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Indian Standard

CODE OF PRACTICE FOR CONSTRUCTION OF AUTOCLAVED CELLULAR CONCRETE BLOCK MASONRY

(First Revision)

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INDIAN STANDARDS INSTITUTION
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Indian Standard

CODE OF PRACTICE FOR CONSTRUCTION OF AUTOCLAVED CELLULAR CONCRETE BLOCK MASONRY

(First Revision)

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Indian Standard

CODE OF PRACTICE FOR CONSTRUCTION OF AUTOCLAVED CELLULAR CONCRETE BLOCK MASONRY

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 31 July 1985, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Autoclaved cellular concrete block is an important addition to the types of masonry units available to the builders for masonry work. Some of the advantages of cellular concrete block construction are lightness of construction, reduced mortar consumption and sometimes faster speed of work compared to brick masonry. Since a large number of builders in this country are yet to become familiar with the use of cellular concrete blocks, guidance in the form of a code of practice will help them to appreciate the essential constructional requirements and details for this type of masonry.

0.3 This standard was first published in 1971. The present revision has been prepared with a view to incorporating the modifications found necessary in the light of experience gained during the use of this standard and also due to the revision of various related standards since its first publication so as to bring it in line with the present practices in the field in this country. In addition to modifying the wall thickness and specifying the grade of concrete for bond beams, this revision also incorporates an additional clause on avoidance of crack formation and fixing of door and window frames to the masonry. Requirements of joint reinforcement have also been modified and use of high strength deformed bars has been allowed in this revision.

0.4 In the formulation of this standard due weightage has been given to international coordination among the standards and practices prevailing in eifferdnt countries in addition to relating it to the practices in the field in the country.

0.5 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 covers the construction of load bearing and non-load bearing walls with autoclaved cellular (aerated) concrete blocks conforming to IS : 2185 (Part 3) - 1984†.

2. TERMINOLOGY

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

2.1 Bond Beam

2.1.1 *Nominal Bond Beam* — A beam made of reinforced concrete or of U-shaped precast concrete elements subsequently filled solid with reinforced concrete built integrally with a masonry wall, but intended only as a continuous tension member.

2.1.2 *Structural Bond Beam* — A reinforced concrete beam built integrally with a masonry wall as a structural member and designed in accordance with structural engineering practice, primarily to transmit lateral loading on the wall to other connecting structural elements.

2.2 Concrete Block | A percast concrete masonry unit either solid or hollow.

2.3 Drying Shrinkage — The difference between the length of specimen which has been immersed in water and then subsequently dried to constant length, all under specified conditions, expressed as a percentage of the dry length of the specimen.

2.4 Joint Reinforcement — The reinforcement embedded in mortar between masonry blocks normally as continuous horizontal element.

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

†Specification for concrete masonry units : Part 3 Autoclaved cellular (aerated) concrete blocks (*first revision*).

2.5 Moisture Movement — The difference between the length of the specimen when dried to constant length and when subsequently immersed in water, all under specified conditions, expressed as a percentage of the dry length of the specimen.

3. MATERIALS

3.1 Masonry Units — The masonry units shall be autoclaved cellular (aerated) concrete blocks conforming to IS : 2185 (Part 3) - 1984*.

3.2 Cement — Cement shall conform to IS : 269 - 1976† or IS : 455-1976‡ or IS : 1489 - 1976§.

3.3 Lime — Lime shall conform to IS : 712 - 1984‖. The lime shall be of class C, unless otherwise specified. All lime other than dry hydrated lime shall be fully slaked in accordance with IS : 1635 - 1975¶.

3.4 Water — Water shall satisfy the requirements specified in IS : 456-1978**.

3.5 Sand for mortar shall generally conform to the requirements of IS : 2116 - 1980†† or to the requirements of IS : 383 - 1970‡‡ (except for particle size grading which shall conform to IS : 2116 - 1980††).

3.6 Fly Ash — Fly ash shall conform to IS : 3812 - 1981§§.

3.7 Calcined Clay Pozzolana — Calcined clay pozzolana shall conform to IS : 1344 - 1981‖‖.

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*Specification for concrete masonry units : Part 3 Autoclaved cellular (aerated) concrete blocks (*first revision*).

†Specification for ordinary and low heat Portland cement (*third revision*).

‡Specification for Portland slag cement (*third revision*).

§Specification for Portland pozzolana cement (*second revision*).

‖Specification for building limes (*third revision*).

¶Code of practice for field slaking of building lime and preparation of putty (*first revision*).

**Code of practice for plain and reinforced concrete (*third revision*).

††Specification for sand for masonry mortars (*first revision*).

‡‡Specification for coarse and fine aggregates from natural sources for concrete (*second revision*).

§§Specification for fly ash for use as pozzolana and admixture (*first revision*).

‖‖Specification for calcined clay pozzolana (*second revision*).

3.8 Reinforcement — Reinforcement used shall conform to the following:

a) Mild steel Grade 1 or Grade 2 bars conforming to IS : 432 (Part 1) - 1982*.

b) Mild steel bars conforming to IS : 226 - 1975†.

c) Hard drawn steel wire conforming to IS : 432 (Part 2) - 1982‡.

d) Mild steel wire conforming to IS : 280 - 1978§.

e) Welded wire fabric conforming to IS : 1566 - 1982‖.

f) High strength deformed bars conforming to IS : 1786 - 1985¶.

3.9 Mortar

3.9.1 Cement-lime-sand mortar, cement-sand mortar or lime-pozzolana-sand mortar generally conforming to IS : 2250 - 1981** shall be used.

3.9.2 The blocks shall be embedded with a mortar, the strength of which is relatively lower than that of the mix used for making blocks in order to avoid the formation of cracks. A 1 : 2 : 9 cement-lime-sand mortar may generally be used for normal work, but where either the intensity of load is high or wall is exposed to severe condition 1 : 1 : 6 mortar shall be used. If good quality lime is not available 1 : 6 cement-sand mortar may be used.

3.9.3 All mortar shall be prepared in accordance with IS : 2250 - 1981**. All mortars when mixed shall have a consistency value of 90 to 130 mm when determined in accordance with Appendix B of IS : 2250 - 1981**.

4. DESIGN CONSIDERATION

4.1 Choice of Type of Walls — Autoclaved cellular concrete blocks may be employed for both load bearing and non-load bearing internal and

*Specification for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement: Part 1 Mild steel and medium tensile steel bars (*third revision*).

†Specification for structural steel (standard quality) (*fifth revision*).

‡Specification for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement: Part 2 Hard-drawn steel wire (*third revision*).

§Specification for mild steel wire for general engineering purposes (*third revision*).

‖Specification for hard-drawn steel wire fabric for concrete reinforcement (*second revision*).

¶Specification for high strength deformed steel bars and wires for concrete reinforcement (*third revision*).

**Code of practice for preparation and use of masonry mortars (*first revision*).

external walls. The wall thickness shall be designed in accordance with the provisions of IS : 1905 - 1980*.

4.1.1 Autoclaved cellular concrete blocks shall not be used in foundations and for masonry below damp-proof course.

4.2 Strength and Stability — Unless otherwise specified, the design and construction of cellular concrete masonry walls shall conform generally to the requirements of IS : 1905 - 1980*.

4.2.1 *Wall Thickness* — The minimum (nominal) thickness of non-load bearing internal walls shall be 10 cm. The minimum (nominal) thickness of external panel walls in framed construction shall be not less than 20 cm. However, depending upon the local condition and desired effect of thermal transmission and sound reduction, 15 cm thick panel walls may be used, provided they are suitably braced and reinforced by lateral and vertical support. The minimum (nominal) thickness of external and internal load bearing walls shall be 20 cm and 15 cm respectively.

4.3 Parapet Walls — Unless adequately braced at intervals not exceeding 3 m, the height of the wall shall be limited to five times its thickness.

4.4 Lateral Supports — Cellular concrete block masonry walls shall be provided with horizontal or vertical lateral supports at right angles to the faces of the wall. Lateral supports may be obtained by cross-walls, pilasters or buttresses where the limiting distance will be measured horizontally, and by floors and roofs where the limiting distance will be measured vertically.

4.4.1 The limiting horizontal or vertical dimension of load bearing and non-load bearing walls shall be in accordance with IS : 1905 - 1980*.

4.5 Modular Co-ordination — Cellular concrete block walls shall preferably be planned on the principles and application of modular co-ordination to facilitate maximum use of full and half length units. The cutting of units at the site shall be restricted to the minimum. Attention shall be paid to the recommendations for modular co-ordination while fixing the overall length and height of the walls, width and height of door and window units and other openings, wall dimensions between the door units and corners. All horizontal dimensions shall be in multiples of 3 M (*see* IS : 7921 - 1975†) and all vertical dimensions shall be in multiples of 2 M (*see* IS : 7922 - 1975‡). This will offer the nominal

*Code of practice for structural safety of buildings: Masonry walls (*second revision*).

†Recommendation for modular co-ordination — multimodules and preferred sizes for horizontal coordinating and controlling dimensions.

‡Recommendation for modular co-ordination — multimodules and preferred sizes for vertical coordinating and controlling dimensions.

half length in horizontal dimensions and full thickness of units in vertical dimensions.

4.6 Avoidance of Crack Formation

4.6.1 The major causes of cracks in the structures of the cellular concrete blocks or partitions and measures for their prevention are described in **4.6.2** to **4.6.6**.

4.6.2 *Structural Movements* — Cracks may occur due to alterations in length, curvature or orientation of the structural members enclosing a wall or partition due to load settlement, thermal expansion or changes in moisture content. The precautions to be taken for prevention shall be as described in **4.6.2.1** to **4.6.2.5**.

4.6.2.1 In the case of framed structures, erection of partitions and panel walls shall be delayed wherever possible until the frame has taken up, as much as possible, any deformation occurring due to structural movements.

4.6.2.2 *Floor deformation and movement* — The floor upon which a partition is built may deflect under load brought upon it after it is built. Where such deflections tend to create non-continuous bearing, the partition shall be strong enough to span between the points of least floor deflection or shall be capable of adapting itself to the altered conditions of support without cracking. This may be achieved by embedding wires of minimum 3 mm diameter mild steel or galvanized steel or welded wire fabric strip in bed joints in cement mortar 1 : 2 after every 900 mm to 1 200 mm height.

4.6.2.3 *Ceiling deflection and movement* — A ceiling above a partition wall may deflect under loads applied after its erection, or through thermal or other movements. To avoid cracking as a result of such deflection, the partition wall shall be separated from the ceiling by a gap or by a layer of resilient material or lean mortar. Where this cannot be done as in the case of plastered finishes, the risk of cracking may be diminished by forming a cut between the ceiling plaster and the wall plaster.

4.6.2.4 *Deflection or movement of structural abutments* — Walls, columns or other structural elements against which a wall or partition abuts may deflect or move because of load, settlement, shrinkage or thermal effects. In order to avoid cracking of walls or partitions as a result of such movements, a slip joint shall be provided where possible, preferably packed with a resilient material or lean mortar.

4.6.2.5 Cracks in partition walls may occur at the corners of door frames and window frames at lintel level or sill level. It may, therefore, be desirable to provide a nominal reinforced concrete bond beam (*see* Fig. 1) at sill level and vertical reinforced concrete stud at either side of

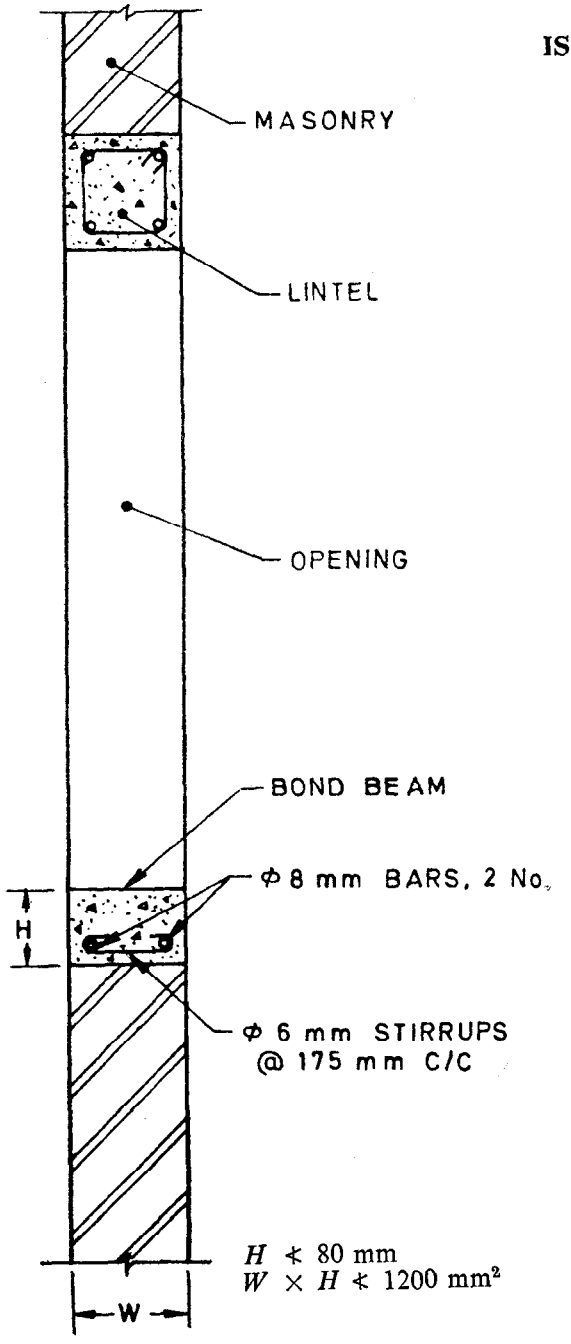

FIG. 1 NOMINAL REINFORCED CONCRETE BOND BEAM AT SILL LEVEL

vertical members of frames which may in addition provide sufficient anchorage for the holdfast.

4.6.3 *Control of Wall Movement Accompanying Temperature and Moisture Changes* — Cracking in concrete masonry walls is often due to tensile stresses which develop when wall movements accompanying temperature and moisture change are restrained by other elements of the building, or when concrete masonry places restraint on the movement of adjoining elements.

4.6.3.1 There are three methods of controlling cracking in concrete masonry structures:

a) Specifying a limit on the moisture content of masonry units at the time of delivery and construction,

b) Incorporating steel reinforcement either in the form of nominal bond beams (*see* **4.6.4**) or horizontal joint reinforcement (*see* **4.6.5**), and

c) Providing control joints to accommodate the movement (*see* **4.6.6**).

In all concrete masonry construction it is essential to employ only moisture-controlled units. Their use, combined with the provision of control joints, is generally adequate to prevent cracking in concrete masonry walls. However, bond beams or joint reinforcement, or both in different locations as considered suitable, may also be used in addition to the above.

4.6.4 *Nominal Bond Beams* — Bond beams, the use of which as structural members has been referred to in **4.7**, also serve as a means of crack control. Nominal bond beams shall be built in the same manner as the structural bond beams with a minimum reinforcement of two 8 mm diameter mild steel bars or two 6 mm diameter high strength deformed bars. Their value for this purpose is due to the increased strength and stiffness they provide to a masonry wall. As a means of crack control, the area of influence of a bond beam shall normally be presumed to extend 600 mm above and below its location in the wall. In walls without openings they shall be spaced 1 200 apart and may be of any length up to a maximum of 18 m (*see* Table 1).

4.6.4.1 Nominal bond beams shall be discontinuous at control joints, but practice here varies depending upon structural requirements. Dummy joints shall be formed when a bond beam is continuous at a control joint.

4.6.5 *Joint Reinforcement* — Horizontal joint reinforcement serves much the same purpose in crack control as bond beams; it increases the

tensile resistance to cracking. Due to the generally closer spacing adopted, joint steel may be more effective in crack control than bond beams.

4.6.5.1 Joint reinforcement shall preferably be fabricated from galvanized steel wire conforming to IS : 280 - 1978* and shall consist of two or more smooth or deformed longitudinal wires of 3 mm dia or larger, welded-connected with 2·8 mm dia or larger cross wires. The out-to-out spacing of the longitudinal wires shall be 30 mm less than the width of the masonry units. The distance between the welded contacts of the cross wires with each longitudinal wire shall not exceed 150 mm for smooth wires and 400 mm for deformed wires. The joint reinforcement shall be available in flat sections 3 to 6 m in length. Where a splice is necessary, the joint reinforcement shall be lapped. At corners, special corner pieces shall be used. The laps shall be of sufficient length to develop the tensile strength of the longitudinal reinforcement, or 300 mm, whichever dimension is the greater.

4.6.5.2 The reinforcement shall be embedded in horizontal joints at intervals of 900 to 1 200 mm depending upon panel length L (*see* Note), height H, and the number and type of wall openings. Table 1 gives the L/H ratios recommended for masonry walls constructed with moisture-controlled units and containing different amounts of joint reinforcement. The ratios are approximate and provide an adequate margin of safety against cracking when employed in walls without openings.

NOTE — A panel is a wall portion in one plane which lies between (a) wall ends, (b) control joints, or (c) a control joint and a wall end.

TABLE 1 RECOMMENDED LENGTH TO HEIGHT RATIO FOR CELLULAR CONCRETE BLOCK MASONRY WALLS

(*Clauses* 4.6.4, 4.6.5.2 *and* 4.6.5.3)

SL No.	WALL PANEL	VERTICAL SPACING OF JOINT REINFORCEMENT		
		900 mm	1 000 mm	1 200 mm
(1)	(2)	(3)	(4)	(5)
i)	Length L of the panel (irrespective of the height H of the panel), *Max*	18 m	15 m	12 m
ii)	Ratio $\frac{L}{H}$, *Max*:			
	a) 200 mm thick wall	3·00	2·75	2·50
	b) 300 mm thick wall	2·25	2·00	1·75

NOTE 1 — When bond beams spaced 1 200 mm vertically are employed in place of joint reinforcement, control joints may be spaced at 18 m maximum.

NOTE 2 — Where reinforcement has not been provided, the ration L/H of wall panel shall conform to the provisions of slenderness ratio specified in IS : 1905 - 1980*.

*Code of practice for structural safety of buildings : Masonry walls (*second revision*).

*Specification for mild steel wire for general engineering purposes (*third revision*).

4.6.5.3 Joint reinforcement shall be used in conjunction with cement mortar not weaker than a 1 : 2 mix. In walls exposed to the action of weather, the reinforcement shall have a mortar cover of not less than 15 mm.

The following points in the location of joint reinforcement shall be noted:

a) Place the joint reinforcement in the first and second bed joints immediately above and below wall openings. It shall not extend less than 600 mm beyond the opening, or to the end of the panel, whichever is the smaller.

b) Place joint reinforcement within the two or three courses immediately below the top of the wall.

c) Joint reinforcement shall not be located closer to a bond beam than 600 mm.

d) Joint reinforcement shall be interrupted at control joints.

e) Joint reinforcement shall not be required where the ratio L/H is according to Note 2 in Table 1.

4.6.6 *Control Joints* — These are employed to reduce restraint by accommodating movement of the masonry wall, or movement of structural elements adjacent to the wall, and thus to control cracking. They are, in fact, vertical separations built into the wall at locations where cracking is likely due to excessive horizontal stresses. The spacing along the wall length depends upon:

a) the expected movements of the wall and other elements,

b) the resistance of the wall to horizontal tensile stresses, and

c) the extent and location in the wall of doors, windows, recesses, chases and other causes of stress concentration.

4.7 Bond Beams and Studs Used as Structural Members

4.7.1 Reinforced concrete structural bond beams may be used in cellular concrete block masonry to meet the requirements of unusual stress conditions. These arise:

a) in buildings in earthquake-prone regions;

b) in buildings in areas where severe wind storms occur;

c) in buildings in areas where unfavourable soil movements and soil subsidence occur; and

d) in buildings where walls are subject to excessive vibration or to very heavy loads.

In all such cases it is necessary to provide more than ordinary stability for all types of masonry walls.

4.7.2 Bond beams may be normal reinforced concrete beams built integrally with block masonry, or they may be built with special U-shaped lintel blocks which are strung together, reinforcing steel placed in the cores, and the cores filled solid with concrete not lower than grade M 15 as specified in IS : 456 - 1978*. The reinforcement shall satisfy structural requirements, but in no case it should be less than two 12 mm diameter steel bars. The beams are always discontinuous at expansion joints, but the joints should be designed to transfer lateral forces along the wall.

4.7.3 Depending upon the stress condition described in **4.7.1** bond beams may be placed at any or all of the following locations:

a) at floor level,
b) at top of all door and window openings (in which case they serve as lintels over them),
c) below the sill in all openings, and
d) at plinth level.

4.7.4 Apart from continuously reinforced bond beams, concrete masonry walls under the conditions outlined above may also be reinforced vertically by reinforced concrete studs at corners, at wall openings, and at regular intervals between wall openings. The vertical alignment of the hollow cores in concrete masonry units facilitates the construction of such vertical studs. The studs shall be tied in with the bond beams. The quantity of the reinforcement for studs shall be according to the structural requirements. In order to protect the vertical reinforcement from corrosion, these reinforcement shall be embedded in structural concrete of grade M 15 (*see* IS : 456 - 1978*).

4.7.5 The non-structural use of bond beams for the purpose of providing a continuous tension member to resist excessive tensile stresses is referred to in **4.6.4**.

5. STORAGE AND HANDLING OF MATERIALS

5.1 The blocks shall be stored in such a way as to avoid any contact with moisture on the site. They shall be stock piled on planks or other supports free from contact with the ground and covered to protect against wetting. The blocks shall be handled with care and damaged units shall be rejected.

5.2 Cement, lime, aggregates and other masonry materials shall be stored and hauled as laid down in the relevant Indian Standard specifications for these materials.

*Code of practice for plain and reinforced concrete (*third revision*).

6. PREPARATORY WORK

6.1 Wetting of Blocks — These blocks need not be wetted before or during the laying in the walls; in case the climatic condition so required, the top and the sides of the blocks may be slightly moistened so as to prevent absorption of water from the mortar and ensure the development of the required bond with the mortar.

7. LAYING OF AUTOCLAVED CELLULAR CONCRETE BLOCK MASONRY IN SUPERSTRUCTURE

7.1 Use of Mortar in Masonry — Mortar shall not be spread so much ahead of the actual laying of the units that it tends to stiffen and loose its plasticity, thereby resulting in poor bond. For most of the work the joints, both horizontal and vertical, shall be 10 mm thick. Except in the case of extruded joint construction, the mortar joints shall be struck off flush with wall surface and when the mortar has started stiffening, it shall be compressed with a rounded or U-shaped tool. This compaction is important, since mortar, while hardening, has a tendency to shrink slightly and thus pull away from the edges of the block. The mortar shall be pressed against the units with a jointing tool after the mortar has stiffened to effect intimate contact between the mortar and the masonry unit and obtain a water-tight joint.

7.2 Operations for Laying Block Masonry

7.2.1 *First Course* — The first course of cellular concrete block masonry shall be laid with greater care, making sure that it is properly aligned, levelled and plumbed, as this may assist the mason in laying succeeding courses to obtain a straight and truly vertical wall. The first layer of cellular concrete block masonry on plinth should preferably have groove/offset outside so that rain water coming down the wall falls out.

7.2.1.1 Before laying the first course, the alignment of the wall shall be marked on the damp-proof course. The blocks for this course shall first be laid dry, that is, without mortar along a string stretched between properly located corners of the wall in order to determine the correct position of the blocks including those of the cross walls jointing it and also adjust their spacing. When the blocks are set in proper position, the two corner blocks shall be removed, a mortar bed spread and these blocks laid back in place truly level and plumb. The string shall then be stretched tightly along the faces of two corner blocks and the faces of the intermediate ones adjusted to coincide with the line. Thereafter, each block shall be removed and relaid over a bed of mortar. After every three or four blocks have been laid, their correct alignment, level and verticality shall be carefully checked.

7.2.2 The construction of walls may be started either at the corners first or started from one end proceeding in the other direction. If the corners of the wall are built first, they shall be built four or five courses higher than the centre of the wall. As each course is laid at the corner, it shall be checked for alignment and level and for being plumb. Each block shall be carefully checked with a level or straight-edge to make certain that the faces of the blocks are all in the same plane. This precaution is necessary to ensure truly straight and vertical walls.

7.2.2.1 The use of a storey rod or course pole which is simply a board with markings 200 mm apart, provides an accurate method of finding the top of the masonry for each course. Each course, in building the corners, shall be stepped back by a half-block and the horizontal spacing of the block shall be checked by placing a mason's level diagonally across the corners of the blocks.

7.2.3 When filling in the wall between the corners, a mason's line shall be stretched from corner to corner for each course and the top outside edge of each block shall be laid to this line. The manner of handling or gripping the block shall be such as to position the block properly with minimum adjustment.

7.2.3.1 To assure satisfactory bond, mortar shall not be spread too far ahead of actual laying of the block or it will stiffen and loose its plasticity. As each block is laid, excess mortar extruding from the joints shall be cut off with the trowel and thrown back on the mortar board to be reworked into the fresh mortar. If the work is progressing rapidly, the extruded mortar cut from the joints may be applied to the vertical face shells of the blocks just laid. If there be any delay long enough for the mortar to stiffen on the block, the mortar shall be removed to the mortar board and reworked. Dead mortar that has been picked up from the scaffold or from the floor shall not be used.

7.2.4 *Closure Block* — When installing the closure block, all edges of the opening and all four edges of the closure block shall be buttered with mortar. The closure block shall be carefully lowered into place. If any mortar falls leaving an open joint, the closure block shall be removed, fresh mortar applied and the operation repeated.

8. PROVISION FOR DOOR AND WINDOW FRAMES

8.1 Door and window frames shall be attached to the surrounding masonry either by conventional method or with 200 mm flooring nails with screwed ends fixed directly into the block after the frame has been wedged into the opening at every nailing position. The number of nails to give adequate stability will be dependent on the dimensions of the

frames. The nails should be spaced at maximum 400 mm and the first nail should not be farther than 200 mm from a corner.

8.1.1 Frames may be attached to the masonry by holdfasts anchored in the vertical reinforced concrete studs provided to the frames as per **4.6.2.5.**

8.2 Provision for Lintels — Lintels for doors, windows and other openings shall be made of either RCC cast *in situ* or precast units or shall conform to IS : 9893 - 1981*; where openings occur close to one another, continuous lintels may be provided.

9. PROVISION FOR ROOF

9.1 The top of the roof course shall be finished smooth with a thin layer of 1 : 3 cement mortar and covered with a coat of crude oil or craft or oil paper to ensure free movement of the roof.

9.2 Where the roof slab projects beyond the external wall face, it shall be provided with a drip.

10. INTERSECTING WALL

10.1 All walls wherever they meet or intersect shall be bonded or tied securely in accordance with **10.1.1** and **10.1.2.**

10.1.1 *Load Bearing Walls* — When two load bearing walls meet or intersect and the courses are to be laid up at the same time, a true masonry bond between at least 50 percent of the units at the intersection is necessary. When such intersecting bearing walls are laid up separately, pockets with 200 mm maximum vertical spacings shall be left in the first wall laid. The corresponding course of the second wall shall be built into these pockets.

10.1.2 *Non-load Bearing Walls* — Meeting or intersecting non-load bearing wall shall be bonded by either of the two methods recommended for load bearing walls.

11. PILASTERS AND PIERS

11.1 Pilasters and piers shall be provided wherever necessary in a manner approved by the engineer-in-charge.

12. RENDERING AND OTHER FINISHES

12.1 External Renderings — The exterior surface of all cellular concrete block walls shall be made waterproof by treating the walls with different

*Specification for precast concrete lintels and sills.

types of renderings, depending upon the intensity of rainfall, nature of exposure, etc.

12.1.1 The renderings shall be applied in accordance with IS : 2402-1963*. Renderings shall not be applied to the walls when these are wet or in monsoon. The walls shall be treated only after they are fully dried.

12.1.2 Satisfactory performance of any rendering depends entirely on the efficiency of the bond developed between the rendering and the wall surface. Extreme care shall, therefore, be taken to ensure effective bond with the wall by preparing the surface, roughening it if necessary, cleaning the surface of all loose particles and dust, moistening it with water just prior to applying the rendering to prevent absorption of water from it. The sand used for the plaster finish shall be graded from 3 mm downwards. The plaster shall not be finished smooth but provided with a coarse finish by means of a wooden float.

12.1.3 In localities where rainfall is heavy or the walls are exposed to sea weather, cellular concrete block masonry shall be rendered with two coats of plaster. First coat (backing coat) shall be of 15 mm thickness of 1 : 1 : 6 cement-lime-sand mortar or 1 : 6 cement-sand mortar. Second coat (finishing coat) shall be of 5 to 10 mm thickness of 1 : 1 : 6 to 1 : 2 : 9 cement-lime-sand mortar.

12.1.4 In moderate rainfall area, cellular concrete block masonry shall be rendered with at least one coat of 10 to 15 mm thickness of 1 : 1 : 6 cement-lime-sand mortar (or 1 : 6 cement-sand mortar) or two coats of cement paint may be applied directly on concrete block masonry to provide a reasonably impervious surface to withstand rain.

12.1.5 In areas of scarce rainfall, the exterior surface of concrete block masonry may only be pointed with 1 : 3 cement mortar.

12.1.6 Where for architectural or other reasons it is necessary to have the cellular concrete block surface exposed, the walls shall either be built with block having richer facing mixture or treated with two coats of approved quality cement based paint. In either case the walls in heavy or moderate rainfall areas shall be pointed with 1 : 2 cement-sand mortar.

12.2 Internal Renderings — As cellular concrete blocks are of uniform size, walls built with them provide an even surface. Where it is desired to have the block surface exposed, the walls may only be flush pointed and painted with an approved quality of a cement paint, emulsion paint or chlorinated rubber paint. Oil based paints are liable to attack by

*Code of practice for external rendered finishes.

alkali from the blocks and mortar. Otherwise the interior surface of walls may be plastered with one coat of 6 to 12 mm thickness of 1 : 2 : 9 cement-lime-sand mortar or 1 : 6 cement-sand mortar. Where a very smooth finish is desired, a second coat of 2 to 3 mm thickness of lime finish may be applied.

13. MAINTENANCE

13.1 The exposed walls shall be inspected closely every year before monsoon, and cracks, if any shall be sealed properly with a cement grout and painted with two coats of cement paint.

(*Continued from page* 2)

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