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## Bridge Design - Concrete Bent Caps

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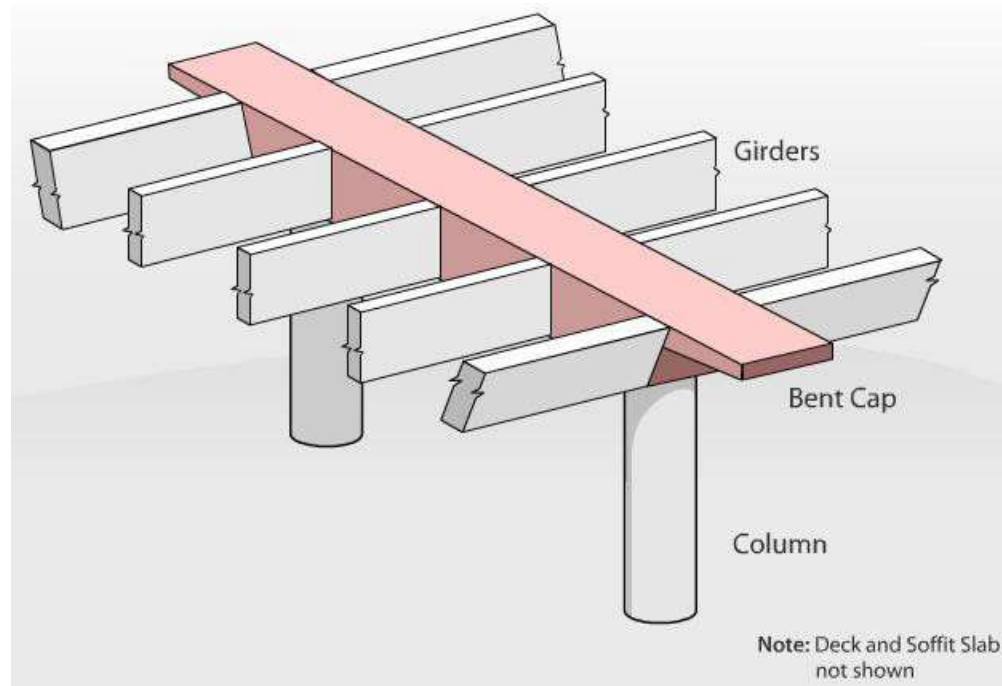
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# CONCRETE BENT CAPS

## 1.1 INTRODUCTION

A bent consisting of columns and a bent cap beam is an intermediate support between bridge spans that transfers and resists vertical loads and lateral loads such as earthquake and wind from the superstructure to the foundation. The bent cap beam supports the longitudinal girders and transfers the loads to the bent columns. Concrete bent cap beams may be cast-in-place or precast and may be either conventionally reinforced or prestressed.

A typical elevation view of a concrete bent integrally connected with the superstructure is shown in Figure 1.1-1.



**Figure 1.1-1 A Typical Integral Concrete Bent**

Bents can be classified as a single-column, a two-column, or a multicolumn bent as shown in Figure 1.1-2.

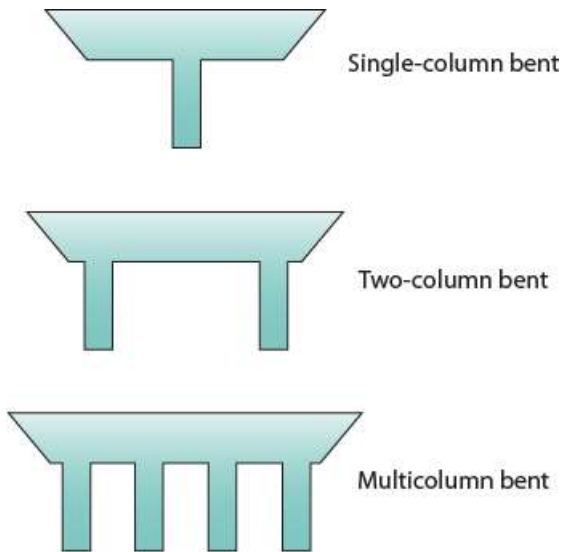


Figure 1.1-2 Typical Bents

### 1.1.1 Types of Bent Caps

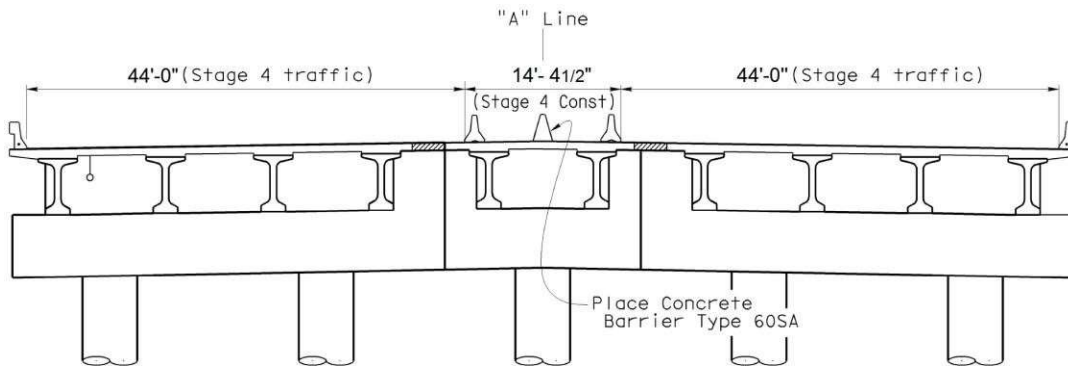
The main types of bent caps are:

- Drop bent cap
- Integral bent cap
- Inverted tee cap

These bent caps may be configured in conventional bent types as shown in Figure 1.1-2, and may possess asymmetric column configurations. Also, they may be utilized in unusual bent types, such as "C" bents, and outrigger bents.

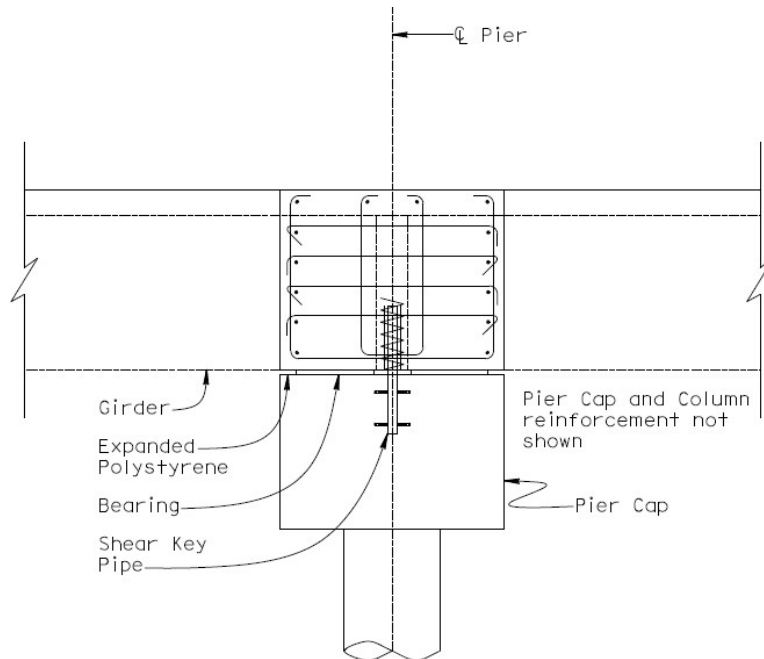
#### 1.1.1.1 Drop Bent Cap

A drop bent cap, as shown in Figure 1.1-3, supports the superstructure girders directly on its top. This type of bent cap is generally used when the superstructure consists of precast concrete or steel girders.



**Figure 1.1-3 Overview of Drop Bent Cap**

Drop bent caps may have different types of connection to the superstructure diaphragm: fixed, pinned, or isolated. Figures 12.1-4 to 12.1-6 show each type of bent cap.



**Figure 1.1-4 Drop Cap with Pinned Connection**



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