

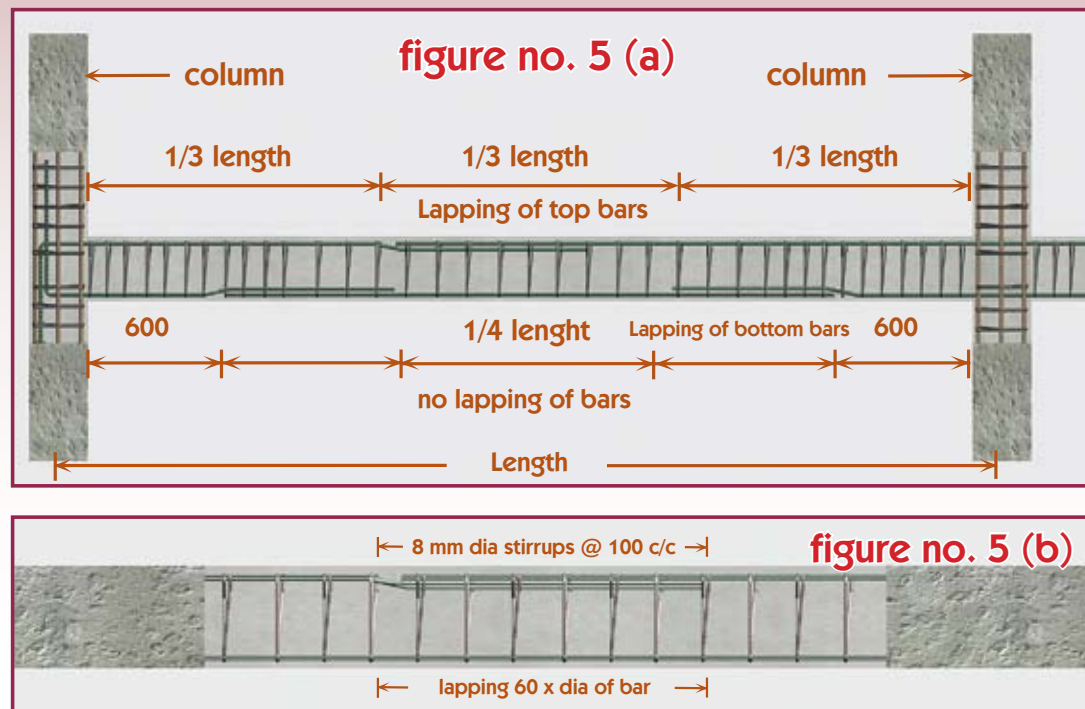


# Recommendations for construction of Earthquake Safer Buildings

## For RCC Frame Structure buildings up to three stories (For Buildings with room sizes up to 3.0 x 4.5m)

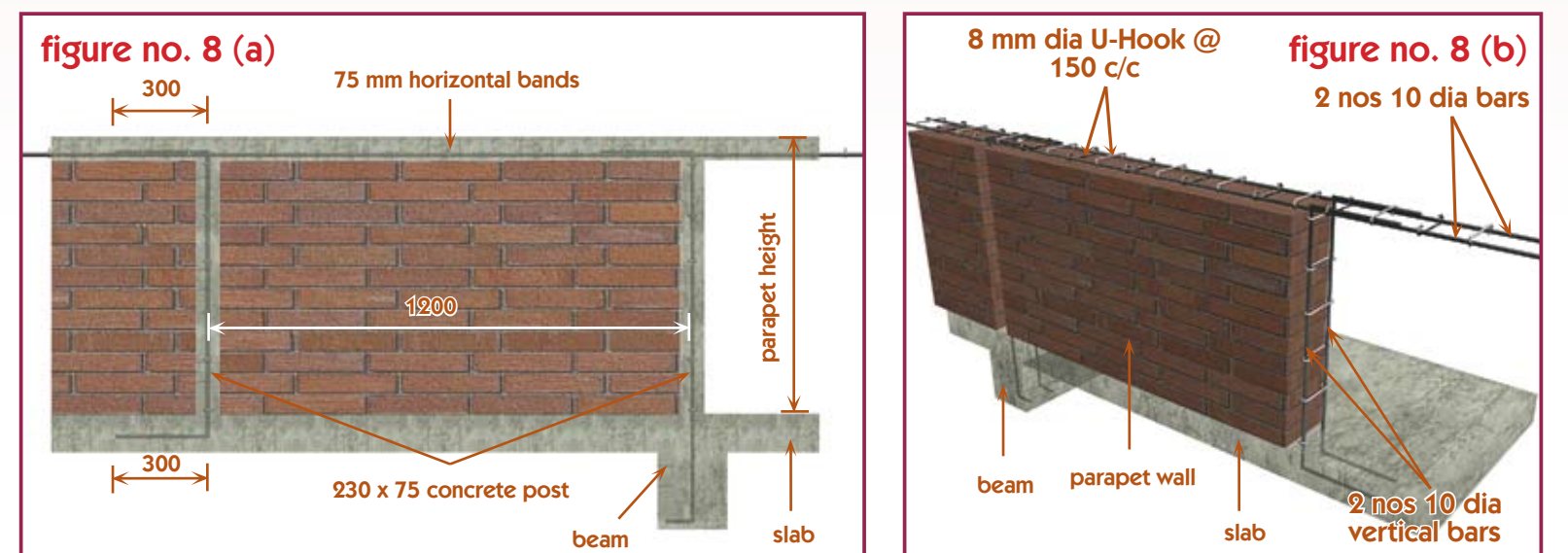
### 5. Lapping in Beams

- Reinforcement bars at bottom should not be lapped at mid  $\frac{1}{4}$  span of beam and should be lapped at edges 600 mm away from column faces.
- Reinforcement bars at top should be lapped at mid  $\frac{1}{3}$  of span of beam.
- The lapping length should be 60 times the diameter of reinforcement bars (for concrete mix 1:2:4). The spacing of vertical stirrups should be 100 mm c/c through out the length of lapping.
- The minimum size of stirrups should be 8 mm diameter.



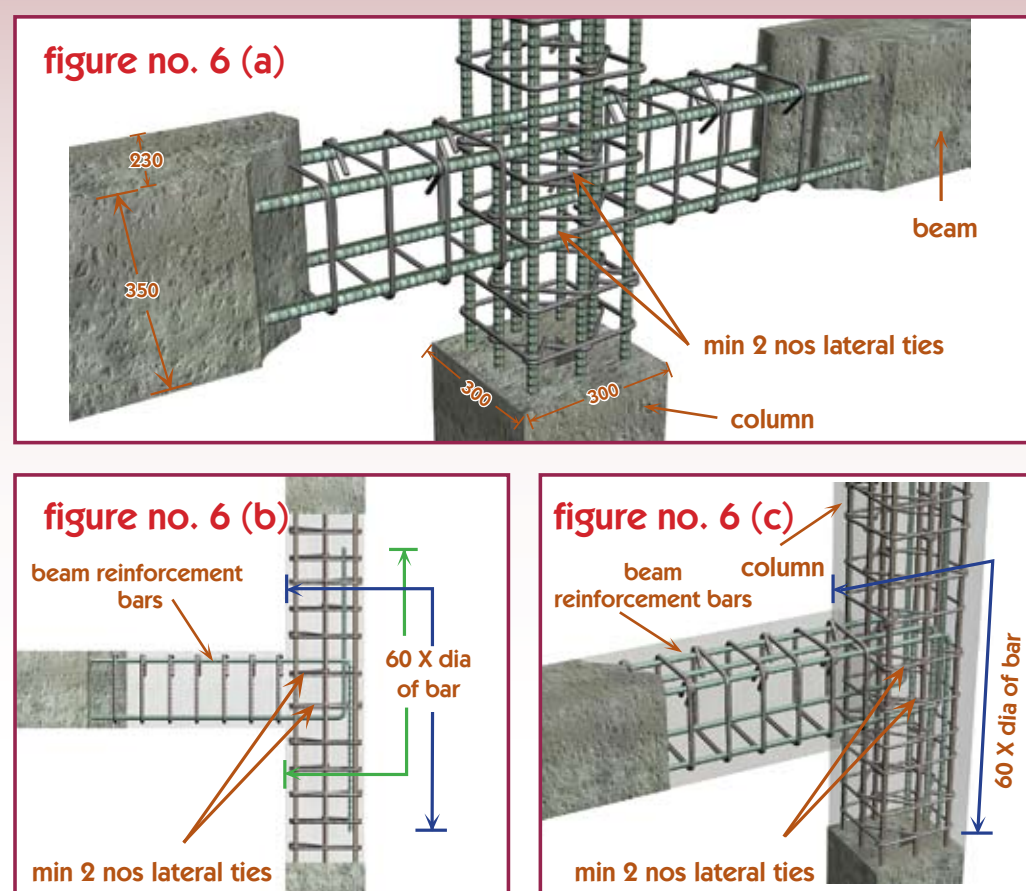
### 8. Construction of Parapet Bands

- Parapet bands should be provided to safeguard parapet walls at terrace and walls at verandahs.
- Concrete posts of size 230 x 75 mm with 2 nos 10mm diameter tied with 8 mm diameter U-hooks should be erected at 100 mm spacing from beams/slabs as shown in figure no. 8 (a, b).
- The concrete posts should be tied up at top with 75 mm thick horizontal concrete bands with 10 mm diameter bars tied with 8 mm diameter U-hooks.



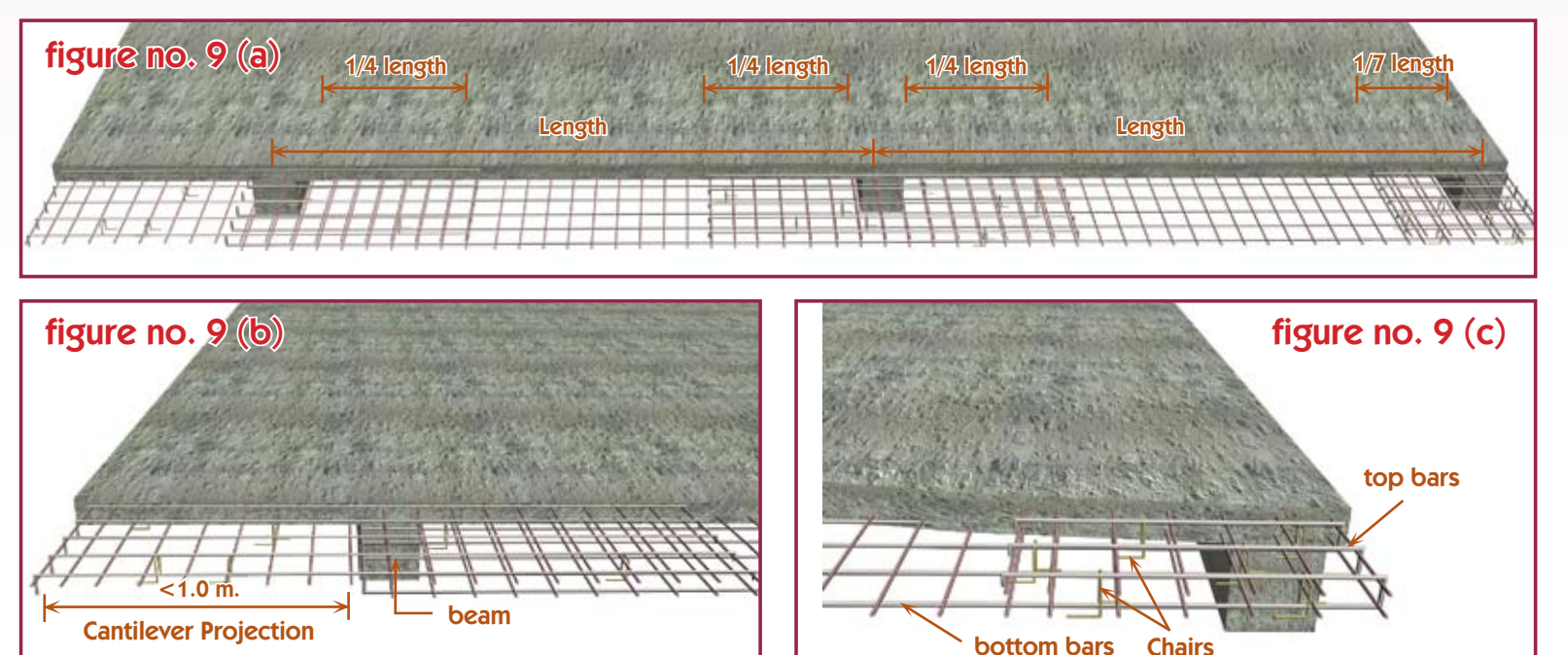
### 6. Beam and column joint

- All reinforcement bars of beams should pass inside the vertical bars of columns.
- Reinforcement of beams at the ending should be bent upwards/downwards inside the column up to 60 times diameter of development length. Bottom bars should be bent upwards and top bars should be bent downwards. The development length should be measured from the inside face of column as shown in figure no. 6 (b, c).
- Minimum two numbers lateral ties should be provided at beam & column joint as shown in figure.



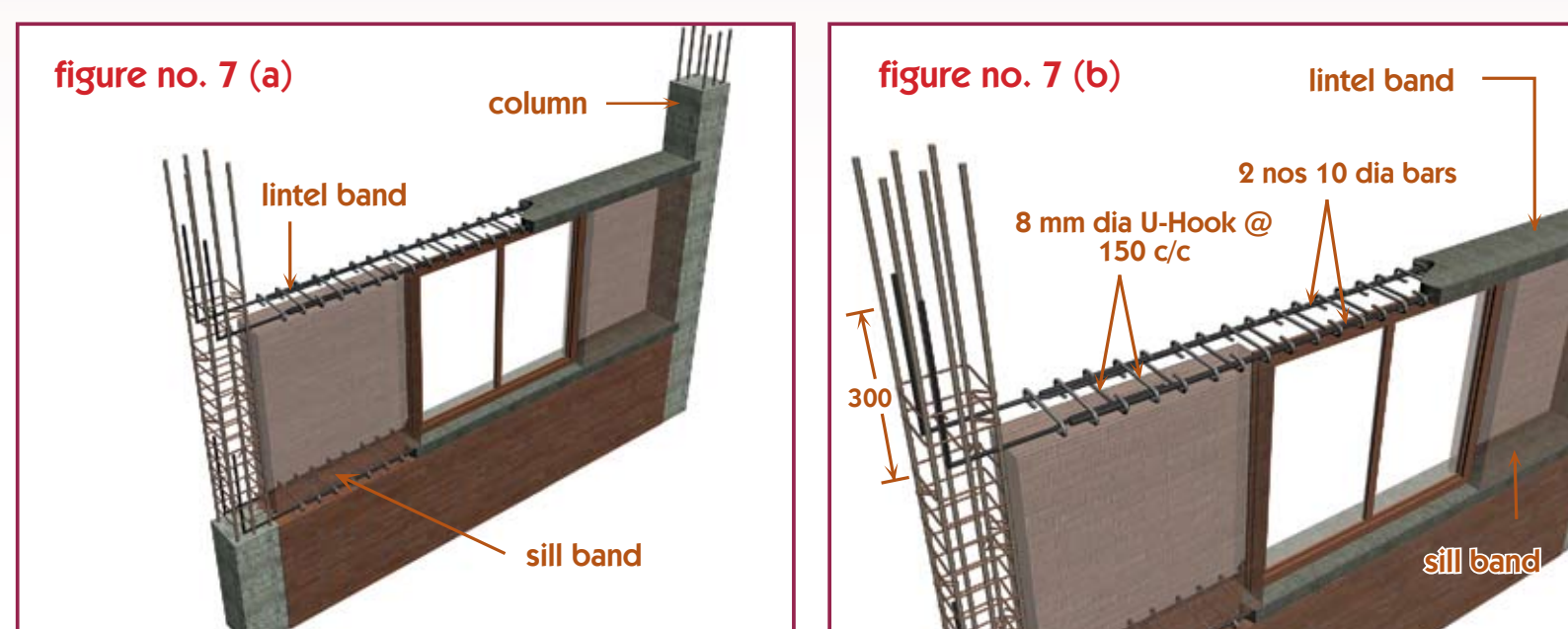
### 9. Construction of Slab

- For slab panel of size 4.5 m x 3.0 m reinforcement bars of 8 mm diameter can be provided at 150 mm spacing.
- For top projections up to 1.0 m, extra bars of 10 mm diameter should be provided.
- Chairs (10 mm diameter) should be provided for placing the top bars in position as shown in figure.
- Cover blocks (1 Cement :1 Sand) mortar of 15 mm thickness should be used for bottom bars.



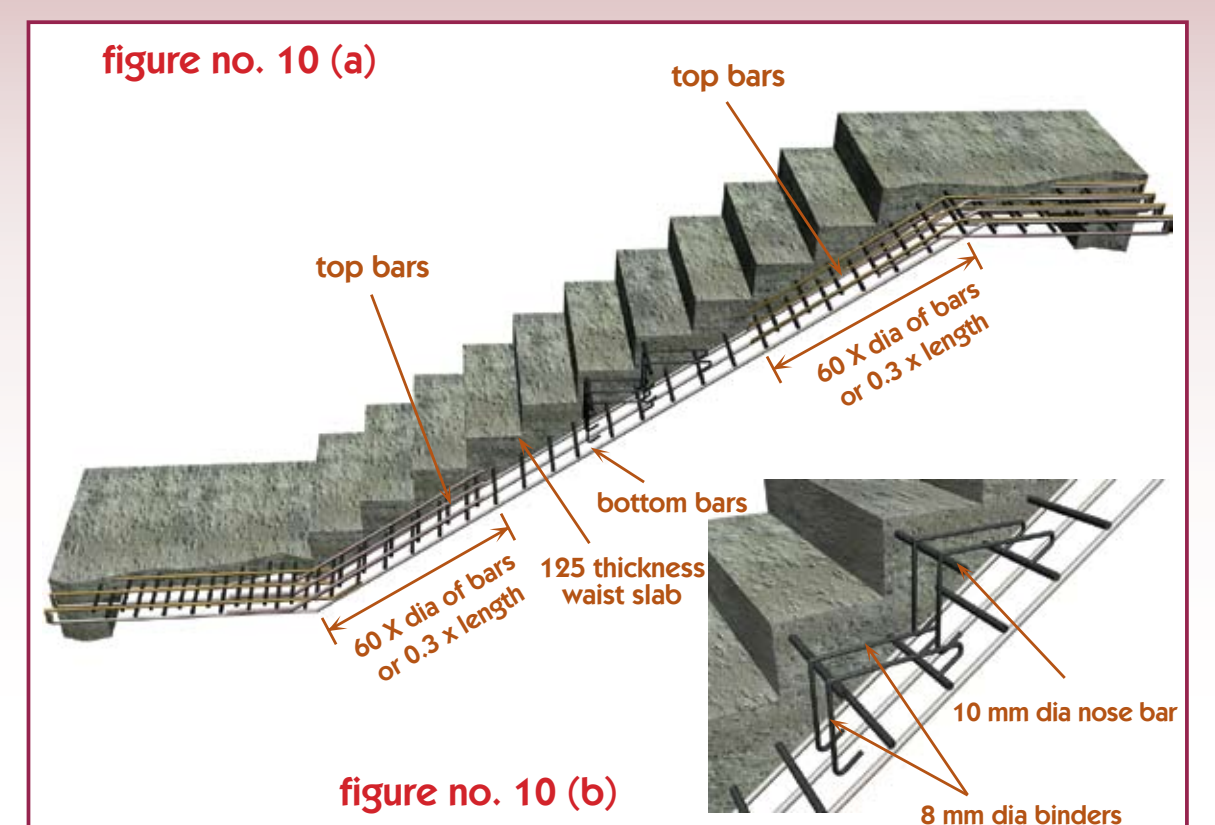
### 7. Sill and Lintel Bands

- To prevent the infill walls from falling out these shall be provided with horizontal reinforced concrete (RC) bands through the wall at about one-third and two-thirds of their height above the floor in each height (at sill and lintel level of openings)
- The RC bands should be tied up with columns abutting the wall by anchoring longitudinal bars fully with U-bars projected from columns
- The width of the band should be equal to the wall thickness and its thickness equal to that of the masonry unit or 75 mm, whichever is larger.



### 10. Construction of Staircase

- The minimum thickness of waist slab should be 125 mm.
- Top bars should be curtailed up to 60 times diameter length or  $\frac{1}{3}$  length of slope portion of waist slab which is greater that has to be measured from starting/ending of slope.
- Nose bars of 10 mm diameter should be provided at every step tied up by 8 mm diameter binders @ 300 mm c/c as shown in figure no. 10 (b).



Based on Nepal National Building Code



Government of Nepal  
Ministry of Physical Planning and Works  
**Earthquake Risk Reduction and Recovery Preparedness Programme for Nepal**  
(UNDP/ERRRP-Project: NEP/07/010)

Department of Urban Development and Building Construction, Babar Mahal, Kathmandu, Nepal  
Tel: (977-1) 4262474 | Fax: (977-1) 4262431 | Email: amrittuladhar@yahoo.com | Website: www.errrp.org.np

