This is a collation of some of the world's railway formal inquiry reports. It includes a brief incident synopsis, along with the main causes and recommendations from each investigation.

Readers may find some of the actions and recommendations useful to their own operations.

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Key issues in this edition:

- Wrong routing
- Break of gauge
- Signalling display information
- Staff competence
- Rail configuration, and warning of the same
- Route knowledge
- Guidance and processes
- RRV modification and maintenance (brakes)
- Culture
- Drug use (and drug and alcohol policy)
- Staff training
- Management check function
- Dangerous goods
- Track inspection and maintenance
At around 06:23 (local time) on 2 March 2013, a Pacific National freight, heading from Appleton Dock to Tottenham Yard, derailed at South Dynon Junction near Melbourne, Victoria.

Due to a track closure, the Network Control Officer (NCO) had been routing all trains via an alternative line through the South Dynon Junction area via DYN114 signal and 113 points on the North Dock line. All these movements involved standard-gauge trains. However, the NCO set the same route for the incident train, which ran on the broad-gauge. Unfortunately, the route was ‘standard-gauge’ only, as it did not contain an extra broad-gauge rail beyond signal DYN114, other than the 40-metre length leading to its truncation.

Having detected the train as broad-gauge and therefore incompatible with the remainder of the established route, the signal interlocking system prevented DYN114 from clearing. The train stopped at the signal and, through discussion, both the NCO and the crew assumed a signal failure. The NCO subsequently issued a verbal authority to the driver to pass DYN114 at danger. The crew then proceeded past signal DYN114 for a distance of about 40 metres where the broad-gauge rail ended, resulting in a low-speed derailment.

The Australian Transport Safety Bureau (ATSB) report listed the following contributory factors:

- The NCO officer established a route for the broad-gauge train on which there was no broad-gauge track available;
- The train control system screen display provided no direct indication to the network control officer that one section of the established route was dual-gauge and another section single-gauge;
- When the incident train approached DYN114 signal, which was displaying a Stop aspect, there was minimal indication to the NCO that the train gauge and the selected route were incompatible;
- The NCO assumed that DYN114 was defective and authorised the crew to pass it at danger;
- The crew did not observe that the broad-gauge rail ended a short distance beyond the signal; and
The configuration of the dual-gauge points assembly led to a truncated broad-gauge rail in one of the turnout directions.

The ATSB also found that:

- The train operator’s Route Knowledge Package did not include track layout diagrams, or specific information warning of the existence of dual-gauge turnouts where track terminated in one direction;
- There was no warning indication at DYN114 signal to warn train crews that the broad-gauge rail terminated in the normal direction;
- The guidance documentation and procedures for authorising movement past signals displaying a Stop indication was ambiguous; and
- The process undertaken by the NCO for issuing a Caution Order did not require validation of compatibility between the gauge of the train and the established route.

**Action taken**

The Australian Rail Track Corporation has modified the train control system to alert NCOs when a route is set that is not compatible with the gauge of the train, and has amended processes regarding authorising train movements past signals that are displaying a Stop indication.

**Safety message**

The ATSB note that this report emphasises the need for rail transport operators to provide adequately designed system displays that are not provocative of decision-making error by operators. It also highlights the need for train crew and NCOs to ensure they have considered the possibility that an unexpected Stop indication is not always due to signal failure.

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**Published 15 September**

*Australia: Fatal RRV collision at Haig level crossing, WA, 24 May 2012*

For the full report, click [here](#).

On 24 May 2012, three Transfield Services Australia (Transfield) road-rail vehicles were travelling in convoy between Forrest and Haig in Western Australia, where they were to be taken off the track.

On arrival at Haig level crossing, shortly before 17:00 (local time), the lead vehicle was off-tracked, but a problem with the second one prevented its removal. At about 17:11, while work was continuing to remove the second vehicle from the track, the third vehicle in the convoy, a flatbed truck, collided with the rear of the second. The force of the impact shunted the stationary vehicle forwards with both vehicles running over one worker, fatally injuring him, while the other jumped clear. The driver of flatbed truck was not injured.

The ATSB determined that the flatbed truck could not be stopped in time to avoid the collision because the brakes that were originally fitted to its front rail guidance equipment had been removed, and its rear wheel brakes were in a poor state of repair. The investigation also identified that the rail workers had developed localised practices that were not compliant with Transfield’s operational procedures.

A sample of the deceased worker’s blood tested positive to both the active and inactive metabolite of cannabis. The other workers were not tested for the presence of drugs and alcohol after the accident.

The ATSB identified a number of systemic issues associated with Transfield’s road-rail vehicle maintenance regime, rail safety worker training, management oversight and drug and alcohol policy and procedures.
In addition, the ATSB highlighted the absence of a national standard for road-rail vehicles which addresses the fitment, modification and maintenance of road-rail equipment and the consequent risk that unsuitable modifications may adversely affect the safe operation of a road-rail vehicle.

**Action taken**

Transfield Services Australia has reviewed and updated its road-rail vehicle maintenance regime. The company has also taken action to improve its management oversight of rail safety workers, its training processes for maintenance and operational staff and its drug and alcohol policies and procedures.

The Rail Industry Safety Standards Board (RISSB) is facilitating the development of *Australian Standard, AS 7502, Road Rail Vehicles*. This will cover the basic requirements for road-rail vehicles across their life cycle, including design, construction, testing and certification, operation, maintenance, modification and disposal.

**Safety message**

The ATSB note that rail operators should ensure that safety critical road-rail vehicle equipment is appropriately maintained. Maintenance regimes and activities should consider the increased loading and wear and tear on the vehicle and its various components as a result of fitting of rail guidance equipment and of the operation of the vehicle on rail.

Operators should also conduct regular reviews of staff members’ and contractors’ ability and competency to ensure they are consistently performing their duties in accordance with the most up to date and endorsed working instructions.

**Published 18 September**

*Canada: Freight train derailment (dangerous goods) near Columbia, Ohio, 11 July 2012*

For the full report, click [here](#).

At about 02:03 (local time) on 11 July 2012, 17 wagons of an eastbound Norfolk Southern Railway Company (NSRC) freight at milepost S2.2, within the city limits of Columbus, Ohio. The train consisted of two locomotives, 97 loaded wagons and one empty wagon.

The derailment destroyed both main tracks. Three of the wagons involved contained denatured ethanol (a hazardous material). One was punctured and the ethanol fuelled a large pool fire. The two other tank wagons that were carrying denatured ethanol were engulfed in the pool fire and split open. Witnesses observed multiple energetic fire eruptions when these two tank cars ruptured.

The train crew was not injured; however, one person near the derailment site sustained minor burns. About 100 people in a one-mile radius of the derailment were evacuated. The damages were estimated to total $1.2 million.

During the National Transportation Safety Board’s (NTSB’s) reconstruction of the rail recovered after the derailment, investigators identified 24 oxidized internal cracks that fractured during the incident. The NTSB Materials Laboratory conducted metallurgical analyses and rail head wear measurements on several rail samples. The running surface of the rail pieces showed evidence of flaking and severe rolling contact fatigue cracks, also referred to as head checks. Other pieces showed no evidence of flaking damage on the head portions of the rail. The exposed fracture faces of some rail sections showed evidence of transverse detail fractures that extended from the gauge side of the rail head in areas that coincided with head check and flaking damage.

The metallurgical evidence thus indicated that the rail was stressed by rolling contact fatigue, which caused the rail to break under the train, leading to the derailment.
Action taken

As a result of the NTSB safety recommendations from previous investigations, the Federal Railroad Authority (FRA) determined that each of the accidents resulted from rail failures. In September 2012, the FRA established a Rail Safety Advisory Committee (RSAC) Rail Failure Working Group to study the effects of rail head wear and the resulting rail surface conditions (known as rolling contact fatigue), and how such rail conditions can adversely affect the results of ultrasonic rail testing.

The RSAC Rail Failure Working Group met four times between January and July 2013. The group proposed new performance-based recommendations for determining rail wear and internal rail inspection criteria. The new criteria, which establish best practices, have improved the FRA’s ability to monitor rail integrity programmes and should help to ensure that track owners can quickly identify, as well as promptly and effectively remediate, problems with rails that could lead to a derailment in populated areas or to track-related accidents involving trains transporting passengers or hazardous materials.

The FRA efforts and the industry’s acceptance of these best practices should reduce the number of accidents caused by rail breaks due to rolling contact fatigue and improve the operation of industry rail risk management programs.

On 16 April 2014, the RSAC adopted the recommendations from the Rail Failure Working Group. On 25 July 2014, the FRA distributed the final Rail Failure Prevention Programme guidance document to the RSAC and the Rail Failure Working Group, and requested that they distribute it throughout the rail industry.

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