Nepal Housing Reconstruction Programme

TECHNICAL DETAIL Progressive Expansion Provision For Stone Masonry in Cement Mortar

Submitted By

November 30, 2015
Considerations for Progressive Expansion of Buildings

General Provisions

Plan ahead: Prepare a master plan of the building and site layout considering future requirements.

Select a smaller core unit for construction now and plan for progressive expansion.

Ensure that adequate lengths of rebar are extended as part of the initial construction so that it is sufficient for lapping with new rebar during expansion. The length of rebar to be extended for different rebar sizes, including lap length and additional 12 inches, is given in the table below:

<table>
<thead>
<tr>
<th>Rebar Diameter (mm)</th>
<th>Bars Extension (mm)</th>
<th>Bars Extension (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.75</td>
<td>550</td>
<td>22</td>
</tr>
<tr>
<td>8</td>
<td>675</td>
<td>27</td>
</tr>
<tr>
<td>10</td>
<td>750</td>
<td>30</td>
</tr>
<tr>
<td>12</td>
<td>875</td>
<td>35</td>
</tr>
<tr>
<td>16</td>
<td>1050</td>
<td>42</td>
</tr>
<tr>
<td>20</td>
<td>1250</td>
<td>50</td>
</tr>
</tbody>
</table>

Use lean concrete to protect rebar extended for future expansion. Concrete mix proportion of 1:3:6 cement, sand, coarse aggregate ratio can be used for lean concrete.
Considerations for Progressive Expansion of Buildings

**Horizontal Expansion**

Extend plinth band rebar for the bar extension length, noted in the table on previous page, beyond the walls and including the strip footing underneath it. Extend the footing beyond the extended plinth band by providing stepping for proper connection for future wall footing.

Provide bar extensions at all horizontal bands: plinth, sill, lintel and floor bands.

Plan the expansion in such a way that the horizontal expansion will be along the ridge of the roof.
Considerations for Progressive Expansion of Buildings

Horizontal Expansion

Provide 90 degree bends in the lintel and sill bands with extensions equal to the noted rebar extension length. Cover the bent rebar in lean concrete to protect them until the future extension will be built and they will be straightened.

Provide roughened edges in walls where the walls will be connected during expansion in future. This will ensure a proper connection between old and new walls.

Extend rebar of floor beam up to the noted extension length and cover it with lean concrete.

Roughened edges

Bent sill and lintel rebar covered in lean concrete for protection

Extended plinth band

Extended floor band

SECTION AT SILL AND LINTEL BANDS INCLUDING EXPANSION PROVISION
Considerations for Progressive Expansion of Buildings

Vertical Expansion

Provide 90 degree bends in the vertical bars at corners and wall junctions at the top of the walls of the core unit. Extend the hook for the bar extension length and cover with lean concrete.

When future expansion is constructed:
- Chip off lean concrete and expose rebar.
- Hold the bent rebar where it extends from the structural concrete and then bend it straight.
- Lap the new rebar with the exposed rebar providing the required lap length.
- Clean the surface of the wall and coat the wall surface with cement slurry before adding new wall to it.
- For vertical expansions, remove the roof carefully and rebuild on the top of the new second floor.
- Always align the walls of the extension with the walls of the core unit, both horizontally and vertically.

If the initial core unit includes an attic, make sure to extend rebar at the sill level in the attic up to noted extension length and cover with lean concrete.

Extend the walls below which would help in acting as a buttress to support the longer walls.