Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

"जाने का अधिकार, जीने का अधिकार"
Mazdoor Kisan Shakti Sangathan
"The Right to Information, The Right to Live"

"पुराने को छोड़ नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"


"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"  
Bhartrhari—Nitisatakam
"Knowledge is such a treasure which cannot be stolen"
CODE OF PRACTICE FOR ANTI-TERMITE MEASURES IN BUILDINGS

PART 2  PRE-CONSTRUCTIONAL CHEMICAL TREATMENT MEASURES

( Second Revision )
FOREWORD

This Indian Standard (Part 2) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Building Construction Practices Sectional Committee had been approved by the Civil Engineering Division Council.

This standard (Part 2) was first published in 1971 and subsequently revised in 1981. In view of comments received and further knowledge that has become available, the Committee responsible for formulation of this standard decided to take up its revision. Considerable assistance has been provided by Central Building Research Institute, Roorkee in revising this standard. In this revision, apart from other changes, Chlorpyrifos and Lindane have been recommended for anti-termite treatment. Part 1 of this standard deals with constructional measures and Part 3 deals with treatment for existing buildings.

Termite control in buildings is very important as the damage likely to be caused by the termites is huge. Wood is one of the cellulosic materials which termites damage, cellulose forming their basic nutrient. They also damage materials of organic origin with a cellulosic base, household articles like furniture, furnishings, clothings, stationery, etc. Termites are also known to damage non-cellulosic substances in their search for food. Rubber, leather, plastics, neoprene as well as lead coating used for covering of underground cables are damaged by termites. The widespread damage by termites, high constructional cost of buildings have necessitated evolving suitable measures for preventing access of termites to buildings.

On the basis of their habitat, termites are divided into two types, namely (a) Subterranean or ground nesting termites, and (b) Non-subterranean or wood nesting termites having no contact with soil (see Annex A). The subterranean termites are most destructive and are mainly responsible for the damage caused in buildings. Typically, they form nests or colonies underground in the soil, near ground level in a stump or in other suitable piece of timber, and some species may construct a conical or dome shaped mound. These colonies may persist for many years and, as they mature, contain a population running into millions. All attacks by subterranean termites originate from the nest but timber either lying on or buried in the ground may be reached by means of shelter tubes constructed within, or over such materials or else by the erection of an independent, free standing mud structure. Chemical barriers which prevent the termites from reaching the super-structure of the building will protect the building and its contents. Treating the soil beneath the building and around the foundations with a soil insecticide is a good preventing measure which is attracting attention throughout the world. The purpose of this treatment is to create a chemical barrier between the ground from where the termites come and woodwork, cellulosic materials and other contents of the buildings which may form food for the termites. Timber which is seasoned and is naturally durable in heartwood may be used in the building structure. However, non-durable timbers and sapwood of all timbers should be treated to withstand the attack of drywood termites (see IS 401 and IS 1141).

The composition of the Committee responsible for formulation of this standard is given in Annex D.

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 2:1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.
Indian Standard

CODE OF PRACTICE FOR ANTI-TERMITE MEASURES IN BUILDINGS

PART 2 PRE-CONSTRUCTIONAL CHEMICAL TREATMENT MEASURES

(Second Revision)

1 SCOPE

This standard (Part 2) gives recommendations for the chemical treatment of soils for the protection of buildings from attack by subterranean termites. It includes reference to the chemicals to be used, lays down minimum rates of application for usage, and outlines procedures to be followed while the building is under construction.

2 REFERENCES

The Indian Standards given in Annex B contain provisions, which through reference in this text, constitute provision 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.

3 TERMINOLOGY

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

3.1 Chemical Barrier

The layer of chemically treated soil in immediate contact with the foundation and floor structure of a building which kills or repels termites thus forming a barrier which is impervious to termite entry.

3.2 Soil Treatment

The application of chemicals (toxicants) to the soil adjacent to and under a building to form a chemical barrier which is lethal or repellent to termites.

3.3 Pre-Construction Soil Treatment

This is a process in which soil treatment is applied to a building during the early stages of its construction.

4 SITE PREPARATION

4.1 The removal of trees, stumps, logs or roots from a building site reduces the hazards from subterranean termites. Similarly, the sub floor area should be kept free from all debris in which new colonies of termites might be established. In order to ensure uniform distribution of the treating solution and to assist penetration, some site preparation, may be necessary. The information given in 4.1.1 to 4.1.4 is for guidance in preparing a building site for chemical treatment.

4.1.1 Heavy Soils and Sloping Sites

On clay and other heavy soils where penetration is likely to be slow and on sloping sites where run off of the treating solution is likely to occur, the surface of the soil should be scarified to a depth of at least 75 mm.

4.1.2 Sandy or Porous Soils

On loose, sandy or porous soils where loss of treating solution through piping or excessive percolation is likely to occur, preliminary moistening to fill the capillary spaces in the soil is recommended.

4.1.3 Levelling, Excavations and Filling

All sub floor levelling and grading should be completed; all cuttings, trenches and excavations should be completed with backfilling in place, borrowed fill must be free from organic debris and should be well compacted. If this is not done supplementary treatments should be made to complete the barrier.

4.1.4 Concrete Formwork

All concrete formwork, levelling pegs, timber off-cuts and other builder’s debris should be removed from the area to be treated.

5 CHEMICALS AND RATE OF APPLICATION

5.1 Basic Principle

Chemical toxic to subterranean termites may be used effectively to check termite infestation in the soil. These are useful in the treatment of new building sites and may also be used to eradicate existing infestation in buildings and to prevent reinfestation. The effectiveness and/or residual activity depend upon the choice of the chemicals, the dosages adopted and the thoroughness of application. The chemical solutions or emulsions are required to be dispersed uniformly in
the soil and of the required strength so as to form an
effective chemical barrier which is lethal and
repellent to termites.

5.2 Mound Treatment

If termite mounds are found within the plinth area of
the buildings these should be destroyed by means of
insecticides in the form of water suspension or
emulsion which should be poured into the mounds at
several places after breaking open the earthen
structure and making holes with crow-bars. The
quantity to be used will depend upon the size of the
mound. For a mound volume of about 1 m³, 4 litres of
an emulsion in water of one percent Chlorpyrifos
20 EC or Lindane 20 EC may be used.

5.3 Soil Treatment

Treating the soil beneath the building and around the
foundations with a soil insecticide is a preventive
measure. The purpose of the treatment is to create a
chemical barrier between the ground from where
termites come and woodwork or other cellulotic
materials in the buildings. The following chemicals
conforming to relevant Indian Standard in water
emulsion are effective when applied uniformly over
the area to be treated.

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Relevant Indian Standard</th>
<th>Concentration by Weight, percent (active ingredient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorpyrifos</td>
<td>IS 8944</td>
<td>1.0</td>
</tr>
<tr>
<td>Lindane</td>
<td>IS 632</td>
<td>1.0</td>
</tr>
<tr>
<td>20 EC</td>
<td>20 EC</td>
<td></td>
</tr>
</tbody>
</table>

NOTE — The chemicals described in this code are insecticides
with a persistent action and are regarded highly poisonous.
These chemicals can have an adverse effect upon health when
absorbed through the skin, inhaled as vapours or spray-mists or
swallowed. Detailed precautions for the safe handling of these
chemicals are given in Annex C. Persons carrying out chemical
soil treatment in accordance with this code should familiarize
themselves for these precautions and exercise due care when
handling the chemical whether in concentrate or in diluted form.
The use of the chemical should be avoided where there is any
risk of wells or other water supplies becoming contaminated.

6 ESSENTIAL REQUIREMENTS FOR
BARRIER AND METHOD OF APPLICATION

6.1 Conditions of Formation

Barrier shall be complete and continuous under the
whole of the structure to be protected. All foundations
shall be fully surrounded by and in close contact with
the barrier or treated soil. Each part of the area treated
shall receive the prescribed dosage of chemical.

6.2 Time of Application

Soil treatment should start when foundation trenches
and pits are ready to take mass concrete in foundations.
Laying of mass concrete should start when the
chemical emulsion has been absorbed by the soil and
the surface is quite dry. Treatment should not be
carried out when it is raining or when the soil is wet
with rain or sub-soil water. The foregoing
requirements applies also in the case of treatment to
the filled earth surface within the plinth area before
laying the sub-grade for the floor.

6.3 Disturbance

Once formed, treated soil barriers shall not be
disturbed. If, by chance, treated soil barriers are
disturbed, immediate steps shall be taken to restore the
continuity and completeness of the barrier system.

7 TREATMENT

7.1 Soil Treatment

The chemical emulsions described in 5.3 shall be
applied uniformly at the prescribed rate in all the
stages of the treatment. A suitable hand operated
compressed air sprayer or watering can should be used
to facilitate uniform disposal of the chemical
emulsion. On large jobs, a power sprayer may be used
to save labour and time.

7.1.1 In the event of waterlogging of foundation, the
water shall be pumped out and the chemical emulsion
applied when the soil is absorbent.

7.2 Treatment for Masonry Foundations and
Basements

7.2.1 The bottom surface and the sides (upto a height
of about 300 mm) of the excavations -made from
masonry foundations and basements shall be treated
with the chemical at the rate of 5 l/m² surface area (see
Fig. 1).

7.2.2 After the masonry foundations and the retaining
wall of the basements come up, the backfill in
immediate contact with the foundation structure shall
be treated at the rate of 7.5 l/m² of the vertical surface
of the sub-structure for each side. If water is used for
ramming the earth fill, the chemical treatment shall be
carried out after the ramming operation is done by
rodling the earth at 150 mm centres close to parallel
to the wall surface and spraying the chemical emulsion
at the above dosage. After the treatment, the soil
should be tamped in place. The earth is usually
returned in layers and the treatment shall be carried out
in similar stages. The chemical emulsion shall be
directed towards the masonry surfaces so that the earth
in contact with these surfaces is well treated with the
chemical (see Fig. 2 and 3).

7.3 Treatment for RCC Foundations and Basement

7.3.1 The treatment described in 7.2.1 and 7.2.2
applies essentially to masonry foundations where
there are voids in the joints through which termites are
able to seek entry into buildings. Hence the
foundations require to be completely enveloped by a chemical barrier. In the case of RCC foundations, the concrete is dense being a 1:2:4 (cement: fine aggregates: coarse aggregates, by volume) mix or richer, the termites are unable to penetrate it, it is therefore, unnecessary to start the treatment from the bottom of excavations. The treatment shall start at a depth of 500 mm below the ground level except when such ground level is raised or lowered by filling or cutting after the foundations have been cast. In such cases, the depth of 500 mm shall be determined from the new soil level resulting from the filling or cutting mentioned above, and soil in immediate contact with the vertical surfaces of RCC foundations shall be treated at the rate of 7.5 l/m². The other details shall be as laid down in 7.2.2 (see Fig. 4).

7.4 Treatment of Top Surface of Plinth Filling
The top surface of the consolidated earth within plinth walls shall be treated with chemical emulsion at the rate of 5 l/m² of the surface before the sand bed or sub-grade is laid. If the filled earth has been well rammed and the surface does not allow the emulsion to seep through, holes up to 50 to 75 mm deep at 150 mm centres both ways may be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion.

7.5 Treatment at Junction of the Wall and the Floor
Special care shall be taken to establish continuity of the vertical chemical barrier on inner wall surface from ground level (where it had stopped with the treatment described in 7.2.2) up to the level of the filled earth surface. To achieve this, a small channel 30 mm × 30 mm shall be made at all the junctions of wall and columns with the floor (before laying the sub-grade) the rod holes made in the channel up to the ground level 150 mm apart and the iron rod moved backward and forward to break up the earth and chemical emulsion poured along the wall at the rate of 7.5 l/m² of vertical wall or column surface so as to soak the soil right to the bottom. The soil should be tamped back into place after the operation.

7.6 Treatment of Soil Along External Perimeter of Building
After the building is complete, the earth along the external perimeter of the building should be rodded at intervals of 150 mm and to a depth of 300 mm. The rods should be moved backward and forward parallel to the wall to break up the earth and chemical emulsion poured along the wall at the rate of 7.5 l/m² of vertical surfaces. After the treatment, the earth should be tamped back into place. Should the earth outside the building be graded on completion of building, this treatment should be carried out on completion of such grading.

7.6.1 In the event of filling being more than 300 mm, the external perimeter treatment shall extend to the full depth of filling up to the ground level so as to ensure continuity of the chemical barrier.

7.7 Treatment of Soil Under Apron Along External Perimeter of Building
Top surface of the consolidated earth over which the apron is to be laid shall be treated with chemical emulsion at the rate of 5 l/m² of the surface before the apron is laid. If consolidated earth does not allow emulsion to seep through, holes up to 50 to 75 mm deep at 150 mm centres both ways may be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion (see Fig. 3).

7.8 Treatment of Walls Retaining Soil Above Floor Level
Retaining walls like the basement walls or outer walls above the floor level retaining soil need to be protected by providing chemical barrier by treatment of retained soil in the immediate vicinity of the wall, so as to prevent entry of termites through the voids in masonry, cracks and crevices, etc above the floor level. The soil retained by the walls shall be treated at the rate of 7.5 l/m² of the vertical surface so as to effect a continuous outer chemical barrier, in continuation with that of the one formed under 7.2.

7.9 Treatment of Soil Surrounding Pipes, Wastes and Conduits
When pipes, wastes and conduits enter the soil inside the area of the foundations, soil surrounding the point of entry shall be loosened around each such pipe, waste or conduit for a distance of 150 mm and to a depth of 75 mm before treatment is commenced. When they enter the soil external to the foundations, they shall be similarly treated at a distance of over 300 mm unless they stand clear of the walls of the building by about 75 mm.

7.10 Treatment for Expansion Joints
Expansion joints at ground floor level are one of the biggest hazards for termite infestation. The soil beneath these joints should receive special attention when the treatment under 7.4 is carried out. This treatment should be supplemented by treating through the expansion joint after the sub-grade has been laid, at the rate of 2 litres per linear metre.
Stages of Treatment

A - Bottom and Sides of Trenches (see 7.2.1)
B - Backfill in Immediate Contact with Foundation Walls (see 7.2.2)
C - Junction of Wall and Floor (see 7.5)
D - Top Surface of Plinth Filling (see 7.4)
E - External Perimeter of Building (see 7.6)

**FIG. 1** TREATMENT OF TRENCH BOTTOM AND SIDES

**FIG. 2** TREATMENT FOR MASONRY FOUNDATIONS WITHOUT APRON
Stages of Treatment
A – Bottom and Sides of Trenches (see 7.2.1)
B – Backfill in Immediate Contact with Foundation Walls (see 7.2.2)
C – Junction of Wall and Floor (see 7.5)
D – Top Surface of Plinth Filling (see 7.4)
E – External Perimeter of Building (see 7.6)
F – Soil Below Apron (see 7.7)

FIG. 3 TREATMENT FOR MASONRY FOUNDATIONS WITH APRON ALONG EXTERNAL PERIMETER
FIG. 4 TREATMENT FOR RCC FOUNDATIONS

Stages of Treatment
A – Backfill in Immediate Contact with Foundation Structure (see 7.2.3)
B – Junction of Wall and Floor (see 7.5)
C – Top Surface of Plinth Filling (see 7.4)
D – External Perimeter of Building (see 7.6)
ANNEX A

( Foreword )

A SHORT NOTE ON TERMITES

A-1 CLASSIFICATION

A-1.1 Termites constitute a separate order of insects called ‘ISEPTORA’. Although, they are commonly called white ants, they are not related to ants. The front pair of wings of the ants are longer than their hind pair whereas in termites, both pairs are equal. There are over 2 300 species of termites of which about 220 are found in India. All these species are not considered to be serious pests.

A-1.2 According to their habits, termites can be divided into two well defined groups:

a) Subterranean or ground nesting termites which build nests in the soil and live in them, and
b) Non-subterranean or wood nesting termites which live in wood with no contact with soil.

A-1.3 Subterranean termites require moisture to sustain their life. They normally need access to ground at all times. They build tunnels between their nest and source of food through covered runways. These covered tunnels provide humidity conditions thus preventing desiccation and protection against predators, darkness necessary for their movement and for maintaining contact with earth. The subterranean termites enter a building from ground level, under the foundation, working their way upwards through floors, destroying all before them. So little is seen of these termite operations that sometimes the structural member attacked is found to be merely a shell with the inside completely riddled and eaten away.

A-1.4 The wood nesting species comprise drywood and dampwood termites. Drywood termites which predominate are able to live even in fairly drywood and with no contact with soil. These frequently construct nests within large dimensional timbers such as rafters, posts, door and window frames, etc, which they destroy, if not speedily exterminated. However, they are not as prevalent and common as subterranean termites, and are generally confined to coastal regions and interiors of eastern India.

A-1.5 A termite colony consists of a pair of reproductives, the so-called king and queen and a large number of sterile workers, soldiers, and nymphs. If, however, the queen is lost or destroyed, her place taken by a number of supplementary reproductive in some group of termites; thus by removing the queen, the colony will not be destroyed. All the work of the colony is carried out by the workers. Guarding the colony is the work of the soldiers. The adult workers and soldiers are wingless. The workers are generally greyish white in colour. The soldiers are generally darker than the workers and have a large head and longer mandibles. There are, however, other types of soldiers whose mandibles are small, degenerated and functionless; instead the frontal part of the head is prolonged to form a long nasus; they dispel the enemy by squirting out white poisonous fluid through the nasus. The reproductives, that is, the flying adults, have brown or black bodies and are provided with two pairs of long wings of almost equal size in contrast to the reproductives of ants which have two pair of wings of unequal size.

A-1.6 The food of the termite is cellulosic material like timber, grass, stumps of dead trees, droppings of herbivorous animals, paper, etc. Once termites have found a suitable foot-hold in or near a building, they start spreading slowly from a central nest through underground and over-ground galleries in the case of subterranean termites, and galleries within the structural member. Once they get direct access to them in the case of drywood termites. In their search for food they by pass any obstacle like concrete or resistant timber to get a suitable food many metres away.

A-1.7 In subterranean termite colony, the workers feed the reproductives, soldiers, winged adults and young nymphs. One of the habits of the termites which is of interest is the trophallaxis by means of which food and other material remain in circulation among different members of the colony. Workers are also in the habit of licking the secretions of exudating glands of the physogastric queen.

A-2 DEVELOPMENT OF TERMITE COLONY

A-2.1 At certain periods of the year, particularly after a few warm days followed by rain, emergence of winged adults on colonizing flights, occurs. This swarming, also called the nuptial flight, may take place any time during the monsoon or post-monsoon period. The fight is short and most of the adults perish due to one reason or the other. The surviving termites soon find their mates, shed their wings and establish a colony if circumstances are favourable. The female of the pair or queen produces a few eggs in the first year. The first batch of the brood comprises only of workers. The rate of reproduction however, increases rapidly after 2 to 3 years. Although a colony may increase in size comparatively rapidly, very little damage may occur in a period less than 8 to 10 years. Any serious damage that may occur in a short time is perhaps due to heavy infestation in the initial stages due to large
population of termites existing in the soil before the building is constructed.

A-3 RECOGNIZING THE PRESENCE OF TERMITE INFESTATION IN BUILDING

A-3.1 Swarms of winged reproductives flying from the soil or wood are the first indication of termite infestation in a building. Often the actual flight may not be observed but the presence of wings discarded by them will be a positive indication of a well established termite colony nearby. Termite damage is not always evident from the exterior in the case of subterranean termites, since they do not reduce wood to a powdery mass of particles like some of the wood borers or drywood termites. These termites are also recognized by the presence of earth-like shelter tubes which afford them the runways between soil and their food.

A-3.2 Drywood termites on the contrary may be recognized by their pellets of excreta. Non-subterranean termites excrete pellets of partly digested wood. These may be found in tunnels or on the floor underneath the member which they have attacked. These termites may further be noticed by blisters on wood surfaces due to their forming chambers close to the surface by eating away the wood and leaving only a thin film of wood on the surface. Also the hollow sound on tapping structural timber will indicate their destructive activity inside.

ANNEX B

( Clause 2 )

LIST OF REFERRED INDIAN STANDARDS

<table>
<thead>
<tr>
<th>IS No.</th>
<th>Title</th>
<th>IS No.</th>
<th>Title</th>
</tr>
</thead>
</table>

ANNEX C

( Clause 5.3 )

SAFETY PRECAUTIONS

C-1 PRECAUTIONS FOR HEALTH HAZARDS AND SAFETY MEASURES

C-1.1 All the chemicals mentioned in 5.3 are poisonous and hazardous to health. These chemicals can have an adverse affect upon health when absorbed through the skin, inhaled as vapours or spray mists or swallowed. Persons handling or using these chemicals should be warned of these dangers and advised that absorption through the skin is the most likely sources of accidental poisoning. They should be cautioned to observe carefully the safety precautions given in C-1.2 to C-1.5 particularly when handling these chemicals in the form of concentrates.

C-1.2 These chemicals are brought to the site in the form of emulsifiable concentrates. The containers should be clearly labelled and should be stored carefully so that children and pets cannot get at them. They should be kept securely closed.

C-1.3 Particular care should be taken to prevent skin contact with concentrates. Prolonged exposure to dilute emulsions should also be avoided. Workers should wear clean clothing and should wash thoroughly with soap and water specially before eating and smoking. In the event of severe contamination, clothing should be removed at once and the skin washed with soap and water. If chemicals splash into the eyes they shall be flushed with plenty of soap and water and immediate medical attention should be sought.

C-1.4 The concentrates are oil solutions and present a fire hazard owing to the use of petroleum solvents. Flames should not be allowed during mixing.

C-1.5 Care should be taken in the application of soil toxicants to see that they are not allowed to contaminate wells or springs which serve as sources of drinking water.

C-1.6 In case of poisoning, suitable measures shall be taken for protection in accordance with IS 4015.
ANNEX D
(Foreword)
COMMITTEE COMPOSITION

Building Construction Practices Sectional Committee, CED 13

Organization
In personal capacity (D-6 Sector 55, Noida 201301)
Bhabha Atomic Research Centre, Mumbai,

Builders Association of India, Chennai
Building Materials & Technology Promotion Council, New Delhi

Central Building Research Institute, Roorkee
Central Public Works Department, New Delhi

Central Road Research Institute, New Delhi
Central Vigilance Commission, New Delhi

Delhi Development Authority, New Delhi
Engineer-in-Chief’s Branch, New Delhi

Engineers India Limited, New Delhi
Forest Research Institute, Dehra Dun

Hindustan Prefab Ltd, New Delhi
Hindustan Steel Works Construction Ltd, Kolkata

Housing & Urban Development Corporation, New Delhi
Indian Institute of Architects, Mumbai

Indian Oil Corporation, Mathura
Indian Pest Control Association, New Delhi

Life Insurance Corporation of India, New Delhi
Ministry of Railways, Lucknow

National Buildings Construction Corporation Ltd, New Delhi
National Industrial Development Corporation Ltd, New Delhi

National Project Construction Corporation, New Delhi
Public Works Department, Government of Arunachal Pradesh, Itanagar
Public Works Department, Government of Maharashtra, Mumbai

Public Works Department, Government of Punjab, Patiala
Public Works Department, Government of Rajasthan, Jaipur

State Bank of India, New Delhi
Structural Engineering Research Centre, Chennai

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CHIEF ENGINEER (BUILDING)

DIRECTOR (R & D) (Alternate)

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CHIEF ENGINEER (BUILDING)

SUPERINTENDING ENGINEER (BUILDING) (Alternate)

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SHRI K. MANI

SHRI H. G. SREENATH (Alternate)

SHRI S. K. JAIN, Director (Civ Engg)
[Representing Director General (Ex-officio)]

Member-Secretary
SHRIMATI RACHNA SEHGAL
Deputy Director (Civ Engg), BIS

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(Continued from page 9)

Timber Engineering Subcommittee, CED 13 : 4

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Central Building Research Institute, Roorkee
Central Public Works Department, New Delhi
DENOCIL, Mumbai
Engineer-in-Chief's Branch, New Delhi
Forest Research Institute, Dehra Dun
Hindustan Prefab Limited, New Delhi
Indian Institute of Technology, Chennai
Indian Plywood Industries Research & Training Institute, Bangalore
Institution of Surveyors, New Delhi
Kerala Forest Research Institute, Peechi
Indian Institute of Technology, Delhi
Ministry of Agriculture, Faridabad
National Building Construction Corporation Ltd, New Delhi
National Environment Engineering Research Institute, Nagpur
National Chemical Laboratory, Pune
PVM Processed Timber (India) Pvt Ltd, Mumbai
Public Works Department, Government of Kerala, Thiruvananthapuram
Public Works Department, Government of Madhya Pradesh, Bhopal
Public Works Department, Government of Tamil Nadu, Chennai
Pest Control India Ltd, Mumbai
Research, Designs and Standards Organization, Lucknow
RITES, New Delhi
Regional Research Institute, Jorhat
Structural Engineering Research Centre, Ghaziabad
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This Indian Standard has been developed from Doc: No. CED 13 (5700).

Amendments Issued Since Publication

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Printed at Simco Printing Press, Delhi