

TSQC Nov '24 – Triple I-Girder Bent Caps

Leon Flournoy, P.E. – SAT District Bridge Supervisor



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HELP

#EndTheStreakTX

End the streak of daily deaths on Texas roadways.

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#EndTheStreakTX Toolkit



Use of Three-Girder Steel Straddle Bent



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Other accelerated methods

- Allows multiple units to be installed in one night closure



TxDOT Considerations

- Vertical Clearance during construction
- Multiple bents placed in one night closure
- Prolonged traffic disruptions: Landlocked residents or businesses
- Crane size and duration – Steel vs. Concrete
- Comparable spans to PT Concrete- fewer closures



TxDOT Considerations

- Upfront cost can be up 2x - 3x for comparable concrete substructure
- Potential protective coating maintenance costs



TxDOT Considerations

Vertical Clearance

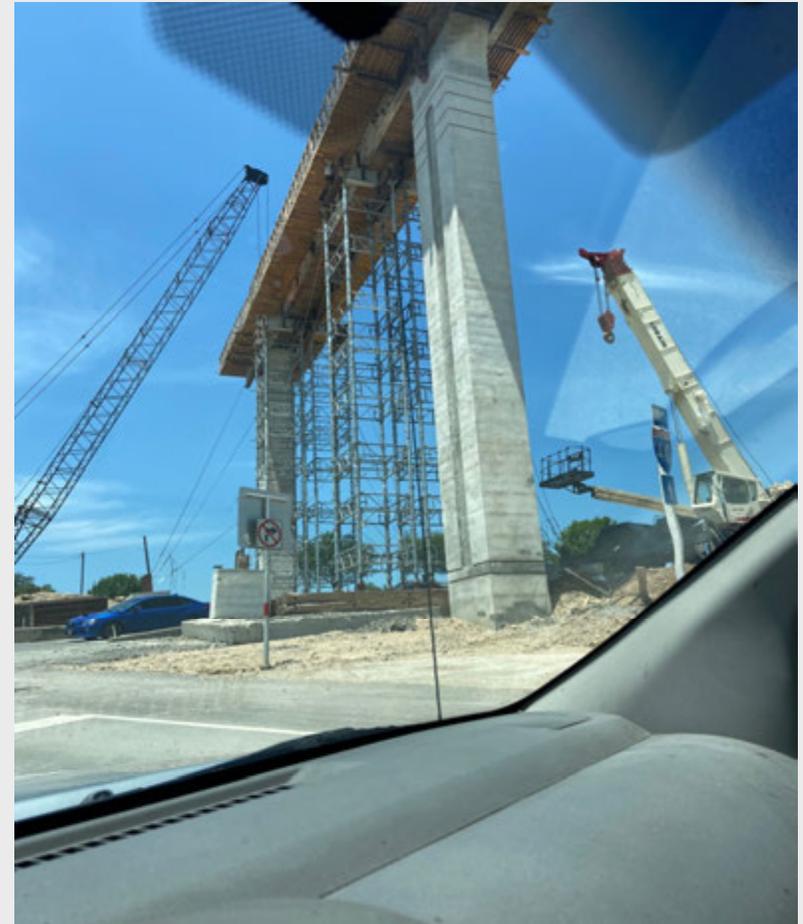
- Support beam depth
- Working over traffic
 - Falling tools, formwork



Considerations

Congested work zones and high traffic counts

- Vulnerable wire supports
and Shoring towers



Use of Three-Girder Steel Straddle Bent

- Allowed multiple units to be installed in one night closure



Txdot Considerations

Number of Closures

- Setting Formwork
- Steel Cage Placement, and/or PT duct installation.



Txdot Considerations

Number of Closures

- Placing Concrete (often more than 12 hours for large elements)
- Stressing Operation



Other Options

- Pre-cast element limitations
- Practical Span Lengths
- Weight Considerations



Crane Assembly Time and Footprint

When considering other accelerated methods, there are other practical considerations.

- These larger concrete elements can push crane limitations and require the use of larger cranes.
- With these larger cranes comes a larger footprint for assembly and storage.



Sample exercise investigating all options

Construction Method	*Max Straddle Weight(84ft) (Tons)	**Unit Cost	Straddle Cost	***Bent Cap Time (Days)	Total Bridge Const. Time (Days)
CIP	321	\$1,188.00	\$472,296.00	70	138
PRECAST	321	\$1,307.00	\$519,605.11	4	72
PRECAST+STEEL	90	-	\$1,175,956.82	4	72
STEEL	90	\$3.00	\$1,772,163.09	4	72

Legend:

Use of Three-Girder Steel Straddle Bent



Questions?

Leon Flournoy, P.E.

TxDOT – San Antonio District