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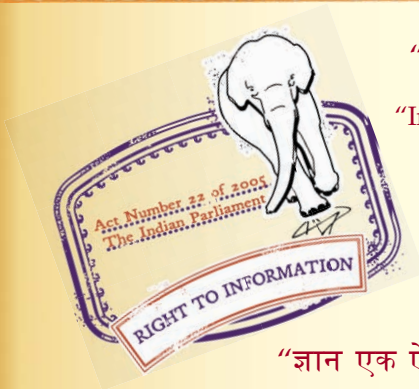
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*Indian Standard*  
CODE OF PRACTICE FOR  
REED WALLING

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# *Indian Standard*

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# *Indian Standard*

## CODE OF PRACTICE FOR REED WALLING

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 26 September 1967, after the draft finalized by the Building Construction Practices Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** Reed walling is a traditional construction in certain parts of India; in Punjab 'SARKANDA reed' is used, whereas in Assam 'EKRA' and 'NAL' are used. In addition to these, machine-made reed boards are also now being manufactured in this country for use in constructions. In these boards, reeds are considerably strengthened by binding together with galvanized wire. Reed walling and roofing have advantages like thermal insulation and light weight and are found specially suited for earthquake resistant construction, where a flexible light weight material is needed for walling. Use of reed boards will facilitate the additional advantages of prefabricated construction particularly suited for panel filling, partitions and roof construction.

**0.3** In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

**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.

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### 1. SCOPE

**1.1** This standard covers the use of reeds and reed boards in the construction of walls and roofs in buildings.

### 2. TERMINOLOGY

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

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

**2.1 Reed Board** — A machine-made board in which dried reeds are bound together at close spacing by galvanized wire so as to form a rigid structural board.

**2.2 Running Wire** — A wire which runs at right angles to the reeds as shown in Fig. 1.

**2.3 Hook Wire** — Wires going through the board to secure the running wires on the two opposite faces of the board.

### 3. DESIGN CONSIDERATIONS

**3.1 Size and Selection of Boards** — Reed boards are generally supplied in three different thicknesses  $2\frac{1}{2}$ , 4 and 5 cm. Preferred widths from the point of view of dimensional co-ordination will be 1 m and 2 m.

NOTE — The width that is generally manufactured now is 1.5 m.

**3.1.1** Reed boards of various thicknesses are generally used in different situations as follows:

<i>Use</i>	<i>Thickness, cm</i>
For door and window panelling, for wall facing, for partitions and for ceiling	2.5
For sloping and gabled roof, for weather board partition walls, for fencing, for wall insulation, etc	4
For panel walls for exterior use, for slope and gabled roofs, for weather boards, CHAJJAS, etc	5

**3.1.2** The lengths of cut boards commonly supplied are 180, 240, 300 and 360 cm and that any other size specified by the purchaser may also be supplied by the manufacturer.

### 3.2 Structural Strength

**3.2.1** Reed board shall generally be treated as non-load bearing walls, the load being taken by the framework.

**3.2.2** Where reed board is used for roof, the reed board shall not be less than 4 cm thick, and shall be supported by purlins, spaced not more than 0.5 m centre to centre. For ceiling, the thickness of board shall not be more than 2.5 cm.

**3.3 Fire-Resistance** — A 5 cm thick reed board with 20 mm thick cement-sand plaster on each face will have normally a fire-resistance grading of half-an-hour (see IS : 1641-1960\*).

\*Code of practice for fire safety of buildings (general): general principles and fire grading.

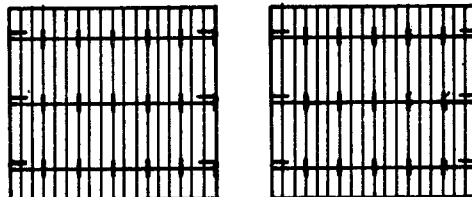
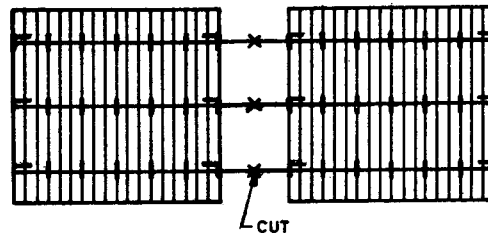
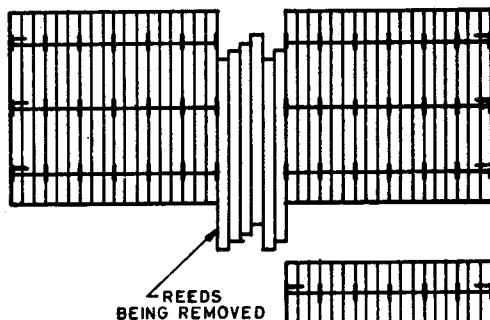
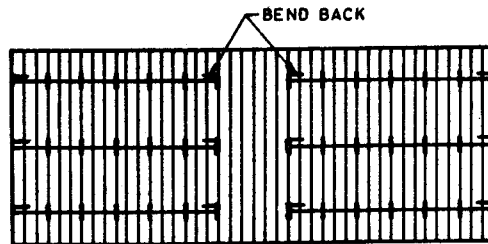
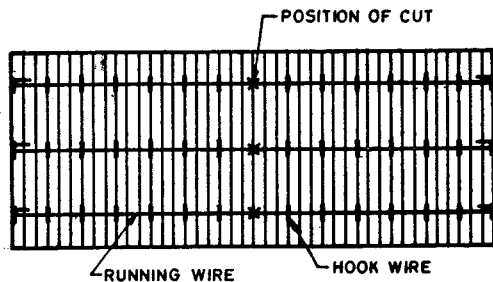


FIG. 1 OPERATIONS FOR CUTTING OF REED BOARD

**3.4 Durability** — Reed board plastered on both sides with cement mortar is sufficiently durable except in heavy rainfall localities. Where termite infestation is present, the normal precautions for termite resistance construction will apply ( *see* IS : 3632\* ). The reeds should also be treated with preservatives before manufacture into reed board.

**3.5 Thermal Insulation** — The thermal insulation of reed board shall be about 4 R cal cm/m<sup>2</sup>h°C.

**3.6 Suitability of Further Finishing** — Generally reed boards will take all forms of plaster on account of its rough surface which facilitates bonding of the plaster with the background ( *see* IS : 1661-1960† ).

**3.6.1** In applying the cement plaster the following points shall be taken care of to avoid development of minor hair-cracks:

- a) The mix shall be generally cement mortar 1 : 6 applied in two coats. The application of excessively wet mixes shall be avoided.
- b) Plain plaster applied in two coats shall not be more than 15 mm thick and rough-cast plaster applied in two coats shall be not more than 20 mm thick. Proper curing of plaster shall be arranged. In area of heavy rainfall both the coats of plaster for exposed walling shall be waterproofed.

**3.6.2** Lime plaster shall be of mix 1 : 3 using Class C lime and applied in two coats, the thickness of coats being the same as in 3.6.1(b).

**3.6.3** Mud plaster shall be stabilized mud plaster ( *see* IS : 2110-1962‡ ), and the minimum thickness for lime plaster and mud plaster shall be the same as for cement plaster.

**3.6.4** In the case of reed board roofing, the waterproofing may be carried out with bitumen felt in the same manner as for cement concrete roof ( *see* IS : 1346-1966§ ) but before application of the felts a coat of cement plaster shall be applied to reed board to give a smooth surface.

**3.7 Dimensional Co-ordination** — For minimizing cutting and wastage of reed board the dimensions of the building and the dimensions of openings shall preferably be done in accordance with IS : 1233-1958||. The sizes of reed boards also shall be so chosen as to suit the planning module chosen for the construction.

**3.8 Fixing to Frames** — Reed board should not be fixed into a groove in wall framing but should be fixed on to the wall frame directly using nails

\*Code of practice for anti-termite measures ( *under preparation* ).

†Code of practice for cement and cement-lime plaster finishes on walls and ceilings.

‡Code of practice for *in situ* construction of walls in buildings with soil-cement.

§Code of practice for waterproofing of roofs with bitumen felts.

||Recommendations for modular co-ordination of dimensions in the building industry.

or screws with diamond  $35 \times 35$  mm plate washers obtained from sheets of 1.3 to 1.6 mm thick.

## 4. MATERIALS

**4.1 Reeds for *in situ* Walling** — The reeds may be of one of the following species:

- a) *EKRA* (*Erianthus ravennae*) — found in the plains.
- b) *EKRA* (*Arundonaria khasiana*) — found in the hills.
- c) *KHAGRA* (*Neyrandiana reynaudiana*)
- d) *NAL* (*Phragmites karka*)
- e) *SARKANDA*

**4.1.1** Reed shall be cut from mature plant, which have their sheaths firmly attached. The reed shall be cut to required length and spread out in sun until all the moisture is dried out.

**4.2 Reed Board** — The reed board shall be manufactured from *EKRA*, *NAL* or *SARKANDA* reeds. The binding wire used shall be galvanized steel wire or aluminized steel wire.

**4.3 Storage and Handling** — Reed boards shall preferably be stored in covered shed and resting off the ground. The ground shall be sprinkled with insecticide powder before stacking the reed board. Excessively long storage shall be avoided.

**4.3.1** Reed board shall not be dragged one over the other as this will result in the running wire or adjacent board being pulled out of the position.

## 5. PRELIMINARY WORK ON REED BOARDS

### 5.1 Cutting of Reed Boards

**5.1.1 Cutting Along the Reed** — Cutting of reed boards shall be done as follows:

- a) Cut each running wire half way between the required hook wire and the next one as indicated in Fig. 1;
- b) After the running wire is cut, bend the ends tightly over the respective hooks;
- c) Remove the reeds which are left between the two hook wires exposing the running wire on the underside of the board;
- d) Place the boards, erect and cut the running wire on the other side in the same manner as in (a); and
- e) Bend the cut ends back over the hook wire as in (b).

**5.1.2 Cutting Across the Reed** — This may be done with the use of a saw or sharp board chisel. Cutting shall not be done near the running wire and at least 25 mm of the board shall be left to cover as edge beyond the running wire.

**5.1.3** For cutting diagonally or in shapes, a combination of the methods specified in 6.1.1 and 6.1.2 may be used taking care not to blunt the cutting instrument when any wire is cut.

## 5.2 Joining of Reed Board

**5.2.1** With the reeds vertical, the joining shall be done as follows:

- a) The edges shall be straight;
- b) Cut out with chisel one reed from each board, under the first and second running wire; and
- c) Cut a single piece of reed to the length equal to the length of empty channel formed by the two pieces as above. Sharpen one end and hammer gently into position, so that it passes under the first and second running wires of each of the boards.

The treatment specified in (a) to (c) shall be continued at regular intervals of every 60 cm along the joints. The other side of the board shall also be dealt with similarly and the jointing reed shall be set at spaces so as to stagger with the jointing reed on the other side. Finally lace wire across the joint in a similar manner as illustrated in Fig. 2.

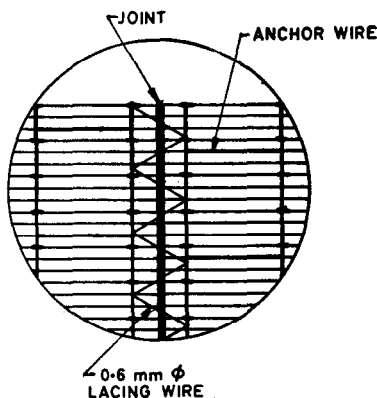


FIG. 2 DETAILS OF JOINING OF REED BOARD

**5.2.2** Where side jointing is required with the reeds vertical, it shall be done as follows:

- a) Place the edges together and thread a galvanized wire of diameter not less than 0.6 mm through both sides of the running joint wire,

- b) Tighten the jointing wire to draw the two edges together and twist wire tie, and
- c) Repeat similar joining on the other side of the board.

## 6. FIXING OF REED BOARD

**6.1 Fixing as Partitions** — Reed board shall be fixed with reeds vertical to horizontal runner spaced at about one metre centre. The adjacent boards shall be butt-jointed and the joint shall be located at the centre of the runner. The fixing to wooden runners shall be done with wood screws and diamond shaped washer and the spacing of the screws shall be not more than 30 cm centre to centre. In the case of mild steel runners, J-hooks and washers may be used instead of screws. While fixing to frames the boards shall not be fixed into a groove (*see 3.8*). While locating the doors and windows openings, care shall be taken to plan the work so as to keep cutting and wastage to the minimum (*see also 3.7*).

**6.1.1** For fixing reed board of window sill the board shall be so cut that it covers half the frame runners at all sides. Cement plaster 15 mm thick shall be applied at the sill, head and jambs formed by reed boarding when finishing so that there is no leakage of water (*see Fig. 3A*). As a better precaution a notch may be cut in the timber frame and then cement plaster may be applied. An alternative method of fixing reed boards to cover window sill is illustrated in Fig. 3B and 3C.

**6.2** For roof construction reed board shall be used only on pitched roof and not on flat roof (*see Fig. 4*). Each board shall be placed in such a manner that it has a purlin to support it at the middle and its edges are resting on adjacent purlins. The minimum bearing of the edges on purlins shall be 25 mm. Adjacent boards shall be butt-jointed. The boards shall be fixed on to the purlins with wood screws in the case of the wooden purlins or J-hooks in the case of steel purlins.

## 7. FIXING OF REEDS FOR *IN SITU* WALL CONSTRUCTION

**7.1** Grooves shall be made in the timber frame to a width of not less than 15 mm and the reeds shall be slipped into the grooves one by one.

**7.1.1** The reed walling so formed shall be stiffened by means of double bamboo slips 25 mm wide and not less than 6 mm thick, spaced at intervals of not more than 40 cm apart. One slip shall be attached on each side of the reed and tied together by means of cane slip. One stiffening slip shall be placed within a distance of 8 cm of all the battens.

**7.2** In the case of temporary or unimportant construction, reeds may be attached on one side of the batten by means of single bamboo slip nailed to the batten with 6 cm long wire nail spaced at 30 cm centres.

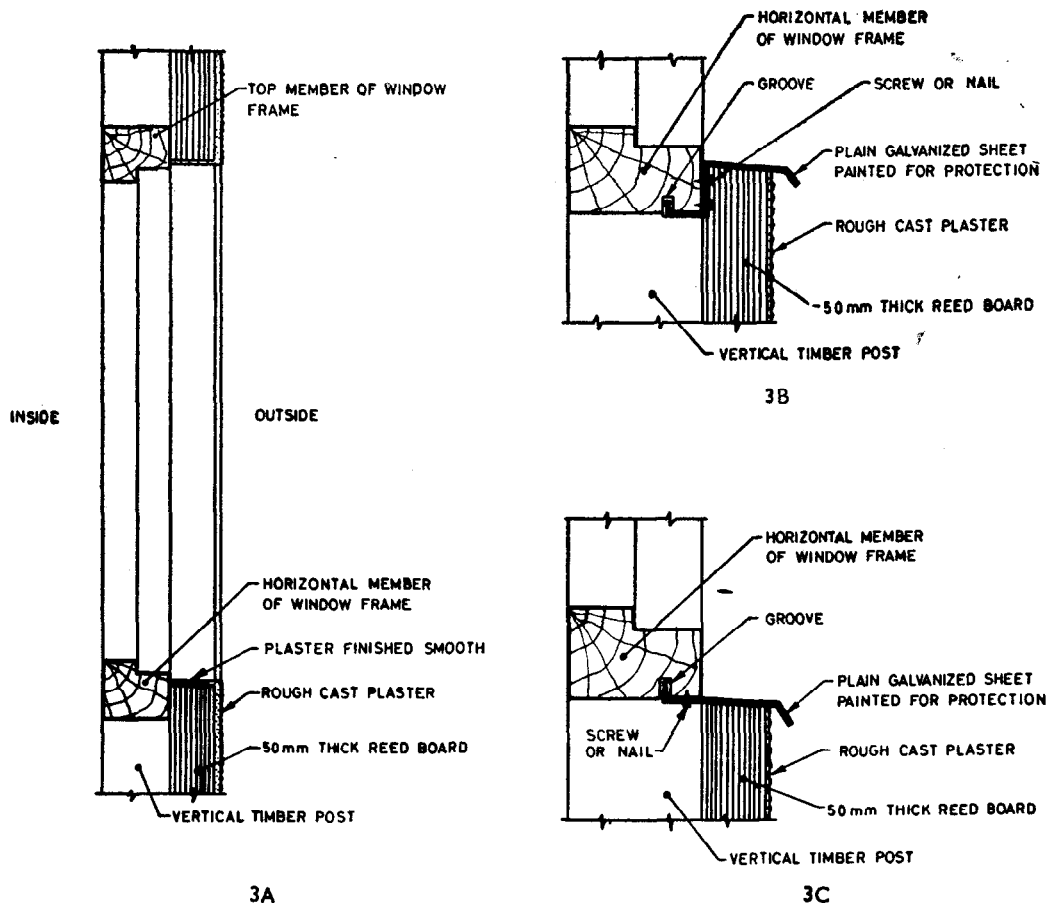


FIG. 3 DETAILS OF CONSTRUCTION FOR THE REED WALLING

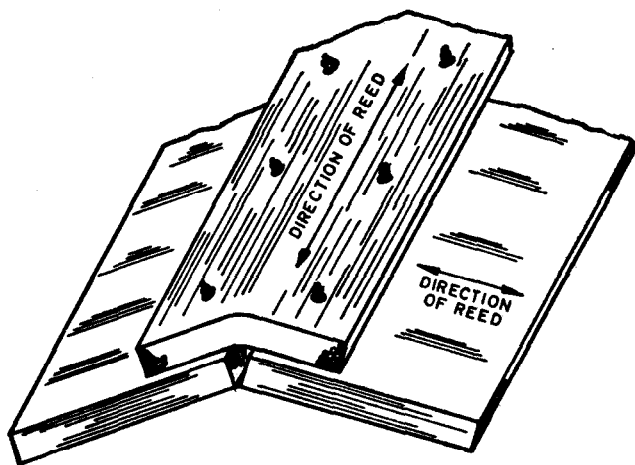


FIG. 4 REED BOARD RIDGING FOR ROOF

**7.3** Reeds shall preferably be fixed with just sufficient space of one centimetre between each other so that the mortar applied on one side for finishing penetrates to the other side to form a key for plaster. All vertical timbers in the walling shall be recessed with grooves 4 cm wide and 1.5 cm deep and the plaster forced into the groove so that there is no gap between the groove and the plaster when the plaster sets and dries.

**7.4 Use in Roof**— Use of reeds without assembly into boards is not recommended for roof construction. Reed may, however, be used as thatching.

## 8. FINISHING

**8.1** Reed board walling may be given a plaster pebble-dash or rough cast finish after fixing. The reed board shall be relatively dry prior to the application of plaster. This is essential as wetting causes reeds to swell and subsequent shrinkage on drying causes cracks to appear in the plaster. The plaster shall be applied not less than two coats for walling work. The recommended mixes and thickness shall be as in 3.6. The first coat shall be applied rough and allowed to stay and harden for 24 hours and subsequent coat shall be applied later. The plaster shall be cured for a minimum period of seven days. Application of cement plaster shall conform to IS : 1661-1960\* or IS : 2402-1963†.

\*Code of practice for cement and cement-lime plaster finishes on walls and ceilings.

†Code of practice for external rendered finishes.

**8.2** In the case of roofing, the top surface shall be finished with cement sand rendering, the mix being 1 : 6 cement sand. The thickness of the rendering shall be sufficient to cover the corrugations and it shall be done in two coats. Both the plaster coats shall be waterproofed in the case of external finishes in the areas of heavy rainfall. Waterproofing treatment shall be done by the application of bitumen felt and the treatment shall be a light one with not more than two layers so that the weight of the roof finish is not excessive.

**8.3 Termite Protection** — Normally plaster finish will give a fair degree of protection against termite, but where extra precaution is needed, treatment with a suitable preservative may be necessary. Reed boards shall never be left in direct contact with soil. At plinth level the cut end of the reed board shall be painted with insecticide or hot bitumen before fixing into groove of concrete or masonry.

**8.4 Paint Finish** — Where colour or paint finish is required, the finish shall preferably be applied by spraying.

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Cement	Poles
Door and Window, and Furniture Fittings	Pozzolanas
Doors and Windows	Reinforcement
Drawing, Estimation and Measurement	Roof Finish
Fire Fighting Equipment and Accessories	Sampling and Testing
Fire Safety	Sieves and Wire Gauzes
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