### Short description

Rat Trap Bond is a brick wall construction technique in which bricks are laid on edge such that the shiner (S) and rowlock (R) are visible on the face of the masonry (brick cross) creating an internal cavity bridged by the rowlock.

### Technical Data

<table>
<thead>
<tr>
<th>Building element</th>
<th>Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>9&quot; thick wall</td>
</tr>
<tr>
<td>Bricks per sq. m</td>
<td>85</td>
</tr>
<tr>
<td>Cement per sq. m</td>
<td>8kg</td>
</tr>
<tr>
<td>Sand per sq. m</td>
<td>1.2 Cu. ft</td>
</tr>
<tr>
<td>Resistance to earthquake</td>
<td>Very good</td>
</tr>
<tr>
<td>Resistance to heat</td>
<td>Very good</td>
</tr>
<tr>
<td>Resistance to sound</td>
<td>Very good</td>
</tr>
<tr>
<td>Resistance to rain</td>
<td>Very good</td>
</tr>
<tr>
<td>Climatic suitability</td>
<td>Very good</td>
</tr>
<tr>
<td>Stages of experience</td>
<td>More than 100 years</td>
</tr>
<tr>
<td>Durability</td>
<td>Very strong</td>
</tr>
</tbody>
</table>

### Advantages

#### Environmental
- Uses 130 MJ/m² less energy than English Bond
- Saves 30 kg/m² less CO₂ than English Bond
- Reduces the green house gases
- A normal two and half story house with total floor area 150 m² has approx. 241m² wall area. Using VSBK brick in Rat Trap Bond masonry, it saves 1.56 Ton CO₂ compared to English Bond

#### Technical
- I.O.E Pulchowk Campus lab test report confirms the load bearing capacity of Rat Trap Bond for H₂ mortar is 10.52 kg/cm²
- Cavity provides good thermal and sound insulation
- Modular masonry reduces wastage of bricks
- Cavity can be filled with steel bars and concrete for earthquake resistance
- Reduces approx. 40% dead weight of wall as compared to English Bond, hence the building can be designed to save steel and concrete

#### Economical
- Cost of masonry is reduced by 25-30% as this technique uses approximately 35% less bricks and 50% less cement mortar compared to English Bond
- Construction Speed of Rat Trap Bond masonry is equal to that of English Bond
- Concealed concreting, bands or beams for earthquake resistance, is possible in the Rat Trap Band masonry without shuttering
- Through cavities concealed plumbing and electrical layout is possible; avoiding and reducing the cost of masonry cutting

### Diagrams

- Shiner (S)
- Rowlock (R)
- 1 Rat Trap Bond Module
- Wall of 10 Rat Trap Bond Modules
- Brick Cross
Specification for its application

- **Brick Size**
  - Length = 230mm, Width = 110mm, Thickness = 55-65mm (most suitable)
  - Rat Trap Bond is possible with different brick sizes as per regional practice, ensuring that the shape and size of bricks are uniform

- **Mortar (Cement: Sand)**
  - For a single stories building – 1:6
  - For a double stories building – 1:4 for Ground floor, 1:6 for the upper floor

- **Earthquake resistance**
  - Reinforced concrete bands to be provided at sill, lintel and roof level. Corners, sides of openings, T-junctions of load bearing masonry to be reinforced with 12mm steel bars grouted in M20 concrete filled in cavity
  - Skilled mason required
  - Architects / Engineers have to calculate the modular length and height of the wall
  - Requires exact planning: Size (length, breadth, height) of a room, and even the size and position of the opening has to be according to the Rat Trap Bond Module size
  - Vertical mortar joints must be applied directly to the brick before placing it
  - “Brick Cross” pattern must be maintained at all the time for a proper Rat Trap Bond masonry

Limits of application

- Load bearing structure up to 2 stories is possible with Rat Trap Bond masonry, there is no limitation if used as in-fill masonry in framed structures
- Thickness of the wall is approximately 9”. No half brick (4”) or one and half brick (14”) thick wall is possible in Rat Trap Bond Masonry

Application

- Community Building at Butwal
- Residence at Butwal
- Residence at Baneshwor

[Images of construction details]