BANGLADESH NATIONAL BUILDING CODE

Volume 1 of 3

(Part 1 to Part 5)

FINAL DRAFT

2015

Housing and Building Research Institute

Volume 1

Volume 2

Volume 3

PREFACE TO BNBC 2015

In order to provide safe and healthy habitat, all activities related to building construction such as planning, design and construction needs to be regulated properly. Technological and socio-economic developments in recent times have led to remarkable increase in demand for more and more sophistication in buildings resulting in ever increasing complexity. Buildings are products of a multi-disciplinary profession involving specialized professional inputs from disciplines like Architecture, Fire prevention, Materials science, Structural engineering, Geotechnical engineering Construction technology, Electrical engineering, Mechanical engineering, Acoustics, Sanitation and plumbing technology, Chemical engineering, Law, etc. It is therefore imperative that a uniform standard of practice covering all aspects of planning, design and construction of buildings, including the service facilities provided in them such as electrical, mechanical, sanitary and other services, be followed to ensure safety, minimization of wastage in construction and optimum return for the user. In the Building code each of the above aspects is addressed adequately by professionals specializing in the relevant disciplines to ensure safety and comfort of the users of the buildings.

In order to regulate the technical details of building construction and to maintain the standard of construction the Bangladesh National Building Code (BNBC) was first published in 1993. It was a 1000 page detailed document specifying safe and acceptable practices in all aspects of building design and construction. However, since its publication, significant changes and developments have taken place in both building technology and material properties requiring the use of the present state of the art knowledge and practices in building planning, design and construction. To keep pace with the changed circumstances, it is a routine practice to update codes. Twenty two years have nearly been elapsed since publication of the first version of the Code.

After introduction of the BNBC in 1993, the technology of building construction in Bangladesh remained almost the same for quite some time as was in practice before its publication. The lack of legal provisions in enforcing its use has been the main reason behind it. In the meantime growing demand for home, scarcity of land and the upward trend in the land prices in the urban areas brought in the culture of construction of moderate to high rise structures and changed the prevailing culture of planning, design and construction of buildings in the private sector. Gradually, the urban dwellers began to accept the concept of living in high rise apartment buildings and investment in the housing sector turned out to be a profitable business. As a result building construction activities were taken up by real-estate developers following which new trends developed in building planning and construction. Some real-estate developers engaged professional people such as Architects, Engineers, Planners to make their buildings more attractive to the buyers and the code started finding its use among the professionals. However, some owners and developers retained the habit of the old method of construction giving rise to unplanned growth of structures in the urban areas. During this time some high rise structures failed to perform satisfactorily due to structural failure / fire hazard which caused alarm among the urban dwellers as well as the policy makers. The policy makers, therefore felt the urgency of updating the BNBC 1993 to make its contents time worthy and also to bring it under strict legal coverage to make its provisions binding to all involved in the planning, design, construction and use.

The building construction sector was first brought into a legal framework through enactment of Building Construction Act 1952. By the power given by the Act, the Government of Bangladesh has promulgated regulations which were amended from time to time. In 2006 the Building Construction Act was amended to include a new Section 18A empowering the Government to promulgate the Building Code as a legally binding document.

Since its publication, BNBC 1993 has been referred to and consulted by the professionals and designers in the field of building design and construction. After the endowment of legal status, importance of the BNBC 1993 has further enhanced. However, unlike other building codes available in the world, the Bangladesh National Building Code has not yet been formally reviewed and updated since it was drafted in 1993. Neither any feedback of the professionals regarding the document has been taken into formal consideration. In the last twenty two years, new materials have been introduced, new scientific methods have emerged, new technologies have evolved and both design of structures and construction practices have gone through enormous changes. Researchers, engineers and academics in Bangladesh have also conducted new studies which enriched our knowledge about planning, design, construction and sustainability of buildings.

Ministry of Housing and Public Works formed a steering committee with the responsibility of Updating BNBC 1993 by a G.O. having circular no. Section 8/IM-5/93(part) 812 (28) date: 15.09.2008. The Steering Committee comprises representatives from relevant government agencies, universities and professional societies. The Housing and

Building Research Institute (HBRI) has been entrusted with the task of providing secretarial service to the Steering Committee and managing the implementation of the project. According to an agreement between HBRI and Bureau of Research Testing and Consultancy (BRTC), Bangladesh University of Engineering and Technology (BUET), for the purpose of reviewing and updating the Bangladesh National Building Code 1993, BRTC, BUET deputed leading experts in all relevant fields among academics and professionals. Finally the updated code is available both in printed form and soft copy in CDs and on website.

The updated BNBC has 10 parts with a total of 49 chapters. Some parts contain a number of appendices wherein sample calculations, design tables, graphs etc. are provided for use by the readers for important analysis and designs. Part-6 Structural Design has 13 chapters which is the maximum among all the parts.

In the contents of the Updated Code, almost all of the topics of BNBC 1993 have been retained. Moreover some of these have been elaborated to accommodate the changes identified during review of the BNBC 1993 and the various codes and documents collected to make their scope wider, up to date and user friendly.

Part-6 "Structural Design" in the Updated Code include two new chapters, one on Bamboo Structure and the other on Steel-Concrete Composite Structures. The former is intended for use in the rural areas. The use of well designed and economic bamboo structures is expected to be attractive to the rural people. The Steel Concrete composite structures are expected to be widely used in the industries. In urban areas this type of structure is expected to find application in high rise construction.

Contrary to the presentation of Geotechnical engineering in BNBC 1993 wherein it has been treated as "Foundation" having limited scope, in the Updated code the chapter on geotechnical engineering has been re-named as "Soils and Foundations." The scope of the proposed "Soils and Foundations" chapter has been made wider by including topics such as ground improvement, geo-textiles, soil reinforcement, slope stability, foundation on problematic soils and sanitary landfills, dewatering, evaluation of liquefaction potential of soils. The new scope of the "Soils and Foundations" chapter is in line with the codes reviewed and requirements of the Geotechnical professionals of the country.

Depletion of energy resources and environmental changes is a major concern worldwide. Bangladesh is no exception to it. Keeping these aspects in mind, changes and modifications have been suggested in BNBC 1993 for use of energy saving appliances, non-conventional fuels etc. in buildings. The updated BNBC contains chapters addressing the issues of energy conservation, rainwater harvesting and distribution mechanisms in buildings.

In Part 3, "General Building Requirements, Control and Regulation" a new Chapter titled, "Energy Efficiency and Sustainability" has been included giving minimum code requirements for achieving the efficiency.

To reduce energy consumption in building provisions for use of variable refrigeration system in HVAC applications, Variable Voltage, Variable frequency drives in elevator applications has been included in Chapter-2 "Air Conditioning, Heating and Ventilation" of Part-8 "Building Services". Energy conservation in lighting using energy saving lamps, Fluorescent lamps and GLS lamps has also been proposed in Chapter-1, "Electrical and Electronics Engineering Services for Buildings" of the same part.

To augment water supply in Buildings, Chapter-8, "Rainwater Management" in Part-8 "Building Services" has been included in the Updated Code containing specific guidelines for harvesting, storage and distribution of rainwater.

Contents of tlhe chapters already existing in BNBC 1993, have been thoroughly revised in the updated version. In some cases new concepts have been included. For example, In Chapter-7 "Masonry structures" of Part 6, the concept of 'Confined Masonry' is introduced and guidelines for design and detailing are provided.

In general up to date information and standards are included in the updated Code in a way which is practicable by designers and professionals involved in building construction. I acknowledge adoption of provisions of various recognized codes and standards in the present code after a thorough review. Part 2, a practical approach is delineated in administering and enforcement of the Code; which I believe will pave the way in actually implementing the Code provisions and ensure safer building construction in Bangladesh.

I gratefully acknowledge contribution of members of the Steering Committee and the Editorial Committees for their active participation and guidance in updating the building code. The process of updating has undergone a rigorous and time-consuming review exercise. I deeply appreciate the diligence and cooperation of the authors during the exhaustive process. Final editing of this huge document has been extremely tedious. We tried to present the entire document in a uniform format. To enhance readability, many figures of the previous version of the code have been redrawn and improved. However, we regret any unintentional editorial or typographical mistakes that may still exist in the code.

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PART 1

SCOPE AND DEFINITION

PART 1

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Chapter 1

TITLE, SCOPE AND GENERAL

1.1 TITLE

The provisions and regulations contained in this document shall constitute and be collectively known and may be cited as the "Bangladesh National Building Code 2015", abbreviated, where desired, as BNBC, and will hereinafter be referred to as the "Code".

1.2 PURPOSE

The purpose of this Code is to establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of all buildings within Bangladesh in order to safeguard, within achievable limits, life, limb, health, property and public welfare. The installation and use of certain equipment, services and appurtenances related, connected or attached to such buildings are also regulated herein to achieve the same purpose.

The provisions of this Code are applicable to all persons of Bangladesh irrespective of class, creed, culture, religion or sex. The Code does not in any way create or otherwise establish or designate any particular class or group of persons who will or should be specially protected or benefited by the provisions of this Code.

The expressed intent of this Code is to ensure public safety, health and general welfare insofar as they are affected by the construction, alteration, repair, removal, demolition, use or occupancy of buildings, structures or premises, through structural strength, stability, means of egress, safety from fire and other hazards, sanitation, light and ventilation.

1.3 SCOPE

The provisions of this Code shall apply to the design, construction, use or occupancy, alteration, moving, demolition and repair of any building or structure and to any appurtenances installed therein or connected or attached thereto, except such matters as are otherwise provided for in other ordinances and statutes controlling and regulating buildings.

If for any case different sections of this Code provide different specifications for materials, methods of design or construction, or other requirements, the most restrictive specification shall govern.

In case of any conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.

Unless otherwise explicitly stated in this Code, all references to part, chapter or section numbers or to provisions not specifically identified by number, shall be construed to refer to such part, chapter, section or provision of this Code.

References made to a section without mentioning a part shall be construed to refer to that section of the part in which the reference is made.

The provisions of any appendix in this Code shall not be mandatory unless they are referred to as such in any section of the Code or they are specifically adopted by any regulation.

Inspection conducted or permission granted for any building or plan of building, under the provisions of this Code, shall not be construed as a warranty of the physical condition of such building or the adequacy of such plan. Neither the Authority administering the Code, nor any employee thereof shall be liable for damages or any defect or hazardous or illegal condition or inadequacy in such building or plan, nor for any failure of any component of such building which may occur subsequent to such inspection or granting of permission under the provisions of the Code.

1.4 EXISTING BUILDINGS

Buildings which are in existence on the date of promulgation of this Code may have their use or occupancy continued without undergoing any alteration, abandonment or removal unless in the opinion of the Authority such continued use is hazardous to life and property and provided such use or occupancy was legal on the date of promulgation of this Code. Buildings approved before adoption of the present updated Code and compliant with the previous version of the Code may continue to be used or occupied unless any deviation is made thereafter or any deterioration has rendered the building unsafe in the opinion of the Authority.

1.4.1 Addition and Alteration

Additions, alterations, modifications or repair to an existing building may be made without requiring the existing building to comply with all the requirements of this Code, provided the additions, alterations, modifications or repairs conform to that required for a new building. Such additions or alterations shall not be permitted when the existing building is not in full compliance with the provisions of this Code except when the addition or alteration will result in the existing building or structure being no more hazardous based on life safety, fire safety and sanitation than it was before the addition or alteration was undertaken.

Any building together with the new additions shall not exceed the height, number of storey's and area specified in this Code for new buildings having the relevant occupancy and type of construction. Non-structural alterations or repairs to an existing building or structure which do not adversely affect any structural member, nor reduce the strength of any part of the building or structure to result in an unsafe condition shall be made with materials and components having the required fire resistance.

1.4.2 Change of Use

Change in use or occupancy in an existing building may be made when such change complies with the requirements of this Code for a new building and provided such change does not render any part or the whole of the affected building or structure any more hazardous based on life safety, fire safety and sanitation than it was before such change was effected.

1.5 HISTORIC OR ARCHITECTURALLY VALUABLE BUILDINGS

A building or structure which has been designated by official action as having special historical or archaeological interest, or a building or structure identified by a legally constituted authority as being architecturally valuable, may be undertaken for repairs, alterations and additions necessary for its preservation, restoration, rehabilitation or continued use provided:

(a) the proposed repair, alteration or addition to buildings of historical or archaeological significance is approved by the legally constituted authority, such as the Department of Archaeology;

(b) the proposed repair, alteration or addition to buildings of architectural value does not impair the aesthetic quality and architectural character of such buildings; and

(c) the restored building or structure will be no more hazardous, if any, based on life safety, fire safety and sanitation than the existing building.

Chapter 2
DEFINITIONS

2.1 GENERAL

Unless otherwise expressly stated, the abbreviations, terms, phrases, words and their derivations listed below shall, for the purpose of this Code, be construed as set forth in this Chapter. Words not explicitly defined shall have their ordinarily accepted meanings as the context implies as provided in *The Oxford English Dictionary, Second Edition, Simpson, J. & Weiner, E., Ed., Oxford University Press, London, 1989; and Chambers Science and Technology Dictionary, Chambers Harrap Publishers Ltd, New York*, 1999.

The terms defined in this Part shall have a general applicability to the entire Code. Other than these, there are other terminology and definitions provided in different parts, chapters and sections which shall be applicable only to that particular part, chapter or section in which they are defined. In case of any conflict or contradiction between a definition given in this Part and that in any other part, chapter or section, the meaning provided in that part, chapter or section shall govern for the interpretation of the provisions of that particular part, chapter or section. In general, definitions given in a lower level shall override the meanings of all upper levels for the interpretation of the provisions within the scope of that lower level.

2.2 DEFINITIONS OF TERMS

The terminologies used in this Code are defined in this Section. Irrelevance of gender, tense and number is implicit in these definitions and throughout the Code. Words in the masculine gender include the feminine and the masculine. Verbs used in the present include the future. Words used in the singular include the plural and the words used in the plural include the singular.

ACCESSORY USE	Any use subordinate to the major use which is normally incidental to the major use.
ALTERATION	Any change, addition or modification in construction such as structural, dimensional, or any removal of any part of a building or any change to or closing of any required means of ingress or egress or a change to the fixtures or equipment or any change in land use or occupancy or use.
APPROVED	Approved by the Authority.
ARCHITECT	A person who has a Bachelor Degree in Architecture and is a member of the Institute of Architects, Bangladesh (IAB).
AUTHORITY	The Authority which has been created by a statute and which, for the purpose of administering the Code or Part thereof, may authorize a committee or an official to act on its behalf. (This definition of Authority shall apply to all appearances of the term in this Code written with a capital A).
AUTHORIZED OFFICER	Same as Building Official.
BASEMENT	A floor of a building more than 50 percent of which is situated at a depth of 1m or more below crown of the main entry road.
BUILDING	Any permanent or semi-permanent structure which is constructed or erected for human habitation or for any other purpose and includes but not limited to the

	foundation, plinth, walls, floors, roofs, stairs, chimneys, fixed platform, verandah, balcony, cornice, projections, extensions, annexes etc. The term building will also include the sanitary, plumbing, electrical, HVAC, appurtenances and all other building service installations which are constructed or erected as an integral part of a building.
BUILDING LINE	The line up to which the plinth of a building may lawfully extend. Also known as SETBACK LINE.
BUILDING OFFICIAL	A person who is the jurisdictional administrator of Building Code appointed by the Bangladesh Building Regulatory Authority (BBRA).
COMMITTEE	A Building Construction Committee constituted for any area in the prescribed manner, if necessary.
CONSTRUCT, TO	See ERECT, TO.
CONVERSION	The change in occupancy or premises to any occupancy or use requiring new occupancy permit.
COVERED AREA	The ground area above the plinth level which is covered by a building structure. The covered area of a building shall exclude gardens, wells, cornice, sunshade, pergola, septic tank, soak well, unpaved uncovered water body, fountains, drainage structures, boundary wall, gates, porch, uncovered staircase, watchman's cabin, detached pump house, garbage chutes and other uncovered utility structures.
DEVELOPMENT	Carrying out construction of buildings, engineering, mining or other operations in, or over or under land or water. Includes re-development and layout and subdivision of any land. 'To develop' and other grammatical variations shall be interpreted accordingly.
DIPLOMA ARCHITECT	A person who has a Diploma in Architecture from any recognized Polytechnic or Technical Institute and is a member of the Institute of Diploma Engineers, Bangladesh (IDEB).
DIPLOMA ENGINEER	A person who has a Diploma in Engineering from any recognized Polytechnic or Technical Institute and is a member of the Institute of Diploma Engineers, Bangladesh (IDEB).
DRAIN	A conduit or channel for conveying water, sewage, or other waste liquid for subsequent disposal.
DRAINAGE	The disposal of any liquid with a system meant for this purpose.
ENGINEER	A person who has a Bachelor Degree in Engineering and is a member of the Institution of Engineers, Bangladesh (IEB).
ERECT, TO	To erect a new building or re-erect an existing building or to convert a building from one occupancy to another. Also known as CONSTRUCT, TO.
FORMATION LEVEL	Finished ground level of a plot. For hilly areas formation levels shall be the gradient of the plot surface.
GEOTECHNICAL ENGINEER	Engineer with Master's degree in geotechnical engineering having at least 2 (two) years of experience in geotechnical design/construction or graduate in civil engineering/engineering geology having 10 (ten) years of experience in geotechnical design/construction.
ENGINEERING GEOLOGIST	A person having a postgraduate degree in engineering geology and having 2 years experience in geotechnical exploration and interpretation.
GOVERNMENT	The government of the People's Republic of Bangladesh.
GRADE	The lowest point of elevation of the finished surface of the ground, pavement or footpath within the area between the building and the property line or a line 1.5 m from the building whichever is nearer the building.

HEIGHT OF BUILDING	The vertical distance from a reference datum to the highest point of the building which includes all building appurtenances like overhead water tank, machine room, communication tower etc. The reference datum shall be the elevation of the nearest footpath or the elevation of the nearest road or street or public way at its centre line, whichever is higher.
HIGH RISE BUILDING	Any building which is more than 10-storey or 33 m high from reference datum. Building appurtenances like overhead water tank, machine room, communication tower etc. will not be considered in determining the height.
OCCUPANCY OR USE GROUP	The purpose for which a building or a part thereof is used or intended to be used.
OCCUPANCY, MAJOR	The major or principal occupancy of a building or a part thereof which has attached to it subsidiary occupancy or occupancies contingent upon it.
OCCUPIER	A person paying or liable to pay rent or any portion of rent of a building in respect of which the ward is used, or compensation or premium on account of occupation of such building and also a rent-free tenant. Does not include a lodger and the words 'occupancy' and 'occupation' do not refer to the lodger. In such cases the owner himself or herself is living in his or her own building, he or she shall be deemed to be the occupier thereof.
OWNER OF A BUILDING	The person, organization or agency at whose expenses the building is constructed or who has the right to transfer the same and includes his or her heirs, assignees and legal representatives, and a mortgagee in possession.
PERMIT	A written document or certificate issued by the Authority for carrying out a specific activity under the provisions of this Code.
PLANNER	A person who has a Bachelor or a Post-Graduate Degree in Planning and is a member of the Bangladesh Institute of Planners (BIP).
PLINTH AREA	The elements from the building bases which are exposed above the formation level to form a covered floor area by joining the peripheral points of the elements which are intersected at finished floor plane at the height of plinth level.
PLINTH LEVEL	Height of a covered finished floor which is not more than 1m above the formation level nor 1.85 m from the crown of adjacent road level.
PLOT	See SITE.
PLUMBING ENGINEER	An Engineer (Civil/Mechanical) who has experience in the field of plumbing or sanitation.
PUBLIC WAY	See ROAD.
RELIABLE LITERATURE	See RELIABLE REFERENCE.
RELIABLE REFERENCE	Reference materials such as published article, codes, standards or other material judged to be reliable by the professional users and specialists in the subject concerned. This may also be referred to as RELIABLE LITERATURE.
ROAD	A thoroughfare or public way which has been dedicated or deeded to the public for public use. Also known as STREET.
ROAD LINE	A line defining the side limits of a road.
ROOM HEIGHT	The clear head room between the finished floor surface and the finished ceiling surface or the underside of the joists or beams, whichever is lower.
SANCTIONED PLAN	The set of plans, design and specifications of a building submitted to the Authority as per provision of this Code and duly approved and sanctioned by the Authority.
SERVICE ROAD	A road or lane provided at the rear or side of a plot for service purposes.

SETBACK LINE	See BUILDING LINE.
SITE	A piece or parcel of land on which a building is intended to be or has already been constructed. Also known as PLOT.
SPECIALIST	A professional who by education, research, practice and experience specializes in a particular branch of a broader discipline and is generally judged to be so by the professional body in the relevant discipline.
STOREY	The portion of a structure between tops of two successive finished floor surfaces and for the topmost story, from surface of the finished floor of topmost floor to the top of the roof above.
STOREY, FIRST	The lowest storey in a building which qualifies as a storey as defined herein; for a building with a basement it is the storey just above the basements.
STREET	See ROAD.
STREET LEVEL	The elevation of the centre line of any road or street which a plot fronts.
STREET LINE	See ROAD LINE.
SUPERVISOR, CONSTRUCTION	An Architect or Engineer or Diploma Architect or Diploma Engineer having experience in supervision of construction works.
UNSAFE BUILDING	A building which, in the opinion of the Building Official, is structurally unsafe, or insanitary, or lacks proper means of ingress or egress, or which constitutes a hazard to life or property.

Chapter 3
ABBREVIATIONS

3.1 ABBREVIATIONS OF NAMES

Names of institutions, organizations and professional societies referred to in this Code are listed below in an alphabetical order.

ACI American Concrete Institute; Box 19150, Redford Station, Detroit, MI 48219, USA.

AISC American Institute of Steel Construction, Inc.; 400 North Michigan Avenue, Chicago, IL 60611, USA.

AISE Association of Iron and Steel Engineers; Suite 2350, Three Gateway Center, Pittsburgh, PA 15222, USA.

AISI American Iron and Steel Institute; Suite 300, 1133 15th Street N.W., Washington, DC 20005, USA.

ANSI American National Standards Institute; 1430 Broadway, New York, NY 10018, USA.

ASHRAE American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc.; 345 East 47th Street, New York, NY 10017, USA.

ASME American Society of Mechanical Engineers; United Engineering Centre, 345 East 47th Street, New York, NY 10017, USA.

ASTM American Society for Testing and Materials; 1916 Race Street, Philadelphia, PA 19103, USA.

AWS American Welding Society; 550 N.W. LeJeune Rd., P.O. Box 351040, Miami, FL 33135, USA.

BIP Bangladesh Institute of Planners, Planners' Tower (Level-7), 13/A, Bir Uttam C.R. Datta (Sonargaon) Road, Bangla Motor, Dhaka-1000, Bangladesh.

BOCA Building Officials and Code Administrators International Inc.; 1313 East 60th Street, Chicago, IL 60637, USA.

BPDB Bangladesh Power Development Board; WAPDA Building, Motijheel Commercial Area, Dhaka 1000, Bangladesh.

BSI British Standards Institution; 2 Park Street, London W1A 2BS, UK.

BSTI Bangladesh Standards and Testing Institution; 116A Tejgaon Industrial Area, Dhaka 1208, Bangladesh.

BWDB Bangladesh Water Development Board; WAPDA Building, Motijheel Commercial Area, Dhaka 1000, Bangladesh.

CDA Chittagong Development Authority; Station Road, Chittagong, Bangladesh.

CGSM Canadian General Standards Board; Technical Information Unit, Ottawa, CANADA K1A 1G6.

DOA Department of Architecture; Sthapatya Bhaban, Shahid Capt. Mansur Ali Sarani, Segunbagicha, Dhaka-1000, Bangladesh.

DPHE Department of Public Health Engineering; DPHE Bhaban, 14, Shaheed Captain Mansur Ali Sarani, Kakrail, Dhaka-1000, Bangladesh.

EED Education Engineering Department; Shikkha Bhaban, Dhaka-1000, Bangladesh.

HED Health Engineering Department; Ministry of Health and Family Welfare, 105-106, Motijheel C/A, Dhaka-1000, Bangladesh.

FM Factory Manual; Standards Laboratories Department, 1151 Boston Providence Turnpike, Norwood, MA 02062, USA.

FSCD Fire Service and Civil Defence; Kazi Alauddin Road, Dhaka-1000, Bangladesh.

HBRI Housing and Building Research Institute; 120/3, Darus-Salam, Mirpur, Dhaka, Bangladesh.

IAB Institute of Architects, House-11(1st Floor), Road-4, Dhanmondi, Dhaka-1205, Bangladesh.

IEB Institution of Engineers, Ramna, Dhaka-1000, Bangladesh.

IDEB Institute of Diploma Engineers, IDEB Bhaban, 160/A, Kakrail VIP Road, Dhaka-1000, Bangladesh.

ICBO International Conference of Building Officials; 5360 South Workman Mill Road, Whittier, CA 90601, USA.

ISO International Organization for Standardization; 1, Rue de Varembé, Case Postal 56, CH-1211, Genève 20, Switzerland.

ISSMFE International Society of Soil Mechanics and Foundation Engineering; University Engineering Department, Trumpington St, Cambridge CB21PZ, UK.

KDA Khulna Development Authority; Shib Bari Crossing, Khulna-9100, Bangladesh.

LGED Local Government Engineering Department; LGED Bhaban, Sher-e-Bangla Nagar, Agargaon, Dhaka, 1207. Bangladesh.

NFPA National Fire Protection Association; Batterymarch Park, Quincy, MA 02269, USA.

NHA National Housing Authority; Grihayan Bhaban, 82, Segunbagicha, Dhaka, Bangladesh.

PWD Public Works Department; Purto Bhaban, Shahid Capt. Mansur Ali Sarani, Segunbagicha; Dhaka 1000, Bangladesh.

RAJUK Rajdhani Unnayan Kartripakkha; Rajuk Avenue, Motijheel, Dhaka-1000, Bangladesh.

RCSC Research Council on Structural Connections of the Engineering Foundation; American Institute of Steel Construction (AISC).

RDA Rajshahi Development Authority; Rajshahi-6203, Bangladesh.

RMA Rubber Manufacturing Association; 1400 K Street N.W., Washington, DC 20005, USA.

SBCCI Southern Building Code Congress International; 3617 8th Ave, S. Birmingham, AL 35222, USA.

SMACNA Sheet Metal and Air Conditioning Contractors' National Association, 8224 Old Courthouse Road, Tysons Corner, Vienna, VA 22180, USA.

SPRI Single Ply Roofing Institute; 104 Wilmont Road, Suite 201, Deerfield, IL 600015-5195, USA.

UDD Urban Development Directorate; Ministry of Housing and Public Works, 82, Segunbagicha, Dhaka-1000, Bangladesh.

UL Underwriters Laboratories, Inc; 207 East Ohio Street, Chicago, IL 60611, USA.

3.2 ABBREVIATIONS OF WORDS

The abbreviations used in this Code are listed below in an alphabetical order. Abbreviations not explicitly defined herein below shall be construed to have their usual meaning as the context implies.

BDS Bangladesh Standards; published by the BSTI

BNBC Bangladesh National Building Code; published by HBRI

BS British Standard; published by the BSI

CBF	Concentric Braced Frame
CFC	Chlorofluorocarbon
CGI	Corrugated Galvanized Iron
CWPC	Cold Drawn Low Carbon Wire Prestressed Concrete
DCP	Dry Chemical Powder (fire extinguisher)
DDT	Dichlorodiphenyltrichloroethane
DPC	Damp-proof Course
EBF	Eccentric Braced Frame
FAR	Floor Area Ratio
FM	Fineness Modulus
FPA	Flood Prone Area
GI	Galvanized Iron
IBC	International Building Code
IMRF	Intermediate Moment Resisting Frame
IS	Indian Standard; published by the Bureau of Indian Standards
LFD	Load Factor Design
LPG	Liquefied Petroleum Gas
MCSP	Multipurpose Cyclone Shelter Program
OMRF	Ordinary Moment Resisting Frame
RC	Reinforced Concrete
RS	Rolled Steel
RSJ	Rolled Steel Joist
SMRF	Special Moment Resisting Frame
SPA	Surge Prone Area
SRSS	Square Root of the Sum of the Squares
UBC	Uniform Building Code; published by the ICBO
WSD	Working Stress Design
cps	Cycles per second

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