

TRA's Train No.4111 at Nan'ao Station Occurrence Investigation Executive Summary

On April 22, 2023, Train No. 4111, a local train operated by the Taiwan Railways Administration (TRA, now restructured as Taiwan Railway Corporation, Ltd.), departed from Nan'ao Station to Shulin Station. At 5:07, the train passed the departure signal at danger (SPAD), prompting the automatic train protection (ATP) system to activate the emergency brake and halt the train.

Following the emergency stop, the train driver operated the ATP system's interface, selected the staff responsibility mode, and resumed operating the train. While proceeding, the train passed through turnout No.19 at the protection position at Nan'ao Station, causing the switch to deform, and journey to the scheduled stop. Eventually, the train arrived at the terminal station, Shulin Station, according to schedule. No casualties were reported 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. The agencies (institutions) invited to participate in the investigation include the Railway Bureau, MOTC and TRA. The investigation report was published on April 12 and was approved by the 60th Board Committee Meeting on March 15, 2024.

On the basis of comprehensive factual information and analyses, TTSB proposes the following 9 findings and 2 recommendations:

Findings

Findings Related to Probable Causes

1. The train driver misinterpreted the departure signal on track No.5 at Nan'ao Station as intended for the current train. Additionally, the Nan'ao Station displayed an incorrect departure sign, leading the train to pass the departure signal at danger on track No.6.
2. After the train passed the signal at danger, the ATP system activated the emergency brake and displayed SPAD on the human-machine interface. However, the train driver believed it was caused by a failure in the Balises, so did not follow the emergency operation regulations for SPAD. Consequently, the train driver selected the ATP to staff responsibility mode and continued operating the train to leave the station, causing turnout No.19 in the protection position at Nan'ao Station to deform.
3. The northbound departure signal on track No.6 at TRA's Nan'ao Station has a poor visual distance, making it difficult for northbound train drivers to confirm the display of the departure signal.
4. The dispatcher on duty at the Operations Control Center manually preset the northbound departure route for the train halted on track No.6. However, they mistakenly set the departure route for track No.5, an error that went unnoticed and uncorrected before the train's departure.
5. The station master on duty at Nan'ao Station failed to personally display the departure sign for the train, as per regulations and instead delegated this task to an unqualified station staff on duty.

Findings Related to Risk

1. The station staff on duty at Nan'ao Station had not received operational training. They may not have been familiar with the equipment's display contents, such as the local control panel and the departure signal's display devices, and cannot subsequently realize that the departure signal was not intended for track No.6.
2. The TRA typically provides training to train drivers on how to handle SPAD incidents through oral reminders, reading handouts, and answering questions on paper. However, it does not utilize simulators for practical training operations, which is detrimental to the personnel's familiarity with ATP human-machine interface SPAD operations.
3. In the event of a SPAD, there are no warnings in the TRA's Operations Control Center or the station's local control panel. This lack of warnings does not facilitate the detection of abnormal situations by railway operating personnel.

Other Findings

1. On the day of the occurrence, except for the station master on duty, all other station staff at Nan'ao had not received operational training. When the station master on duty took a break at the scheduled time, no substitute could assist the station master on duty in handling operating works.

Safety Recommendations

To the Taiwan Railway Corporation, Ltd.

1. Improve the poor visual distance problem of the northbound departure signal on track No.6 at Nan'ao Station, and inspect whether the same problems exist in the departure signal on all tracks at Nan'ao Station, to improve the train driver's response time to the signal.
2. Review the contents of the train driver simulator training and incorporate simulation scenarios designed to help train drivers effectively manage SPAD incidents, thereby enhancing their operational skills.

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.