



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG, NEW DELHI 110002

व्यापक परिचालन मसौदा

हमारा संदर्भ : सीईडी 02:2/टी-30

11 जनवरी 2024

तकनीकी समिति : सीमेंट और कंक्रीट विषय समिति, सीईडी 02

प्राप्तकर्ता :

- 1 सिविल इंजीनियरिंग विभाग परिषद, सीईडीसी के सभी सदस्य
- 2 सीमेंट और कंक्रीट विषय समिति, सीईडी 02 के सभी सदस्य
- 3 सीईडी 02 उपसमिति एंव इसकी पैनल और कार्यदल के सभी सदस्य
- 4 रूचि रखने वाले अन्य निकाय।

महोदया/महोदय,

निम्नलिखित मसौदा संलग्न है:

प्रलेख संख्या	शीर्षक
सीईडी 02 (24638)WC	सीमेंट कंक्रीट से संबंधित शब्दों की शब्दावली: भाग 11 दबा हुआ ठोस (पहला पुनरीक्षण) का भारतीय मानक मसौदा (ICS: 01.040.91)

कृपया इस मसौदे का अवलोकन करें और अपनी सम्मतियाँ यह बताते हुए भेजे कि यह मसौदा प्रकाशित हो तो इस पर अमल करने में, आपको व्यवसाय अथवा कारोबार में क्या कठिनाइयाँ आ सकती हैं।

सम्मतियाँ भेजने की अंतिम तिथि: **12 फरवरी 2024**

सम्मति यदि कोई हो तो कृपया अधोहस्ताक्षरी को उपरिलिखित पते पर संलग्न फॉर्मेट में भेजें या ced2@bis.gov.in पर ईमेल कर दें या सम्मितियाँ बीआईएस ई-गवर्नेंस पोर्टल, www.manakonline.in के माध्यम से ऑनलाइन भी भेजी जा सकती हैं।

यदि कोई सम्मति प्राप्त नहीं होती है अथवा सम्मति में केवल भाषा संबंधी त्रुटि हुई तो उपरोक्त प्रलेख को यथावत अंतिम रूप दे दिया जाएगा। यदि सम्मति तकनीकी प्रकृति की हुई तो विषय समिति के अध्यक्ष के परामर्श से अथवा उनकी इच्छा पर आगे की कार्यवाही के लिए विषय समिति को भेजे जाने के बाद प्रलेख को अंतिम रूप दे दिया जाएगा।

यह प्रलेख भारतीय मानक ब्यूरो की वेबसाइट www.bis.gov.in पर भी उपलब्ध है।

धन्यवाद।

भवदीय

ह/-

(अरुण कुमार एस.)

वै. 'ई' / निर्देशक और प्रमुख (सिविल इंजीनियरिंग)

संलग्न: उपरिलिखित



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG, NEW DELHI 110002

DRAFT IN
WIDE CIRCULATION

DOCUMENT DESPATCH ADVICE

TECHNICAL COMMITTEE:

Reference	Date
CED 02:2/T-30	11 January 2024

CEMENT AND CONCRETE SECTIONAL COMMITTEE, CED 02

ADDRESSED TO:

1. All Members of Civil Engineering Division Council, CEDC
2. All Members of Cement and Concrete Sectional Committee, CED 02
3. All Members of Subcommittees, Panels and Working Groups under CED 02
4. All other interested

Dear Madam/Sir,

Please find enclosed the following draft:

Doc. No.	Title
CED 02 (24638)WC	Draft Indian Standard Glossary of terms relating to Cement Concrete : Part 11 Prestressed Concrete (<i>First Revision</i>) (ICS 01.040.91)

Kindly examine the draft and forward your views stating any difficulties which you are likely to experience in your business or profession, if this is finally adopted as National Standard.

Last Date for comments: 12 February 2024

Comments if any, may please be made in the attached format and mailed to the undersigned at the above address or preferably through e-mail to ced2@bis.gov.in. The comments may preferably be shared in the prescribed template through the Manak Online portal at www.manakonline.in. Alternatively, the comments may be sent through the attached format for consideration by the BIS' Sectional Committee for necessary action.

In case no comments are received or comments received are of editorial nature, you will kindly permit us to presume your approval for the above document as finalized. However, in case comments, technical in nature are received, then it may be finalized either in consultation with the Chairman, Sectional Committee or referred to the Sectional Committee for further necessary action if so desired by the Chairman, Sectional Committee.

The document is also hosted on BIS website www.bis.gov.in .

Thanking you,

Yours faithfully,
Sd/-
(Arun Kumar S.)

Sc. 'E'/Director and Head (Civil Engg.)

Encl: As above

BUREAU OF INDIAN STANDARDS**DRAFT FOR COMMENTS ONLY**

(Not to be reproduced without the permission of BIS or used as a Standard)

Draft Indian Standard**GLOSSARY OF TERMS RELATING TO CEMENT CONCRETE
PART 11 PRESTRESSED CONCRETE
(First Revision)**

Cement and Concrete
Sectional Committee, CED 02

Last date of Comments:
12 February 2024

FOREWORD

(Formal Clauses to be added later)

Cement concrete is one of the most versatile and extensively used building materials in all civil engineering constructions. There are a number of technical terms connected with the basic materials for concrete as well as the production and use of concrete which quite often require clarification to give precise meaning to the stipulations in the standard specifications, codes of practices and other technical documents. Based on this necessity and to standardize the various terms and definitions used in cement and concrete technology, this standard was published in 12 parts.

The other parts in the series are:

- Part 1 Concrete aggregates
- Part 2 Materials (other than cement and aggregate)
- Part 3 Concrete reinforcement
- Part 4 Types of concrete
- Part 5 Formwork for concrete
- Part 6 Equipment, tools and plant
- Part 7 Mixing, laying, compaction, curing and other construction aspects
- Part 8 Properties of concrete
- Part 9 Structural aspects
- Part 10 Structural aspects
- Part 12 Miscellaneous

In addition to the above, two separate standards were brought out concerning terminology relating to hydraulic cement and pozzolanic materials. These standards are IS 4845: 1968 'Definitions and terminology relating to hydraulic cement' and IS 4305: 1967 'Glossary of terms relating to pozzolana'.

In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in

addition to relating it to the practices in the field in this country. This has been met by deriving assistance from the following publications:

- a) BS 6100-9 (2007) Building and civil engineering – Vocabulary – Part 9 – Work with concrete and plaster, British Standards Institution
- b) ASTM C125 (2021) Standard terminology relating to concrete and concrete aggregates, American Society for Testing and Materials (revision 21A)
- c) ACI No. SP-19 (1967) Cement and concrete terminology, American Concrete Institute.
- d) ACI 617 (1968) Recommended practice for concrete formwork, American Concrete Institute.

This standard (Part 11) was first published in 1973. In this revision the necessary changes required have been incorporated in the light of experience gained in its use and also to bring it in line with the latest development on the subject. The significant modifications made in this revision include:

- a) Definition of creep, creep coefficient, chemical prestressing, grouting, final and initial tension, etc has been included.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2: 2022 'Rules for rounding off numerical values (second revision)'. The number of significant places retained in the rounded off value should be periodically removed to create more space for the future falling blocks.

BUREAU OF INDIAN STANDARDS**DRAFT FOR COMMENTS ONLY**

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Draft Indian Standard**GLOSSARY OF TERMS RELATING TO CEMENT CONCRETE
PART 11 PRESTRESSED CONCRETE
(First Revision)**

Cement and Concrete
Sectional Committee, CED 02

Last date of Comments:
12 February 2024

1 SCOPE

This standard (Part 11) covers definitions of terms relating to prestressed concrete.

2 REFERENCES

The Indian Standards listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

<i>IS No.</i>	<i>Title</i>
IS 1343: 2012	Code of practice for prestressed concrete

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Anchor — In pre stressed concrete, to lock the stressed tendon in position so that it will retain its stressed condition; in precast concrete construction, to attach the precast units to the building frame; in slabs on grade or walls, to fasten to rock or adjacent structures to prevent movement of the slab or wall with respect to the foundation, adjacent structure, or rock.

3.2 Anchorage — In post-tensioning, a device used to anchor the tendon to the concrete member; in pre tensioning, a device used to anchor the tendon during hardening of the concrete; in precast concrete construction, the devices for attaching precast units to the building frame; in slab or wall construction the device used to anchor the slab or wall to the foundation, rock, or adjacent structure.

3.3 Anchorage Bond Stress —The bar forces divided by the product of the bar perimeter or perimeters and the embedment length.

3.4 Anchorage Deformation or Slip — The loss of elongation or stress in the tendons of prestressed concrete due to the deformation of the anchorage or slippage of the tendons in the anchorage device when the prestressing force is transferred from the jack to the anchorage device.

3.5 Anchorage Device — See 3.3.

3.6 Anchorage Loss — See 3.4.

3.7 Anchorage Zone — In post-tensioning, the region adjacent to the anchorage subjected to secondary stresses resulting from the distribution of the prestressing force; in pretensioning, the region in which the transfer bond stresses are developed.

3.8 Block Beam — A flexural member, composed of individual blocks which are joined together by prestressing.

3.9 Bonded Member — A prestressed concrete member in which the tendons are bonded to the concrete either directly or through grouting.

3.10 Bonded Post-tensioning — Post-tensioned construction in which the annular spaces around the tendons are grouted after stressing, thereby bonding the tendon to the concrete section.

3.11 Bonded Tendon — A prestressing tendon which is bonded to the concrete either directly or through grouting.

3.12 Cable — See 3.67.

3.13 Camber — A slight, usually upward; curvature of a truss, beam, or form to improve appearance or to compensate for anticipated deflection, such as that produced as a normal consequence of the eccentricity from the centre of gravity of the section of the prestressing tendons.

3.14 Cap Cables — Short cables (tendons) introduced to prestressing the zone of negative bending only.

3.15 Concentric Tendons — Tendons following a line coincident with the gravity axis of the prestressed concrete member.

3.16 Concrete, Prestressed — See 3.53.

3.17 Curvature Friction — Friction resulting from bends or curves in the specified prestressing cable profile.

3.18 Dead End — In the stressing of a tendon from one end only, the end opposite that to which stress is applied.

3.19 Dead-End Anchorage — The anchorage at that end of a tendon which is opposite the jacking end.

3.20 Deflected Tendons — Tendons which have a trajectory that is curved or bent with respect to the gravity axis of the concrete member.

3.21 Development Bond Stress — See 3.3.

3.22 Duct — A hole formed in a concrete member to accommodate a tendon for post-tensioning; a pipe or runway for electric, telephone, or other utilities.

3.23 Eccentric Tendon — A tendon which follows a trajectory not coincident with the gravity axis of the concrete member.

3.24 Effective Prestress — The stress remaining in concrete due to prestressing after, all losses have occurred, excluding the effect of superimposed loads, but including effect of weight of member.

3.25 Elastic Shortening — In prestressed concrete, the shortening of a member which occurs immediately on the application of forces induced by prestressing.

3.26 End Anchorage — Mechanical device to transmit prestressing force to the concrete in a post-tensioned member.

3.27 End Block — An enlarged end section of a member designed to reduce anchorage stresses to allowable values.

3.28 Final Prestress — See 3.28.

3.29 Final Stress — In prestressed concrete, the stress which exists after substantially all losses have occurred.

3.30 Flat Jack — A hydraulic jack consisting of light gauge metal bent and welded to a flat shape which expands under internal pressure.

3.31 Flexural Bond — In prestressed concrete, the stress between the concrete and the tendon which results from the application of external load.

3.32 Harped Tendons — See 3.28.

3.33 Hoyer Effect — In prestressed concrete, frictional forces which result from the tendency of the tendons to regain the diameter which they had before they were stressed.

3.34 Indented Wire — Wire having machine-made surface indentations intended to improve bond; depending on type of wire, may be used for either concrete reinforcement or pretensioning tendons.

3.35 Initial Prestress — The stress or force applied to concrete at the time of stressing.

3.36 Initial Stresses — The stresses occurring in prestressed concrete members before any losses occur.

3.37 Jack — A mechanical device of varying design used to apply force to prestressing tendons, adjust elevation of forms or form supports, and raise weights by small distances.

3.38 Jacking Device — The device used to stress the tendons for prestressed concrete; also, a device for raising a vertical slipform.

3.39 Jacking Force — Temporary force exerted by the device which introduces tension into prestressing tendons.

3.40 Jacking Stress — The maximum stress occurring in a prestressed tendon during stressing.

3.41 Linear Prestressing — Prestressing as applied to linear members, such as beams and columns.

3.42 Linear Transformation — The method of altering the. Trajectory of the prestressing tendon in any statically indeterminate prestressed structure by changing the location of the tendon at one or more interior supports without altering its position at the end supports and without changing the basic shape of the trajectory between any supports; linear transformation does not change the location of trajectory of the pressure line.

3.43 Loss of Prestress — The reduction of the prestressing force which results from the combined effects of creep in the steel and creep and shrinkage of the concrete; does not normally include friction losses but may include. The effect of elastic deformation of the concrete.

3.44 Multielement Prestressing — Prestressing accomplished by stressing an assembly of several individual structural elements as a means of producing one integrated structural member.

3.45 Multistage Stressing — construction progresses. Prestressing performed in stages as the construction progresses.

3.46 Non concordant Tendons — In statically indeterminate structures, tendons that are not coincident with pressure line caused by the tendons.

3.47 Overstretching — Stressing of tendons to a value higher than designed for the initial stress to:

- a) overcome frictional losses,
- b) temporarily overstress the steel to reduce steel creep that occurs after anchorage, and
- c) counteract loss of prestressing force that is caused by subsequent prestressing of other tendons.

3.48 Parallel-Wire Unit — A post-tensioning tendon composed of a number of wires or strands which are approximately parallel.

3.49 Partial Prestressing — Prestressing to a stress level such that, under design loads, tensile stresses exist in the precompressed tensile zone of the prestressed member.

3.50 Partial Release — Release into a prestressed concrete member of a portion of the total prestress initially held wholly in the prestressed reinforcement.

3.51 Post-Tensioning — A method of prestressing reinforced concrete in which tendons are tensioned after the concrete has hardened.

3.52 Pre-Post-Tensioning — A method of fabricating prestressed concrete in which some of the tendons are pretensioned and a portion of the tendons are post-tensioned.

3.53 Prestressed Concrete — Concrete in which internal stresses of such magnitude and distribution are introduced that the tensile stresses resulting from the service loads are counteracted to a desired degree; i.e. Reinforced concrete the prestress is commonly introduced by tensioning the tendons.

3.54 Pretensioning — A method of prestressing reinforced concrete in which the tendons are tensioned before concreting.

3.55 Pretensioning Bed (or Bench) — The casting bed on which pretensioned members are manufactured and which resists the pretensioning force prior to release.

3.56 Sequence-Stressing Loss — In post-tensioning, the elastic loss in a stressed tendon resulting from the shortening of the member when additional tendons are stressed.

3.57 Sheath — An enclosure in which post-tensioned tendons are encased to prevent bonding during concrete placement.

3.58 Sheathing — The material forming the contact face of forms; also called lagging or sheeting.

3.59 Sheeting — See 3.58.

3.60 Shrinkage Loss — The loss of stress in the prestressing steel resulting from the shrinkage of the concrete.

3.61 Strand — A prestressing tendon composed of a number of wires most of which are twisted about a centre wire of core.

3.62 Strand Grip — A device used to anchor strands.

3.63 Stress Corrosion — Corrosion of a metal accelerated by stress.

3.64 Stressing End — In prestressed concrete, the end of the tendon from which the load is applied when tendons are stressed from one end only.

3.65 Stress Relaxation — Stress loss resulting from strain developed when a constant length is maintained under stress.

3.66 Swift — A reel or turntable on which prestressing tendons are placed to facilitate handling and placing.

3.67 Tendon — A steel element, such as a wire, cable, bar, rod, or strand used to impart prestress to concrete when the elements tensioned.

3.68 Tendon Profile — The path or trajectory of the prestressing tendon.

3.69 Threaded Anchorage — An anchorage device which is provided with threads to facilitate attaching the jacking device to effect the anchorage.

3.70 Trajectory of Prestressing Force — The path along which the prestress is effective in a structure or member; it is coincident with the centre of gravity of the tendons for simple flexural members and statically indeterminate members which are prestressed with concordant tendons, but is not coincident with the centre of gravity of the tendons of a statically indeterminate structure which is prestressed with nonconcordant tendons.

3.71 Transfer — The act of transferring the stress in prestressing tendons from the jacks or pretensioning bed to the concrete member.

3.72 Transfer Bond — In pretensioning, the bond stress resulting from the transfer of stress from the tendon to the concrete.

3.73 Transfer Length — See 3.75.

3.74 Transfer Strength — The concrete strength required before stress is transferred from the stressing mechanism to the concrete.

3.75 Transmission Length — The distance at the end of a pretensioned tendon necessary for the bond stress to develop the maximum tendon stress; sometimes called transfer length.

3.76 Transverse Prestress — Prestress that is applied at right angles to the principal axis of a member.

3.77 Unbounded Member — Post-tensioned, prestressed concrete element in which tensioning force is applied against end anchorages only, tendons being free to move within the element.

3.78 Unbounded Post-Tensioning — Post-tensioning in which the tendons are not grouted after stressing.

3.79 Unbounded Tendon — A tendon which is not bonded to the concrete section.

3.80 Wedge Anchorage — A device for providing the means of anchoring a tendon by wedging.

3.81 Wobble Coefficient — A coefficient used in determining the friction loss occurring in post-tensioning, which is assumed to account for the secondary curvature of the tendons.

3.82 Wobble Friction — Friction caused by the unintended variation of the prestressing steel sheath or duct from its specified profile.

3.83 Characteristic Load — Load which has 95 percent probability of not being exceeded during the life of the structure.

3.84 Characteristic Strength — Strength of material below which not more than 5 percent of the test results are expected to fall.

3.85 Chemically Prestressing — Concrete made with expansive cement and reinforcement under conditions such that the expansion of the cement induces tensile stress in the reinforcement so as to produce prestressed concrete.

3.86 Column/ Strut — A compression member, the effective length of which exceeds three times the least lateral dimension.

3.87 Creep — Time dependent deformation due to sustained load.

3.88 Creep Coefficient — The ratio of creep strain to elastic strain in concrete.

3.90 Final Tension — The tension in the prestressing tendon corresponding to the state of the final prestress.

3.91 Grouting — The purpose of grouting is to provide permanent protection to the post-tensioned steel against corrosion and to develop bond between the prestressing steel and the surrounding structural concrete. The grout ensures the encasement of steel in an alkaline environment for corrosion protection and by filling the duct space, it prevents water collection and freezing.

3.92 Initial Tension — The maximum stress induced in the prestressing tendon at the time of the stressing operation.

3.93 Short Column — A column, the effective length of which does not exceed 12 times the least lateral dimension.

3.94 Slender Column — A column, the effective length of which exceeds 12 times the least lateral dimension.

3.95 Stress at Transfer — The stress in both the prestressing tendon and the concrete at the stage when the prestressing tendon is released from the prestressing mechanism.