PRELIMINARY DESIGN CHARTS
Northeast Bulb- Tee Girders

Girder Properties

Section properties form the Northeast bulb-tee girders are given in Appendix C of the PCI Bridge Design Manual.

Design Criteria

The design charts for the Northeast bulb-tee girders were developed to satisfy the flexural design criteria of the *AASHTO LRFD Bridge Design Specifications, 1st Edition with Interims through 1997.* All designs are for simply supported beams.

Live Loads

The charts use the HL-93 live loads and live load distribution factor given in the *LRFD Specifications*.

Dead Loads

The girders carry their own weight plus the weight of the composite deck and a 12" thick partial-depth concrete diaphragm at midspan. Dead loads placed on the composite section are distributed between four girders. Composite dead loads include the weight of two barriers (470 lb/ft ea.) and the weight of a bituminous concrete wearing course (35 lb/ft^2). All reinforced and prestressed concrete has a density of 150 lb/ft^3.

Composite Deck

For girders spaced at 4 feet where the top flanges of adjacent girders are touching, a composite deck thickness of 5" is used. For all other girder spacing, a composite deck thickness of 8" is used. The dead load for a 2" haunch is included in all cases. The haunch is neglected in the computation of composite section properties.

Concrete Strength

Two combinations of concrete strengths are given in the charts. Normal strength designs are computed using f'_{ci} = 4350 psi and f'_c = 6500 psi. Designs using high strength concrete are computed using f'_{ci} = 6500 psi and f'_c = 10000 psi. The charts include designs in which the release strength f'_{ci} was permitted to increase beyond the specified limit. Such designs are indicated using a lighter line width. The composite deck has a concrete strength of 4350 psi for all designs.

Allowable Stresses

Allowable stresses for all designs conform to the current specifications, except that tension is not permitted at service loads. It is assumed that stresses at the ends of beams can be satisfied by draping or debonding of strands.

Strand Size and Spacing

Designs using normal strength concrete use 0.5"diameter seven-wire Grade 270 low-relaxation strands. Designs using high strength concrete use 0.6" diameter strands. All strands are spaced on a 2"grid, with the center of the first row of strands located 2.76"above the bottom of the girder. Strands are draped with the hold-down located at 0.4L from the end of the beam.

Design Limits

The charts indicate whether tensile stress at service or strength controls the maximum span. For girders where strength governs, the maximum reinforcement limit was exceeded. Release stresses govern above the lines labeled with the specified release strengths. The endpoint of each line is labeled with the minimum value of f'_{ci} required to satisfy the allowable stresses at release.

Some designs shown on the charts require a large number of strands. Some producers may not be able to produce such beams economically. For longer spans, transportation and jobsite constructability of beams should be investigated.

Chart NEBT-13
Northeast Bulb-Tee

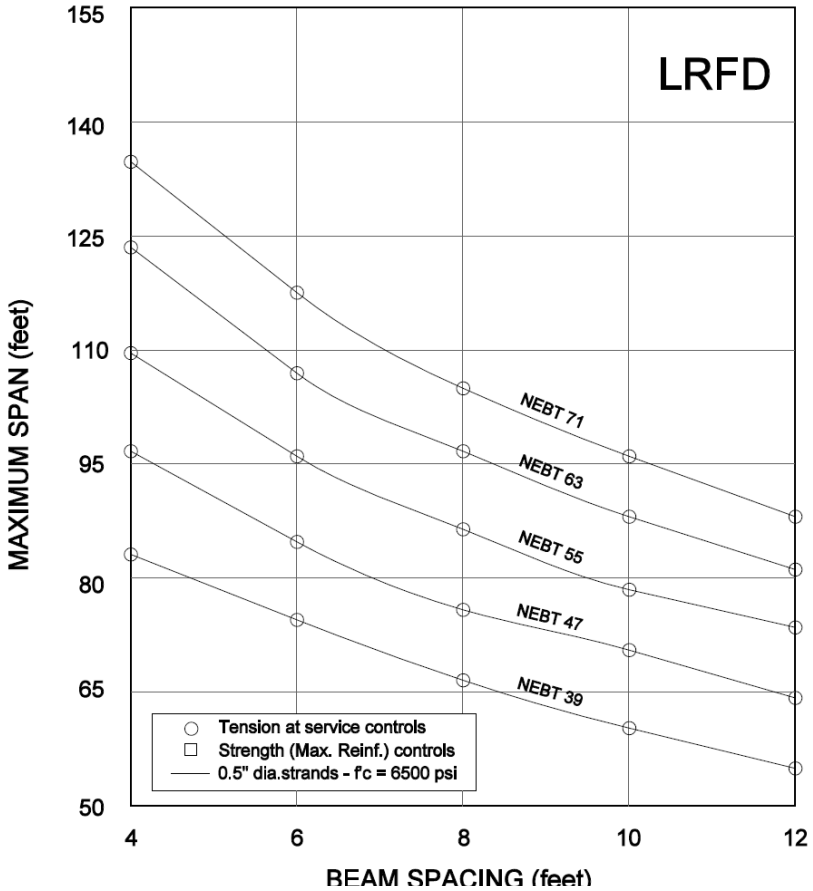

Chart NEBT-14
Northeast Bulb-Tee - NEBT 39

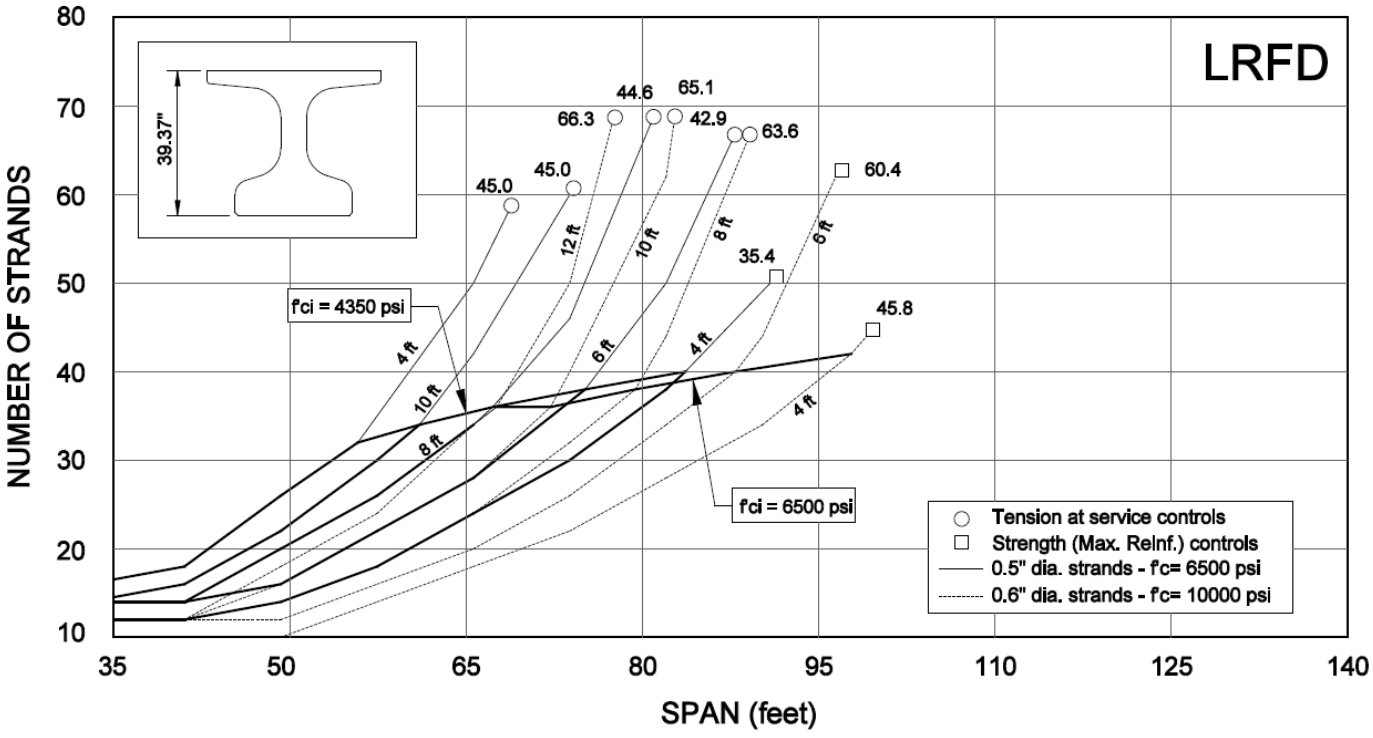

Chart NEBT-15
Northeast Bulb-Tee - NEBT 47

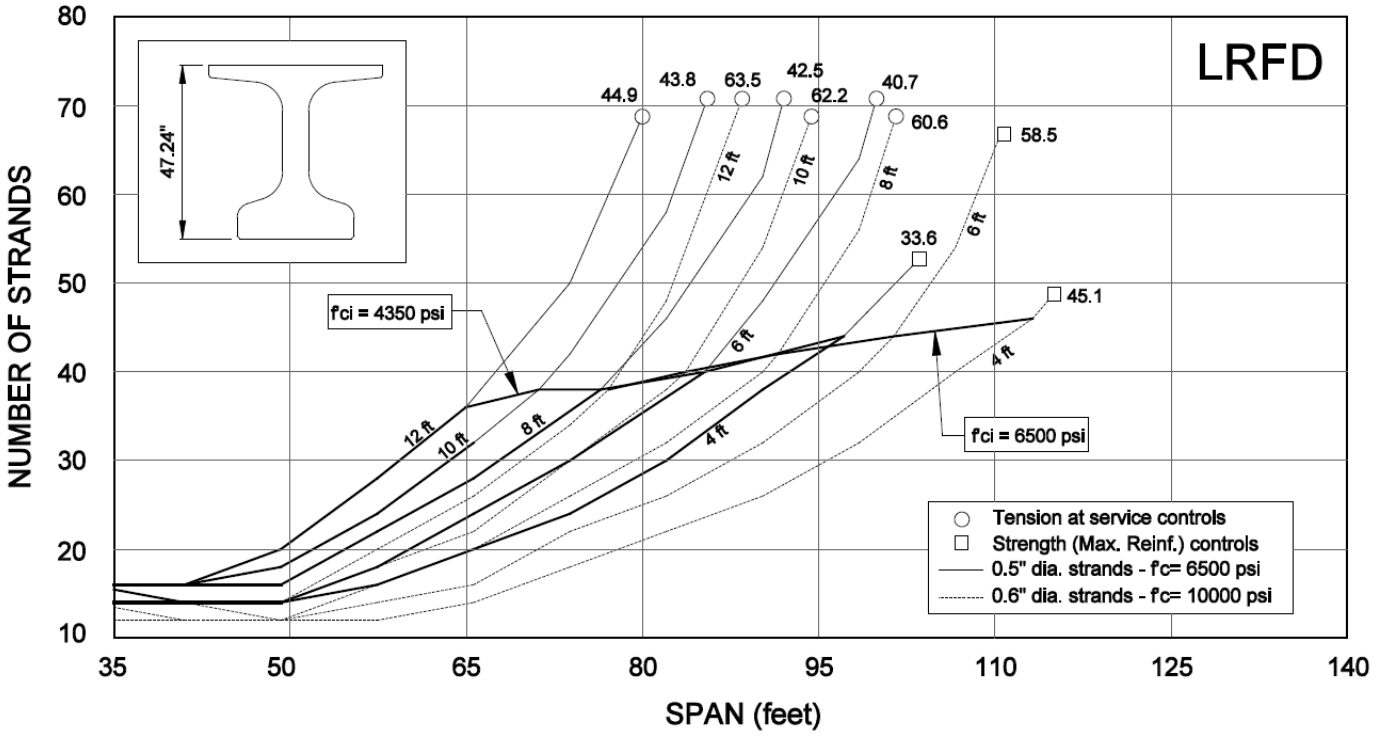

Chart NEBT-16
Northeast Bulb-Tee - NEBT 55

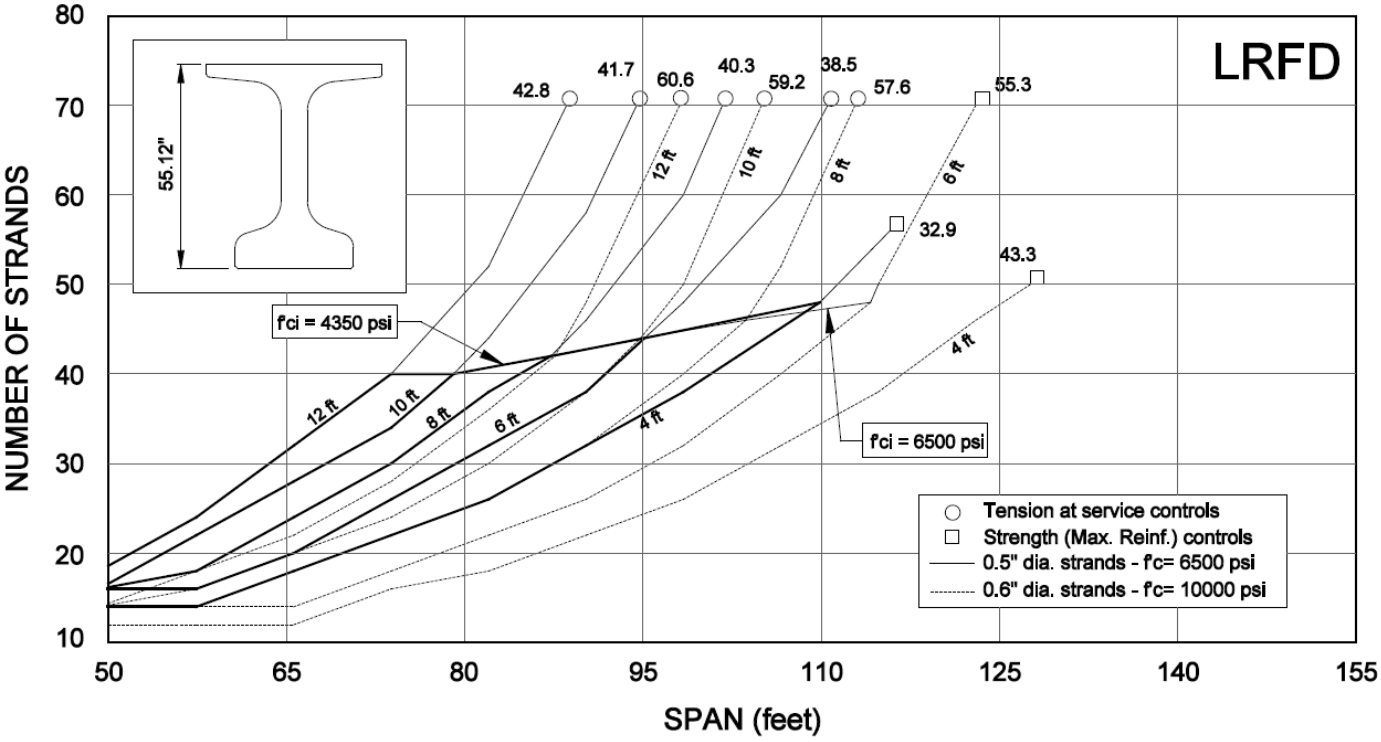

Chart NEBT-17
Northeast Bulb-Tee - NEBT 63

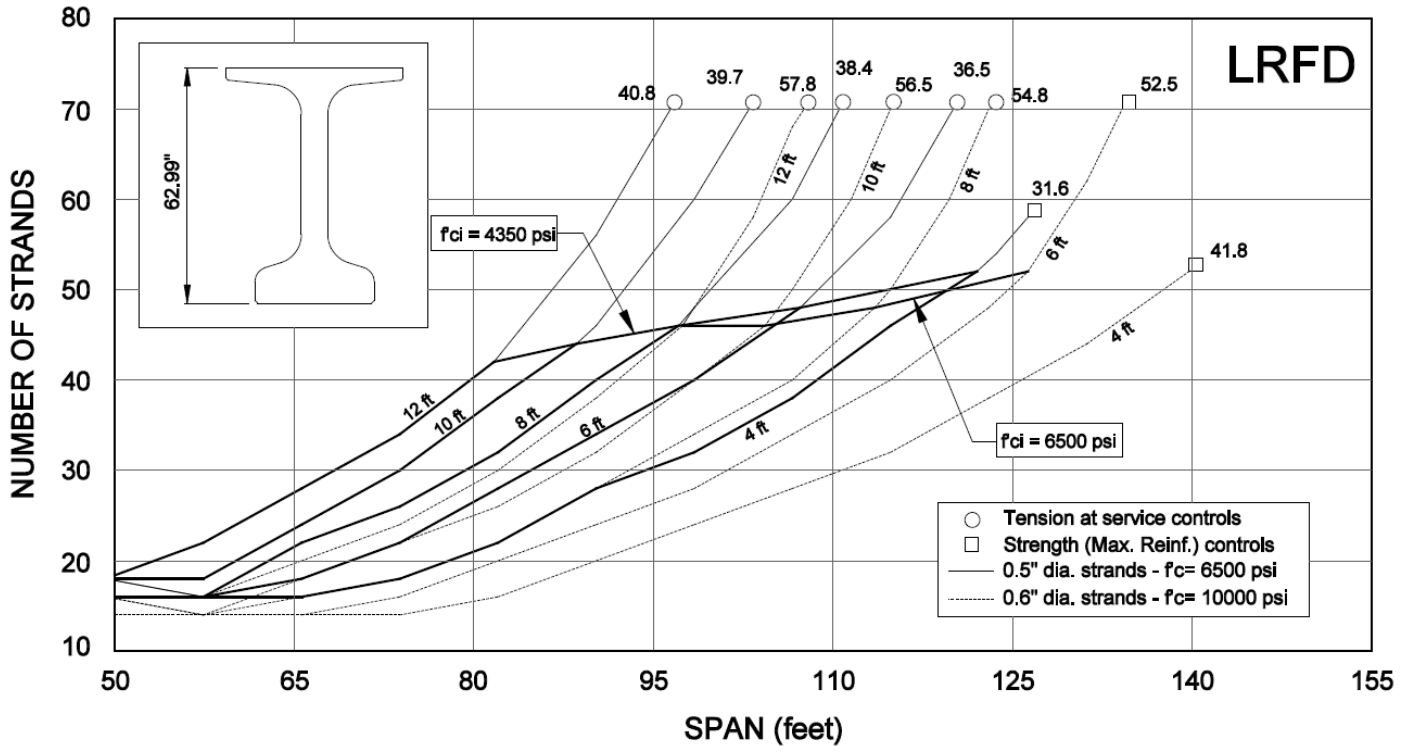

Chart NEBT-18
Northeast Bulb-Tee - NEBT 71