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- safety data recording, analysis and research
- fostering safety awareness, knowledge and action.

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Derailment of Ballast Train 8M24N near Broken Hill NSW 11 April 2012

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.

Background information

Train information

Train 8M24N was a ballast train comprising locomotives 442s1 and 48s28 hauling 34 ballast wagons and one ballast plough car at the rear. The ballast wagons were AHBY class ballast hopper type with discharge doors in the middle of the wagon. The ballast train was operated by Southern Spur Rail Services Pty Ltd (SSR) under contract to Australian Rail Track Corporation (ARTC) to provide Hook and Pull services for the Broken Hill to Parkes re-sleeper works. The ARTC supplied the ballast wagons and SSR owned the locomotives.

Track information

The track consisted of 53 kg /m rail, anchored to concrete sleepers with resilient fasteners on a bed of ballast.

WHAT HAPPENED

On 9 April 2012, ballast train 8M25 had been discharging ballast and was taken to the Broken Hill ballast siding. Once in the ballast siding, it was inspected to ensure that the doors were closed and secured following that days ballast drop. The train was scheduled to be reloaded the next day to form ballast train 8M24N to continue working on the Broken Hill to Parkes re-sleeper project. There were no documented defects with the operation of the doors for wagon AHBY0001R.

On 10 April at 0900¹, a front-end loader commenced loading ballast into the ballast wagons. To facilitate the loading process, a ramp was constructed from ballast, adjacent to the track. This ramp assisted the loader operator to obtain the required height to access the top of the wagons for loading.

The filling procedure was to place a bucket load at each end of the wagon visually checking every bucket load to ensure that there was no discharge under the wagon. Once the operator was satisfied that the wagon was not discharging, he then finished loading the wagon. The operator stated that he did not recall any of the wagons discharging ballast.

1 Central Daylight Time

The operator loaded all the wagons apart from six that were inaccessible due to obstacles adjacent to the track.

Once the train crew arrived, the loader operator requested that the train crew shunt the ballast train to give access to the remaining empty wagons. The loader operator noted that everything appeared to be normal as the ballast train was being moved. The operator then proceeded to load the remaining empty wagons. The operator reported that he did not observe anything abnormal during the loading and movement of the wagons and noted that all the discharge doors were secured. Loading finished on that afternoon and the train was stabled and the locomotives removed.

On 11 April at approximately 0300, the train crew arrived at the ballast siding and prepared the train for departure. Whilst preparing the train, they observed that the middle door on wagon AHBY0001R was open and that a small amount of ballast had discharged from it. The train crew believed that due to the small amount of ballast that had been dropped, the load in the wagon would be relatively full and still evenly loaded. The train crew had no means to visually check inside the wagon as there were no safe vantage points to inspect the train from above and there was no external lighting at the siding. As the discharged ballast was not fouling the wagon, the train crew completed their preparation for departure. Preparation of the train for departure was done without any external lighting.

At 0406, the train crew had received their train authority and departed Broken Hill heading in an easterly direction towards Parkes to begin discharging ballast at various work sites. Shortly after departing, at approximately 0409, the train crew noticed “dust and sparks” coming from the rear portion of the train, while it was traversing the Menindee Rd. level crossing. They stopped the train at the 1118.500 km point to conduct an inspection. On inspection, the crew found that the 26th wagon, AHBY0001R, had derailed both bogies. The train crew notified Network Control and then secured the train.

Subsequent to the derailment, there was considerable track damage over a 4 km length. The derailed wagon sustained minor damage and was able to be re-railed. An inspection of the wagon after the derailment found that the load was uneven (Figure 1).

Figure1: Wagon AHBY0001R post derailment showing uneven load



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Procedure for inspecting ballast wagon loads

The train operator's procedure for pre-distribution and pre-departure inspection of ballast hoppers stated that inspections for uneven loads should be performed from ground level. Where there was a geographical feature where the load could be viewed from higher vantage point, train operators were encouraged to do so where safe. Under no circumstances are train operators permitted to climb into the wagons to check load distribution.

ARTC investigation

An ARTC investigation into the loading of the ballast train suggested that the front-end loader operator would not have seen if the middle door on AHBY001R wagon was open, due to the loading ramp obscuring his view. The report concluded that the wagon had discharged ballast until there was no more room underneath for it to discharge, as seen by the amount of ballast in the 4 foot² (Figure 2). Once the train was shunted for the final wagons to be loaded, the ballast continued to discharge.

Figure 2: Ballast siding showing ballast in 4 foot and ballast ramp

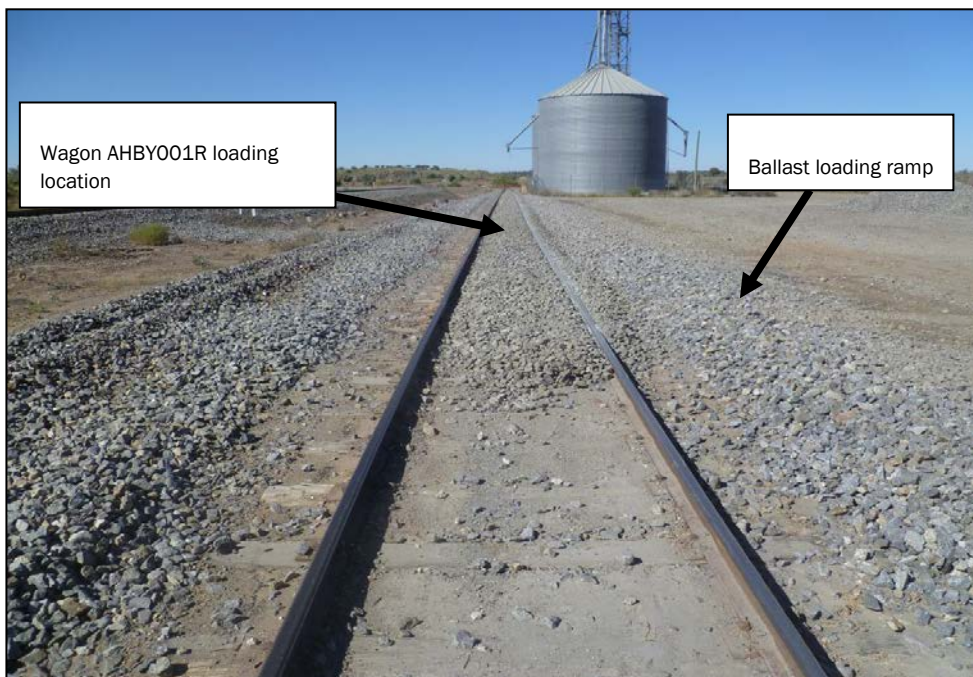


Photo from "Ballast Siding Condition Report" Copyright – ARTC ©

ATSB COMMENT

The load in wagon AHBY001R had partially discharged from one door, which resulted in an uneven load. The wagon was therefore unbalanced and, when the train negotiated a curve, the wagon derailed.

SAFETY MESSAGE

Uneven loading of ballast wagons increases the potential of derailment. In 2010, the Independent Transport Safety Regulator (ITSR) released a Rail Industry Safety Notification (RISN) No. 32 on the "operation of less than safely loaded wagons". Although the notice refers to coal trains, some of the

2 The area between the rails of a standard gauge railway

issues raised in the RISN are also applicable to ballast trains such as ensuring the appropriate wagon loading configurations are in place.

An example of uneven loading of ballast wagons which contributed to a derailment was a ballast train derailment near Roopena, South Australia on 22 May 2007 which the ATSB investigated.

The investigation report can be found at:

- Derailment of Train 3MR2 near Roopena, South Australia on 22 May 2007
www.atsb.gov.au/publications/investigation_reports/2007/rair/2007-003.aspx

To ensure wagons are evenly loaded, the rail operator's procedures for checking the load distribution need to be followed and carried out to the required standard.