FAQ 07-14

What height restrictions should I be aware of with segmental retaining wall construction?

Segmental Retaining Wall Height
The height of a segmental retaining wall is measured from the top of the leveling pad to the top of the uppermost SRW unit (not including the cap). This includes the bottom portion of the wall that extends below the finished grade. The following discussion provides general guidance and recommendations to consider when planning a SRW project. As always, consult with a qualified SRW designer for project-specific considerations.

Maximum Segmental Retaining Wall Height
1) Gravity Walls – The height of unreinforced segmental retaining walls (gravity walls) depends on the SRW unit depth (front to back), weight of the individual unit, face batter, soil properties, and loading conditions. Unreinforced SRWs typically can be built up to 3 to 4 ft (1.0 – 1.2 m) high, or less if poor soil conditions or surcharges loads are present. When the maximum height of the gravity SRW system is not sufficient, the design engineer should consider using a reinforced structure and incorporate geosynthetics.

2) Reinforced Walls – Reinforced segmental retaining walls have no theoretical maximum height when properly designed. Reinforced SRWs in excess of 50 ft (15.2 m) have become more common and terraced and single-height retaining walls in excess of this height have also been constructed.

When to Engineer SRW Projects
Segmental retaining walls fall under the requirement of the International Building Code, Section 105.2, which requires a building permit for earth retaining structures which are over 4 ft (1.2 m) in total height. Building permits may be required for shorter walls if they support a surcharge load. In addition, local building codes may require a design prepared by a design professional. Where there is no specific requirement, NCMA recommends the following guidelines:
Terraced (Tiered) SRW Walls

Terraced or tiered retaining walls consist of two or more walls whereby the upper wall is set back from the underlying wall. As a rule of thumb, the minimum distance between segmental retaining wall terraces (D) for each wall to act independently must be at least equal to twice the height of the lower wall (D > 2H1). When the terraces do not meet this condition, the design analysis models the structure as a single taller wall to account for the added dead and live loads from the upper terrace wall on the lower wall(s). As with all designs, global stability must be checked in the design process.

<table>
<thead>
<tr>
<th>Design Method</th>
<th>Wall Height</th>
<th>Allowable Soil &amp; Foundation Conditions</th>
<th>Recommended Engineering Required</th>
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</thead>
<tbody>
<tr>
<td>Method 1: Non-engineered</td>
<td>Less than or equal to 4 ft (1.2 m) from leveling pad to top of wall</td>
<td>Sand/gravel, silty sands, silt/lean clays</td>
<td>Use design chart provided by SRW system provider.</td>
</tr>
<tr>
<td>Method 2: Engineered</td>
<td>Greater than 4 ft (1.2 m) from leveling pad to top of wall</td>
<td>Sand/gravel, silty sands, silt/lean clays</td>
<td>Have the design section reviewed/prepared by a registered professional.</td>
</tr>
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</table>

Note: $H_1 \geq H_2$