Installation of RMG Cranes at Rail Intermodal Yard
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• Planning & Conceptual Design
  – Travel Routes and Gate Operations
  – Trucks, Trains and Cranes
  – Rail Mounted Gantry Cranes
  – Building Green
  – Planning for the Future

• Design
  – Crane Rail Foundation
  – Crane Rail

• Construction
  – It’s Not a Problem, Its an Opportunity
Planning & Conceptual Design

- Travel Routes and Gate Operation

![](image_url)

**Truck Travel Time Surveys**

- Route 1: Outbound 5, Inbound 5
- Route 2: Outbound 10, Inbound 10
- Route 3: Outbound 15, Inbound 15
- Route 4: Outbound 20, Inbound 20
Planning & Conceptual Design

- Trucks, Trains and Cranes
Planning & Conceptual Design

• Rail Mounted Gantry Cranes

Stripping and Stacking RMG’s
Building on the Past, Respecting the Future

Planning & Conceptual Design

- Rail Mounted Gantry Cranes

Stacking RMG’s
Planning & Conceptual Design

• Building Green

Green Project Elements

- Regeneration of Power
- Noise Reduction
- Operational Efficiency/Yard Densification
- Automated Gate System
- Recycled Concrete as Base Material
- No Diesel Emissions
Planning & Conceptual Design

- Planning for the Future

Ultimate Build-Out Concepts

What if Scenarios

Next Generation Equipment

Automated Gate Systems
Design

Design Specific to RMG Cranes

• Crane Rail Foundation
• Crane Rail

Critical but not specific to RMG Cranes < Not Covered>

• Traffic control
• Facility operations
• Storm drainage
• Geotechnical issues
Design

- Crane Rail Foundation
Design

-Crane Rail Foundation
-Geotechnical Investigation

Existing Soil

<table>
<thead>
<tr>
<th>SAMPLE DATA</th>
<th>SOIL PROFILE</th>
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<tbody>
<tr>
<td>Depth (ft)</td>
<td></td>
</tr>
<tr>
<td>Sample Name</td>
<td>Sample Type</td>
</tr>
<tr>
<td></td>
<td>Blown/Sand</td>
</tr>
<tr>
<td></td>
<td>Test Data</td>
</tr>
<tr>
<td></td>
<td>USCS Symbol</td>
</tr>
<tr>
<td></td>
<td>Drilling Method: Hollow stem Auger</td>
</tr>
<tr>
<td></td>
<td>Drilled By: Holocene Drilling</td>
</tr>
</tbody>
</table>

-2ft of medium dense sand
-2ft of soft to stiff clay
-Remainder is soft to loose, wet sand, clay and silt

Crane Beam
-3ft of crane beam
-6in of 1 ¼” minus
-18in of recycled conc
-6in of 1 ½” minus
-24in of quarry spalls

Coeff of subgrade reaction = 135pci

Asphalt
-3in of HMA top course
-4in of HMA base course
-6in of top course
-12in of base course

Superpave mix design
Design

• Crane Rail Foundation
  – Seismic Analysis
Design

- Crane Rail Foundation
  - Loads and Load Combinations
Design

• Crane Rail Foundation
  – Required Tolerances; ISO 12488 Cranes – Tolerances for wheels and travel and traversing tracks

Tolerances for Crane Rail Installation and In Service
Design

- Crane Rail Foundation

![Typical Section of a Crane Rail Foundation](image)
Design

• Crane Rail
  – Continuous
  – Flash Butt Welding
  – Soleplates and Clips
  – Head Hardened
  – Epoxy/Cementitious Grout
  – Installation Tolerances
Construction
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