TABLE OF BEAM SIZES AND DESIGN DATA (4 FT. MAX. BEAM SPACING)

<table>
<thead>
<tr>
<th>BEAM SPAN</th>
<th>ROLLED BEAM</th>
<th>DEFORMATION IN INCHES</th>
<th>DC (kip)</th>
<th>OR (kip)</th>
<th>LL1 (kip)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 Max.</td>
<td>M18x45</td>
<td>0.60</td>
<td>0.06</td>
<td>5.39</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>M16x45</td>
<td>13.7</td>
<td>0.01</td>
<td>5.42</td>
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<tr>
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<td>M18x65</td>
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<td>M17x57</td>
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<td>M16x57</td>
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<tr>
<td></td>
<td>M15x7</td>
<td>12.4</td>
<td>0.01</td>
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<td>0.05</td>
<td>11.07</td>
<td>1.05</td>
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<tr>
<td></td>
<td>M22x45</td>
<td>24.3</td>
<td>0.05</td>
<td>11.07</td>
<td></td>
</tr>
<tr>
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<td>M19x36</td>
<td>20.8</td>
<td>0.05</td>
<td>11.35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M18x33</td>
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<td>0.06</td>
<td>11.63</td>
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<tr>
<td>40 Max.</td>
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<td>15.09</td>
<td>1.20</td>
</tr>
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<td>M22x50</td>
<td>31.0</td>
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<td>15.23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M18x50</td>
<td>20.3</td>
<td>0.06</td>
<td>15.63</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M17x60</td>
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<tr>
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<td>17.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M15x35</td>
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<td>0.20</td>
<td>18.20</td>
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<tr>
<td>60 Max.</td>
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<td>19.06</td>
<td>1.50</td>
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<tr>
<td></td>
<td>M24x11</td>
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<td>0.22</td>
<td>19.44</td>
<td></td>
</tr>
<tr>
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<td>M22x11</td>
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<td>0.24</td>
<td>19.85</td>
<td></td>
</tr>
<tr>
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<td>22.1</td>
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<td>20.58</td>
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<tr>
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<td>M26x16</td>
<td>40.7</td>
<td>0.28</td>
<td>21.24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M22x10</td>
<td>35.7</td>
<td>0.30</td>
<td>21.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M18x15</td>
<td>27.0</td>
<td>0.33</td>
<td>22.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M16x15</td>
<td>23.9</td>
<td>0.40</td>
<td>22.63</td>
<td></td>
</tr>
<tr>
<td>100 Max.</td>
<td>M36x18</td>
<td>50.0</td>
<td>0.42</td>
<td>23.40</td>
<td>1.80</td>
</tr>
</tbody>
</table>

**TABLE OF BEAM SIZES AND DESIGN DATA (4 FT. MAX. BEAM SPACING)**

- **BEAM SPAN**: 15, 20, 25, 30, 40, 50, 60, 75, 100 Max.
- **ROLLED BEAM**: M18x45, M16x45, M18x65, M16x65, M16x79, M15x7, M20x60, M17x57, M16x57, M15x7, M25x55, M19x50, M18x67, M16x79, M15x7, M30x29, M22x45, M19x36, M20x33, M18x50, M17x60, M30x7, M22x42, M18x44, M16x44, M15x35, M30x16, M24x11, M22x11, M18x17, M16x17, M16x15, M18x15, M20x15, M16x15, M16x15.
- **DEFORMATION IN INCHES**: 0.60, 13.7, 12.2, 10.8, 18.0, 16.4, 15.5, 12.4, 24.3, 24.3, 20.8, 19.3, 19.9, 15.0, 35.0, 27.6, 24.5, 22.1, 50.0, 40.7, 35.7, 27.0, 23.9.
- **OR (kip)**: 0.75, 28.34, 0.90, 28.94, 1.05, 28.37, 1.20, 28.69, 1.35, 29.93, 1.50, 30.13, 1.65, 30.29, 1.80, 40.45.

**Notes**

- **MATERIAL DESIGN SPECIFICATIONS**
  - **for Beam Steel**: Fy = 60000 PSI
  - **for Steel Reinforcement**: Fy = 60000 PSI
  - **for Class "A" Deck Concrete**: f'c = 4000 PSI

- **DESIGN LOADS**: Beam sections are designed for M20 Live Load. The fatigue truck is also set at M20.

- **SUBSTRUCTURE DESIGN LOADS**: Unfactored design reaction forces per beam end. DC (kip): Beam, Slab, and assumed Type III rating dead loads. OR (kip): Future wearing surface.

- **DESIGN LOAD DISTRIBUTION**: Contrary to AASHTO LRFD Bridge Design Specifications, the design moment and shear distribution for all beams is 0.6 lanes.

- **FUTURE WEARING SURFACE**: These beams are designed for a 15 PSF future wearing surface load.

- **CONCRETE DECK**: This will improve the load rating, but smaller beams are not to be used.

- **Use of these beams will limit the loaded live load to 20 kips**.
General Notes

Specifications: All references to the standard Specifications are to the current edition of the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, with current supplemental specifications, as referenced to the ASHTO LRFD Bridge Design Specifications, with Interims.


Substructure Design Loads: Unfactored design forces per beam span, DC (kips), Beam, Slope, and assumed Type III traffic dead loads. DC (kips): Future wearing surface loads.

Material Design Specifications:
- Steel: A572 Gr 50
- Concrete: F'c = 4000 PSI

Design Loads:
- Load of 640 pound/foot uniformly distributed.
- Max. Design Load: 50' (25' each span) at 40° F.

Reinforcement:
- Steel: A325
- Concrete: F'C = 4000 PSI

Design Loads: Beam sections are designed for 1.25*HL93 (KYHL93) Live Load. Vehicular Live Loading designated HL-93.

Design Load Table: From ASHTO design code.

Reinforcement:
- Beam: A325
- Concrete: F'C = 4000 PSI

Division of Structural Design

Table of Beam Sizes and Design Data (4 ft. Max. Beam Spacing)

<table>
<thead>
<tr>
<th>Beam Span</th>
<th>Rolled Beam</th>
<th>Deflection in Inches</th>
<th>DC (kips)</th>
<th>OR (kips)</th>
<th>LL1 (kips)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Design Load:
- V-Notch
- Type III traffic dead loads
- Unfactored design forces per beam span

Notes:
- Sampling and testing procedures shall be in accordance with ASHTO T243 and T244.
- Frequency testing, the Fm value of testing shall be 100.
- High-strength bolts, nuts, and washers, A325 M16-4.
- High-strength bolts, nuts, and washers, A325 M16-4.
- Design Load Table: From ASHTO design code.

Reinforcement:
- Steel: A325
- Concrete: F'C = 4000 PSI

Division of Structural Design

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- Design Load Table: From ASHTO design code.

Reinforcement:
- Steel: A325
- Concrete: F'C = 4000 PSI

Division of Structural Design
**Slab and End Diaphragm Details**

**Notes:**
1. Diaphragm Spans one to project from the slab regardless of slab forming method.
2. Place Diaphragm bars parallel to face of beams.
3. Reinforcing steel shall be epoxy coated.
4. End Diaphragms are required on both Grid Deck and Slabs.

**DIAGRAM**

- **Diaphragm X-Section (Perpendicular to Diaphragm)**

- **DIAGRAM**

- **PLAN OF SLAB**

Not all reinforcing steel shall be epoxy coated.

**Notes:**
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- **DIAGRAM**

- **PLAN OF SLAB**

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2. Place Diaphragm bars parallel to face of beams.
FRAMING PLAN

SECTION A-A

INTERMEDIATE DIAPHRAGM (for up to 14" beam depth)

Holes Throughout.
Note: Use 5/8" Bolts with 4'-0" max. beam to beam spacing.

END OF BEAM DETAIL

@ SUPPORTS

FRAMING TYPICAL

SECTION A-A

INTERMEDIATE DIAPHRAGM (for up to 20" beam depth)

Holes Throughout.
Note: Use 5/8" Bolts with 4'-0" max. beam to beam spacing.

END OF BEAM DETAIL

@ SUPPORTS

FRAMING TYPICAL
**GENERAL NOTES**

Mastic Tape: Mastic Tape used to seal joints is to meet the requirements of ASTM C-877 Type I, II, or III. The joint is to be covered with 12-inch wide mastic tape. Prior to application, the joint surface shall be clean and free of dirt, debris, or deleterious material. Primer, if required by the tape manufacturer, shall be applied for a minimum width of nine inches on each side of the joint.

Mastic Tape shall be either:
- EZ-WRAP RUBBER by PRESS-SEAL GASKET CORPORATION,
- SEAL WRAP by MAR MAC MANUFACTURING CO., INC.,
- CADILLOC by the UP RUBBER CO., INC.
- or approved equal.

Mastic Tape shall cover the joint continuously unless otherwise shown in the plans. Mastic Tape may be split by lapping a minimum of six inches, and in accordance with the manufacturer's recommendations with the overlap running downhill.

The cost of labor, materials, and incidental items for furnishing and installing Mastic Tape shall be considered incidental to the unit price bid for Concrete Class AA and no separate measurement or payment shall be made.

**DIAPHRAGM X-SECTION**

**DIAPHRAGM ELEVATION**

**MASTIC TAPE APPLICATION**

- Provide 6 MIL plastic between diaphragm and ends of bridge to prevent damage to tape.
- Tape shall be looped as shown at expansion joint material.
- The contractor shall provide 12" wide mastic tape loop and expansion bond breaker between plastic film or other joint material.

**Note:** When Slab is used and high water expected over bottom of beam elevation, place mastic tape above beam. Then add plastic pipe above mastic tape, as shown.