High-Speed Inspection or Railroad Track Using Passive Acoustics

Tech ID: 30252 / UC Case 2017-108-0

BACKGROUND

The number one cause of train derailments globally are unidentified track defects which accumulate over time under the heavy loads and weathering to which rail is exposed. For the last 100 years rail inspection has sought to identify these structural defects before they can pose a serious threat to regular rail traffic. Unfortunately, rail inspection has required specialized low-speed testing cars which can only operate at less than 25% the normal speed of a train. These inspection cars must coordinate their work around planned outages of the rail line, impacting normal rail traffic. Due to this inconvenience, rail defects are typically repaired in real-time, as identified, vs. being prioritized as to potential seriousness and repaired in order of likelihood to cause a future accident.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have developed a passive-acoustic rail inspection system which can assess rail health at train speeds, enabling ordinary locomotives and/or passenger/cargo cars to gather information on rail integrity as they operate their normal routes. The passive-acoustic system captures reflected acoustic noise that is native in the wheel/rail interface and interprets changes in the received acoustic profile to categorize developing defects which could further develop into potential hazards. Through real-time rail-health acquisition, a comprehensive assessment of all active rail-lines is now possible, enabling the broad prioritization of rail-repairs in order of their severity and likelihood of causing a near term accident.

APPLICATIONS

This technology is applicable to all passenger and heavy cargo rail lines subject to regular defect inspection.

ADVANTAGES

This technology enables real-time train-speed inspection of rail health and the development of a comprehensive rail maintenance program driven by a greatest-risk/ first-fixed paradigm. This is a dramatic shift away from the present first-found/ first-fixed approach, which can clearly leave maintenance resources pre-occupied with lesser threat repairs.

STATE OF DEVELOPMENT

A working prototype of the invention has been created and tested at the National Rail Research Center in Colorado. A local prototype is also available for demonstration.

INTELLECTUAL PROPERTY INFO

Patent Pending and available to license

RELATED MATERIALS

- Francesco Lanza di Scalea, Xuan Zhu, Margherita Capriotti, Albert Liang, Stefano Mariani, Simone Sternini, Robert Wilson, "High-speed non-contact ultrasound system for rail track integrity evaluation," Proc. SPIE 10600, Health Monitoring of Structural and Biological Systems XII, 106000J (27 March 2018) - 03/27/2019

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	2019-0346408	11/14/2019	2017-108

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OTHER INFORMATION

KEYWORDS

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CATEGORIZED AS

- Sensors & Instrumentation
  - Physical Measurement
- Transportation
  - Other

RELATED CASES

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