

6.6.2 FRACTURE

A Fracture Critical Member (FCM) is defined as a component in tension whose failure is expected to result in the collapse of the bridge or the inability of the bridge to perform its function.

Examples of fracture critical members include components of steel non-redundant bridges in tension. See AASHTO LRFD Section 1.3.4 for a discussion of Redundancy. Generally, this can include tension members of trusses, floor beam flanges in tension, tension flanges of two girders bridges and bottom flanges of twin box girder bridges.

As noted in AASHTO LRFD Article 6.6.2 the location of all FCMs shall be clearly delineated on the contract plans. The contract documents shall require that FCMs shall be fabricated according to Section 12 of the *AASHTO/AWS D1.5M/D1.5 Bridge Welding Code*.

FCMs are subject to more stringent Charpy V-notch impact energy requirements than non-fracture components. Good construction practices for FCMs are covered under AASHTO LRFD Construction Specification Section 11- Steel Structures, designers should be familiar with these sections.

ITD has several bridges with FCMs in its inventory, including trusses, arches, two girder steel bridges, and twin box girder bridges. Designers may find information regarding special inspection criteria for these bridges in ITD's Manual for Bridge Evaluation. From time to time preservation projects for these bridges are initiated; a good reference for designers to address maintenance issues is the 2013 FHWA Manual for Repair and Retrofit of Fatigue Cracks in Steel Bridges.

Revisions:

May 2014 Added new article.