

AASHTOWare BrDR 7.5.0

Reinforced Concrete Structure Tutorial
RC7-Varied Flange Width RC Tee Beam Section Properties Example

RC7 – Varied RC Tee Beam Section Properties

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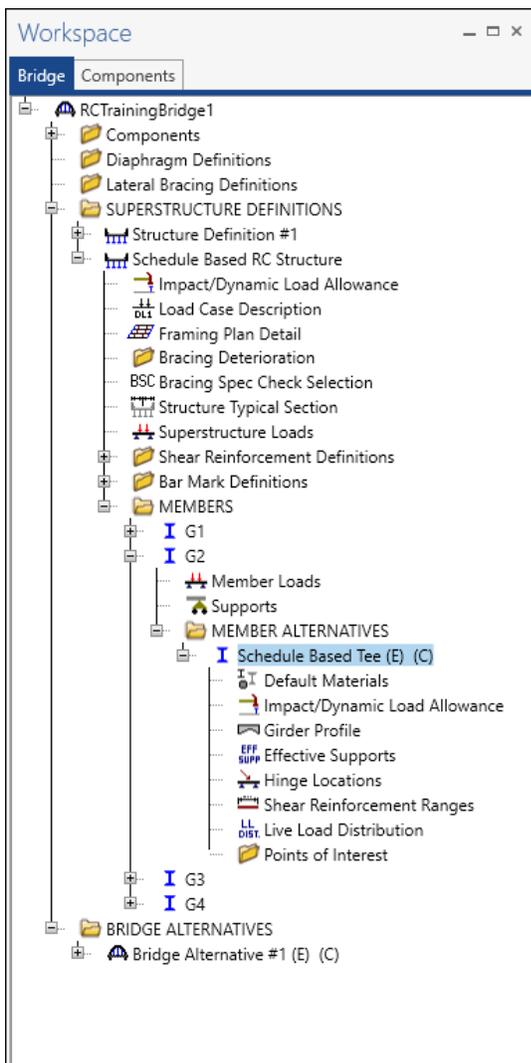
This example describes the entry of an RC tee beam cross section using the **Allow flange width to vary** option. This feature is only available in schedule based tee beam cross sections. This example assumes access to **RCTrainingBridge1** (BID11) delivered with the BrDR sample database from the installation.

Topics Covered

- Enter varied RC tee beam section properties
- Compare spec check details at different locations

Enter varied RC tee beam section properties

Open **RCTrainingBridge1** from the Bridge Explorer, expand **Schedule Based RC Structure** superstructure definition, **G2** member and **Schedule Based Tee** member alternative as shown below.



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Girder Profile

Double-click on **Girder profile** in the **Bridge Workspace** for the **Schedule Based Tee** member alternative to open the **Girder Profile** window as shown below.

Type: Reinforced Concrete Tee

Section | Web depth | Reinforcement

Allow flange width to vary

Tributary width: 96.0000 in

24.0000 in

6.5000 in

24.0000 in

A: in

CJ: in

Top flange

Material: Class A (US)

Modular ratio:

Eff. width (Std): 72.0000 in

Eff. width (LRFD): 96.0000 in

Struct. thick: 6.5000 in

Other parts

Material: Class A (US)

Modular ratio:

OK Apply Cancel

Check the **Allow flange width to vary** check box and enter data as shown below in the **Section** tab.

Type: Reinforced Concrete Tee

Section | Web depth | Web width | Reinforcement

Allow flange width to vary A: in CJ: in

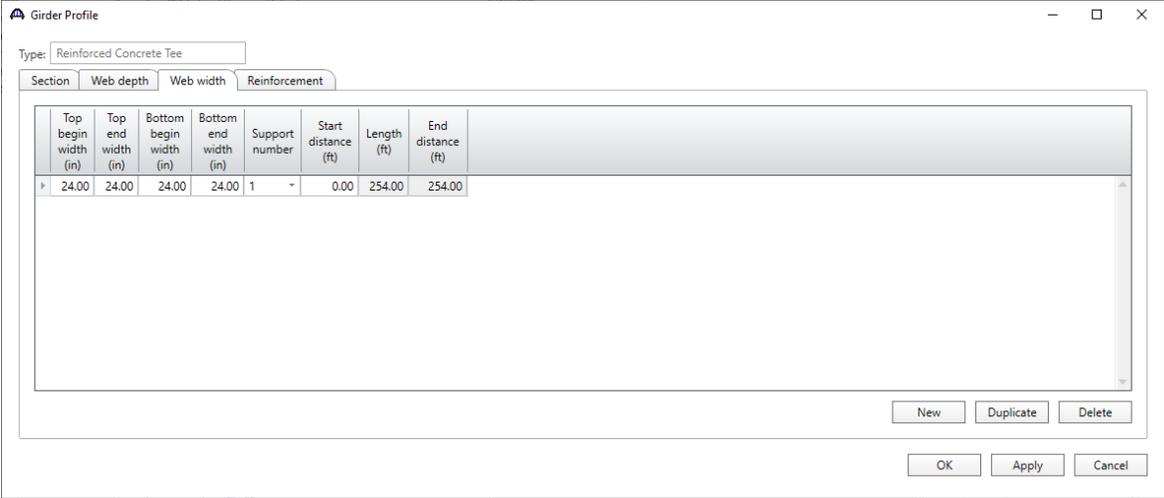
| Top flange material | Other part material | Support number | Start distance (ft) | Length (ft) | End distance (ft) | Top flange total thickness (in) | Top flange structural thickness (in) | Start tributary width (in) | End tributary width (in) | Start effective flange width (LRFD) (in) | End effective flange width (Std) (in) | Start effective flange width (LRFD) (in) | End effective flange width (LRFD) (in) | Top flange n | Other parts n |
|---------------------|---------------------|----------------|---------------------|-------------|-------------------|---------------------------------|--------------------------------------|----------------------------|--------------------------|--|---------------------------------------|--|--|--------------|---------------|
| Class A (US) | Class A (US) | 1 | 0.00 | 57.50 | 57.50 | 6.50 | 6.50 | 72.00 | 96.00 | 60.00 | 72.00 | 72.00 | 96.00 | | |
| Class A (US) | Class A (US) | 1 | 57.50 | 196.50 | 254.00 | 6.50 | 6.50 | 96.00 | 96.00 | 72.00 | 72.00 | 96.00 | 96.00 | | |

New Duplicate Delete

OK Apply Cancel

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Select the **Web Width** tab and enter constant web width as shown below.

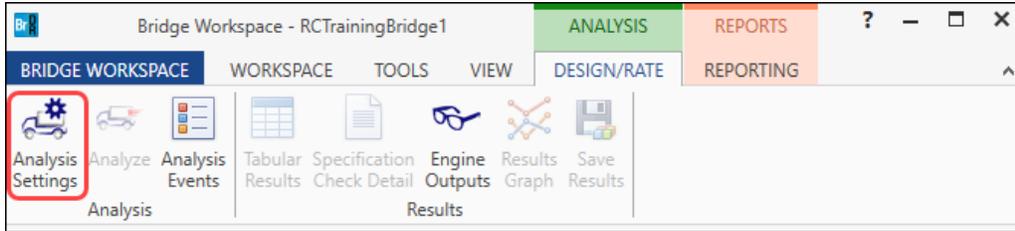


Click the **OK** button to apply the data and close the window.

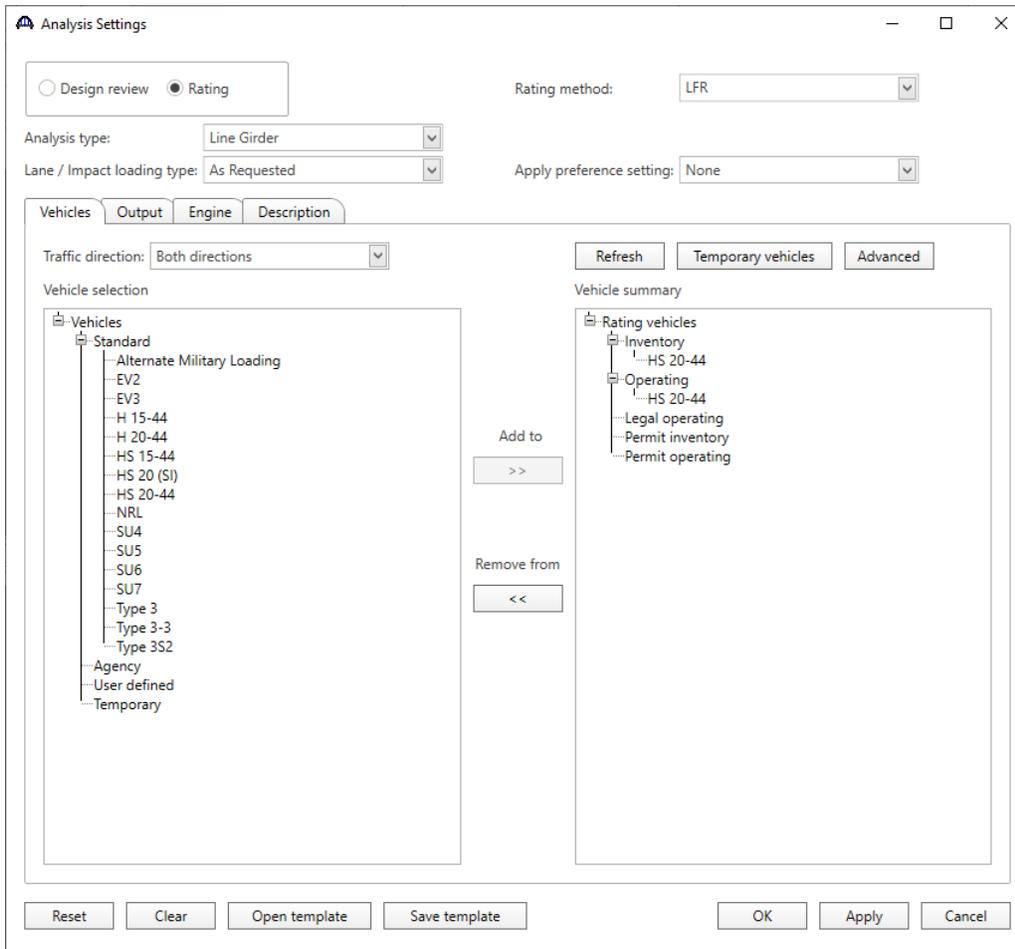
RC7 – Varied RC Tee Beam Section Properties

LFR analysis

To perform an **LFR** rating, select the **Analysis Settings** button on the **Analysis** group of the **DESIGN/RATE** ribbon to open the window shown below.



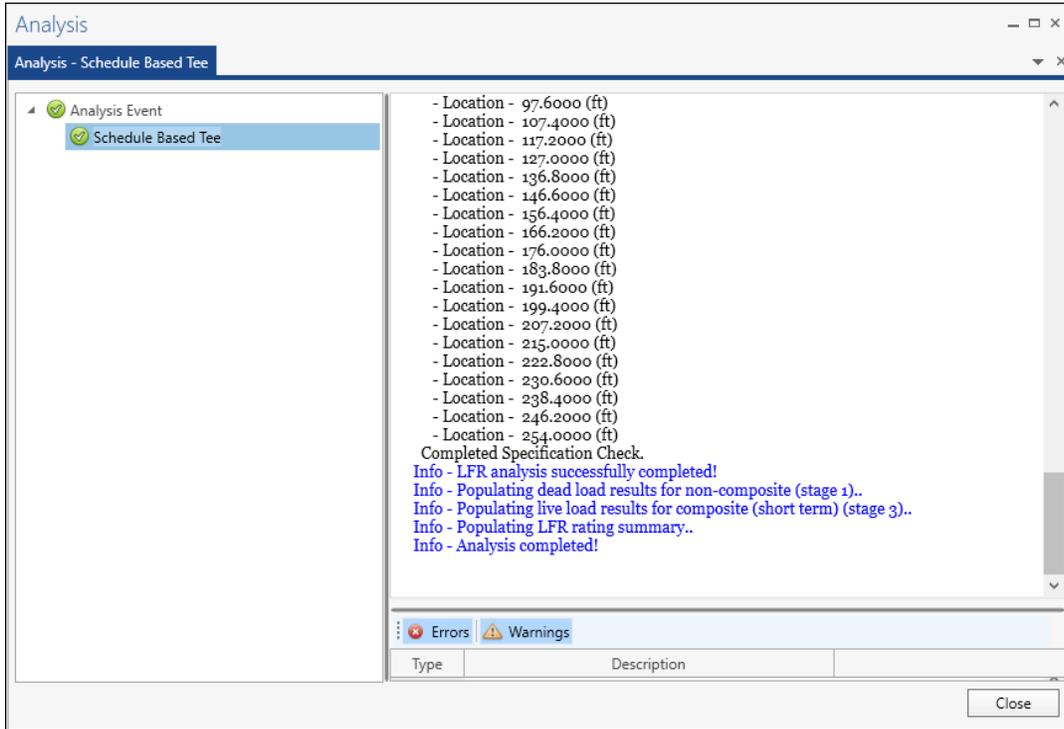
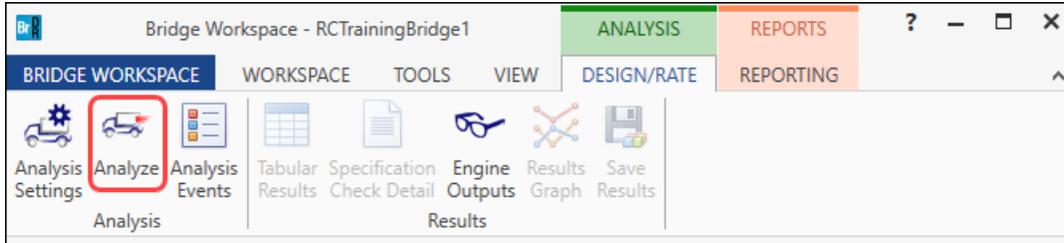
Click the Open Template button and select the **HS 20 LFR Rating** to be used in the rating and click **OK**.



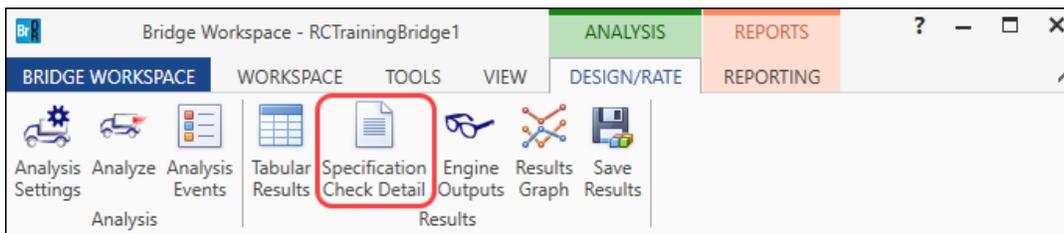
RC7 – Varied RC Tee Beam Section Properties

Compare spec check details at different locations

Next click the **Analyze** button on the **Analysis** group of the **DESIGN/RATE** ribbon to perform the rating.



When the rating is finished, click the **Specification Check Detail** button from the **Results** group of the **DESIGN/RATE** ribbon to view the article list for each point of interest.



RC7 – Varied RC Tee Beam Section Properties

Open the Flexural article **8.16.3** for **Span 1** at **39.0 ft** as shown below.

| Specification reference | Limit State | Flex. Sense | Pass/Fail |
|--|-------------|-------------|---------------|
| ✓ 68.4.1 RC Flexure Rating General Concrete Flexure | | N/A | Passed |
| ✓ 68.4.1 RC Shear Rating General Concrete Shear | | N/A | Passed |
| 8.16.2.7 Design Assumptions | | N/A | General Comp. |
| ✓ 8.16.3 Flexural | | N/A | Passed |
| 8.16.6.1 Shear Strength | | N/A | General Comp. |
| 8.16.6.2.1 Shear in Beams and One-Way Slabs and Footings | | N/A | General Comp. |
| 8.16.6.3 Shear Strength Provided by Shear Reinforcement | | N/A | General Comp. |

Comparing article **8.16.3 Flexural** at different locations, different flange widths are used for analysis.

8 Reinforced Concrete
8.16 Strength Design Method (Load Factor Design)
8.16.3 Flexure
(AASHTO Standard Specifications for Highway Bridges, Seventeenth Edition - 2002)
RC T-Beam - At Location = 39.0000 (ft) - Left

Cross Section Properties

Total height = 46.00 (in) Web Width Top = 24.00 (in)
Flange Width = 68.14 (in) Web Width Bot = 24.00 (in)
Flange Thick = 6.50 (in)
No fillet specified.
Area = 1390.90 (in²)

Flexural Reinforcement

| As | Dist. From Bottom |
|--------------------|-------------------|
| (in ²) | (in) |
| 3.12 | 43.17 |
| 3.12 | 6.50 |
| 6.24 | 6.50 |
| 9.36 | 3.00 |

f'c = 4.00 ksi
Beta1 = 0.85

OK

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