Rail Transportation Case Study

Rail Transportation Signal Testing Case Study
Mobile command center with remote signal simulation reduces field personnel by 60% and testing time by 70%.
Industry: Transportation & Logistics

Quick Facts

Attribute	Value
Customer	Herzog (leader in railroad services)
Application	Railway signal testing and commissioning
Personnel Reduction	60%+
Testing Time Reduction	Up to 70%
Communication	Ethernet real-time
Components	Wayside System Simulator (WSS) + Mobile Command Center

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The Challenge

Challenge: Testing and commissioning railway signal systems was labor-intensive and error-prone, requiring multiple field personnel during cutover phases with limited visibility of overall control systems.

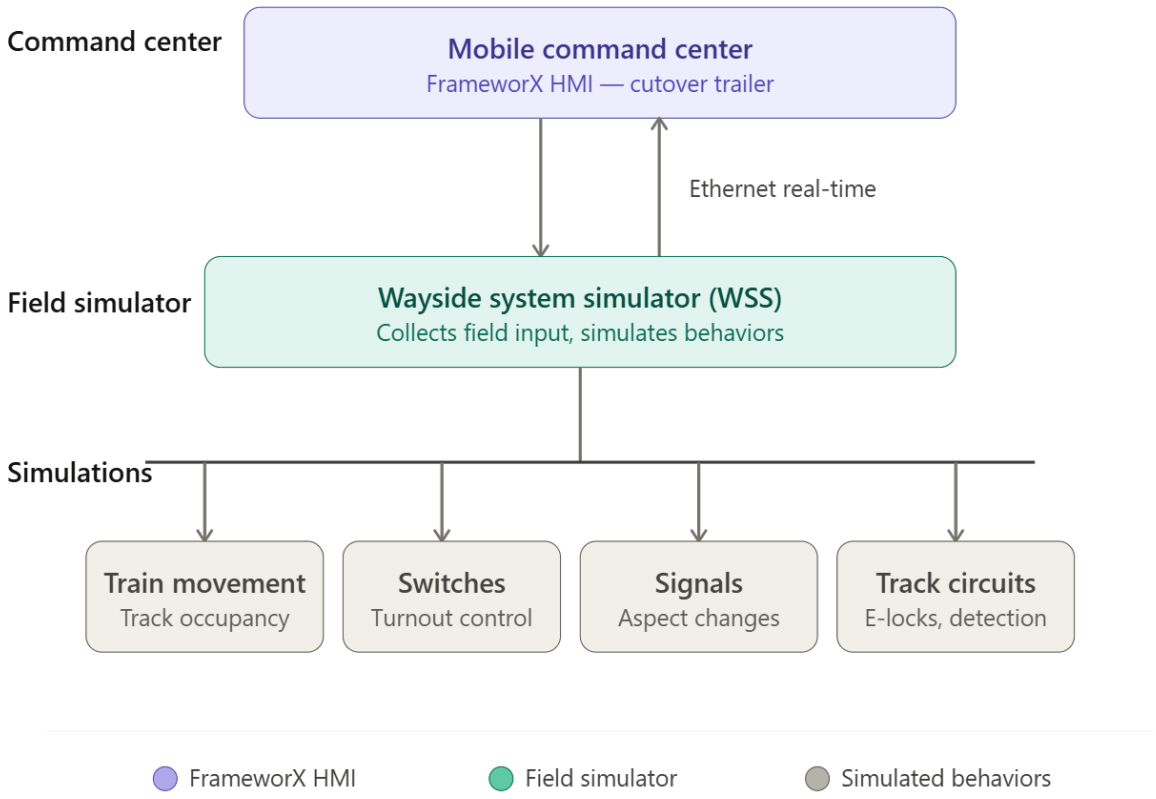
Specific pain points:

- Several signal personnel required in field during cutover phase
- Manual manipulation of signal inputs and outputs
- Time-consuming and costly process
- Testing engineers had limited visibility of overall control system
- Potential errors and delays in cutover process
- High costs for manpower, overtime, lodging, and overhead

Impact: Labor-intensive testing created safety risks, increased costs, and delayed commissioning timelines.

The Solution

Architecture



Component	Location	Capabilities
Wayside System Simulator (WSS)	Field	Simulates train movement, switch operations, signal responses
Mobile Command Center (Cutover Trailer)	Central	FrameworX HMI for remote control and testing
Ethernet Communication	Network	Real-time data exchange between WSS and command center

System Components

Wayside System Simulator (WSS):

- Simulates real-world signal behaviors
- Simulates train movement
- Simulates switch operations
- Simulates signal responses
- Collects input from field
- Sends data to mobile command center

Mobile Command Center (Cutover Trailer):

- FrameworX-powered HMI
- Centralized control unit
- Remote signal control and testing
- Eliminates need for field personnel
- Multiple display monitors
- Complete control point visibility

Signal Behaviors Simulated

Simulation	Purpose

Train Movement	Track occupancy testing
Switch Operations	Turnout control verification
Signal Responses	Aspect change validation
E-Lock Controls	Electrical lock testing
Track Circuits	Occupancy detection

Key Enablers

FrameworX capabilities that made this solution possible:

Capability	Application
Real-Time Connectivity	Ethernet communication between WSS and command center
Flexible HMI	Mobile command center visualization
Remote Control	Signal I/O manipulation from central location
Scenario Simulation	Test scenarios difficult to replicate in live environments
Centralized Monitoring	Complete control point system visibility

The Results

- **60%+ Field Personnel Reduction** — Most field personnel eliminated from testing process
- **70% Testing Time Reduction** — In-service testing time cut dramatically in many cases
- **Increased Accuracy** — Human error significantly reduced with centralized control
- **Improved Safety** — Limited personnel exposure to field environment
- **Cost Reduction** — Manpower, overtime, lodging, and overhead costs reduced significantly
- **Higher Quality** — Engineers can simulate scenarios difficult to replicate live, resulting in fewer errors
- **Comprehensive Testing** — Controlled environment allows more careful pre-testing and commissioning
- **Complete Visibility** — Engineers focus on entire control point system, minimizing error risk

Resources

Download case study: CaseStudy_RailTransportation.pdf

This case demonstrates mobile command center signal testing with remote simulation reducing field personnel and testing time for railway commissioning.

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