, Invitees</i> and <i>Chairperson</i> for giving their valuable time to national standardization activity and for participating actively in the discussions during the meeting. He requested <i>Conveners</i> of <i>Working Groups</i> to send the updated drafts of various standards as well as draft <i>Table of Contents</i> of the new standards so that the same can be moved to advanced stages of <i>Standards Formulation</i> process.	

57.93 Chairperson

The *Chairperson* thanked all *Members* for maintaining high interest in the standardization work and sharing their valuable inputs on the Agenda Items presented during the meeting. In view of the urgency of harmonization underway of *earthquake engineering standards* as per the revised earthquake hazard, he reiterated the request to:

- (1) *Conveners of Working Groups* which have *started their work*: to consider the inputs of the Committee, to complete the drafting of clauses of *standards* along with the *commentary*, and present the same for discussion in the ensuing meeting of CED39; and
- (2) *Conveners of Working Groups* which are yet to start their work: to populate the *Draft Table of Contents* of the standards in line with the revised earthquake hazard.

He informed that the next meeting of CED 39 will be held in the last week of August 2024.

The meeting ended with *thanks* to all attendees.

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