

23rd ANNUAL RESEARCH REVIEW, March 27-28, 2018
IMPACT OF INNOVATIVE TECHNOLOGY ON SAFETY AND EFFICIENCY

| TIME | PRESENTATION TITLE | LEAD |
|-----------------|---|--|
| | PLENARY SESSION | |
| 8:00 am | Introduction and Welcome | Lisa Stabler, President TTCI |
| 8:10 am | Keynote Speech | Lance Fritz, CEO, Union Pacific Railroad |
| 8:30 am | AAR Strategic Research Overview | Semih Kalay and Gary Fry |
| 8:45 am | FRA Research Update | Maryam Allahyar, Director, Office of Research, FRA |
| 9:00 am | Railroad Technology Implementation <ul style="list-style-type: none"> • Implementation of Machine Vision Inspection Systems | Hark Braren, Director Mechanical Reliability, BNSF |
| 9:20 am | Railroad Research Implementation <ul style="list-style-type: none"> • Condition Based Maintenance of Railcar Roller Bearings using Predictive Wayside Alerts Based on Acoustic Bearing Detector Measurements | Kyle Mulligan, CP Rail, Assistant Chief Mechanical Engineer |
| 9:40 am | Railroad Research and Implementation <ul style="list-style-type: none"> • International Heavy Haul Technology Benchmarking | Michael Roney, Retired CP General Manager & Special Consultant to IHHA |
| 9:55 AM | International Heavy Haul Association Heavy Haul of Fame Award Presentation | Semih Kalay, Scott Lovelace, CEO IHHA |
| 10:05 am | B R E A K | AAR University Affiliated Lab Posters, Other SRIs |
| 10:20 am | VEHICLE/TRACK SYSTEMS RESEARCH | Jeff Wright, VP, Mechanical, BNSF |
| 10:25 am | <ul style="list-style-type: none"> • Investigation of Rail Failures in Revenue Service Operations | Harry Tournay |
| 10:45 am | <ul style="list-style-type: none"> • Developments in Rail Grinding and Wheel/Rail Friction Control | Scott Cummings |
| 11:05 am | <ul style="list-style-type: none"> • Rolling Contact Fatigue (RCF) Research | Harry Tournay |
| 11:25 am | <ul style="list-style-type: none"> • Advanced RCF Measurement Technologies | Matt Witte |
| 11:40 am | Panel Discussion <ul style="list-style-type: none"> • Team TTCI • Kyle Mulligan, Mike Roney, Hark Braren | Jeff Wright, VP, Mechanical, BNSF |
| 12:00 pm | L U N C H | Poster Presentations, Affiliated Labs, FRA, and SRI posters |
| | MECHANICAL RESEARCH | |
| 1:15 pm | Equipment Research | Rex Beck, General Manager Car, Union Pacific Railroad |
| 1:20 pm | <ul style="list-style-type: none"> • Analytical and Statistical Evaluation of the Effects of Wheel Impact Loads on Wheel Failures | Gary Fry |
| 1:45 pm | <ul style="list-style-type: none"> • Investigation of UDEs and Other Ongoing Brake Research | Scott Cummings |
| 2:05 pm | <ul style="list-style-type: none"> • Performance Evaluation of 1,000,000-Mile Trucks | Russ Walker |
| 2:20 pm | <ul style="list-style-type: none"> • Next Generation High Performance Wheel Steels | Kerry Jones |
| 2:40 pm | Panel Discussion (20 Min) <ul style="list-style-type: none"> • Team TTCI | Rex Beck, General Manager Car, Union Pacific Railroad |

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| 3:00 pm | BREAK | |
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| 3:20 pm | Automated Equipment Inspection | Brian Barr, VP Mechanical, CSX |
| 3:25 pm | <ul style="list-style-type: none"> Effectiveness of Cracked Rim Detectors to Identify Broken Wheels | Witte |
| 3:45 pm | <ul style="list-style-type: none"> Truck Component Inspection Using Machine Vision Systems | Meddah |
| 4:05 pm | <ul style="list-style-type: none"> Evaluation of the Effectiveness of Multi-Scan Hot Bearing Detectors | Steve Belport |
| 4:20 pm | <ul style="list-style-type: none"> Advanced Technologies to Inspect Cracked Axles | Matt Witte |
| 4:35 pm | Panel Discussion (20 Min) <ul style="list-style-type: none"> Team TTCI | Brian Barr, VP Mechanical, CSX |
| | | |
| 4:55 pm | CLOSING REMARKS | Semih Kalay |
| 5:00 pm | A D J O U R N | |
| | | |
| | TRACK AND STRUCTURE RESEARCH | |
| 1:15 pm | Track and Structure Design and Materials | Greg Workman, VP, Engineering, UP |
| 1:20 pm | <ul style="list-style-type: none"> Accelerated Service Testing of New and Improved Track Components | Joseph LoPresti |
| 1:40 pm | <ul style="list-style-type: none"> Implementation of Special Trackwork Designs in Revenue Service | Duane Otter |
| 2:00 pm | <ul style="list-style-type: none"> Engineered Pads for Railroad Track Improvement | Mike McHenry |
| 2:20 pm | <ul style="list-style-type: none"> Revenue service evaluation of rail steels under HAL | Ananyo Banerjee |
| 2:40 pm | Panel Discussion (20 Min) <ul style="list-style-type: none"> Team TTCI | Greg Workman, VP, Engineering, UP |
| 3:00 pm | B R E A K | Poster Presentations, Affiliated Labs, FRA and SRI posters |
| 3:20 pm | Track and Bridge Structure Testing | Phil Merilli, VP, Engineering, NS |
| 3:25 pm | <ul style="list-style-type: none"> Field Evaluation of Hybrid Composite Bridges and Bridge Crack Growth | Duane Otter |
| 3:45 pm | <ul style="list-style-type: none"> Effects of Heavy Axle Loads on Track Substructure | Colin Basye |
| 4:05 pm | <ul style="list-style-type: none"> Effects of Wear on Rail Performance | Harry Tournay |
| | | |
| 4:35 pm | Panel Discussion (20 Min) <ul style="list-style-type: none"> Team TTCI | Phil Merilli, VP, Engineering, NS |
| 4:55 pm | Closing Remarks | Gary Fry |
| 5:00 pm | A D J O U R N | |

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March 28, 2018 Tour Schedule

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|---------------|---|
| 6:00 | Leave Cheyenne Mountain Resort / Ride bus to TTC for Trackwalk |
| 7:00 – 7:25 | Buses from parking lot to Passenger Services Building (PSB) |
| 7:05 – 7:30 | Check in / Registration in PSB |
| 7:15 – 7:45 | Breakfast |
| 7:45 | Welcome and Safety Briefing |
| 8:00 – 8:15 | Buses from PSB to FAST |
| 8:00 – 11:45 | Tour at FAST (details below) |
| 10:45 | Bus from FAST to PSB for demos |
| 10:45 – 11:45 | Demos at PSB (details below) |
| 11:15 | Buses from FAST to PSB for lunch |
| 11:15 | Lunch begins in PSB |
| 12:00 | Last bus from FAST to PSB |
| 11:15 – 12:30 | Buses from PSB to OPS parking lot |
| 12:30 | Lunch and tour end - Bus leaves TTC to return to Cheyenne Mountain Resort |

In-Building Displays, PSB

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|---|---------------------|
| • RCF measurement Systems (EMFI and EMA Techniques) | Witte/Poudel |
| • Wheel/Rail Interface Research | Tournay, Fry, Witte |
| • Composite Tie Fatigue Lab Testing | McHenry |
| • Communication and Train Control | Brosseau |
| • Structural Testing and Analysis | Valdez-Salazar |
| • Unmanned Aerial Vehicles | Joy |
| • Track and Bridge Maintenance Models | Li |
| • TTCI Instrumentation and Laboratory Testing | Mauger |
| • Scientific Software and Dynamics Modeling | Jones |
| • AAR Standards and Inspections | Hannafious |
| • Root Causes of Wheel Failures | Fry, Jones |
| • Brake System Research | Cummings |

Experiment Inspections and FAST Walk

| | |
|---|----------------------------|
| • Phased Array Rail Inspection | Witte/Lindeman |
| • Cracked Wheel Detection | Witte |
| • Machine Vision Vehicle Inspection Systems | Meddah, Lindeman & Vendors |
| • Track Components and Tests | |
| o Premium Rail Steels | Banerjee, LoPresti |
| o Intermediate Hardness Rail Steels | Banerjee |
| o Improved Hardness, HAZ Treated, and Impact Treated Thermite Welds | Archuleta |
| o Effects of Moisture on Ballast Degradation | Wilke/Gao |
| o The New Wood and Composite Tie and Fastener Tests | McHenry |
| o Flange Bearing Ramp Materials | Wilk |
| o Steering Switch Points and Heavy Point Frog STW | Bakkum |
| o Frog Repair Tests | Bakkum |
| o Steel Bridge Tests | Otter/Dick |
| o Improved Hot Box Detection | Belport |
| o Machine Vision Inspection Systems | Meddah, Witte |
| o Cracked Rim Detector System | Witte/Lindeman |
| o Improved Track Inspection Systems | Various Vendors |
| o UAV demo | Rich Joy |