

Data Management Plan

Submitted by

Hualiang (Harry) Teng, Professor and Director

University of Nevada, Las Vegas

Rail Transportation Engineering and Advance Methodology (RailTEAM))

Tier 1 University Transportation Center on Improving Rail

Transportation Infrastructure Sustainability and Durability

April 5 2017

The theme of the research center is Improving Rail Transportation Infrastructure Sustainability and Durability during which research in the following four areas will be conducted:

- Asset Management and Performance Management
- Condition Monitoring, remote sensing, and use of GPS
- Application of new materials and technologies
- Construction Methodologies and Management

Examples of the research projects are listed in Table 1 which shows that two types of data will be produced from our research projects:

- Test data
- Railroad supplied data

Test data are data obtained by members of the UTC team, to include condition and measurement data from applying technologies to railroad system components. These data are in digital format and can be archived. Data provided by the railroads include data about the conditions of the track, vehicle or railway system and their components as well as such information as traffic levels (tonnage), maintenance history, cost information, etc. This data is proprietary in nature, and is not allowed to be made available to the public and thus cannot be submitted to DOT for archiving.

The data generated from our research projects, excluding any proprietary railroad data, will be submitted by the PIs of the research projects to USDOT after the completion of the projects.

Table 1. Research Topics Proposed for Year 1 of RailTEAM UTC

	Research Projects	Data
Virginia Tech (Condition Monitoring)	1. Real-time monitoring of coupler forces using low-cost, low-energy accelerometers	Measurements of pressures on couplers
	2. Real-time monitoring of switches and frogs using rail-embedded sensors	Measurements of pressures on switches and frogs
	3. Top of rail (ToR) lubricity assessment using laser optic reflective sensors	Measurements of lubricity
	4. Data analytics for enhancing track infrastructure condition monitoring using accelerometer sensors	Data from accelerometer
	5. Detecting the on-set of track rolling contact fatigue (RCF) with ultrasonic emissions	Measurement of rail defects
	6. Application of LIDAR technology for rail surface monitoring	Measurement of smoothness
	7. In situ and impedance-based rail neutral temperature assessment and structural health monitoring (SHM) of railroad tracks and joints	Measurement of rail temperature
	8. Field testing of ultrasonic wheel crack detection system	Measurement of wheel strength
University of Delaware (Maintenance)	1. Track maintenance planning and forecasting using big data theory	Track maintenance data from railroads
	2. Development of new generation rail wear and fatigue life forecasting models using big data theory	Rail condition data from railroads
	3. Risk-based management of rail defect testing	Rail defect data from railroads
	4. Optimization of rail replacement using life cycle cost analysis a. Tangent track (fatigue based) b. Curved track (wear based)	Rail replacement data, cost data from railroads
	5. Tie life forecasting and optimization of tie replacement schedules	Tie condition and cost data from railroads
	6. Track surfacing optimization using life cycle cost analyses	Track surface condition and cost data from railroads
	7. Integration of new generation inspection technology with track degradation analysis and maintenance planning	Track condition data from railroads

UNLV (High Speed Rail)	1. Development of performance-based seismic design method for the girder bridge in high-speed rail considering the near-fault earthquake effects	Simulation data from computer
	2. Develop smart bridge bearing system for high speed rail	Bearing testing data
	3. Rail flaw detector at high speed (>70 mph)	Testing data
	4. High speed rail track alignment and design standards	No data
	5. Low solar absorption rail coating for high speed rail	Testing data
	6. Use new materials to design cost-effective bridge bearing	Testing data
	7. Geogrid-reinforced rail foundation	Testing data
	8. Continuous and robust railroad inspection using hyperspectral imaging	Testing data

References:

U.S. Department of Transportation, Plan to Increase Public Access to the Results of Federally-Funded Scientific Research Results, Version 1.1 December 16, 2015.