Nepal Housing Reconstruction Programme

TECHNICAL DETAIL Progressive Expansion Provision For Brick Masonry in Cement Mortar

Submitted By

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### 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 length 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.

Opt for horizontal expansion first then vertical expansion. This will minimize the risk of differential settlements of the old and new construction parts of the building.
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.
BRICK MASONRY IN CEMENT MORTAR

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. Protect the bent rebar in lean concrete until the future extension will be built and they will be straightened.

Provide toothed edges in walls where the walls will be connected to new walls during expansion in future. This will ensure proper bonding between old and new walls.

BRICK IN CEMENT MORTAR 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. Protect the bent rebar in lean concrete until the future extension will be built and they will be straightened.
- Provide toothed edges in walls where the walls will be connected to new walls during expansion in future. This will ensure proper bonding between old and new walls.

Scale: None
Designed by: Nepal Housing Reconstruction Programme

Technological Details (Progressive Expansion Provision)

- Extended floor band
- Toothed edges
- Bent sill and lintel rebar covered in lean concrete for protection.
- Extended plinth band

Detail at A

- Re-bar extension to be bent to 90 degrees before concreting the sill band.
- Re-bar bend radius to be provided not less than 4x diameter of re-bar.

计划用于扩展扩展

- 在梁和梁带的外端提供90度弯曲，并延长至标注的钢筋延伸长度。保护弯曲钢筋在轻混凝土中，直到未来扩展将被建造，并且它们将被拉直。
- 在将与新墙连接的旧墙中提供齿状边缘。这将确保旧墙和新墙之间的良好粘接。

规模: 无
设计者: 尼泊尔住房重建计划

技术细节 (扩展扩展)
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.

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.

**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.