

Executive Summary

TRC's Train No. 229 at Xin-Heren Tunnel

On June 21, 2024, the New Tze-Chiang Express Train No.229, a 12-car train operated by Taiwan Railway Corporation, Ltd. (TRC), departed from Ruisui Station in Hualien County and was scheduled to travel north to Shulin Station in New Taipei City (hereinafter referred to as the "occurrence train"). After passing through the Xin-Qingshui Tunnel in Hualien County, the train struck a debris flow that had overflowed from the Daqingshui River onto the track at the south entrance of the Xin-Heren Tunnel in Hualien County, causing the derailment of Cars Nos. 1, 2, and 9 of the occurrence train.

According to the train's front video recording, CCTV footage, and the field investigation at the occurrence site, at 1632:06, the track between K51+178 and K51+200 on the North-Link Line was submerged by a debris flow that had overflowed from the Daqingshui River. At 1649:54, the occurrence train, traveling at approximately 118 km/h, struck the debris flow, causing the front of the train to lift. As a result, the 4th axle of Car No. 1, all 4 axles of Car No. 2, and the second axle of Car No. 9 derailed, and the main obstacle deflector of Car No. 1 was broken. Additionally, the main compressor was damaged, resulting in a drop in main reservoir pressure and triggering the train's emergency brake. At 1650:22, the occurrence train came to a stop at K50+696 on the North-Link Line, located inside the New Heren Tunnel. A total of 9 people were injured 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, the Railway Bureau of the Ministry of Transportation and Communications, and the TRC.

The final report was reviewed and approved by the 78th Board Meeting on September 23, 2025.

On the basis of comprehensive factual information and analyses, TTSB proposes the following 7 findings and 6 safety recommendations:

I . Findings

Findings Related to Probable Causes

1. The original design of the real-time surveillance camera in the duty room of the Hualien Engineering Section of TRC, installed for monitoring the Western Main Line, did not include AI identification and alert functions, unlike the other cameras in the duty room. However, TRC failed to inform or train the duty personnel regarding this difference. As a result, the personnel on duty did not detect in a timely manner that a debris flow had overflowed onto the track both one day before and on the day of the occurrence, and therefore were unable to notify the Traffic Control Department, which could have notified the train driver to stop train operations in time.
2. Failing to be alerted to the obstruction ahead, the train driver did not see the debris flow in time and therefore did not apply the brake valve or press the emergency brake switch before the impact occurred. The train, traveling at approximately 118 km/h, struck the debris flow and subsequently derailed. Four seconds after the impact, the injured train driver moved the brake valve handle to the emergency brake position.

Findings Related to Risks

1. TRC failed to develop a comprehensive mechanism for debris flow information acquisition, early warning, and response based on the impact lists of potential debris flow torrents on railways published annually by the Agency of Rural Development and Soil and Water Conservation, Ministry of Agriculture. This was not conducive to the early detection of debris flows from the Daqingshui River.
2. Following earthquakes, neither the Ministry of Transportation and Communications nor TRC collaborated with the relevant authorities upstream, midstream, or downstream of the potential debris flow torrents to establish a cooperative mechanism for joint debris flow investigation, management, and early warning. This has hindered timely awareness of watershed landslides and sediment deposition in the rivershed, increasing the risk of debris flows overflowing onto tracks.
3. A special inspection of the Daqingshui River Bridge conducted by TRC revealed siltation in the riverbed, requiring follow-up monitoring. However, TRC failed to follow the Railroad Bridge Inspection Manual to conduct the monitoring and follow-up actions for improvement. As a result, the risk of debris flows onto the railway tracks in this section was not detected early.
4. The on-the-job training materials of the Rolling Stock Section of TRC did not include an introduction to the emergency brake switch installed on the EMU3000 series trains, making it difficult for train drive to act on the emergency brake in emergencies, thereby reducing the extent of injury from train impacts.

Other Findings

1. No abnormalities related to this occurrence were found in the

qualifications, physical examination results, urine tests, or alcohol tests of the train driver and conductor of the occurrence train.

II . Safety Recommendations

Interim Transportation Safety Bulletin

On July 19, 2024, the TTSB issued the following Transportation Safety Notices During Investigation to the Alishan Forest Railway and Cultural Heritage Office of the Forestry and Nature Conservation Agency under Ministry of Agriculture, Taiwan Railway Corporation, Ltd., Taiwan High Speed Rail Corporation, and Taiwan Sugar Corporation.

1. The TTSB requested that railway operating bodies assess the potential impact of potential debris flow torrents on railroad bridge sections and establish a comprehensive monitoring and response mechanism to prevent trains from striking debris flows and causing occurrences.

To the Ministry of Transportation and Communications

1. Assist Taiwan Railway Corporation, Ltd. in coordinating with bodies such as the Ministry of Agriculture, Ministry of Economic Affairs, Central Weather Administration of the Ministry of Transportation and Communications, and National Science and Technology Center for Disaster Reduction to establish a joint prevention mechanism for potential debris flow torrents.

To the Railway Bureau of the Ministry of Transportation and Communications

1. Exercise your supervisory authority and include the safety recommendations for Taiwan Railway Corporation, Ltd. in this case into the periodic and non-periodic inspections stipulated in Article 41 of the

Railway Act.

To the Taiwan Railway Corporation, Ltd.

1. Establish standard operating procedures for the observation, early warning, and response to potential debris flow torrents based on the impact lists of potential debris flow torrents and potential large-scale landslide areas published by the Agency of Rural Development and Soil and Water Conservation, Ministry of Agriculture.
2. Re-examine the Railroad Bridge Inspection Manual to ensure that it requires the establishment of a safety assessment and improvement tracking mechanism to be implemented when siltation or other abnormalities are detected upon bridge inspections, including periodic, flood control, and special inspections.
3. Re-examine and revise the training materials and instructions for the early warning system to clearly specify the differences between devices with alert features and those without.
4. Re-examine the training materials for the EMU3000 series trains, focusing particularly on training related to the functional differences between the equipment of EMU3000 series trains and that of existing train models.