RailTEC’s Research and Innovation Laboratory (RAIL) Capabilities

General Briefing
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Research and Innovation Laboratory (RAIL)

- State-of-the-art rail infrastructure research laboratory in Champaign, IL
  - Pulsating Load Test Machine (PLTM)
  - Static Tie Tester (STT)
  - Full-Scale Track Loading System (TLS)
  - Rapid Component Degradation System (RCDS) [future]
- Ability to test at component and system levels on any types of track (e.g. wood, concrete, etc.)
  - Crosstie structural capacity
  - Fastening system wear and degradation rates
  - Quantification of force distributions from wheel through superstructure into substructure
Pulsating Load Testing Machine (PLTM)

- Owned by Amsted RPS
- Maintained and managed by UIUC since Spring 2010

**Experimental Capabilities**
- One 50,000 lb (222 kN) vertical actuator
- One 35,000 lb (156 kN) lateral actuator

**Functionality**
- Ability to simulate various L/V force ratios (e.g. track conditions)
- Adaptability for other support and service conditions (e.g. ballast box and environmental chamber)
Static Tie Tester (STT)

- Owned by RailTEC/UIUC since Summer 2012
- **Experimental capabilities**
  - Two 95,000 lb hydraulic cylinders
- **Functionality**
  - Ability to study the rail seat compression
  - Ability to simulate various support conditions (e.g. track conditions)
  - Ability to study the bending moment capacity of crossties
Full-Scale Track Loading System (TLS)

- Operational since Spring 2014
- **Experimental capabilities**
  - Two 55,000 lb hydraulic actuators
  - One 100,000 lb hydraulic cylinder
- **Functionality**
  - Full-depth track substructure for representative support conditions
  - Eleven (11) crossties for representative end effects
  - Loading via wheelset for representative loading conditions
  - Ability to change the L/V and magnitude of loads applied
  - Ability to answer hypothesis based questions pertaining to infrastructure and substructure
Full-Scale Track Loading System (TLS)
Rapid Component Degradation System (RCDS)

- Future Testing Frame – Proposed for Development in 2015

- **Experimental capabilities**
  - Fixed L/V ratio applied to rail head via designed loading frame
  - One vertical actuator

- **Functionality**
  - Ability to simulate various support conditions (e.g. track conditions)
  - Ability to study the degradation of components at various loading and time intervals
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