

# TR NEWS

## Railroads and Research *Sharing Track*

- Impact Tests and Crashworthiness
- Safety Design for Hazmat Tank Cars
- Track Support for Increased Volumes
- Buying-In to Safety Culture
- Reducing Grade Crossing Incidents
- Implementing Positive Train Control
- Aligning Research Approaches





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# TR NEWS

NUMBER 286

MAY–JUNE 2013

## RAILROADS AND RESEARCH: SHARING TRACK

### 3 INTRODUCTION

#### **Railroads and Research Sharing Track**

*John Tunna and Deborah Butler*

The railroad industry successfully provides safe and efficient freight and passenger transportation largely by implementing research results. Examples highlighted in this issue are drawn from the disciplines of civil, mechanical, and electrical engineering and from the science of human factors.

### 4 **Crash Energy Management: An Overview of Federal Railroad Administration Research**

*David Tyrell and Jeff Gordon*

From 1999 to 2005, the Federal Railroad Administration, working with industry stakeholders, conducted a series of six impact tests to assess the crashworthiness of rail passenger equipment, both conventional and with crash energy management features. The results can improve train crashworthiness significantly.

### 11 **Realizing the Potential of Diesel Multiple-Unit Technology: Research Overcomes Barriers**

*Thomas C. Cornillie*

### 12 **Cooperative Research in Tank Car Safety Design: How Science and Engineering Are Reducing the Risk of Rail Transport of Hazardous Materials**

*Christopher P. L. Barkan, M. Rapik Saat, Francisco González, III, and Todd T. Treichel*

Railroad tank car safety in North America has improved continuously through cooperative testing, research, and standards development by industry and government. Recent design advances have followed three approaches to enhance the safety of tank cars, which transport more than 1.6 million shipments of hazardous materials each year: statistical analysis and optimization of design, structural modeling, and physical testing.

### 20 **Transporting Hazardous Materials by Rail: Identifying Feasible, Lower-Risk Routes**

*David Hunt, David Friedman, Mark Meketon, and Carl Van Dyke*

### 22 **Gaining Track Support to Improve Track Safety, Efficiency, and the Competitiveness of the Rail Industry**

*Ted Sussmann, David Read, John Choros, and Shane M. Farritor*

Track components have been hardened and strengthened to improve durability and performance, but increases in train loads and speeds, coupled with recent extreme weather events, have necessitated constant vigilance for track safety. The authors explore advances in track support and measurement systems that are ensuring a more efficient and safe performance from the track structure.

### 28 **Evaluations of Demonstration Pilots Produce Change: Fourteen Years of Safety-Culture Improvement Efforts by the Federal Railroad Administration**

*Joyce M. Ranney, Michael K. Zuschlag, Jonathan Morell, Michael K. Coplen, Jordan Multer, and Thomas G. Raslear*

To address the slow progress in reducing accidents, the Federal Railroad Administration implemented an evaluation program to identify and test system-based safety-culture interventions. The program produced four approaches and confirmed significant positive results, particularly through change effected collaboratively by labor and management.

### 37 **Fatigue Research Improves Regulatory Effectiveness**

*Thomas G. Raslear and Colleen A. Brennan*

### 38 **Success Factors in the Reduction of Highway–Rail Grade Crossing Incidents**

*Suzanne M. Horton and Marco P. daSilva*

In the past 20 years, safety at public highway–rail grade crossings has improved significantly. A two-phase study identified 11 factors as likely contributors, including rulemakings, advances in the grade crossing and transportation environment, and political, societal, and economic changes. Most of the 11 factors were associated with applications of research findings.



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COVER: Known as the Warm Springs local, a BNSF train leaves the Port of Oakland, California, through the Jack London Square neighborhood; the train provides competitive access to Silicon Valley shippers. (Photo: Thomas C. Cornillie)

# TR NEWS

features articles on innovative and timely research and development activities in all modes of transportation. Brief news items of interest to the transportation community are also included, along with profiles of transportation professionals, meeting announcements, summaries of new publications, and news of Transportation Research Board activities.

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**TR News** (ISSN 0738-6826) is issued bimonthly by the Transportation Research Board, National Research Council, 500 Fifth Street, NW, Washington, DC 20001. Internet address: [www.TRB.org](http://www.TRB.org).

**Editorial Correspondence:** By mail to the Publications Office, Transportation Research Board, 500 Fifth Street, NW, Washington, DC 20001, by telephone 202-334-2972, by fax 202-334-3495, or by e-mail [jawan@nas.edu](mailto:jawan@nas.edu).

**Subscriptions:** North America: 1 year \$55; single issue \$10. Overseas: 1 year \$80; single issue \$14. Inquiries or communications concerning new subscriptions, subscription problems, or single-copy sales should be addressed to the Business Office at the address below, or telephone 202-334-3216, fax 202-334-2519. Periodicals postage paid at Washington, D.C.

**Postmaster:** Send changes of address to *TR News*, Transportation Research Board, 500 Fifth Street, NW, Washington, DC 20001.

**Notice:** The opinions expressed in articles appearing in *TR News* are those of the authors and do not necessarily reflect the views of the Transportation Research Board. The Transportation Research Board and *TR News* do not endorse products or manufacturers. Trade and manufacturers' names appear in an article only because they are considered essential.

Printed in the United States of America.

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*Paul C. Worley*

- 45 **Developing and Implementing Positive Train Control at BNSF Railway**  
*Larry Milhon*

In response to requirements in the Rail Safety Improvement Act of 2008, BNSF Railway is developing and implementing an electronic train management system to prevent train-to-train collisions, overspeed derailments, incursions into work zones, and movements through improperly aligned switches. The author describes the testing and application of research findings and the progress to date.

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**Diverse Motivations Strengthen Rail Research**  
*Anthony Perl*

Railroad research reflects diverse priorities—the varied needs of carriers, shippers, travelers, and government—as well as the distinctive means for seeking new knowledge preferred by industry, government, and universities, the author notes. Each of these orientations brings strengths to measuring and managing research, and aligning the motivations can enhance the effectiveness of rail research.

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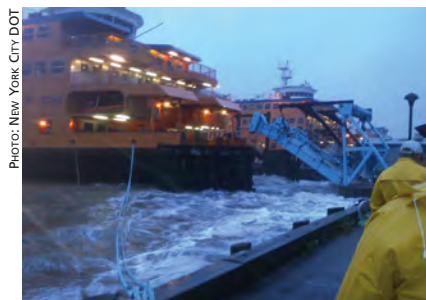
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## **COMING NEXT ISSUE**



Staten Island Ferry crew and landside staff set heavy water moorings in advance of Superstorm Sandy, October 2012, at the Ferry Maintenance Facility in New York City harbor.

The logistics of disaster response and business continuity is the focus of articles in the July–August *TR News*, examining supply chain performance challenges in a crisis, the role of the private sector in maintaining supply chains for relief efforts, recent lessons learned for postdisaster relief logistics, and a state department of transportation's emergency management program—plus reports on the effect of gasoline shortages after a disaster, the role of ferries in rescue efforts, applications of social media in disaster preparation and in response and recovery, contingency planning for airport irregular operations, and more.