Australian Government
Australian Transport Safety Bureau

Publication Date: December 2010 ISBN 978-1-74251-125-2

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ATSB-Dec10/ATSB157

Released in accordance with section 25 of the Transport Safety Investigation Act 2003

ATSB TRANSPORT SAFETY REPORT
Rail Occurrence Investigation RO-2010-011
Preliminary

Derailment of train 3PW4 Wodonga, Victoria

23 October 2010

Figure 1: The derailment site

Abstract

At approximately 0710[1] on 23 October 2010, 15 wagons on freight train 3PW4 derailed near Wodonga, Victoria. There were no injuries but serious damage to rolling stock and track infrastructure was sustained during the derailment.

The investigation is continuing.

FACTUAL INFORMATION

The information contained in this preliminary report is derived from the initial investigation of the occurrence. Readers are cautioned that it is possible that new evidence may become available that alters the circumstances as depicted in the report.

Location

Wodonga is a regional city in Victoria, on the banks of the Murray River and the state border between Victoria and New South Wales. Wodonga is also located on the Hume Highway and the Defined Interstate Rail Network (DIRN), the major inland road and rail transport corridors between Sydney and Melbourne.

The derailment occurred on the Wodonga rail bypass, a newly constructed rail alignment located to the north of Wodonga. The bypass consisted of about 5 km of dual track, constructed of continuously welded rail secured to concrete sleepers and supported on ballast.

The Melbourne – Wodonga standard gauge rail corridor was leased by the Australian Rail Track Corporation (ARTC) and maintained under contract by Downer EDI Works.

1 The 24-hour clock is used in this report to describe the local time of day, Eastern Daylight Time (EDT).

Train information

Freight train 3PW4 was owned and operated by Pacific National (PN). It consisted of three locomotives (NR46 leading, AN4 and NR87) hauling 61 wagons. The train was about 1137 m long with a total weight of about 3439 t.

The wagon believed to have first derailed was RKWY-4125C, the 20th wagon behind the locomotives. The RKWY class wagons are used to carry structural steel products. At the time of the derailment, wagon RKWY-4125C was carrying structural steel beams giving the wagon a gross mass of 85.37 t[2].

The occurrence

Freight train 3PW4 originated at the Perth Freight Terminal and was travelling to Port Kembla. However, wagon RKWY-4125C originated at Whyalla, South Australia and joined train 3PW4 at Spencer Junction, near Port Augusta.

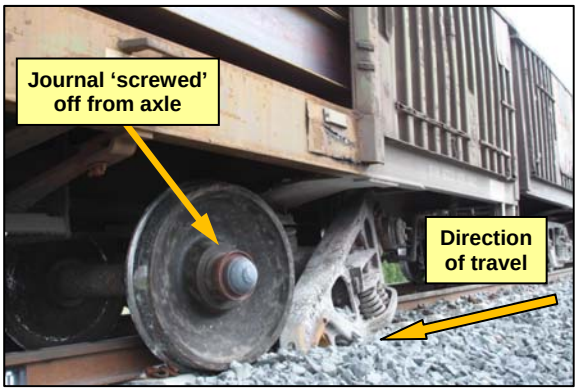
Train 3PW4 was travelling towards the Victoria/New South Wales border on 23 October 2010. At approximately 0710, while passing over the newly opened Wodonga rail bypass at a speed of about 65 km/h, the drivers noted a loss of brake pipe pressure, indicating that brake pipe air was exhausting to the atmosphere and the train brakes would be in the process of applying. The train slowed to a stop and the driver contacted the ARTC train controller to advise that train 3PW4 had stopped due to a loss of brake pipe pressure.

The second driver walked back to investigate the cause of the brake application and discovered that the rear bogie on wagon RKWY-4125C (the 20th wagon behind the locomotives) had derailed. It was evident that a bearing on the lead axle of the bogie had failed, resulting in the bearing journal separating from the axle (commonly referred to as a screwed journal - Figure 2).

Bogies under three of the following four wagons had also derailed, beyond which a gap of about 140 m existed before the remainder of the train. Most of the derailed wagons had come to rest on one of the Wodonga bypass bridges (spanning the Wodonga Creek). In total, 15 wagons had derailed and were lying at various angles to the track, including two which had fallen, each with one end resting on the ground and one end on the bridge (Figure 1).

The drivers contacted the ARTC train controller and advised that train 3PW4 had derailed, a significant portion of track had been destroyed and the adjacent track was obstructed.

Figure 2: Rear bogie of wagon RKWY-4125C



Post occurrence

Australian Transport Safety Bureau investigators arrived on site later on 23 October 2010. Investigators examined and photographed the derailment site before releasing the site to allow recovery operations to begin. However, the position of derailed wagons and the environmental sensitivity of the site served to make the recovery operations a challenging task.

Limited freight services were restored on 25 October 2010, with trains only operating on the adjacent track at a restricted speed of 10 km/h. Heavy lift cranes and recovery equipment arrived later in the week and began removing rolling stock and freight from the derailment site. Passenger services recommenced on 3 November 2010 and operated along with freight services on the adjacent track, but recovery of wagons continued for many days. The two wagons that fell from the bridge were finally cut up and removed from the site, before major track restoration works could commence.

Rail, sleepers and ballast were removed from the damaged track during the week beginning 15 November 2010. An engineering assessment was expected to occur during the week beginning 22 November 2010, the outcome of which would determine what actions would be required to fully restore the track.

2 Gross wagon mass as reported in the Pacific National train consist report.

A total of 15 wagons sustained damage and the track restoration site extended over a distance of about 550 m.

Site information

It was evident from on-site examination that the derailment was caused by a 'screwed journal' as a result of a bearing failure on wagon RKWY-4125C. The evidence suggested the following, as the most likely derailment sequence.

As the train approached Wodonga, it is likely that the condition of the wheel bearing on wagon RKWY-4125C had deteriorated to the point where the bearing had seized. As the wheel-set continued turning, the bearing lost interference fit on the axle journal, generating and transmitting sufficient heat to the journal to make it 'plastic' and causing it to 'screw off' (Figure 3).

Figure 3: Axle journal

Once the bearing journal had separated from the axle, the bogie side-frame and axle could not be contained within their normal configuration. The side-frame fell down and dragged along the sleepers and ballast while the wheel-set was permitted to turn and derail. As the train continued, the side-frame and wheels impacted with the concrete sleepers which ultimately failed to maintain track gauge and allowed further wagons to derail.

The train parted behind the 24th wagon as wagons began to dig into the ballast. The rear portion of the train continued to push into the rapidly slowing derailed wagons, thereby causing more wagons to derail until the wagons came to a complete stop.

The bearing that failed was completely destroyed and could not be examined to determine the cause of its failure. The investigation is continuing to identify possible causes and will include an examination of the following:

- The partner bearing located at the other end of the axle to the failed bearing.
- Bearing maintenance records and procedures.
- Operational conditions that may contribute to bearing failure.
- Data recorded by trackside condition monitoring systems.