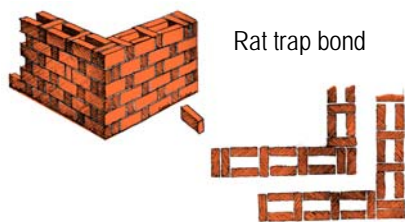


Walls Using The 'Rat-Trap Bond' Technology

Introduction

The rat-trap bond technology has been developed by Architect Laurie Baker with the HABITAT Resource Centre in India and is a result of its experimentations in cost-effective housing technologies conducted over 40 years. This technology has been used in India for over 20 years and has been successfully adopted in Sri Lanka by Practical Action in partnership with a local community based organisation called the Rural Centre for Development (also known by the Sinhala acronym, 'Sangrama')



- The rat-trap brick wall can be constructed in 8" or 9" thicknesses
- Its strength is compatible with to standard 9" brick wall, but consumes 20% less.
- The air medium that is created by the bond helps maintaining a good thermal comfort inside the building.
- As the construction is appealing to the eye both internally & externally, plastering is not necessary.
- The overall cost saving on this wall compared to the conventional 9" wall is about 26%.

The Technology & the Process

- Standard (2 ¼" x 4" x 8") fired clay bricks can be used.
- The first layer of bricks should be laid as brick-on-edge in a continuous row, allowing a space of about ½" between bricks.



Positioning of brick courses

- The height of this first layer would be about 4" with the ends of the brick facing the outer and inner face of the wall (see fig 1A)

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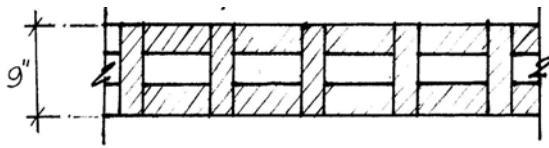


Fig 1A - Plan view

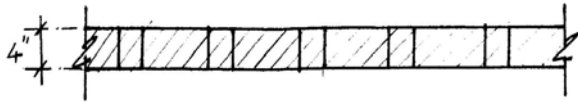


Fig 1B - Elevation

- The next row above the base row of bricks should have 2 bricks laid parallel with each other along the exterior and interior surface of the wall with a cavity between them. The ends of these bricks will be stabilised with the placement of a single brick on edge that spans the width of the wall. (see fig 1B)
- L and T corners in wall must be constructed as illustrated below. (see fig 2)

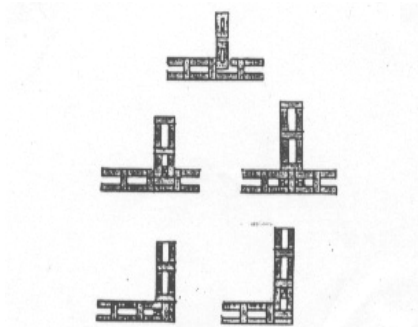


Fig 2

- At the base of openings in the wall for windows, a single layer of bricks laid flat must be used. Lintels for door and window openings must have a single row of bricks placed on edge as a lintel support. fig 3A shows the positioning of bricks for a 7' high door opening. fig 3B shows the positioning of bricks at the sill level and head level for windows.

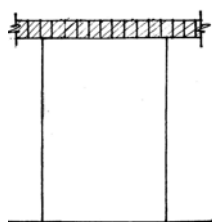


Fig 3A

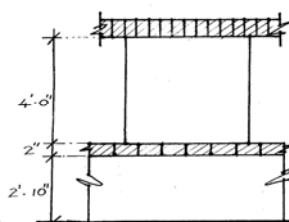


Fig 3B

It is important to ensure that the row of bricks serving as a base for lintels placed at the top of door and window openings should extend not less than 6" inches beyond the sides of the opening as shown in fig 3A and 3B.

An 8"W x 4"H reinforced insitu concrete lintel reinforced with 2 no. 8" dia. top steel and 2 nos. 10" dia. bottom steel with stirrups at 8" centres must be laid on the base described above.

From the lintel upward, the standard Rat-Trap bond can be repeated. The topmost layer of brick on walls must be placed flat.

Constructing a corbel

Corbels can be constructed using bricks placed flat or on-edge as preferred, as shown in fig 3A & 3B.

The construction of Corbels above doors and windows

Each layer in a corbel can project from 2" to a maximum of 2 1/2" inches, whether placed flat or on edge as shown in illustrations 4a and 4b. The corbel can be taken to a height of 3' 6". The corbel at window openings can begin at half the height of the opening or at the base of the opening, and corbels at doors can be lined-up with the starting point of corbels for windows to maintain a uniform appearance.

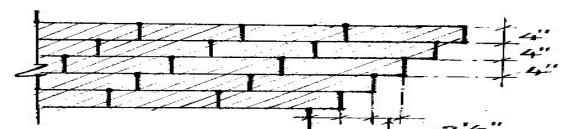


Fig 4A

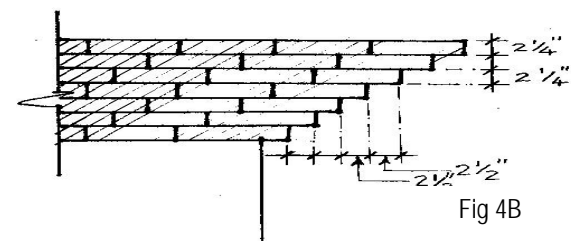


Fig 4B

Corbel Bench (Seat)

When constructing a corbel seat – an 8" wide Rat-Trap supporting wall must be constructed on a brick foundation of 12" width and 3" thickness to the required length of the seat. A corbel can be built on the Rat-Trap supporting wall using three layers of brick with each layer projecting $2\frac{1}{2}$ ", thus providing a seat width of 15". A cement/sand mix of 1:6 can be used as mortar. The seat may then be cement rendered. The height to

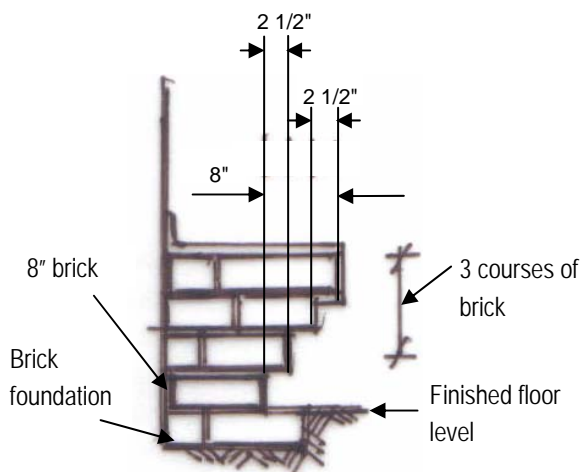


Fig 5 - Section at corbel seat

the top of the seat from the finished floor level must be 1' - 6". (See fig: 5).

Points to note:

- When constructing Rat-Trap walls for a building that does not have internal walls, no additional columns are required for wall lengths up to 15'.
- When constructing a floor slab on such walls – for walls lengths greater than 15' – brick columns must be used.
- These brick columns, when used, must be about 13" x 13" in size, in order to facilitate the placing of the concrete roof on the walls. It best to reinforce each column with suitably sized reinforcement.
- The above-described specifications would be applicable to a single hall that has no internal walls, but would not be needed for houses with rooms that require internal dividing walls.
- The Rat-Trap construction method allows for two storey construction.
- It is important that all bricks used should be adequately fired and of uniform sized to ensure consistency of strength and performance.
- It is necessary to use a cement/sand mix of 1:6 for mortar.