Executive Summary

TRC's Train No. 4816 at Lingjiao Station

On February 12, 2024, Taiwan Railways Corporation, Ltd. (TRC) local train No. 4816, consisting of four cars and operating from Badouzi Station (at the border of New Taipei City and Keelung City) to Jingtong Station in New Taipei City, experienced a derailment after departing Lingjiao Station on the Pingxi Branch Line. The first and second axles at the front end of car No. 3 derailed.

The train arrived at Lingjiao Station at 1049:12. It departed at 1050:18. Based on damage to the ballast and sleepers at the accident site, the train's final stopping position, and footage from the event recorder, the third car derailed to the right (in the direction of travel) at 1051:21.

According to site measurements, driver's interview, and records from the Automatic Train Protection (ATP) system, the wheels of the third car climbed the rail at K10+152, traveling at approximately 14 km/h, and dropped at K10+153. Before entering the railway bridge, the driver advanced the throttle to notch two but observed unusual vibrations and a lack of expected acceleration. At 1052:01, the train came to a stop due to an engine stall. The third car stopped at K10+285, approximately 133 meters from the wheel-climbing point. Upon inspection, the driver confirmed that the first and second axles of the first bogie on the third car had derailed, and the front-end pilot was deformed. There were no fatalities or injuries in this occurrence.

In accordance with the Transportation Occurrences Investigation Act, R.O.C., and the definition of major transportation occurrences specified

therein, the Taiwan Transportation Safety Board was the independent agency in charge of investigating the railway accident. Agencies (institutions) invited to participate in the investigation included the Ministry of Transportation and Communications (MOTC), the Railway Bureau, and the TRC.

The final report was reviewed and approved by the 76th Board Meeting on June 13, 2025.

On the basis of comprehensive factual information and analyses, TTSB proposes the following 8 findings and 6 recommendations:

I. Findings

Findings Related to Probable Causes

1. The third car (DR1032) of the train experienced a significant reduction in vertical wheel load on the right wheel of the first bogie due to a malfunction of the air spring leveling valve. Additionally, the poor track geometry in the derailment section further reduced the vertical force on the same wheel, potentially resulting in the wheel treads losing contact with the rail surface. Moreover, a guard rail that should have been installed in this section was absent. While DR1032 was operating through this section, the minimum derailment coefficient threshold dropped below international safety standards, resulting in the right wheel of the first bogie climbing the rail at mileage K10+152 and derailing to the right in the direction of travel.

Findings Related to Risk

1. The installation criteria for guard rail, as specified in the “Track Maintenance and Inspection Regulations for 1067 mm Gauge,” are

inconsistent. The TRC’s interpretation of these criteria led to the absence of a guard rail in the derailment section, which increased the risk of wheel climb derailment.

2. Although the TRC possesses equipment capable of measuring wheel loads, it has not implemented any wheel load management measures. As a result, it missed the opportunity to proactively detect and address abnormalities in advance, failing to prevent the risk of a train with unbalanced wheel loads derailing while operating on the main line.

3. The TRC has not established time limits for rectifying track irregularities that exceed emergency maintenance thresholds. Additionally, post-maintenance inspections are conducted only at isolated points, making it difficult to confirm compliance with twist geometry standards. As a result, trains continued operating on tracks with poor geometry.

4. Although drainage ditches were present in the derailment section, they appeared ineffective. Water remained in the ballast even after several rain-free days. The presence of water mixed with silt hindered drainage, reduced ballast strength, and contributed to track irregularities.

5. The TRC's inspection systems are unable to detect the reduction rate of rail cross-sectional area, from Category A inspections to routine track patrols. As a result, defective rails could not be identified or corrected promptly. Furthermore, there are no regulatory standards regarding railhead wear.

6. The Railway Bureau’s periodic and non-periodic inspection frequencies on the Pingxi Branch Line were insufficient to identify this segment as high-risk promptly and to mandate corrective action from

the TRC.

Other findings

1. The TRC did not adjust the maintenance cycle for wheel diameter on DRC1000 series vehicles to correspond with the specific operating conditions of the Pingxi Branch Line. This resulted in wheel wear exceeding allowable limits prior to the next scheduled maintenance.

II. Safety Recommendations

To the Ministry of Transportation and Communication (MOTC)

1. Review and revise the "Track Maintenance and Inspection Regulations for 1067 mm Gauge" to clearly define the criteria for guard rail installation and to include standards for railhead wear.

To the Railway Bureau

1. Review and strengthen the inspection mechanisms for both track maintenance on the Pingxi Branch Line and maintenance practices of DRC1000 series rolling stock.

To the Taiwan Railway Corporation, Ltd.

1. Evaluate incorporating wheel load as a vehicle maintenance indicator and establishing a wheel load management system.
2. Improve drainage functionality along the Pingxi Branch Line.
3. Establish repair deadlines for rectifying track irregularities exceeding emergency maintenance thresholds and reinforce post-maintenance inspection procedures.
4. Review and improve rail wear inspection methods to ensure

compliance with regulatory standards.

Note: The language used in the occurrence investigation Final Report is in Chinese. To provide a general understanding of this investigation for the non-Chinese reader, the Executive Summary of the Final Report was translated into English. Although efforts are made to translate it as accurately as possible, discrepancies may occur. In this case, the Chinese version will be the official version.