

# Roofing options

## Filler slabs

Filler slabs, consume less concrete and steel as compared to conventional RCC (Reinforced Cement Concrete) slabs, due to the use of less-heavy, low-cost filler material such as rejected Calicut tiles, clay pots and broken pieces of cement blocks. The slab filled with lighter filler materials is known as the filler slab.

### Advantages

- It enhances the thermal comfort inside the building due to heat resistant qualities of the filler materials used.
- It is an ideal option for low-income users who have limited space for building a house with the possibility of later expansion vertically, by adding a second floor.
- The roof can serve many other purposes by facilitating livelihoods such as drying of incense sticks, crackers, fish and fishing nets.
- It completely eliminates the use of timber for roofing, and is therefore extremely eco-friendly.
- Reduction in the use of concrete results in saving in the cost of cement and metal by about 40%.
- The soffit (underside) of this slab gives an attractive appearance and therefore, a ceiling is not needed
- Even semi-skilled masons can construct filler slabs after short-term training. These slabs require careful erection with proper training and can be used as floor slabs for multi-storied buildings and for sloping roofs.
- The saving on the cost of this slab compared to the conventional slab is about 22%



## The technology

When preparing the shuttering for the slab, fill small gaps between wooden shuttering panels with wet paper or small pieces of timber. Mark 30cm on both sides of the longer walls of the room. Place 8/10mm steel bars aligned to the marking on both sides (see fig.1). Similarly, mark 45cm on both sides of the short walls of the room (see fig.2). The spacing given is as an example only & needs to be determined depending

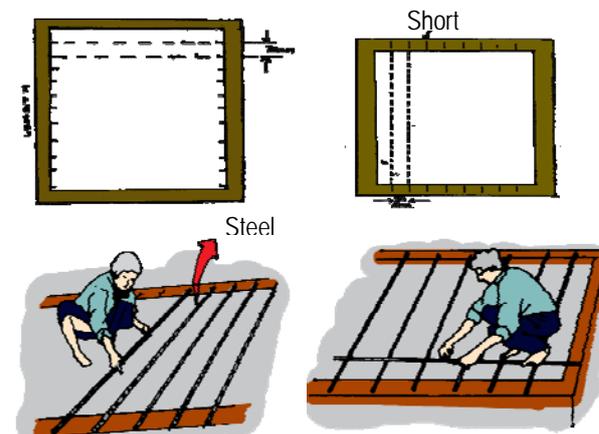


Fig 1 & Fig 2

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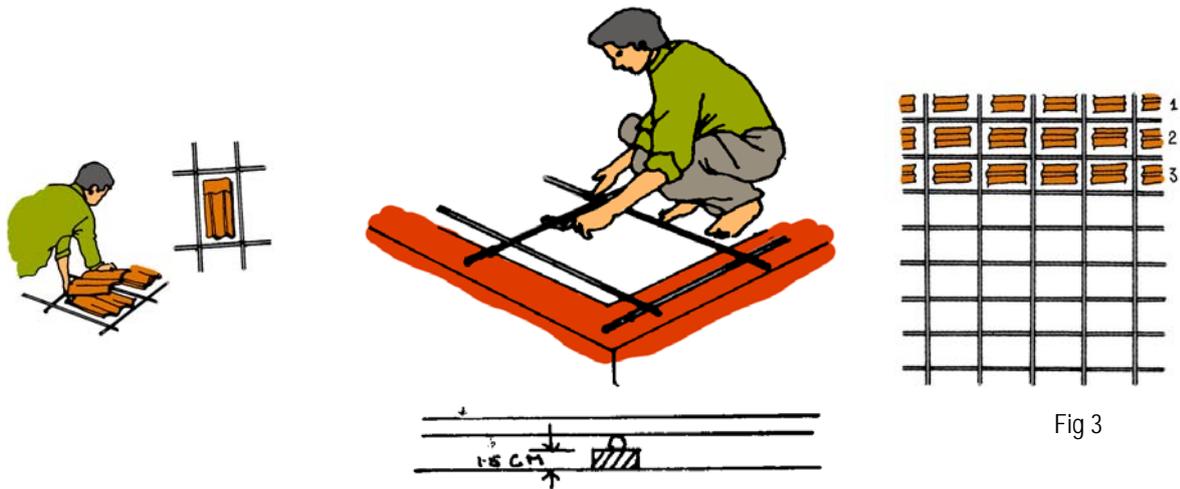


Fig 3

on the size of the area of the slab. The reinforcement bars across the shorter span should be placed as bottom steel. The reinforcement bars across the longer span should be placed as top steel. Top and bottom steel should be tied together with binding wire.

Place a pair of Calicut tiles at the centre of each rectangular space between the reinforcement steel (see fig.3). Check the clear cover of reinforcement (minimum 1.5cms). Lay each pair of Calicut tiles accurately in a line. Lay only two or three rows of tiles for convenience. **If the filler material is not to be exposed, apply cement mortar over the shuttering before the filler material is placed.**

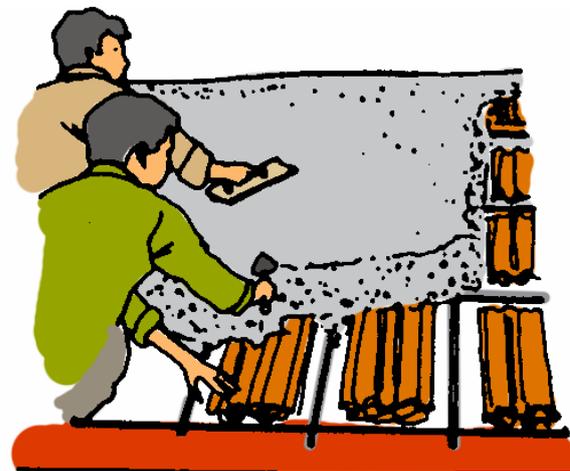


Fig 4.2

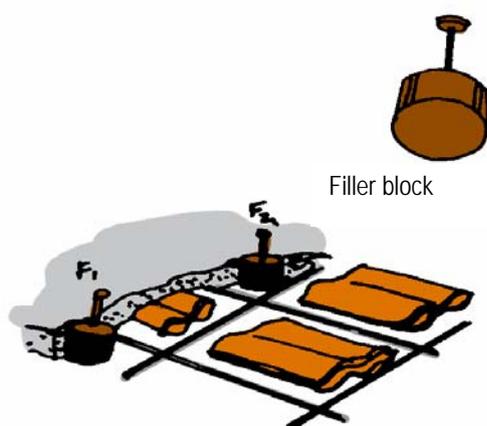


Fig 4.1

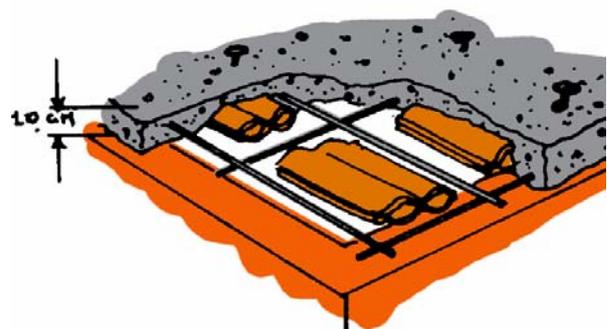


Fig 4.3

Other filler materials may be used as alternatives Prepare well mixed 1:2:4 cement concrete. Pour the concrete in the space between the filler materials as well as on the top.

Maintain the thickness of the slab using wooden pieces with nails (fig.4.1 & 4.2). Establish levels according to the slab thickness required and finish the top layer with proper compaction, as in fig.4.3.

Water curing of the slab should be done for at least 14 days.



Fig 5

After removing the shuttering, lightly rake the concrete if required before plastering. The slab can be left unplastered if required. To achieve an attractive appearance, finish the ceiling with a right angle and a trowel (fig.6).



Fig 6

## Cost comparisons

Cost comparison between filler slab and R.C.C slab Filler slab (flat) R.C.C. 100 sq.ft. 4" thick.

## Filler slab

Item	Unit	Quantity	Rate	Amount
8 mm tor steel	Kg	30-40	18	517
cement	Kg	200	4.20	840
metal	Cft	20	17.50	350
sand	Cft	15	15.33	229.95
tiles	No	80	2.75	220

Lab our and shuttering charges 100 Sq.ft x Rs.10 = 1000.00

**Total = 3156.95**

The above prices as of March 2005 have to be revised periodically.

## Conventional flat slab

The above prices as of March 2005 have to be revised periodically.

Item	Unit	Quantity	Rate	Amount Rs.
8 mm tor steel	Kg	70	17	1190
Cement	Kg	300	4.20	1260
Metal	Cft	30	17.50	525
Sand	Cft	18	15.33	275.94
labour			8	800

**Total = 4050.94**

Saving in using filler slab (RCC) instead of traditional RCC=22%