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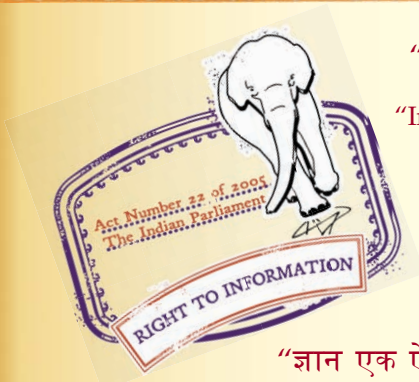
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IS 6061-2 (1981): Code of practice for construction of floor and roof with joists and filler blocks, Part 2: With hollow clay filler blocks [CED 13: Building Construction Practices including Painting, Varnishing and Allied Finishing]



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“Knowledge is such a treasure which cannot be stolen”

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IS : 6061 (Part II) - 1981
(Reaffirmed 1995)

Indian Standard
CODE OF PRACTICE FOR CONSTRUCTION OF
FLOOR AND ROOF WITH JOIST
AND FILLER BLOCKS

PART II WITH HOLLOW CLAY FILLER BLOCKS

(*First Revision*)

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BUREAU OF INDIAN STANDARDS
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Indian Standard

CODE OF PRACTICE FOR CONSTRUCTION OF FLOOR AND ROOF WITH JOIST AND FILLER BLOCKS

PART II WITH HOLLOW CLAY FILLER BLOCKS

(*First Revision*)

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Indian Standard

CODE OF PRACTICE FOR CONSTRUCTION OF FLOOR AND ROOF WITH JOIST AND FILLER BLOCKS

PART II WITH HOLLOW CLAY FILLER BLOCKS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part II) (First Revision) was adopted by the Indian Standards Institution on 29 December 1981, after the draft finalized by the Building Construction Practices Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Floor and roof construction using hollow clay filler blocks has been found to be advantageous over the conventional type of beam and slab construction. This type of construction consists of placing reinforced cement concrete precast beams or prestressed concrete beams at suitable spacing and the gap between them is filled with hollow clay blocks. This type of construction is lighter in weight and provides better sound and thermal insulation to the buildings. It also ensures rapid construction and eliminates the use of shuttering which are essentially required to support slabs and beams in the conventional type of construction. This type of floor or roof is, however, not recommended where occurrence of impact loads and/or vibration is expected. This standard is intended to provide guidance for construction of floor and roof built-up of RCC joists and hollow clay filler blocks and is one of a series of Indian Standards on construction of floor and roof with joists and filler blocks.

0.3 This standard first published in 1971, was intended to bring out a long felt uniformity in the constructional methods for these type of floor and roofs. It is being revised to incorporate the improvements found necessary in the light of usage of this standard and the suggestions made by various bodies implementing it. In this revision the requirements for hollow clay filler blocks used in this type of construction have been deleted and reference has been drawn to the latest Indian Standards published for it. HOURDIS type of construction has been deleted since this is no longer in vogue. Topping concrete has been permitted to be laid in situ over the hollow clay blocks only with reinforcements. The method of casting, covering and maturing of precast RCC joists has been added.

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0.4 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 II) covers the details of construction of floor and roof built up of precast RCC joists and hollow clay filler blocks or tiles.

2. TERMINOLOGY

2.1 For the purpose of this standard, definitions given in IS : 2248-1969† and IS : 3951 (Part I)-1975‡ shall apply.

3. NECESSARY INFORMATION

3.1 For the efficient design and construction of hollow clay filler block roofs and floors, detailed information with regard to the following is necessary:

- a) Total area to be covered;
- b) Individual room size or column grids;
- c) Supporting elements, namely, framed structure or load bearing walls and their dimensions and restrictions, if any;
- d) Superimposed load to be carried;
- e) Level at which the floor or roof should be finished;
- f) Treatment of junctions of the floor or roof with the walls or parapets;
- g) Provision of slope to be made in the roof for the purpose of drainage;
- h) Provision for fixing of services, ceiling, etc; and
- j) Openings to be left in the floor or roof.

3.2 All the informations as listed in 3.1 should be made available to those responsible for the design and construction of the floor or roof.

3.3 Arrangements may also be made for proper exchange of information between the designer, builder and user at all stages of construction.

*Rules for rounding off numerical values (revised).

†Glossary of terms relating to structural clay products.

‡Specification for structural hollow clay tiles for floors and roofs: Part I Filler type (first revision).

4. MATERIALS

4.1 Aggregates — The coarse and fine aggregates shall conform to the requirements as given in IS : 383-1970*.

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

4.3 Hollow Clay Blocks or Tiles — These shall conform to IS : 3951 (Part I)-1975||.

4.4 Precast Concrete Joists — Precast concrete joists shall conform to the requirements given in Appendix A.

4.5 Reinforcement — This shall conform to either IS : 432 (Part I)-1966¶ or IS : 1139-1966** or IS : 1786-1979†† or IS : 226-1975‡‡ or IS : 1566-1967§§.

4.6 Water — Water used shall be clean and free from oil, acid, alkali, organic or vegetable matter. Generally potable water will be suitable. In case of doubt the quality of water should be analysed to ascertain conformity with IS : 456-1978|||.

5. PRECAST CONCRETE JOISTS AND HOLLOW CLAY FILLER BLOCKS FLOOR OR ROOF

5.1 General

5.1.1 This type of floor or roof shall consist of the following components:

- a) Precast reinforced prestressed concrete joists spaced at suitable centres;
- b) Hollow clay filler blocks laid in the space between the joists;

*Specification for coarse and fine aggregates from natural sources for concrete (*second 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 structural hollow clay tiles for floors and roofs: Part I Filler type (*first revision*).

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

**Specification for hot rolled mild steel, medium tensile steel and high yield strength steel deformed bars for concrete reinforcements (*revised*).

††Specification for cold-twisted steel bars for concrete reinforcement (*second revision*).

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

§§Specification for hard-drawn steel wire fabric for concrete reinforcement (*first revision*).

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

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- c) Topping concrete laid in situ over the hollow clay blocks with reinforcement;
- d) The required floor finish at the top; and
- e) Suitable ceiling finish applied to the bottom, if desired.

5.2 Strength and Stability

5.2.1 The spacing of the joists shall not exceed 600 mm centres unless otherwise specified.

5.2.2 The maximum span of the joists shall not normally exceed 6 m.

5.2.3 The design of precast reinforced concrete and prestressed concrete sections for joists shall be in accordance with the principles laid down in IS : 456-1978* and IS : 1343-1980† respectively.

5.2.4 The joists and filler blocks shall be so shaped as to give a minimum bearing of 25 mm for the filler blocks on the joists. The shape of joists shall depend on the block profiles.

5.2.5 The minimum thickness of topping concrete shall be 50 mm and the size of coarse aggregates used shall not exceed 12 mm.

5.3 Programming the Work — All supporting elements like walls, pillars, main beams and frames, shall be completed sufficiently early and cured well before the flooring or roofing work is taken up. A 75 mm thick plain concrete bed block may be provided over load bearing walls, if necessary. The top surface of supporting elements shall be level-finished. Attention shall be paid for arrangements necessary for fixing all service pipes, conduits, fixtures, etc, passing through the floor.

5.4 Storage, Transport and Handling of Materials — Necessary precautions shall be observed in the storage, transport and handling of precast concrete joists and hollow clay filler blocks. Cement, coarse and fine aggregates and other construction materials shall be stored at site in accordance with the recommendations given in IS : 4082-1977‡.

5.5 Laying the Floor or Roof

5.5.1 The precast reinforced concrete joists or prestressed concrete joists shall be placed in position at the designed spacing so as to span between the supporting elements such as walls and beams.

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

†Code of practice for prestressed concrete (*revised*).

‡Recommendations on stacking and storage of construction materials at site (*first revision*).

5.5.2 The joists designed to act as T-beams shall be temporarily supported at the points stipulated by the designer and the supports shall be left in position for at least 7 days from the date of laying the topping concrete.

5.5.3 Space, if any, between the ends of adjacent joists occurring over walls or beams shall be filled with the same masonry or concrete as the supporting element so as to flush with the top of joist to present an even bearing surface for the wall above.

5.5.4 The hollow blocks shall be placed in between the joists with their ends resting on the projecting lips of the joists in manner indicated in Fig. 1.

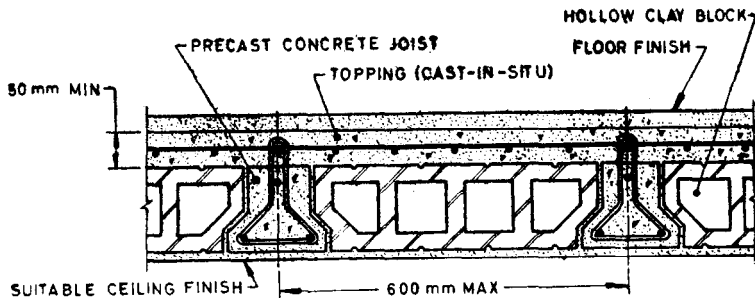


FIG. 1 PLACING HOLLOW BLOCKS IN BETWEEN JOISTS

5.5.5 Reinforcement shall be provided for the topping concrete slab in accordance with the relevant provisions given in IS : 456-1978*. At least 0.15 percent reinforcement along the joists and 0.20 percent reinforcement across the joists shall be provided for the structural topping concrete slab. The spacing of reinforcement bars shall not exceed 300 mm. The reinforcement in the topping over the supports (joists) should be tied to the stirrups projecting from the joists. Welded wire mesh may be used for the reinforcement as an alternate to mild steel bars.

5.5.6 The blocks shall be thoroughly wetted to reduce absorption of water and then the topping concrete shall be laid to the designed thickness when the blocks are skin dry. The topping concrete shall be cured for at least 7 days.

6. FINISHING

6.1 The roof or floor may be further finished with the specified roof or floor finish in accordance with the relevant Indian Standard mentioned in 6.1.1.

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

6.1.1 Indian Standards covering floor finishes so far published are listed below:

<i>Sl No.</i>	<i>Type of Finish</i>	<i>IS:</i>
1.	Magnesium oxychloride	658-1962*
2.	Bitumen mastic	1196-1978†
3.	Rubber	1197-1970‡
4.	Linoleum	1198-1958§
5.	Cement concrete tiles	1443-1972
6.	Terrazzo	2114-1962¶
7.	Mud Phuska	2115-1980**
8.	In situ cement concrete	2571-1970††
9.	Epoxy resin	4631-1968‡‡
10.	PVC	5318-1969§§
11.	Brick	5766-1970

6.2 The ceiling may be rendered (*see* IS : 2402-1963¶¶) or plastered (*see* IS : 1661-1972***) as may be necessary. The blocks shall be thoroughly wetted before rendering or plastering.

6.3 The water proofing of the roof may be done in accordance with IS : 1346-1976††† or IS : 3036-1965‡‡‡ or IS : 4365-1967§§§ or IS : 7290-1979|||.

*Code of practice for magnesium oxychloride composition floors (*revised*).

†Code of practice for laying bitumen mastic flooring (*second revision*).

‡Code of practice for laying of rubber floors (*first revision*).

§Code of practice for laying and maintenance of linoleum floors.

||Code of practice for laying and finishing of cement concrete flooring tiles (*first revision*).

¶Code of practice for laying in situ terrazzo floor finish.

**Code of practice for flat roof finish - *MUD PHUSKA* (*second revision*).

††Code of practice for laying in situ cement concrete flooring (*first revision*).

‡‡Code of practice for laying of epoxy resin floor toppings.

§§Code of practice for laying of flexible PVC sheet and tile flooring.

|||Code of practice for burnt clay brick flooring.

¶¶Code of practice for external rendered finishes.

***Code of practice for application of cement and cement-lime plaster finishes (*first revision*).

†††Code of practice for waterproofing of roofs with bitumen felts (*second revision*).

‡‡‡Code of practice for laying lime concrete for waterproofed roof finish.

§§§Code of practice for application of bitumen mastic for waterproofing of roofs.

|||Recommendation for use of polyethylene film for waterproofing of roofs.

APPENDIX A

(Clause 4.4)

PRECAST REINFORCED CONCRETE JOISTS

A-1. GENERAL

A-1.1 All precast reinforced concrete joists shall be of uniform width. The length and depth shall vary according to the span and the depth of the filler blocks.

A-1.2 The joists shall have stirrups projecting to be bent into the topping concrete slab to give composite action.

A-2. MATERIALS

A-2.1 Concrete — The concrete for the joists shall be minimum of Grade M15 as specified in IS : 456-1978*.

A-2.2 Reinforcement — The reinforcement for the joists shall be as given either IS : 456-1978* or IS : 1343-1980†.

A-3. CASTING, CURING AND MATURING OF CONCRETE JOISTS

A-3.1 The joists shall be cast on a level platform protected from direct sun as well as quick drying action of strong winds.

A-3.2 The mould shall be either of steel or timber or combination of both and shall be clamped to the levelled platform to withstand vibrations during casting. The shape of RC joists shall depend on the hollow clay block profiles and they may be precast in a battery of moulds as shown in Fig. 2. A typical precast RC joist is shown in Fig. 3.

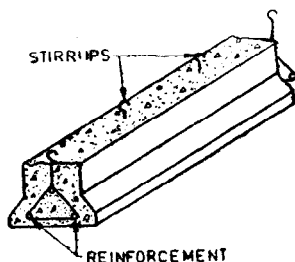


FIG. 2 TYPICAL PRECAST RC JOIST

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

†Code of practice for prestressed concrete (*first revision*).

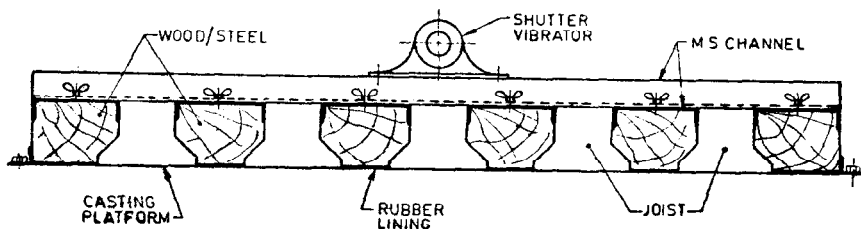


FIG. 3 BATTERY OF MOULDS FOR CASTING RC JOISTS

A-3.3 Before filling concrete in the moulds, the inner surface of the mould and the bottom shall be thoroughly treated to aid the casting and removal of the precast unit without damage and to ensure a smooth surface finish of the concrete. The reinforcement should be placed and secured in the mould in correct position so as to ensure proper cover of concrete over the reinforcement. The concrete shall be gradually filled into the moulds and kept continually filled and compacted by suitable vibrations.

NOTE — Even when the mould is full, the top end of the stirrups and the stirrup holding bar are purposely left projecting out of the mould so that the joists will bond with reinforced concrete topping and functions as T-beam.

A-3.4 Releasing of the sides of the mould shall not be done earlier than 24 hours after casting. The mould shall be very carefully released without disturbing or causing shock to the casting. After removal of the sides of the moulds, the joists shall be kept damp for 24 hours by spraying water on them at the same location, unless adequate arrangements are made for shifting the base plate without disturbing the joists. After the concrete has developed sufficient strength to withstand handling stresses the joists shall be removed to a curing yard and shall be kept continually moist for at least 7 days from the date of casting.

A-3.5 After the curing of the joists is completed these shall be stored in a shady place and allowed to dry for at least three weeks before these are used in the constructions.

A-4. PRECAUTIONS FOR LIFTING AND HANDLING OF JOISTS

A-4.1 Lifting of joists from the platform shall be done with care. Subsequent handling shall be done without causing any damage to the joist and from points indicated by the designer. While stacking and transporting temporary supports shall be given at the points indicated by the designer, joists should be stacked on firm and even ground or platform. If stacked in more than one row all props should be in the same vertical plane.

(Continued from page 2)

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