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Florida's Brightline service offers hope for HSR advocates.

Photo: Virgin Rail USA/Brightline

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Fix What's Broken First



In 1910, the Pennsylvania Railroad inaugurated one of the most impressive, massive railway engineering projects of all time: The New York Improvements, linking New Jersey and the Borough of Queens with Manhattan.

The project consisted of two tunnels under the Hudson River, four under the East River, the Pennsylvania Station complex in the area of Manhattan known as "Hell's Kitchen," the Sunnyside Yards storage and maintenance facility in Queens, and numerous other elements, among them Portal Bridge, a two-track swing span in the New Jersey Meadows over the Hackensack River. Originally third-rail electrified, it was converted to AC catenary in the 1930s.

More than a century later, the infrastructure the PRR so brilliantly designed and built accommodates hundreds of thousands of daily New Jersey Transit, Long Island Rail Road and Amtrak passengers. Keeping it in a state of good repair is a monumental and expensive task shared by the three railroads that operate it—some would say almost a miracle, given its age.

For years, this critical piece of the Boston-to-Washington Northeast Corridor has needed a major overhaul, as well as expansion. The Hudson River ("North River") Tunnels, heavily damaged by Superstorm Sandy in 2012, are within five years of failure by some accounts—meaning that they will have to be shut down before a

catastrophe like a collapse occurs. They need to be overhauled—*now*, not after new tunnels have been built to supplement them as part of the politically charged, multi-billion-dollar Gateway Project.

By some estimates, construction of new Hudson River Tunnels—again, not to replace the original PRR tubes—will take 10 years. That's five years longer than when the existing tunnels are expected to give up PRR President Alexander Johnston Cassatt's ghost.

The controversy surrounding Gateway has mostly focused on fixing what's broken first, or fixing it after new structures are in place.

USDOT Secretary Elaine Chao—in my opinion, counseled by Ron Batory, her wise, experienced Federal Railroad Administrator—supports repairing the existing structures first. Last month, at a House Appropriations Committee hearing, she said: "The Department is working closely with Amtrak to advance rehabilitation work on the existing Hudson Tunnels. Given the time, cost and complexity of building new tunnels, the Department is working with Amtrak to design and validate a faster, more cost-effective method to improve safety and functionality, as the first order of business. So, beginning rehab work in the near term is the right move, not waiting years for the construction of new tunnels beforehand."

Good choice. Makes sense. Now go do it.

WILLIAM C. VANTUONO
Editor-in-Chief

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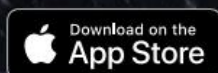
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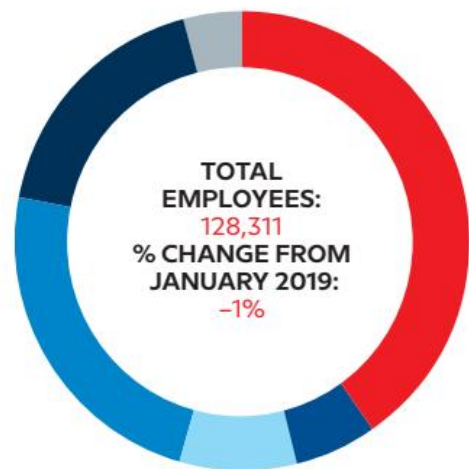
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"U.S. Rail Volumes Fell Again in January, but There Were Glimmers of Hope"

"At first glance, January's U.S. rail traffic numbers look like more of the same we've been seeing for many months," the AAR noted last month. "But there are glimmers of hope in the January numbers. Nine of the 20 carload commodity categories we track each month saw gains in January 2020. That's the most since January 2019. Moreover, for several carload commodities that saw carload declines in January 2020, the declines were not as bad as they were in other recent months. It's still too early to say the worst for rail traffic is behind us, but perhaps a light at the end of the tunnel is beginning to be visible."

RAILROAD EMPLOYMENT, CLASS I LINEHAUL CARRIERS, JANUARY 2020 [% CHANGE FROM JANUARY 2019]



- **Transportation (train and engine)**
51,709 (-1%)
- **Executives, Officials, and Staff Assistants**
7,608 (-1%)
- **Professional and Administrative**
10,849 (+1%)
- **Maintenance-of-Way and Structures**
30,152 (-1%)
- **Maintenance of Equipment and Stores**
22,647 (-1%)
- **Transportation (other than train & engine)**
5,346 (-1%)

Source: Surface Transportation Board

TWO-YEAR EMPLOYMENT DECLINE AT 12%

Figures released by the STB show Class I total railroad employment again dropped 1% in January 2020, measured against January 2019. This figure has remained constant for more than one year. Five of six employment categories experienced virtually the same percentage drop, 1%, when rounding is taken into account. This most certainly indicates headcount reductions attributable to PSR, but declining traffic most likely is a larger factor. But looking at the bigger picture, total employment has dropped 12% over the past two years—from 145,592 in January 2018.

TRAFFIC ORIGINATED CARLOADS

FIVE WEEKS ENDING FEBRUARY 1, 2020

MAJOR U.S. RAILROADS			
BY COMMODITY	JAN. '20	JAN. '19	% CHANGE
Grain	98,173	111,081	-11.6%
Farm Products ex. Grain	4,255	4,450	-4.4%
Grain Mill Products	45,804	44,221	3.6%
Food products	28,218	28,907	-2.4%
Chemicals	161,567	158,291	2.1%
Petroleum & Petroleum Products	67,014	66,313	1.1%
Coal	348,532	404,414	-13.8%
Primary Forest Products	5,351	5,229	2.3%
Lumber and Wood Products	15,606	16,372	-4.7%
Pulp and Paper Products	28,113	29,516	-4.8%
Metallic Ores	24,667	23,244	6.1%
Coke	18,860	18,576	1.5%
Primary Metal Products	44,667	46,129	-3.2%
Iron & Steel Scrap	18,722	17,790	5.2%
Motor Vehicles & Parts	67,940	72,259	-6%
Crushed Stone, Sand, & Gravel	88,466	93,439	-5.3%
Nonmetallic Minerals	18,527	19,936	-7.1%
Stone, Clay & Glass Products	33,784	32,849	2.8%
Waste & Nonferrous Scrap	17,124	18,042	-5.1%
All Other Carloads	30,343	27,785	9.2%
TOTAL U.S. CARLOADS	1,165,733	1,238,843	-5.9%
CANADIAN RAILROADS			
TOTAL CANADIAN CARLOADS	390,501	404,554	-3.5%
COMBINED U.S./CANADA RR	1,556,234	1,643,397	-5.3%

INTERMODAL

FIVE WEEKS ENDING FEBRUARY 1, 2020

MAJOR U.S. RAILROADS			
BY COMMODITY	JAN. '20	JAN. '19	% CHANGE
Trailers	91,323	116,601	-21.7%
Containers	1,153,757	1,999,560	-3.8%
TOTAL UNITS	1,245,080	1,316,161	-5.4%
CANADIAN RAILROADS			
Trailers	1	0	-
Containers	329,397	325,704	1.1%
TOTAL UNITS	329,398	325,704	1.1%
COMBINED U.S./CANADA RR			
Trailers	91,324	116,601	-21.7%
Containers	1,483,154	1,525,264	-2.8%
TOTAL COMBINED UNITS	1,574,478	1,641,865	-4.1%

Source: Rail Time Indicators, Association of American Railroads

TOTAL U.S./CANADIAN CARLOADS, JAN. 2020 VS. JAN. 2019



1,556,234

JANUARY 2020

1,643,397

JANUARY 2019

SHORT LINE AND REGIONAL TRAFFIC INDEX

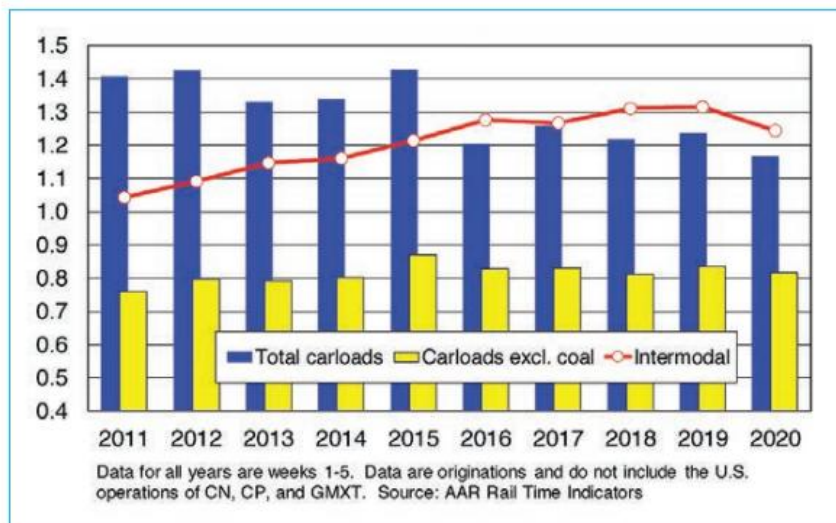
CARLOADS

BY COMMODITY	ORIGINATED JAN. '20	ORIGINATED JAN. '19	% CHANGE
Chemicals	57,764	53,399	8.2%
Coal	16,309	21,140	-22.9%
Crushed Stone, Sand & Gravel	21,530	22,974	-6.3%
Food and Kindred Products	11,068	11,548	-4.2%
Grain	23,384	25,482	-8.2%
Grain Mill Products	8,982	7,542	19.1%
Lumber and Wood Products	8,723	8,936	-2.4%
Metallic Ores	2,760	3,307	-16.5%
Metals and Products	18,632	19,514	-4.5%
Motor Vehicles and Equipment	10,043	9,281	8.2%
Nonmetallic Minerals	2,833	2,535	11.8%
Petroleum Products	2,312	2,330	-0.8%
Pulp, Paper and Allied Products	21,580	21,127	2.1%
Stone, Clay and Glass Products	12,800	11,872	7.8%
Trailers / Containers	39,950	42,482	-6%
Waste and Scrap Materials	10,434	10,279	1.5%
All Other Carloads	71,181	78,136	-8.9%

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TOTAL U.S. CARLOADS AND INTERMODAL UNITS, 2011-2020

(YEAR-TO-DATE THROUGH JANUARY 2020, IN MILLIONS)



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Alstom Acquiring Bombardier Transportation

ALSTOM HAS SIGNED a memorandum of understanding (MOU) with Bombardier and pension fund Caisse de Dépôt et Placement du Québec (CDPQ) to acquire Bombardier Transportation, ending weeks of speculation about a proposed tie up between the two railway equipment manufacturers.

Alstom will acquire 100% of Bombardier Transportation's shares at between Euros 5.8 billion and 6.2 billion. Under the deal, CDPQ, which currently holds a 32.5% stake in Bombardier Transportation, will become Alstom's largest shareholder with around 18% of capital. CDPQ will reinvest about Euros 2 billion in Alstom plus an additional Euros 700 million. Bouygues will remain a shareholder in Alstom with around 10% of capital.

The signing of the MOU was unanimously approved by the boards of both Alstom and Bombardier. The transaction is fully supported by CDPQ and Bouygues.

An extraordinary general meeting to vote on the reserved capital increases and the rights issue will take place no later than Oct. 31, 2020. This will be followed by a rights issue between the first half of

2020 and the first half of 2021.

The transaction is subject to approval from relevant regulatory and anti-trust authorities, and closure of the deal is expected in the first half of 2021. However, this will be a challenge bearing in mind that the planned merger between Alstom and Siemens Mobility was overturned by the European Commission in early 2019 over the potential impact of the deal on competition in the signaling and high-speed rolling stock markets.

The acquisition of 100% of Bombardier Transportation shares will be paid through a mixture of cash and new Alstom shares. The total equity component is about Euros 5 billion, of which Euros 2 billion will be raised on the market. Euros 2.6-2.8 billion of equity will be provided by CDPQ for a fixed price of Euros 44.45 per Alstom share. Bombardier will provide Euros 500 million in equity for a fixed price of Euros 47.50 per Alstom share. A Euros 2.4 billion bridging facility will be fully underwritten by banks and refinanced by equity of up to Euros 2 billion to be raised through a rights issue and new debt of about Euros 400 million.

FRA Issues RRP Final Rule

THE FEDERAL RAILROAD ADMINISTRATION (FRA) has issued a final rule—49 CFR Part 271 [Docket No. FRA-2009-0038, Notice No. 7] RIN 2130-AC11—launching the Risk Reduction Program (RRP) “to support an increasing standard of safety for the nation’s freight railroads.” The final rule is effective April 20, 2020.

The rulemaking, which implements a mandate required by the Rail Safety Improvement Act of 2008, requires “all Class I freight railroads and Class II and III freight railroads with inadequate safety performance to develop and implement a Risk Reduction Program to improve the safety of its operations,” the rulemaking says.

FRA describes an RRP as “a comprehensive, system-oriented approach to safety that determines a railroad operation’s level of risk by identifying and analyzing applicable hazards, and involves developing plans to mitigate, if not eliminate, that risk.”

“Each railroad has flexibility to tailor an RRP to its specific railroad operations, shall implement its RRP under a written RRP plan that FRA has reviewed and approved, and shall conduct an annual internal assessment of its RRP,” FRA noted.

“FRA will audit a railroad’s RRP processes and procedures,” the agency noted. “Other railroads may proactively submit RRP Plans to FRA for approval. Railroads must involve employees in implementation of the RRP including identification of risks and hazards.”

“Railroads’ ongoing evaluation of their asset base and employee performance associated with operations and maintenance, under FRA regulations, can now follow a more uniform path of standardization toward further reducing risks and enhancing safety,” FRA Administrator Ronald L. Batory said.



Shell Investing in Masabi FPaaS

Masabi, a global developer of FPaaS (Fare Payments-as-a-Service) for public transport, last month announced that it has finalized an investment from Shell, among the world's largest oil and gas companies. "This investment will help support the global expansion of Masabi's Justride platform, which is bringing cutting-edge ticketing technology and enabling Mobility-as-a-Service (MaaS) for public transport operators and authorities of all sizes around the globe," the company said. Masabi and Shell did not disclose the terms of the investment.

WORLDWIDE

WABTEC Corp. has struck gold in Germany—DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen, or "German Sustainable Building Council") Gold. The company has broken ground in Bochum on a 20,000-square-meter facility for developing, manufacturing and/or maintaining transit vehicle brakes and couplers. Described as "green and state-of-the-art," the plant will be DGNB Gold-certified "in recognition of its sustainable and innovative design" when completed in third-quarter 2020.



NORTH AMERICA

TNW Corp. a Dallas-based privately held operator of short line railroads and transportation logistics services, has acquired a multi-commodity bulk material handling and storage facility located in Harwood, Tex. The 20-acre facility meets a growing demand for transloading, logistics services and product storage, TNW said. The facility is operated by TNW Logistics and is rail-served by Texas Gonzales and Northern Railway (TXGN), a TNW Company. Commodities transloaded on-site include agricultural products, sand and raw materials. The facility offers high-volume/high-speed loading and storage for rail-to-truck services. Located between San Antonio and Houston, it is close to I-10, with a direct Union Pacific connection. Total storage capacity is 414,000 cubic feet. This acquisition allows us to serve our clients more efficiently and cost-effectively," said Wade Hoffmann, TNW Vice President of Marketing and Sales. "We are streamlining our transloading and logistics services to offer customers a wider variety of value-added solutions to their storage and shipping needs."

Focused Technology Solutions, Inc. (a Marmon/Berkshire Hathaway Company) reports that the SpikeEase, the company's flagship product, is continuing to pull in orders from multiple Class I railroads. "Business is about having a great product, great engineering and great customer service," FTS President Peter Bartek said. "We at Focused Technology Solutions start with our customers' experience and then work our way toward the technology—not the other way around. Our customers have reported an increase in productivity, as the tool pulls spikes in just three to seven seconds and weighs less than 30 pounds."

Stone Canyon Industries Holdings LLC announced that its SCI Rail Holdings LLC has, through its subsidiary, **A. Stucki Co.**, acquired **Salco Products, Inc.**, a supplier of circular hatch covers, valves and metal- and plastic-based components for hopper cars, tank cars and over-the-road trailers, and corrosive resistant parts for plant processing equipment. Salco will remain unchanged and will operate under the Salco name. The company will continue to operate out of its facilities in Lemont, Ill., and Houston, Tex.

A Reinvigorated Operation Lifesaver

Welcome back, Operation Lifesaver. Visibly restored is the vim and vigor vital to your task. While you were regrouping, horrors continued at highway-rail grade crossings and on the steel rails that too often are narcotizing agents for otherwise safety-conscious hikers, joggers, dog walkers, photographers, short-cut seekers, snowmobilers, those fishing, midday wanderers and the permanently idle.

Because daily more than two people die in grade crossing accidents and trespassing, with five more hospitalized owing to related injuries, and when every three hours a person or vehicle is hit by a train, the OLI job description is memorialized in blood. Today and tomorrow, as yesterday, there must be resolute determination to change human behavior.

Yes, Operation Lifesaver Inc. (OLI) is a small non-profit—just four full-time employees—but as Daniel Webster memorably told the Supreme Court in 1819 in defending Dartmouth College's private charter, "there are those who love it."

Demonstrating similar love are some 2,000 OLI volunteers across America, each carrying a simple slogan, "Always Expect A Train." Accompanying that message is education on train safety, the law as it applies to grade crossings and rail private property, encouragement that those laws be enforced, and pleas for improved civil engineering to make rail crossings safer.

Indeed, with more than 210,000 public grade crossings nationwide, vehicle-miles

traveled setting annual records, the magnetizing attractiveness of deceptively deadly rail rights-of-way when the iron horse isn't visible, a proliferation of attention-diverting personal digital devices, and that it takes a moving train a mile or more to stop, it is understandable that safety awareness messaging is an immense challenge.

Impressively, there appears a renewed OLI commitment evidenced in three relatively new arrivals—the three collectively injecting newfound eagerness, rail-safety expertise and sorely needed supplemental private sector funding to give OLI better tools to pursue more effectively its mission.

OLI Executive Director Rachel Maleh, with 25 years in non-profit management and public outreach, is focusing those skills on OLI's grassroots network of state program directors and their volunteers. Among them is retired history professor Rudolph Daniels, author of "Trains Across the Continent" and "The Great Railroad War," who travels at his own expense thousands of miles across Iowa annually to make OLI-endorsed presentations at schools and before civic groups and to first responders and police.

Maleh's leadership has boosted by 55% to 42,000 the number of OLI followers on social media such as Facebook and Twitter, while an upgraded oli.org website is generating 600,000 annual views. Complimentary print, television and radio Public Service Announcements are reaching millions of Americans annually. Direct presentations, as well as on-line interactive instruction and videos, reach 2 million annually at schools, state fairs and in classes for first responders, police and commercial vehicle drivers.

Providing guidance to OLI is a board of directors representing railroads, rail suppliers and motor coach operators, and chaired by Jo Strang, Senior Vice President, Safety and Regulatory Affairs at the American Short Line and Regional Railroad Association. A former National Transportation Safety Board Rail Division associate director, and later the Federal Railroad Administration's chief safety officer, Strang's expertise has won wide acclaim from labor unions, and she long has been consulted for

“SAFETY AWARENESS MESSAGING IS AN IMMENSE CHALLENGE.”

guidance by congressional committees.

The third OLI reinforcement is former Conrail operations executive and now entrepreneur Henry Posner III, chairman of Railroad Development Corp., whose global rail holdings include Iowa Interstate Railroad. Continuing a decades-long family tradition of compassionate capitalism, the Posner Foundation has made what Maleh terms a "significant" financial contribution to help leverage OLI's federal and state grants and Class I railroad contributions. Notably, Posner established an OLI program on his Estonia rail operation, and is extending it to rail holdings in Colombia, Guatemala and Peru.

American railroads have teamed with OLI in asking Congress to increase grants appropriated to a variety of federal programs that fund grade crossing active warning devices, provide direct assistance for OLI educational materials and activities, and aid states in eliminating at-grade highway crossings, including construction of under- and over-passes.

"OLI," says Maleh, while impatiently sharing slide decks, data-rich charts and media packages, "is all about safer choices near tracks and trains." ■

RACHEL MALEH'S
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GLASS HALF-FULL, OR HALF-EMPTY?

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What does the U.S. have to report?**

BY ALBRECHT P. (AL) ENGEL, PRINCIPAL, AL ENGEL CONSULTING AND CHAIR, APTA H-S&IPR COMMITTEE; KENNETH G. SISLAK, VICE PRESIDENT, AECOM AND PUBLISHER, SPEEDLINES; AND ERIC C. PETERSON, PRINCIPAL, TRANSPORTATION POLICY CONSULTANT AND ASSOCIATE PUBLISHER, SPEEDLINES

In March 2010, the Amtrak Board of Directors authorized the creation of a Department of High Speed Rail reporting to the CEO. Its charge was to advance a vision of next-generation high-speed rail (HSR) for the Amtrak Boston-to-Washington corridor and also advance other high-priority corridors such as Orlando-to-Tampa. It felt that we were finally on the cusp of a new era or renaissance in passenger rail. It seemed that the stars had finally aligned with a uniform national government in place and critically important authorizing and funding legislation in place to facilitate a meaningful national program. In fact, the Federal Railroad Administration was busy preparing a national rail plan to identify corridors and

routes for implementation.

The enactment of the Passenger Rail Investment and Improvement Act (PRIIA) of 2008, and the subsequent appropriation of upwards of \$10 billion for passenger rail improvements in the American Recovery and Reinvestment Act (ARRA) of 2010, launched implementation plans for new routes as well as existing service upgrades. It was also a real plus that the California citizens approved Proposition 1A authorizing \$9 billion in bonding for the San Francisco-to-Los Angeles HSR project. This provided substantive matching money for federal grant applications netting California billions in federal money.

The global disposition in 2010 for HSR was highly favorable with China making

final plans to host the 7th World HSR Congress in Beijing in December 2010. China had two years of operating experience with Beijing-Tianjin HSR line (73 miles, 205 mph) launched in the summer of 2008 for the Beijing Olympics. China had a highly reliable proof of concept and was already under way building out a national network connecting its major cities, reducing intercity trips as much as 70% or more. The Japanese were already advancing their plans to celebrate 50 years of accident-free Shinkansen high-speed passenger rail service.

Ten years later, China has achieved the remarkable milestone of completing and putting into service more miles of high-speed passenger rail service than all of the

rest of the world's nations have built in the past 50 years. And once again, China is hosting another UIC HSR Congress (the 11th) in Beijing, June 30-July 3, 2020. It can now profile an "eight-vertical, eight-horizontal" HSR grid that has been extended to 32 of the country's 34 provincial-level administrative divisions and reached 22,000 miles (35,000 km) in total length, accounting for about two-thirds of the world's HSR system in commercial service. The HSR building boom continues with the network set to reach 24,000 miles (38,000 km) by 2025, completing its ambitious grid network.

The APTA (American Public Transportation Association) H-S&IPR (High Speed & Intercity Passenger Rail) Committee is represented on the UIC Program Planning Committee and has been for many years. So what will we have to report? The near-ending of the 2020 winter is bringing with it a proposal from the U.S. House of Representatives to appropriate \$55 billion over the next five years to fund improvements to freight rail networks across the continent that might some day allow passenger trains to operate at speeds up to 160 mph.

But as dreary as this situation seems for the U.S., it is a far cry from where the nation was 10 years ago, and there is reason to be optimistic that things will only get better.

Since the enactment of PRIIA in 2008, and the subsequent appropriation of upwards of \$10 billion for passenger rail improvements in the ARRA of 2010, significant progress has been made to update and expand the capacity of the nation's passenger rail service. In corridor after corridor, track upgrades are occurring, new track capacity is being built, new rolling stock is being built, and new passenger rail service is coming to life.

In the Northeast Corridor, plans are being drawn to eliminate critical bottlenecks, straighten alignments and acquire state-of-the-art passenger rolling stock that will allow faster, more frequent, more reliable service between Boston and Washington. Along the corridor, New England states have upgraded to quality and frequency of service like the Hartford Line that give travelers new mobility options.

To the south of Washington, Virginia and the Carolinas are adding new service

and capacity that will someday allow electrified passenger trains to operate from Boston to Raleigh and beyond. Further south, mayors, governors and state legislators are collaborating to reinstate passenger rail service across Louisiana, Alabama, Mississippi and Florida that was wiped away from hurricanes 15 years ago. And entrepreneurs in Florida have opened brand new passenger rail service from Miami north.

Similar progress is being made in the Midwest, in Texas, in the Rocky Mountain states, in the Northwest and in California.

These advances, while not jaw-dropping, are significant, and reflect the efforts of legions of volunteers and hired advocates who have, for many decades, labored to convince federal, state and local regulators and lawmakers of the merits and benefits of passenger rail, and especially higher-speed/high-speed passenger rail as a mobility option to other popular modes of transportation.

One of the leading voices in this on-going campaign has been the APTA H-S&IPR committee. Formed with APTA in the early

2000s, the original members of the committee had earlier formed the U.S. High-Speed Ground Transportation Association and merged it with APTA. From its emergence with APTA, the H-S&IPR committee has become one of the largest APTA committees, and has membership that includes passenger rail operators and owners, state rail entities, engineering firms, labor representatives, rolling stock and locomotive manufacturers, policy consultants and other passenger rail advocates.

MAKING THE CASE

The need for public investment in intercity passenger rail, especially HSR, has been based on arguments relating to economic development, environmental impact, energy intensity, land use efficiency and more. While convincing in most modern industrialized nations running the gamut from Japan, France, Spain, Germany to China, HSR has experienced a global build-out of some 30,000 miles.

In the U.S. (and even in Canada), HSR has been a much harder sell. Here, many of our political leaders have the



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mistaken notion that intercity passenger rail should pay for itself from the farebox or the direct proceeds from the return on investment (ROI). Highway and aviation public investment are not held to the same standard.

The H-S&IPR Committee has recognized this shortcoming by undertaking research that quantifies the total ROI to the community. In October 2017, APTA released a Phase I study establishing that H-S&IPR Committee projects can have broad societal benefits that go far beyond time and cost for users. A large set of individual impact and benefit factors that can be applicable for H-S&IPR projects are identified. For each one, it defines impact metrics and describes how information and tools can be applied to measure or estimate the impact. It then lays out a framework for classifying and portraying benefits from public policy perspectives relevant for constructing a “business case” for H-S&IPR projects. The practical application of this approach is illustrated via case studies. The report also summarized traditional approaches to estimating ROI and their limitations.

A Phase II is now planned that will

The next Surface Transportation Reauthorization Act must maintain the current Rail Title.

develop a comprehensive and prescriptive methodology for determining ROI for H-S&IPR projects. The study will also quantify the economic benefits of linking mega-regions. Both the AASHTO (American Association of State Highway and Transportation Officials) Rail Council and the States for Passenger Rail Coalition have recognized the value of this project, especially given the current emphasis on regions and corridors.

The committee has worked within APTA to help shape legislation and policy recommendations, and has called on Congress

annually to seek support for legislative authorization and appropriations. The committee also works with other organizations like the Rail Passengers Association (ARP), States for Passenger Rail (SFPR), the AASHTO Committee on Rail, One-Rail, and the Intercity Passenger Rail Committee of the Transportation Research Board (TRB), as well as a broad range of non-rail organizations like the U.S. Chamber of Commerce, the American Association of Retired Persons (AARP), utility interests and environmental advocates.

In the first 15 years of the 21st century, the APTA H-S&IPR Committee celebrated significant victories with the inclusion of nearly \$10 billion in President Obama's ARRA initiative and subsequent budget requests—the largest U.S. investment in passenger rail since the authorization and funding of the Transcontinental Railroad in the mid-1800s—and the passage of the Fixing America's Surface Transportation (FAST) Act in 2015, which contained the first-ever Rail Title in a surface transportation authorization bill.

The FAST Act Rail Title provided many important policy achievements for the freight and passenger rail industries, and



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demonstrated the significance of rail to the nation's mobility. The measure also provided opportunities for both the private and public sectors to access a variety of funding and financing mechanisms that could underwrite the further renewal of America's rail network.

FAST ACT REAUTHORIZATION

Now, the APTA H-S&IPR Committee is working within APTA and collaborating with other traditional and non-traditional partners to ensure that the Rail Title in the FAST Act is renewed in the next Surface Reauthorization act, and is urging congress to establish a permanent funding mechanism that will assure on-going support for intercity and high-speed passenger rail, including Amtrak, in much the same way that other transportation modes have been funded for decades. Among the committee's requests to Congress are:

- Maintain a Rail Title in the next Surface Transportation Authorization act.
- Create a Passenger Rail Trust Fund, and identify new, long-term, dedicated revenues to significantly increase intercity passenger rail investment.
- Authorize Qualified Tax Credit Bonds

for surface transportation projects under section 54A of the tax code.

- Expand the eligibility of mass-commuting facility PABs (Private Activity Bonds) beyond their current use (construction of rail and bus infrastructure and facilities) to include acquisition of rolling stock.
- Remove mass-commuting facilities from the federally-imposed state volume cap for PABs, thereby aligning these public transportation and intercity passenger rail activities with airports, docks and wharves, which are not subject to the PAB state volume caps.
- Reduce the "capable of 150 mph" speed requirement for high-speed intercity passenger rail facility PABs to allow more projects to be eligible, especially privately-operated passenger rail services running on shared rights-of-way with freight railroads.
- Establish a public transportation version of Economic Opportunity Zones, or its equivalent, in which investors in real estate projects in the vicinity of a public transportation or intercity passenger rail station, multi-modal terminal or facility would be eligible for certain tax benefits (tax credits and/or accelerated depreciation) upon making an investment that benefits

the local agency for capital purposes in an amount equal to a specified percentage of the real estate investment.

- Create tax code incentives to attract "tax-oriented equity" into public transportation and intercity passenger rail projects (i.e., equity investments whose return is based principally or solely on federal tax benefits).
- Require the Department of Transportation (DOT) to consistently apply the requirement that federal loans be considered local match across all DOT programs.
- Specify in statute that Railroad Rehabilitation and Improvement Financing (RRIF) loans be used for the non-federal share of a project.
- Authorize Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grant funds to be used to fund the subsidy cost of federal credit assistance under RRIF, similar to the authority to use BUILD grants for TIFIA (Transportation Infrastructure Finance and Innovation Act) subsidy cost.
- Permanently extend eligibility for TOD (transit-oriented development) projects for RRIF loans and loan guarantees.
- Require the Secretary of Transportation to repay the credit risk premium for recipients that have satisfied all obligations

attached to RRIF loans.

- Authorize federal funds for credit risk premiums under RRIF to leverage RRIF loan assistance.

- Provide specific funding to commuter railroads for PTC (Positive Train Control) implementation and ongoing operations and maintenance costs incurred after completing PTC implementation under the

Consolidated Rail Infrastructure and Safety Improvements (CRISI) program.

- Provide specific funding to commuter railroads for passenger rail-highway grade crossing safety.

- Authorize advance acquisition of railroad right-of-way (ROW) similar to advance acquisition permitted for highway and public transit projects.

- Authorize a study to address the actions needed to upgrade and restore intercity passenger rail for 21st century demands.

- Restore the Railroad Cooperative Research Program and authorize appropriations to support a broad range of railroad research needs.

- Mandate that intercity passenger rail grants will be funded in part with new, long-term dedicated revenues to significantly increase passenger rail investment. These passenger rail revenues will be deposited in a Passenger Rail Trust Fund and will not compete with revenues dedicated to the Highway Trust Fund.

- Require that Surface Transportation Authorization Recommendations authorize funding for four specific commuter and intercity passenger rail programs including CRISI Grants; Federal-State Partnership for State of Good Repair Grants; High-Performance Intercity Passenger Rail Grants; and the Railroad Cooperative Research Program.

- Authorize that the CRISI and Federal-State Partnership for State of Good Repair Grants grow at the same general rate (i.e., 16.1% per year) as public transit capital funding.

- Include specific authorizations of funding within the CRISI Grant program for operations and maintenance of PTC on commuter railroads (\$160 million per year); and Passenger Rail-Highway Grade Crossing Grants for commuter railroads and other operators of high ridership corridors (\$250 million per year).

- Authorize \$21 billion for High-Performance Intercity Passenger grants over a six-year period.

- Fund commuter and intercity passenger rail grants through a combination of new contract authority and General Fund authorizations.

- Establish contract authority derived from the newly established Passenger Rail Trust Fund, with the percentage of funding derived from contract authority increasing each fiscal year (growing from 10% of funding in FY 2021 to 60% in FY 2026).

- Require that during the authorization period, the Authorization Recommendations include \$13.6 billion of contract authority for commuter and intercity passenger rail grants.

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of the H-S&IPR Committee will descend on Washington this spring to encourage members of congress to fashion reauthorization legislation and to seek its passage before the current FAST Act expires this coming September.

FROM POLICY FORUM TO MULTI-DAY CONFERENCE

Because congressional advocacy is so critical to advancing legislative and regulatory support, recruiting and education an army of advocates is vital. Over the past six years, the committee has held a series of policy forums that have focused on issues ranging from achieving the tipping point for making intercity passenger rail competitive with the rest of the world, to examining the economic impact of high-speed and intercity passenger rail.

Every June, APTA holds a Rail Conference, which this year takes place in San Francisco June 14-17. It's a multi-modal (heavy rail, light rail, commuter rail and intercity rail) that includes sessions on

domestic and international HSR developments. Since we are on the West Coast, the California project will be profiled along with other public and private project updates. The H-S&IPR Committee holds a regular committee meeting on the Sunday morning of the conference.

In 2021, the committee will take a major leap, hosting a two-day conference in Philadelphia on April 7-9, at the Philadelphia Marriott. The conference will feature leading passenger rail advocates from throughout the U.S. and the world, myriad workshops and panel presentations on subjects such as rail planning, economic impact, rail funding and financing, project delivery, shared right-of-way, public policy, technology and innovation, advocacy, workforce development and global competition.

2021 will also mark the 50th anniversary of Amtrak, and it is hoped that Amtrak's new *Acela Express* NEC trainset will be available for conference delegate inspection.

H-S&IPR Committee members are busy organizing the conference and preparing

an agenda sure to be of interest to industry experts as well as non-traditional partners who may see in passenger rail, and especially HSR, new mobility options that are economical, climate-friendly, reliable and very customer-conscious.

THE FUTURE OF PASSENGER RAIL IN AMERICA

In the early 2000s, Amtrak was struggling to attract Congressional support and ridership. Over the past two decades, Amtrak's ridership has reached record levels, and Congressional support for Amtrak and passenger rail continues to grow. Today, on the eve of writing the next Surface Transportation Reauthorization, it is incredible to see the number of states and corridors that are aggressively pursuing the renaissance of passenger rail. In fact, by a recent count, there are more than \$260 billion in rail development projects in the pipeline. Over the next decade, it's easy to see a very bright future for U.S. passenger rail. ■

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Jeffrey D. Knueppel, General Manager, SEPTA (ret.), delivering the keynote address at the 2019 Big Data in Railroad Maintenance Planning Conference.

BIG DATA JOURNEY

How the industry is moving from collection to analysis to predictive use.

BY ALLAN M ZAREMBSKI, PH.D, PE FASME, HON. MBR. AREMA; PROFESSOR OF PRACTICE AND DIRECTOR, RAILROAD ENGINEERING AND SAFETY PROGRAM, DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING, UNIVERSITY OF DELAWARE-NEWARK

The December 2019 Big Data in Railroad Maintenance Planning Conference, held at the University of Delaware, continued to highlight the advances the railroad industry is making in addressing the growing volume of data from inspection and other systems, and learning how to apply it. This was clearly shown in the keynote address, where the keynote speaker, Jeffrey D. Knueppel, P.E., now retired as General Manager of Southeastern Pennsylvania Transportation Authority (SEPTA) presented how his agency is already using a range of data collection, data analysis and data management tools in the everyday running of SEPTA. In fact, he titled his presentation “SEPTA’s Journey Into Big Data” [1] and presented a range of Big Data applications that are currently implemented or being implemented on SEPTA.

Knueppel noted that SEPTA has started its move away from manual data management and into the realm of automated data collection and analysis, and is moving toward the

next step of using data in a predictive manner, in five major focus areas:

- Customer experience.
- Workforce development and support.
- Rebuilding the system.
- SEPTA as a business.
- Safety and security.

As can be seen in Figure 1, Data Analytics is viewed by SEPTA as being fundamental to

making improvements in all five of these focus areas. Knueppel went on to show how Big Data and corresponding Big Data tools and techniques are being applied within SEPTA. These data analytic tools have been developed internally and by several conference sponsors and presenters. Thus, for example, in the key conference areas of maintenance management for rolling stock and track, Knueppel gave

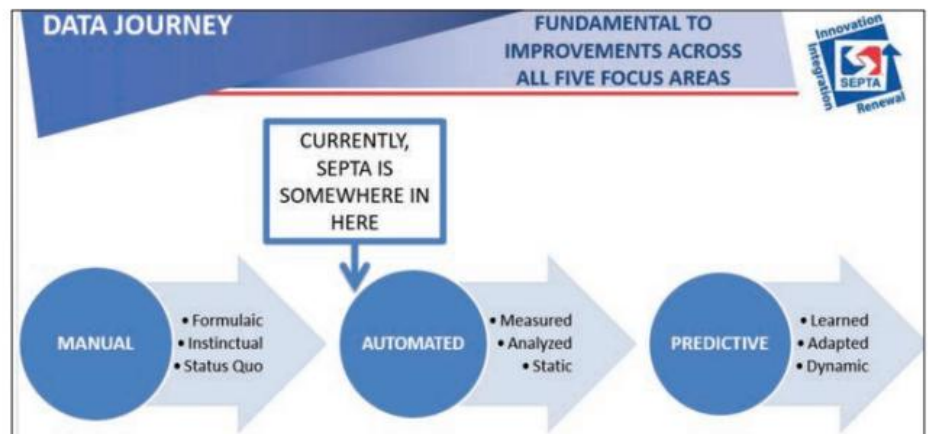


FIGURE 1: SEPTA’s Journey Into Big Data [1].

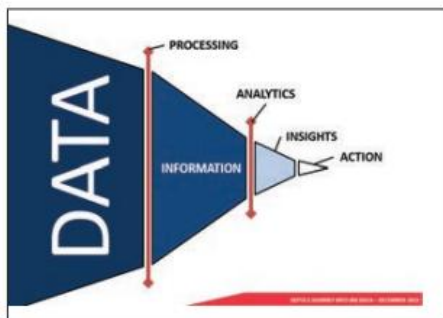


FIGURE 2: Converting Data Into Action [1].

specific application examples:

- Real-time remote condition monitoring, with automatic notices of unusual conditions, such as the “TekTracking” System Proof of Concept Application for Remote Monitoring at 40th Street Trolley Portal.
- Use of automated track inspection systems and associated analysis algorithms for Just-in-Time Replacement, such as the use of GREX’s “Aurora” system for wood tie replacement.
- Use of centralized vehicle onboard diagnostic systems with remote access such as the Wi-Tronix Violet System purchased for SEPTA’s new locomotives.
- Use of new-generation automated inspection systems to include Remote Bridge Monitoring, GPS-Enabled Drones (Above-Ground); GPS-Denied Drones (Under Ground); Head-End Video; Geometry Car; UT Testing; and Ground-Penetrating Radar.

In all cases, the goal is to convert Data into Action, as shown in Figure 2.

The more-than 25 technical presentations addressing Big Data issues in track, equipment and operations, followed the keynote speaker’s lead in addressing what is being done right now in the industry, with the increasing amount of data being collected in all aspects of the railway industry. There is an increasing use of Data Science, the interdisciplinary field using evolving analysis tools and techniques to extract knowledge or insights from data in various forms, either structured or unstructured [2]. Associated Data Analytic tools [3] are being integrated into a new structure, Rail Data Science as illustrated in Figure 3 [4].

Rail Data Science, sometimes referred to as Railroad Big Data Analytics, has been divided into 9 basic steps as follows [5]:

1. Understand the problem(s).
2. Data collection and investigation.

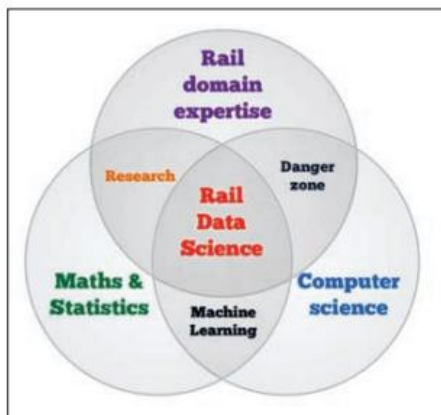


FIGURE 3: Transformation Toward Digital Railways [4].

3. Data cleaning and integration.
4. Feature engineering.
5. Model development and feature selection.
6. Model training and parameter tuning.
7. Model evaluation and comparison.
8. Model prediction and decision-making.
9. User feedback and possible further refinement (possibly back to step 1 and the whole process iterates).

While most railways have developed the tools for extensive data collection, cleaning, storing, collating and integration remain major challenges as is illustrated in Figure 4 [6] and Figure 5 [7]. Likewise, structuring the data in preparation for and in conjunction with the model development steps (Figure 5) represents a critical part of any effective data modeling activity.

Likewise, the analysis and modeling tools represent critical steps in the Data Analytics process. The range of such tools currently being used by railways, suppliers and researchers include predictive analytic tools such as Logistic Regression and Bayesian Inference to Machine Learning and Deep Learning techniques, Image Recognition, Blockchain Technology, Language Recognition, Text Analytics, etc. One non-traditional approach uses Text Analysis and Latent Semantic Analysis (LSA), a Language Recognition technique used to analyze relationships between sets of documents and the terms they contain, to look at rail safety data in a new way [8].

The use of data for improved operations, maintenance and safety was an ongoing theme for the conference. This included applications in all aspects of railroad operations to include track, rolling stock and transportation.

On the track side, use of data analytics addressed many of the key aspects of track

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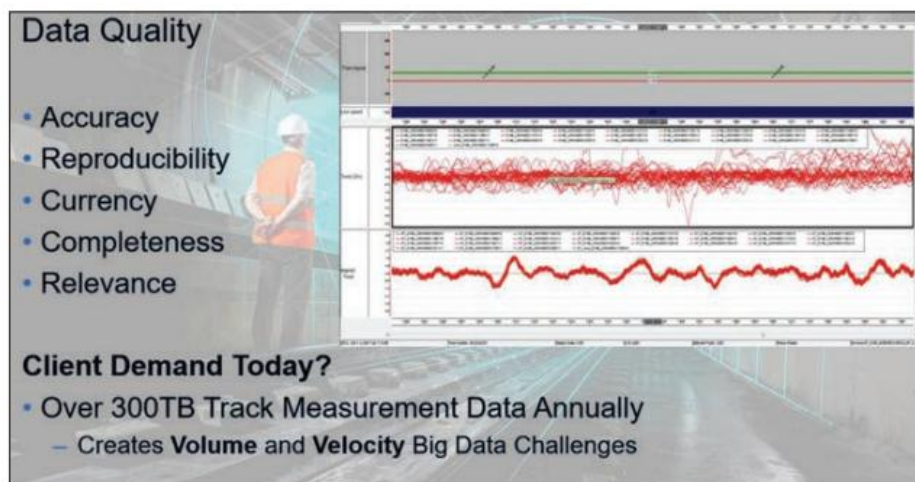


FIGURE 4: Data Quality and Cleansing [6].

maintenance and safety, ranging from rail wear prediction, broken rail safety, tie inspection, and prediction of track geometry degradation and associated risk of derailments. Several such presentations looked at using such tools as Logistic Regression analysis to forecast probability of degradation of track geometry as a function of supplemental measurement data that provides for increased prediction accuracy over the traditional traffic and MGT inputs. This is illustrated in Figure 6 [9], which shows the range of additional input variables that can be introduced using such Data Analytic techniques, and Figure 7 [10] which presents an example output showing the probability of developing a geometry defect as a function of several of these key input variables.

Likewise, use of data analytics for addressing both transportation and rolling stock (equipment) was discussed for a range of issues [11].

- On-Time Performance.
- Conflicts (Merging/Diverging Routes; Meets/Passes).
- Rolling Stock (Equipment) Maintenance and Failures.
- Locomotive Maintenance and Failures.
- Train Handling.
- Positive Train Control.
- Safety.

This included the use of Data Analytics to predict anomalous events as shown in Figure 8 [12], and to address the effect of unplanned (anomalous) events on on-time performance as discussed in Figure 9 [11].

Data Analytics is leading the way in the move from Corrective (Reactive) maintenance to Predictive (Preventive) maintenance [13].

This is, in fact, the path that SEPTA's Knueppel discussed and showed in Figure 1. However, helping in this move is the development of the concept of a "Digital Twin," a digital replica of a living or non-living physical entity. By bridging the physical and the virtual world, data is transmitted seamlessly, allowing the virtual entity to exist simultaneously with the physical entity [14]. The evolution of Data Analytics is moving toward the concept of a Digital Twin [15].

For example, in the case of track data, the static and dynamic data collected by the broad array of inspection tools currently available (and being implemented in the near future) are locational and as such can be referenced to a digital Asset Register [13]. This is

independent of whether data comes from measuring, monitoring, IoT or inspections and reports. These in turn can be brought together in a Digital Twin, allowing Maintenance Engineers to:

- Evaluate all relevant data and decide on what to do, when, by whom, with what information.
- Generate work orders for fault correction and (condition-based) maintenance, plus reports.
- With one source of truth at strategic, tactical and operational levels, allowing clear line of sight for forecasting, planning and predictive maintenance.

Thus, we continue to witness an evolution in data analysis (Data Analytics or Data Science) moving from Deep Learning, to the Internet of Things (IoT), to Cognitive Computing to the Digital Twin. This evolution is clearly evident in the presentation of each year's Big Data in Railroad Maintenance conference, with each new conference providing new focus on what has been accomplished in the "mining" of the railroads' Big Data and the implementation of data analytics to develop predictive models and tools for both maintenance and safety. The University of Delaware expects even more insightful information to be available in its Big Data 2020 conference, which will be held Dec. 16-17, 2020, at the University of Delaware Newark campus. For more information, contact Professor Allan M Zaremski at dramz@udel.edu.

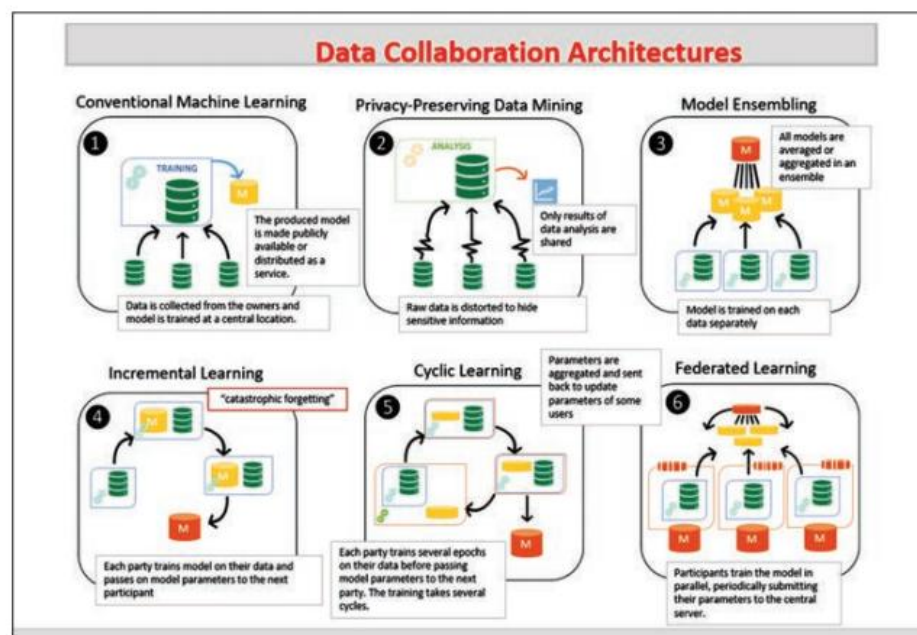


FIGURE 5: Data Collaboration and Integration Into Analysis and Modeling Steps [7].

Independent and Dependent Variables

Zarembski et. al., (2018).

- Independent Variables
 - Ballast Fouling Index Right (BFI R)
 - Ballast Fouling Index Center (BFI C)
 - Ballast Layer Thickness (BLT Center)
- Dependent Variable
 - RProfile62

This Study

- Independent Variables Available in Project
 - Support Indication Pc/Pt
 - Soil Moisture or Rainfall
 - Temperature
 - Accelerations
 - Strains in tie (Left, Right and Center)
 - Transient Displacements
- Independent Variables Used
 - Support Indication Pc/Pt
 - Soil Moisture or Rainfall
 - Temperature
- Dependent Variable
 - LProfile62
 - LProfile31
 - LProfile20

FIGURE 6: Variables That Affect Development of Track Geometry Defects [9].

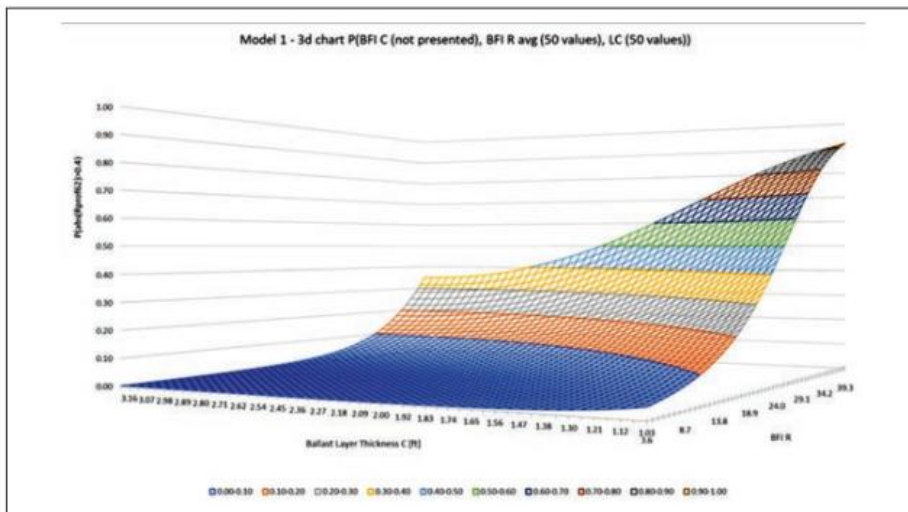


FIGURE 7: Probability of Developing a Track Geometry Defect as a Function of Ballast Condition and Depth [10].

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Predicting anomalous events: Training Procedure: Bayesian Optimization



- Evaluate the loss with some (parametrized) architecture and hyperparameters
- Determine what set of hyperparameters should be evaluated next
- Repeat

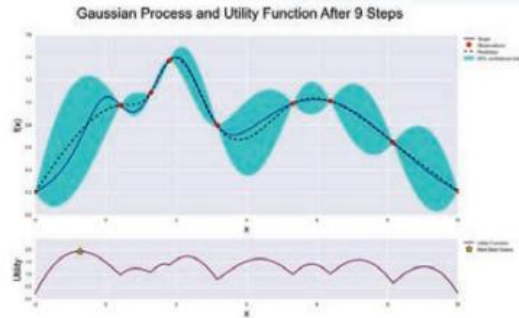


FIGURE 8: Use of Bayesian Optimization to Predict Anomalous Events [11].

ON-TIME PERFORMANCE

CHALLENGE

Late starts and unplanned events en route delay trains

	Freight	Passenger
Impacts	Capital Costs Crews "On the Law" Late Deliveries Secondary Train Delays Lower Velocity	Missed Connections Secondary Train Delays Headway Impacts Ridership
Relevant Data	Incident Reporting Delay Reporting Dispatch Logs Location History Maintenance Logs PTC Logs Crew Calling Consist Data	Incident Reporting Delay Reporting Dispatch Logs Location History Maintenance Logs PTC/CBTC Logs Crew Assignment/Pick System Car/Locomotive Assignments

ANALYTICS SOLUTIONS

Correlate Delays With:

- Crews
- Equipment Type
- Equipment History
- Locations
- Incident Types
- Assigned Delay Codes
- Other Relevant Events

FIGURE 9: Data Issues Associated with On-Time performance Behavior [12].

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13. Tegelberg, Erland, "Asset Management: Limits and Opportunities for Big Data," Strukton Rail, 2019 Big Data in Railroad Maintenance Planning Conference.
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POSITIONING, THE **NEXT GENERATION**

BY WILLIAM C. VANTUONO, EDITOR-IN-CHIEF

One of the final duties that former MTA New York City Transit Vice President Network and Resignaling Pete Tomlin discharged before he left the agency was demonstrating an innovative piece of new technology—UWB (Ultra-Wide Band), wireless technology that offers faster and less-expensive installation of modern CBTC (communications-based train control) by eliminating much of the onboard and wayside equipment traditionally required for advanced-technology signaling.

On Jan. 23, only hours after NYCT President Andy Byford—fed up with political meddling by New York State’s grandstanding, media-attention-loving Governor Andrew Cuomo—resigned, Tomlin (above)—arguably one of the finest signaling and train control people on the planet—collaborated with suppliers Thales and Piper Networks in an impressive public demonstration of UWB.

Later that day, the man who has worked closely with fellow Englishman Byford to modernize the Toronto Transit Commission, London Underground and NYCT

subway systems, submitted his own resignation. How quickly the New York MTA recovers from the double-loss of Tomlin and Byford (affectionately dubbed the “Train Daddy”) remains to be seen.

NYCT’s UWB proof-of-concept was the culmination of a pilot program on the Flushing (7) Line that came together in only nine months, thanks to Tomlin’s expertise and that of Thales, Piper Networks and MTA Chief Innovation Officer Mark Dowd. UWB traces its roots to the MTA’s Genius Transit Challenge program, launched in 2017, which “challenged leading companies



New York City Transit, Thales and Piper Networks demonstrate UWB.

from around the world to improve subway signals, capacity and communications for the future.”

In March 2019, the NYCT awarded Thales and Piper a contract for a UWB-based Train Control System Pilot Program on the Flushing Line. At the same time, NYCT awarded Siemens and Humatics a contract for a UWB pilot on the Canarsie (L) Line. The pilot's scope involved preparing UWB for safety certification. It consisted of nine months of testing and collecting 2,500 hours of operational data. An automated data upload facility at

NYCT's Corona Yard enabled Cloud-based processing of all collected sensor data from the line that can be compared with data from the CBTC system and a LiDAR (light detection and ranging)-based “ground truth” digital map.

Four trainsets on the Flushing Line, one of two lines equipped with CBTC, were outfitted with the Thales' CBTC system that integrates Piper's UWB technology. Four on the Canarsie Line were outfitted with a Siemens CBTC system that integrates Humatics UWB technology.

The Flushing Line demonstration took place on the center express track between the 61 Street/Woodside and 40th Street stations. The demo “showed the potential of an even more precise positioning system, UWB, to improve system performance and recovery,” NYCT noted. “The pilot proved it could also help accelerate the implementation of CBTC.” Additionally, UWB technology is installed on the wayside rather than directly on the railbed, so “it could be considerably easier for NYCT personnel to maintain in the long term and cut down on delays stemming from malfunctioning track-borne equipment.”

Key advantages and features of UWB:

- Rapid implementation, achieved through a reduction of onboard equipment by elimination of vehicle undercarriage installation. This could enable NYCT to modernize aging subway infrastructure on an accelerated timeline.

- Improved train positioning accuracy, called NGP (Next-Generation Positioning), achieved through utilization of modern onboard sensors including UWB radios. The UWB test runs are used to evaluate the accuracy and fault tolerance of the NGP system. Each end-of-the-test train is equipped with a Thales Vehicle On Board Computer (VOBC), part of the CBTC system, integrated with the NGP sensors.

- Accelerated start-up position initialization. The NGP system is described as

“highly tolerant of equipment or sensor failures without impacting overall function.” Upon power-up and initialization, the NGP system tells the onboard controller precisely where it is located, enabling a train to initialize and engage Automatic Train Operation (ATO) faster than current-generation CBTC systems.

- High accuracy and availability: NGP provides greater positional accuracy and can support much greater separation between wayside landmarks. This means that future CBTC systems based on this technology will support more precise station stopping

accuracy and will be able to travel a greater distance between wayside landmarks. If inputs from sensors or UWB controllers at one end of the train fail, the system can seamlessly switch over to inputs from the other end of the train.

There are five high-tech components/sensors integrated with Thales' NGP systems:

- UWB, a type of radio communications that uses a very low amount of energy with short-range, high-bandwidth waves employing a wide range of the radio spectrum. NYCT's Flushing Line system uses Piper onboard UWB radios and controllers and Piper UWB wayside “anchors.” The NGP system uses UWB to receive location updates every 100 milliseconds.

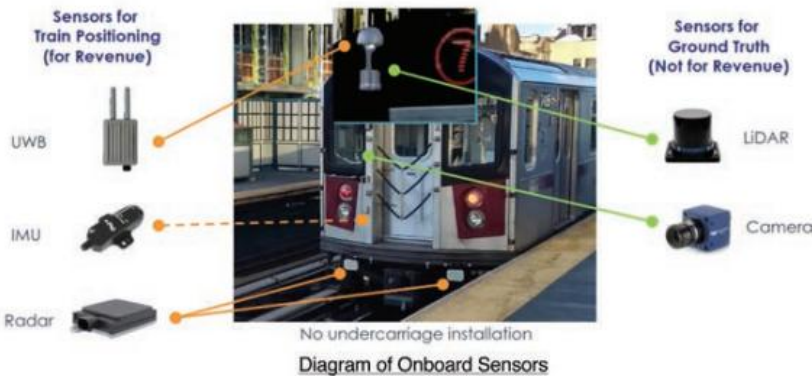
- IMUs (Inertial Measurement Units) that detect changes in speed and direction with an “extraordinary” level of accuracy. The NGP system uses the IMU for inertial navigation and orientation verification.

- Radar (radio detection and ranging). Radar, which uses radio waves to measure the distance and speed of objects, is employed by the NGP system for speed measurement and zero speed/stationary status.

- LiDAR, which uses pulsed laser light to measure distance with high precision to any targets within range to create a dense 3D map of its surroundings. LiDAR was used to scan the route and create a “ground truth”

UWB OFFERS RAPID IMPLEMENTATION, AND HIGH TRAIN POSITIONING ACCURACY AND AVAILABILITY.

THALES



The Thales/Piper UWB system employs five conveniently located onboard sensors. There is no undercarriage equipment.

digital map that the positioning system data can be compared with.

- High-definition camera: Using advanced image processing techniques, the camera can detect objects such as rails,

wayside equipment or trackside workers. These functions are still in the preliminary testing phase.

"All of these features will contribute to faster system deployment and more reliable

service with fewer delays for our passengers," NYCT notes.

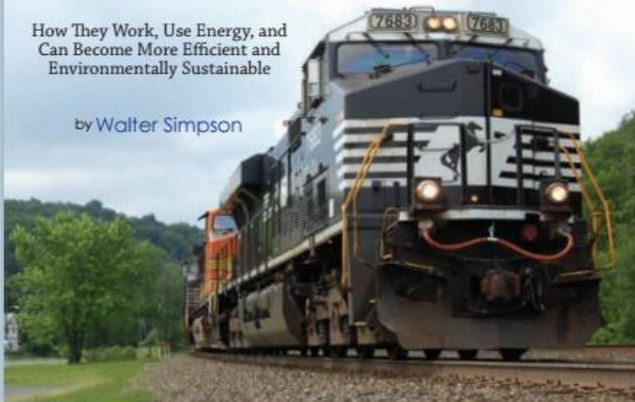
"Thanks to this partnership with NYCT, we're delivering cutting-edge technology as we test the next generation of train positioning," said Dominique Gaiardo, Thales Vice President and Managing Director for Urban Rail Signaling. "Thales has integrated modern onboard sensors with a UWB network to create an enhanced next-generation positioning system for our CBTC digital signaling architecture. The new system has higher accuracy, resiliency and availability, and is quicker to deploy than current-generation products."

"We took an exciting step in safety certifying Piper's Ultra-Wide Band technology for the MTA, and we're looking forward to rolling out this technology across other subway lines as part of the Fast Forward program," said Robert Hanczor, CEO of Piper Networks. "Together with our partner Thales, we worked closely with the NYCT leadership team, who continually demonstrated their desire to support new

Diesel-Electric Locomotives

How They Work, Use Energy, and Can Become More Efficient and Environmentally Sustainable

by Walter Simpson



How energy-efficient are locomotives?

Come along with us as we explore how diesel-electric locomotives actually work and penetrate the hush-hush world of locomotive fuel economy and energy efficiency. This beautifully illustrated, information-packed book, written by an energy expert, allows you to look under the hood of the most modern diesel-electric locomotives through an energy and environment lens.

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- Learn about locomotive fuel economy technologies and energy efficiency performance measures rarely discussed by the railroad industry.
- Gain insights on meeting future environmental challenges with alternative fuels and motive power options.

"Walter Simpson's book should prove interesting and educational to a wide audience—from rail buffs wanting to know more about the inner workings of their passion to anyone working on transportation policy. Professional railroaders will benefit from this well-researched nuts-and-bolts book."

—Dave Cook, *Rail Propulsion Systems*

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technology providers and encourage innovation in the transit sector.”

NYCT said it “will take the lessons learned from CBTC implementation on the Flushing Line and incorporate industry best practices to improve and expedite future implementation on other subway line corridors, including better costing estimates, formalized personnel structure and responsibilities, enhanced project and contractor monitoring, more frequent surveys and enhanced attention on subway car interfacing. NYCT has created a new database to capture cross-discipline feedback and information from CBTC projects to better-track such valuable information to help improve future CBTC processes.”

All this may be a tall order for NYCT following the loss of Pete Tomlin and Andy Byford. No doubt, high-tech projects such as UWB require innovative suppliers like Thales, Piper, Siemens and Humatics, skilled engineering consultants like Parsons Transportation Group and others, and NYCT’s equally skilled and dedicated



Thales Vice President Research and Innovation Walter Kinio explains how UWB determines train position and velocity with a high degree of accuracy.

workers. But they also require strong, focused leadership at the agency level, one or more “champions” who can get the job done, providing motivation and guidance. That’s what NYCT had in Tomlin and

Byford. Interim NYCT President Sarah Feinberg is now charged with picking up the pieces and regrouping the agency following the destruction caused by an egotistical politician. We wish her well.

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TIES THAT BIND

Transferring loads to track ballast and subgrade and helping maintain track geometry and gauge, crossties are the foundation of a railroad. BY ANDREW CORSELLI, MANAGING EDITOR

Crossties come in many forms, with wood being the most prevalent. Concrete ties are the standard for high-performance rail and select heavy-haul freight applications. Steel and composite have been making inroads in recent years, for specialized applications.

The Railway Tie Association (RTA), which in 2019 marked its centennial, describes itself as “the forum for the interests and needs of all groups that depend on the wood crosstie for their business success.” RTA’s Procurement Trends Dashboard, offered on its website (www.rta.org) “represents the monthly opinions of ‘in-the field’ wood tie buyers who procure untreated crossties from sawmills in their specific regions.” The data is submitted to RTA within the first two weeks of the month following the reporting period. The output is in two forms: monthly and a 12-month running view. Users can choose individual

regions or grouped regions from the drop-down menus for monthly and trend data.

Koppers has been serving the railroad industry with treated wood railroad ties and railroad crossing panel products for more than 25 years. “In North America, we are the largest provider of railroad crossties for Class I’s and are known for our pre-plated crossties,” the company noted. “With nine wood treatment plants located on major rail lines throughout the United States and Canada, Koppers is uniquely positioned to meet the demands of Class I and short line railroads and railroad contractors. Our nationwide tie procurement network means crossties and switch ties are readily available to quickly meet customer needs. We maintain a network of 30 hardwood crosstie concentration yards. Untreated crossties and switch ties from these procurement centers are delivered as needed to Koppers wood-treating plants. These plants produce high-quality creosote-treated crossties and

switch ties, combining industry-standard treatment with strategic location to provide reliability and maximum efficiency.”

Wood ties, which depending upon application can last 25 or more years in service, require preservatives and pressure treatment. There are various treatment methods and chemicals. In recent years, environmental considerations have taken on increasing importance.

Nisus Corp. manufactures several crosstie preservatives, Ken Laughlin, Vice President Wood Preservation Division, told *Railway Age*. Cellutreat—a Disodium Octaborate Tetrahydrate wood preservative available in a 98% water-soluble powder and a 50% liquid concentrate—is “Nisus’s biggest seller,” he said. “Fifty percent of the ties in North America are dual-treated with a borate, which is basically our Cellutreat product.”

Nisus’s second-best seller is QNAP, described as “an environmentally friendly

copper naphthenate product.” Laughlin estimated that Nisus “presently has more than four million ties treated with QNAP in-track in North America.” Also popular is Nisus’s BTX Bridge Tie Extender. “We’ve got just about every Class I railroad switching over to copper naphthenate for bridge ties,” Laughlin noted. BTX has also caught on with Class II and III railroads, many of which are upgrading older bridges to handle 286K GRL railcars.

QNAP2—a 2% oil-borne preservative—rounds out Nisus’ lineup, but for a different application. “Ties are not treated with QNAP2,” said Jim Gorman, Corporate Vice President Marketing. “But when you cut a tie, you’re exposing wood that’s not pressure-treated. QNAP2 is applied to a cut or a drill hole, so that you’re not exposing the tie.”

Nisus ventured into the crosstie space via an unconventional path. “We were a pest management company first,” Laughlin said. “When there were three manufacturers of copper naphthenate, all three decided they

were going to stop selling it because the U.S. EPA (Environmental Protection Agency) did a data call that was going to cost them about \$3 million each. Some people from the wood preservation industry contacted us. They said, ‘You know, this is a great chemical and we’re going to lose it if somebody doesn’t pick up the registrations.’ I met with EPA, and we were able to get a copper naphthenate registration in just six weeks so that we could start selling it. Once that happened, we went into the wood preservation business.”

In addition to the tried-and-true tie mainstays, non-traditional materials like composites, plastics and steel—which suppliers say offer low lifecycle costs—are increasing in use.

“It was more than 20 years ago,” said Linda Thomas, President, LT Resources Inc., of her first foray into composite materials. “One of my customers had some inconsistency issues with timber grade crossings. So we started looking into something different and began manufacturing

composite grade crossings in 1998. It made sense to put a composite tie into a crossing. We got involved with the composite tie industry and AREMA Committee 30, developed standards and worked through the acceptance process. Composite ties are environmentally friendly, last longer and don’t have the disposal issues that you have with treated wood.”

Conrail turned to NARSTCO (a division of RailWorks) steel turnouts for its lower installation costs, reduced maintenance needs and longer in-service life, according to Assistant Vice President Engineering and Mechanical Eric Levin. “With proper surface maintenance, these steel ties can withstand the heaviest traffic areas. Conrail has had measurable success in every location NARSTCO steel ties have been installed.”

“We’re seeing a greater increase in the use of steel ties throughout the rail industry,” said NARSTCO Senior Director of Sales and Marketing Matt Violin. “Steel is easier, faster and less expensive to install and maintain, lasts longer than other materials, and



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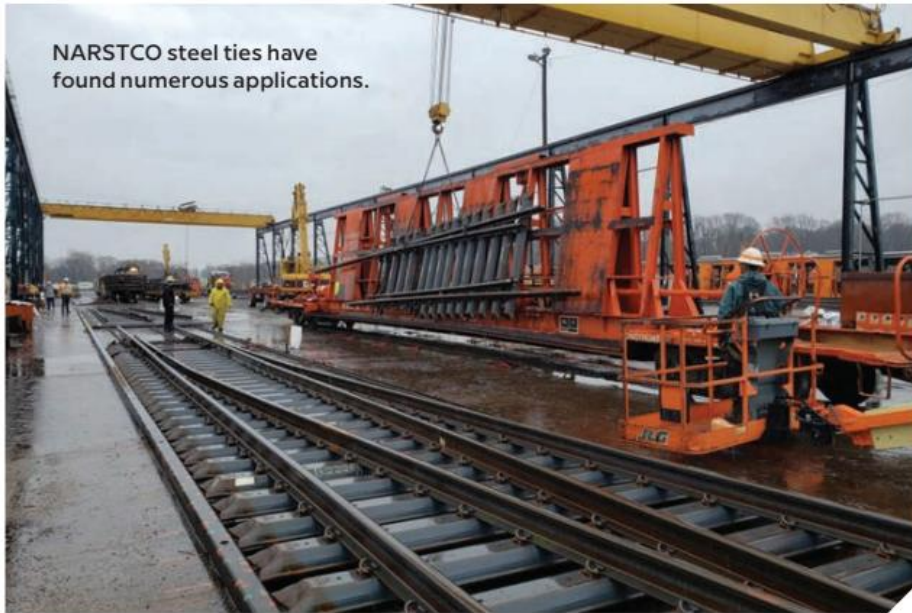


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custom aging wood turnouts. Upon receipt of site surveys and field measurements, NARSTCO's engineering team designed four custom steel turnout sets matching the existing infrastructure. For Conrail's Mound Road Yard in Detroit, a similar procedure was followed, where two custom turnouts "provided a high-quality installation without the necessity of field modifications or additional installation time." Three steel turnouts will also be installed at Conrail's Doremus Yard in the Philadelphia area. NARSTCO is providing on-site support for crews constructing these materials at Norfolk Southern's Roanoke Turnout Panel Facility.

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Several companies lease tie-replacement equipment to railroads. Progress Rail, for example, supplies Kershaw® maintenance-of-way machines to all Class I's, transits and short lines, and contractors around the world. Among its equipment is the

helps improve operational efficiency." Steel ties, he noted, are recyclable and call for less ballast—up to 40% less compared to wood ties—and can last longer, as evidenced by ties installed more than 50 years ago that

are still in service.

For Conrail, the adoption of steel continues as existing wood ties and turnouts are replaced. Conrail's Stoney Creek Yard in Chester, Pa., required replacement of



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Harsco Rail describes its TKO® Tie Exchanger as “executing fast, efficient used tie removal and proper insertion of new ties with minimum disturbance of the track structure. The TKO® focuses on controlling rail-to-tie clearance with its distinctive rail life system. Its two clamp/lift units are located on four-foot centers. Articulated gripper heads are able to pivot up to 40 degrees.” Performance-wise, this machine offers an extracting force of up to 20,700 pounds, a tie kicker with up to 10,000 pounds of force to push the end of the tie being removed, an inserting force of up to 13,550 pounds, and a 66-inch tie removal stroke, with the extracting head located on the right side of the machine.

Harsco’s TR-10 Production Tie Exchanger is equipped with an extracting head on both sides, and a swivel head that provides

adjustment of the tie position, “allowing easy insertion or extraction.” With an extracting force of up to 19,080 pounds and an inserting force of up to 13,550 pounds, the TR-10 “handles switch ties with ease.”

Encore Rail Systems, Inc. is a full-service company. Greg Spilker, Vice President and General Manager, told *Railway Age* that Encore has more than 100 machines in its lease fleet. “We supply the machines with field support,” he said. “We have the parts and technical help, and a field service team in North America for repairing, training and assisting customers with their equipment needs.”

Spilker added that Encore recently celebrated a safety milestone. “We’ve gone three years without a lost-time injury, and working in the environment we are, we’re very proud of that. It’s something we focus on quite a bit.”

Some railroads develop and deploy their own specialized equipment. Union Pacific, which annually replaces between 3 and 4 million ties across its 32,000-plus

route-mile, 23-state system, has designed and built, with a supplier it declined to disclose, high-tech equipment to expedite the tie removal process. UP’s Maintenance of Way Tie Pickup Work Equipment has two excavators that ride along the top of a series of connected 70-foot-long railcars. Operators in the excavators pick up tie bundles left in stacks along the right-of-way. Once the railcars are fully loaded, the train departs directly to one of three facilities where ties are recycled or shredded for cogeneration fuel. (Used ties are not offered to the general public for reuse.)

Each railcar holds 500-700 ties, which is about the same number it can pick up in an hour. The new system doubles the number of railroad ties that can be disposed of per day, to nearly 5,000. UP said it plans to add more of these machines over the next 15 months.

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in-track. "This provides railroads with a data-driven strategy for planning the replacement of these assets as they approach end of life expectancy," said Nate Bachman, GREX Vice President Marketing and Sales.

INDUSTRY DIRECTION

George Caric, Vice President Marketing, Stella-Jones Corp., told *Railway Age* that—unlike last year at this time—"we're seeing tie inventories pick up; the demand for crossties is strong." Caric concedes, though, that Mother Nature could put the kibosh on that.

"We need it to stop raining," he said. "Alabama and the South are experiencing torrential downpours and flooding. We need it to dry up. We're coming out of winter with a semi-good log pile. Hopefully we'll be able to ride this out and get our inventories back where they need to be."

Despite that, Caric said, "We're in a much better position than we were last year. Pricing was rising due to outside influences—China exports and wet weather

all had an effect on crosstie production. There's a consistent demand for ties, and the sawmills know that the railroads are going to buy 21-22 million a year—and that's year-over-year. That's helping the sawmills now because the markets for the boards and the side lumber are not as lucrative as they were 18-24 months ago."

Encore's Spilker noted that he thinks 2020 is going to be a good year. "It should be an up year compared to 2019 as far as new rail installation," he said. He added that Encore has several new crosstie-related products it's looking to introduce this year. Nisus Corp.'s Laughlin agreed that "prices and availability are pretty much stabilized."

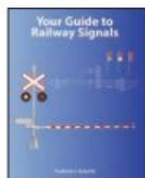
Bachman noted that "2019 was an excellent year for GREX. In fact, it was the best in the company's history. We feel good about what 2020 holds. I anticipate that it will be another growth year for GREX, with the potential to be even more than that. We are working with partners to develop the next generation of inspection imaging hardware. The system will be available

for field testing in 2020 with the future capability to see the entire field of view of track at maximum speed. Our expectation is this new technology will allow for the enhancement of existing GREX inspection technologies as well as the development of new solutions."

The transit side, too, seems to be tying things together very nicely. Vince Petersen, Engineering Manager, CXT® Inc./L.B. Foster, is encouraged by positive developments in the transit segment expanding the use of the company's concrete ties. CXT has secured contracts for special trackwork concrete turnout ties for projects in Ottawa and Calgary from London Trackwork, Inc., an Ontario-based supplier of railway track materials.

"Canadian transit infrastructure spending continues to perform well on both the East and West Coasts," Petersen said. "We expect that to continue for the next few years, especially in Ottawa, Calgary and Edmonton." ■

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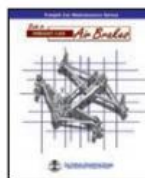
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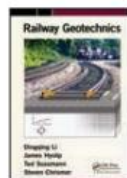
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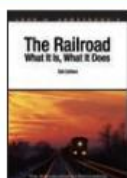
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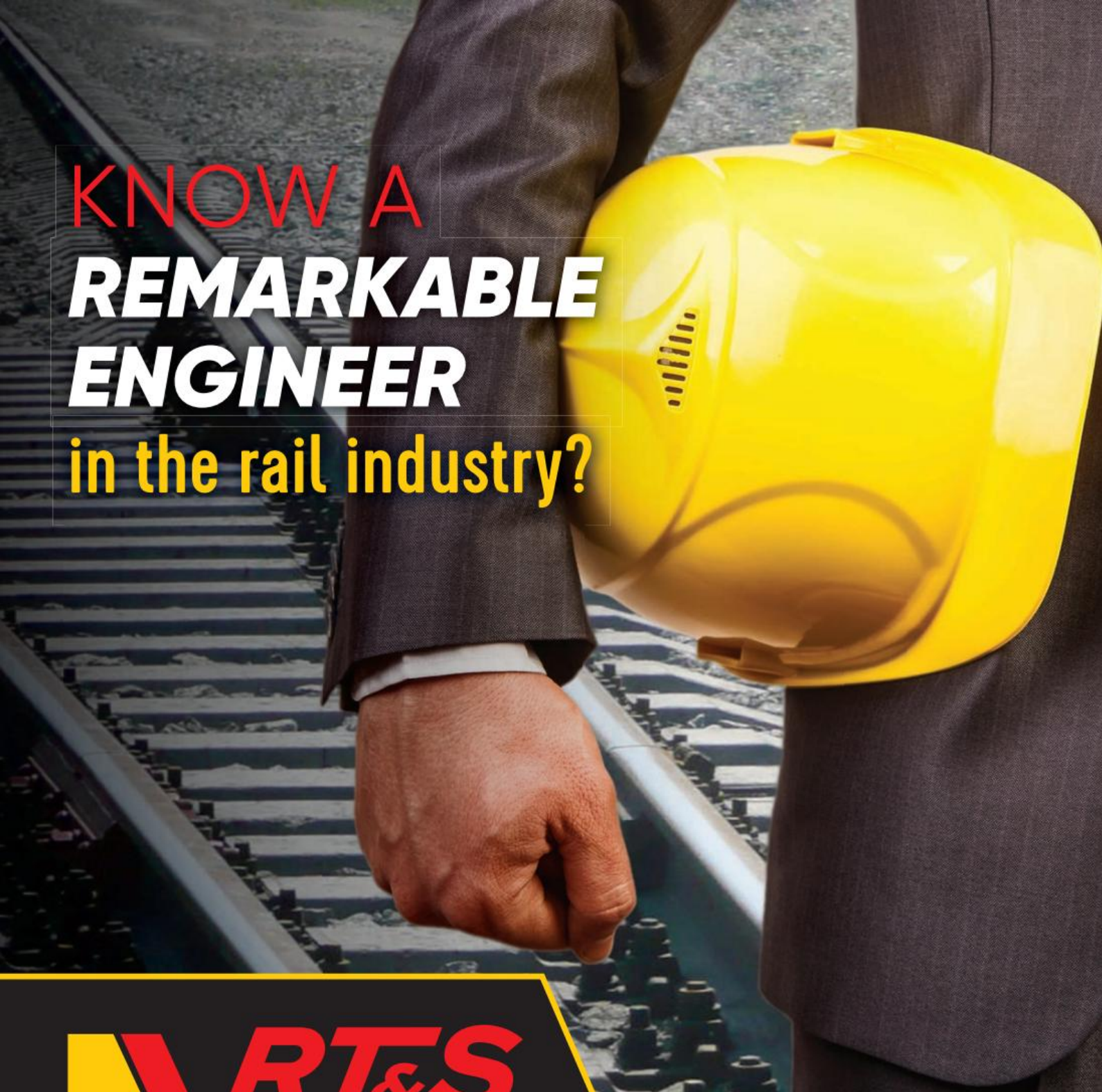
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GREG DALPE
New York Air Brake

HIGH PROFILE: New York Air Brake LLC appointed Greg Dalpe as Senior Vice President Sales and Marketing. He succeeds Jason Connell, who was named President and CEO of NYAB's sister rail division company, Knorr Brake Co. Dalpe joined NYAB in early 2015 as Operations Director and was promoted to VP Operations in January 2018. He brings 15 years of transformation leadership across a variety of regulated industrial manufacturing segments, including a proven track record of deploying global operational excellence business systems focused within manufacturing and supply chain operations in North America and China. Prior to joining NYAB, Dalpe worked in private equity, serving as divisional quality manager and director of operations for ONEX Corporation. He holds a bachelor's degree in Chemistry from Rhode Island College in Providence, R.I., and a Master's in Operations Design and Leadership from Worcester Polytechnic Institute.

Alaska Railroad (ARRC) promoted Sean Mesloh to Chief Mechanical Officer, effective March 1. Mesloh replaced 36-year railroad veteran Don Freestone, who retired Feb. 28. Mesloh began his railroad career in December 2000, when he was hired as a Car Shop mechanical laborer in the Anchorage Car Shop. Within months, he began an apprenticeship, progressing through Carman Apprentice levels, learning to maintain freight and passenger railcars. In January 2004, he earned full Carman status. By 2006, Mesloh was promoted to Mechanical Supervisor, overseeing work on railcars, locomotives and heavy equipment. In this role, he gained three more years of hands-on shop experience. In 2008, Mesloh was promoted to General Mechanical Supervisor, Fairbanks. In late 2015, he was promoted to Director of Fairbanks Operations, responsible for terminal and train functions on the railroad's north end. Mesloh returned to Anchorage in November 2019 to accept ARRC's Manager of Motive Power and Equipment position.

Pacific Harbor Line (PHL) promoted **Stephane Perri** to Vice President. Perri's rail career spans 20 years, beginning with PHL in April 2000 as an assistant locomotive engineer. In 2005, he advanced to assistant trainmaster and subsequently moved through management posts, becoming Senior Director of Transportation in 2016, Superintendent in 2017 and General Superintendent in 2018. As VP, Perri oversees PHL's activities in the ports of Long

Beach and Los Angeles, which together are the top intermodal gateways in the U.S. Perri holds a bachelor's degree from La Sorbonne-Paris and completed Michigan State University's railway management certificate program.

Keolis has appointed **Erika Mazza** as Vice President of Keolis Operations for the western region of North America. Mazza brings more than two decades of planning and operational management experience with an emphasis on economic development, urban planning, affordable housing and transit to this role, where she will be responsible for leading the company's operations across various modes in western North America. Prior to joining Keolis, Mazza served as Mountain Line's CEO and General Manager, overseeing all aspects of the transit agency in Flagstaff, Ariz. She led and directed all business activities to ensure the organization provided safe, on-time service and oversaw 125 employees and a total transit budget of \$43 million. She previously served as Mountain Line's Deputy General Manager. Prior to joining Mountain Line in 2011, Mazza was the Human Services Planning Director in Boulder, Colo., where she led efforts to enhance mobility opportunities for low-income households. Mazza also serves on the APTA Board of Directors and the Transit Cooperative Research Program's Oversight and Project Selection Committee. She is a graduate of the APTA Leadership Program and serves as Vice-Chair for the Legislative Committee.

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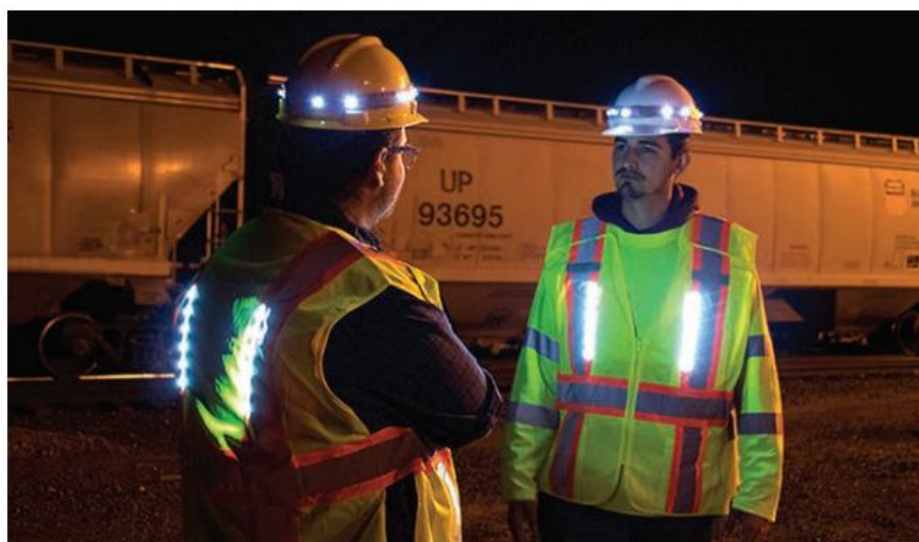
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RAILWAY AGE

What Will Happen When The Other Shoe Drops?

In its 4Q2019 earnings call, Union Pacific announced a decline in revenue and the laying off of 3,000 employees (layoffs as opposed to furlough). Freight revenue declined 10%; operating revenue declined 5%. Operating expenses declined 12%, thereby decreasing (improving) the operating ratio (OR) to 59.7%. Additionally, UP indicated that the reduction in workforce would bring the total number of employees to roughly 35,000, from roughly 42,000 in 2018.

After the announcement, UP's stock price hit a 52-week high.

With that as a preface, let's be clear out of the gate: This is not a criticism of UP or any other Class I railroad. UP's trend lines in revenue, carloadings, OR and employment reduction follow the trend lines of just about every Class I railroad. And "Financial Edge" would never fault a corporation for ethically doing what is correct for its investors/owners.

So, let's talk about Wall Street.

The concept, appropriately named the "Cult of OR" by analyst Tony Hatch, that investors or market makers are only focused on OR as it relates to the price of railroad common stocks has been floating around for some time. Plenty of ink has been spent determining or attempting to determine what a railroad is supposed to do in the face of such two-dimensional thinking. It's all been to no avail since very clearly the market continues to prioritize OR over all other railroad metrics.

The unanswerable question is, what will happen when the other shoe drops? In other words, what happens when all the OR improvements have been squeezed out of the system? After all, OR decreases (even in the face of a 20% reduction in workforce over three years) have a limit. That is, of course, unless revenue and workforce continue to decline in tandem (perish the thought).

At some point, one expects that the Class I railroads will add back lost freight at margins that do not support the current OR percentages. What can they actually expect from Wall Street

when that happens?

Ari Ashe, Senior Editor at the *Journal of Commerce*, highlighted the potential for decreasing rail margins in an article in the *JOC* on Feb. 12, 2020. Ashe noted that 2020 intermodal pricing is shaping up to be softer than it was in 2019, as railroad grip on volumes seems to be slipping. The potential is real.

Back to Wall Street.

While "Financial Edge" could spend time looking to experts to peg the potential pivot point and the results, the more interesting circumstance is that the investment community has turned railroad OR into a tech-style boom for an industry that, despite being increasingly technologically advanced, is remarkably "untechie."

In fact, the cult of OR and the persistent 52-week high trending of the Class I stock prices has a Y2K feel to it (albeit on a smaller scale). As of this writing, every Class I (except BNSF) is within 5% of its 52-week high stock price—this on the heels of a 9% reduction in rail freight YOY from 2018 to 2019 and a continued decrease in loadings through the beginning of 2020.

Headlines describing coverage of Class I stock prices fitter between bull and bear trying to navigate the terrain. Journalists reporting on railroad stocks sound more like they are describing Tesla rather than North American Class I's.

In September 2019, Barron's went all in on the bear case with this story: "Railroad Stocks Could Struggle As Challenges Mount." (Why does almost everyone say "challenges" instead of "problems"?) In January, Barron's flipped to the bull side of the story: "Union Pacific Will Likely Report Lower Rail Freight Volumes. Wall Street Won't Care."

Barron's rhetoric is priceless: "The industry's high-flying multiples give some folks vertigo. Shares of Kansas City Southern Railway (KSU) chugged up 60% in 2019. They are at \$166 lately, or some 21-times this year's consensus estimate for 2020 earnings." KSU closed at \$175 on 2/20/2020.

So what? You might ask. Rather than

“IS CHASING LOW OPERATING RATIOS THE NEW NORMAL OR A BUMP IN THE ROAD?”

toss-off, here's the important question: By applying outsized multiples to railroad stocks, is Wall Street unintentionally "preventing" the railroads from growing their franchise and increasing loadings—growing the *top line*—in pursuit of the lowest OR?

Investors, and more important, car owners, manufacturers and shippers, may not know the answer until they see what feels like the inevitable (and unfortunate) Lucifer-like fall that is the destiny of all stocks trading on unrealistic multiples and fundamentals.

Although the railroads won't mimic MicroStrategy (a dot-com stock that lost 62% of its market cap in one day of trading in March 2000), they are unlikely to continue to rise through the malaise of a post-OR peak than a tech darling like Amazon.

Until that time, interested parties may not know whether chasing OR is the new normal or a bump in the road on the return to normalcy.

Got questions? Set them free at dnahass@railfin.com. 



David Nahass

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BKINFRA18	Track and Rail and Infrastructure Integrity Compliance Manual - Volume II, Track Safety Standards - Part 213	38.00	34.00
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Updates from the Federal Register *may be supplied in supplement form.*

FRA News:

There are no new proposals or final rules to report for this issue. Be sure to check back next month to see if there are any changes to FRA regulations.



Part 215: Freight Car Safety Standards

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