

Dear All,

Greetings!

We have had animated discussions in the e-conference for Discussion on New BIS document SSD-II 06 (19914) : REQUIREMENTS FOR STRUCTURAL DESIGN AND PROOF CHECKING CONSULTANCY SERVICES FOR STRUCTURES. There are over 120 posts on the topic and from the deliberations, we have identified salient points which seem to find resonance in the structural engineering community.

At the outset one may say that the objective of the document does not come out clearly from the way the code has been drafted. There are more advanced, detailed and fine-grained standard operating procedures for the registration of Structural engineers and Peer Reviewers in many cities, towns and states of India. Such documents or regulations are usually prepared by the Town Planning authorities, the Municipal authorities or similar building authority which has jurisdiction. The e-conference response recommends a review of these existing operating procedures. The inputs and discussions from the e-conference are as follows:

1. Applicability of the standard

- 1.1. This standard while apparently for all structures appears to be focussed on Buildings and may not have captured the nuances of other different structures such as industrial, infrastructure and design-build projects.
- 1.2. The appointment of PC should NOT be left to the Owner/Constructor (Ref. Cl. 5.2). The requirement of PC should be based in the importance/category of the structure.
- 1.3. The Model 2 (Ref. Cl.6.2) in the document suggests routing all matters through owner rather than the Project Management Team (hired independently or through the Design-Build contractor)- this may not represent how projects run in practice. It is recommended to define the role of PMC in this document.
- 1.4. Categorisation based on importance of buildings is required and suggested that perhaps this system may not be required for small structures up to g+2 storeys.
- 1.5. Appointment of the PC through the Owner/Constructor may result in conflict of interest. It is recommended to have the PC appointed through the approving authority.
- 1.6. In the current practice, the full responsibility of the structural design is assigned to the PDC. Design of the foundation system and important aspects of structural design – the structural engineer takes direct inputs from the geotechnical consultant for this aspect. The draft code should also describe the role and responsibilities of geotechnical consultant.

2. Review of existing practices across India and system of Registration and/or Licensing of Structural Engineers.

- 2.1. This document appears to have drafted without reviewing the practice already existing in other parts of the country, for Structural Design and Peer Review Process, especially western India, which has a fairly well developed set of standard operating procedures for the empanelment/licensing of structural engineers-. This includes cities like Mumbai, Thane, Navi Mumbai, Pune, Surat, and Ahmedabad. One of SEFI members has described in detail of the practice in Odisha which is similar to that prevalent in Maharashtra.
- 2.2. The issue of registration of engineers is presently city-wise. The licensing of structural engineers in cities such as Mumbai is not only based on educational qualification, experience, and recommendation letter alone but also on a viva conducted by a panel of structural engineers.
- 2.3. This document under review disingenuously does away with any kind of “register of structural engineers” or competency-based licensing of structural engineers. This is dangerous and will

ensure that there will never be any possibility of mobility of structural engineering services from India across the world. This runs counter to the Nation's attempt to be global players in all fields.

2.3.1. Responsibility of execution of the project as per the structural drawings should not be the responsibility of the PDC and PC. This should be explicitly included in the draft document.

2.3.2. The term "Principal Design Consultant (PDC)" refers to the "Comprehensive Design consultant", where the organization holds the responsibility to deliver design covering all Disciplines. The roles and responsibility of Structural Design Consultant (SDC) or Lead/ Principal Structural Design Consultant are quite different from PDC. This difference should be clearly recognised.

3. Experience of PDC and PC

3.1. A model based on the qualification Class (of PDC and PC) ranging from Class A to Class E, and Category (of structure) ranging from Category 1 to Category 5, has been suggested during the e-conference (link). While this model is similar to that in Table 1 in the draft document, it is further refined for Class of PDC/PC. The following additional points should be included in improving Table1:

3.1.1. The category of structure, and

3.1.2. Past project experience and past peer review/ proof checking process.

3.2. The qualification of the PDC and PC should be based on a system which is verifiable by the Owner/Approving authority. Following are the suggestions of the e-conference:

3.2.1. The verification of credential of PDC/PC should be based on a central database managed at national or state level.

3.2.2. There should be an element of continuous development and evaluation.

3.2.3. IEI membership with maintenance/evaluation of continuous professional development may be considered by the central database.

3.2.4. The draft document should review the existing operating procedures in different parts of the country, along with the guidelines of NBC 2016.

3.3. Following is the summary of the discussions regarding academic institutes as PC:

3.3.1. Peer Review works is being under the sole purview of a chosen few academic institutions is highly problematic.

3.3.2. Academic faculty may not have practical design experience, but they may have better knowledge in other areas like research-oriented subjects, testing related matters, advance analysis modules, various software applications, etc.

3.3.3. A requirement of 7-15 years of field practice may disqualify all academic faculty to as PC. Academic institutions need to be engaged in the form of Peer Review work, to be in touch with the state of practice. This will enable their better understanding of the needs of the industry, and engagement in relevant research and development in areas required by the industry.

4. Legal implications for BIS and Users & Responsibility and Liability of structural design

4.1. From a legal standpoint, there is significance of only the structural engineer who is taking responsibility, i.e., the Structural Engineer on Record.

4.1.1. The document does not make a distinction between the roles of Structural Engineer-on-record, Design Lead and Team Leader. A Team Leader on many projects

may not even be a structural engineer but may be a Project Engineer/Manager in charge of delivery and coordination. This is especially true in industrial and infrastructure projects.

- 4.1.2. Further, the Structural Design Lead may not have the requisite qualifications as per the document under review but may still be designing the project under supervision of the 'Structural Engineer on Record'. It is not possible to monitor what happens inside a consultant's office. It is therefore difficult to understand the term "Team Leader" and qualifications of that person. What can be defined is only the Structural Engineer on Record.
- 4.1.3. Considering the scenario of inadequate structural design, and probable failure, the responsibility should be assigned to the 'Structural Engineer on Record (SER)'. Since the draft document has the requirement of signing of the design and drawings by both PDC and PC (Ref. Cl. 7.2.c and Cl. 7.3.n), both PDC-SER and PC-SER need to be defined.
- 4.2. The draft document does not acknowledge the role and responsibility of a geotechnical engineer (Ref. Cl. 7.2.b.3). In case of failures that may be ascribed to incorrect foundation advice become the responsibility of a structural engineer.
 - 4.2.1. The draft code should also define role and responsibilities of geotechnical consultant.
- 4.3. The code is silent on what are the liabilities of the structural engineer. Accuracy of Building dimensions at site, for example, should not be the responsibility of a structural engineer. Participants have raised many such instances of incorrect affixing of responsibility to a structural engineer. The draft document ascribes the responsibility of completeness of the architectural and service drawings (Ref. Cl. 7.2.b.4).
 - 4.3.1. The completeness and accuracy/correctness of the architectural and services design should not be the responsibility of the SER.
 - 4.3.2. The draft document should introduce the responsibility of the town/country/municipal planning authority for the intended implementation of the approved drawings.
 - 4.3.3. The draft document should include responsibility for failure due to unauthorised addition alteration by builder / constructor.

In closing it may be pertinent to question whether Standardisation of Services of PC and PDC which, as of date, falls within the purview of the Building Authority with Jurisdiction (many of which have a well-developed system already in place) should be taken up by the Bureau of Indian Standards.

Thank you and regards

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