TECH-LINE

BGFMA
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Scuppers

Bridge decks with combination curb and railing or concrete barriers prevent over-the-edge drainage of rainfall so it is very important to ensure that the bridge deck is designed to remove water within the limits of the allowable spread. An inlet (scupper) is a device commonly used and strategically located on the bridge deck to remove the water. However, an inlet is a common location for debris to collect, clog the drainage system and promote deterioration of the deck. Most states discourage the design of new bridge decks with deck drains and only allow them if the length of the bridge exceeds established criteria or if the turning point of a sag vertical curve is located on the bridge deck. From a hydraulic standpoint, inlets should be large and widely separated; but from a structural point of view, inlets should be avoided or made as small and as few as possible.

If scuppers are required on a proposed grid reinforced concrete deck, it will be necessary to modify the steel grid in some way to accommodate the inlet. For Exodermic® decks with main bars at 12", cutting one cross bar and adding rebar may be all that is required. More often than not, a main bar needs to be cut and the designer needs to investigate load path distribution. Presented in this Tech-Line are three common methods to distribute the load path.

The scupper shown in *Figure 1* is fabricated to fit snugly between two main bars and then welded to them. The cut supplemental bars and main bar on adjacent sides are then welded to the frame. The entire scupper is then galvanized with the grid.

The scupper in *Figure 2* is prefabricated cast iron and could be set into the grid as shown at the time the panels are set in the field. A main bar is cut to allow installation of the scupper. The load from the cut main bar is distributed to the adjacent main bars by means of a bolted support beam, along with additional reinforcement (not all shown for clarity) and a thickened full-depth deck. It is the designer's responsibility to ensure that the main bars picking up the load are not overstressed.

The scupper detail shown in *Figure 3* is similar to that shown in Figure 2, except the scupper is fabricated with the panel, and the cut main bars are supported by a support beam which is distributed to transverse support beams framed into the stringers.

If a project requires scuppers, there are a few considerations to be incorporated for an economic design:

- Keep the main bar spacing consistent within a panel. Altering the main bar spacing within a panel can significantly increase tooling costs.
- If multiple scuppers are required, try to place the scupper in the same location within a panel for redundancy.
- If the scupper is fabricated into the panel, keep the drain pipe extension to a minimum to reduce the cost of special blocking for shipping and to minimize the potential for damage during shipping and handling. Ideally, the bottom of the extension pipe should extend 6" to 12" below the bottom of the main bar.

Other scupper options are available. For more information, contact the BGFMA at the number below or visit our website at www.bgfma.org.

(Figures 1-3 Shown on Back Page)

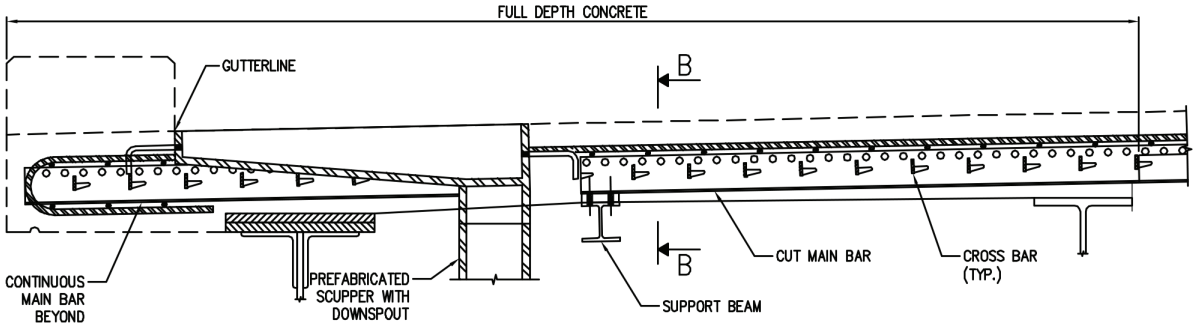
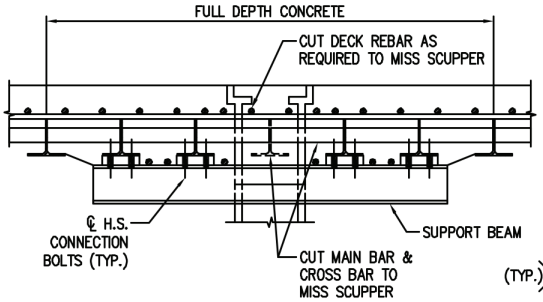


FIGURE 2 – TRANSVERSE SECTION



SECTION B–B

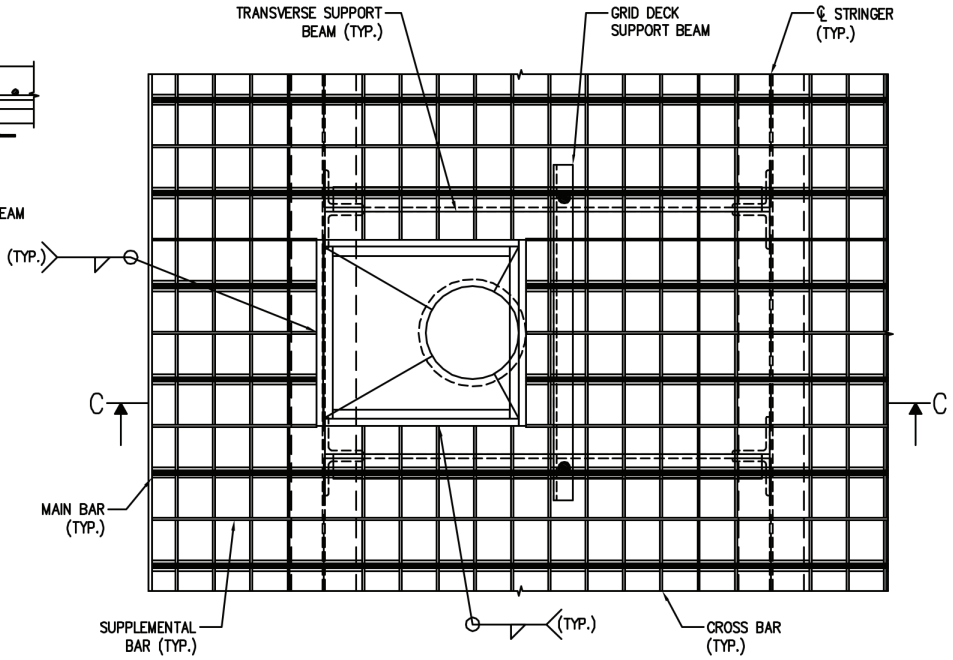


FIGURE 3 – PLAN VIEW

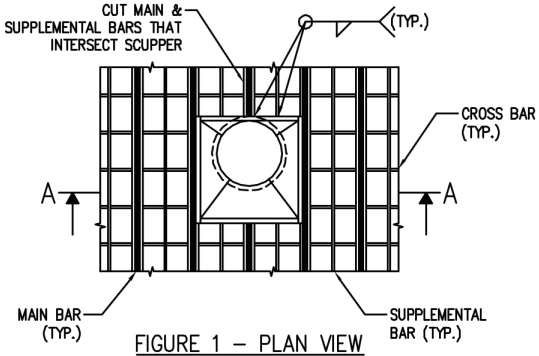
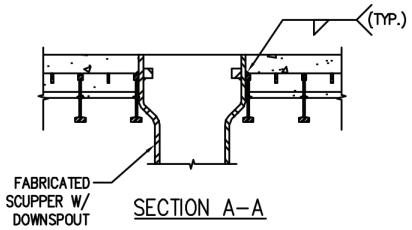
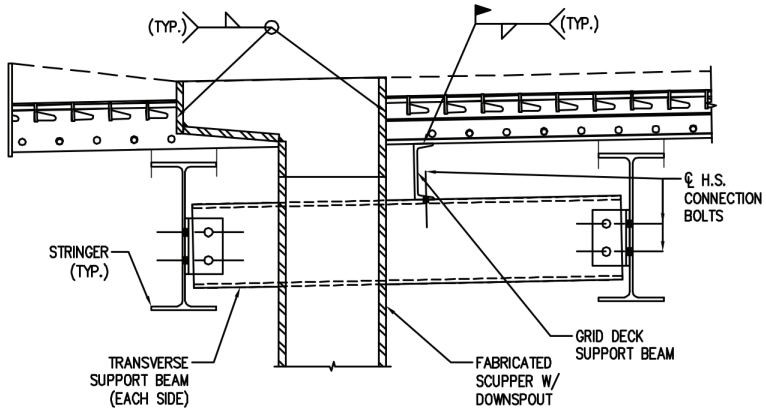


FIGURE 1 – PLAN VIEW



SECTION A–A



SECTION C–C

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