

# **Executive Summary**

## **TRA's Train No. 126 at Zhongli Station**

On April 11, 2021, train No.126, a 12-car EMU 300 Tze-Chiang Limited Express Train of Taiwan Railways Administration (TRA), MOTC, departed from Dounan Station, Yuanlin County, to Qidu Station, Keelung City. When the train passed Yangmei Station at 18:02 and Puxin Station at 18:05, there was a fire underneath car No. 3.

At 18:09, the train arrived at Zhongli Station, Taoyuan City. The station staff discovered a fire on the bottom of car No. 3 and extinguished the fire with extinguishers. At 18:10, the train master opened the door next to platform 1 to evacuate passengers, and at 18:17, the train master reported to the station master that doors were open on both sides. At 18:36, the power supply cut off, and the firefighters sprayed water on the bottom of the car. Train service resumed at 19:22. There were no fatalities or injuries in this occurrence.

According to the Transportation Occurrences Investigation Act, the Taiwan Transportation Safety Board is responsible for investigating major transportation occurrences that arise in the R.O.C. territory. This incident is classified as a fire accident that occurred on the main line and is considered as a major transportation occurrence within the scope of investigation. The Railway Bureau and TRA were invited to participate in the investigation.

The investigation report was approved by the 47<sup>th</sup> Board Meeting on February 2, 2023, and published on February 10, 2023.

After comprehensive investigation and analysis of the factual data, a total of six conclusions and six safety recommendations were obtained, which are detailed as follows:

## **Findings**

### **Findings related to probable causes**

1. TRA has no maintenance manuals for EMU 300 and the maintenance staff are not required to use the end cap screws specified by the original supplier. The maintenance personnel used a substitute screw of similar size and did not install the locking plate with tongue edge when overhauling the axle of the 1st bogie of Car No. 3. The maintenance staff didn't ask inspectors as required to confirm the installation of end cap screws or inspectors only confirmed the locking status of the screws by visual inspection and by tapping with an inspection mallet and didn't find out the locking plate was not installed according to the original specification. Due to the vibration generated by the train operation, the end cap screws loosened, which caused the bearing to collapse and generated excessive heat. The heat generated by the continuous friction of the bearings caused the rubber spring to catch fire.

### **Findings related to risk**

1. TRA didn't develop maintenance manuals for EMU 300 according to supplier specifications, which made maintenance staff difficult to follow supplier specifications.
2. TRA didn't require maintenance staff to confirm the installation results after outsourced maintenance staff installed the end cap and other parts, which made maintenance quality difficult to be assured.

### **Other findings**

1. TRA didn't regulate the torque value of end cap screws according to supplier specifications.
2. In the "Standard Operating Procedures for Traffic Accident Response Handling", in case of a train fire in a station, TRA didn't regulate the evacuation assembly point, fire scene blockade, the criteria for determining whether following trains can enter the station, and the procedures for passenger evacuation between stations.
3. There is no smoke or fire detection equipment installed at the underframe of the train carriage. In case of fire, no alarm will be generated in the driver's cab, and the driver will not be able to know the situation of the fire and respond promptly.

## **Safety Recommendations**

### **To TRA**

1. Although the EMU 300 has ceased to operate, all types of trains should be thoroughly inspected to confirm the use of end cap screws and locking plates that meet the original supplier specifications.
2. Although the EMU 300 has ceased to operate, it is still necessary to internalize the original supplier documents and establish maintenance manuals for each type of train to provide maintenance personnel with operating guidelines.
3. Educate maintenance staff to use parts that meet the supplier specifications and implement temporary maintenance records and supervision to ensure the quality of maintenance.
4. Revise the "Standard Operating Procedures for Traffic Accident Response Handling", with a special focus on improving the implementation of passenger evacuation procedures by train conductors; add passenger evacuation points in case of a train fire in the station, on-site isolation specifications, and criteria for determining whether

subsequent trains can enter the station.

5. Evaluate the installation of smoke and fire detection devices at the bottom of new trains to be purchased in the future or at stations to enable drivers immediately identify the cause of the malfunctions and take appropriate measures.

### **To Railway Bureau, MOTC**

1. The Railway Bureau, MOTC, based on its authority supervision, and management responsibilities, should integrate all safety recommendations made in this case to TRA into periodic and non-periodic inspection items in accordance with the Railway Act, to supervise TRA and track their progress.

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.