### Box Culvert Tables

#### Precast Concrete

**Revision:** 10-09-2015

**Calculations verifying compliance with AASHTO 5.7.3.4 "Control cracking by stress of 65 ksi. If bar reinforcement is substituted for welded wire requirements are for welded wire reinforcement with minimum specified yield strength of 60 ksi.**

**General Notes**

- See Standard FILL-356-2009 for basis of design. Fill height is defined as the distance from the top of the culvert to the top of the pavement on top of fill if there is no pavement.
- Design for full heights greater than shown in the tables are available from the MnDOT Bridge Office.

- See Standard FILL-356-2009 and FILL-357-2009 for additional information. Transverse reinforcement is provided at the end of the culvert or at a span longitudinal reinforcement is perpendicular to the culvert span.
- If the fill height range extends into more than one class, use the class with the largest steel areas. Check maximum and minimum fill heights over the full area of roadway and shoulders.
- Roadway or shoulders fill heights of less than 0.5' require a distribution slab. Extend the width of the distribution slab to the outside edges of the roadway shoulders unless specified by the engineer.

**Concrete Use:** 2350 for the distribution slab.

- Place 4" thick cast-in-place distribution slabs with nos. 5 bars at 1'-0" transversely and nos. 3 bars at 1'-0" longitudinally. Every other 10' of distribution slab and transverse center distribution slab joints shall be sealed with 1" W.R. mahogany material per spec. between culvert and distribution slab.

- Precast distribution slabs with the same reinforcement may be used for full heights over 1'. Center distribution slab is made from barrel segments, made of 6" V.D. granular material per spec. by other culvert manufacturer.

**Concrete Design slab per the Worst Project Design Manual if it is used as pavement surface.**

**Curvature radius is based on 150 PSI with a minimum size of 12 inches.**

1. **Reinforcement areas are in square inches per linear foot of barrel. All reinforcement lengths and areas are minimum requirements.** Reinforcement requirements are for mild steel reinforcement with minimum specified yield strength of 60 ksi. Bar reinforcement is substituted for welded wire reinforcement. **Design calculations verifying compliance with AASHTO 5.7.4 "Control cracking by distribution of reinforcement."**

2. **Place longitudinal reinforcement denser as A6s and A6s in all slabs and walls with a minimum of 24 in./ft.**

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#### Table: Box Culvert Cross Section

<table>
<thead>
<tr>
<th>Size</th>
<th>CL</th>
<th>Spn</th>
<th>FHR</th>
<th>T+</th>
<th>T-</th>
<th>T</th>
<th>As1</th>
<th>As2</th>
<th>As3</th>
<th>As4</th>
<th>As7/As8</th>
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</table>

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#### Box Culvert Cross Section

**Diagram:**

- **Box Culvert Cross Section**
- **Diagram of Box Culvert Cross Section**
- **Box Culvert Cross Section Diagram**
- **Diagram showing Box Culvert Cross Section**
- **Visual representation of Box Culvert Cross Section**

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**Notes:**

- Box Culvert Tables
- Precast Concrete Box Culvert Tables
- FIG. S-395.1000
- Do not include tables with plan

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**Box Culvert Cross Section Diagram:**

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- **Diagram of Box Culvert Cross Section**

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**Questions:**

- **What are the reinforcement requirements for the box culvert tables?**
- **How are the fill heights determined?**
- **What is the minimum specified yield strength for the reinforcement?**
- **How are the longitudinal reinforcement placed?**
- **What is the curvature radius for the pavement surface?**
- **What are the minimum size requirements for the box culvert?**
- **What is the purpose of the distribution slab?**
- **What is the role of the MnDOT Bridge Office?**