

PGSuper Tutorials

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Modeling Inverted Tee Bent Caps

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SoftwareTM

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Title	PGSuper Tutorial – Modeling Inverted Tee Bent Caps		Publication No.	BS10282009-1
Abstract	This document provides a discussion and step-by-step procedure for modeling inverted tee bent cap systems in PGSuper.			
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Introduction

Many state DOTs make use of the Inverted Tee Bent Cap system in simple span precast-prestressed concrete girder bridges. This is a simple and effective system for supporting precast-prestressed girders during construction and in the final bridge configuration.

PGSuper does not model any specific substructure system. Instead, the software provides a flexible geometric description to accommodate inverted tee bent caps and virtually every other substructure system. The key to this flexibility is the Connection object.

Connection Objects

Connection objects are defined in the PGSuper Connections library. A Connection object defines geometric parameters at the intersection of the girders and bents as well as diaphragm geometry and loading at bents. For purposes of this tutorial, discussion will be limited to the geometric aspects of the Connection object.

Connection objects define the Bearing Offset, End Distance, and Support Width parameters. These terms are defined as follows:

Bearing Offset - Distance from the Back of Pavement Seat at end abutments, or Centerline of Pier at intermediate piers, to the centerline of bearing. The bearing offset can be measured along the centerline of the girder or normal to the abutment or pier.

End Distance - Distance from the centerline of bearing to the end of the girder. The end distance can be measured from the center of bearing along the centerline of girder, from the center of bearing normal to the abutment/pier, from the centerline of abutment/pier along the centerline of girder, or from the centerline of abutment/pier normal to the abutment/pier.

Support Width - An approximate width of support used to determine the Face of Support for Longitudinal Reinforcement for Shear computations. The support width is always measured along the centerline of girder.

The connection geometry options available in PGSuper are shown in Figure 1.

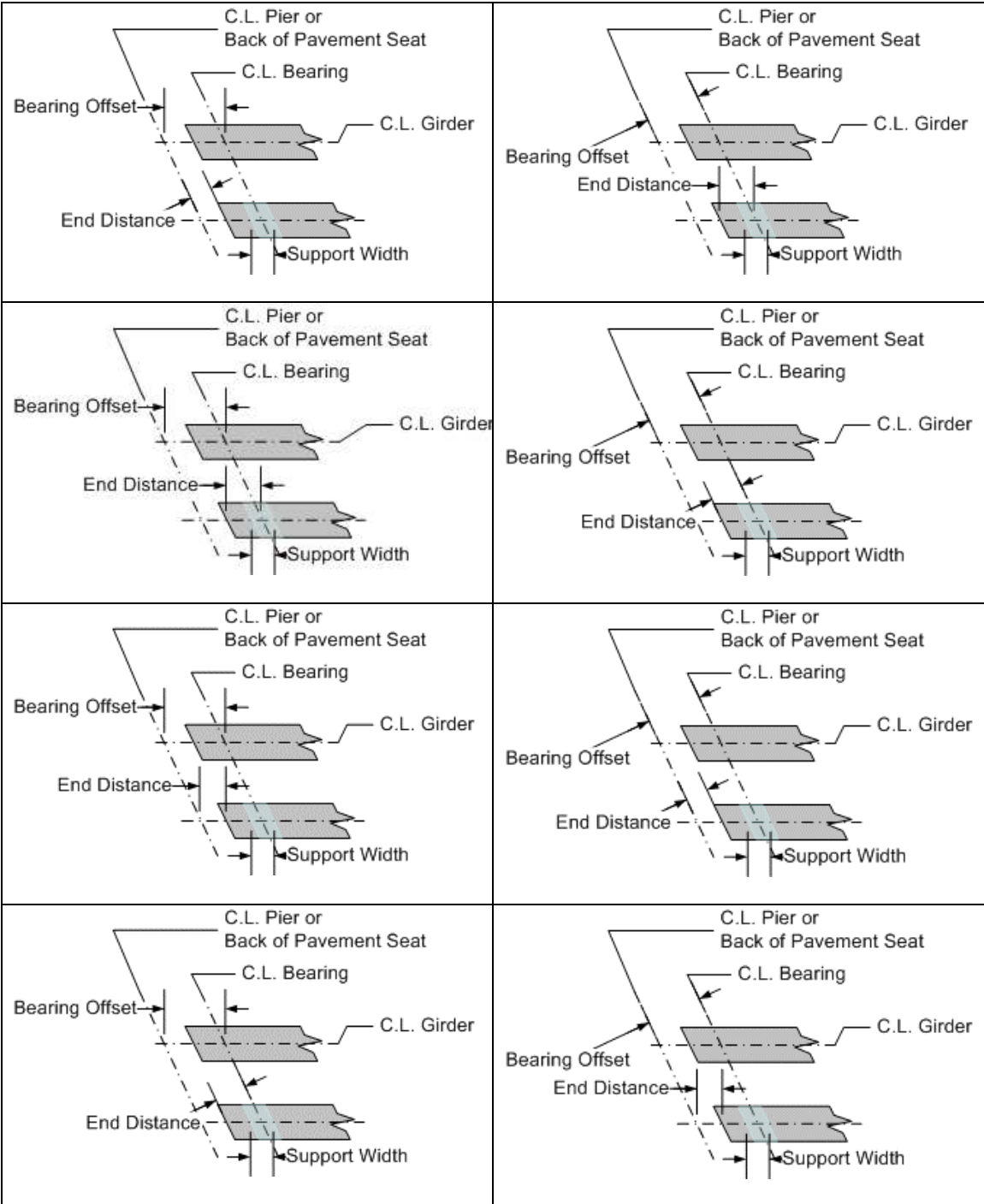


Figure 1 Connection Geometry Options

Inverted Tee Bent Cap Geometry

The geometry of an inverted tee bent cap is shown in Figure 2. Inverted tee bent caps are easily modeled in PGSuper.

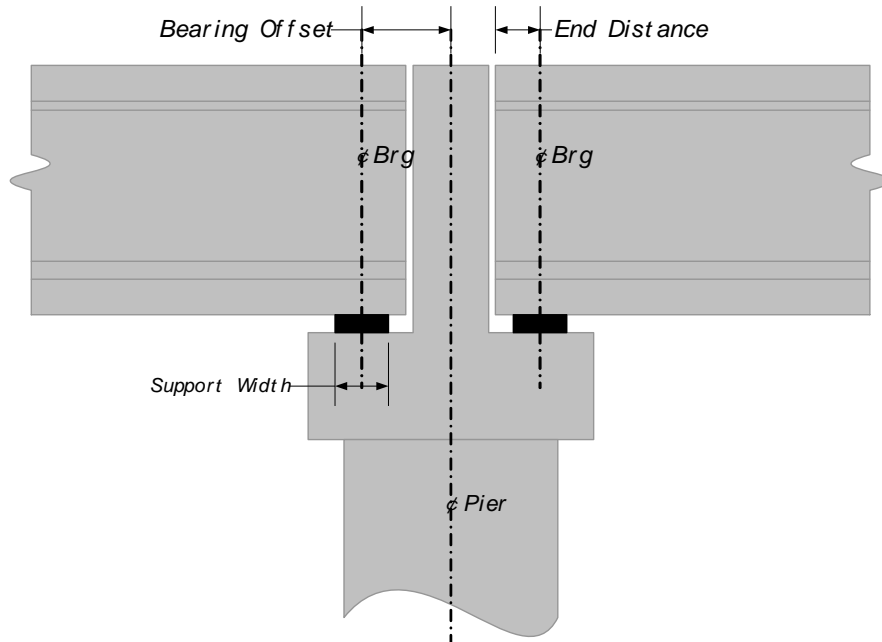


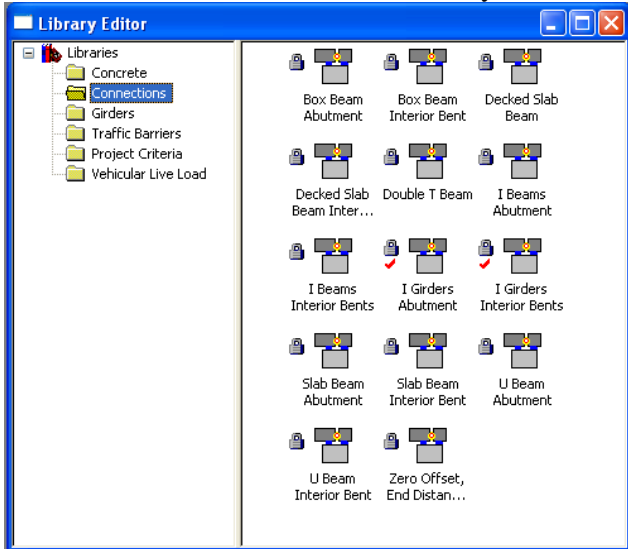
Figure 2 Inverted Tee Bent Cap Geometry

Modeling an Invert Tee Bent Cap

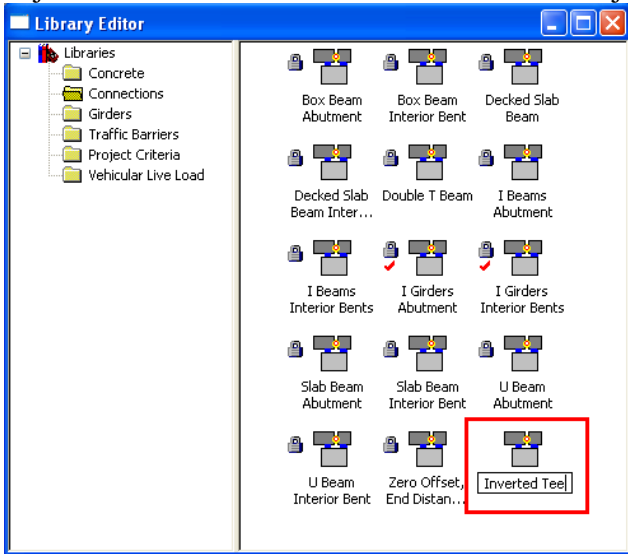
This step-by-step example demonstrates how to model an inverted tee bent cap in PGSuper. However, note that the same steps are applicable to define any type of cap geometry. First we will demonstrate how to create a new Connection object in the Connections library and then use the new connection in a bridge model. The connection object is created in the local project library however; a similar procedure can be used to define a connection in the Master Library so that it can be shared by all of the engineers in your organization.

Creating an Inverted Tee Connection Object

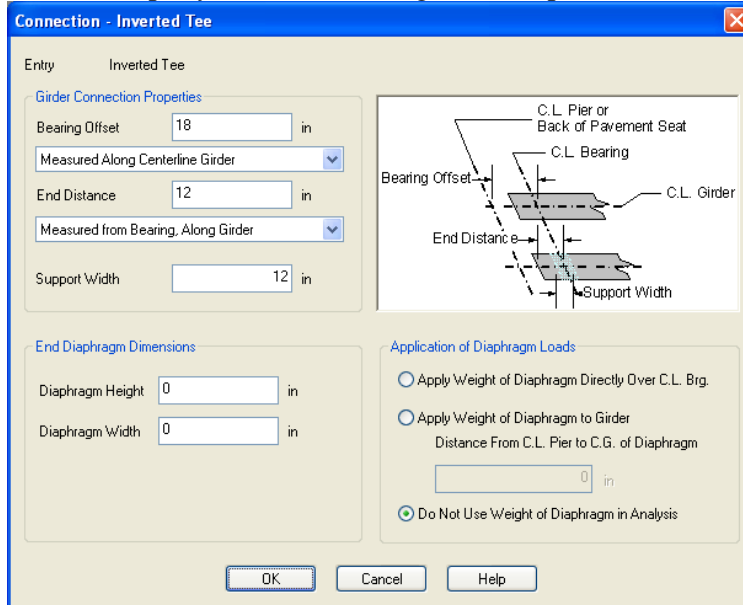
1. Select Edit Libraries from the Library menu. This will open the Library Editor window. Select the Connections library



2. Select Add New Entry from the Library menu. This will create a new Connection object. Enter the name "Inverted Tee" for this object.



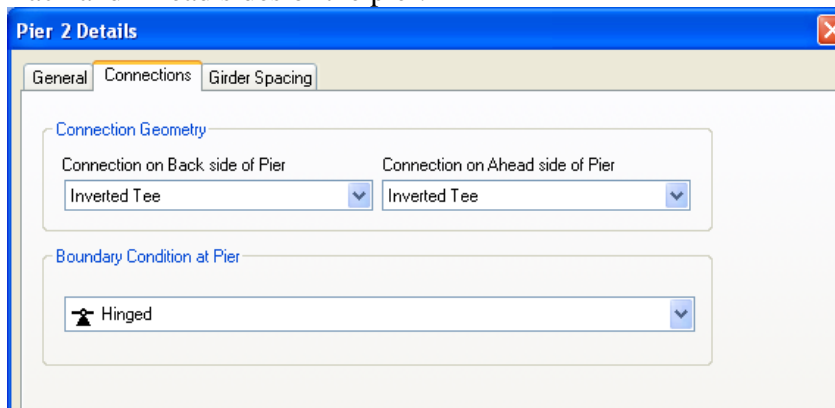
3. Select the new entry and pick Edit Entry from the Library menu, or simply double click on the Inverted Tee library entry. This will open the Connection editing window. Input your inverted tee geometric parameters as shown below .



Using the Inverted Tee Connection Object

Our first step was to create a new library object. Next you must reference it in your project.

1. The connection objects that are used in a bridge model are defined by editing either a span or pier. There are several methods for accessing the span and pier editing windows. An easy method is to double click the graphical representation of an intermediate pier in the bridge plan view. Use your favorite method to open the pier editing window for an intermediate pier.
2. On the Connections tab, select the Inverted Tee connection object for both the Back and Ahead sides of the pier.



3. Repeat this step for all intermediate piers that use an Inverted Tee system.

As you can see, modeling an inverted tee bent cap system in PGSuper is very easy.

Additional Information

Additional information on working with Libraries and Templates in PGSuper can in the PGSuper User's Guide. Interactive training videos can be viewed at PGSuper.com.