Differences Between BRASS and AASHTO LRFD/LRFR Engines
• AASHTO LRFD Engine Version 6.3 and BRASS-GIRDER(LRFD) Version 2.0.3 are compared
Steel Girders

Moment Redistribution Control Option

AASHTO LRFD Engine
• Implemented

BRASS-GIRDER(LRFD)
• Not implemented
Steel Girders

Wind Effects

AASHTO LRFD Engine
- Implemented

BRASS-GIRDER(LRFD)
- Not implemented
Steel Girders

Built-up Section Web Depth

AASHTO LRFD Engine

- Uses plate depth entered by user

BRASS-GIRDER(LRFD)

- Computes web depth as back-back angle depth minus the flange thicknesses
Article 6.10.1.8 Net Section Fracture

6.10.1.8—Net Section Fracture

When checking flexural members at the strength limit state or for constructibility, the following additional requirement shall be satisfied at all cross-sections containing holes in the tension flange:

\[ f_t \leq 0.84 \left( \frac{A_t}{A_g} \right) F_a \leq F_y \]  

(6.10.1.8-1)

AASHTO LRFD Engine
• Implemented

BRASS-GIRDER(LRFD)
• Not implemented
Steel Girders

Article 6.10.8.2.3 LTB Resistance

For nonprismatic sections:

For unbraced lengths in which the member is nonprismatic, the lateral torsional buckling resistance of the compression flange \( F_{me} \) at each section within the unbraced length may be taken as the smallest resistance within the unbraced length under consideration determined from [Eq. 6.10.8.2.3-1], [6.10.8.2.3-2] or [6.10.8.2.3-3], as applicable, assuming the unbraced length is prismatic. The moment gradient modifier, \( C_b \), shall be taken equal to 1.0 in this case and \( L_b \) shall not be modified by an effective length factor.

For unbraced lengths containing a transition to a smaller section at a distance less than or equal to 20 percent of the unbraced length from the brace point with the smaller moment, the lateral torsional buckling resistance may be determined assuming the transition to the smaller section does not exist provided the lateral moment of inertia of the flange or flanges of the smaller section is equal to or larger than one-half the corresponding value in the larger section.

AASHTO LRFD Engine
- Implemented

BRASS-GIRDER(LRFD)
- Not implemented
Prestressed Concrete Girders

Loss and Stress Calculations

AASHTO LRFD Engine
• Control option allows you to pick gross or transformed section properties

BRASS-GIRDER(LRFD)
• Uses gross section properties
Loss Calculations

AASHTO LRFD Engine
- Loss Methods
  - AASHTO Approximate
  - AASHTO Refined
  - AASHTO Pre-2005 interim Refined
- Elastic gains can be included

BRASS-GIRDER(LRFD)
- Loss Methods
  - AASHTO Approximate
  - AASHTO Refined
  - Lump Sum
  - PCI
- Elastic gains cannot be included
Prestressed Concrete Girders

Article 5.10.10.1 Splitting Resistance

AASHTO LRFD Engine
- Implemented

BRASS-GIRDER(LRFD)
- Not implemented
Prestressed Concrete Girders

Article 5.8.3.4.3

\[ V_{ci} = 0.02 \sqrt{f'_c b_v d_v} + V_d + \frac{V_i M_{cre}}{M_{max}} \geq 0.06 \sqrt{f'_c b_v d_v} \]

(5.8.3.4.3-1)

AASHTO LRFD Engine

• No limit on \( M_{cre}/M_{max} \)

BRASS-GIRDER(LRFD)

• Controlled by engine data:
  • No limit on \( M_{cre}/M_{max} \)
  • Limit \( M_{cre}/M_{max} \) to 1.0
Support Positions

AASHTO LRFD Engine
• Uses simple span bearing span lengths for DL1 analysis and centerline of support span lengths for DL2 and LL analyses. Analysis points considered for DL1 analysis correspond to tenth points of the continuous span lengths used for DL2 and LL analyses. Analysis points for which the results are reported correspond to tenth points of the continuous span lengths.

BRASS-GIRDER(LRFD)
• Uses the same support positions, simple span bearing span lengths or centerline of support span lengths, for all stages. Non-composite stage is considered as simple spans and composite stage as continuous spans.
Composite Slab Designation

AASHTO LRFD Engine

- Considers regions of the deck to be composite if the effective slab thickness and width are entered on the Deck Profile window and one of the following are entered on the PS Shear Reinforcement Ranges window:
  - Vertical reinforcement extends into deck
  - "Composite" horizontal reinforcement range entered
  - Horizontal shear reinforcement range entered

BRASS-GIRDER(LRFD)

- Considers the total length of deck to be composite if the effective slab thickness and width are entered on the Deck Profile window.
Reinforced Concrete Girders

Article 5.8.3.4.3

\[ V_{ci} = 0.02\sqrt{f'_c b_v d_v} + V_d + \frac{V_i M_{cre}}{M_{max}} \geq 0.06\sqrt{f'_c b_v d_v} \]

\[(5.8.3.4.3-1)\]

AASHTO LRFD Engine

- No limit on Mcre/Mmax

BRASS-GIRDER(LRFD)

- Controlled by engine data:
  - No limit on Mcre/Mmax
  - Limit Mcre/Mmax to 1.0
Thank you