MONORAILEX 2011
“MONORAIL FOR MASS TRANSIT”

Elevated Guideway and Facility Design for Advanced Transit Systems

INTERNATIONAL MONORAIL ASSOCIATION
3rd International Monorail Conference
Las Vegas – December 14-16, 2011

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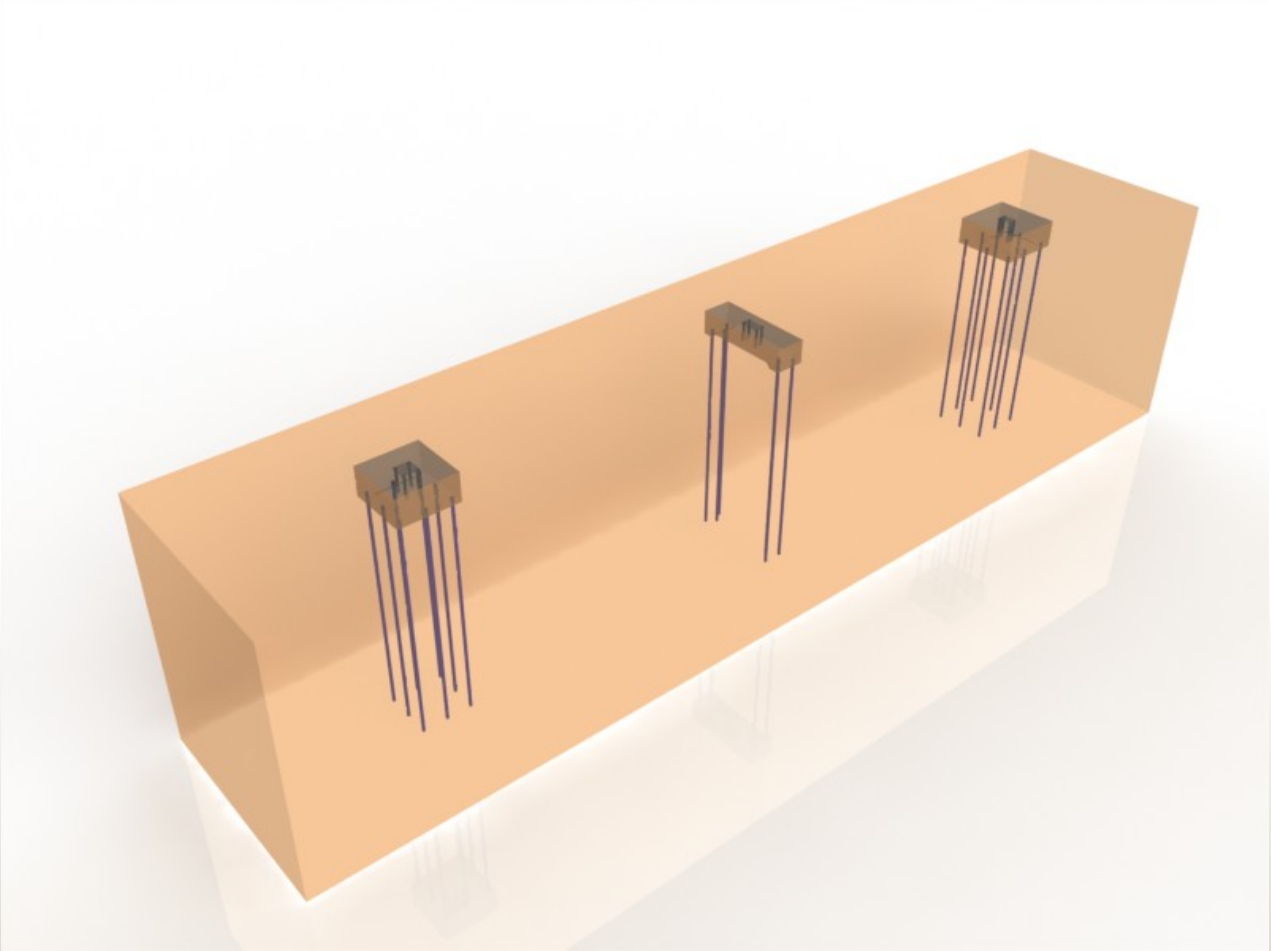
Disney World Monorail Guideway

- 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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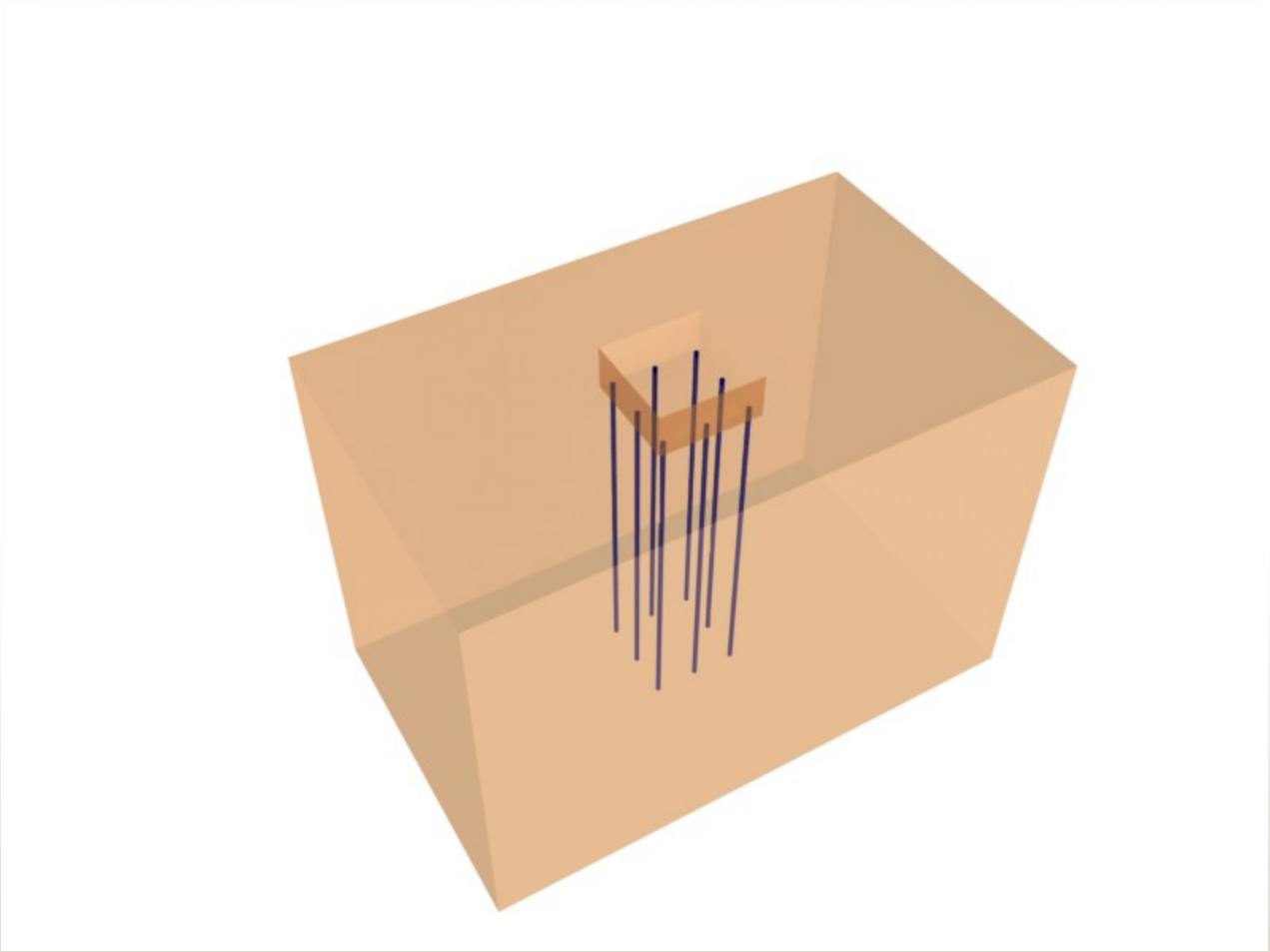
Disney World Monorail



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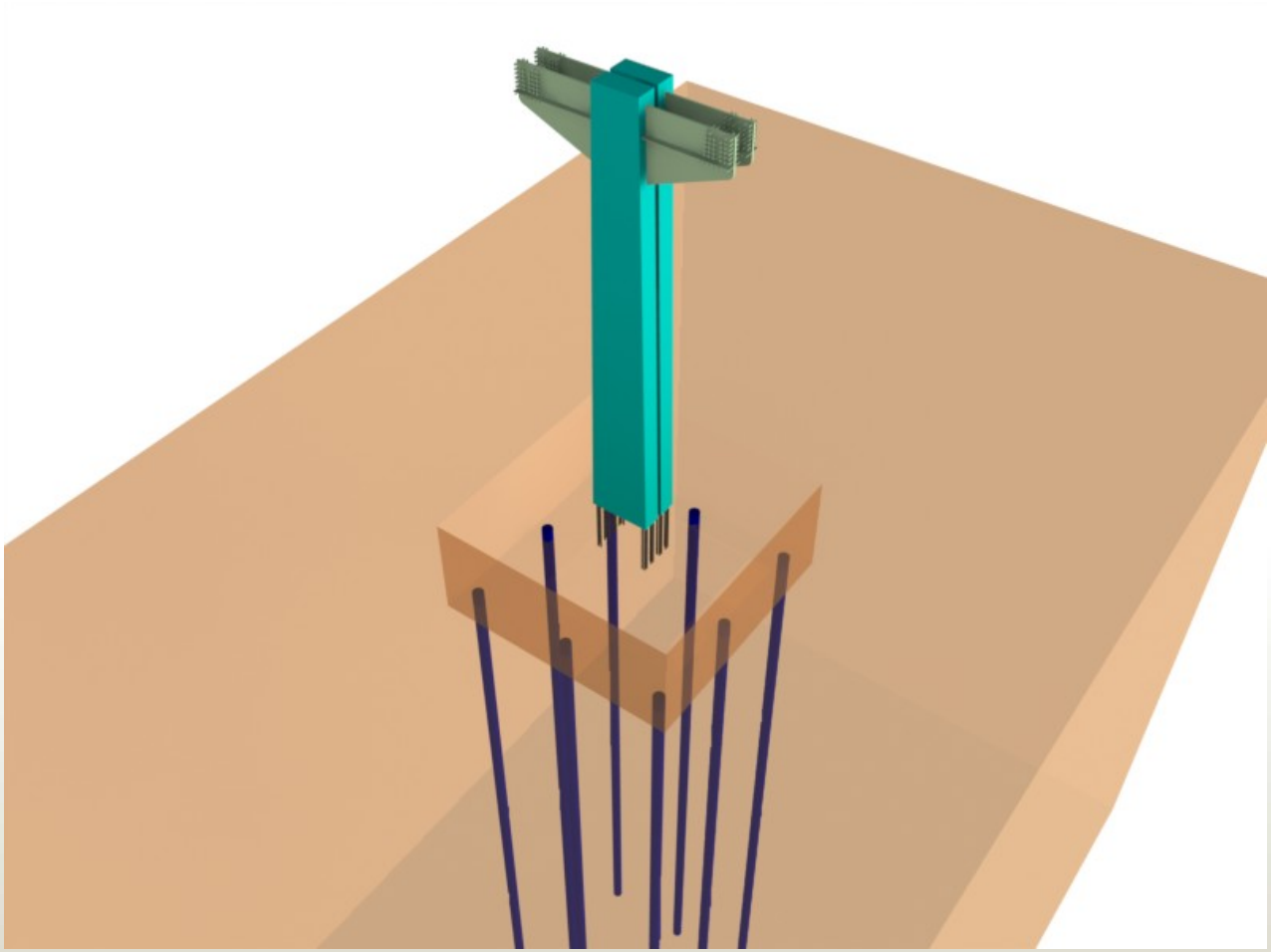

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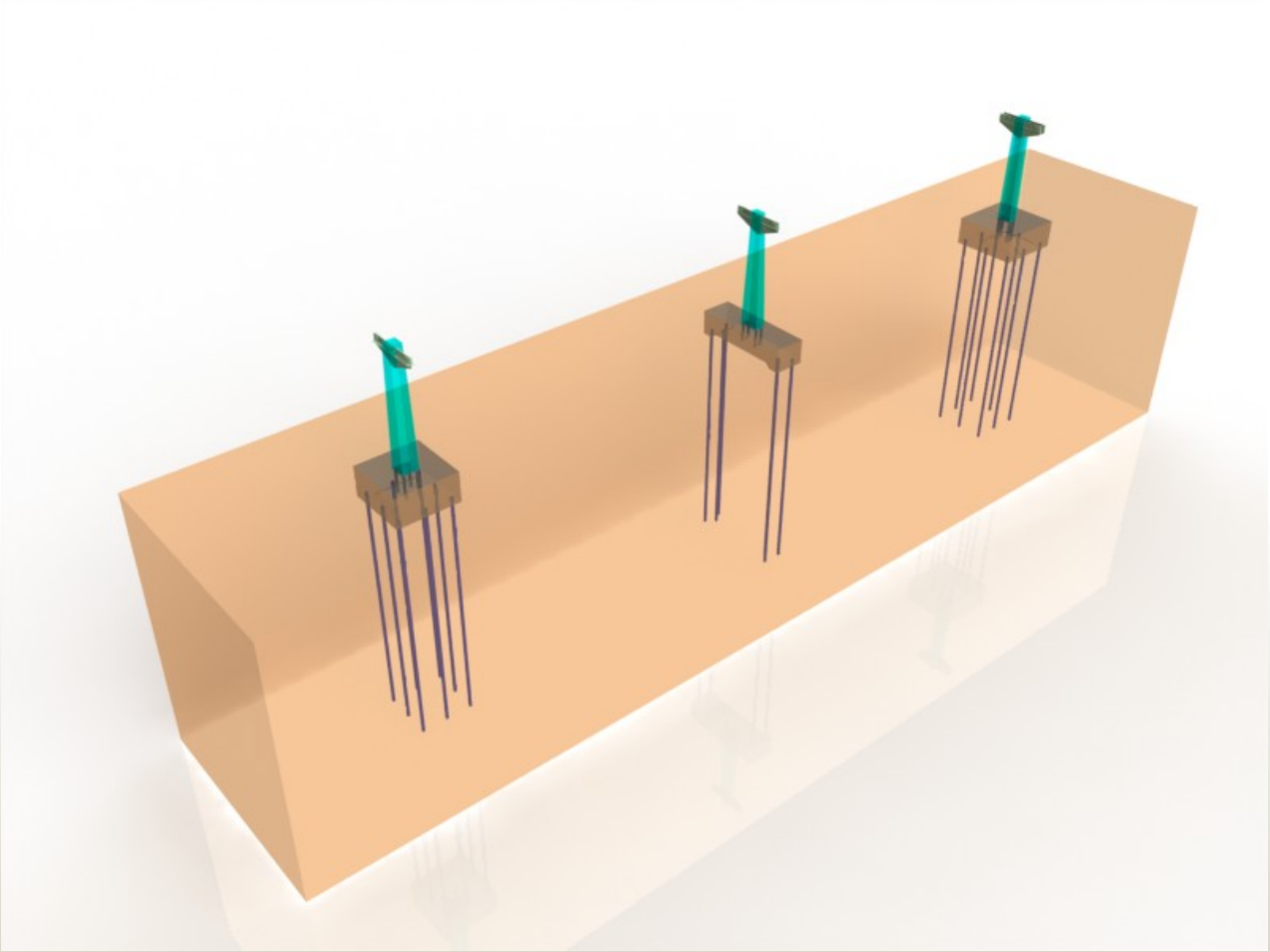

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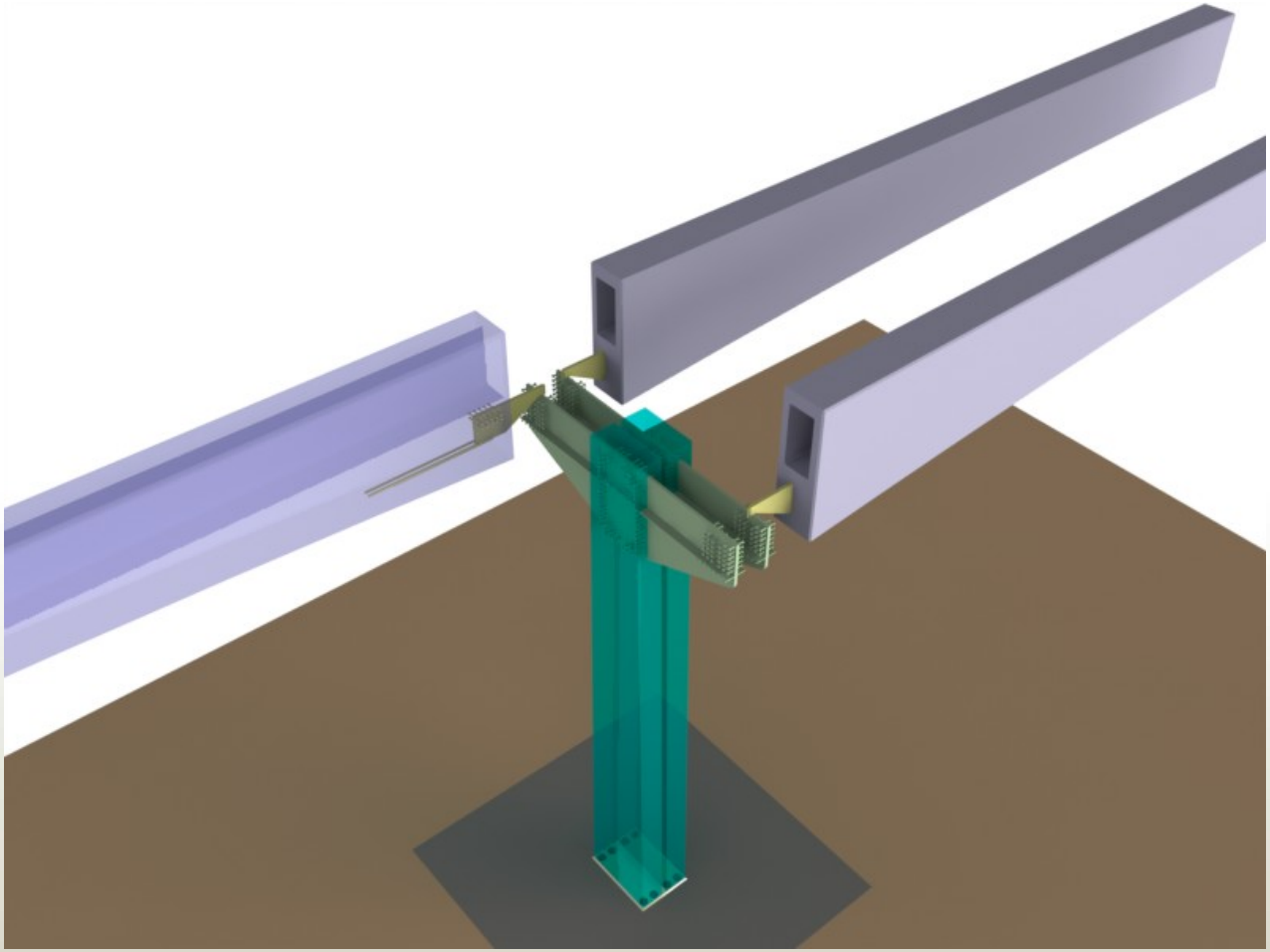

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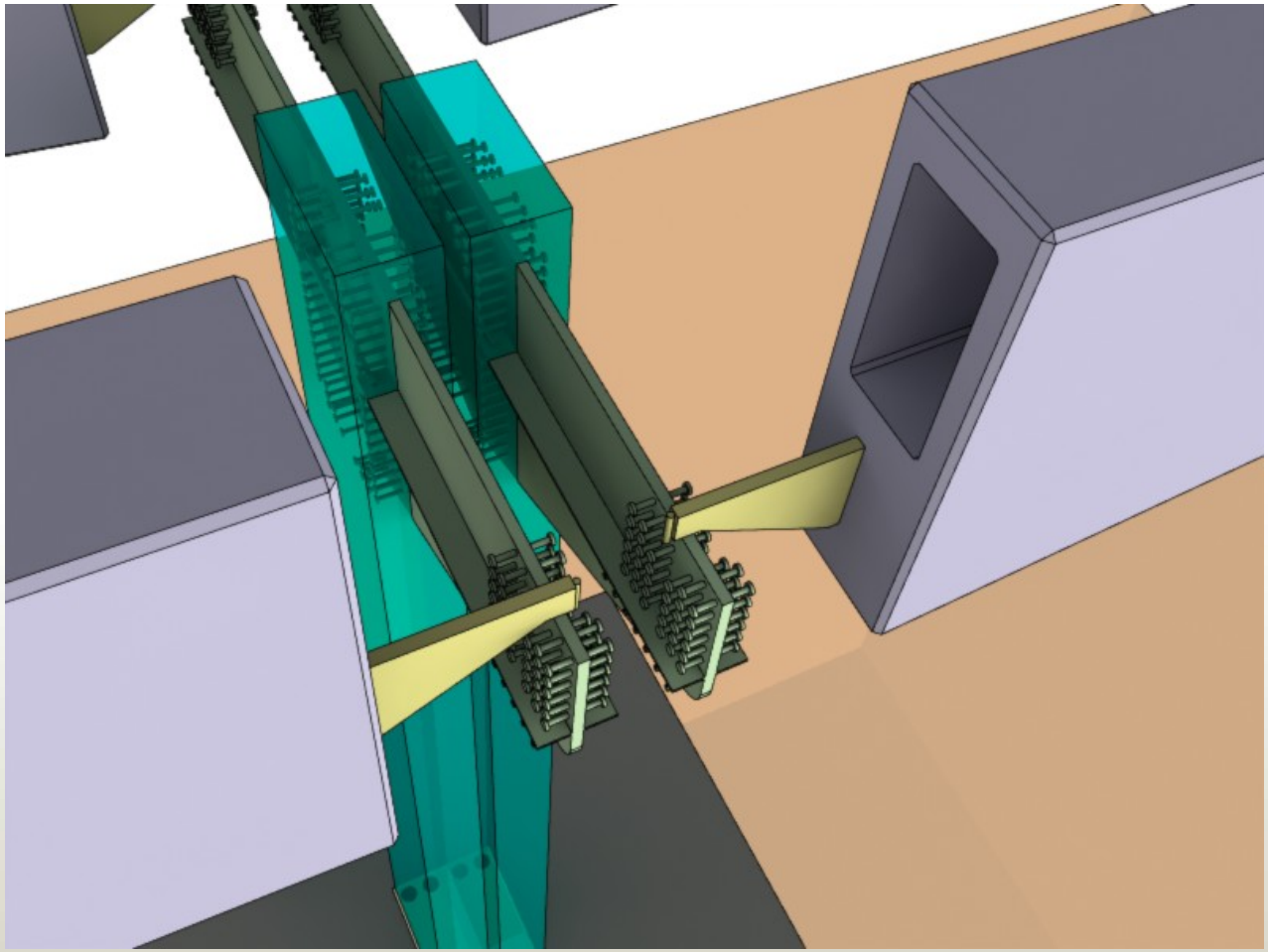

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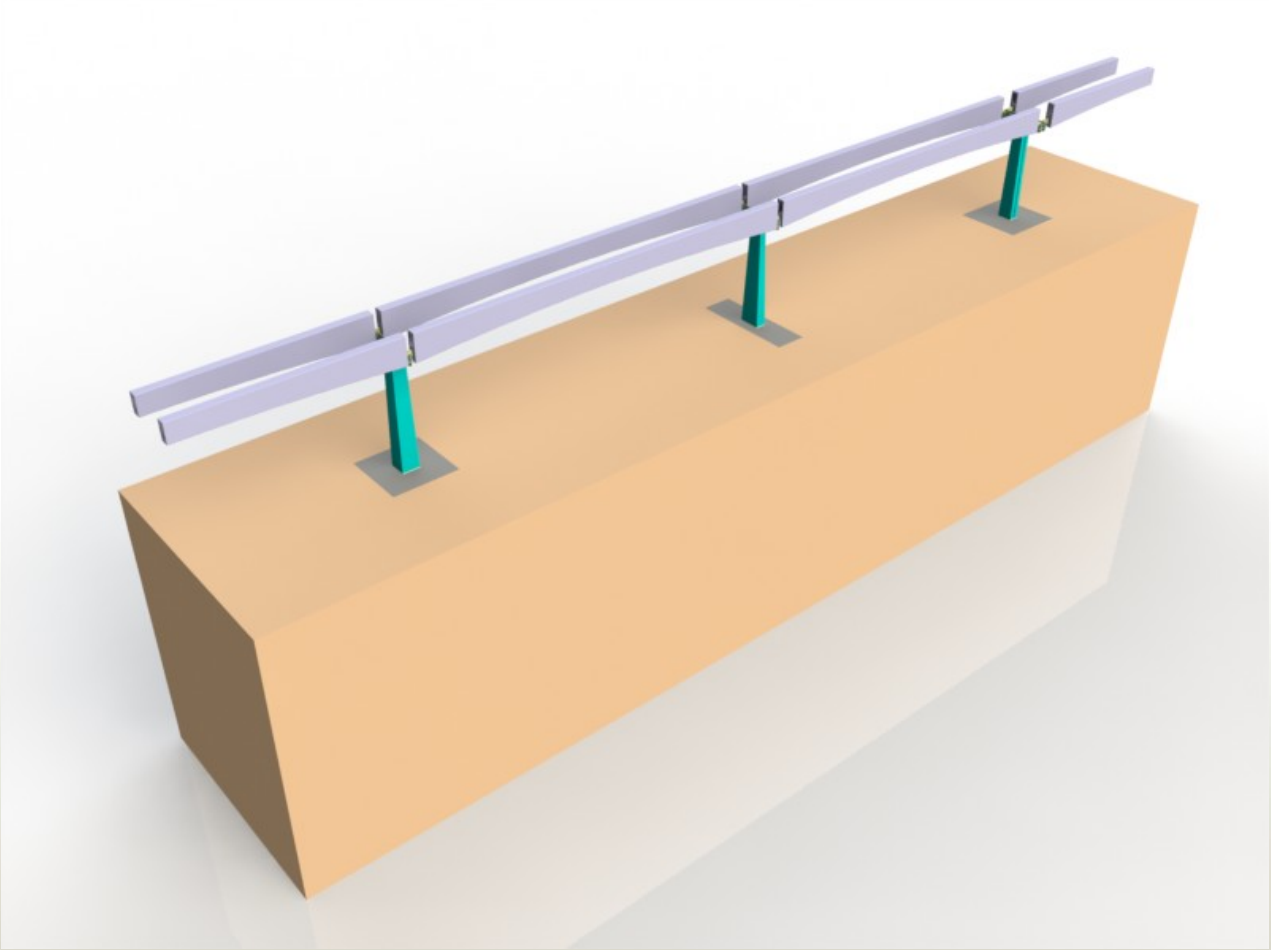

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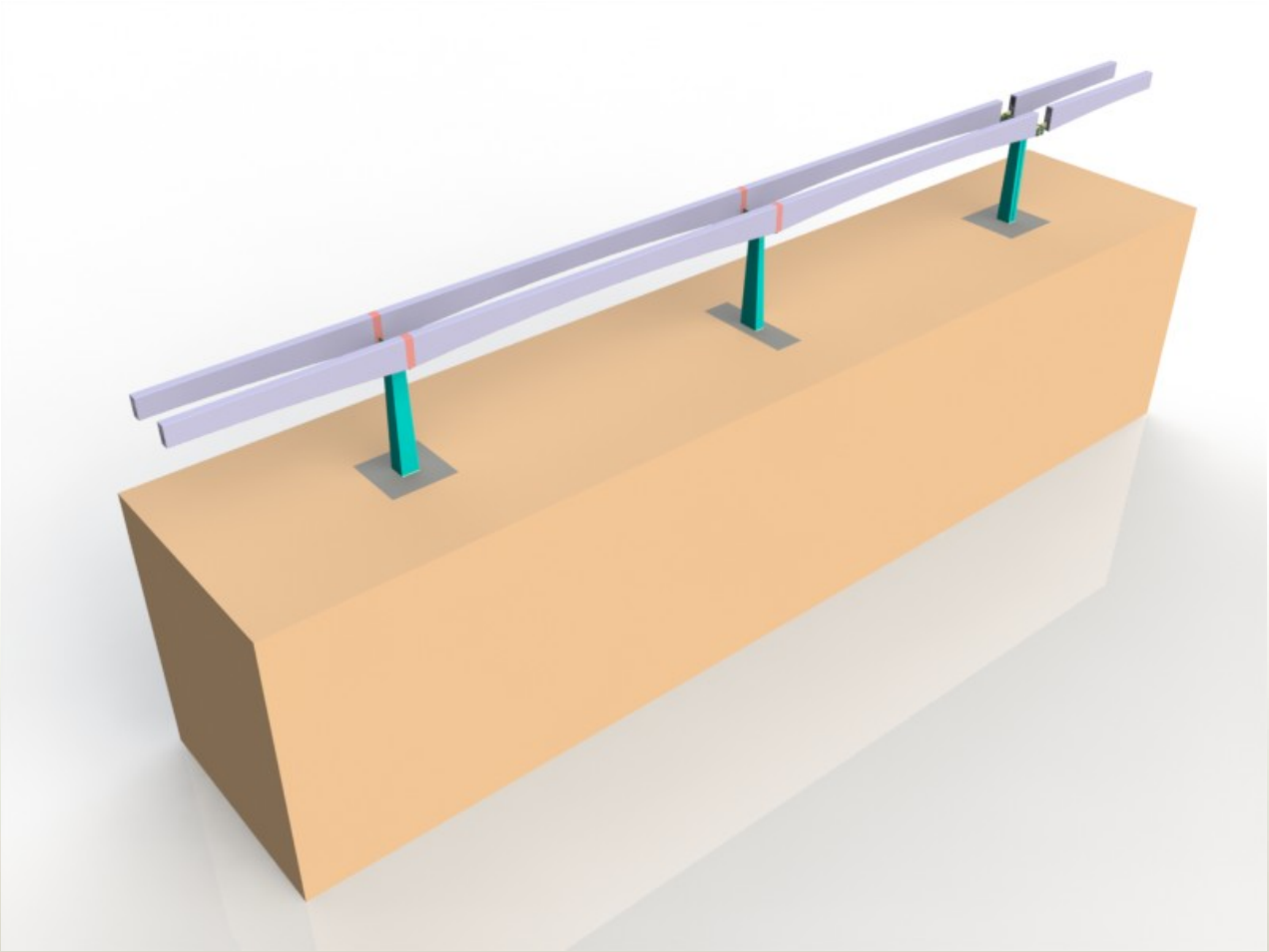

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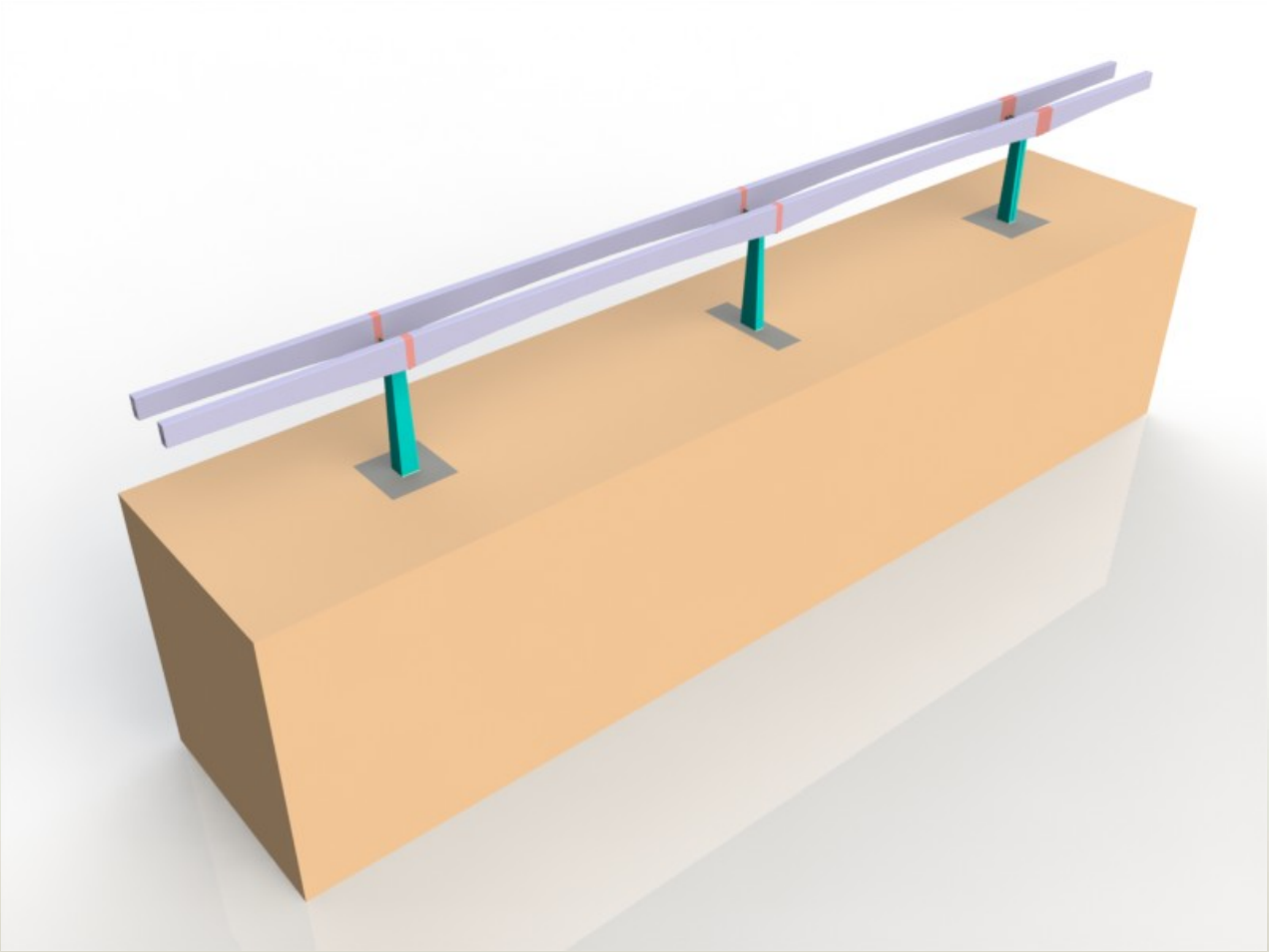
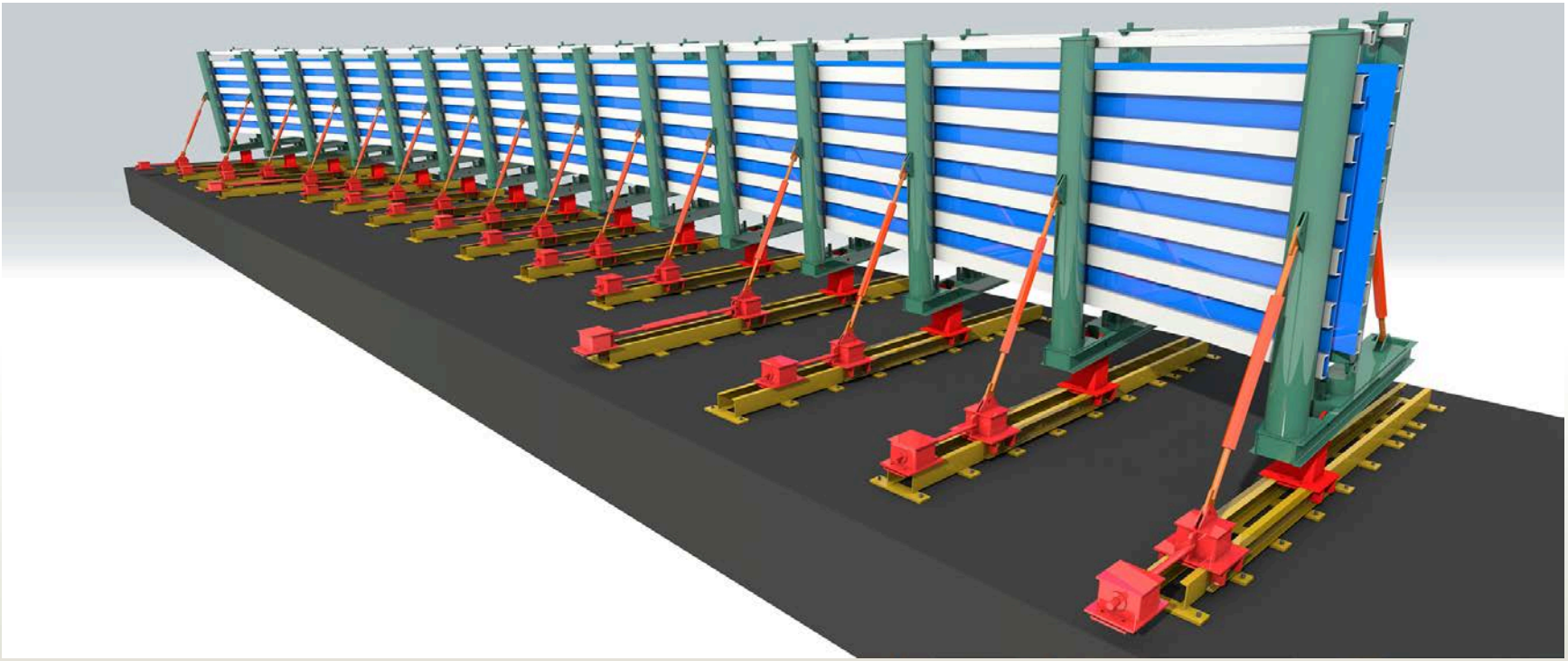


Disney World Monorail Beam Form



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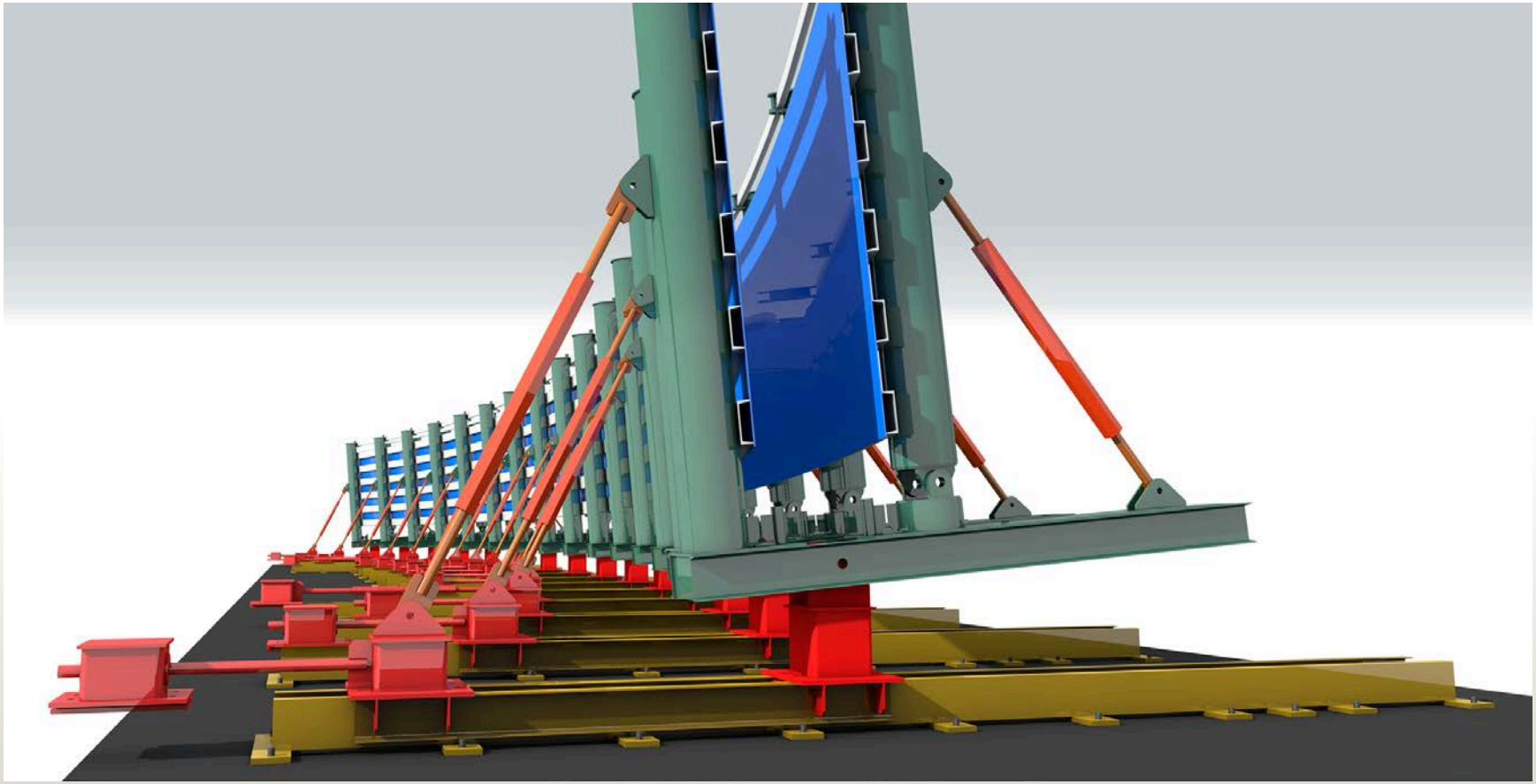

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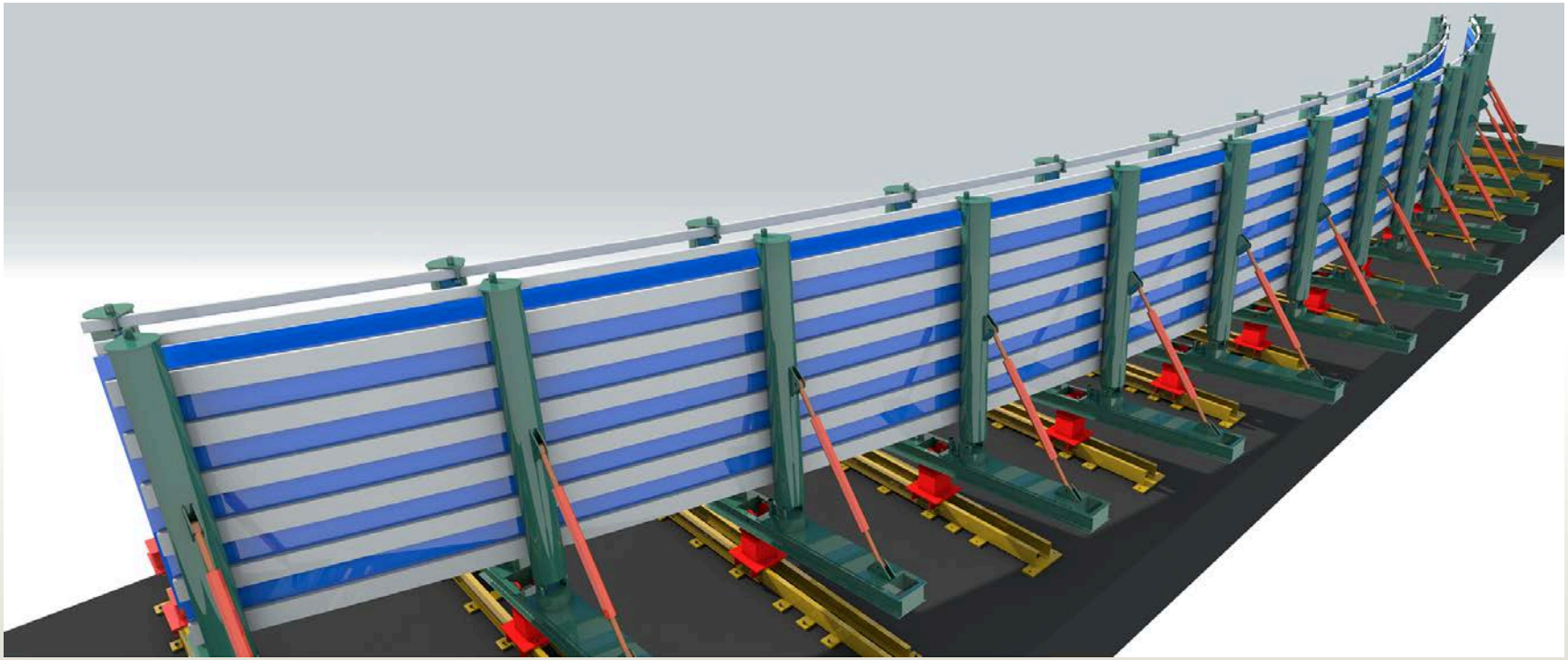


Application of Accelerated Bridge Construction Connections in Moderate-to-High Seismic Regions

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

Application of Accelerated Bridge Construction Connections in Moderate-to-High Seismic Regions

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

Application of Accelerated Bridge Construction Connections in Moderate-to-High Seismic Regions

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:

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_698.pdf

Acknowledgements:

Research for this synthesis report was performed under NCHRP Project 12-88, supported by the National Academies, the Transportation Research Board, and the National Cooperative Highway Research Program.

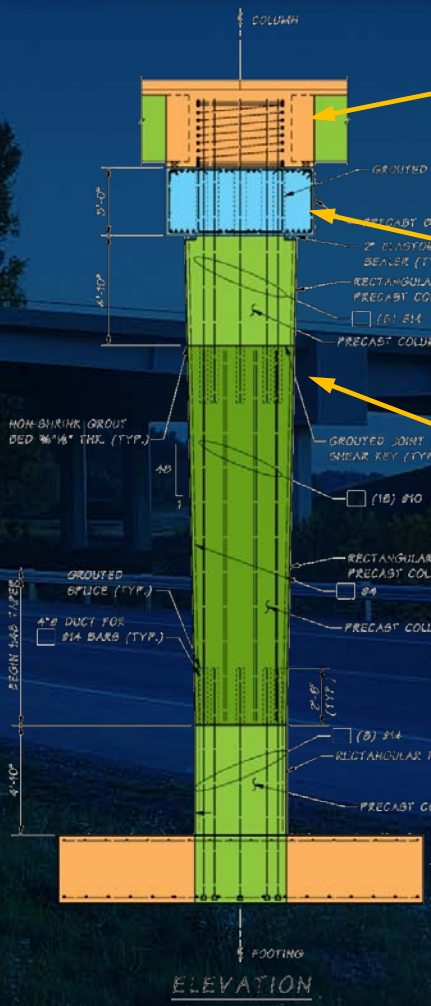
Fully Precast Bridge Bents for Use in Seismic Regions

- 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

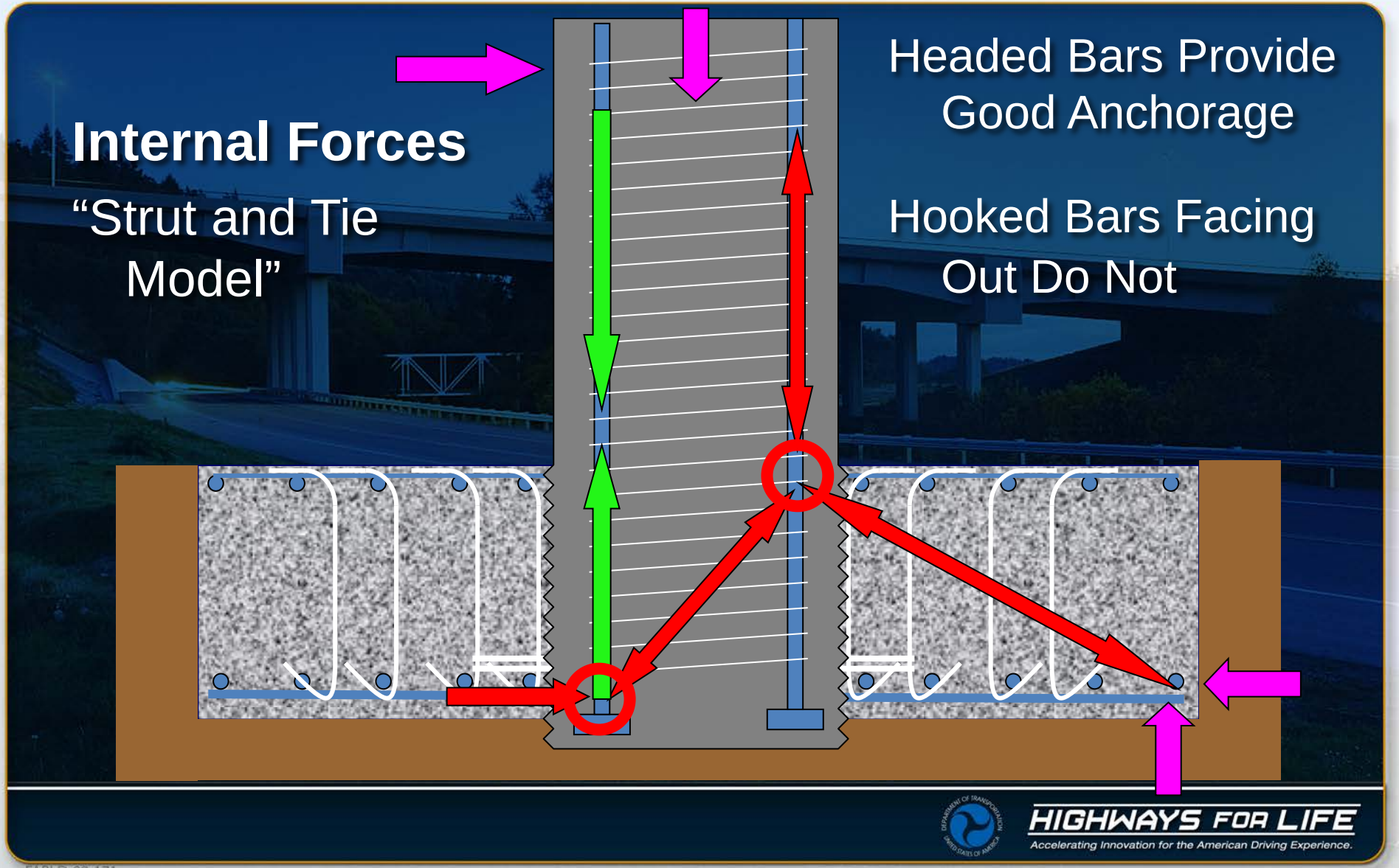
Precast Cap-beam

Precast Segmental Column (to demonstrate feasibility)

CIP Footing

HIGHWAYS FOR LIFE
Accelerating Innovation for the American Driving Experience.

Spread Footing Connection – Lateral Strength



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:

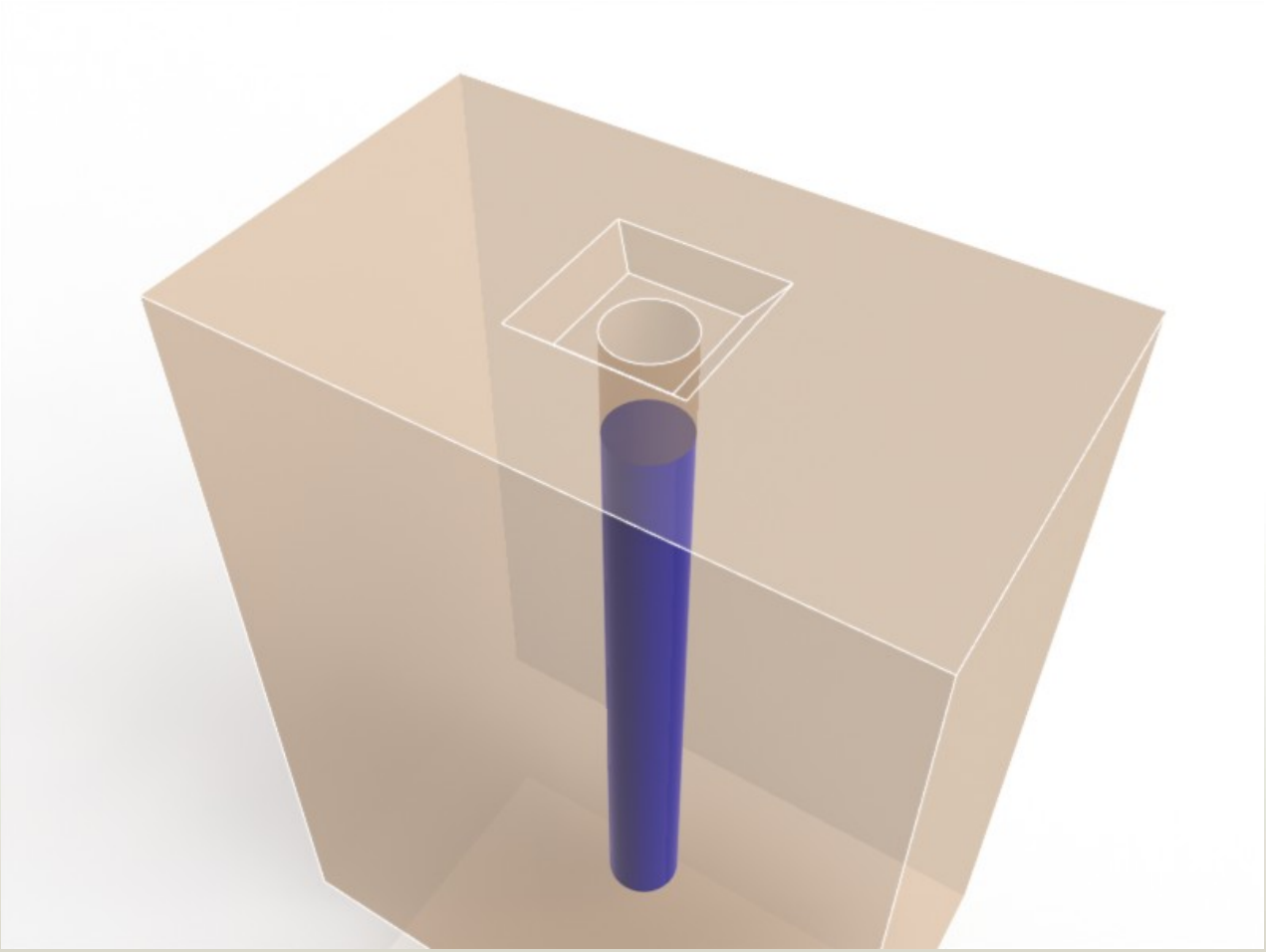
- http://fhwa.adobeconnect.com/n134083201108/
- http://www.fhwa.dot.gov/hfl/partnerships/bergerabam/index.cfm

Fully Precast Bridge Bents for Use in Seismic Regions

Acknowledgements

Support for this work was provided by the Federal Highway Administration's Highways for LIFE Technology Partnerships Program, by the Washington State Department of Transportation, and by the Valle Foundation at the University of Washington.

Monorail Guideway with Drilled Shaft and Large Bar Connections



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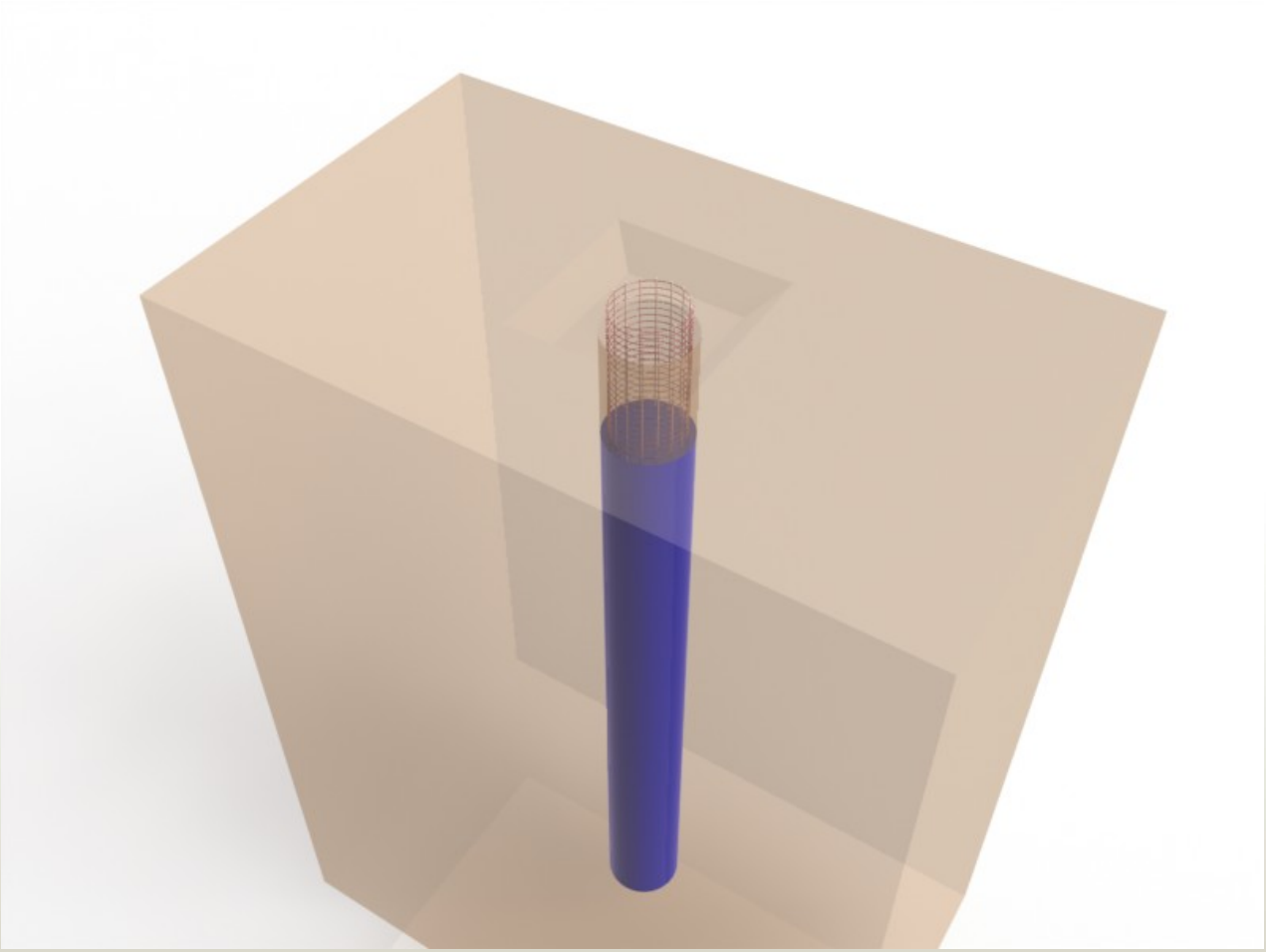

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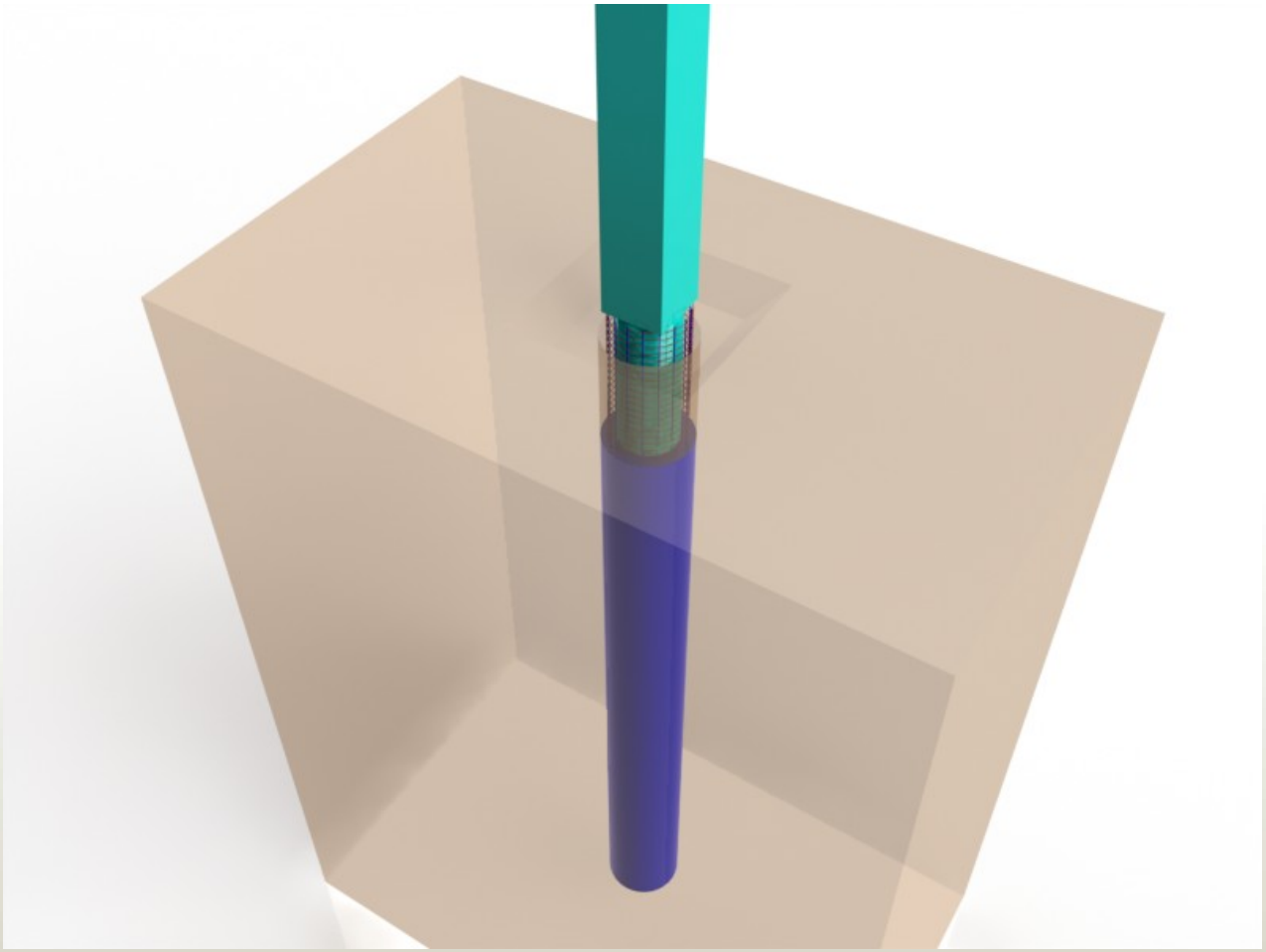

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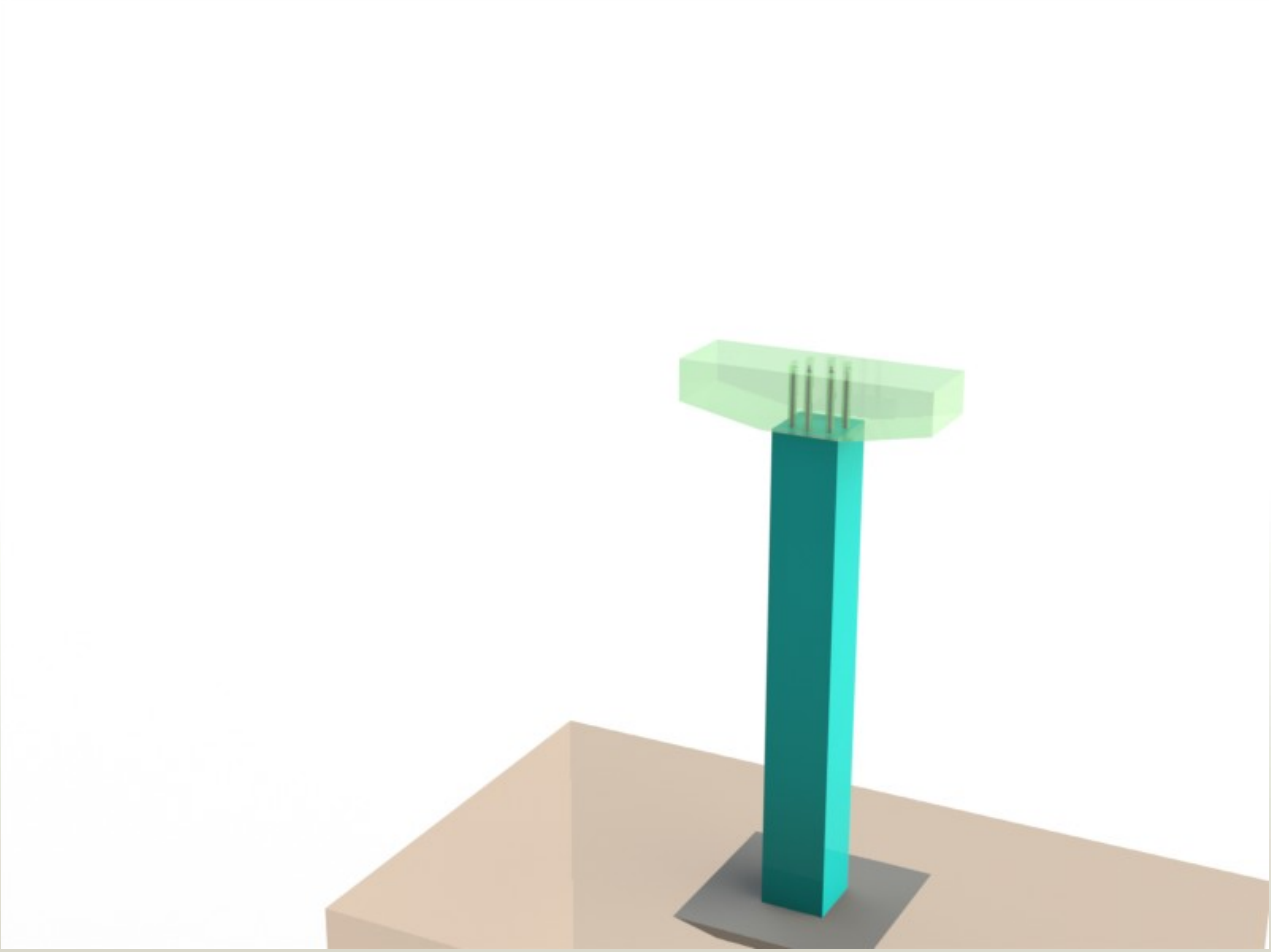

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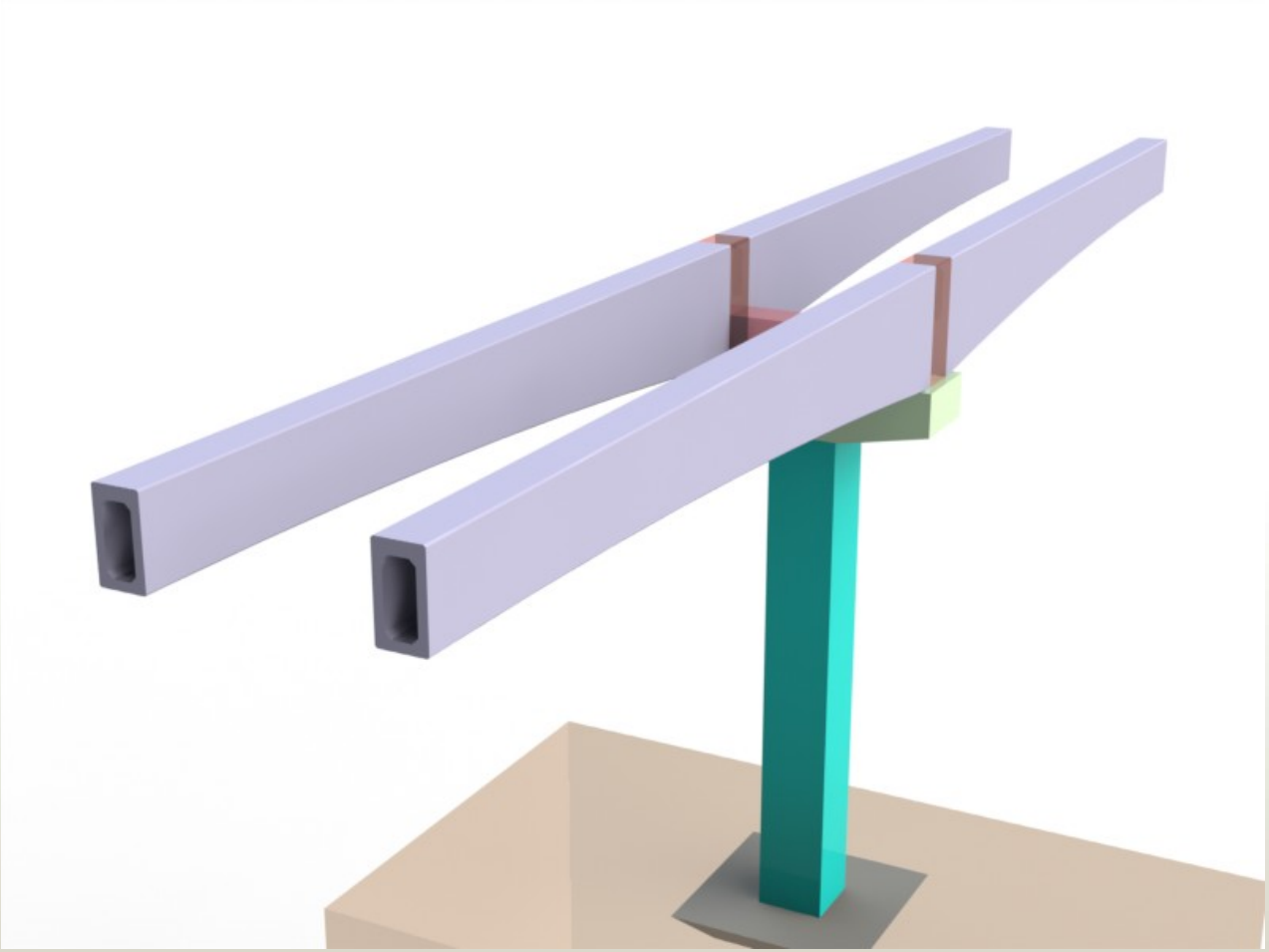

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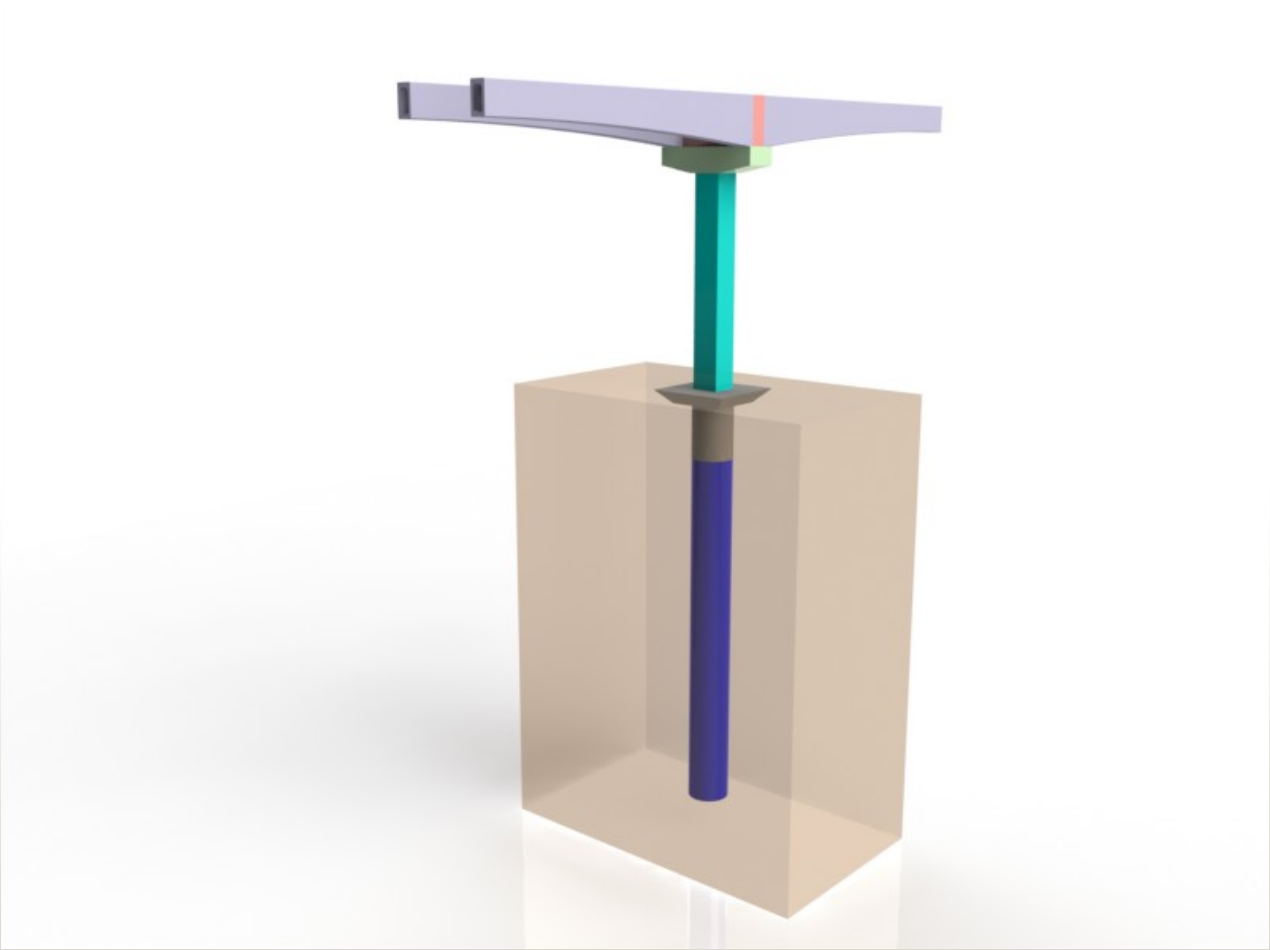

Elevated Guideway and Facility Design for Advanced Transit Systems

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.