Elevated Guideway and Facility Design for Advanced Transit Systems
Disney World Monorail Guideway

- Concrete filled steel pipe piles
- CIP concrete pile caps
- Precast concrete, tapered columns with integral steel crossheads
- Precast, prestressed, haunched guideway beams
- CIP concrete closures between beams
- Field post-tensioning up to six continuous spans
Disney World Monorail Guideway
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Disney World Monorail Beam Form
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NCHRP Report 698 identifies:

• Promising connections which will provide a variety of tools for design of precast columns

• Viable connections providing adequate seismic performance in moderate-to-high seismic regions

• Applicable accelerated construction techniques for bridges, but also relevant to monorails and transit structures
The report also:

- Evaluates and ranks the connections using three parallel metrics: technology readiness, performance, and time savings potential.
- Identifies connection types that may be feasible following near-term testing
- Identifies connection types where further research is required
Potential benefits of accelerated bridge construction:

- Reduced construction time
- Minimum traffic disruptions
- Reduced life-cycle costs
- Improved construction quality
- Improved construction safety
Application of Accelerated Bridge Construction Connections in Moderate-to-High Seismic Regions

To view the NCHRP Report 698, visit the following website:

Acknowledgements:
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Fully Precast Bridge Bents for Use in Seismic Regions

- ABC in moderate to high seismic regions has been limited
- Typical ABC techniques use Prefabricated Bridge Elements and Systems (PBES)
- Elements are typically connected at locations where the highest seismic demands are placed on a bridge during an earthquake
Fully Precast Bridge Bents for Use in Seismic Regions

• The project deployed a precast bent pier system to connect PBES in high seismic regions

• Delivered service and seismic performance required of modern bridges
Bent System: For Prestressed Girder Bridges
Integral at Bents

- CIP Diaphragm
- Precast Cap-beam
- Precast Segmental Column (to demonstrate feasibility)
- CIP Footing
Spread Footing Connection – Lateral Strength

Internal Forces
“Strut and Tie Model”

- Headed Bars Provide Good Anchorage
- Hooked Bars Facing Out Do Not
Fully Precast Bridge Bents for Use in Seismic Regions
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Fully Precast Bridge Bents for Use in Seismic Regions

To view the project, go to the following websites:
• http://fhwa.adobeconnect.com/n134083201108/
• http://www.fhwa.dot.gov/hfl/partnerships/bergerabam/index.cfm
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Monorail Guideway with Drilled Shaft and Large Bar Connections
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Conclusion:
Viable means for accelerating construction of monorail guideways using precast columns with high-performing seismic connections will be available within the next few years, supported by further research, including design, testing, specifications, and construction techniques.