RISSB
RAIL INDUSTRY SAFETY AND STANDARDS BOARD

FAST TRACK

THE NEWSLETTER OF THE HORIZONS PROGRAM | DECEMBER 2018

INSIDE THIS ISSUE – WHAT IS SHAPING THE RAIL INDUSTRY TODAY AND INTO THE FUTURE

Open Data

Improved use of data has transformed the way some businesses work in areas such as retail and logistics. The use of data is a potential area for growth for rail and transport.

One way to encourage growth in data use is Open Data. Open Data gives developers and analysts opportunities to create innovative solutions for transport customers. Within the context of state-run transport, there is also increasing recognition that government agencies collect data on behalf of the community and that the community should have access to it, where possible.

Open Data policies need to be thoughtfully implemented. To be considered truly "open" data should be both technically and legally open. Technically it should be easy to access and use. Legally the community must have license to use it. There are also specific reasons why some data should not be made available, such as privacy, security, and public interest.
Transport for NSW has developed a policy explaining how data can be shared to be re-used by members of the community and industry. There are more than 100 datasets provided through the TfNSW Open Data Hub. In the rail space, datasets such as opal data, train occupancy and peak loads have been made available. TfNSW promotes the use of Open Data by running Hackathons, Pitchfests, and Innovation Challenge activities.

The Australian Government provides open data through data.gov.au. The site has over 30,000 publicly available datasets on a number of topics, including a number on rail.

Rail Freight – Efficient, But Innovation is Key

Background

The movement of freight across Australia is critical to the nation's economy. 24 hours a day, 365 days a year freight is being transported across the country by rail with a plethora of products able to be moved safely and efficiently. A reasonable percentage of the food you eat or the things you use / wear has likely been transported by rail. Just as a quick example, Woolworths has made the decision to move a considerable amount of its goods via rail due to the social, environmental and economic benefits when compared to road transport.

But why is rail freight a preferable option to that of road-based transport methods? Why do customers decide that the movement of their goods both on short haul (e.g. port to facility) and long haul (e.g. Sydney to Perth) trips is a better option? There a number of key reasons behind this, but this article aims to focus on one aspect - the environmental benefits of freight rail.

Environmental Benefit

In November 2017, the ARA (Australian Railway Association) and Deloitte Access Economics published a report which noted a number of environmental benefits related to the transportation of freight via rail. A few of the key Environmental benefits are stated below:

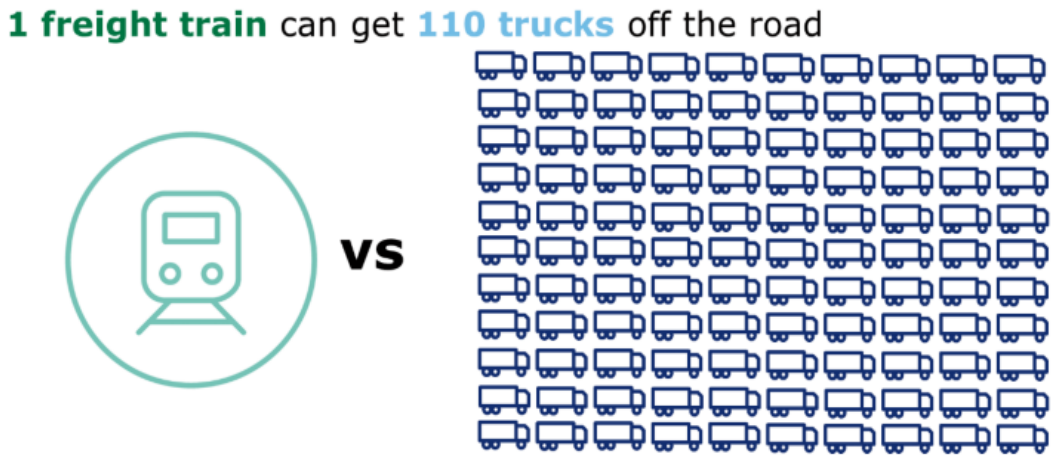
1. Rail transport produces 16 times less carbon pollution than road transport per a tonne kilometre;
2. 1 Rail freight train can get 110 trucks off the road;
3. Rail freight has the potential to relieve congestion on public roads, reducing the emission profile caused when vehicles are stuck in traffic jams;
4. One freight train from Melbourne to Sydney replaces 150 semi-trailers, saving 45,000 of fuel on every journey.

In summary, the ARA-Deloitte report stated, "Put simply, rail is better for all – better in terms of energy use, safety, cost effectiveness and environmental outcome".

Future proofing – It's Time to Innovate

You now may be thinking, "Well rail sounds great! It is both safer and more environmentally friendly" and you are correct, but the rail industry needs to continue to innovate. What stays the same and avoids innovation has the potential to be left behind. This fact is especially poignant when you consider the continued rise of electric vehicles and renewable energy, with innovative companies such as Tesla releasing prototypes for electric trucks. Such vehicles if paired with the an environmentally friendly electrical supply have the potential to leave rail freight locomotives, with their diesel engines, some of which are 30-40 years old, as the "old polluting dinosaur". With a push to reduce the emissions from anthropogenic sources, rail henceforth must innovate – it has little choice. Locomotives need to both become more efficient and to take advantage of new technologies that utilise low to zero emission technology. Without this radical change, there is a very real reality that rail freight could no longer claim the environmental benefits it currently holds over the road transport industry.

The rail industry has the people, the passion and the expertise to move towards a low emission future, it just needs the courage to lead in this space.



Training With Technology

The training and development of rail employees, particularly Freight Train Drivers, is a lengthy and comprehensive learning process. Using technology and specialized instructional equipment, Trainee Train Drivers at Genesee and Wyoming Australia (GWA) are provided simulated learning opportunities from their commencement.

In addition to extensive on-track mentoring and coaching simulated learning environments continue to prove advantageous in the replication of on-track emergencies and extreme train handling scenarios. Such situations pose obvious learning challenges without the use of effective simulation capabilities. The use of learning simulators enhances and complements additional training methods and significantly supports a smoother classroom to in-field application transition.

The purpose engineered and constructed air brake stand and driving simulator, provide effective controlled learning environments in which Trainees are able to acquire task familiarization, demonstrate learned skills and their understanding of rail safeworking rules and principles.

The air brake stand used by GWA is a scaled model replicating both pneumatic and dynamic brake interlock functions of a locomotive. Also having the capability for an Instructor to simulate the time it takes after applying the automatic brake for the application and the release from the front wagons to the rear wagons on a train consists.

The driving simulator is equipped with Computer Generated Imagery (CGI) created from actual footage taken by cameras mounted on the front of a locomotive. The learning resource provides the opportunity for trainees to gain insight into the application of safeworking rules and train handling requirements over critical track sections. Practicing on geo-typical track imagery overlaid with specific safeworking systems ensures trainees are also able to gain learning towards the acquisition of route competencies whilst learning to handle the train.

The use of technology and innovation in the skilling of trainee train drivers at GWA continues to be a functional investment for enhancing and promoting positive experiences for trainee train drivers.

Automating Maintenance Notification for Rolling Stock

Rio Tinto has recently integrated automatic roll bye on the Tom Price Mainline. The technology uses cameras to capture thousands of high resolution photographs for each train passing focusing on key components (Figure 1. shows retainer bolts on draft package) and the data is utilised to identify the condition of the rolling stock, enabling preventive maintenance to be planned reducing the productivity loss from unplanned failures. Initially the planning teams had to check numerous systems to ascertain the condition of the consist and if any maintenance is required. With humans interacting with multiple systems (up to four different systems) there was an increased risk that information was being missed and data had shown consists where returning to operation with defects that had not been repaired or removed.

Figure 1. Photograph of retainer bolts from iron ore car

By understanding the end user requirements, the classification of the consist and required maintenance were able to be automated through to the planning team. The systems were integrated into a master consist list which enabled the automatic classification of the consist prior to arrival at a port. Both the planning and operations teams receive notification through the central planning system and schedule the required maintenance to be completed in consists at the opportune time, or schedule the asset to be removed from the consist if the maintenance is unable to be completed in situ. The automatic classification has removed the need to check multiple systems and removed the human error component while reducing the unplanned failures of rollingstock and increasing asset productivity.

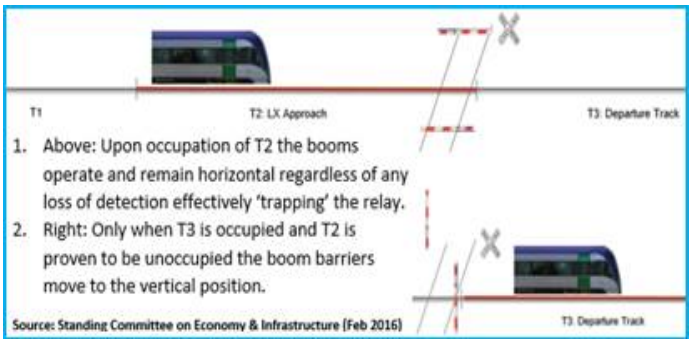
Track Circuit Track Traps

Background
V/Line is Victoria's regional passenger operator as well as infrastructure manager. There are more than 450 active level crossing on the V/Line network.

Trap circuits
The majority of these level crossings require track circuits electrically detect the train through its wheels. Rail head contamination can cause electrical isolation leading to loss of detection prior to the train clearing the crossing. This can cause what is called a wrong side failure or short warning time.

Trap track
Once a train has been detected the trap tracks ensure a minimum level crossing warning time is maintained.

The initial trap tracks were rolled out in August 2016 on the Ballarat line. Since then, 38 crossings have been upgraded across the network with this technology. In total, 45 crossings have been upgraded.



Observed Trap tracks benefits
Early this year there were bush fires in south west Victoria, trap tracks operated to prevent wrong side failure due to loss of detection from leaf litter or soot from the fires that was deposited on the rail head.

Observed Trap tracks dis-benefits
Trap tracks: rely on a rail to wheel interface, they can only be fitted to certain level crossing detection technology, capital is required to be spent to determine if they can be implemented and fitting to legacy systems may outweigh the benefit compared to axle counters.

Thanks for reading

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