

Revolutionizing Rail: How Signaling Tech Powers Faster, Greener Trains

Ever wonder how modern trains achieve lightning speeds while staying safe?

Join rail engineering expert Orijit Pandit for an eye-opening journey through signaling evolution – from vintage mechanical arms to AI-driven smart systems. You'll discover:



- The basics of electrified rail's 2×25 kV AC systems used in bullet trains around the world
- How wireless signaling (CBTC) enables self-optimizing schedules during rush hours
- Real-world solutions reducing maintenance costs
- The future of driverless rail using 5G and predictive AI

In this session, Orijit will explain:

1. The Power Behind Speed: Caltrain's Electrification Revolution

- 2×25 kV systems explained: How transmitting power at 50 kV then stepping down to 25 kV minimizes energy loss across 51 miles
- High-speed rail tech on commuter lines: Shared infrastructure enabling future 110-mph Caltrain/HSR blended service
- Field challenges: Retrofitting legacy corridors while maintaining daily service

2. Signalling's Evolution: Safety Meets Smart Tech

- From mechanical arms (1800s) to modern CBTC and AI-powered collision prediction systems
- How CBTC wireless networks replace trackside hardware

3. Integration Breakthroughs

- Unified control centers managing signaling, power, and passenger flow
- Predictive maintenance slashing costs through SCADA-CBTC synergy

4. What's Next for North American Rail

- Self-adjusting timetables using live passenger data
- Future CBTC Expansion Projects such as NYC MTA
- Future 2x25 AC electrification projects
- Next-Gen CBTC Innovations

About Orijit Pandit, P.Eng, P.E., IntPE, PMP, Vice President – Rail and Transit Engineering at WSP USA

- ✓ Led Caltrain's 2×25 kV traction power integration for the \$1.9B electrification project
- ✓ Directed testing/commissioning of North America's first full conversion of a BRT to LRT network
- ✓ Pioneered CBTC-SCADA integration reducing signal maintenance costs
- ✓ Licensed Professional Engineer (Ontario and Nevada) and PMP-certified project leader

Throughout the presentation, Orijit will share his firsthand experience including from Caltrain's 2x25 kV installation and Ottawa's CBTC Commissioning.