The culvert-box inlet is formed by placing a drop spillway at the upstream end of a culvert. It may be built as an integral part of a new culvert, or fastened to the upstream headwall of an existing culvert. See Fig. 1.

**Uses:**
1. Control the grade and reduce erosion above culverts in a natural or constructed channel.
2. Control the grade and reduce erosion in ditches bordering a road or highway.
4. Can be redesigned to serve as a ramp to a large culvert used as a cattle pass.

**Advantages:** It is one of the most economical structures for controlling overfalls because the existing culvert and highway embankment replace the outlet portion of the typical drop-inlet spillway.

**Limitations:** It requires the availability of a structurally sound road culvert. It is often attached to a road culvert which is the property of a roadway governing body and therefore requires their permission.

**Design and Construction:** A box inlet capacity need not be greater than 1.25 times the culvert capacity unless greater capacity is needed to meet the following requirements.

1. Make the horizontal area of the box inlet at least 1.5 times the cross-sectional area of the culvert.
2. Make the dimensions of the box inlet large enough to prevent submergence of the existing culvert headwall at the design runoff or extend the existing headwall. Follow suggestions given in UMC Guide 1509 "Types of Stabilization Structures" in selecting the design storm which the inlet should carry.

The capacity of box inlets can be determined from Table 1.

Plan for at least 1 foot of freeboard between the design water level and the lowest point on the roadway, or meet the requirements of the highway department.

Use reinforced concrete, plain concrete or concrete blocks if the culvert is of concrete. If the height of the box inlet is less than 1.5 times the diameter of the culvert, concrete may be used on corrugated metal culverts. Tie the floor and walls of the box inlet to the existing culvert headwall with dowel.
TABLE 1
CAPACITIES OF BOX INLETS, in CFS

<table>
<thead>
<tr>
<th>Depth of Flow, Feet</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>22</th>
<th>24</th>
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<td>19</td>
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<td>93</td>
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<tr>
<td>1.5</td>
<td>20</td>
<td>34</td>
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<td>57</td>
<td>68</td>
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<td>171</td>
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<td>140</td>
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<td>263</td>
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<tr>
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<td>147</td>
<td>172</td>
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<td>221</td>
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<td>528</td>
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<td>595</td>
<td>645</td>
<td>694</td>
<td>744</td>
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</tr>
</tbody>
</table>

*The length of the wall over which water flows in entering the inlet. Measured around the inside of the drop box.

bars. Follow accepted construction practices in mixing, placing and curing the concrete and in selecting and placing the reinforcing.

Use corrugated metal box inlets on corrugated metal culverts when the height of the box is greater than 1.5 times the diameter of the culvert. Prefabricate the box inlet with a tee of the same diameter as the culvert. Attach the tee to the culvert with a watertight coupling band. Extend the box inlet 1 foot below the elevation of the invert of the culvert. Place concrete to the level of the invert of the culvert, extending out 1 foot from the inlet, to provide a firm base.

Place backfill following procedures given in UMC Guide 1546 "Designing and Constructing Earth Embankments."

Establish a vegetative cover on the disturbed area in accordance with UMC Guide 4805 "Establishing and Maintaining Vegetation on Critical Area."

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