IS : 6313 (Part I) - 1981
(Reaffirmed 1995)

Indian Standard

CODE OF PRACTICE FOR ANTI-TERMITE MEASURES IN BUILDINGS

PART I CONSTRUCTIONAL MEASURES

(First Revision)

Fifth Reprint FEBRUARY 1998

UDC 699·878·3 : 595·73 : 69·001·3

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 7 *March* 1982

Indian Standard

CODE OF PRACTICE FOR ANTI-TERMITE MEASURES IN BUILDINGS

PART I CONSTRUCTIONAL MEASURES

(First Revision)

Building Construction Practices Sectional Committee, BDC 13

Chairman

SHRI C. P. MALIK
C-4/38, Safdarjung Development Area
New Delhi

Members	*Representing*
SHRI SURAJ S. J. BAHADUR	Housing & Urban Development Corporation Limited, New Delhi
SHRI D. R. BATLIVALA	Bhabha Atomic Research Centre, Bombay
SHRI J. R. BHALLA	Indian Institute of Architects, New Delhi
SHRI M. G. BHARGAVA	Public Works Department, Government of Uttar Pradesh, Lucknow
SHRI R. K. MATHUR (*Alternate*)	
CHIEF ENGINEER (NORTH)	Public Works Department, Government of Punjab
CHIEF ENGINEER (BLDGS), PWD, MADRAS	Public Works Department, Government of Tamil Nadu, Madras
SUPERINTENDING ENGINEER (SPECIAL BUILDING CIRCLE), PWD, MADURAI (*Alternate*)	
CHIEF ENGINEER-CUM-ADDITIONAL SECRETARY TO THE GOVERNMENT (B&R)	Public Works Department, Government of Rajasthan, Jaipur
EXECUTIVE ENGINEER (DESIGN & SPECIFICATION) (*Alternate*)	
CHIEF ENGINEER (TRAINING)	Central Public Works Department, New Delhi
SUPERINTENDING SURVEYOR OF WORKS (TRAINING) (*Alternate*)	
DIRECTOR (ARCHITECTURE), RDSO, LUCKNOW	Railway Board (Ministry of Railways)
JOINT DIRECTOR (ARCHITECTURE), RDSO, LUCKNOW (*Alternate*)	

(*Continued on page* 2)

(*Continued from page* 1)

Members	*Representing*
SHRI H. S. DUGAL	Builders' Association of India, New Delhi
BRIG HARISH CHANDRA (*Alternate*)	
SHRI T. A. E. D'SA	Concrete Association of India, Bombay
SHRI N. C. DUGGAL (*Alternate*)	
SHRI R. G. GOKHALE	State Bank of India, Bombay
SHRI J. S. KOHLI	Engineer-in-Chief's Branch, Army Headquarters, New Delhi
SHRI M. G. VIRMANI (*Alternate*)	
SHRI R. L. KUMAR	Institution of Surveyors, New Delhi
SHRI K. S. KHARB (*Alternate*)	
SHRI M. Z. KURIEN	Tata Consulting Engineers, Bombay
SHRI G. K. MAJUMDAR	Hindustan Prefab Ltd, New Delhi
SHRI H. S. PASRICHA (*Alternate*)	
SHRI R. C. MANGAL	Central Building Research Institute (CSIR), Roorkee
SHRI M. P. JAI SINGH (*Alternate*)	
OFFICER-IN-CHARGE	Forest Research Institute & Colleges, Dehra Dun
SHRI P. K. PANDARE	Life Insurance Corporation of India, Bombay
DEPUTY CHIEF ENGINEER (NORTH) (*Alternate*)	
SHRI T. K. SARAN	Bureau of Public Enterprises (Ministry of Finance), New Delhi
SHRI S. S. KAIMAL (*Alternate*)	
SHRI S. R. SIVASWAMY	Gammon India Ltd, Bombay
SHRI H. D. MATANGE (*Alternate*)	
SHRI K. S. SRINIVASAN	National Buildings Organization, New Delhi
DEPUTY DIRECTOR (*Alternate*)	
SHRI SUSHIL KUMAR	National Buildings Construction Corporation Ltd, New Delhi
PROF C. G. SWAMINATHAN	Central Road Research Institute (CSIR), New Delhi
SHRI S. R. TAMBE	Public Works & Housing Department, Government of Maharashtra, Bombay
SHRI B. T. UNWALLA	Institution of Engineers (India), Calcutta
SHRI G. VENKATESULU	Ministry of Shipping & Transport (Roads Wing), New Delhi
SHRI PRAFULLA KUMAR (*Alternate*)	
SHRI G. RAMAN, Director (Civ Engg)	Director General, ISI (*Ex-officio Member*)

Secretary
SHRI S. SENGUPTA
Assistant Director (Civ Engg), ISI

Timber Engineering Subcommittee, BDC 13 : 4

Convener

SHRI A. N. BAJAJ	Forest Research Institute & Colleges, Dehra Dun

Members

SHRI R. K. GUPTA (*Alternate* to SHRI A. N. Bajaj)

(*Continued on page* 26)

Indian Standard

CODE OF PRACTICE FOR ANTI-TERMITE MEASURES IN BUILDINGS

PART I CONSTRUCTIONAL MEASURES

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part I) (First Revision) was adopted by the Indian Standards Institution on 30 November 1981, after the draft finalized by the Building Construction Practices Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 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, furnishing, clothings, stationery, etc. Termites are also known to damage non-cellulosic substance in their search for food. Rubber, leather, plastic, neoprene as well as lead coating used for covering of underground cables are damaged by termites. The wide spread damage by termites, high cost of buildings and increased cost involved in repairs and replacements of portions damaged by termites have necessitated evolving suitable measures for preventing access of termites to buildings.

0.3 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* Appendix 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 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 underground foraging galleries from which the attack may spread well above ground level, either inside the wood or by way of mud-walled shelter tubes on the outside. Timber resting on the materials which termites do not attack may be reached by means of shelter tubes constructed within, or over

such materials or else by the erection of an independent, free standing structure.

0.4 Prevention of possible invasion by the subterranean termites from the ground to the building through external entry or internal attack from under floors should be undertaken by: (a) external preventive-cum-detection methods, for example, masonry groove or termite shield or string course and cement concrete apron floor; (b) internal preventive methods, such as providing solid type floor. The constructional measures recommended in this part of the standard for the control of termites are the result of actual scientific investigations but might need modifications depending on the local conditions. The measurers are essentially mechanical in nature, and it is recommended that all measures as specified in this part shall be provided together to be most effective. It is also recommended that measures specified in Parts I, II and III of the standard should be carried out independently in order to provide complete protection to a building. Part II of the standard lays down preconstructional chemical treatment measures and Part III treatment for exsisting buildings.

0.5 This standard was first published in 1971. In view of number of comments received and further knowledge that has become available, the Committee responsible for formulation of this standard decided to revise the same. In this standard the details of internal and external anti-termite constructional methods have been updated and the sketches supporting the various stages of anti-termite construction have been modified. More information about the behaviour of termites has been added which may help in more careful detection of termites in buildings. This revision also take into account Amendment No. 1 issued to the earlier version of the standard.

0.6 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*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part I) covers anti-termite constructional measures for the control of subterranean termites in buildings.

2. PRELIMINARY CONSTRUCTIONAL OPERATIONS

2.1 Presence of Termites — The presence of termites in an area where it is proposed to construct buildings may be recognised by either carrying

*Rules for rounding off numerical values (*revised*).

out stake test (*see* **2.1.1**) at the site or by depending upon the experience of the inhabitants of that area. The site shall then be graded so that the drainage is maintained all round the building. Care shall be taken to see that all wooden debris, roots, leaves, stumps and other organic matters are not accumulated or buried near the foundation or under the floor of the building. If the site is covered by soil rich in decaying matter, the top layer of soil (about 50 to 100 mm) shall be removed.

2.1.1 *Stake Test* — A number of stakes 50 × 50 mm of timber species which are susceptible to termites, such as chir, kail, mango, etc, should be buried at least 150 mm in the ground, spaced at 1 m centre to centre at the proposed construction site. After a period of 3-4 months, the stakes may be taken out and the infestation of termites observed. The presence of termites in the area will damage the stakes.

2.2 Measures for Elimination of Moisture — Drainage around the building site shall be ensured so that water does not stagnate in the vicinity of the building. Access of water to the underside of the ground floor shall be prevented through proper constructional measures, such as construction of concrete apron around the building.

2.3 Foundation and Sub-Base of Ground Floor — Every effort shall be made in the construction of foundation so as to avoid voids. The earth and sand filling around the foundations and in the sub-base should be fully rammed so as to prevent any subsidence in the soil. Where jointless sub-base is not possible, precautions may be taken to prevent crack formation and the joints are sealed. If concreting of sub-base has to be resumed on a surface which has hardened, such surfaces shall be roughened, swept clean, thoroughly wetted and covered with a 15 mm layer of mortar composed of cement and sand in the same ratio as in the concrete mix. This layer of mortar shall be freshly mixed and laid immediately before placing of concrete. When concrete has not fully hardened all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of particles of aggregates. The surface shall be thoroughly wetted and all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm in thickness and shall be well rammed against old work, particular attention being paid to corners and close spots.

2.4 Selection of Timber — Seasoned timber which is naturally durable in heartwood and which is treated to withstand the attack of subterranean termites, should be used in the building structure (*see* IS : 401-1967* and IS : 1141-1973†).

*Code of practice for preservation of timber (*second revision*).

†Code of practice for seasoning of timber (*first revision*).

3. DESIGN CONSIDERATION

3.1 In a conventional building not protected by anti-termite measures, the probability of attack by external entry of termites from plinth and foundation walls is very little, whereas the probability of internal attack of termites through floors and plinth filling is great.

3.2 Anti-termite constructional measures will only be effective if both external and internal protection are adequately provided. The external protection refers to prevention of termite access on the surrounding area of the building and internal protection refers to access from the soil under the floor area. For external protection, provision of metal shields or masonary grooves around the periphery of the building and cement concrete apron around the building are recommended. To act efficiently as a termite barrier, the shape of the metal shield shall be properly maintained. For internal protection the concrete sub-base shall be extended under the walls so that the entire plinth area is fully covered without any break. In case of depressed floors like lift wells, bathrooms, garrage pits, etc, the sub-base should be continuous. Furthermore, the concrete flooring shall be laid over a layer of coarse sand (of size larger than 3 mm) as the sand layer checks the soil moisture rising up. The details of construction for protection against termites are covered in **4** and **5.**

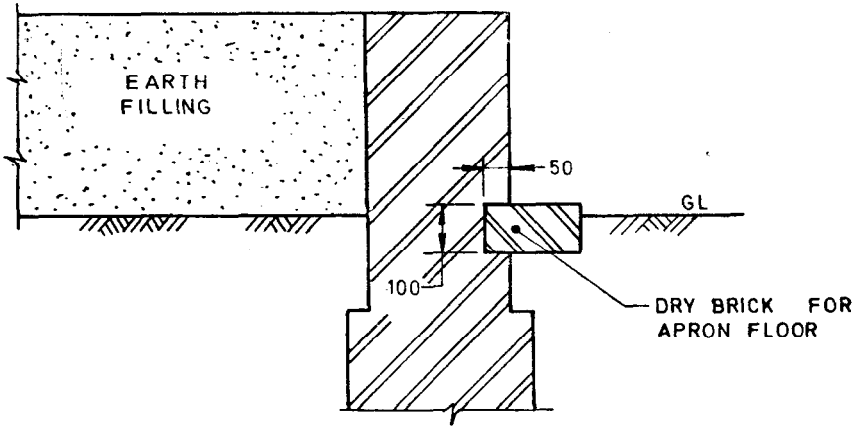
3.3 Termites generally do not penetrate masonry or concrete in which there are no voids. Masonry with lime mortar of mix leaner than 1 : 3 shall not be used to be in contact with soils where the concrete floor has not been laid. If the floor construction gives rise to vertical joints between the floor and the plinth masonry, these joints may be filled with heavy grade coal tar pitch conforming to IS : 216-1961* to minimize the tendency of termites to infiltrate through these joints.

4. INTERNAL AND EXTERNAL ANTI-TERMITE CONSTRUCTIONAL METHODS

4.1 The construction measures specified in **4.1.1** to **4.1.8** should be adopted for protection against subterranean termites originating both internally from within the plinth and externally from the area surrounding the building.

4.1.1 Earth free from roots, dead leaves, or other organic matter shall be placed and compacted in successive horizontal layers of loose material not more than 200 mm thick. Dry brick shall be inserted at least 50 mm in brick masonry for providing apron floor alround the periphery (*see* Fig. 1).

*Specification for coal tar pitch (*revised*).



All dimensions in millimetres.

FIG. 1 ANTI-TERMITE CONSTRUCTION — STAGE 1

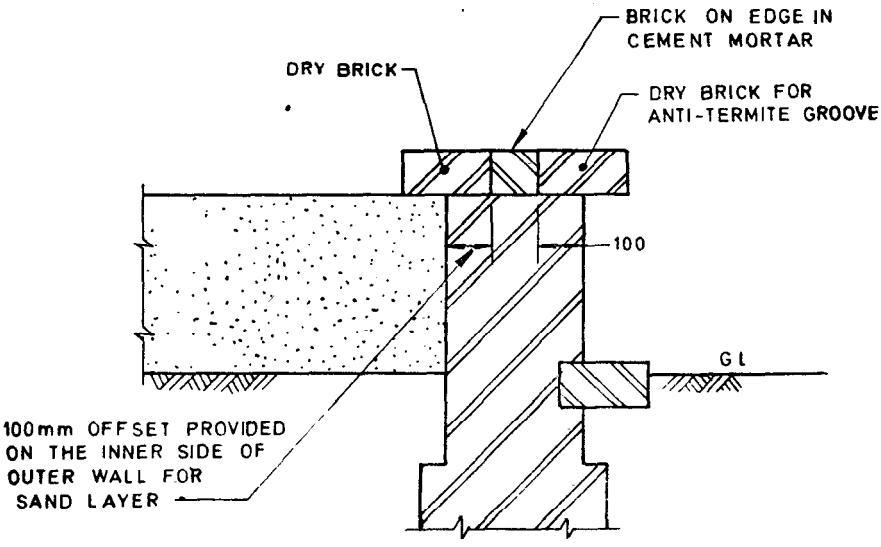
4.1.2 Brick on edge masonry in cement mortar shall be laid on the plinth wall. Dry brick shall be placed on the inner side of plinth wall for getting anticipated offset space for coarse sand and on the other side for installing anti-termite masonry groove. In the case of intermediate walls, dry bricks are placed on either side of the brick on edge masonry for getting offset space for coarse sand layer (*see* Fig. 2).

4.1.3 The dry brick for the anti-termite groove shall be taken out and dense cement concrete 1 : 3 : 6 (1 cement : 3 sand : 6 coarse aggregate, by volume) sub-floor carpet shall be laid casting the anti-termite groove in position. In case of internal partition walls, the cement concrete sub-floor shall be laid on either side over the dry bricks to sufficient extent for getting staggered vertical joints over the joint of plinth wall and earth filling (*see* Fig. 3).

4.1.4 Superstructure masonry shall be raised over the dense cement concrete sub-floor carpet and over-head jobs completed (*see* Fig. 4).

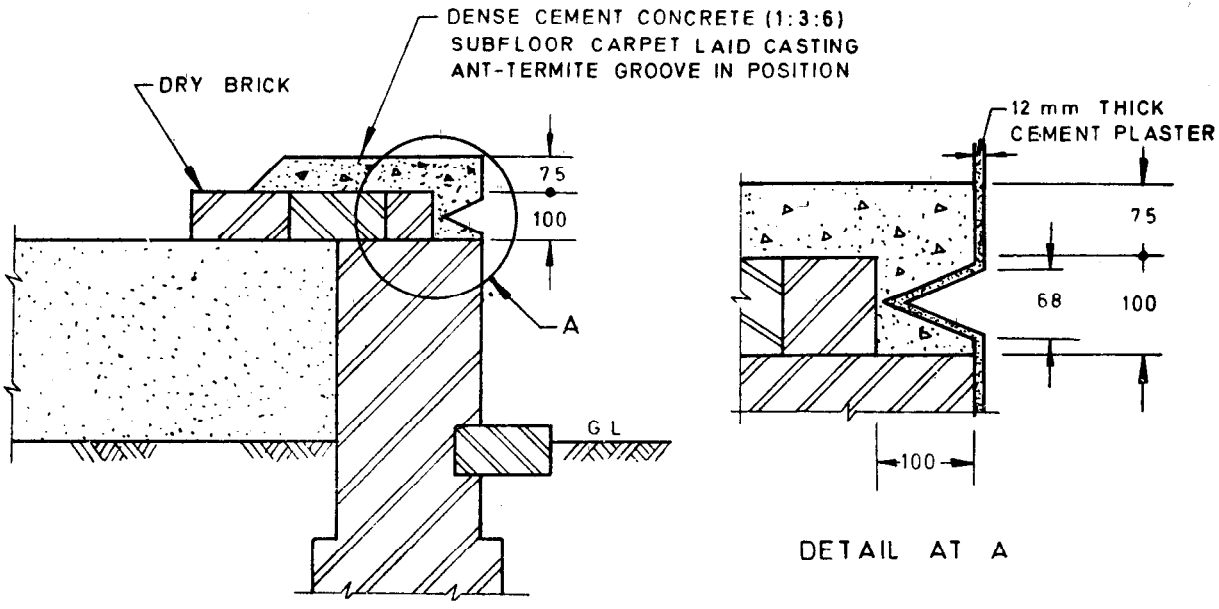
4.1.5 The dry brick for coarse sand layer shall be removed and graded sand (of size 3 to 5 mm) layer at least 100 mm thick shall be compacted over the earth filling and underneath the partially laid dense cement concrete sub-floor carpet (*see* Fig. 5).

4.1.6 Dense cement concrete (1 : 3 : 6 mix) sub-floor at least 75 mm thick shall be laid over the sand filling. Necessary finish may be provided to the cement concrete sub-floor carpet (*see* Fig. 6).



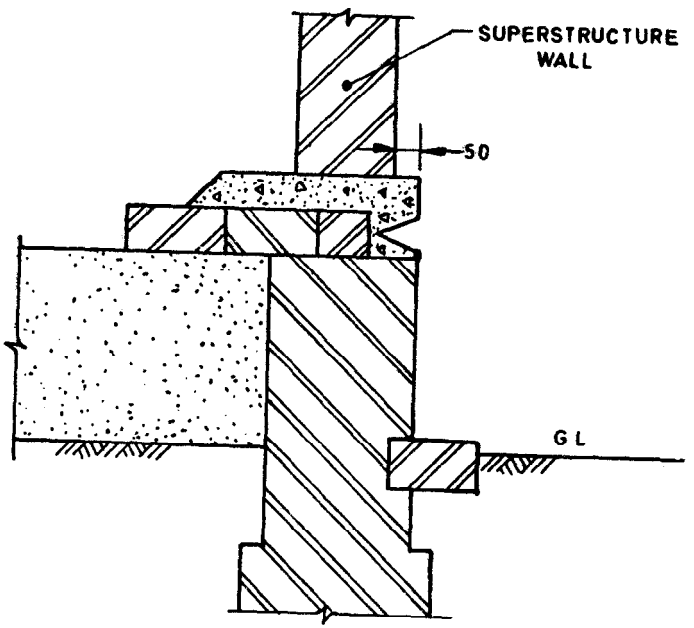
All dimensions in millimetres.

FIG. 2 ANTI-TERMITE CONSTRUCTION — STAGE 2



All dimensions in millimetres.

FIG. 3 ANTI-TERMITE CONSTRUCTION — STAGE 3



All dimensions in millimetres.

FIG. 4 ANTI-TERMITE CONSTRUCTION—STAGE 4

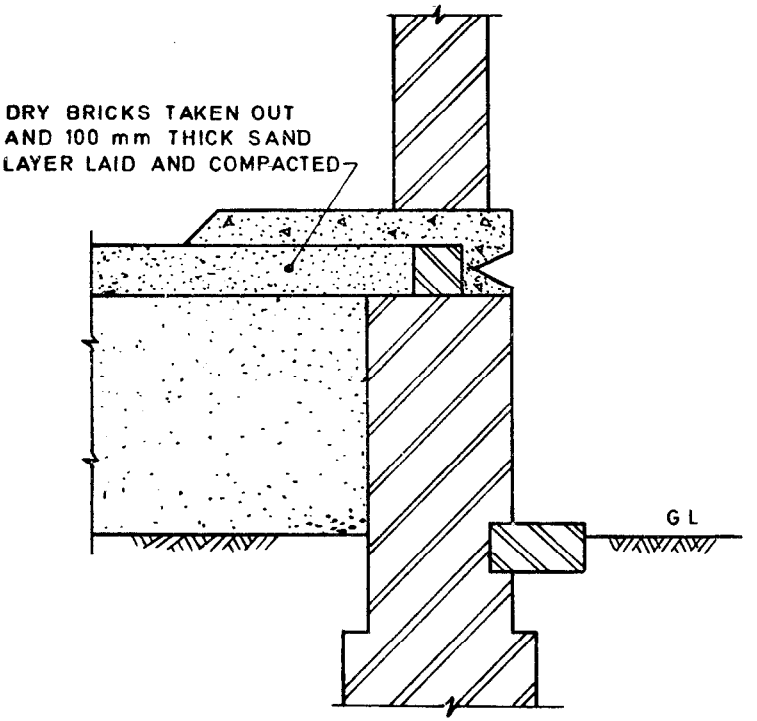


FIG. 5 ANTI-TERMITE CONSTRUCTION — STAGE 5

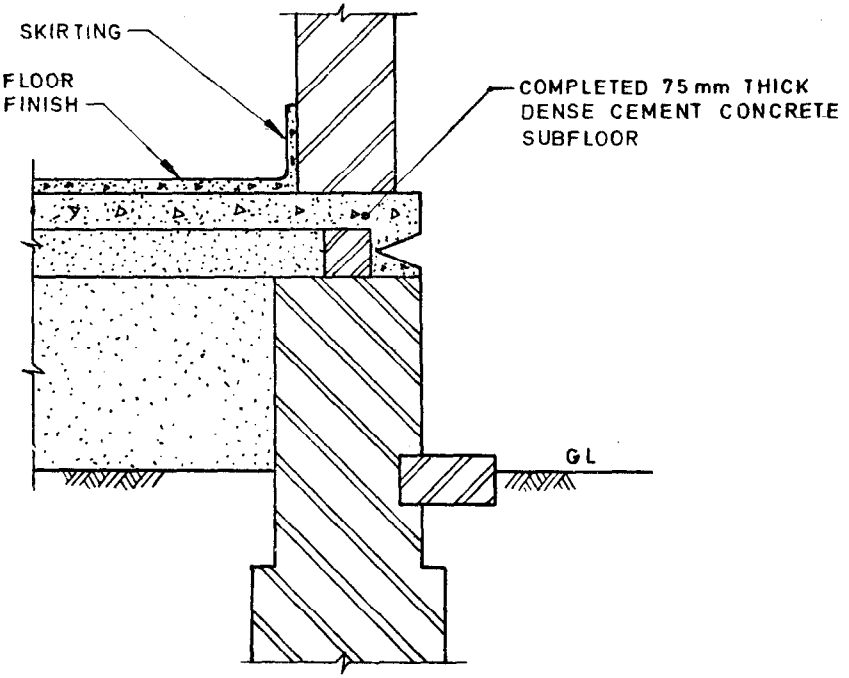
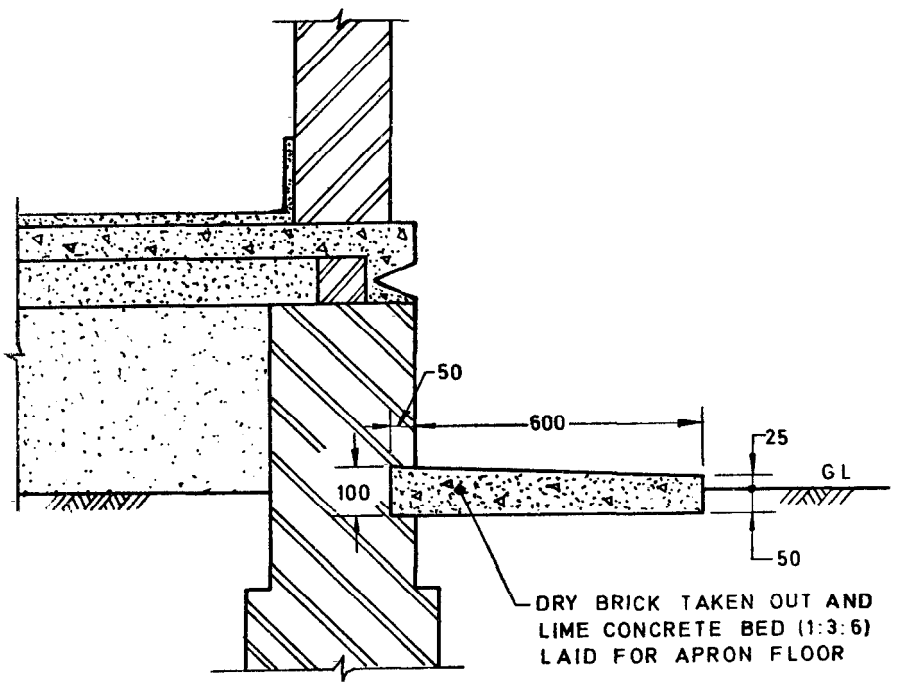


FIG. 6 ANTI-TERMITE CONSTRUCTION — STAGE 6

4.1.7 Dry brick provided for apron floor (*see* **4.1.1**) shall be taken out and 600 mm wide formation of earth in 1 : 30 slope shall be made. Over the formation, 75 mm thick lime concrete 1 : 3 : 6 (1 lime : 3 sand : 6 coarse aggregate, by volume) shall be laid (*see* Fig. 7).



All dimensions in millimetres.

FIG. 7 ANTI-TERMITE CONSTRUCTION — STAGE 7

4.1.8 Over the 75 mm thick lime concrete bed at least 25 mm thick cement concrete topping 1 : 2 : 4 (1 cement : 2 sand : 4 fine aggregate, by volume) shall be laid and 12 mm thick cement plaster shall be applied on foundation and plinth (*see* Fig. 8).

4.2 The final recommendations incorporating the constructional details given in **4.1.1** to **4.1.8** are shown in Fig. 9.

4.3 Figure 10 shows the anti-termite constructional details recommended in the case of stone masonry.

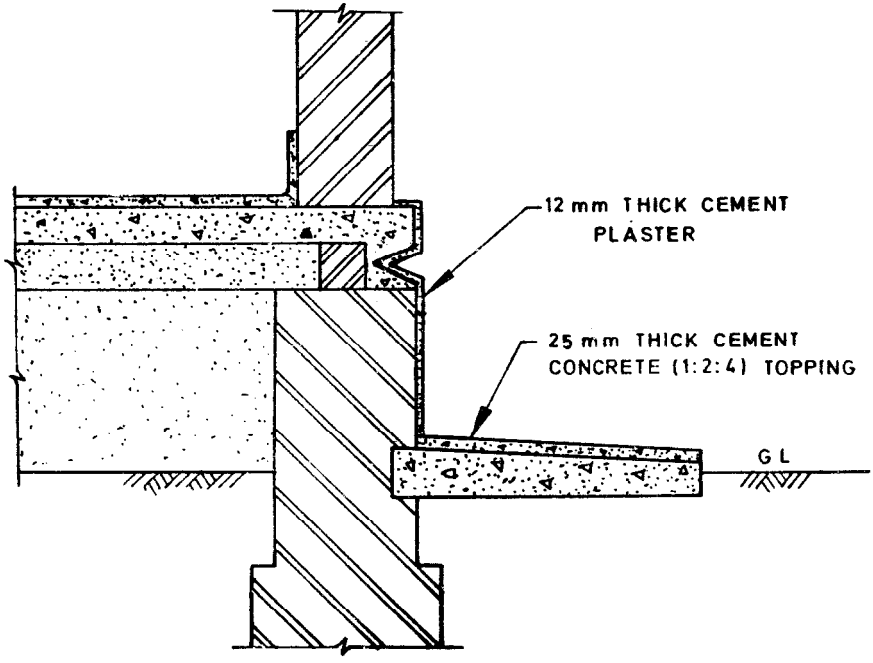
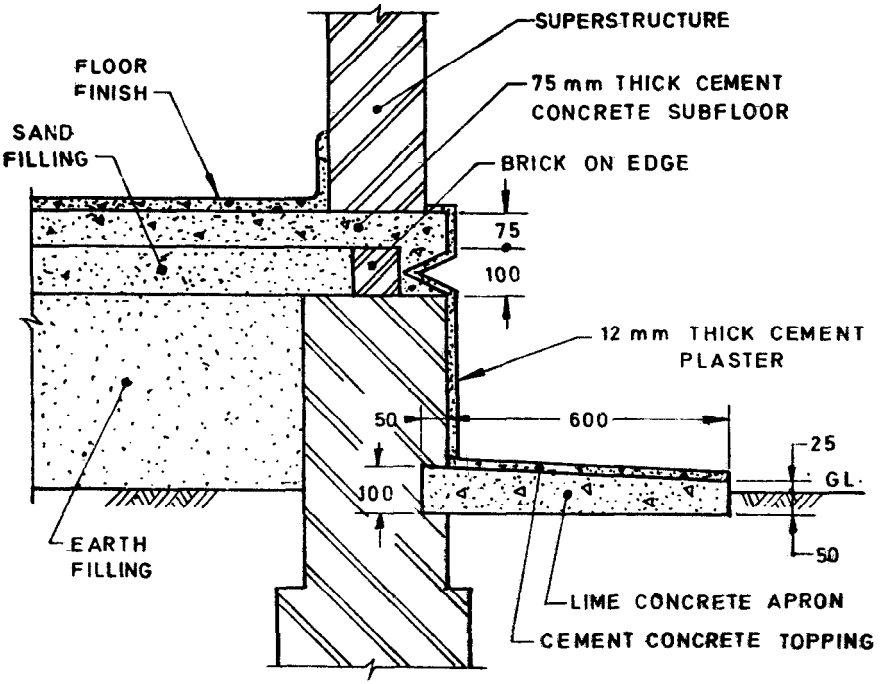
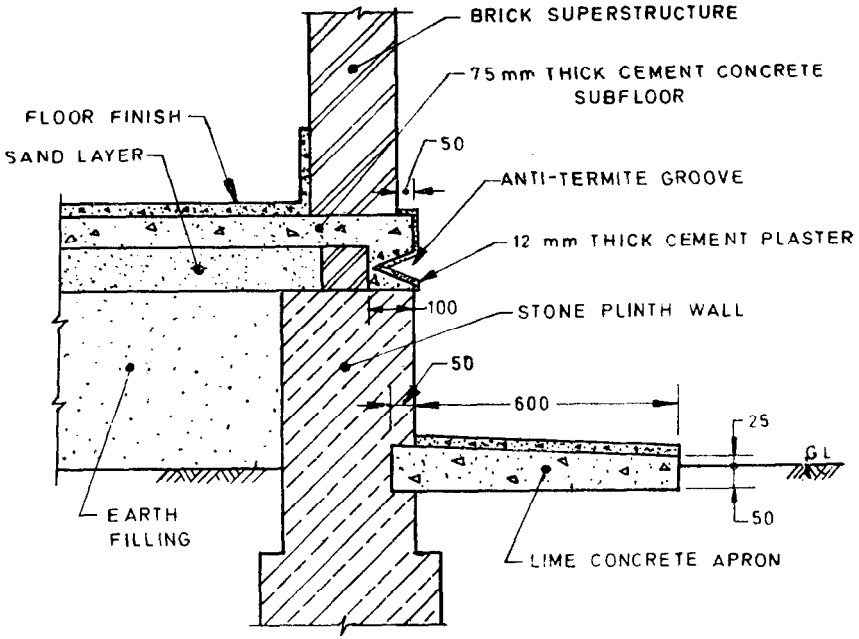


FIG. 8 ANTI-TERMITE CONSTRUCTION — STAGE 8



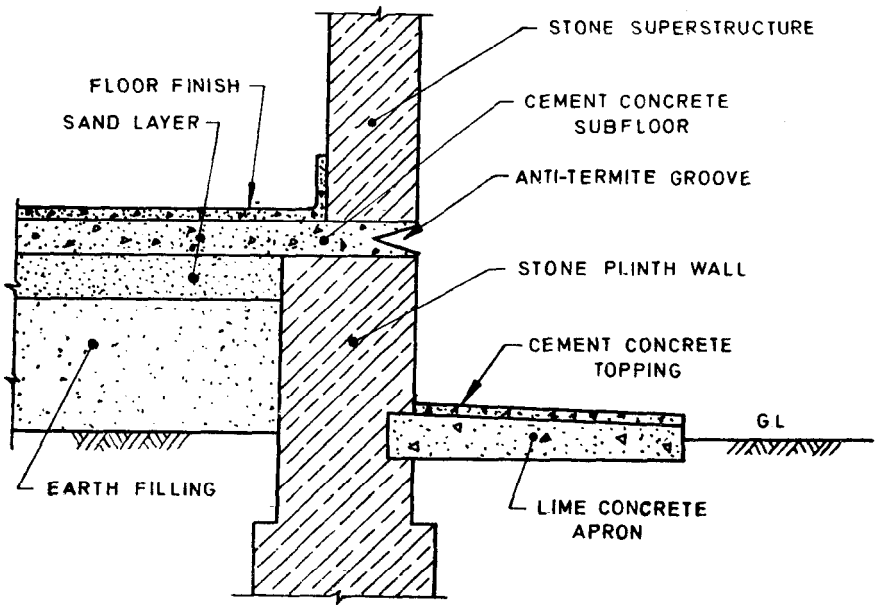
All dimensions in millimetres.

FIG. 9 ANTI-TERMITE CONSTRUCTION — FINAL RECOMMENDATIONS



10A

All dimensions in millimetres.



10B

FIG. 10 ANTI-TERMITE CONSTRUCTION IN STONE MASONRY WALL

5. INSTALLATION OF TERMITE SHIELDS, CAPS AND FRAMES

5.1 Function of Termite Shields, Caps, Frames and Masonry Grooves — The function of termite shields, caps, frames and masonry grooves is to cause termites to build their entry tunnels in positions where they can be detected during regular or other inspections and so facilitate appropriate control measures being taken. It is stressed that to give complete protection, regular and periodical inspections of the barriers are always necessary. The time interval between inspections should be determined by the local hazards.

5.2 Termite Shields

5.2.1 Termite shields may be installed round the periphery of a building where infestation of termite is high. Provision of metal shields takes care of external protection only. For the metal shield to function effectively, it is essential that it is installed correctly and the shape of the shield shall be maintained properly which requires periodical inspection after installation.

NOTE — The initial high cost of installation, frequent maintenance, occasional replacement after installation and also sharp edge of the metal shield projecting out causing injuries to the children playing near by, are some of the disadvantages for adopting metal shields in residential buildings. The metal termite shields may be conveniently used for grain storage godowns, warehouses, etc.

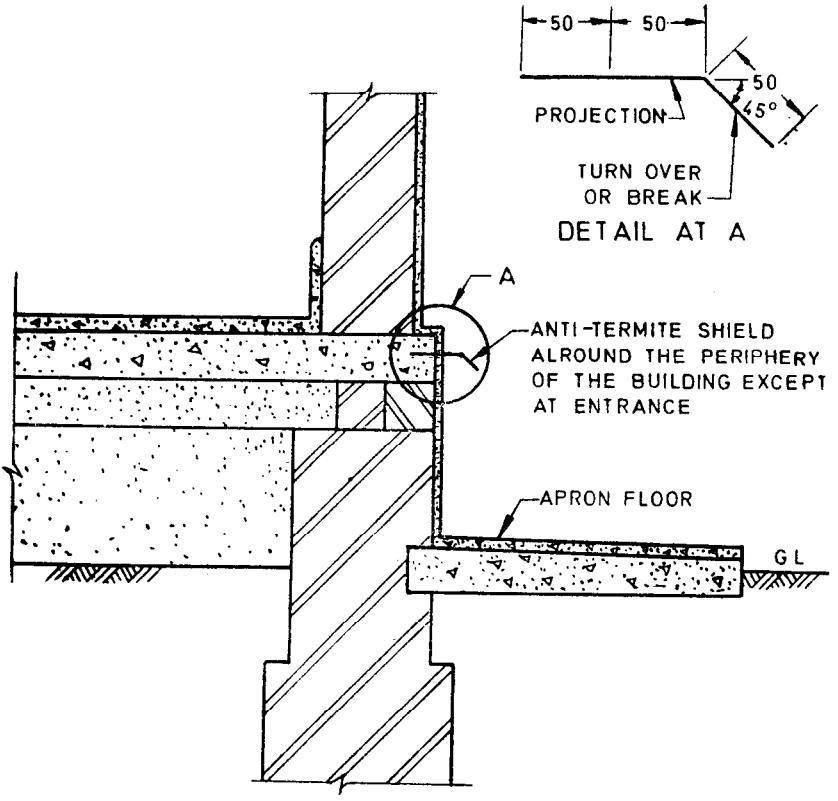
5.2.2 Termite shield shall be made out of galvanised steel sheets of thickness not more than 0·63 mm and conforming to IS : 277-1969*.

5.2.3 At least 50 mm width of termite shield shall be properly embedded in the cement concrete sub-floor with 50 mm horizontal projection on the external side of the wall and further projection of 50 mm bent downwards at an angle of 45°. The 50 mm embedment of termite shield in concrete sub-floor facilitates its easy replacement whenever required (*see* Fig. 11).

5.2.4 At entrances and doorways, where installation of termite shield is not practicable anti-termite masonry groove is installed (*see* Fig. 12). Necessary construction arrangements shall be made at the junction of termite shield and groove to ensure that entry of termite is prevented (*see* Fig. 13).

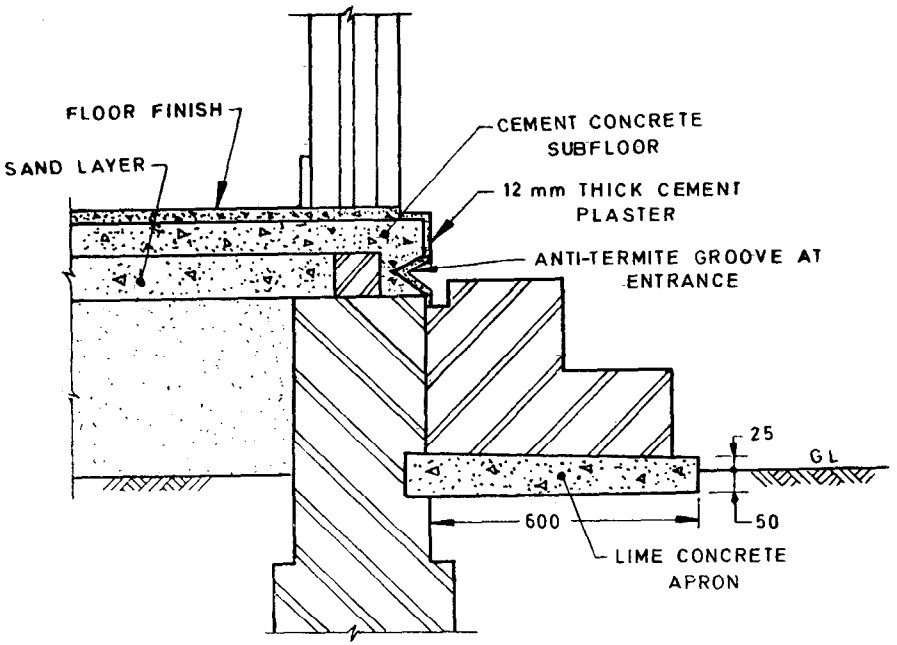
5.2.5 Joints in termite shields shall be made by lapping ends at least 20 mm lengthwise and soldering them. A piece of 20 × 10 mm shall be cut off from the lower end portion of one of the pieces before soldering the two ends so that the thickness of the free edge remains constant throughout as specified. It is necessary that the free edge is maintained thin as termites are capable of negotiating around blunt edges.

*Specification for galvanized steel sheets (plain or corrugated) (*third revision*).



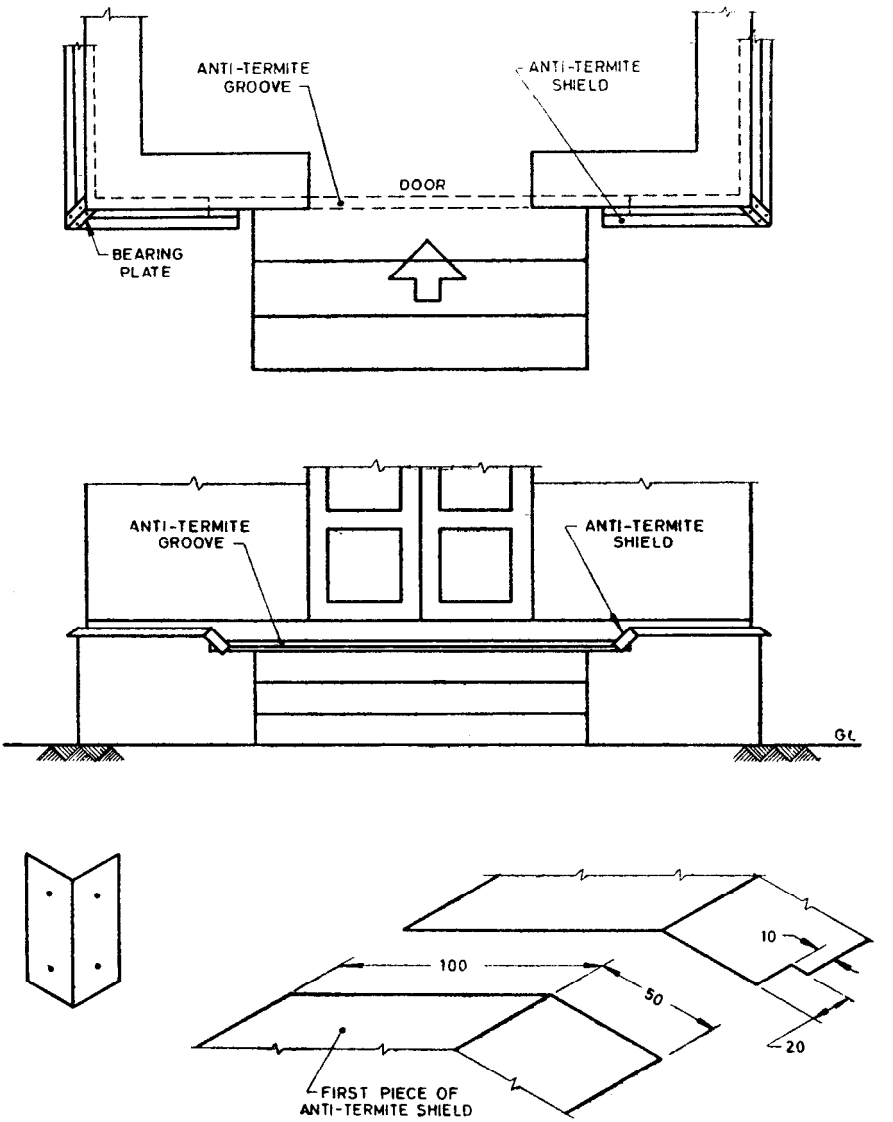
All dimensions in millimetres.

FIG. 11 TERMITE SHIELD AT PLINTH LEVEL



All dimensions in millimetres.

FIG. 12 ANTI-TERMITE GROOVE AT ENTRANCE



All dimensions in millimetres.

FIG. 13 CONSTRUCTION ARRANGEMENT AT THE JUNCTION OF TERMITE SHIELD AND GROOVE

5.3 Installation of Termite Caps — Termite caps shall be used in the case of basement with support where timber sections occur over them in the case of columns. The termite caps shall be kept at plinth level covering the whole of the section in the plinth below providing the necessary projection of 50 mm beyond the outer edge of the column on all sides and also the turnover of 50 mm width. In case of down-water-pipes the termite cap shall be fitted on the pipe in the form of a ring. The projection and turn-over shall be the same as specified for termite shields in general. The bottom portion of down-water-pipe should be at least 200 mm away from wall (*see* Fig. 14 and 15).

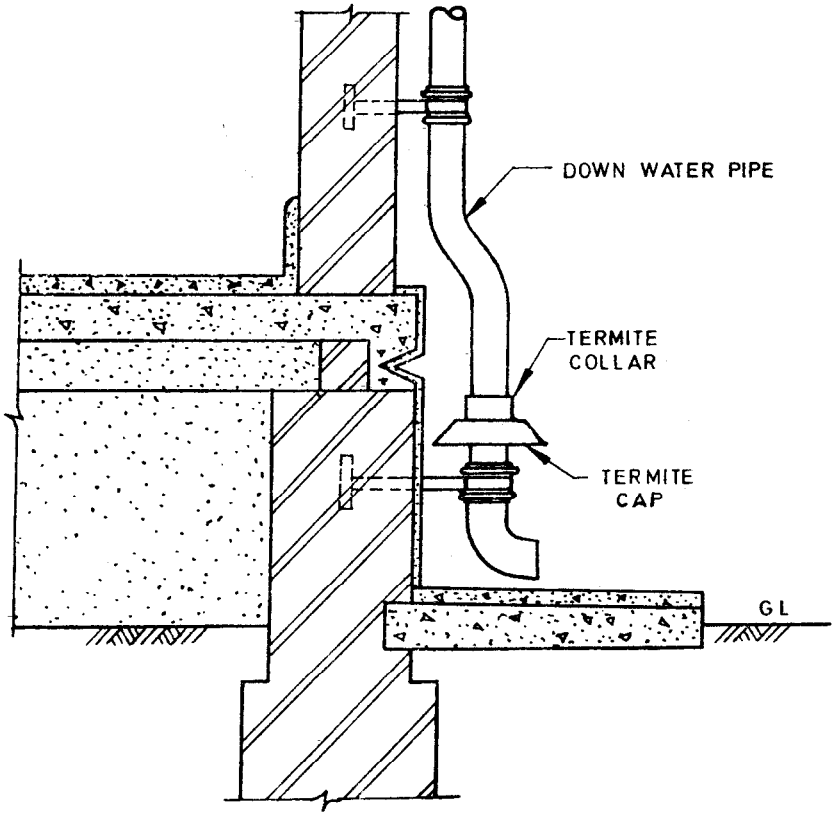
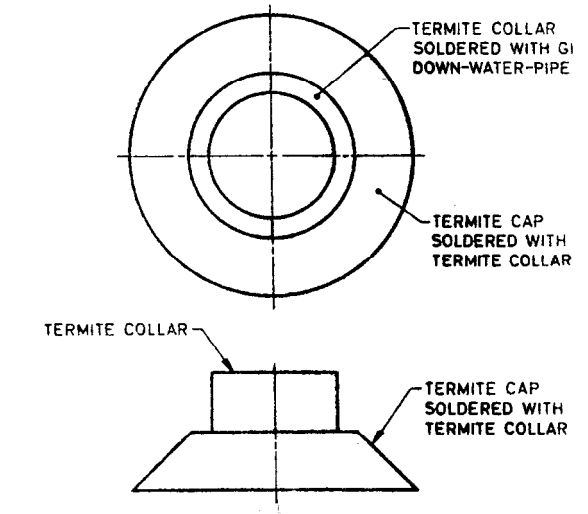
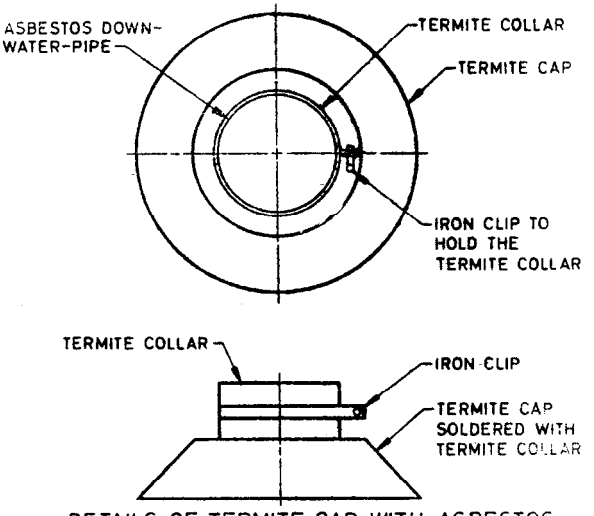


FIG. 14 DETAILS SHOWING TERMITE COLLAR AND TERMITE CAP



DETAILS OF TERMITE CAP WITH GI DOWN-WATER-PIPE



DETAILS OF TERMITE CAP WITH ASBESTOS CEMENT DOWN-WATER-PIPE

FIG. 15 DETAILS SHOWING TERMITE COLLAR AND TERMITE CAP

5.4 Installation of Termite Frames — Termite frames are shaped out of metal sheet and are used to cover all the sides of an opening. Termite frames shall have its edges projecting and bent as in the case of termite shields, to serve as an external barrier against termite entry. Termite frames shall be provided in the case of honey-combed wall openings or other ventilators in walls of basements. They shall project 50 mm beyond all sides of the ventilator and shall also have the turn-over of 50 mm.

5.4.1 Where holding down bolts pass through termite shields the joint between the bolt and shield shall be sung fit and coal tar pitch shall be used to seal the joint. Similarly termite caps fitted to pipes shall be tight fit on the pipe and coal tar pitch shall be applied at the joint to close any gaps between the pipe and the cap.

APPENDIX A

(*Clause* 0.3)

A SHORT NOTE ON TERMITES

A-1. CLASSIFICATION

A-1.1 Termites constitute a separate order of insects called 'Iseptora' (ises is 'equal' and pteron means 'wing' in Greek). 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, pests, 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 interior 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 is taken by a number of supplementary reproductives 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 of 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 pairs of wings of unequal size.

A-1.6 The food of the termite is cellulosic materials 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 colonising flights, occurs. This swarming, also called the nuptial flight, may take place any time during the monsoon or post-monsoon period. The flight 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 BUILDINGS

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 or push particles like some of the wood borers or drywood termites. These termites are also recognised 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 recognised 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.

(*Continued from page* 2)

Members	*Representing*
SHRI S. C. CHAKRABARTI	Central Building Research Institute (CSIR), Roorkee
SHRI Y. SINGH (*Alternate*)	
DEPUTY DIRECTOR STANDARDS (B&S), RDSO, LUCKNOW	Railway Board (Ministry of Railways)
DIRECTOR	Indian Plywood Industries Research Institute, Bangalore
DR H. N. JAGADEESH (*Alternate*)	
DR C. D. DWIVEDI	Directorate of Standardization (Ministry of Defence), New Delhi
SHRI R. A. PANSE (*Alternate*)	
SHRI P. N. GADI	Institution of Surveyors, New Delhi
SHRI K. S. KHARB (*Alternate*)	
SHRI M. S. KOPPIKAR	Pest Control (India) Pvt Ltd, Bombay
SHRI T. R. RAO (*Alternate*)	
SHRI G. K. MAJUMDAR	Hindustan Prefab Ltd, New Delhi
SHRI H. S. PASRICHA (*Alternate*)	
DR R. S. RATRA	National Buildings Organization, New Delhi
SHRI A. K. LAL (*Alternate*)	
SHRI P. R. RIJHSINGHANI	Engineer-in-Chief's Branch, Army Headquarters, New Delhi
MAJ V. S. RAO (*Alternate*)	
SUPERINTENDING SURVEYOR OF WORKS (CZ)	Central Public Works Department (Architectural Wing), New Delhi
SURVEYOR OF WORKS (CZ) (*Alternate*)	
SUPERINTENDING ENGINEER (PLANNING) PWD (B&R)	Public Works Department, Government of Madhya Pradesh, Bhopal

BUREAU OF INDIAN STANDARDS

Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 323 0131, 323 3375, 323 9402
Fax : 91 11 3234062, 91 11 3239399, 91 11 3239382

Telegrams : Manaksanstha
(Common to all Offices)

	Telephone
Central Laboratory:	
Plot No. 20/9, Site IV, Sahibabad Industrial Area, Sahibabad 201010	8-77 00 32
Regional Offices:	
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	323 76 17
*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	337 86 62
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113	235 23 15
†Western : Manakalaya, E9, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093	832 92 95
Branch Offices:	
'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001	550 13 48
‡Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	839 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	55 40 21
Plot No. 62-63, Unit VI, Ganga Nagar, BHUBANESHWAR 751001	40 36 27
Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037	21 01 41
Plot No. 43, Sector 16 A, Mathura Road, FARIDABAD 121001	8-28 88 01
Savitri Complex, 116 G.T. Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No. 29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	54 11 37
5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001	20 10 83
E-52, Chitaranjan Marg, C-Scheme, JAIPUR 302001	37 29 25
117/418 B, Sarvodaya Nagar, KANPUR 208005	21 68 76
Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001	23 89 23
NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010	52 51 71
Patliputra Industrial Estate, PATNA 800013	26 23 05
Institution of Engineers (India) Building 1332 Shivaji Nagar, PUNE 411005	32 36 35
T.C. No. 14/1421, University P.O. Palayam, THIRUVANANTHAPURAM 695034	6 21 17
*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street, CALCUTTA 700072	27 10 85
†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007	309 65 28
‡Sales Office is at 'F' Block, Unity Building, Narashimaraja Square, BANGALORE 560002	222 39 71

Printed at Simco Printing Press, Delhi