

# BUREAU OF INDIAN STANDARDS

## AGENDA

Panel for Glass and Glazing, CED 46:P20 : Third Meeting

Friday, 05 April 2024 : 1030 h

### In Hybrid Mode from:

Mimaansa (White room), Bureau of Indian Standards, Manak Bhavan, 9  
Bahadur Shah Zafar Marg, New Delhi 110 002

&

#### Online using:

1) Meeting link:

<https://bismanak.webex.com/bismanak/j.php?MTID=m25cafcdc92fac66f46b150ed1f355e81>

2) Meeting number: 2518 099 3775

3) Password: Nbc@2025

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**Convener:** Shri Pradeep Garg

**NBC Officer:** Shri Shubham Chaudhary  
**Head (NBC Cell):** Shri Arunkumar S.

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### Item 0 OPENING REMARKS

### Item 1 CONFIRMATION OF MINUTES OF THE LAST MEETING

1.1 The Minutes of the second meeting of the Panel held on 21 October 2015 in New Delhi, were circulated vide BIS DG letter No. CED 46:P20/A-2.2 dated 18 January 2016. No comments have been received.

The Panel may **CONFIRM** the Minutes.

### Item 2 COMPOSITION

2.1 The present composition of the Panel as reconstituted by the National Building Code Sectional Committee, CED 46 is given at **Annex 1 (P- 6)**.

The Panel may **CONSIDER**.

2.2 Request for Co-option has been received from M/s BES Consultants Pvt. Ltd., Mumbai in 2015 [from their Shri Rajan Govind] for representation on the panel.

The Panel may **CONSIDER**.

**2.3** Request for Co-option has been received from M/s Asahi India Glass Ltd. [nominating therein Shri Nagendra Kumar and Shri Shailesh Ranjan] for representation on the panel.

The Panel may **CONSIDER**.

**2.4** The Panel may also **NOTE** regarding the Structural Reforms in Standardization established by BIS to bring greater efficiency in standards formulation and revision work in BIS addressing speed, skill and scale. The same relates to aspect like:

- a) technical committees of BIS having members with widely acknowledged domain area expertise and experience on the subjects
- b) optimum size of the technical committee
- c) review of membership with focus on continuity of participation including contribution by every member
- d) holding periodic meetings (physical/virtual/hybrid)
- e) decide on timelines to enable stage-wise development of the documents (draft standards)
- f) resource centre to enable share the information and documents associated with the standardization work

**2.5** Further, BIS has established in place systems such as action research projects, R&D for standards development and provision for having short-term Consultants. Also, focus should be made w.r.t developments on the subject happening world-wide including in technical events, literature, research publications, standard bodies, etc. Wherever possible research based inputs be generated including by associating with the various eminent institutions with whom BIS has entered into MoU with (List of MoU institutions is available at: <https://www.bis.gov.in/partnership-with-technical-and-professional-institutions/> ).

The Panel may **NOTE**.

### **Item 3 PROJECT OF REVISION OF NBC**

**3.1** Under the project of Revision of NBC, various Parts/Sections of NBC 2016 [a list of which is given in **Annex 2 (P-8)**] are being comprehensively revised, to bring out a most modern and state-of-the-art revision of the Code.

The Panel may consider revising the chapter (**Part 6 / Section 8 on Glass and Glazing**) taking into cognizance the latest developments in the field. In the revision exercise, due consideration may be given to ensuring coherence among various chapters of the Code. Where required, suggestions for improvements in the other chapters of the code may also be provided.

The Panel may **NOTE**

**3.2** The Panel may therefore engage in a high-level review of the existing chapter covering Structural Design namely 'Glass and Glazing'. The contents of existing Part 6 / Section 8 'Glass and Glazing' is given in **Annex 3 (P-10)**. This review may involve an examination of the structure, content, and alignment of the chapters with current industry standards and practices.

The Panel may **CONSIDER**.

**3.3** To facilitate the revision process, the following working draft has been prepared and circulated to the members for their comments vide our email dated 28 March 2024:

*Working Draft of National Building Code of India: Part 6 Structural Design, Section 8 Glass and Glazing, Doc: CED 46 (0283)WD*

Comments received on the draft would be circulated (separately) among the members and also discussed during the meeting.

In addition, the following changes are suggested in this revision of the Code:

- [Update to address changes incorporated in IS 16231 \(Parts 1 to 4\) on glass and glazing](#)
- [Detailed provisions on glazing systems](#)

The Panel may **CONSIDER**.

#### **Item 4 COMMENTS RECEIVED ON / INPUTS RELATED TO PART 6 STRUCTURAL DESIGN: SECTION 8 'GLASS AND GLAZING' OF SP7 : 2016**

**4.1** The following comments were received on the above Chapter of NBC 2016 from **National Safety Council**:

| <b>Clause number</b>               | <b>Gaps identified in the existing clause</b>  | <b>Recommendations</b>  |
|------------------------------------|--|---|
| 6.1.8 Load Contribution            | Load due to pressure difference occurring in building<br>Eg- Sudden closing or opening of doors. | Such loads to be considered.  |
| 6.3.9 Safety during installation   | Safety of workers involved In installation   | Awareness and personal protective equipment for workers   |
| 6.3.10 Handling and Transportation | Safety of personnel involved in transportation   | -Awareness and personal protective equipment for workers.<br>-Protection for sharp edges of glass |

The Panel may **CONSIDER**.

#### **Item 5 PROJECT OF PROMOTION OF USE OF NBC 2016 IN ALL STATES AND UTs OF INDIA**

**5.1** An ambitious Project for Promotion of use of National Building Code of India 2016 in all States and UTs of India was earlier taken up by BIS involving a comprehensive study and review of rules and regulations governing land development and building construction in various states and union territories of India. The Project involves preparing draft regulations which are aligned with provisions in National Building Code of India 2016 (NBC 2016), for use by the States and UTs in

revising their existing regulatory documents in line with the revised state-of-the-art NBC 2016. The Project had 09 deliverables as below:

| SI No. | Deliverable  |
|--------|--|
| 1      | Compilation and study of existing processes, rules and regulations as existing in various States and UTs which govern the land development and building construction, and other statutory provisions which have to be complied with currently, etc |
| 2      | Classification of the Provisions in various Rules and Regulations as mandatory/recommendatory, identification of commonalities/dissimilarities, conflicts, if any  |
| 3      | Mapping the existing Rules, Regulations, Processes against provisions given in NBC 2016  |
| 4      | Identification of other best practices which may currently not be a part of the existing rules or of NBC 2016, which may be aspirational but will help further the Aim/Objective of this project   |
| 5      | Preparation of a draft revised standardized/model Rules and Regulations aligned with the provisions of NBC 2016, for the consideration of the Bureau   |
| 6      | Preparing State/UT-wise standardized/model regulatory documents, including such required documents for some metro/mega cities, which can be adopted by various authorities & obtaining approval of the Bureau as per scope of work                 |
| 7      | Creating pamphlets for an awareness campaign for general public  |
| 8      | Creating a simplified booklet on using NBC which can be used by all stakeholders- academicians, students and professionals   |
| 9      | Dissemination to designated States/UTs, the knowledge base created and presenting to them advantages of adopting the same through meetings and workshops   |

With the support of an external consultant, the main deliverable namely Draft Development and Building Regulations for each of the States and UTs of India was prepared. Followed by 20 number of 2-day workshops covering all the States and UTs, the inputs received as part of such workshops, the finalized regulations were shared with the respective States & UTs.

In addition, a new special publication, **SP 73 : 2023 'Standardized Development and Building Regulations, 2023'** was also published and released, which is available for access (free download) from the BIS' website and from: <https://standardsbis.bsbedge.com/>

The Panel may **NOTE**.

**Item 6 DATE & PLACE OF THE NEXT MEETING**

**Item 7 ANY OTHER BUSINESS**

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**ANNEX 1**  
(Item 2.1)

**COMPOSITION OF THE PANEL FOR GLASS AND GLAZING, CED 46:P20**

| SI No. | NAME OF THE ORGANISATION  | REPRESENTED BY  |
|--------|---|---|
| 1)     | Central Public Works Department, New Delhi                            | Shri Pradeep Garg (Convener)  |
| 2)     | AECOM India Pvt Ltd, Noida  | Shri Vijay K. Mattoo<br>Shri Sunil Shahani (Alternate)  |
| 3)     | Ahluwalia Contracts India Limited, New Delhi                          | Shri Pradeep Kumar<br>Shri Jaspal Singh Rawat<br>(Alternate)  |
| 4)     | The All India Glass Manufacturers' Federation, New Delhi              | Shri Somasundaram Senthil<br>Shri Rupinder Shelly (Alternate)   |
| 5)     | Bureau of Energy Efficiency, New Delhi                                | <b>Nominations Awaited</b>  |
| 6)     | Central Public Works Department, New Delhi                            | Shri A.K. Sharma<br>Shri Saju Siddharthan (Alternate)   |
| 7)     | Creative Design Consultants & Engineers Pvt. Ltd., Ghaziabad          | Shri Aman Deep Garg<br>Shri Barjinder Singh Ghai (Alternate)  |
| 8)     | CSIR-Central Building Research Institute, Roorkee                     | Dr Shorab Jain<br>Shri S. K. Negi (Alternate)   |
| 9)     | Delhi Development Authority, New Delhi                                | Shri Gajendra Kumar<br>Shri A K Singhal (Alternate)   |
| 10)    | Façade India Testing Inc, Thane                                       | Shri V S Ravi<br>Shri Pravin Gaikwad (Alternate)  |
| 11)    | Glazing Society of India, Chennai                                     | Shri Subramanian R<br>Shri Gohul Deepak (Alternate)   |
| 12)    | GSC Glass Ltd, Greater Noida  | Shri C. J. Singh  |
| 13)    | Indian Association of Structural Engineers, New Delhi                 | Shri Vipul Ahuja<br>Dr Mahesh Tandon (Alternate)  |
| 14)    | International Fenestration Forum, Noida                               | Shri Arun Sharma<br>Shri Nikhil Kant (Alternate)  |
| 15)    | IIT Madras (Structural Glass Research & Testing Facility), Chennai    | Dr S. Arul Jayachandran   |
| 16)    | IIT Roorkee, Roorkee  | Dr Avlokita Agrawal<br>Dr E. Rajasekar (Alternate)  |
| 17)    | Larsen & Toubro Ltd, Chennai  | Shri Sthaladipti Saha<br>Shri Surya Prakash (Alternate)   |
| 18)    | Meinhardt Facade Technology India Pvt Ltd, Chennai                    | Shri Mahesh Arumugam  |
| 19)    | Municipal Corporation of Greater Mumbai (Mumbai Fire Brigade), Mumbai | Chief Fire Officer<br>Dy. Chief Fire Officer (Alternate)  |
| 20)    | National Buildings Construction Corporation Limited, New Delhi        | Shri Anuj Kumar Goyal<br>Shri Vinay Kumar Khullar (Alternate)   |
| 21)    | Saint-Gobain Glass India, Chennai                                     | Shri Manish Srivastava<br>Shri N Murali (Alternate)   |
| 22)    | Schueco India Pvt Ltd, Bangalore                                      | Shri Antony John<br>Shri Kushagra Awasthi (Alternate)<br>Smt. Shruthi S (Alternate II)                  |
| 23)    | The Indian Institute of Architects, Mumbai                            | Shri Rupinder Ahuja<br>Shri Ashutosh Kumar Agarwal (Alternate)<br>Smt Jyoti Rajeev Panse (Alternate II) |

|     |   |  |
|-----|---|--|
| 24) | The Institution of Engineers (India), Kolkata | Er. Shivanand Roy<br>Er. Lokesh Ranjan (Alternate) |
| 25) | UWDMA, New Delhi                              | <b>Nomination Awaited</b>                          |
| 26) | Winwall Technology India Pvt Ltd, Chennai     | Shri P. Jothi Ramalingam                           |
| 27) | In Personal Capacity, New Delhi               | Shri S. K. Dheri                                   |

**ANNEX 2**  
*(Item 3.1)*

***Details of Chapters of NBC 2016***

| <i>Part/Section</i> | <i>Title</i>   |
|---------------------|--|
| 1                   | <b>PART 0</b>  |
|                     | <b>INTEGRATED APPROACH – A PRE-REQUISITE FOR APPLYING THE PROVISIONS OF THE CODE</b> |
| 2.....              | <b>PART 1</b>  |
|                     | <b>DEFINITIONS</b>   |
| 3.....              | <b>PART 2</b>  |
|                     | <b>ADMINISTRATION</b>  |
| 4.....              | <b>PART 3</b>  |
|                     | <b>DEVELOPMENT CONTROL RULES AND GENERAL BUILDING REQUIREMENTS</b>                   |
| 5.....              | <b>PART 4</b>  |
|                     | <b>FIRE AND LIFE SAFETY</b>  |
| 6.....              | <b>PART 5</b>  |
|                     | <b>BUILDING MATERIALS</b>  |
|                     | <b>PART 6</b>  |
|                     | <b>STRUCTURAL DESIGN</b>   |
| 7.....              | Section 1 Loads, Forces and Effects  |
| 8.....              | Section 2 Soils and Foundations  |
|                     | Section 3 Timber and Bamboo  |
| 9.....              | 3A Timber  |
| 10.....             | 3B Bamboo  |
| 11.....             | Section 4 Masonry  |
|                     | Section 5 Concrete   |
| 12.....             | 5A Plain and Reinforced Concrete   |
| 13.....             | 5B Prestressed Concrete  |
| 14.....             | Section 6 Steel  |
|                     | Section 7 Prefabrication and Systems Building and Mixed/Composite Construction       |
| 15.....             | 7A Prefabricated Concrete  |
| 16.....             | 7B Systems Building and Mixed/Composite Construction                                 |
| 17.....             | Section 8 Glass and Glazing  |
| 18.....             | <b>PART 7</b>  |
|                     | <b>CONSTRUCTIONAL PRACTICES AND SAFETY</b>   |
|                     | <b>PART 8</b>  |
|                     | <b>BUILDING SERVICES</b>   |
| 19.....             | Section 1 Lighting and Ventilation   |
| 20.....             | Section 2 Electrical and Allied Installations  |
| 21.....             | Section 3 Air-conditioning, Heating and Mechanical Ventilation                       |
| 22.....             | Section 4 Acoustics, Sound Insulation and Noise Control                              |
|                     | Section 5 Installation of Lifts and Escalators and Moving Walks                      |
| 23.....             | 5A Lifts   |
| 24.....             | 5B Escalators and Moving Walks   |
| 25.....             | Section 6 Information and Communication Enabled Installations                        |
|                     | <b>PART 9</b>  |
|                     | <b>PLUMBING SERVICES</b>   |
| 26.....             | Section 1 Water Supply   |
| 27.....             | Section 2 Drainage and Sanitation  |
| 28.....             | Section 3 Solid Waste Management   |
| 29.....             | Section 4 Gas Supply   |



|         |                |  |
|---------|----------------|--|
|         | <b>PART 10</b> | <b>LANDSCAPING, SIGNS AND OUTDOOR DISPLAY STRUCTURES</b> |
| 30..... |                | Section 1 Landscape Planning, Design and Development     |
| 31..... |                | Section 2 Signs and Outdoor Display Structures           |
| 32..... | <b>PART 11</b> | <b>APPROACH TO SUSTAINABILITY</b>                        |
| 33..... | <b>PART 12</b> | <b>ASSET AND FACILITY MANAGEMENT</b>                     |

**ANNEX 3**  
**(Item 3.2)**

**CONTENTS OF PART 6 / SECTION 8 'GLASS AND GLAZING' (OF NBC 2016)**

FOREWORD

- 1 SCOPE
- 2 TERMINOLOGY
- 3 APPLICATION
- 4 GENERAL METHODOLOGY FOR SELECTION
- 5 ENERGY AND LIGHT
- 6 FIRE AND LOADING
- 7 SAFETY RELATED TO HUMAN IMPACT
- 8 GLAZING SYSTEM

ANNEX A MINIMUM PERFORMANCE REQUIREMENT OF GLAZING FOR EXTERIORS

ANNEX B TEST REQUIREMENTS FOR COATED GLASS

ANNEX C PROCEDURE FOR CALCULATING THE APPROXIMATE DEFLECTION AT CENTRE OF GLASS PANEL

ANNEX D MODEL CALCULATION OF GLASS THICKNESS

ANNEX E SHOT BAG IMPACT TEST

ANNEX F PERFORMANCE TESTS FOR GLAZING SYSTEM

ANNEX G INSTALLATION OF MIRRORS

ANNEX H GLASS RAILINGS

LIST OF STANDARDS

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