Event: 2015 Rail Conference
Track/Route: Capital Programs
Session/Sub-Route: Worldwide Mega Projects
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Abstract Title: Coming to California: How California learned from HSR's international success stories

Text: **ID: 2381**

California’s High-Speed Rail system will spur economic development, enhance environmental and energy goals, create near and long-term employment, improve mobility and save money over the coming decades. Californians will begin to see these benefits as early as 2014, when initial construction will provide a much-needed economic boost to the Central Valley and produce 20,000 jobs annually for five years.

Connecting Los Angeles and San Francisco will generate 66,000 jobs annually for 15 years and the Phase 1 Blended System will generate 2,900 permanent operations jobs. As the Golden State’s great economic centers are connected, our economy will be given the opportunity to grow in ways never before imagined. Meanwhile, goods will move more freely from our ports to vital markets as freight rail traffic is alleviated. California’s workers, who waste too much time and money in cars and at airports, will spend their time more productively.

This presentation will focus on the differences between international high-speed rail system creation and creating a high-speed rail system in California. The presentation will include topics such as right-of-way, memorandums of understanding with countries currently running high-speed rail, and taking best practices from international high-speed rail systems and applying them to California’s high-speed rail program.

Event: 2015 Rail Conference
Track/Route: Capital Programs
Session/Sub-Route: Tell the Story of Your Capital Project
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Abstract Title: How high-speed rail came to California

Text: **ID: 2380**

The California High-Speed Rail Authority is responsible for planning, designing, building and operation of the first high-speed rail system in the nation. California high-speed rail will connect the mega-regions of the state, contribute to economic development and a cleaner environment, create jobs and preserve agricultural and protected lands. By 2029, the system will run from San Francisco to the Los Angeles basin in under three hours at speeds capable of over 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations. In addition, the Authority is working with regional partners to implement a state-wide rail modernization plan that will invest billions of dollars in local and regional rail lines to meet the state's 21st century transportation needs. This presentation will focus on the sheer size of creating a high-speed rail system in California as well as the cooperation level needed when working with regional and federal/state transportation agencies. The presentation will also discuss economic, environmental, and political factors that go into creating a high-speed rail system in California.

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Systems Engineering

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Abstract Title: Applications of Finite Element Analysis in Systems Engineering

Text: **ID: 2234**

As the United States continues to implement various rail projects in built out urban environments, systems engineers often encounter unique situations where creative solutions must be vetted. This paper will discuss the definition of Finite Element Analysis (FEA), its use in Structural Engineering, and how systems designers often overlook FEA as a tool for structural analysis of systems elements. In cities today the existing infrastructure creates a myriad of obstacles for new rail lines. At times, engineers have to attach systems elements to bridges and buildings, avoid infrastructure altogether, or install systems elements in limited Right of Way. For example, one challenge occurs when the Overhead Contact System (OCS) has to attach to a bridge or when the signals cannot use a standard foundation due to right of way limitations. Successful solutions often require the designer to use several different design methods to ensure the safety and structural integrity of the implemented solution. This paper will use the Sound Transit East Link Floating Bridge OCS Portal as an example to show how FEA can be the preferred tool for structural analysis in Systems Engineering.

Event:	2015 Rail Conference
Track/Route:	Capital Programs
Session/Sub-Route:	Other Capital Programs Topics
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Abstract Title: Portland To Milwaukie LRT Project: A shared transitway. Integrating LRT, bus, and streetcar.

Text: **ID: 2160**

The Portland to Milwaukie Project underway in Portland Oregon contains a segment that will function as a 'shared transitway' simultaneously serving light rail, bus, and streetcar service in common lanes and stations. This segment includes a major river crossing, the two most urban stations, and an at-grade crossing of short-line heavy rail.

Presentation will share the genesis of the idea of the shared transitway as well as it's planning, design, construction and pre-revenue activities (project will open in September 2015) as a case study in integrating multiple transit modes.

Emphasis will be placed on trade-offs and synergies in the development of this most multi-modal segment of the project as well as the sharing of insights into operational complexities and issues.

Event: 2015 Rail Conference
Track/Route: Capital Programs
Session/Sub-Route: Tell the Story of Your Capital Project
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Abstract Title: Integrated Service Information and Management: Coming Down the Tracks for MTA: NYCT letter lines

Text: **ID: 2298**

With the success and lessons learned experienced with bringing centralized; service management, communications and control to the A division New York City Transit has developed its short and long term strategy for the B Division. It is called Integrated Service Information and Management (ISIM-B). Due to the size and complexity the ISIM program will span three capital programs and be rolled out in phases called “Modules”. Using a Systems Engineering approach we have secured stakeholder buy-in along with setting a clear mission statement and objectives. They are:

ISIM is to provide consistent and timely information about the current state of B Division service to staff and customers. The successful delivery of ISIM has been further defined as dependent on the realization of the following prioritized objectives, which collectively will lead to improved service, safety, and security.
1. Better service management by improving service monitoring and regulation;
2. Better management of safety and security by improving information sharing and decision making;
3. Better customer information by improving the quality, accuracy and timeliness of communication; and
4. Better operational plans and schedules by improving analysis of historical service data.

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Tell the Story of Your Capital Project

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Abstract Title: Ready, Set, Go.. Now Change

Text: **ID: 2325**

As a Project Manager, it is expected that changes will occur during a multi-year design-build construction project. The nature of a design-build delivery method allows for innovation and value engineering from the contractor and design team. There are tools and strategies the team can implement to identify risk areas in order to plan for and manage potential changes. When entering into a contract, the one thing that should be fully established is the alignment. Prior to entering into a contract, a preferred alignment has been vetted through multiple planning studies. Through the studies, impacts are identified and documented, stakeholders and public are informed through coordination meetings, yet still there are organizations and development groups that have the potential to bring a project to a halt. The RTD FasTracks I-225 Rail Line experienced this scenario following award of a $350 million light rail extension design-build project. As a result, the team coordinated with the contractor and stakeholders quickly to find a viable alternative while staying on schedule and within budget. The I-225 Rail line Project is a 10.5mile extension of an existing rail line along the eastern side of the Denver metro area through the City of Aurora.

Event:	2015 Rail Conference
Track/Route:	Capital Programs
Session/Sub-Route:	Systems Engineering
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Abstract Title: Value added of System Engineering to Transit and rail projects

Text: **ID: 2176**

The practices of systems engineering are believed to have high value in the development of complex system. Rail and transit as complex system can advantage from systems engineering if it is implemented properly. There are historical and statistical data and analysis which explore the underlying theoretical relationships among project cost and schedule, technical value, technical size, technical complexity, and technical quality and Systems Engineering practice. Systems engineering improves the quality and management of Requirements, better Work Breakdown Structures and Plans, delivers better Specifications, defines the System Parts and how they fit together correctly, and finally provides Test and Acceptance Criteria linked to Requirements. The cost of fixing errors rises exponentially with the phase of discovery, from being equal to 1 as cost factor at requirement stage to 250 at operations stage. Systems engineering covers the entire project life-cycle, but has particularly strong leverage in the early stages. SE brings people benefits as well. Their work will become less chaotic and stressful. Quality of work benefits from this.

Event:	2015 Rail Conference
Track/Route:	Capital Programs
Session/Sub-Route:	Tell the Story of Your Capital Project
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Abstract Title: Between a Rock and a Hard Place - How to Fit a Maintenance Facility on a Two-acre, Sloped Site

Text: **ID: 2279**

Kansas City, Missouri desired a downtown streetcar starter line to improve mobility and spur economic growth. While streetcar projects typically face hurdles, this one faced an additional issue due to the location of the maintenance facility - only a two acre parcel (with a 30-foot slope) was available.

Initially, the concept for the facility involved excavating 90% of the site and using costly retaining walls and systems. Bay doors would have faced north, forcing a 90-degree turn-in and increasing yard track, with Administration/Operations buried in a lower level away from natural daylighting.

Using an interactive charrette process and careful study, the Design Team suggested using the sloping nature of the property advantageously, rotating the facility 90 degrees, pushing it completely to the north property line.

In the final design, the maintenance area is at grade and Administration/Operations are moved to an upper level. This new orientation allows a bike path and commuter rail right-of-ways to be maintained. It also minimized track lead-in work and yard storage track, as track was routed around bridge structures

This concept lowers the overall budget requirement for the project while improving access and function, and allows for future expansion. The design also meets LEED Gold certifications by including sustainable design strategies.

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Alternative Delivery

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Abstract Title: Maryland Purple Line and Red Line P3s

Text: **ID: 1766**

This presentation will provide an overview and update on the two public-private partnership (P3) light rail transit projects in Maryland--the Purple Line DBFOM P3 project just outside Washington, DC and the Baltimore Red Line project.

By spring 2015, the Maryland Transit Administration (MTA) is scheduled to close a P3 transaction on the Purple Line. The presentation will provide an overview of the P3 transaction, including lessons learned.

MTA is also advancing the Baltimore Red Line project, which will have a traditional design-bid-build approach for a portion of construction as well as a significant P3 component. The presentation will also describe the Red Line's P3 approach, which will be the first of its kind in the United States.

Event: 2015 Rail Conference
Track/Route: Capital Programs
Session/Sub-Route: Worldwide Mega Projects
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Abstract Title: 'Architecture, quality and success in Metro and Rail'

Text: **ID: 2275**

Metro and rail projects are expensive mega-projects of national importance. There is a perception that securing the 'design legacy' of these projects may result in cost overrun. This paper sets out to investigate the proposition that, despite attracting a low percentage of the overall project cost, the architectural component of metro and rail projects plays a fundamental role in securing project success and lasting legacy. In the UK, research into other types of values and design quality has resulted in a set of tools designed to embed design quality into all types of construction projects. Integrating this into the design process to secure the design quality of the end product is harder to find. Studies investigating the causes of cost overrun on metro and rail projects revealed several key contributors relating to the need for extremely effective project planning, which has led to the primary research question; "How can the management of metro and rail projects ensure that the design quality of the built component is recognised as a critical factor in project success?" Key findings from interviews with leading transport architects and engineers are documented and analysed to inform conclusions and recommendations for future metro and rail projects.

Event: 2015 Rail Conference
Track/Route: Capital Programs
Session/Sub-Route: Other Capital Programs Topics
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Abstract Title: Lower Manhattan Resiliency Initiative: Keeping Mother Nature Out of NYC Subways

Text: **ID: 2180**

Hurricane Sandy introduced millions of gallons of saltwater into NYC's subway system, saturating vital electrical signal, communication and power infrastructure system-wide. Subway service for millions was crippled, bringing the city to a halt.

Within 8 days, 90% of subway service was restored. However, latent salt damage soon led to increasing equipment failures, resulting in service delays and unreliable performance. This situation continues to-date.

NYCT's operational imperative is to sustain 24/7 service while developing and implementing a program of capital repairs and protective resiliency measures. This poses one of the greatest challenges ever faced by NYCT.

To illustrate this challenge, one initiative – the locking down of all water-entry points into Lower Manhattan's subway system – will be discussed, including:
* multiple, varied water entry points
* challenge to provide immediate protection over a wide geographic area
* piloting innovative measures
* limited vendors and long lead time for customized solutions
* coordination with outside agencies, often with competing needs
* operating and deployment challenges
* cost / benefits of large capital cost and complex deployment, relative to the infrequency of catastrophic storm events
* pressure to promptly spend down allocated funding while ALSO delivering NYCT's 'normal' multi-billion capital program

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Tell the Story of Your Capital Project

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Abstract Title: The BART Earthquake Safety Program - A Mid-Project Report

Text: **ID: 2232**

The BART Earthquake Safety Program was created in 2000 to evaluate seismic vulnerability of BART's system and recommend retrofits. BART performed well during the 6.9 magnitude 1989 Loma Prieta earthquake, but the threat of a much closer event of larger magnitude dictated the need for this examination. The Program published its vulnerability study in 2002 and was fully funded in 2004 by a combination of Federal funds, local bridge tolls and a general obligation bond measure within the BART District.

The Program has completed retrofits of most of BART's aerial stations and structures; all systems, yards and shops; ancillary structures; and several retrofits to the Transbay Tube. Still to be completed are remaining stations and structures on the Fremont Line (expected completion: 2019) and further retrofits for the Transbay Tube (2022).

The Program, originally estimated at $1.307 billion, has been highly successful in economizing on retrofits through design optimization and good construction bids; surpluses generated have provided opportunities to upgrade Program segments from life safety to operability standards, and to support other important BART projects. The current Program budget is $1.276 billion.
The Earthquake Safety Program has been highly successful in its mission to improve the BART system's seismic performance.

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Other Capital Programs Topics

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Abstract Title: Partnering for Success: Sound Transit and City of Bellevue, East Link Light Rail Extension–South B

Text: **ID: 2374**

The East Link, South Bellevue to Overlake Transit Center project is an eight-mile $900-million extension of Sound Transit's light rail system that will connect the Puget Sound Greater Eastside with downtown Seattle, SeaTac Airport, and the University of Washington via fast , frequent and reliable rail transit service. The Greater Eastside includes downtown Bellevue a robust regional activity and economic center and home to over 45,000 jobs and 10,000 residents. Key project features include 2 miles of retained cut guideway, 3-miles of aerial guideway, a 2,500 foot SEM tunnel, eight stations, two significant pedestrian bridges and two structured parking garages. The East Link Extension is planned to start construction in 2015 and open for revenue service by 2023. This is the first light rail to be constructed within the City of Bellevue.

A project of this magnitude does not happen without active collaboration and partnering between project stakeholders. This paper will discuss the collaboration process used during the final design by Sound Transit and the City of Bellevue including a four-step escalation ladder used to drive decisions and other tools used to balance sometimes competing project goals, integration of adjacent City projects, handling of concurrent project costs (betterments), cost sharing and resolution of key community concerns. The paper concludes with a lessons learned and a "collaboration toolbox" for peer agencies and cities.

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Tell the Story of Your Capital Project

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Abstract Title: From the Train de l'Est to the Mascouche line

Text: **ID: 2220**

Here is an overview of the topics discussed during the presentation:
- Project objective: to meet a need
- Project scope: 10 new train stations, 13 km of new railway track
- Project history: main steps
- Environmental approach
- Commissioning challenges
- Project spinoffs

The Train de l'Est will fill the permanent public transit infrastructure gap for residents in eastern Montréal and the north-east suburbs. This major AMT project required the construction of 10 new train stations, several civil engineering structures and 13 km of new railway track. Once commissioned, this new commuter train line will connect downtown Montréal to Mascouche in just over an hour and accommodate 11,000 passengers per day.

It is too early to discuss lessons learned, but in June 2015 the line will have been in operation for 6 months and will have gone through its first winter. We will certainly have lessons to present at the conference.

Event: 2015 Rail Conference
Track/Route: Capital Programs
Session/Sub-Route: Other Capital Programs Topics
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Abstract Title: Optimization for Performance and Cost – Sound Transit Light Rail Lynnwood Link Extension

Text: **ID: 2274**

Optimization for Performance and Cost – Sound Transit Light Rail Lynnwood Link Extension
This 8.5 mile light rail extension from north Seattle to Lynnwood, with estimated cost of $1.5 billion, is an important link of the Sound Transit system. Since approximate half of the project cost is on structures, optimizing structural design for cost effectiveness and performance, can significantly save tax payers' money and maximize the benefits to the public. The preliminary engineering optimized the structural types, dimensions, layouts, etc., based on criteria collaboratively developed by Sound Transit and the consultant team:
• Structural performance including passenger comfort, etc.
• Structural durability
• Maintenance friendly
• Capital/maintenance/operation costs
• Construction speed, which is important for long guideway structures
• Constructability, such as material and equipment access and shipping routes, etc.
• Construction Impacts, including traffic delay, noise, erosion, etc.
• Sound Transit preferences and maintenance practices
• Aesthetics
• Possible contract packaging and methods
Restrictions due to rail/vehicle and structure interactions further complicated the design: Required minimum fundamental frequency, strict deflection limits, restrictions on expansion joint location for controlling rail gaps, etc. The design had to overcome these challenges in order to achieve an optimized solution.

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Other Capital Programs Topics

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Abstract Title: Exploring Facility Project Delivery Methods: What's Best for Your Project?

Text: **ID: 2362**

Design-Bid-Build (DBB), Construction Manager/General Contractor (CMGC), Design-Build (DB)... when it comes to selecting a project delivery method, there is an alphabet soup of options from which to choose. What are the reasons for considering one method over another on a given project? Are some methods better for certain types or sizes of projects? Does your agency receive the same product regardless, or are there significant differences?

During this presentation, we will discuss the different project delivery methods and how each can benefit your project. We will address specific types of bus projects and why a delivery method may vary from project to project. The presentation will include discussions about the roles, responsibilities, and deliverables of both the design team and the construction team, and how their relationships with your agency vary with each delivery method.

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Tell the Story of Your Capital Project

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Abstract Title: Transportation Infrastructure Update and Delivery Challenges in the San Diego Coastal Corridor

Text: **ID: 2182**

SANDAG's 2050 Regional Transportation Plan envisions $8.4 Billion of capital improvements for the LOSSAN Rail Corridor, I-5 North Coast Highway Corridor, Mid-Coast Light Rail Transit Corridor and Environmental Enhancements Program. The programs are a coordinated, pioneering effort to implement multi-modal transportation projects involving light rail, commuter rail, intercity passenger rail and freight rail capacity improvements; interstate freeway capacity improvements with focus for bus and HOV; bike/pedestrian facilities improvements; environmental protection, lagoon enhancements and coastal access improvements in one of the nation's busiest Interstate freeway corridors and second busiest passenger rail corridor, using DBB, CMGC and other alternative delivery methods.

Updates and delivery challenges:

o Status of improvements in the 60 mile LOSSAN Commuter Rail Program.
o Implementing the 11 mile Mid-Coast LRT Project using the CMGC delivery method.
o Completing overlapping aspects of the LOSSAN Commuter Rail Program using the Mid Coast LRT CMGC Project.
o Implementing a portion of the 27 mile I-5 North Coast Corridor Highway Program and overlapping portions of the LOSSAN Corridor using the CMGC delivery method.
o Coordinating construction of the SANDAG I-5 Highway Program and the LOSSAN Commuter Rail Program to minimize environmental impacts on coastal lagoons.
o Implementing an Environmental Enhancements Program in order to minimize impacts on and restore six coastal lagoons.
o Implementing LOSSAN parking structures and facilities using the Design/Build delivery method.

This paper will present updates to and delivery challenges in SANDAG's approach to the multi-project implementation that will accomplish the 2050 RTP goals and objectives.

Event:	2015 Rail Conference
Track/Route:	Capital Programs
Session/Sub-Route:	Tell the Story of Your Capital Project
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Abstract Title: Expo OMF: A Delicate Balance of Sustainability, Efficiency and Aesthetics

Text: **ID: 2281**

The Expo Light Rail Line, one of newest additions to Southern California's many public transit offerings, will be the first mass transit line to connect Downtown Los Angeles with the Westside. Covering over 15.2 miles and 19 stations, one of the major components of the project is the Operations and Maintenance Facility (OMF). But this project is not without its challenges. Sited in a primarily residential neighborhood, this facility will orchestrate an immense amount of activity in a relatively small amount of space.

The project team started the design process using a triple-bottom line approach for environmental, economic, and social indicators. Given the site location and Metro's LEED Gold certification goals, it was a natural progression to designing a facility that will optimize efficiency and functionality for users while being sensitive to the environment and the surrounding neighborhood in which it will be carefully integrated.

The Expo OMF includes six light rail vehicle (LRV) storage tracks which can hold up to 15 three-car trains (45 total LRVs), a thru track, and a run-around track that allows efficient access to the entire LRV storage yard. In addition, it includes service and inspection, maintenance and shop functions, administrative office and training areas, a wash building and cleaning platform.

Event:	2015 Rail Conference
Track/Route:	Capital Programs
Session/Sub-Route:	Systems Engineering
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Abstract Title: Organizational Change Management & Incremental Implementation of System Engineering

Text: **ID: 2219**

In the first part of this paper we address and acknowledge challenges in the task of “changing habits” for us as humans as well as transit professionals. We present examples and results of research on why resistance to change is natural attributes of human beings and rather than being labeled as a negative attribute it should be acknowledged as a normal constraint to any improvement program.
In the second part of the paper we present examples and guidelines on how to incrementally introduce and establish system engineering processes so that stakeholder are less overwhelmed and can be motivated be positive results of small changes so they can embrace the subsequent phases of SE implementation. This part of the paper provides examples of how templates and relatively short and simple work instructions can result in immediate positive impacts on the capital projects.

Event:	2015 Rail Conference
Track/Route:	Capital Programs
Session/Sub-Route:	Tell the Story of Your Capital Project
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Abstract Title: The CTA Red Line Reconstruction project

Text: **ID: 2350**

The CTA Red Line Reconstruction project (Red Line) was proposed as a sustained mobility effort for residents living in the Chicago's South Side. The original track opened for service in 1968 and had fallen into a state of disrepair, creating slow zones and increasingly long trip times for passengers with few transportation alternatives. The new Red Line eliminates slow trip times and provides fast, reliable transportation to the heart of downtown Chicago. This project not only provides an affordable and reliable mode of transportation to passengers, but it also demonstrates the vision of transportation leaders to create a long-term sustainable community revolving around the Red Line.
The project team faced many challenges, specifically passenger and community support, a demanding construction schedule requiring project completion in 154 days, coordinating work access the middle of the Dan Ryan Expressway and interfacing schedules with another station rehabilitation contractor. The Dan Ryan project team met these challenges head on by understanding and developing a plan to manage schedule constraints, appointing a full time community outreach leader and implementing a training program for local laborers interested in working in construction. Through these efforts the project team reached nearly a 50% minority participation rate, surpassing the required goal of 19.6%. The result is a brand new rail line with decreased trip time and a sustainable mode of transportation for the community.

Event: 2015 Rail Conference
Track/Route: Capital Programs
Session/Sub-Route: Systems Engineering
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Abstract Title: A Systems Engineering Approach to Enhance and Support the Acceptance Process of RTD FasTracks

Text: **ID: 2158**

Project closeout is often the most neglected phase of the project lifecycle. The key activities in the closeout phase is the gathering of project data, records, and disseminating information as a basis to formally accept the project, perform project closure, and turnover the completed transit project to operations for revenue service. The Regional Transportation District (RTD) is currently engaged in FasTracks, a multi-billion dollar transit expansion program to build new rail and bus rapid transit in the Denver region of Colorado. All of RTD's project activities are aimed at ultimately accepting the work. This paper discusses the application of a systematic acceptance process based on the principles of systems engineering which is implemented by the RTD FasTracks team and the contractor to jointly monitor acceptance conditions. This best practice has proven to be instrumental to the RTD FasTracks team to proactively access relevant project acceptance information at the right time and in the right context to discern trends, identify issues, and ultimately open a corridor on time.

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Other Capital Programs Topics

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Abstract Title: Signalling Contracts: “I know you think you understand what you thought I wrote but I'm not sure...

Text: **ID: 2424**

Signalling Contracts: “I know you think you understand what you thought I wrote but I'm not sure you realize that what you read is not what I meant”

Signalling contracts are always written with noble goals, the best of intensions and clarity in mind. So why do so many signalling contracts end up with widely differing interpretations when property owner and supplier alike reach for the contract to clarify what is to be delivered?

This paper/presentation explores what goes into getting a signed contract between a property owner and a supplier that works and is intended to deliver a world class solution for the city it is to serve. It will explore what works and what doesn’t work. Who should be involved and many of the influences in play at the time it’s being hammered out. There is more similarity between them than one might think.

From the “Promise Makers” who wordsmith the contract through to agreement to the “Promise Keepers” who subsequently follow and whose job it is to deliver, this presentation aims to help get to “what you understand is written is what was meant”

Event: 2015 Rail Conference

Track/Route: Capital Programs

Session/Sub-Route: Tell the Story of Your Capital Project

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Abstract Title: Sugar House Streetcar (The S-Line Success)

Text: **ID: 2335**

This $37 Million TIGER II funded project includes two miles of streetcar and required focus and teamwork by nine federal and local stakeholder entities/agencies. The project had an aggressive budget and schedule that created numerous project challenges. One solution by the team involved full collaboration with five of the nine entities creating a unique "5 party Alliance Partnership" where the total $37 Million budget was used as a team incentive. The team was empowered with fiscal responsibility for project outcome as the team would split the savings on project five ways evenly to the partners. This approach served many other benefits than just fiscally, such as encouraging collaboration, reducing scheduling hurdles, open communication, and great lasting friendships.

In addition to the streetcar, the vision of this existing 66 foot wide railroad corridor was to encourage future development to front the streetcar corridor as well as create a plaza feel at key locations. It also houses a parallel trail and linear greenway in corridor. The end result is a multi modal corridor with streetcar, trail system, bocce courts, linear park, landscaping, and plazas that encourages the community to enjoy a more livable, walkable, and sustainable corridor.

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Other Operations & Maintenance Topics

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Abstract Title: Vehicle Availability in Small Fleet Operations

Text: **ID: 2301**

Due to size and limited funding availability, many newer rail systems (1989 to present) operate revenue service with a vehicle fleet sized to meet the service schedule, plus only one or two “spare” units. This lack of available equipment increases operating cost and can reduce service quality.

With the low number of total available vehicles, mechanical departments are required to advance, expedite, segment or, in the case of non-regulated systems, reschedule vehicle maintenance, to ensure standby availability required to protect revenue service. At the same time, operating departments are required to develop contingency plans to operate with a reduced fleet if it becomes necessary. Without cooperative and innovative approaches, customers could be left to wait for a non-existent train.

This presentation will look at four systems (3 commuter rail and 1 light rail) which operate or have operated under these conditions and the how each system worked to meet the schedule requirements.

The systems discussed will be:

Tri-Rail Commuter Rail
Northstar Commuter Rail
Blue Line (Hiawatha Light Rail)
Capital MetroRail

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Other Operations & Maintenance Topics

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Abstract Title: Human Factors and Ergonomics in Transportation Control systems

Text: **ID: 2419**

As the future public transit industry moves towards higher capacity, higher frequency and higher performance focused control systems, the operator's performance and reliability becomes ever more crucial. As a result, innovations in information technology, driven by demands for safer, more reliable and efficient operations, have led to the increased use of automation and centralized supervisory control, which in turn amplifies the consequences of equipment and human failures within safety critical environments.

The application of Human Factors and Ergonomics expertise in transportation reduces human error and influences human behaviour through designing effective and intuitive control systems. A holistic approach to considering Human Factors and Ergonomics throughout a system design lifecycle: the equipment being designed; the people using or encountering the equipment; the procedures that people adopt in their jobs using the equipment; and the characteristics of the environment where people use the equipment, is therefore necessary to support the required human intervention points within any control system

The public transit industry needs to recognize these demands and actively embed Human Factors and Ergonomics thinking and techniques into existing processes and safety culture to not only avoid errors affecting safety, but also those that impact upon service reliability.

Event: 2015 Rail Conference
Track/Route: Operations & Maintenance
Session/Sub-Route: Other Operations & Maintenance Topics

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Abstract Title: Challenges of Single Corridor Mixed DMU/LHC/Freight Use

Text: **ID: 2371**

Passenger rail in North America is experiencing a renaissance with dozens of projects under consideration or in development across the continent. The shift from a boxcar based freight system to primarily unit train and intermodal operations has created a number of opportunities for agencies to acquire lightly used freight corridors that may be up-graded to also accommodate passenger service. However, the comparatively high initial cost of a passenger project can be daunting. Thus agencies are looking at lower cost alternatives, especially for lines with light ridership estimates. A common option is to consider the use of modern Diesel Multiple Unit (DMU) equipment for off-peak services and traditional locomotive haul coaches (LHC) equipment for times of higher ridership. DMU are attractive due to the potential for lower capital and operating costs. However, in today's operating and regulatory environment, there are a number of items that must be considered when mixing DMU, LHC and freight on a single corridor. This paper looks at the challenges in operations, ADA compliance, and regulations in the development of mixed use corridors.

Event:	2015 Rail Conference
Track/Route:	Operations & Maintenance
Session/Sub-Route:	Maintenance Programs
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Abstract Title:	Using Thermal Video Imagery for Early Detection of Traction Power Anomalies
Text:	**ID: 2155**

Purpose

To capture thermal imagery of traction power infrastructure during peak revenue loads as a means of early detection of faults before they negatively impact revenue operations.

Background

WMATA has experienced a number of incidents involving failed components of the traction power infrastructure that caused disruptions to revenue service. By performing periodic testing of the complete rail system using thermal video imagery, WMATA has averted several potentially serious service disruptions.

Test Methodology

Railcars are outfitted with thermal video cameras that are interfaced to a data acquisition system. A speed sensor signal and visible light camera are also interfaced. The speed sensor input is used to calculate speed and distance so that locations along the line are known.

These specially equipped railcars are then run as normal revenue service cars during peak afternoon revenue hours to capture the system under maximum stress. Data analysis pinpoints the location of hot spots for follow-up inspection and corrective action.

A presentation will include details of equipment and software used, testing setup and execution, video showing a sample of testing in progress and examples of hotspots found and corrected.

This project, an example of being proactive rather than reactive, is a huge success for WMATA and we now perform this testing quarterly.

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Other Operations & Maintenance Topics

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Abstract Title: Organizational Change Management in the Transit Industry

Text: **ID: 2383**

Is the organizational structure of your transit agency capable of supporting the future operational needs of your organization, and more importantly the needs of your riders? Are your business processes, standard operating procedures, and job descriptions older than some of your employees? Are your training methods efficient and meeting the needs of your organization?

Significant technology advances in the transit industry are quickly changing the way the workforce completes daily tasks, however new technology hasn't often led to improved business processes designed to leverage technology that you already have – saving time and money! Are maintenance workers utilizing the built in troubleshooting and diagnostic programs built into new technology, or are they troubleshooting the old fashioned way – through trial and error. Are management and administrative staff utilizing the full benefits of "enterprise software applications" or did your organization spend hundreds of thousands of dollars on to have 25 – 50% utilization on expensive software and your staff sill managing the organization with "spreadsheets."

Updating business processes and SOP's is an effective way to create save time, reduce costs, and potentially minimize the number of workers needed to perform daily tasks. Learn from experts on how to change and improve business processes to improve operations, and drive change throughout your organization.

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Metrics, Performance Measures

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Abstract Title: Passenger Environment Survey - Relationship with Customer Satisfaction

Text: **ID: 2194**

MARTA began conducting the Passenger Environment Survey (PES) in 2010, based on the model developed by New York City Transit. The PES program involves the inspections of MARTA facilities and assessments of a number of qualitative elements that are difficult to measure by existing automated means. PES measures critical aspects of the transit experience at the stations and aboard bus or trains from the customer's perspectives.

PES consists of 130 metrics in four distinct categories measured in four passenger environments: Railcar, Station, Fixed Route Bus, and Mobility. Audits are done by a team of two quality assurance specialists and eight senior-level surveyors, none of whom report to operation's management. The data collected has a statistical reliability above 95% ± 5%, and it goes to a strict process of quality control. Reports are produced weekly, monthly, quarterly, and end of the year and distributed to stakeholders.

This paper will show how MARTA attempts to link performance on PES metrics with service attributes measured on MARTA's annual customer satisfaction survey (QOS). These point-in-time audits will be compared against customer perceptions from the annual customer satisfaction survey to determine the degree of agreement. The results will enable decision-makers to prioritize service improvements.

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Fare Technologies, Implementation Case Studies

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Abstract Title: Accelerating the Payback from Fare Collection Investment

Text: **ID: 2402**

Large public transit agencies are spending an average of 15 percent of their total revenue on fare collection. A recent survey of North American public transit agencies and transit sector consultants found that half of survey respondents have deployed, or are in the process of deploying, a new fare collection system, presenting both an opportunity and challenge.

This presentation will focus on cost saving strategies with solutions that can reduce the total cost of owning and operating a modern electronic fare payment system. It will also present opportunities to optimize additional multi-media channels to attract and invigorate new riders by lowering barriers to entry; and discuss the advantages of using commercially available software packages as a means to lower capital and on-going operational costs.

According to the survey, the most common driver behind a change of fare payment systems is the desire to make buying a fare and traveling on public transit easier for customers. The presentation will provide how transit agencies are meeting the need to replace old or outdated systems as the main impetus to consider modernization.

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Fare Technologies, Implementation Case Studies

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Abstract Title: Emerging Trends in Payment Options for Rail: Light Investment, Fast Returns

Text: **ID: 2300**

Recent advances in technology and communications have generated exciting new fare payment options, such as mobile payments and transit gift cards sold through third-party networks. These alternatives are subsets of programs primarily intended to fulfill other consumer needs and challenge the traditional approaches to transit fare payment. This session will compare and contrast traditional payment systems (hardware heavy: ticket vending equipment, faregates) vs. emerging payment programs (software-dependent) from a variety of disciplines: Financial (capital and operating costs, flow of funds), Schedule to completion, Effectiveness, Agency Intelligence (data), and Consumer acceptance and equity. The session will offer timely guidance for transit operators considering fare payment refreshment in the future. The panel for this session may include two or more rail transit operators reporting on agency experiences with emerging payment programs and two suppliers/consultants from the payments' area.

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Maintenance Programs

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Abstract Title: Non-Icing System (NIS) Light Rail Vehicle Pantograph

Text: **ID: 2285**

This paper describes the implementation of a method to prevent formation of frost or ice on a light rail transit system overhead catenary wire. The system comprises a special, non-current collecting, pantograph mounted on the light rail vehicle (LRV) roof, glycerin fluid storage and return containers, and an application control unit. The system has been used in Europe and will first be used in the U.S. by the Maryland Transit Administration (MTA) Light Rail in Baltimore, Maryland. Whereas mechanical catenary scrapers have been used to remove ice after formation, this system is to be used before the ice forms and does not wear the catenary wire. The special pantograph uses a soft felt-like roller one meter wide to coat the underside of the catenary wire with a film of glycerin. The glycerin film acts as a non-toxic hydrophobic barrier. This pre-treatment prevents formation of frost or ice for about two to three days. The paper will describe the implementation and level of success the MTA experienced during the first year of use. The paper will also describe the basic design and features of the system and interfaces with the LRV.

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Other Operations & Maintenance Topics

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Abstract Title: Golden rules & operational considerations when implementing a brownfield CBTC re-signalling project

Text: **ID: 2412**

With 29 years experience at London Underground in Operations and Projects, 2 years with Thales implementing CBTC projects and now with the Toronto Transit Commission as Deputy Chief Operating Officer, Mike Palmer has been on both sides of the fence as the customer, and contractor on brownfield resignalling projects.

Many older metros are facing capacity issues, or life expired assets in urgent need of replacement. With access at a premium and weekday closures untenable – resignalling an existing railway whilst maintaining a weekday service is not for the faint hearted but is often the only option.

Mike brings 20 years signalling project experience along with his operational knowledge and experience along some lessons learnt the “hard way” to the conference. These golden rules and operational considerations can apply at the 5 key stages in any project. However, particular emphasis and effort must be placed at the concept and definition stages when information and knowledge are often scarce, but aspirations and requirements run high.

Using real and recent examples, this is a chance to learn lessons from others before making the same mistake. It’s not bad though as there are plenty of areas of good practise to be shared as well.

Event: 2015 Rail Conference
Track/Route: Operations & Maintenance
Session/Sub-Route: Metrics, Performance Measures
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Abstract Title: A Flexible Approach to Performance Measurement Tools

Text: **ID: 2321**

Analyzing large systems for subtle trends and metrics is very difficult. With hundreds of thousands of events logged each day, it can be nearly impossible to measure how well a transit system is performing. Costly development efforts are often undertaken to create powerful tools and stylized reports, but those functions are intrinsically bound to the shape of the data; when a new site is commissioned, the development effort must begin anew. A common approach to this problem is data harmonization, but this technique loses much of the application-specific meaning, making it very difficult to actually use the data beyond specific purposes.

In this paper, a new approach will be detailed. By using an intermediate translation layer, data can be utilized in its native form. This approach allows for reuse of reports and queries without losing any meaning or context. The paper will also show how this technique has been used on new and legacy projects with different signaling systems and data formats and will showcase how this process resulted in development hours for a typical project being reduced by 92%. Finally, some examples of the automated reports will be included.

Event: 2015 Rail Conference
Track/Route: Operations & Maintenance
Session/Sub-Route: Other Operations & Maintenance Topics
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Abstract Title: Semi-Permanently Coupled Cars – Friend or Foe

Text: **ID: 2425**

Every Transit Organization will encounter a lifecycle asset replacement at some point; the process of procurement from the earliest stages of design through production are challenging enough. The “devil” is always in the details, selecting signaling interface, vehicle systems and forecasting ridership growth to determine fleet requirements are normal considerations/rational that will be realized, however consideration for Vehicle consist cannot be overlooked:

Friend:
Operations-Make up to form Trainsets no longer required, Workforce savings for service and maintenance
Facility-Opportunity to introduce the latest new facility/ergonomic and equipment enhancements, Trains are easily tracked
Reliability-Elimination of “Couplers” reduces Trainline induced communication issues (can be hardwired), Less moving parts to maintain
Availability-Train system set-up reduced down to either cab ends of the train, Passenger capacity is increased due to reduction of secondary cab control units, Improves dwell time due to larger passenger capacity handling
Maintainability-Reduced maintenance on redundant components, Safety/Standard Inspections are Train based versus Car based

Foe:
Operations-Learning curve to adapt to new technology and new configuration, Limitations to cross populate vehicles to other lines
Facility-Overhaul of existing infrastructure required to accommodate length of semi-permamently coupled cars, Speciality built infrastructure (Extensive impact to Brownfield operation)
Reliability-Reliability deficient car cannot be easily removed and coupled with another reliable car
Availability-Component Critical failures will result in the removal of the entire train, Components cannot be swapped with mate cars keeping vehicle available, Does not enable Transit to reduce vehicle length to correspond with passenger demand
Maintainability-Maintenance failure and or delay will result in entire train hold at facility, Less Flexible for consist reformation

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Other Operations & Maintenance Topics

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Abstract Title: Asset Life Extension in Uncertain Times

Text: **ID: 2422**

The TTC has been operating the Scarborough Rapid Transit (SRT) line for about 30 years. The line features linear induction motors, double traction power rails, and SELTRAC communications-based train control. Numerous studies over the years have made wide ranging recommendations regarding the future of the line, such as replacing the fleet and extending the line, converting it to a different LRT technology, replacing it with subway or shutting it down in favour of buses. This uncertainty has been challenging in terms of asset renewal – the TTC has been reluctant to expend large sums of public money on renewal of a line that may be decommissioned, but at the same time must maintain safe and reliable operation as the system ages.

Recently a bold decision has been made to extend the life of the line by 10 years, instead of shutting it down in Q4 2015. The scope of the renewal effort includes all SRT assets – rolling stock, track, structures, stations, signalling, power and communications – and is to be fast tracked over a two to three year period to gain maximum benefit from capital expenditures. Innovative solutions are being adopted to meet this very challenging schedule.

Event:	2015 Rail Conference
Track/Route:	Operations & Maintenance
Session/Sub-Route:	Rail Standards & Recommended Practices
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Abstract Title:	“When is the Right Time to Perform Stray Current and Corrosion Control Testing? A Guide for Procedur
Text:	**ID: 2204**

Abstract Title “When is the Right Time to Perform Stray Current and Corrosion Control Testing? A Guide for Procedures and Scheduling for AC & DC Powered Transit Systems.”

Although many Federal, State, and Local Agencies provide guidelines for various safety aspects of commuter and transit rail systems during construction, operations and maintenance there is no consensus or standards established for periodic maintenance and monitoring of AC and DC rail transit systems for corrosion control and stray current measurements. In addition, the scheduling, timing, and procedures to be used vary widely within the industry itself. This paper is intended to provide guidance on the periodic performance of maintenance testing; when it should be scheduled, how to reduce costs associated with its performance, what type of testing should be performed, criteria levels for stray current impact, test procedures and equipment required, coordination with adjacent utilities in the transit corridor, and what type of troubleshooting might be anticipated for issues such as low track-to-earth resistance, high levels of earth potential gradient, high levels of structure-to-earth voltage, and high levels of stray current generated from the traction power system.

Event:	2015 Rail Conference
Track/Route:	Operations & Maintenance
Session/Sub-Route:	Other Operations & Maintenance Topics
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Abstract Title: PlatformSafe – Warning Workers on Station Platforms Of Approaching Trains

Text: **ID: 2356**

Whilst the platform of a station might be considered outside the envelope of a train, there are nevertheless significant hazardous. For example, high speed trains can cause significant airflows which can be strong enough to literally blow personnel off their feet.

Snowfall is another hazard. With significant accumulations, a train can act like a giant snowplow, pushing a huge bank of snow at speeds in excess of 80 mph as the train passes through the station.

As a result of the risks, many operators take action such as rerouting or moderating train speed or providing costly flagging support to warn of the approach of trains. This can be disruptive as well as having significant budgetary implications.

In addition, managing the deployment of personnel across a transit agencies network poses many challenges.

In response to these needs, Bombardier's has developed a technology capable of automatically alerting personnel on station platforms of approaching trains as well as providing visibility of their locations and work activities at Central Control or elsewhere across the agencies network.

This session will discuss Bombardier's revolutionary PlatformSafe technology and the significant lessons learned from the second phase of its pilot deployment at a major North American commuter rail operation.

Event: 2015 Rail Conference

Track/Route: Operations & Maintenance

Session/Sub-Route: Other Operations & Maintenance Topics

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Abstract Title: YardSafe – Improved Safety and Effectiveness Within Rail Yards

Text: **ID: 2358**

Vehicle maintenance activities within rail yards pose both safety hazards as well as operational challenges. To ensure the safety of personnel, it is very important to establish effective controls that prevent any attempt to move trains while maintenance and other tasks are in progress either in, on, under or around the train.

Train maintenance facilities by their very nature are spread over a large area and often significant time is spent by personnel in walking between vehicles in order to complete their allotted tasks. This can often be several hundred yards or more each time.

Bombardier has developed a technology that both automatically provides the controls necessary to prevent train movements while work is in progress and optimizes work-flow and maintenance operations at rail yards at the same time.

This session will be used to discuss the implementation of YardSafe to optimize safety and work scheduling and the impact on worker effectiveness. The results of a pilot projects at two major North American rail yards will be presented as part of this session.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Funding, Financing & Revenue
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Abstract Title: California High-Speed Rail Authority and public-private partnerships

Text: **ID: 2377**

The Authority's delivery strategy is based on leveraging private sector innovation and expertise in the delivery of the IOS and the remainder of the system. The Authority recognizes the need to create significant partnership with the private sector that features balanced risk transfer, early planning input for innovation and cost reduction, and private sector investment. A key goal of the commercial approach will be incentives and strategies designed to support an excellent service while reducing the costs of developing and operating the system. The civil works activities on the IOS will be primarily delivered through a series of design-build contracts and funded through a combination of federal, state, and local funds. The Authority has already contracted with the private sector on the first design-build contract in the Central Valley (consortium of Tutor-Perini/Zachry/Parsons) and plans to continue to do so to build out the remaining substructure of the IOS. This presentation would highlight the public-private partnership needed for current public infrastructure projects and how that helps keep the program on time and on budget. The presentation would also talk about how the Authority is front loading their investment through state and federal grants and bonds while entertaining private sector investment interest at the same time.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Priortizing Rail in the Region
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Abstract Title: High-speed rail: Investing in the past, present, and future of California rail

Text: **ID: 2379**

California is estimated to grow to 50 million people by 2050, which would be similar to adding the entire population of New York state to California's current population. Providing the equivalent new capacity on the state's highways and airports would cost more than double the investment to develop a high-speed rail system between San Francisco and Los Angeles. If it was even possible, that would mean building over 4,000 new highway lane miles, 115 additional airport gates, and four new airport runways at an estimated cost of $158 billion. While the high-speed rail system would be able to operate without subsidies, the California Department of Transportation estimates operations and maintenance costs on those new highway lanes at $132.8 billion for over 50 years. Part of the Authority's Statewide Rail Modernization Plan is placing priority on improving existing rail corridors in the Central Valley, Bay Area, and Los Angeles/ San Diego regions. This presentation will talk about how the high-speed rail program is California's attempt at getting past its long-standing car culture and developing systems that prioritize smart and sustainable growth and transportation choices. Speakers will focus on the ability to connect communities through rail using high-speed rail as the impetus to create smarter, transit-oriented communities.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Station Area Planning
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Abstract Title: How California's high-speed rail system spurs smart growth

Text: **ID: 2378**

The California high-speed rail program is the largest public works project in the country and it is envisioned as the cornerstone for creating a new and more sustainable future for California. Growth in population and increased demand for travel will continue to occur in our state and investments in infrastructure will be required – The high-speed rail program represents a future with less dependence on the automobile and air travel and lower greenhouse gas emissions. Participants will learn how the plans for the project are becoming a reality and how the California High-Speed Rail Authority is working with the Federal Railroad Administration and the local jurisdictions to integrate the high-speed rail program into the existing transportation network to achieve a more sustainable environmental model and with local jurisdictions to find solutions that provide opportunities for more focused growth in downtowns and around stations.

Event: 2015 Rail Conference

Track/Route: Planning, Sustainability & Finance

Session/Sub-Route: Environmental Processes

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Abstract Title: I spent five minutes at this public hearing. What I heard will shock you.

Text: **ID: 2310**

With its “viral content” sounding title, this presentation is intended to emphasize the critical nature of communications amongst customers, advocacy groups, and transit agencies. While social media and mobile devices have altered our communications strategy, discontent still remains between community members and transit agencies. Mention a public meeting and chances are you will hear a collective groan, or at minimum, an audible eye roll. Advocacy groups and community members expect very much out of these meetings and often leave disappointed and frustrated. Transit agency representatives expect that the meeting will run smoothly and be effective; they often leave disappointed and frustrated. Why are both sides feeling such a high degree of discontent with this process? There are multiple opportunities to improve the conversation —public hearings on service or fare changes, promotion of new transit initiatives, relaying information about projects being built, and day-to-day customer feedback. Based on experience working with a local advocacy group and case studies of other advocacy groups, the presentation will focus on lessons learned from the front lines of public meetings. Key points of the research include: understanding and communicating the overarching planning process; utilizing media channels to optimize communications; and creating an overall structure to the transit agency’s engagement program. The case study locations include: Louisville, KY; Atlanta, GA; Providence, RI; Eugene, OR; and San Jose, CA.

Event:	2015 Rail Conference
Track/Route:	Planning, Sustainability & Finance
Session/Sub-Route:	Other Planning, Sustainability and Finance Topics
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Abstract Title: Storm Hardening for DC Traction Power Systems, with a Focus on Urban and Sub-Surface Environments

Text: **ID: 2318**

Hurricane Sandy had a major impact on many transit agencies in the Northeast. Facilities and infrastructure assets were severely damaged. Some are still in a state of disrepair as engineering designs are being developed. With climate change and more severe weather predicted, replacement of equipment in-kind is not sufficient. Flood mitigation solutions are required for prevention of costly damage and service outages such as those suffered as a result of Sandy.

Options for long-term resiliency of traction power systems are presented: watertight electrical enclosures, removable ventilation barriers for substations, waterproof and electrically insulated materials for cable splices and connections, and strategies for closing emergency exits and other openings for sub-surface systems. The costs, impacts, and practicality of each solution are discussed.

The recommended materials and configurations include gasketed fiberglass boxes, silicon gel connectors and heat shrink, watertight hatches similar to those found in naval applications, and custom ventilation covers for substation and sub-surface ventilation.

With appropriate implementation of these solutions, existing traction power systems will be more resilient to future water damage imminent with severe weather, and it is recommended that transit lines prone to water damage, located in flood zones, close to sea level, or in underground tunnels install these solutions.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Environmental Processes
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Abstract Title: Streamlining Maintenance of Way Management in a Complex Regulatory Environment

Text: **ID: 2290**

The Sonoma-Marin Area Rail Transit (SMART) is rehabilitating a historic railroad right-of-way (ROW) in San Francisco's North Bay area for new passenger service to relieve traffic congestion on Highway 101. The project involves restoration of the track bed, signals and communications, bridges, and numerous stream crossings along a 70 mile corridor. Financial, logistical, and planning constraints required SMART to rehabilitate the corridor in phases. Project segmentation and the presence of endangered species and sensitive aquatic habitats led to highly complex regulatory processes. To better navigate the highly restrictive regulatory environment, SMART prepared a Maintenance of Way Compliance Plan (MOWCP) streamlining ROW maintenance by combining individual plans for integrated pest and vegetation management, hazardous materials handling, natural resource protection, stormwater and non-stormwater management, fire management, cultural resources management, and training together into one document. This presentation will highlight MOWCP organization and illustrate how it is linked with environmental geodatabases to empower maintenance planners and work crews with access to precise locational information to enhance identification of sensitive buffer areas and treatment options. It will also demonstrate how the MOWCP can increase operational efficiency by simplifying maintenance planning, implementation, and record keeping while ensuring protection of sensitive environmental resources.

Event:	2015 Rail Conference
Track/Route:	Planning, Sustainability & Finance
Session/Sub-Route:	Other Planning, Sustainability and Finance Topics
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Abstract Title: Linking Planning and NEPA with Local Planning Studies

Text: **ID: 2410**

Now that FTA no longer requires an Alternatives Analysis step, how are local agencies making planning decisions that will feed to good and informed decisionmaking about major capital investments? How do agencies best involve the public, and what are the major challenges they are facing when the project is not yet "real"? This paper will look at several active projects in Seattle, Portland and Utah that are currently developing options for major investments that are likely to seek federal funding under New Starts or other grant programs. This includes high capacity investments that are part of larger corridor/subarea comprehensive planning programs (Portland, Oregon and Salt Lake City, Utah) and several multi-jurisdictional corridors in the Seattle Metropolitan area that are considering a range of BRT, Light Rail and related high capacity transit investments for long range planning and potential new local funding programs. The paper will compare some of the local steps to the previous AA requirements, and recommend key elements that best support decisions that "stick." It will also review innovative ways to use social media, transit advocay groups, and other interactive tools to more fully engage the public.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Environmental Processes
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Abstract Title: Planning for and Preparing Section 4(f) and 6(f) Evaluations for Transit Projects

Text: **ID: 2284**

This paper and presentation will cover the considerations regarding Section 4(f) of the Department of Transportation Act and Section 6(f) of the Land and Water Conservation Act (LWCA) for transit project development. Section 4(f) of the Department of Transportation Act of 1966 requires special consideration of publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public/private historical sites for projects using federal funds. Requirements include analysis of the project alternatives to determine whether or not there is a feasible and prudent alternative to use of the land and consideration of all possible planning to minimize harm. Section 6(f) requires that the conversion of lands or facilities acquired with Land and Water Conservation Act funds be coordinated with the Department of Interior and typically requires in-kind replacement of property. With further streamlining of the FTA project development process and the focus on locally-led analysis of project alternatives, considering these types of properties early in the process is important. Documenting potential impacts and decisions made regarding alignments is necessary, especially when there are potential impacts to 4(f) properties. Some examples include special considerations for 4(f) properties such as reuse of historic train depots and shared use of historic railroads that can be part of the actual project but still require evaluation. In addition, overhead contact systems in historic downtown settings have posed specific challenges on recent projects. 6(f) properties impacted along linear corridors can also present specific challenges in terms of in-kind replacement of properties. This paper and presentation will cover specific transit project examples across the country and considerations given to de minimis, programmatic evaluations, and evaluations that include a least overall harm analysis.

Event:	2015 Rail Conference
Track/Route:	Planning, Sustainability & Finance
Session/Sub-Route:	Transit Oriented Development (TOD)
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Abstract Title: Route 1, Northern Virginia: Anticipating rail along a suburban arterial corridor

Text: **ID: 2391**

The Washington DC metropolitan region continues to benefit from high-quality rail service. With the recent opening of the Metro Silver Line, community leaders have seen that system expansions are possible.

How to set the stage for the next rail extension? And how to integrate plans within the context of a multi-lane suburban arterial highway? The Route 1 multimodal alternatives analysis, conducted by the Virginia Department of Rail and Public Transportation, considered key “implementation factors” including transit supportive land use, a feasible project funding plan, and a transformed local street network.

The study applied an innovative approach to synthesize alternative growth scenarios, transit demand forecasts, and phased infrastructure requirements, all within a challenging multi-agency, multi-jurisdiction environment.

Event: 2015 Rail Conference

Track/Route: Planning, Sustainability & Finance

Session/Sub-Route: Environmental Processes

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Abstract Title: Environmental Justice and Closing the Light Rail Gap in Los Angeles

Text: **ID: 2203**

The Regional Connector Transit Corridor project is a just under 2-mile underground light rail link in downtown Los Angeles which will connect 4 LRT corridors covering over 80 miles. The project will allow LA Metro to operate major LRT lines which are currently discontinuous and require bus to rail transfers. Construction of the project will affect all of downtown but especially the Little Tokyo community. Little Tokyo is one of only three remaining Japan-towns in the U.S. It is a historic and cultural focal point for Japanese Americans in Los Angeles and the U.S. A portion of the neighborhood is designated as a historic district and on the NRHP. Impacts to Little Tokyo would affect not only local residents, but also the cultural roots of Japanese Americans nationwide. Metro applied focused, innovative and proactive issue resolution techniques during the NEPA and construction phases to ensure the community is protected.

Event: 2015 Rail Conference

Track/Route: Planning, Sustainability & Finance

Session/Sub-Route: Other Planning, Sustainability and Finance Topics

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Abstract Title: Unique Partnership and Phased Approach to Project Development

Text: **ID: 2202**

Utah Transit Authority (UTA) is leading the Southwest Salt Lake County Transit Study; a 13-mile transit project identified in the MPO's long range plan. The project would provide a fixed-guideway E-W connection between two N-S light rail lines and commuter rail through 4 suburban cities. UTA, in partnership with the cities, county, and 2 private land owners, entered a cost-share agreement to conduct a two phase study. Phase I is a TOD market study, ET+ scenario modeling, and ridership modeling. Phase II is the NEPA document (EIS). By phasing, a risk analysis checkpoint is created for the stakeholders and UTA to review the modeling data and decide whether or not to enter Phase II.

The data output from the market study is the input for the land use scenarios. The combined output of both models is the input for the ridership model. The unique approach of utilizing these modeling tools in Phase I, in addition to the traditional travel model, provides a wider range of project benefits and more information regarding the costs and benefits of transit and land use changes. The end result is more informed decision making, better guidance for policy makers, and refined alternative in the EIS.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Station Area Planning

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Abstract Title: Walkability - A Powerful Tool to Drive Ridership and Revenue

Text: **ID: 2214**

Metro cares about transit walk sheds because more households accessible to transit by walking translates directly into more ridership.

We've been focusing a lot on transit walk sheds lately. We've shown that the size of a transit walk shed depends heavily on the roadway network and pedestrian infrastructure, and that these sizes vary dramatically by Metrorail station. We've also demonstrated that expanding the walkable area can make hundreds of households walkable to transit.

But why do we care so much about walk sheds? Because larger walk sheds mean more households in the walk shed, and that means ridership. For example, we'd be hard pressed to find many households in Landover's small walk shed, so it's no surprise that walk ridership at that station is low. On the other hand, thousands of households are within a reasonable walk to Takoma's larger walk shed, and walk ridership there is much higher.

In other words, the more people can walk to transit, the more people do walk to transit – and data across Metrorail stations prove it.

In part because walk access is so critical to ridership growth, our new Connecting Communities KPI (PDF) will evaluate how well the region adheres to its plans to promote the highest and best use of the land around Metrorail stations by growing and improving walk access to transit.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Other Planning, Sustainability and Finance Topics
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Abstract Title: Planning Service Networks with HCT to Maximize Benefits and Support

Text: **ID: 2253**

Engagement and planning for transit network planning should be an integral part of planning for a high capacity transit alignment. Doing service and capital planning together allows integration of service to better serve communities. It also allows transit project agencies to have a more complete understanding of the project and potential benefits. The presentation would include examples from one project under construction and due to open the year of the conference, and two more in planning or Project Development stages.

Event: 2015 Rail Conference

Track/Route: Planning, Sustainability & Finance

Session/Sub-Route: Priortizing Rail in the Region

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Abstract Title: Tri-Rail Coastal Link (TRCL) – A Case Study in Shared-use Railroad Corridors

Text: **ID: 2326**

The TRCL project is a unique rail project in that it involves an extension of Tri-Rail commuter service onto the active and expanding FEC railroad in southeast Florida. It encompasses an 85-mile stretch of Henry Flagler's original railroad from Jacksonville to Key West, Florida. The corridor, which carries freight and intermodal trains, is simultaneously being improved to carry higher-speed intercity passenger trains between Miami and Orlando, the busiest city-pair in the U.S. And in anticipation of the widened Panama Canal, the railroad, USDOT and FDOT have invested in significant upgrades to track and ICTFs at PortMiami and PortEverglades.

TRCL has been in the planning phase for a decade and is scheduled to enter the FTA Project Development phase shortly. FECI stopped running passenger trains in 1968 but has demonstrated renewed interest in permitting an easement for commuter rail service from Miami to Jupiter while running intercity service from Miami to Orlando.

Public and private stakeholders strongly support the TRCL commuter rail service and SFRTA has completed an extensive TOD study noting the benefits to the regional tax base of capturing incremental real estate value increases to offset part of the service's O&M costs.

Event: 2015 Rail Conference

Track/Route: Planning, Sustainability & Finance

Session/Sub-Route: Priortizing Rail in the Region

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Abstract Title: Washington Metro: Impacts of regional growth and system expansion on downtown transfer stations (

Text: **ID: 2392**

As the Washington DC region continues to grow, patterns of Metrorail use are changing, leading to passenger crowding at key transfer stations within the rail system.

This presentation highlights how WMATA is applying system-level demand forecasting, and station-level pedestrian simulation, concept engineering, and cost-benefit analysis to evaluate the utility and feasibility of expanding key underground stations.

The Gallery Place and L'Enfant Plaza stations have been the subject of intensive capacity and design studies. WMATA has applied detailed forecasts and simulations of transfer movements to develop alternatives for station reconfiguration. In turn, engineering design and economic analysis have been applied to assess and compare the alternatives.

The resulting designs have been adopted into capital plans and are being carried forward for implementation.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Funding, Financing & Revenue
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Abstract Title: Core Capacity Experience: Three Years Later

Text: **ID: 2365**

MAP-21's new authority for "core capacity" projects has now been on the books for just under three years. The core capacity program has the potential to dramatically expand funding for existing rail transit systems which already provide a vital link in delivering customers to work, education, and other services. With ridership demand pressures increasing commensurate with a trend in urban core revitalization, the need for increased core capacity is essential for global competitiveness of our cities. Generational shifts are recognizing the sustainability and health benefits of urban living, and our transit systems must be prepared for the future generations of transit customers. With the Chicago Transit Authority receiving the first cycle of funding and other cities queued up for the next cycle, this session will lay out the program approach. Additionally, we will explore the actual benefits and challenges of the core capacity program in the context of projects in the pipeline. How does the program apply to rail line capacity improvements? Do station improvements contribute to the capacity of a line or system? What lessons-learned can be applied to core capacity project development for your city?

Suggested Panel: CTA – Michael McLaughlin or Steve Hands; FTA?; Jacobs – Michael Booth (NEPA consultant for CTA); other agencies (Charlotte and New York have applied to enter Project Development, and others such as BART and WMATA are considering core capacity projects)

Event:	2015 Rail Conference
Track/Route:	Planning, Sustainability & Finance
Session/Sub-Route:	Funding - FTA Rules & Oversight
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Abstract Title:	New Starts and Public Private Partnerships (P3):Streamlining Opportunities and Recommendations

Text: **ID: 2186**

In an effort to support a greater number of projects, the percentage of federal funding for an individual New Starts/Small Starts project has been limited to 60% or less of project costs. Reduced federal funding and more local government and private sector participation create a need and opportunity for faster and more nimble project development. Contractors and investors eager to commit to jobs or projects may not be willing to wait for extended periods of time, and agencies need to control costs, which typically increase over time due to inflation and the opportunity for scope changes.
Our paper will provide suggestions for the FTA to streamline the New Starts process by focusing its oversight efforts on the most critical risk areas of a project that are not already being overseen by another third-party entity. This can be accomplished by basing the level of oversight required for an individual project on the following factors:
1. Level of experience of the grantee;
2. Type of procurement/risk transfer;
3. Amount and type of existing oversight from independent, third-party entities other than FTA;
4. Type of financing applied to the project.

Event: 2015 Rail Conference
Track/Route: Planning, Sustainability & Finance
Session/Sub-Route: Higher and High Speed Rail
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Abstract Title: High Speed Rail - The Texas Way

Text: **ID: 2259**

Discuss the development of high speed rail in Texas. The Texas methodology is a different approach as it is will be an investor lead initiative. We will discuss the role of government in that process. In this approach, TxDOT would work to ferret out the the largest risks any project faces - environmental risk. By bringing projects through the environmental stage items that will make projects attractive to investors will be readily known. We will talk about where TxDOT is in this new process for realizing high speed rail in the United States.

Event: 2015 Rail Conference

Track/Route: Planning, Sustainability & Finance

Session/Sub-Route: Other Planning, Sustainability and Finance Topics

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Abstract Title: Pay Parking at Transit Stations: Balancing Objectives & Making the Case

Text: **ID: 2168**

GO Transit has regularly increased ridership on average by 4% per year, increasing parking spaces by 2,500 per year. With more than 67,000 parking spaces across the system, GO Transit is North America's second largest parking operator. Currently, parking is free at all commuter rail stations with the exception of 4,000 reserved spots at specific stations.

As part of the GO Transit Rail Parking & Station Access Plan, GO Transit is adopting a new approach to parking expansion, curbing the number of new spaces built annually and investing more in alternative modes of station access. To support this plan, Metrolinx and GO Transit staff undertook a one-year study to investigate a pay parking policy and begin planning a system to be prepared if and when a decision is made to implement pay parking at GO Transit's 53 rail stations that offer parking.

The objectives of the pay parking program are threefold. First, to manage the demand for parking, thus reducing the amount of annual investment required for parking expansion. Second, to generate revenue to offset the costs of building and operating parking facilities. And third, to ensure that the parking experience for customers that have no choice but to drive to the station remains attractive and of a quality that will continue to attract and retain riders.

The study included a number of research methods to inform an evidence-based, robust and responsive approach to pay parking at transit stations. Case study research included interviews with 12 different transit agencies throughout North America, Australia and the UK to understand proven best practices and key lessons learned. Scenario modelling incorporated a sophisticated user behaviour model to test and evaluate the impacts of different pay parking scenarios on parking demand, ridership growth, and net revenue. The study also incorporated focus group sessions with customers to test the system concept, rate structure options, and communications messages.

Event: 2015 Rail Conference

Track/Route: Planning, Sustainability & Finance

Session/Sub-Route: Transit Oriented Development (TOD)

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Abstract Title: Transit-Friendly, Complete Streets are Critical to Transit-Oriented Development

Text: **ID: 2416**

Successful Transit Oriented Development (TOD) requires the seamless integration of the public realm of streets with the private realm of buildings. The streets of TOD need to be much more than conduits for vehicular travel – they must be corridors for mobility by all modes of travel as well as vibrant venues for commerce and social interaction. Functionally, they are spaces shared by a diversity of users including private automobiles and trucks, public buses and shuttles, and, significantly, people on foot and bicycles.

This session will discuss the process to plan and design green, sustainable streets adjacent to commuter rail stations in three Connecticut cities – New Haven, Norwalk and Stamford - that expand transportation choice, encourage healthy and active lifestyles and create more livable communities.

The integration of public infrastructure and private development is important to transit because it:

• Improves accessibility and mobility to a range of convenient and efficient transportation modes;
• Provides for a safe, continuous network of sidewalks and bicycle routes that will foster non-motorized transportation;
• Creates a more walkable, transit-friendly environment; and
• Attracts quality development and greatly enhances transit ridership.

Event:	2015 Rail Conference
Track/Route:	Planning, Sustainability & Finance
Session/Sub-Route:	Funding, Financing & Revenue
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Abstract Title: Filling the Gap: Funding Transit Infill Stations in the United States

Text: **ID: 2169**

This paper summarizes the success factors in obtaining funding to support construction and operations of ten infill station projects in the United States. Due to population growth and changes in land use patterns, some areas along existing transit lines have become prime locations for infill stations. Infill stations can be a cost-effective way to provide access to transit systems, but many agencies have limited funding available to support the capital and/or operating costs of new transit projects. Therefore, most infill stations have been funded with a creative mixture of federal, state, and local funding sources, including tax increment financing (TIF) and special assessments. In addition, private stakeholders have recognized the development potential of infill stations, serving as project champions and funding partners. For infill station projects to succeed, it is important to obtain transit agency cooperation, define long-term operating funding, and earn the support of stakeholders in the immediate project vicinity. Infill stations that have a strong partnership between stakeholders and the transit agency may have access to a larger pool of potential capital and operating funding. Other success factors for transit infill stations include the use of innovative project delivery and greater public support.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Contracting for Services

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Abstract Title: Trust, Teamwork and Contract Operations

Text: **ID: 2303**

Over half of all commuter rail services in the U.S. and Canada are entirely or partially provided by private contract operators. With the growth of rail in North America (commuter, light rail and street car), contract operations is becoming more prevalent.

The decision to contract service varies but, once that decision is made, a contractor is entrusted to operate the service in the name of the agency. That trust can be limited by varying the scope of the contract from only a small portion of the service (e.g. MOE only) to full turnkey operations.

In any case, the level of trust and teamwork between agency and contract staff can result in a visible difference to the traveling public. A lack of trust can result in reduced efficiency, redundancy and potential confusion to the traveling public.

Building a trusting partnership between a government agency and a private company can be difficult but is essential to ensure a reliable and efficient service. Although each party shares the common goal of providing excellent service to the public, they may have different approaches to meet this goal. Improving understanding and communication on both sides can result in an improved team atmosphere and better service to the public.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Other Policy, Management & Workforce Topics

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Abstract Title: How data and information impacts your ability to make policy: What your BI and Dashboards won't tell

Text: **ID: 2421**

An organization's policies are often set with data or information as part of the decision-making process. Data and information are included in the decision-making process with the intention of improving the quality of the decisions. However, the way in which data is reported can have a great impact on whether the data improves your decision or leads you astray. Data presentation methods can make it appear as though there is a difference, change or trend when no such pattern exists. Equally concerning, is that common tools for representing data can hide a pattern that exists, preventing a policymaker from recognizing a pattern.

The impact of seemingly simple and innocuous data presentation techniques, such as an average, can hide important information that would change decisions if they were known, will be explored. Other common issues, such as how decimals can influence the perceived accuracy of a result, are core topics.

By incorporating knowledge of data interpretation from the disciplines of asset management, and market research, some essential data best practices will be communicated. This will allow policymakers, and others to better leverage data's positive potential and avoid pitfalls that have negative impacts.

By relying on easily relatable examples of data and information presentation issues, and tying those back into transit applications, the often reviled and avoided subject of data interpretation will be made accessible.

Event: 2015 Rail Conference
Track/Route: Policy, Management & Workforce Development
Session/Sub-Route: Human Resources/Workforce Development/Aging Workforce
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Abstract Title: Transportation Train-the-Trainer Program

Text: **ID: 2266**

In 2013, the industry's Transit Elevator/Escalator Training Consortium developed a train-the-trainer program. In this one week, learner-centered course participants learn:
• Characteristics of adult learners and how to accommodate them
• Qualities of an effective instructor
• The 9 key events of instruction
• Pros and cons of different teaching techniques
• Evaluation techniques

This instructor-ready course includes detailed instructors guides, PowerPoint presentations and assessments.

The course was recently piloted at BART - co-instructed by Bart's Elevator/Escalator Section Manager George Younger and Program Manager of Instructional Design Julie Deibel from The Transportation Learning Center. Although there were experienced trainers in the class, there was still room for growth. One participant said this of the course: "When they told me I was going to a Train-the-Trainer course I thought 'Why? It's like going through a driving course after you've been driving for 30 years.' Little did I know I had been driving with one eye shut!" These thoughts were further supported by an average knowledge gain of 70% as measured by pre- and post-course assessments.

This presentation will focus on sharing experience and exploring how the Train-the-trainer can be used in other sectors of transportation.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Human Resources/Workforce Development/Aging Workforce

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Abstract Title: National Signals Training Consortium Abstract

Text: **ID: 2265**

Amtrak, the five large commuter railroads and a dozen transit rail agencies have joined with the Transportation Learning Center to form a National Signals Training Consortium with the aim of developing an all new suite of signal maintenance training materials. The Consortium is driven by the increasing need to train maintainers because of retirements, line expansion and new technology like PTC. The Consortium is funded by contributions from the agencies and during the first 18 months a grant from the Federal Transit Administration.

The Consortium is based on the proven methodology of the industry's elevator-escalator training consortium where locations assign two subject matter experts (one management and one labor) to courseware development teams. These SMEs work with instructional designers that use the 9 events of instruction and a strong focus on interactivity to engage adult learners. Finished instructor-ready courseware includes detailed instructors guides, PowerPoint presentations, original video footage, photos and assessments for key topics including track circuits, switches, train stops, grade crossings, signaling, interlockings, troubleshooting and control panels. Later PTC specific materials will be developed to supplement the basic modules above.

This presentation will highlight the consortium's formation, work processes and resulting products along with a review of participants' feedback.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Human Resources/Workforce Development/Aging Workforce

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Abstract Title: Training Employees New to the Railroad Industry

Text: **ID: 2222**

Training Employees New to the Railroad Industry:

Metro-North Railroad consists of 6000 employees. Most of these individuals are hired without any prior railroad industry exposure. The railroad industry is a unique environment with unique workplace hazards, and the function of Metro-North's Training Department is to equip these newly hired individuals with the knowledge and skills necessary to be a valuable asset to our organization. At Metro-North, we are currently facing a very unique challenge. In 2013, our organization turned 30 years old. This milestone also marks 30 years of service for a large number of our most knowledgeable and experienced veteran employees. These employees are now retiring at a rate not previously experienced by Metro-North, and their vacancies must be filled. Our Training Department is tasked with the responsibility of not only filling these vacancies, but also replacing the knowledge and the experience that we are so rapidly losing. Our structured New Hire Programs along with periodic refresher training is designed to turn out the valuable employees that we rely on to keep our equipment running and in good condition. We combine informative classroom sessions with hands-on training and Supervised Work Practice to give our New Employees the best advantage possible. The presentation that I plan to deliver will outline the circumstances of Metro-North's workforce turnover and highlight the role of the Training Department in replenishing our most valued asset, our workforce.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: State of Good Repiar (SGR)

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Abstract Title: Solving the $86 Billion Problem: A Call to Action for SGR and Transit Asset Management

Text: **ID: 2404**

The latest US DOT report places the SGR backlog for the nation's transit systems at an all-time high of $86 billion, growing $2.5 billion annually. And while the focus on transit asset management (TAM) and funding for infrastructure in MAP-21 has been a critical first step, the sobering reality is such: there is no amount of future funding that will allow transit agencies to "buy" their way into a state of good repair simply by replacing aging assets.

This presentation is a call to action to our industry. Without a transformational shift in how we manage our assets and run our organizations, we will find ourselves increasingly having to cut service in a time where we should be adding service, and even worse – progressively compromising safety and reliability along the way. Drawing on recent survey research of transit asset managers across the US and around the world, we will explore the current deficiencies in asset visibility, investment, and organizational commitment that must be overcome in order for us to seriously reduce the SGR deficit.

Fortunately, transit can take lessons from other asset-intensive industries that have learned to operate with greater efficiency, less risk, and higher customer satisfaction by not only funding a vision for strong asset management, but also transforming the entire organization along the way.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Accessibility, ADA

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Abstract Title: Validation of the space for accommodating Wheeled Mobility Devices on the Next Generation of Accessi

Text: **ID: 2166**

The specific project objective includes developing “virtual” models of accessible lavatories and seating spaces that incorporate the recommended new accessibility specifications. The use of “virtual” validation tools and models permits the development, validation and calibration of different spatial configurations and different types of wheeled mobility devices prior to full scale testing. The design wheeled mobility device is a power base. Larger scooters are also evaluated for unoccupied stowage with the assumption the scooter users will transfer to regular train seats.
The validation work has used the Acela and TALGO cars to serve as base models for the 2-D and 3-D renderings. These designs were optimized, validated, and calibrated with large wheeled mobility devices including; sport manual wheelchairs, power wheelchairs and 4 wheel scooters. The large scooter that meets the 30 inch by 54 inch long footprint does not fit inside the accessible restrooms and also compromises seating space in the coach. The powerbase and manual wheelchairs work the current Acela trainsets, and the new recommended accessibility specifications.

Event:	2015 Rail Conference
Track/Route:	Policy, Management & Workforce Development
Session/Sub-Route:	Human Resources/Workforce Development/Aging Workforce
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Abstract Title: Success through Mentor-Protégé Programs: Advancing Opportunities for Disadvantaged Businesses

Text: **ID: 2184**

Transit Agencies put a lot of resources toward their Disadvantaged Business Enterprise (DBE) programs. With minimal additional investment, a Mentor-Protégé Program can be implemented to leverage existing Agency/Contractor relationships and foster the growth of disadvantaged firms within the Agency's ridership area. A successful Mentor-Protégé Program will further augment our industry's strong support for the participation of DBE's, providing tailored partnerships that assist firms in obtaining opportunities to provide the services our industry so desperately needs.

A Mentor-Protégé Program will provide tangible results to Transit Agencies:

1. Enhance the capabilities of disadvantaged firms to successfully compete for and execute transit work as prime contractors and/or subcontractors,

2. Increase the pools of qualified local disadvantaged firms, and by extension, increase disadvantaged firm participation on transit contracts.

This paper will show how agencies can develop strong Mentor-Protégé Programs modeled on the successful Mentor Protégé Connection (MPC) Program as administered by the Georgia Minority Supplier Development Council (GMSDC). The Georgia MPC Program has successfully paired large corporations, including Delta Airlines, Home Depot and Coca-Cola with emerging firms, with demonstrable results.

Event: 2015 Rail Conference
Track/Route: Policy, Management & Workforce Development
Session/Sub-Route: Human Resources/Workforce Development/Aging Workforce
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Abstract Title: Knowledge Management in the Transit Industry

Text: **ID: 2387**

You Don't Need a Crystal Ball to Plan for the Future – Why Your Organization Needs to Implement a Knowledge Management and Retention Strategy

The time is now to start asking difficult questions about your workforce. Do you know who and how many of your seasoned employees will retire in the next year? Within three years? Within five years? Do you have a way to capture the knowledge and experience of your soon-to-retire employees? Do you have a plan to transfer knowledge from retiring workers to current or new workers who will be their successors? Do you have a plan for recruiting new employees to either replace the retiring workers, or backfill positions current employees will vacate as they assume positions of retiring workers?

During the recent U.S. recession, a large group of retirement-eligible employees put their plans on hold. For an employer, when experienced employees stay to help manage a successful path as they anticipate retirement, it is certainly a benefit. However, impending retirements and the increasing use of technology in the workplace have most organizations wondering what their workforces will look like in the near future. The picture may not be clear, but that doesn't mean organizations can't start planning for the future.
Creating Your Roadmap for Success

Knowledge Management deals with how best to leverage knowledge internally and externally in organizations—that is, creating value out of the organization's intellectual assets. Many organizations are using Knowledge Management to increase innovation, build their institutional memory, improve their internal and external effectiveness, and help in becoming adaptive, agile organizations. Implementing effective Knowledge Management and Retention strategies have a profound impact on organization performance.

This session will provide attendees with clear steps to develop a knowledge management program within their organization.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Human Resources/Workforce Development/Aging Workforce

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Abstract Title: PTC - Addressing workforce skills and developing customized training

Text: **ID: 2384**

The Rail Safety Improvement Act of 2008 requires that Positive Train Control (PTC) systems be installed by 2015 on rail lines providing passenger service and the National Transportation Safety Board has identified PTC as one of its “most wanted” initiatives.

Training is key to the successful implementation of PTC systems which makes ensuring that agencies existing training documentation, facilities and training schedules, in addition to understanding the impact of the new system on the railroad’s rules and procedures impact operators, technicians and training personnel a critical element of any PTC project.

Whether or not this mandate will be met is yet to be determined, the larger looming question is will the Transit Industry’s workforce have the skills necessary to install and maintain these complex systems. Attendees will learn from industry experts on how training is being deployed to address skills related to PTC – in the classroom and remotely in the field.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Other Policy, Management & Workforce Topics

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Abstract Title: The Transit Training Department's Consultant Role in transit Operations

Text: **ID: 2283**

In public transit organizations, training specialists acting in a consultant role is vital to transit maintenance and operations. Once an incident occurs, operations departments in distress do not always find it easy to admit that a performance problem exists. When transit employees that can perform their jobs properly but do not, transit mangers are faced with addressing the serious issue of public employees not meeting established standards of performance. Oftentimes, an operations performance issue is misinterpreted as a training problem. Both training departments and line operations will benefit from a clearly identified separation of training and performance deficiencies. This formalized collaboration will enable training departments to develop a more suitable alignment of training objectives to solve performance problems.

Can a training department really change the behavior of senior employees that previously performed the job without incident? This presentation will show how a training specialist adds value to transit operations by not only teaching employee skills but by helping to differentiate between performances and training problems before incidents occur. This presentation contends that a training specialist is not exceeding their expertise or charter by providing recommendations related to operation issues. These skill sets will be most useful when training departments are sought for consultation about employees that know how to perform a job but do not perform it for some reason. This discussion highlights how transit training departments are an added value to operation departments when they are not regulated to only solving human performance problems in public transit.

At the end of this presentation, the participant will understand:
• How transit training departments can add value to transit operations by analyzing operations and business practices
• The need for training specialists to expand beyond addressing human performance issues

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Human Resources/Workforce Development/Aging Workforce

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Abstract Title: Veteran Recruitment - Hiring The Best

Text: **ID: 2188**

According to the US Bureau of Labor Statistics, the 2013 unemployment rate for Gulf War veterans is 9.0 percent in.* This underutilized group has some of the key skills for the transportation industry. Overall, Veterans offer leadership, ability to respond quickly to emergencies, experience in following safety procedures, and affinity to working in a team environment.

The MTA has made large strides in hiring vets. For example, over 29% of NYC Transit's Security Eagle Team are current and former military.

The key to attracting vet candidates is the development of in-person relationships.

They include:

At each veteran job fair, MTA recruiters provide business cards for each military applicant. At each outreach event, the MTA compiles e-mail addresses and regularly provide these applicants with examination opportunities, employment listings and military job fair events.

Another important source is social media. The MTA has over 3900 contacts on Linked-In and has joined several military Linked-In groups like the Afghanistan War Veterans with 9,771 members and Army Strong Leaders with 16,133 members. .

With jobs that have high level of veterans such as Security or Bus Operations, a veteran is included in the interview panel.

The MTA attends events such as military drills, mega-musters and Family Days at military installations.

To ensure that reservists are treated correctly, the MTA coordinated an USERRA workshop (Military leave law) with the US Department of Labor and a military resume class with the Wounded Warriors Project.

On September 4th, the MTA is having an Educational Summit inviting College and University Veteran Liaisons to learn about the internship opportunities throughout the MTA.

Hiring Veterans provides the transportation industry with uniquely qualified staff. They made our country safer and they will make our industry safer too.

Event:	2015 Rail Conference
Track/Route:	Policy, Management & Workforce Development
Session/Sub-Route:	Labor Relations
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Abstract Title: Unique Approaches to Labor Relations

Text: **ID: 2368**

This presentation will examine working with unions in the absence of a collective bargaining agreement and how to manage relationships in an Open shop environment. The presentation will also examine unique approaches to labor and employee relations including labor strategies and conflict resolution and mutual outcomes.

Event: 2015 Rail Conference
Track/Route: Policy, Management & Workforce Development
Session/Sub-Route: Buy America
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Abstract Title: FRA vs. FTA Buy America Requirements: What are the differences?

Text: **ID: 2199**

Buy America is always an important topic among Recipient/Grantee transit agencies, TVMs and equipment suppliers. Since transit industry members aren't always clear on the differences between the FTA and FRA, attendees would have an opportunity to "ask the experts" (i.e., FTA & FRA) and the practitioners. Why is a Component on one contact a Subcomponent on another? While FTA contemplates increasing the Rolling Stock 60% standard incrementally toward 100%, FRA defines domestic component counting values and those requiring domestic steel manufacturing. What costs 'count' and what's not included? Panelists will discuss the "grey areas" of required documentation, sufficient manufacturing activities, supplier certification, and moving Buy America forward.

Moderator:
Charles R. Wochele, Managing Partner/Owner, TransitConsult (backup Moderator would be current APTA Procurement & Materials Management Chairperson)

Panelists:
• Representative from Chief Counsel's office, USDOT Federal Railroad Administration, Washington, DC (Linda Martin invited, other potential FRA panelists include Karen Hedlund, John Johnson, Kevin Kesler)
• Representative from Chief Counsel's office, USDOT Federal Transit Administration (Richard Wong invited, other potential FTA/DOT panelists include Mary J. Lee, Corey Walker, Dorval Carter)
• Robert "Bob" Nixon, President, Diversity Matters 2 US, LLC, Canisteo, NY
• Representative from a TVM who's manufactured both FTA and FRA funded railcars (e.g., CAF, Sumitomo)

Event: 2015 Rail Conference
Track/Route: Policy, Management & Workforce Development
Session/Sub-Route: Other Policy, Management & Workforce Topics
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Abstract Title: Metro's Workforce Involvement Network, a Path to Workforce in Transit Partnership

Text: **ID: 2372**

LACMTA - Metro has been working diligently on meeting the near term and long term workforce learning and development needs. It began with the vision of our CEO Mr. Art Leahy of capturing the experience and wealth of knowledge gained by our frontline workforce as On-the-Job Training (OJT). To be followed by developing strategies to meet the growing need for the most qualified operators as the Metro rail system expands and its experienced workforce nearing retirement.
In partnership with Federal Transit Administration Metro was successful in developing a Metro University program to:
1. Fill the near term leadership gaps and preparing the next generation to lead Metro's important role in moving the Los Angeles economy and population
2. Prepare the frontline workforce to continue providing excellence in service, based on OJT, while it expands its knowledge of new technologies in transit
This presentation will focus on the many programs that are being either developed and/or implemented for leadership and frontline workforce training, coaching, mentoring, and expanding the role of women in transit. It will provide actual data and examples of some of the programs with a focus on one of the best practices program.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Human Resources/Workforce Development/Aging Workforce

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Abstract Title: Use of Mentoring to Expand Training Capacity

Text: **ID: 2277**

The importance of providing bus technicians with essential mechanical and electrical skills cannot be overstated, especially in an environment of rapidly advancing vehicle technology and a dwindling supply of skilled workers. Unfortunately, training is a luxury that many agencies simply cannot afford as budget reductions often mean that maintenance training gets cut in favor of other agency needs. There is, however, a path to enhancing maintenance training capacity with minimal effort and cost. Making use of highly experienced technicians as mentors not only allows them to pass down the wealth of skills they have acquired over the years, but provides novice technicians eager to learn with a highly effective hands-on training experience. A guidebook on mentoring prepared by the Transportation Learning Center will serve as the basis for a presentation and follow-up interaction to assist APTA Rail Conference participants better understand how a structured mentoring program can become an effective training tool. Topics will include tips on selecting the right mentors, defining roles and responsibilities during the mentoring period, understanding various learning styles, and describing how to develop task sheets to guide and document on-the-job learning.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Human Resources/Workforce Development/Aging Workforce

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Abstract Title: Transforming a Culture through On-Boarding and Training

Text: **ID: 2351**

Over the last two years, Rail Transportaion at WMATA has adopted several strategies to support robust bench strength development. These strategies include core competency studies, structured on boarding and orientation, executive coaching, and re-alignment of training programs. RTRA has quietly begun the process of strengthening their workforce and transforming the organization culture.

The mantra for RTRA's training branch has been Opening doors to careers in Rail Transportation . Consequently, instead of training focused exclusively on hardware, all training programs focus on customer service & interpersonal communication skills, job related skills, safety, and the business of transit. These four components work together to develop a new kind of transit employee with fuller understanding of the transit business and the customer experience. Finally, the introduction of the Leadership Development Initiative for RTRA management personnel has provided all leaders with coaching and professional development to enhance their leadership skills. With a strong emphasis on building leaders for today and tomorrow, RTRA is attempting to move from a hardware oriented approach to workforce development to a people-skills and people management approach.

Event: 2015 Rail Conference

Track/Route: Policy, Management & Workforce Development

Session/Sub-Route: Other Policy, Management & Workforce Topics

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Abstract Title: Driving innovation through knowledge and tackling the demographic knowledge bomb

Text: **ID: 2256**

America's Rail industry is facing a demographic knowledge bomb as the current generation of 'baby boomer' experts are now starting to leave the workforce. This is likely to leave significant experiential knowledge gaps for the organization's corporate memory. Also, as staff leave organizations strategically important knowledge within the organization leaves with them.

This paper will outline the process that Arup has undertaken to ensure that knowledge of rail projects is not only captured, but is also actively utilized in its day to day work in its global rail business through the use of a range of knowledge reviews that can be delivered both in the office and trackside.

It will also outline how, in a global organization, the requisite knowledge is located, as well as tapping into that expertise to provide highly focused 'just in time' knowledge.

It will also set out the use of 'communities of practice' within the global rail business and how this is used, not only to answer key technical, but also key business questions and as a driver of innovation within the business.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Security Technology

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Event: 2015 Rail Conference
Track/Route: Safety, Security & Emergency Preparedness
Session/Sub-Route: Safety Programs & Safety Culture
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Abstract Title: Transit safety engagement: Creating a culture of commitment in public transportation

Text: **ID: 2250**

Moving transit organizations from a culture of compliance—where workers are only passive participants in safety—to a culture of commitment, with workers taking the initiative to identify exposures and reduce at-risk behavior, requires a comprehensive approach to safety that engages employees at all levels.

When people are not involved in the safety process and marginalized to a position of only “following the rules,” a culture of commitment to safety becomes virtually impossible to achieve. High-functioning cultures actively involve workers in safety-related decisions and engage them in their area of expertise, using their unique position to address exposures and risks at the worksite. Workers who feel their voice is heard and their participation is valued become more engaged in their work, the goals of the organization, and efforts to improve safety.

This presentation will be co-presented with Gary Webster, Retired CEO, TTC and covers the steps transit leaders need to take to move their culture from compliance to commitment using employee engagement to drive the change. This change starts with:

1. Understanding how value is created in your organization and how to cultivate the value for safety
2. Ensuring that employees see the connection between their work and the big-picture objectives for safety
3. Empowering individuals to exercise their personal judgment in assessing and mitigating exposures to risk and injury
4. Making sure that higher-order systems and processes don’t punish people for trying to do the right thing—even when they fail

Creating a culture of commitment is about meaningful involvement. When employees see that their input is valued and management takes their concerns seriously, they naturally want to reciprocate by taking the organization’s mission and goals on as their own.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Safety of Track Workers

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Abstract Title: CPUC has approved LAMTA newest ranging technology for the safety of track workers

Text: **ID: 2293**

The CPUC in California has approved LAMTA's newest ranging technologies for track worker safety. CPUC has issued new requirements for wireless technology to be mandatory with track workers and flagging on the Right Of Way.

Protran Technology the leading manufacture or advance warning technology has been the only system approved by the CPUC, LAMTA, MTA, GCRTA and other agencies. Do the CPUC's requirements supersede the NTSB recent highest recommendations.

What do these requirements mean to the industry, what technologies are required and approved.

The presentation will focus on the following:

1. New Mandatory requirements
2. CPUC requirements and the NTSB recommendations
3. What technologies have over 5 year of revenue service in the United States and European countries
4. Who is using the technologies in the United States and what are the Pro's and Con's
5. What's next in track worker advance warning

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Prevention of Platform, Pedestrian, & Trespasser Fatalities

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Abstract Title: Protran Technology deploys deploys newest Trespasser, Pedestrian and flood Warning Technologies

Text: **ID: 2295**

LA Metro, MTA Maryland, GO Transit deployed Protran Technologies newest advance warning technologies utilizing special sensor, radar and communications to allow advance warning to train operators of platform intruders, wayside trespassers and flood warning. The system give an advance warning to train operators to help mitigate accidents to give the operator enough time to react well before the danger.

The presentation will show the newest systems that have been implemented which feature data logging, real time streaming of pictures and video and communicate directly with safety and security.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: Train Operator advance warning of Rail Break, Buckles and kinks to prevent derailments and accidents

Text: **ID: 2291**

In 2014 the Transportation Research Board (TRB) awarded Protran Technology grant "78" to further develop and test a unique sensor and communication system to detect any major delta change in rails such as breaks, buckles and kinks and condition that lead to such events. The system must warn any train operator in the area in real time and well in advance to the danger. It must further data log the state of the rails "Rail Neutral Temperature" (RNT) for historical data to determine factors that contribute to rail fatigue.

The current finding will result in giving advance warning to train operators of pending poor or dangerous rail conditions and help provide safer transit rail service by more definitive continuous reporting of rail conditions and allow for verification of field weld, distressing curves and any rail cuts that will prevent rail breaks, buckles and kinks.

We would like to present the results or this outstanding TRB program.

Kind regards,

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Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: If You Build It, They Will Use It! A Dedicated Emergency Operations Center

Text: **ID: 2174**

Are you an Emergency Manager or Planner, challenged by the lack of understanding of what it is that you do, what Emergency Management is, and why it is important?

Are you in an agency that does not or will not support an active emergency management program because it lacks merit and value? Do you have one side of the organization wanting support and coordination during every day crisis' while the other side of the organization does it on their own? Are there competing priorities which silence your voice? Or do you have an active program, a great emergency operations plan, but no one turns the lights on in the EOC?

This presentation will focus on every day challenges of emergency management in the transit environment. Strategies on how to educate policy makers, stakeholders and operations staff will be discussed while promoting a paradigm shift through capacity training and recruitment of EOC staff.

Best practices will be discussed to help move the emergency management program from status quo to a robust, innovative and progressive program.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Safety Programs & Safety Culture
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Abstract Title:	Getting Your Safety Message to the Floor (End User)
Text:	**ID: 2359**

For years in the industry we have a constant focus on engaging our leadership to become Safety Leaders. With a focus on a Safe and Preventative Culture, we need to ensure the right message get to the employees on the floor or in the field. In this presentation, I will review the following activities of strong leadership, of our organization and within the industry and the key elements of their communications.
These activities being:
- Developing the right message
- Best methods of Delivery
- Validation and understanding of message (2 way communication)
- Informal versus informal
- Pitfalls & penetrating the layers of the organization

As we know leadership is the driving force of getting the right organizational culture, for them to be to creating the right and sustaining culture – their message must be understood, heard and validated.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Other Rail Safety, Security & Emergency Preparedness Topics
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Abstract Title: De-Escalation Techniques for Transportation Professionals

Text: **ID: 2242**

Confronting angry and potentially aggressive passengers is an everyday occurrence on most public transportation systems. Knowing how to properly interact with these individuals can mean the difference between an uneventful route and someone being injured or killed. Interpersonal skills are an often overlooked yet undeniably important talent transportation operators must possess. Understanding valuable verbal and non-verbal de-escalation techniques as they relate to public transportation is critical in lowering liabilities and the number of violent encounters on any transit system. This presentation will discuss and demonstrate how to effectively and efficiently calm, relax and de-escalate individuals and bring about the end result the transit operator is looking for. These techniques are useful in preventing violence and creating a more friendly and peaceful atmosphere for public transportation. Effective communication techniques are a must for all transportation professionals.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: Emergency Response Planning & 911 Communication Skills

Text: **ID: 2244**

Proper preparation prevents poor performance. Simply knowing what to do in an emergency is not enough. People must practice and rehearse. Participation in realistic drills and hands-on training scenarios is a must for all public transportation operators and administrators. This presentation discusses how to effectively design emergency response drills and conduct essential, lifesaving tasks. Critical information such as the "Fight or Flight Syndrome", heart rate considerations, tactical breathing and the "OODA Loop" will be discussed in detail along with numerous examples. Additionally, effective 9-1-1 communication skills will be taught allowing for a more streamlined and rapid response from first responders. Understanding the benefits and limitations of an All Hazards Approach will be discussed. Regardless of the type of emergency (traffic crash, fire, active shooter, tornado, earthquake, etc...) this presentation will provide beneficial information to all attendees.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Other Rail Safety, Security & Emergency Preparedness Topics
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Abstract Title: Hijacking Awareness & Response

Text: **ID: 2240**

Recent research indicates an annual increase in mass transit system hijackings and attempted hijackings. Public transportation operators and administrators must know how to effectively, and realistically, respond to these types of dangerous situations. This presentation will detail current public transportation hijackings and attempted hijackings, how to prevent a hijacking, what operators should do if they are hijacked, how to assist law enforcement, and an overview of what the law enforcement response will be during these stressful circumstances. This presentation also covers the increasingly frequent occurrences of active shooters, and is specifically geared towards mass transportation. Understanding the proper response procedures for hijackings is essential for the safety and security of passengers and as well as the operator, and critically important for an effective response from the transportation agency involved.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: Identification of Concealed Weapons on Mass Transit Systems

Text: **ID: 2243**

Everyday individuals bring weapons onto mass transit systems. Nearly all of these weapons are concealed. Public transportation is at risk when passengers illegally carry weapons such as knives, pistols, rifles, shotguns or explosives into transit systems. What steps can transportation agencies take to prevent concealed weapons? How can transit operators identify when a person is carrying a concealed weapon? These questions and many more will be answered in this presentation. Numerous examples will be discussed and demonstrated, including audience participation. When transit operators know what clues to watch for they can determine when someone is potentially carrying a weapon, and then take preventative steps to avoid a violent situation.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Other Rail Safety, Security & Emergency Preparedness Topics
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Abstract Title: Indicators of Violence on Transportation Systems

Text: **ID: 2241**

The best response to violence on public transportation systems is to avoid the violent encounter all together. If transportation operators, and administrators, know what human signals to watch for they can prevent a violent situation. Understanding both the verbal and the non-verbal indicators of violence can alert transportation professionals to impending violence and allow them an opportunity to prevent the outburst. This presentation discusses and demonstrates the warning signs people display prior to lashing out in violence. These clues are observable in all people regardless of cultural background, ethnicity or any other individually identifiable characteristics. Violence within general society is increasing and as it does it spreads to more mass transit systems around the globe. If you want to prevent violence on your transportation system, this is the presentation for you.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Safety Programs & Safety Culture

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Abstract Title: Financial benefits of Safety management for public transportation organization

Text: **ID: 2172**

System safety management has some costs associated with it when you try to implement it in your organization. Often, organizations do not recognize the long run benefits of establishing system safety management in return of upfront cost associated with developing the system. The benefits are all across the organization and project life cycle. It starts from design engineering steps through system requirements, implementation, manufacturing, installation, testing and commissioning. System safety can reduce cost of redesign, re-engineering, retest and associated impact in organization and project. At the same time there are major risks related to not running the system safety management in organization which can be summarized in to “Health, economic and legal”. Every single of these risks can have significant consequences in Organization which will be presented in detail. These benefits are mostly generic across any type of project and organization and can be easily translated to financial benefits.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Other Rail Safety, Security & Emergency Preparedness Topics
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Abstract Title: Security Planning and Emergency Preparedness for Rail and Transit Tunnels

Text: **ID: 2289**

As a former regional director for TSA responsible for rail and transit security, I developed an understanding of the relationship between being proactive and reactive. This blended operational security and infrastructure protection to provide an overarching framework for a balanced security plan.

Operational security enhanced by physical measures is vital to protecting a rail line or transit system. Mitigating the threat, lessening the impact of an incident and resuming operations as quickly and safely as possible is the goal. It is important that measures be used that detect the incident, trigger evacuation and emergency response, and activate an operations plan to mitigate the incident.

The premise of this paper is to identify tunnel and underground station events, such as the release of toxic chemicals, and mitigation measures to be employed to effectively respond to and not compound the incident. A concern is that trains entering the tunnel and station could “push” a contaminant further into the tunnel and possibly to another station. A combination of operational planning and technology coupled with a properly designed system are important for a measured response. Forward thinking will also provide for a resilient contingency plan.

Parameters considered include contaminant detection, triggering a proper response, station and tunnel evacuation, preventing trains from entering the tunnel, alternate routes and operational support to manage the incident. Further, several things must be considered when planning for emergencies. The first is identifying anticipated threats, vulnerabilities and risks and mitigation measures. Then and operationally, system capabilities to support alternate routes should be identified. Finally, geographical, political subdivision and support infrastructure constraints must be addressed. These parameters will be developed as they impact security, emergency preparedness and contingency planning.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Safety Programs & Safety Culture

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Abstract Title: Leverage the silver lining: Using safety incidents to uncover cultural opportunities

Text: **ID: 2249**

No leader wants to hear that an employee was injured. But when an incident occurs, how people handle it and investigate its causes goes a long way to ensuring that it doesn't happen again. Unfortunately many incident investigations tend to be shallow, resulting in a blame game that concludes with the injured employee being punished and told to "be more careful" in the future.

Safety incidents provide transit organizations with an opportunity to recognize unwanted patterns in behavior that may be unintentionally endorsed by leaders, legacy, and the company's culture. These influences are often the primary causes of accidents. Identifying them and creating action plans that will minimize their impact on employee behavior will not only improve safety outcomes but will also advance overall performance.

A successful incident investigation:
• Identifies immediate causal factors (unsafe condition or at-risk behavior)
• Identifies root causal factors (additional unsafe conditions, at-risk behavior, systems or cultural factors)
• Develops a set of action items that will address the immediate and/or root causal factors
• Identifies a mechanism for ensuring the action items are having the desired impact and that the change is sustainable

Safety incidents are never welcome news, but they provide opportunities to identify underlying factors that contribute to risk. This session will be co-presented with Mr. Gary Webster, Retired CEO, TTC. It explores the best approaches to handling public transportation incidents and discusses what leaders can do to care for employees and ensure that improvement efforts target the underlying causes of accidents.

Learning outcomes:
• Gain practical knowledge of the underlying causes of most incidents
• Examine why employee behavior is not usually the root cause of incidents
• Explore the principles of effective incident handling
• Improve understanding of the cultural influences that contribute to accidents

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Security Technology

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Abstract Title: Real-time Video Forensics for Rail and Transit

Text: **ID: 2157**

Chances are, your transit agency employs hundreds or even thousands of video surveillance cameras, recording the daily comings and goings of passengers. That video is a useful tool for investigations, but what if you had to use that video to get to the heart of the matter fast? Imagine trying to locate and track the movements of a potential suspect. Where is the suspect now? What's he planning next? Manually searching through all that video could take hours, even days.

Now imagine if with the aid of next generation video analytics, you could reduce your search time from days or hours, to minutes. While it may sound like a concept straight out of an episode of CSI, this technology, which unleashes the real-time forensic capabilities of surveillance video to locate a person of interest – is real. And it's available to transit agencies today.

An operator simply selects a video image, uploads a suspect picture, or creates a suspect composite, and the Suspect Search video analytics goes to work, searching through hours of video in minutes and automatically filtering out 95% of irrelevant images. Based on the operator's target match selection, the suspect's route is marked on a map, showing the suspect's current or latest known location. The operator quickly relays this information to field personnel who can then apprehend the suspect.

This technology enables you to quickly:

•Search for a criminal suspect, intruder, active shooter or suspicious looking individual
•Find the owner of an unattended/suspicious baggage
•Locate a lost child
•Conduct a thorough forensic search

Join NICE for this session to explore this innovative technology and share in several success stories. Discover firsthand how your rail or transit agency can leverage this innovative technology in its daily operations.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: Creating and Implementing Effective Tabletops, Exercises, and Drills

Text: **ID: 2305**

Transit operations and infrastructure can cover large areas and could involve multiple different agencies if a problem were to occur. When it comes to transit-related accidents, this means there may be many hazards that emergency personnel may not be aware of. A recent NTSB report of a rail accident even cited the local fire department for their lack of preparation. While transit does not carry hazardous cargo, do emergency responders know how to safely gain access to the trackway when responding to a rail incident? Do they understand the dangers of rail vehicles, third rail equipment, overhead catenary, or other types of propulsion systems and what to do? What about the differences in vehicles in the same consist? Each method has its own positive and negatives in training company personnel and first responders. Opening new transit facilities and rail alignments requires familiarization for emergency responders, but follow up is an important key. These methods can be helpful in teaching your own personnel on how to interface with first responders and other public workers by maintaining relationships and contributing to continuing operations.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Interface of Light Rail & Traffic

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Abstract Title: In the Middle of the Street - Improving Safety Around Street-Running Operations

Text: **ID: 2304**

Mixing rail vehicles with automobiles can bring about serious consequences – especially when operating in close proximity such as adjacent to or sharing lanes in the street. While interurbans and steetcars were much more common in the early twentieth century, street-running operation has brought back the challenge of trying to interact with cars, buses, trucks, and pedestrians in today's urban environment. Planning stages are always the best time to fix problems, such as finding alternatives to street running or creating transit-only lanes and transit malls. There are many operational changes that have been tried to help reduce accidents, such as: changing traffic signals and patterns, adding backplates and in-pavement lighting at intersections, working with City Public Works on maintenance and striping, and partnering with stakeholders and adjacent business in creating safer environments for vehicles and pedestrians. Each idea works differently depending on location. With the growth of new streetcar systems around the country, these are issues which will become more common. Most important is learning that very few problems are unique to one property - learning what others have done can translate into creating a safer system for your passengers and the public.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: Rail Runs Through It: Maintaining Safety and Operations Around Construction Zones

Text: **ID: 2302**

Rail transit can be an impetus for growth and redevelopment. However, this can bring about hazards within our Safety Zones related to old buildings being torn down or refurbished, new buildings constructed in their place, or others that are being expanded. This tends to disrupt service and create serious safety issues throughout the construction period, especially when directly above or below the track or power supply. Large construction projects can affect the safety of a rail system due to modified vehicle and pedestrian traffic flows, modifications to OCS or other rail infrastructure, temporary closures of stations, and necessary modifications to service that are outside the agency's control. Additionally, risk management and insurance policies need to be considered and updated in order to plan for the "unexpected" occurrences which happen during such projects. By performing proper hazard analysis and implementing proper company procedures and policies, along with working with City management, workers and passengers can be kept safe and aware of hazards during construction periods while minimizing the impact to operations.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Prevention of Platform, Pedestrian, & Trespasser Fatalities
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Abstract Title:	Manual to Improve Rail Transit Safety at Platform/Train and Platform/Guideway Interfaces
Text:	**ID: 2165**

The objective of this TCRP A – 40 research project is to develop a manual for practitioners to improve safety at rail public transportation platform/train and platform/guideway interfaces. The research results will assist transit agencies to prevent and minimize the consequence of incidents and improve safety. This research is focused on rail transit, and is divided in engineering, operational and passenger profile. Key issues include the design of the vehicle doors and the interface with the platform edge, distracted passenger behavior, shared right of way with freight operations, and between car barriers. The incident data obtained during the project indicates that one of the key challenges are severely intoxicated and suicidal passengers. The project also highlights best practices from transit operators around the world and these include public outreach programs, event management to mitigate platform crowding, use of intrusion detection technology for platform edge protection including platform screen doors, and innovative station designs that accommodate two modes of public transit. The product of the research will be a safety manual for public transit agencies.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: Legacy Safety Case Verification for a Train Control System in a Modern Standards Environment

Text: **ID: 2299**

Verification of acceptability of railroad risks requires application of a comprehensive safety strategy. Industry practices and Safety Standards (e.g. AREMA, CENELEC) have evolved over the past thirty years and have equipped the modern safety engineer with the tools to comprehensively assess the safety of new train control systems to produce robust Safety Cases. However, with the advanced age of many railways' infrastructure, the safety engineer often faces the issue of systems that were developed prior to the existence of modern safety standards. Such systems are typically considered to have grandfathered safety status based upon a prolonged operating history without safety incident. In the event of an incident that calls into question the validity of this grandfathered status, the existing Safety Case must be reevaluated in the context of modern standards.

This paper outlines the undertakings of the Systems Assurance team at Hatch Mott MacDonald along with WMATA's engineering staff to define and construct a Safety Case for the WMATA legacy ATC system that utilizes the obtainable Product Safety artifacts, developed in the 1970s and 80s, as foundations for a comprehensive Application Safety Case consistent with modern day Safety Standards or to provide legitimately defensible safety arguments therein, where inconsistencies exist.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Safety Programs & Safety Culture
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Abstract Title: Risk Reduction Program for Commuter Railroads – A Proposed Framework

Text: **ID: 2271**

A major concern for US Commuter Railroads is to ensure safety of the passengers, employees and the general public while maintaining operations. Recent catastrophic accidents at major Railroads emphasize the need for improving safety. Enactment of Railroad Safety Improvement Act (RSIA) of 2008 requires all commuter Railroads to develop a Railroad safety risk reduction program to systematically analyze the risks in Railroad operation and mitigate them to reduce the number of accidents, incidents and employee injuries. A risk analysis is required to evaluate operating and maintenance procedures and practices, infrastructure, equipment, employee levels and schedules, employee training, management structures and other elements of Railroad operations.

This paper proposes a framework for a risk reduction program that addresses all aspects of a Railroad and explains how to apply traditional hazard analysis techniques to prevent accidents, employee injuries and fatalities. Hazard analysis approach can be thought of as investigating an accident before it occurs. The proposed framework classifies the Railroad system into equipment, infrastructure and personnel and explains appropriate hazard management tools to assess the risk involved in design, operation and maintenance phases. This paper also describes risk assessment methods to evaluate the identified hazards.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Security Technology
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Abstract Title: Improving CCTV functionalities, Challenges and Opportunities at MARTA

Text: **ID: 2218**

CCTV is an important part of safety and security measures in any transit agency. Significant amount of capital is spent to provide coverage to vehicles and properties to enhance safety and security of passengers, employees and assets. It is crucial to reach maximum functionality out of the massive investment. Knowing that resources are limited, including human resources to store and monitor online and offline videos MARTA is pursuing three initiatives in parallel with enhancing CCTV infrastructure and covering all its vehicles and major properties.
In this paper we provide our experiences as case studies for the benefit of the APTA members. These initiatives include:
• Optimizing video quality vs storage space by focusing on use case development for police functions and using video coding and video quality measures.
• Using accelerometers in three dimension to tag recorded videos helping the investigation of incidents associated with sudden change of speed in the MARTA Vehicles
• Using Video analytics equipped with Artificial intelligence and learning ability to help with surveillance, prevention and investigation of vandalism in MARTA’s vulnerable properties.

Event: 2015 Rail Conference
Track/Route: Safety, Security & Emergency Preparedness
Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: Importance of Verification & Validation (V&V) in Rail/Transit

Text: **ID: 2423**

The paper will provide introduction, definition and define goals and objectives of V&V. It will detail phases involved, discuss elements of V&V and elaborate on efforts involved in increasing V&V implementation in U.S. Rail/Transit. Paper will include a discussion on V&V interfaces with System Safety, auditing, QA/QC, System Assurance factors as well as Operations Support. Finally, it will cite lessons learned from V&V implementation in overseas rail/transit and their direct application on U.S. Rail/Transit.

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Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Safety Programs & Safety Culture
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Abstract Title: Never Too Busy For Safety - The Culture of Safety at SEPTA

Text: **ID: 2364**

The Southeastern Pennsylvania Transportation Authority (SEPTA) is the 6th largest transit agency in the nation. The culture of safety at SEPTA must include a holistic approach that incorporates employees, customers and neighbors. Safety at SEPTA must cross modal boundaries as compliance with FRA, FTA and State Safety Oversight regulations must be incorporated into a culture that also includes 17 labor unions. In order to do that, SEPTA created an employee safety campaign titled "Never Too Busy Create evaluation criteria and methodology for Clever Devices Bus Turn Warning System. For Safety" as well as a customer campaign titled "Make The Safe Choice". Both campaigns cross multiple modes and includes a multi-media approach to reaching the target audience.

SEPTA's internal safety campaign included a global safety stand down where managers professed the importance of safety to their employees. Tools were created for managers to help assess work place hazards and make corrections where needed. The external campaign addressed trespassing as well as platform safety and distracted pedestrians. The campaign featured 500 septa staffers fanning out across the system to address customers with safety tips. The campaign was featured prominently on local news broadcasts and even included a safety video featuring the Phillies Phanatic.

Both customers and employees have embraced the campaigns.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Other Rail Safety, Security & Emergency Preparedness Topics
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Abstract Title: Fulton Center: A Fire & Life Safety Case Study

Text: **ID: 2367**

Fulton Center is a new head house that will interconnect 12 existing transit lines and six stations serving more than 275,000 passengers per day in New York City. Existing transit lines were built by multiple private agencies in the early 20th century. Fulton Center will house a variety of different tenants and occupancies including assembly, business, and mercantile. The building features an atrium that extends from two levels below to five levels above grade. The design marries new construction with the Corbin Building, a listed historical property constructed in 1889.

How do you integrate modern rail infrastructure with existing transit lines and stations built over 100 years ago? How do you construct one of the largest and most complex transit centers while preserving a historic treasure?

This paper is a fire and life safety case study on the Fulton Center and will highlight the challenges and unique solutions associated with:

• Implementing a range of life-safety codes across multiple jurisdictions and agencies.
• Developing appropriate code variances to enhance function and architecture while maintaining safety.
• Integrating historical properties with modern construction and rail infrastructure.
• Understanding how fire strategies can be integrated with architectural strategies for cost savings and architectural preservation.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Cyber Security
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Abstract Title: Cybersecurity Programs at MARTA

Text: **ID: 2187**

The Metropolitan Atlanta Rapid Transit Authority (MARTA) has been working on a Control and Communications Security effort since undergoing a Cyber Security Evaluation Tool (CSET) audit in 2012 by the US Department of Homeland Security (DHS).
The program began by looking at the Operations side of the business, namely the Train Control and SCADA systems, and has expanded to include systems belonging to Transit Police and the IT Enterprise
This presentation will focus on some of the findings of the CSET audit, and the program MARTA has put in place to address the audit deficiencies, while moving MARTA further up the learning curve in Cybersecurity.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Other Rail Safety, Security & Emergency Preparedness Topics
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Abstract Title: 3rd Party Safety/Stakeholder Management

Text: **ID: 2344**

The Foothill Extension Phase 2A project is an 11.5-mile extension adding new stations, from Pasadena to Azusa. This Extension is a design build contract fully funded by Los Angeles County's Measure R and the agency overseeing the project is the Metro Gold Line Foothill Extension Construction Authority.
One of the major challenges faced by the project is the interfacing of schedules and public safety with a variety of stakeholders, including public transportation agencies, utility and infrastructure providers, government agencies, cities, businesses, and concurrent Authority construction projects along the alignment. The project team met this challenge by making it an upmost priority from day one.
Comprehensive third party management and public relations plans were immediately developed utilizing key experienced staff appointed as a primary point of contact to each third party organization and a full time public information manager. The project team coordinates design and construction activities through a task force to ensure all parties' needs are met in a safe timely manner with as little impact as possible to services, businesses, and communities. The projects public information manager worked side by side with the Authority's community relations staff as one cohesive unified team proactively providing project information to all stakeholders/communities.

Event: 2015 Rail Conference

Track/Route: Safety, Security & Emergency Preparedness

Session/Sub-Route: Safety of Track Workers

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Abstract Title: Improving Track Worker Safety at MARTA - FTA Pilot/Demonstration Project Update

Text: **ID: 2388**

The integrity of rail and track conditions plays a significant role in ensuring that trains are able to move people safely. As track infrastructure is impacted by wear and tear as well as environmental factors, inspections of the rail and track area must be conducted on a regular basis. These inspections must be conducted at all hours of the day and night, due to their required frequency. The job presents hazards as track inspectors often walk along tracks while trains are in revenue service.

Although this work has always been risky, there have been few successful attempts at improving location awareness of approaching trains and of mobile track inspectors. Typically the mobile inspection crews have limited warning when a train is approaching, and train crews usually receive system wide broadcasts of where inspection crews are working. While some transit systems have more robust procedures, the work remains hazardous.

Addressing safety issues goes beyond exploiting technology advances. Although advances in technology assist in developing infrastructure that can be used to address the challenges, attention needs to be paid to ensure that the proposed solution does not have a negative impact on worker productivity. This session will be used to discuss the activities that MARTA has undertaken to improve track worker safety, while enhancing productivity. It will outline a detailed systems design approach to manage the planning and deployment of a track worker safety system. This session will provide an overview of the approach followed by MARTA and results from the initial activities including the FTA pilot/demonstration project employing Bombardier’s TrackSafe technology.

Event: 2015 Rail Conference
Track/Route: Safety, Security & Emergency Preparedness
Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics

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Abstract Title: PlatformSafe – Warning Workers on Station Platforms Of Approaching Trains

Text: **ID: 2353**

Whilst the platform of a station might be considered outside the envelope of a train, there are nevertheless significant hazardous. For example, high speed trains can cause significant airflows which can be strong enough to literally blow personnel off their feet.
Snowfall is another hazard. With significant accumulations, a train can act like a giant snowplow, pushing a huge bank of snow at speeds in excess of 80 mph as the train passes through the station.
As a result of the risks, many operators take action such as rerouting or moderating train speed or providing costly flagging support to warn of the approach of trains. This can be disruptive as well as having significant budgetary implications.
In addition, managing the deployment of personnel across a transit agencies network poses many challenges.
In response to these needs, Bombardier's has developed a technology capable of automatically alerting personnel on station platforms of approaching trains as well as providing visibility of their locations and work activities at Central Control or elsewhere across the agencies network.
This session will discuss Bombardier's revolutionary PlatformSafe technology and the significant lessons learned from the second phase of its pilot deployment at a major North American commuter rail operation.

Event: 2015 Rail Conference
Track/Route: Safety, Security & Emergency Preparedness
Session/Sub-Route: Other Rail Safety, Security & Emergency Preparedness Topics
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Abstract Title: YardSafe – Improved Safety and Effectiveness Within Rail Yards

Text: **ID: 2357**

Vehicle maintenance activities within rail yards pose both safety hazards as well as operational challenges. To ensure the safety of personnel, it is very important to establish effective controls that prevent any attempt to move trains while maintenance and other tasks are in progress either in, on, under or around the train.

Train maintenance facilities by their very nature are spread over a large area and often significant time is spent by personnel in walking between vehicles in order to complete their allotted tasks. This can often be several hundred yards or more each time.

Bombardier has developed a technology that both automatically provides the controls necessary to prevent train movements while work is in progress and optimizes work-flow and maintenance operations at rail yards at the same time.

This session will be used to discuss the implementation of YardSafe to optimize safety and work scheduling and the impact on worker effectiveness. The results of a pilot projects at two major North American rail yards will be presented as part of this session.

Event:	2015 Rail Conference
Track/Route:	Safety, Security & Emergency Preparedness
Session/Sub-Route:	Grade Crossing Safety Programs
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Abstract Title:	Where Safety and Technology Collide: Integrating GIS, LiDAR, and High-resolution Imagery into Accide

Text: **ID: 2217**

While safety is a significant focus in public transportation, recent legislation in the form of the Railway Safety Improvement Act (RSIA) and Moving Ahead for Progress in the 21st Century (MAP-21) have added asset management and state of good repair into the formula. The Metropolitan Transit System (MTS) has had positive experiences using technology to assist in these areas. The MTS-Rail Safety department saw additional opportunities, using these existing technologies, to improve its accident tracking and prevention activities.

Geographic Information Systems (GIS) analyze and manage spatial and geographical data. MTS-Rail imported accident data dating back 33 years into the GIS database in order to plot and visually examine high incident locations throughout the system. This database includes date and time, environmental conditions, type of highway user involved, and circumstances surrounding the incident for a total of 62 incident variables. When high incident areas are identified, two other technologies are employed to determine elements or measures that can be taken at the location to improve safety.

A 3D mapping technology known as LiDAR (Light Detection And Ranging) was used to develop high-resolution maps and asset inventories. This information can be consulted to establish the age of components in the area. Examining these components can aid in determining whether current conditions (compared to conditions present when the crossing was installed) require augmented safety measures. High-resolution imagery captured from a first-person vantage point is an economical alternative to simulators. This imagery is used in defensive driving classes to help operators learn to identify potential hazards along the right-of-way, as well as to determine if any elements at a location, such as visual obstructions, could be altered to reduce the likelihood of incidents.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Procurement
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Abstract Title: California High-Speed Rail Authority and rolling stock procurement

Text: **ID: 2376**

The California High-Speed Rail Authority is beginning its procurement process for state-of-the-art off the shelf high-speed rail trainsets. These trainsets will be the first truly high-speed rail sets procured for a United States high-speed rail system. By 2016, the Authority will have chosen a vendor and design for their high-speed trainsets. Through rolling stock procurement, the Authority will be able to jumpstart the high-speed rail manufacturing and construction industry in the United States. This presentation will talk about the procurement process and highlight finding international bidders willing to work with “Buy America” mandates; working with partner agencies for next generation trainsets; the differences in trainset technology between Amtrak Acela and California’s High-Speed Rail program; and using trainset procurement to create a new California industry based around high-speed trainset production.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Fire Life Safety
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Abstract Title: Rolling Stock Fire Hazard Assessment

Text: **ID: 2411**

A wide range of fire scenarios can occur within a transit system with one of the most prominent and sizable hazards being an interior passenger rail vehicle fire. How large a fire may become is dependent upon the initiating fire, vehicle lining properties, vehicle configuration, ventilation, and fire protection systems. Predicting the outcome from a given initiating fire scenario is vital in assessing the response-to-fire characteristics of rolling stock and in understanding the hazards present in the system as a whole.

Both NFPA 130 - Standard for Fixed Guideway Transit and Passenger Rail Systems and ASTM E2061 - Standard Guide for Fire Hazard Assessment of Rail Transportation Vehicles outline a fire hazard analysis process for passenger rail vehicles. While each presents representative initiation fire scenarios that ought to be evaluated, neither provides direction or a means to evaluate the vehicle response. Full-scale or even intermediate-scale testing of materials or whole vehicles to specific initiating fires can be prohibitively costly and time-consuming. This paper presents, instead, a methodology for using small-scale test data, coupled with initiating fire data, simplified calculation methods and numerical modeling to cost-effectively assess the response-to-fire characteristics of rolling stock to a potential range of fire scenarios.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Track & Rail
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Abstract Title: An Evaluation of Rolling Contact Fatigue in Light Rail Transit Tracks

Text: **ID: 2322**

Rolling contact fatigue (RCF) has been identified as a cause of rail surface and subsurface defects. This is damage due to stress on the rail from repeated, intense and concentrated wheel-rail contact cycles that appears first on the surface as head checks and shelling. Intuitively the occurrence would be expected for heavy freight railroads but surprisingly, albeit less common, the phenomenon is apparent in Light Rail Transit tracks as well. As systems age this may become a cause for more maintenance and rail replacement costs. By observing in the field a section of track on a local light rail system that exhibits RCF, this paper will first record the state of the track condition, research possible causes, and evaluate expected improvements to the track life cycle based on implementation of some well-known techniques to treatment of this condition: increased inspections for gauge control and track component condition, rail defect detection, lubrication and friction management, rail profile grinding and addressing wheel profile. The paper will conclude with recommendations to prevent and treat RCF particularly targeted at Light Rail Transit.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Other Technology Topics
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Abstract Title: HVAC Energy Savings

Text: **ID: 2341**

Passenger railcars typically include a heating, ventilating and air conditioning (HVAC) system that processes a fixed amount of outside air to ensure adequate ventilation of the passengers under all operating conditions. The energy consumption associated with this approach represents 20 to 50%* of the total energy consumption of the HVAC system.

To address the needs of its customers to minimize energy demand and reduce their CO2 footprint, Bombardier Transportation has developed a green technology for passenger railcar application called “Demand-Controlled Ventilation” (DCV). This technology is currently used in the building industry but has not yet been implemented widely in the passenger rail industry. DCV provides an amount of outside air proportional to the passenger car occupancy or the passenger area CO2 level.

Implementation of the DCV technology in passenger railcars offers the following advantages:
• Significantly reduces the yearly energy consumption
• Significantly reduces the Total Cost of Ownership of the HVAC system for the life of a vehicle
• Contributes positively and significantly to the reduction of global warming (for fossil fuel energy sources) and energy demand, whatever the source of energy

This paper will present the results of a case study comparing the traditional approach of providing the passenger area with a fixed amount of outside air with an approach using DCV modulated as a function of the passenger area occupancy. It will also demonstrate the positive impact on the Total Cost of Ownership for the operator.

*20% for the cooling mode and 50% for the heating mode for a typical rail application

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Signal Systems
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Abstract Title: Implementation of Transit Signal Priority (TSP) and Preemption at Grade Crossings

Text: **ID: 2270**

The Regional Transportation District's (RTD) I-225 Rail Line, a design build project currently under construction, will bring light rail through Colorado's Aurora City Center and provide a system which will balance automobile and Light Rail Transit (LRT) operations. This balanced approach has posed several challenges to the project team, given there are two gated crossings directly adjacent to signalized intersections within the City Center. Typically, traffic signals adjacent to gated crossings are preempted; however, the impacts to traffic from preemption at this location will be severe given the randomness of its activation and the high traffic volumes along the major arterial roadway being crossed. To overcome these challenges, a unique approach of collaborating TSP routines, in conjunction with preemption, is proposed to be implemented, which will allow a controlled release of the train from a station or a hold signal to ensure the train passes through the gated crossings with reduced impacts to traffic signal coordination. This paper will elaborate on the proposed approach of utilizing linked priority routines to maintain signal coordination while providing track clearance, holding the adjacent non-conflicting co-phases, and utilizing background preemption.

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Other Technology Topics

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Abstract Title: Utility Relocation for Rail Terminal Expansion

Text: **ID: 2311**

As the demand for rail travel increases, existing transportation infrastructure needs to expand proportionately. Established rail hubs must be retrofitted to accommodate additional tracks and increased passenger throughput. Utilities such as domestic water, sewage, HVAC, steam and electrical systems often obstruct the new design for station expansion and must be relocated.

When embarking upon an endeavor of this magnitude, safety is paramount. The consultant overseeing the identification of electrical utilities must have a thorough understanding of the hardware and circuitry involved. It is essential that the consultant has an ongoing and open line of communication with the transportation agency, as well as the outside contractors that will do the bulk of the work.

The identification of electrical utilities encountered in a typical railroad terminal begins with a study of what is being delivered to the terminal via outside entities such as power and telephone companies. Agency circuitry such as traction power, signal control, communications, back up generation, lighting, elevator control and signage must be identified and re designed. This paper will outline the unique challenges faced when electrical systems are to be moved prior to and during new rail construction and expansion, as well as methods to insure a safe and seamless re location program.

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Technology - Emerging Technologies, Implementation Case Studies

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Abstract Title: Making BART Run with the Warm California Sun

Text: **ID: 2375**

The San Francisco Bay Area Rapid Transit (BART) system uses approximately 75 MW at peak load and more than 340,000 MWh annually for both traction and station power, costing about $40 million. BART also owns and operates 45,000 parking spaces, many of them surface lots, as well as several hundred acres of train storage yards. Arup and the Center for Sustainable Energy (CSE) were contracted by BART to study the economic and engineering feasibility of using distributed solar photovoltaic (PV) generation to provide traction power – which propels trains and accounts for 80 percent of BART's energy consumption – for BART's electric trains.

The study found significant potential to generate PV energy on BART owned property, totaling 15% to 25% of annual demand. However, regulatory as well as technical issues, including internal "wheeling" of power within the existing BART 34.5 kV distribution system, coupled with a misalignment between BART's daily consumption peaks and potential PV generation peaks, result in a challenging technical analysis. Among the techniques considered in the study to better match supply with demand are energy storage, a "smart grid" for traction power, and net energy metering with the local utility. The advantages and disadvantages of each approach will be discussed in the paper and the overall cost-benefit for PV will be analyzed to inform future BART policy.

Presenters: Sadie Graham, BART Planning
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Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Noise & Vibration Mitigation

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Abstract Title: Modeling Wayside Noise from Transit Vehicles using 3-D Acoustical Software

Text: **ID: 2221**

The guidelines contained in the FTA publication Transit Noise and Vibration Impact Assessment provide formulas and data for predicting wayside noise from transit vehicles. Typically noise modeling for new transit lines is accomplished by spreadsheet calculations requiring labor intensive input to specify the geometric relationship between the rail line and community noise receptors, unless GIS data exist, in which case this step can be automated. Where the surrounding topography and/or existing walls provide acoustic shielding, it is necessary to manually calculate distances and shielding factors also adding to the effort. Commercial software programs are now available that accurately model the complex 3-D geometry of source/receptor relationships. These programs provide generic train noise models that can be selected if the source levels adequately represent a particular transit system. Where measured data are available, it is possible for the software user to customize the train source input. Using the program SoundPLAN, a train/receptor model was developed to represent an existing transit system operating on an aerial structure. Rail roughness conditions were examined and various approaches to noise control were modeled. The challenges faced and the benefits gained are presented along with the results.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Fire Life Safety

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Abstract Title: Transit Vehicle Design Standards and Risk Analysis on Fire Development in Rapid Transit Vehicles

Text: **ID: 2407**

The two most common vehicle testing standards are the harmonized European Standard EN 45545 – “Railway applications - Fire protection on railway vehicles” and NFPA 130 – Standard for Fixed Guideway and Rapid Transit Systems”. Both standards prescribe test methods and acceptance criteria for the flammability of rail car vehicles.

This paper will provide a comparative analysis of the two design standards and what aspects can be utilized from both to address issues related to both new and legacy systems. In the latter, the most common question is related to retrofits and upgrades, and quantifying whether there is an existing hazard and identifying corresponding mitigating measures. For owners/operators, how can an acceptable level of risk be maintained or reduced without the extensive capital expenditure that is imposed on new builds?

With computational fire modelling, the risk and propensity to spread can be quantified with probabilistic risk and cost benefits analysis. This paper will evaluate what the common design standards prescribe, and how computational fire modelling and risk analysis can be used to address both new and legacy systems.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Technology - Emerging Technologies, Implementation Case Studies
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Abstract Title: Ideas for leveraging emerging technologies

Text: **ID: 2179**

Three-dimensional (3D) printing holds promise for a wide variety of applications for transit maintenance, from onsite manufacturing, proto-typing, customized accessibility, design visualization, complementing traditional manufacturing to still yet unknown possibilities. This isn't exactly a new technology but still many have no idea how it works or its benefits and drawbacks. This presentation / paper is/are a great opportunity to learn something new that will change the transit industry in the very near future.

3D printing also known as additive manufacturing, rapid prototyping or direct manufacturing is exactly what it sounds like – using a machine to create a three-dimensional object out of a variety of materials. Materials range from plastics to metals, concrete and ceramic powders allowing the creation of parts that would be impossible to machine and can be made in hours not days.

These newer technologies such as 3D printing are being utilized in schools by millennials. Technologies often bridge the generational gap by providing opportunities for all users to speak the same language and share experience and knowledge.

Together we will explore this new technology and its amazing possibilities.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Track & Rail

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Abstract Title: Mechanistic Design of Concrete Crossties for Rail Transit Loading Conditions

Text: **ID: 2258**

Light rail, heavy rail, and commuter rail transit systems experience a complex range of loading conditions that must be considered in the design of their track infrastructure and its components. Both internal factors (e.g. wheel load and speed) and external factors (e.g. climate and extreme weather) affect the loads applied to the track system and the system's response. These factors must be considered when designing optimized crosstie and fastening systems capable of performing under a wide range of operating conditions. Concrete crossties are widely used for rail transit applications, but their current method of design is empirically derived from freight rail design practices, and does not consider actual field loadings and service demands. Actual loading conditions should be considered, and are an integral part of mechanistic design. The need for a mechanistic design approach is recognized by manufacturers of crossties and fastening systems, rail transit operators, and researchers, and will provide the framework for optimized component design. The focus of this paper is to highlight the differences between the loading environments of freight, intercity passenger, and rail transit systems, and propose a method for concrete crosstie design for rail transit applications.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Procurement
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Abstract Title: FRA alternative compliance approach applied to critical software certification – IEEE1558 vs EN50128

Text: **ID: 2246**

Importing rail vehicles into the North American market has historically presented challenges in terms of compliance with local regulations. The alternative compliance waiver process has liberalized the approach to crashworthiness and will soon be formalized by the forthcoming FRA notice of proposed rulemaking. Theoretically, this should broaden the supply market for rail vehicles in North America.

However, all rail vehicles will still have to comply with other relevant local regulations concerning issues such as accessibility, fire, signalling, dynamics and emergency egress.

Precedents exist for introducing new rail vehicles in North America under the alternative compliance waiver process, but the cost of the modifications required to comply with local regulations can dilute the benefits associated with procuring proven rail vehicles designed according to overseas standards.

Applying the alternative compliance principle to other areas, specifically onboard equipment, could help bring down the cost of introducing non-FRA compliant rail vehicles, while maintaining an equivalent or better level of safety demanded by the North American regulations.

A recent study, performed by Interfleet Canada shows how the comparison between IEEE1558 and EN50128 could be used as a foundation to deliver software certification based on a similar alternative compliance waiver process as for the crashworthiness.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Energy, Environment & Rail
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Abstract Title: Evaluating the Effects of Energy-Saving Technologies on US Commuter Rail Systems

Text: **ID: 2370**

Energy costs represent a significant portion of the operating budgets of commuter railroads in the United States. Furthermore, the environmental impact and energy efficiency of the commuter rail mode relative to competing modes of passenger travel is increasingly significant in determining the benefit of specific systems. Energy-saving strategies and technologies are constantly under research and development throughout the railroad industry. However, full-scale testing and implementation of these modifications are expensive and risky for public-sector agencies. Modeling is a cost-effective method to evaluate the benefits of specific strategies or technologies on individual systems, allowing for specific equipment, route, and operational characteristics. This research investigates the effects of energy-saving techniques or technologies on the door-to-door trip (including access/egress) energy and emissions intensity of commuter rail systems in the United States using publicly-available computer modeling software. Strategies and technologies are focused on improvements to the equipment, infrastructure, or operational characteristics of each system. Results of this research will illustrate the potential benefits of implementing similar energy-saving modifications on transit systems. Furthermore, this research provides a framework for agencies to evaluate the effects of strategies under consideration, accounting for the specific characteristics of their property.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Signal Systems
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Abstract Title: Feedback on CBTC factory and field tests and commissioning

Text: **ID: 2229**

Communications-Based Train Control (CBTC) technology is the most advanced train control system for urban railway infrastructures. It is very different from conventional relay based signaling systems and more complex than most cab signaling systems. CBTC functions are numerous, highly complex with customized details for each project. They cannot be tested for all possible conditions at all locations. Knowledge of the CTBC system and experience with train control commissioning are keys to performing enough tests to detect most issues but permit the start of revenue service as early as possible. The testing strategy proposed by the CBTC supplier is the result of years of experience with the goal of minimizing expensive field tests while demonstrating that the system will work properly in revenue service. Despite the numerous tests performed before revenue service, it is inevitable that operating challenges will be faced during the first months of CBTC system operation. The recent IEEE Std 1474.4-2011 Recommended Practice for Functional Testing of a Communications-Based Train Control (CBTC) System provides a good description how and where CBTC functions should be tested. However, it does not describe the sequence of tests in the context of a project where CBTC is deployed on a transit property. This paper presents the sequence of factory and field tests required to commission a CBTC system, from environmental tests to pre-revenue service operational tests. The paper also provides insight based on experience with several CBTC projects in the last decade.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Driverless/Automated Rail
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Abstract Title: Human Factors and Ergonomics in Transportation Control systems

Text: **ID: 2420**

As the future public transit industry moves towards higher capacity, higher frequency and higher performance focused control systems, the operator's performance and reliability becomes ever more crucial. As a result, innovations in information technology, driven by demands for safer, more reliable and efficient operations, have led to the increased use of automation and centralized supervisory control, which in turn amplifies the consequences of equipment and human failures within safety critical environments.

The application of Human Factors and Ergonomics expertise in transportation reduces human error and influences human behaviour through designing effective and intuitive control systems. A holistic approach to considering Human Factors and Ergonomics throughout a system design lifecycle: the equipment being designed; the people using or encountering the equipment; the procedures that people adopt in their jobs using the equipment; and the characteristics of the environment where people use the equipment, is therefore necessary to support the required human intervention points within any control system

The public transit industry needs to recognize these demands and actively embed Human Factors and Ergonomics thinking and techniques into existing processes and safety culture to not only avoid errors affecting safety, but also those that impact upon service reliability.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Other Technology Topics
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Abstract Title: Battery Operated Vehicles - Light Rail Vehicles and Buses

Text: **ID: 2342**

With the advent of superior battery systems, freeing urban rail vehicles from catenaries is becoming more and more of a reality. Much research has been devoted in the past years alone in this field as the potential long-term benefits are simply too great to ignore. What has gone unnoticed in the rail industry however is that the benefits were also applicable to different transit modes. With new systems being deployed in rail environments, it was only then a matter of time before the technology would migrate to the world of buses.

As the quest for more environmentally-friendly cities is ever increasing, demand for hybrid or electric buses is set to soar in the short to mid-term future. While varying solutions of bus network electrification exist on the market today, the complexities of choosing the right technology while maximizing the benefits has not been well understood. This presentation will draw on real life examples to explore the intricacies of rightsizing the battery of a bus or light rail vehicle while taking into account such factors as line parameters, operating scenarios and the necessity of multiple charging stations.

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Procurement

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Abstract Title: Life Cycle Cost - The European Experience

Text: **ID: 2343**

The traditional approach to procuring passenger rail vehicles typically begins with the development of a technical specification covering the details of the car and ends with the selection of the vehicle with the lowest cost of acquisition. While in some cases a scorecard system is used, detailing how many points are given to characteristics such as vehicle cost, weight, project management experience and the quality of the technical proposals, to name only a few, it has proven to be difficult to also include detailed and measurable life cycle cost targets. For instance, what is the value of axle load? What are the savings in track maintenance over a vehicle's life span of 30 years when a vehicle with lower axle load is selected? How can we balance the cost of acquisition with those associated with maintenance and operation? In this presentation, we will use the example of the Stockholm C-30 metro vehicle to demonstrate the benefits of a thorough life cycle cost approach used in a novel procurement method.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Fire Life Safety

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Abstract Title: Cross-passages vs. exit stairs in rail tunnels

Text: **ID: 2193**

Enclosed trainways of transit and passenger rail systems are required to have one of two options for a means of egress (per NFPA 130). Tunnels can be equipped with emergency exit stairs to the surface or cross-passages. There is a perception in the industry that emergency exit stairs are safer. Some authorities having jurisdiction (such as local fire departments) reject the cross-passage option even though this solution is allowed by NFPA 130.

The purpose of this paper is to compare the two options. Criteria will include egress of passengers, tenable environment along egress paths, ingress of first responders, and cost of installation. This information will help designers, owners, and authorities make informed decisions based on quantitative analysis rather than perceptive beliefs. The issue of a systems with a mixture of the two options is discussed.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Noise & Vibration Mitigation
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Abstract Title: MTA “Purple Line” Transit System Noise Assessment

Text: **ID: 2415**

The Purple Line is a proposed 16 mile transit line located north and northeast of Washington DC, inside the circumferential of I-95/I-495 Capital Beltway. The Purple Line would extend between Bethesda, MD (Montgomery County) and New Carrollton, MD (Prince George’s County). The Purple Line Corridor would operate mainly on dedicated or exclusive lanes, providing fast, reliable transit operations which would include twenty-one stations.

The construction and operation of the Purple Line has the potential to increase noise levels at sensitive land uses near the project corridor. In addition, a portion of the new light rail system will be operating on an abandoned freight line that has been converted to the Capital Crescent trail, once known as the Georgetown Branch.

This presentation will address the challenges conducting a noise assessment to account for the following:
• Different track types used
• The train whistle noise near or at grade crossings
• The train bells at stations
• The noise associated with the transit line operations

Finally, the presentation will provide a comparison between the results of the FTA versus FHWA noise assessment guidelines, as well as, addressing some of the questions and/or issues that arise when applying the noise assessment methodology. Also included in the presentation will be discussion of feasible abatement techniques recommended to mitigate the wayside noise associated with the day to day operation of the Purple Line.

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Rolling Stock, Railcars

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Abstract Title: Houston METRO III: The Next Generation LRV

Text: **ID: 2354**

The new Houston LRV represents the next generation of LRVs. It was designed using modern design techniques inside and out. Some of the modern features include:

- Cutting edge Monitoring and Diagnostics System that helps make maintenance more effective and efficient.
- Spacious and modern interior, huge windows, and a roomy C-car.
- Managed communications network that reduces single point failures.
- Standardized Modular LRU construction.
- Ergonomic and attractive cab and operator’s console.
- Hydraulic over coil spring fail-safe suspension

This new generation vehicle shows how comfortable, practical, maintainable and attractive a modern LRV can be.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Communications System
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Abstract Title: The benefits of the open architecure train network

Text: **ID: 2189**

Passenger rail vehicles are equipped with a multitude of functions that are interconnected to achieve the desired train operation. In addition, the latest data-intensive technology, such as web access for train troubles diagnosis, CCTV system with video recording, commercial data update at train stations and other wireless services like GPS, grew out of the capability of traditional train-specific networks LonWorks and TCN. The desire for the latest technology and ability for "plug and play" led to solutions based on Ethernet networks.

The open-standard Ethernet network is widely supported by not only rolling stock industry but also many other industries. With an open architecture that anchored with the open-standard network backbone, the ultimate goal of plug-and-play can be archived, and result in reduced cost, extended system life cycle and more availability of the commercial off the shelf (COTS) product. This paper illustrates the existing network protocols for the railway application and reveals the global trend for the next generation train networks.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Technology - Emerging Technologies, Implementation Case Studies
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Abstract Title: From Duplicate to Digital: A Case Study in Moving from Paper to Technology Tools

Text: **ID: 2396**

By now, most rail operators have heard of and likely investigated migrating their current maintenance processes from paper into the digital age using computerized maintenance management systems, analytical tools, and mobile devices. But few are readily embracing this switch, often due to a lack of awareness of key factors such as cost and value, or a lack of time to implement updates to processes or technology.

In the presentation, we will outline one rail operator’s experience with demonstrating this migration, including steps taken to date and planned for the future, lessons learned along the way, and best practices for others to consider when undertaking a similar journey.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Noise & Vibration Mitigation
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Abstract Title: Effects of Rail Roughness on Wayside Noise from Transit Vehicles

Text: **ID: 2287**

Rail roughness has a direct effect on the amount of wayside noise generated by transit vehicles. In particular, severe roughness such as corrugation can generate exceptionally high levels of noise. Two case studies will be presented in which rail roughness was measured as well as wayside noise. The relationship between rail roughness and wayside noise is explored using empirical formulations. The effects of roughness can also be examined using theoretical models which account for noise radiation from the transit vehicle's wheels as well as the rails. The results of a theoretical model for one of the case studies will be presented and the results compared with measured data as well as an empirical formulation.

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Technology - Emerging Technologies, Implementation Case Studies

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Abstract Title: New parking technologies in the rail space

Text: **ID: 2233**

Parking is a central service for those who travel to a rail or transit station by car. New parking- related technologies now offer customers an improved overall experience as well as providing new revenue generation opportunities to rail and transit operators. This presentation focuses on technology advances that will see a convergence of payment methods, directional improvements, and mobile application advances that allow rail travelers new technology options to leverage when driving to a rail station parking facility.

Rail travelers now have the ability to reserve parking bays in advance to guarantee a space, park in certain locations for preferential parking, utilize application technology to locate their car, and leverage reward programs. Rail and transit operators now have the opportunity to deploy car sensor guidance systems, utilize software technology to create parking products to cater to business or leisure riders, generate loyalty programs, and generate significant customer data to use for marketing purposes.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Other Technology Topics
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Abstract Title: Data, Data Everywhere: Key Steps to Integrating Systems for Improved Decision Making

Text: **ID: 2399**

Over the last several years, rail operators have seen a rapid influx in technology available, and with it a vast increase in the data produced. But few so far have been able to capitalize on that data to turn it into meaningful information for either the operator or the customer. Concepts like "big data" and "analytics" seem to promise answers, but with lean budgets and workforces, how can agencies reasonably expect to take advantage of new solutions and still run day-to-day operations?

Through examples and case studies, this presentation illustrates a four-step methodology to improve the quality and visibility of your operational data and bring real-time transparency across the enterprise in order to improve system reliability, customer service, performance management, and ultimately the bottom line. Using well designed transit data models, and open, integrated business application architecture, IT leaders can harness existing investments in core systems such as operations and scheduling, asset and work management, and financial and HR management systems, along with extended capabilities such as analytics, mobility, and spatial, in order to give the agency real-time information for better decision making.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Technology - Emerging Technologies, Implementation Case Studies
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Abstract Title: ECP Standard Development and Testing Update - What You Need to Know?

Text: **ID: 2200**

Since the June 2014 rail conference, the APTA PRESS Mechanical working group – ECP sub group has continued working on the implementation of electronically controlled pneumatics (ECP) standards for the introduction of this technology into the passenger and commuter rail environment. The phase 1 emulation test started during the June 2014 rail conference. This presentation will address the progress made since the 2014 conference and current status at the conference. Areas to be addressed in the presentation include: standard development, safety analysis deliverables, phase 1 performance report, phase 2 full ECP testing implementation, CFR change recommendations under consideration. The anticipated schedule for the 12 months beyond the June 2015 will be discussed. This presentation will provide an update to these activities and a look forward to the final technology implementation.

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Technology - Emerging Technologies, Implementation Case Studies

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Abstract Title: Jacksonville Transportation Authority ERP – A Story of Success!

Text: **ID: 2307**

This is the story of how Jacksonville Transportation Authority used an enterprise-wide approach to replace inefficient legacy systems with modern integrated applications, streamlined processes and efficient reporting. The adventure begins with the implementation of Oracle E-business Suite with modules for Human Resources, Asset Management, Purchasing, Finance, Grants, Procurement and others. The foundation of the project was based on JTA core values: Customer Service; Efficiency and Effectiveness; Financial Sustainability; Mobility and Safety and Security but challenges within the systems and organization kept them from reaching these goals easily. These challenges included: Inefficient legacy systems; Non-integrated processes across the organization; Fragmented data and manual reconciliation; Lack of security control; Manual processes; Lots of paperwork (to name a few). This presentation will review the overall project approach, the successes that have been seen already, and the lessons learned providing the happy ending everyone always hopes for.

Project Overview
Project Approach
• Building the consolidated team – agency, implementation staff, and agency advocate
• Two Phases
  • Phase I – Baseline enterprise applications installed
  • Phase 2 – Enhanced HR systems
• Project Management & Control
• Assess – review legacy applications and processes
  • Initial prototype or product pilot
• Design / Build / Test
  • Detailed requirements
  • Data Conversion
  • Second prototype with detailed testing
  • Train
• Deploy
  • Extensive business testing of advanced designs
  • Final configuration and “cut-over”
  • Production Support
Project successes
Lessons Learned

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Other Technology Topics

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Abstract Title: Signal assignment using genetic algorithms

Text: **ID: 2315**

In critical environments such as railroads, it is essential to eliminate potential risk of critical signal corruption, by segregating signals within a connector. Today the signal assignment in safety critical systems, like the train electrical coupler head, is generated using tedious and time consuming manual processes. The paper discusses the development of an optimal signal to pin assignment technic for connectors, based on multi-objective genetic algorithms. The challenge of such solution lies in the definition of the different constraints used to guide the optimization process. The proposed solution eliminates time consuming manual operations while being a precious support to perform Failure Mode Effect Critical Analysis (FMECA).

Keywords: multi-objective optimization, genetic algorithm, electrical signal segregation

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Crash Energy Management
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Abstract Title: Execution of a Modern Operator's Cab Design for a Crash Energy Management-Equipped Commuter Car

Text: **ID: 2336**

In the "…best industry designs for crashworthiness" of the "Railcar Construction & Structural Research" Track of the 2013 APTA Rail Conference, Bombardier discussed the unique set of challenges posed by the design of a modern operator's cab for a commuter car equipped with Crash Energy Management (CEM).

This paper will update the 2013 session and review how the design was executed and validated in the context of an ongoing contract.

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Communications System

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Abstract Title: Secure Communication-Based Train Control: Standards, Requirements, and Best Practices

Text: **ID: 2262**

The utilization of Ethernet for the Communication-Based Train Control (CBTC) data transmission network has brought many enhancements that were previously not possible for the rail industry; however, it has also exposed the CBTC to a new set of unknowns, one of which is the network/cyber security concern. Due to the novelty of telecommunication applications within the CBTC industry, the topic of network security is not often paid the deserving attention.

This paper will analyze relevant CBTC standards pertaining to communication security and provide the best practices for the network security design, implementation, and risk mitigation of CBTC systems in order to achieve the required end-to-end communication security.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Streetcars
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Abstract Title: 100% Low Floor Streetcars…the new normal

Text: **ID: 2348**

Proven in Europe over the past decade, 100% Low Floor Streetcars are becoming the vehicle of choice for urban transit all over the world. Once considered a low speed inner city niche, proven service histories combined with recent advances have allowed 100% Low Floor Cars to operate in environments formerly reserved for High Floor and 70% Low Floor Vehicles.

The paper/presentation will focus on recent advances in 100% Low Floor Streetcar design on cutting edge projects in Europe, Asia, and the US, including:

- Advanced truck design allowing higher speeds and greater stability; independent wheels vs. solid axle design.
- 3, 5, 7 and 9 module vehicles: increasing capacity and efficiency.
- GPS based wheel lubrication.
- Enhanced passenger and pedestrian safety.
- LED interior lighting.
- ASME RT-1 compliance.
- Advances in materials.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Other Technology Topics
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Abstract Title: For a Passenger Rail Industry Substance List in America

Text: **ID: 2339**

On the path toward sustainable communities, there is a clear responsibility to tighten control of toxic chemical substances used in finished manufactured goods, including mass transit vehicles. Separately, each organization can only achieve part of this target. Together, stakeholders can extend their reach to a new world of safer product solutions. This presentation builds the case for a common policy and a common list of controlled substances across the procurement of passenger rail vehicles. Through real case studies, the presentation will review the American context and present the major challenges: current rules regarding toxics disclosure and transparency of the supply chain; use of technical requirements to obtain for toxics disclosures; key conditions to foster competitive alternate solutions to toxic materials; and ongoing initiatives in other major industries, various states and other countries.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Technical Issues - Implementing PTC Technology
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Abstract Title: Push To Comply

Text: **ID: 2288**

As the Positive Train Control deadline approaches, the acronym “PTC” takes on a new meaning--Push To Comply. Since the inception of the PTC mandate, numerous railroads have gone through the painstaking process of submitting the alphabet soup of plans required, i.e., PTC Implementation Plans (PTCIP), PTC Development Plans (PTCDP) and the PTC Safety Plans (PTCSP). This paper would address the “Push to Comply” and would begin with the identification of the barriers encountered while attempting implementation to comply with the 2015 mandate and the resolutions, or proffered resolutions. This paper will also address which resolutions are within reach and which are unattainable by the 2015 deadline.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Ventilation
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Abstract Title:	Quantitative Risk Assessment and Design Criteria for Tunnel Ventilation System
Text:	**ID: 2225**

Quantitative Risk Assessment and Design Criteria for Tunnel Ventilation System
Tunnel Ventilation System (TVS) is a critical emergency management system for agencies with tunnels and subterranean stations. MARTA is planning upgrades to its TVS through a multi-year multi-million dollar initiative. Planned work besides ensuring ability of the Authority to stay compliant with local and national regulations, is aiming to better align overall operations, deployed technology, people and processes with industrywide improvements in general and standards (NFPA 130) where feasible.
Proper assumptions about size and physical characteristics of a fire profoundly impact the design and TVS project cost. However, not all fire sizes have same likelihood or severity in the consequences. Quantitative analysis and risk assessment is integral to best practices in the Aviation industry. Some transit agencies as well as some sectors of transit system such as train control and signaling systems are already using quantitative risk assessment in their operations.
This paper explores the potential benefits of using quantitative risk assessment in the Tunnel Ventilation System as an additional step for moderating industry prescribed fire size of 15MW. We contrast benefits to be had in hazard mitigation from an objective approach that quantifies risk, with predominant subjective approaches.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Signal Systems
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Abstract Title: An Integrated LRT Modeling Approach - the Calgary Solution

Text: **ID: 2198**

Light Rail Transit systems are frequently forced to interact with highway traffic where both modes end up in competition for the operational space, priorities, and time on at-grade crossings. Although the two conflicting modes have entirely different operating characteristics and control systems, there is a need for their integration so that an operational balanced point can be achieved between the two that also optimizes the whole system. Current techniques involve analyzing each mode's control system separately, giving only limited consideration to the other mode. The practice often fails to deliver a balanced and converged optimal solution. This paper presents a new approach that aims to overcome the above limitations.

This paper describes work that has been carried out on developing an integrated holistic systems approach under one framework and based on one software platform. The one platform rule requires the selected platform to be able to model different modes of transportation (LRT, autos, trucks, buses , cyclists and pedestrians) and their control measures (e.g. train signaling, gate operations, traffic signals, pre-emptions) through innovative systems integration. This new approach delivers true optimal solutions by ensuring model consistency and convergence. It has been developed on Calgary's Downtown LRT capacity expansion project.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Fire Life Safety
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Abstract Title: Grounding and Electrical Safety of Shore Power System Design

Text: **ID: 2294**

Abstract: To enhance personnel safety and equipment protection design of the shore power (head end power – HEP) to the locomotive train should consider appropriate grounding design. It is well known from the statistical data of the operating power system design that more than 75% of the hazards are due to line-ground faults, especially for the ac power system supply. More recent developments of the new standards on the electrical arc-hazards and enforcement of OSHA regulations it has become extremely important to review current recommended APTA guidelines, APTA PR-E-RP-016-99, APTA PR-E-RP-015-99 and PRIIA 305-009/Amtrak 995 Technical Specifications (Chapter 13) and other related codes and standards and provide recommendations for improvement in safety of personnel and to minimize equipment damage due to electrical hazards.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Ventilation
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Abstract Title: Industry Standard Specifications and Guidelines

Text: **ID: 2330**

The objective is to develop an industry side standard specifications and guidelines for major tunnel ventilation equipment such as fans, silencers and dampers. Safety, reliability and cost are among the primary considerations in the development of these documents.
While all tunnel vent systems invariably have similar components such as fans, silencers dampers and expansion joints, there is considerable variation in how they are specified. In many instances what is specified is beyond the manufacturer's standard offerings with a consequent increase in cost. What is truly necessary to provide a safe yet economical system?
A good example is fan blade materials. Some owners insist on forged blades while others consider cast blades to be perfectly acceptable. It's there a significant advantage in reliability and/or life cycle cost to justify any initial capital cost premium?
Testing requirements should also be considered. How much testing is necessary to procure the equipment is sufficiently robust for transit service with the longevity required?
Another example is in the method of speed control. For example, while there is a trend to provide tunnel vent fans with VFDs in lieu of two speed motors, the advantages are not clear cut. Guidelines could be developed to help in the selection of the appropriate system for a particular application.

Event: 2015 Rail Conference

Track/Route: Technology & Technical Forums

Session/Sub-Route: Signal Systems

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Abstract Title: North County Transit District (NCTD) Positive Train Control (PTC)

Text: **ID: 2196**

In the design of NCTD's PTC system, NCTD went to a fiber based network as opposed to using a peer-to-peer PTC radio network. A fiber backbone was installed from the Orange County Line to San Diego, a distance of 60 miles. A Wayside Status Relay Service (WSRS) allows the PTC system to utilize the fiber optic network installed at each signal location to send messages from the WIU locations through the office and back through the fiber network to the base station radio sites to the PTC train, eliminating the need to have a radio and antenna tower at each signal (WIU) location. The benefits of the fiber network resulted in a reduction of towers and radios needed and allows for 100% redundancy utilizing the base radio towers. The WSRS configuration meets ITC specifications and the Interoperability and High Availability provisions of the NCTD PTC requirements. Future benefits include supporting expansion for the future NCTD disaster recovery site, in addition to the ability to remotely connect to Control Point train control equipment. Fiber hand holes were installed at highway grade crossings for future projects that may utilize the fiber.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Traction Power
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Abstract Title: Innovative Approach to Traction Power System Modeling

Text: **ID: 2320**

Modeling traction power systems is a very difficult process. Containing moving and non-linear devices, these systems tend to be far more complex than the simplistic circuits taught in most books. Accuracy of the solution is vital to ensure the system is adequately sized for the lowest capital cost; a few volts can mandate the addition of millions of dollars of equipment. Users also demand a high level of performance, allowing them to optimize for efficiency and cost.

Typical approaches, such as Newton-Raphson, require guessing of voltage for certain members, and solving for the rest. Due to the difficulty in making accurate guesses, this approach is generally slow. This paper will detail how EnerGplan, Bombardier's simulation software, solves the system without the typical guesswork. The system is modeled using a network of Norton branches, controlled by finite state machines, which are in-turn controlled by a primitive AI. In typical transit systems, this approach yields superior speed and stability, and a field-tested high degree of accuracy. This paper will also detail a novel way to inverse a sparse matrix, which resulted in a performance increase of over 500% versus traditional methods.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Traction Power
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Abstract Title: Negative Grounding Devices – Theory, Performance and Application

Text: **ID: 2251**

The negative return portion of modern direct current (dc) light and heavy rail power systems is intentionally isolated from ground under normal operations to the maximum extent practical. The purpose of this electrical isolation is the prevention of stray direct current flow into the earth and nearby infrastructure. In North America at present, equipment is frequently installed in traction power substations to temporarily ground the substation dc negative bus in response to unsafe rail potentials. This equipment is commonly referred to as a negative grounding device (NGD). Although the use of negative grounding devices is common in the USA, particularly on newer light rail lines, very little information is available that describes their application or their effectiveness at reducing rail potential.

This paper will describe in simple terms the theory of negative grounding device operation. Equivalent circuits will be provided to illustrate their response to rail potentials caused by train operations and by ground faults, and the resulting voltages and currents. Simulation results will be presented to evaluate NGD performance under a range of possible light and heavy rail system operating conditions. Application guidelines derived from the theory and performance results will be provided.

Event:	2015 Rail Conference
Track/Route:	Technology & Technical Forums
Session/Sub-Route:	Noise & Vibration Mitigation
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Abstract Title:	Rolling noise reduction of metro systems by track based solutions.
Text:	**ID: 2255**

The paper reports on a specific task within the EC Quiet Track project which consists in combining existing infrastructure solutions for rolling noise reduction aiming at a global performance of at least 6 dB(A).
The combined effect of different solutions has been simulated by using the enhanced Wheel/Rail Noise software which incorporates wheel and rail roughness, wheel and track dynamic properties, track decay rate, vehicle parameters and vehicle speed. A specific section in the network of Attico Metro line 1 (Athens, Greece) was selected with tangent concrete slab track emitting high rolling noise during vehicle passage at 40 mph.
Three solutions were evaluated for noise reduction and their individual and combined effect was simulated. These solutions are: horizontal noise absorbing panels placed on the concrete slab, low height noise barriers close to the track and rail dampers. These solutions have also been installed consecutively and their effect on the emitted rolling noise has been measured at each installation phase. The global noise reduction performance is then compared with the results of the simulations.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Communications System
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Abstract Title: Wireless technologies for smart rail projects

Text: **ID: 2333**

Consumer use of Tablets, Smartphones, and video content is increasing exponentially. So also is passenger demand for a broadband Internet connection on-board.

On the rail operator side, there is also a need and growing demand for high quality video surveillance on board. As a result, throughput requirements are increasing in order to ensure a reliable transmission of audio-video data in real time, and increase passengers' safety and security.

Many on-board services (onboard ticketing, advanced traffic monitoring, content on demand) that could translate into increase ridership are not widespread enough yet due to the limitations of the on-board data connection.

Train operators around the globe are now considering track-side solutions. They've realized that 4G and LTE systems simply can't provide enough throughput to vehicles carrying many passengers who are all trying to use their phones and access the Internet. A 4G/LTE network deployed for the communities living in the areas surrounding the train track is not designed to support a burst in traffic that lasts for just the few seconds when a train passes by.

On the other hand, a reliable wireless track-side system is able to perform both in densely populated urban areas and in remote rural areas, and is able to provide high speed connectivity when the train is running up to 220mph.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Other Technology Topics
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Abstract Title: Intelligent Wayside Solution for Fleet Management

Text: **ID: 2346**

Trains no longer operate in isolation but rather are part of an integrated and complex transportation system that includes connection to wayside management solutions. Those solutions improve fleet management by gathering better decision-based data helps to:
• Improve fleet availability and punctuality
• Reduce the overall cost of fleet management
• Reduce energy consumption

More specifically for the operational aspects, this provides the ability to obtain the train's location and access the train's data such as status and engineering logs. Those data items can be used to perform troubleshooting of key issues on the fleet during operations. From a maintenance perspective, historical train data can be analyzed to see trends and identify condition based patterns. Afterwards, it is possible to monitor specific components and extend some planned maintenance intervals.

At the same time, new trains are creating new challenges in terms of complexity. We now have more complex components inside the trains with a high quantity of data to be monitored. The way to address this situation is by identifying the key information data from the mass of data using smart people, optimization processes and technologies such as the Bombardier ORBIFLO product suite, now in use on over 6000 connected cars.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Energy, Environment & Rail
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Abstract Title: Comparing the performance of a battery-based versus a hybrid wayside energy storage system

Text: **ID: 2418**

The term “regenerative braking” has been popularized by the replacement of friction braking for electric braking. Now that regenerative braking is virtually ubiquitous, its full economic and environmental benefit can now be realized with a wayside energy recovery system in a DC electrified rail network. This is because the receptivity of rail networks, measured by the degree of energy transfer between braking and running trains, varies significantly during the day causing significant amount of braking energy to be wasted in dissipation resistor units.
In 2012, ABB commissioned the world’s first battery-based wayside energy storage system (WESS) at SEPTA’s Letterly Substation in Philadelphia to recycle the braking energy of its trains and also provide frequency regulation services on the Regional Transmission Organization network of PJM. By doing so, the system significantly improves the energy efficiency of SEPTA’s operation, and generates additional revenue from the sale of the grid regulation services.
In 2014, ABB commissioned the world’s first hybrid WESS featuring both batteries and supercapacitors at SEPTA’s Griscom Substation, on the same line as the Letterly WESS installation. Like the Letterly installation, the Griscom installation will perform the same function of recovering braking energy and providing frequency regulation, but instead using two storage media optimized for both functions.
This presentation will present and compare actual performance data and financial benefits achieved by the Letterly WESS and Griscom WESS, and provide attendees with an appreciation for the difference in business cases.

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Procurement
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Abstract Title: Automatic Passenger Counting: 5 questions to ask before writing your next proposal

Text: **ID: 2209**

Automatic Passenger Counting (APC) systems are evolving from simple laser systems to more advanced video-based or Time of Flight (TOF) systems. Today, the technology is becoming smarter and the data can be analyzed with greater resolution. This is why agencies can now obtain more detailed passenger data for better planning.

Since many APC systems are now being installed at the train vendor's manufacturing facility – before they are delivered to the agency – the importance of accurate APC technology descriptions is crucial. Initially, understanding which functionalities are required to gather accurate, usable data on ridership is the first step.
This presentation will provide important tips for how to write an effective passenger counting RFP including answers to questions like:

1. Which sensor type should be installed on your vehicles?
2. How will the data transfer take place?
3. How will vehicle data be matched with your scheduling system? .....

Event: 2015 Rail Conference
Track/Route: Technology & Technical Forums
Session/Sub-Route: Driverless/Automated Rail
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Abstract Title: New Generation Driverless Monorail for Mass Transit Application

Text: **ID: 2230**

This paper will talk about Bombardier's new generation driverless monorail system. It will talk about the main features of the monorail technology that are designed for mass transit application. Traditionally monorail technology is used for smaller capacity lines in amusement parks or airports. The new monorail technology expands its application to mass transit which requires greater capacity, passenger comfort and mass transit standards.

This paper will provide an update on a mass transit monorail project that is under construction in Sao Paulo, Brazil. The Line 15 in Sao Paulo is a fully driverless line with peak capacity of 40,000 passengers per hour per direction. Ultimate capacity of the line is 48,000 passengers per hour per direction. The line is 24 km long. It has 17 stations. It is an extension of Sao Paulo Metro Line 2. It opens to passenger services in phases.

Note: I will investigate the possibility of having a co-author from Sao Paulo Metro to present the project update part.