

# The HYBRID Section

**Proper Applications from a Producer's Perspective**

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# Prestress Services Industries

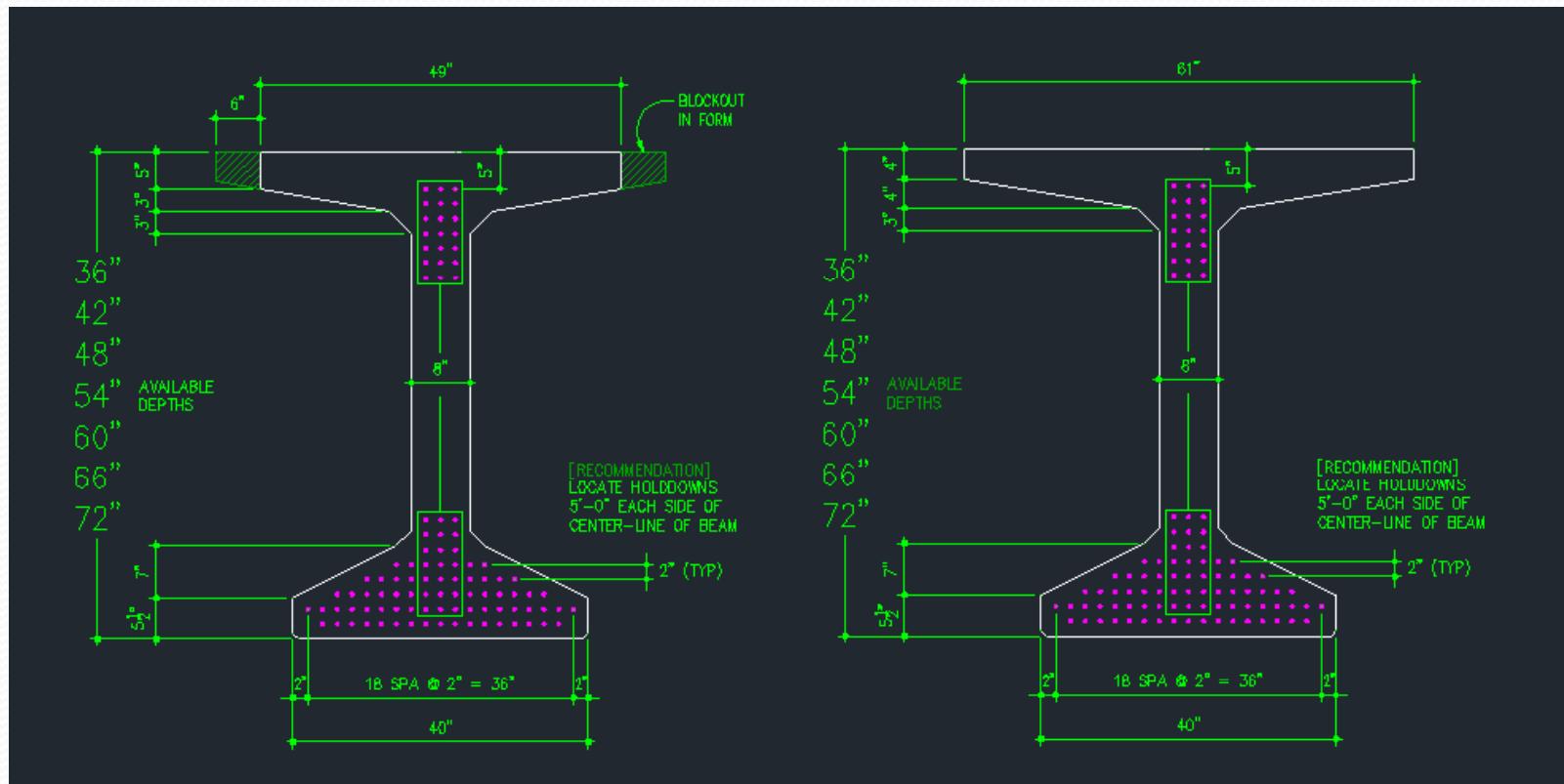
- Produce precast, prestressed concrete products
- Help KY designers use hybrids successfully
- Minimize opportunity for value engineering

# Outline

- The Hybrid Section
- Properties
- Comparison to Bulb Tee
- Things to Watch For
- Design Approach
- Summary

# The Hybrid Section

- 49" Top Flange
- 61" Top Flange



# Section Properties

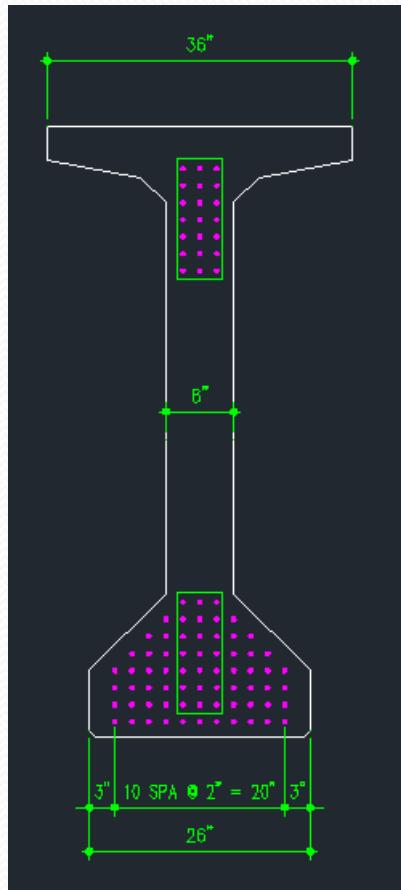
- Hybrid section has:
  - Increased area
  - Increased bending properties
- These differences can yield longer, shallower spans
- Higher section weight
  - Substructure Sizing & Loading
  - Producer Handling & Transportation
  - Contractor Handling

# Stability

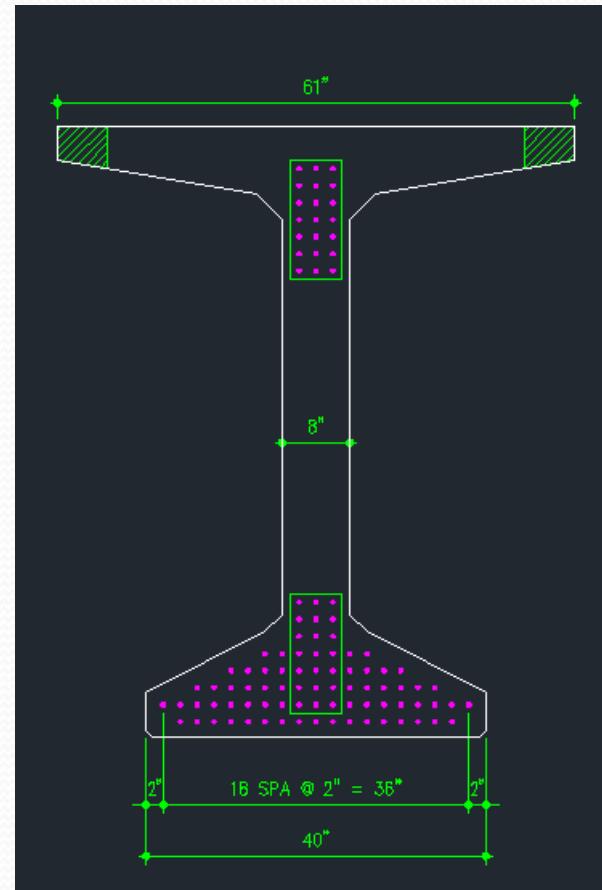
- Excellent lateral stability
  - Handling, transportation
  - Erection
- Beneficial as depth increases
- Remember that larger bearing assembly is needed

# Comparison with Bulb Tee

- Mod. Type 4



- Hybrid



# Comparison with Bulb Tee

60" Deep	Mod. Type 4	61" Hybrid	Compare
Area =	955.4 in <sup>2</sup>	1124.4 in <sup>2</sup>	18%
I <sub>xx</sub> =	615,361 in <sup>4</sup>	903,667 in <sup>4</sup>	46%
I <sub>yy</sub> =	37,324 in <sup>4</sup>	144,995 in <sup>4</sup>	388%
Wt. / LF =	996 plf	1222 plf	23%

# Things to Watch For

- Increased amount of strand
  - Holddown limits
  - Space for splitting resistance rebar – AASHTO 5.10.10.1
- Transportation constraints
  - Permits
  - Equipment
- Job site constraints
  - Site access
  - Contractor's crane limits

# Cost

- Hybrid is ~ 10% more expensive per LF
- Beam for beam swap usually not cost effective
- Designer determines if beam cost is offset elsewhere
  - # of beams
  - Beam depth
  - Longer span length

# Pros & Cons

- Pros:
  - Increased section properties yield longer, shallower spans
  - Increased lateral stability
  - More strand positions
- Cons:
  - Higher cost per LF
  - Heavier beams



# Design Approach

- There is no “design table”
- Start a design with familiar section
- Introduce hybrid as an option
- Refine as needed



# Summary

- Hybrids can be an excellent alternative to traditional bulb tee sections and steel designs.
- Consider them an option, not a requirement.
- Think of the project as a whole.
- Every project is unique, it is up to the designer to determine the appropriateness for each project.

# Resources

- All PSI Bridge Product Sheets:
  - [www.prestressservices.com/products\\_bridge.asp](http://www.prestressservices.com/products_bridge.asp)
- Contact PSI Directly:
  - Estimates, Fabrication & General Inquiries, Plant Tours
  - Celeste Spaans, Chief Engineer
    - 859-312-5637
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# Questions?

[www.prestressservices.com](http://www.prestressservices.com)

