

Executive Summary

A commercial tourist bus owned by Chung Yuan Transportation Co., Ltd. (hereinafter referred to as Chung Yuan) overturned at 5.3 kilometers northbound on Yilan Special Highway No. 1 at 15:14 on November 5, 2023. One passenger was killed, 16 passengers were seriously injured, and 23 passengers were slightly injured.

In accordance with the Transportation Occurrence Investigation Act, the Taiwan Transportation Safety Board (TTSB) is an independent transportation occurrence investigation agency, and responsible for conducting the investigation. The investigation team also included members from the Highway Bureau, Ministry of Transportation and Communications (MOTC); the Yilan Branch of the Forestry and Nature Conservation Agency, Ministry of Agriculture (MOA); Chung Yuan Transportation Co., Ltd.; and Daimler Trucks Asia Taiwan Ltd.

The draft for this investigation report was completed in January 2025. It was revised after preliminary review at the 72nd Board Meeting of the TTSB on February 14, 2025, according to procedures, and then sent to relevant agencies (institutions) for their opinions. The investigation report was published after review and approval by the 73rd Board Meeting on March 14, 2025.

After comprehensive investigation and analysis of the factual data, a total of 13 findings and 8 safety recommendations were obtained.

I. Investigation Findings

Findings Related to Probable Causes

1. The driver was not sufficiently familiar with the operation of the

auxiliary brakes, and only used the main brake to slow down the vehicle during a long downhill section. Despite having detected an unusual odor due to the brake disc and brake drum rubbing against each other for a long time, he did not take appropriate response measures, and continued to use the main brake, thus leading to insufficient brake pressure. Ultimately, he lost control of the vehicle, which led to the occurrence.

Findings Related to Risks

1. When Chung Yuan was assigning a driver to this bus, they did not have sufficient safety awareness regarding the risks of driving downhill for lengthy periods, and did not confirm the familiarity level of the driver toward the bus's braking system as well as his ability to perform long downhill drives. This may have led to a driver who was not sufficiently proficient at driving on mountain roads receiving this assignment involving driving long downhill sections. This, in turn, increased the vehicular risk.
2. After issuing bus driver licenses to qualified drivers, the motor vehicles supervisory authority does not have any review or testing mechanisms to reconfirm that drivers are capable of operating specific vehicle types. If the bus company itself does not have sufficient driving skills or safety awareness, then they cannot screen out drivers who do not have sufficient experience or who are unfamiliar with vehicles' functions.
3. Among the 42 occupants in the bus, 30 (71.4%) had worn seat belts, while 12 (28.6%) did not wear seat belts or it is unknown if they wore seat belts. The proportion of serious injuries or deaths among passengers who did not wear seat belts or it is unknown if they wore

seat belts (66.7%) was 2.2 times that of those who had worn seat belts (30%). The proportion of serious injuries among passengers who were wearing seat belts is lower, and their injuries were not fatal. This shows that the seat belts played a role in reducing the severity of passenger injuries and deaths in this occurrence.

Other Findings

1. The driver involved in the occurrence held a valid driving license issued by the Highway Bureau; there is no evidence that alcohol or drugs were involved in this occurrence. The bus has a valid motor license issued by the Highway Bureau. Furthermore, according to the bus's vision-based driver assistance system and the results of the vehicle inspection, there were no abnormalities in the tires or steering system, nor the maintenance, repair, and inspection records.
2. The driver had worked for a maximum of 22 consecutive days in the month before the occurrence. Furthermore, for 12 of those working days and the day before occurrence, the driver had had less than 10 hours of rest time. Other drivers employed by Chung Yuan also had a record of overly long working hours and insufficient rest time between working days.
3. Although Chung Yuan has established various regulatory documents related to attendance to manage their drivers, some discrepancies exist between the recorded work times and actual work times, making it difficult to have full knowledge of drivers' actual driving times. If other management methods are not used to confirm the actual operational status of vehicles, it would not be possible to ensure that the time drivers spend on the road as well as their rest times comply with

regulatory requirements.

4. Safety assessments conducted by the motor vehicles supervisory authority mainly involve checking drivers' driving times and rest times. Other attendance-related issues subject to the regulations of the Labor Standards Act should be confirmed by the labor administration unit. If the labor administration unit does not confirm the relevant matters at the same time as the motor vehicles supervisory authority, then it may lead to no one discovering in time that drivers have been driving for several consecutive days. In addition, conducting checks based only on the information provided by the bus company may not accurately reflect the actual status of the bus company's management of drivers' driving times and rest times.
5. Due to their physical properties, when brake discs have undergone brake fade due to heat, if they experience high temperatures again, they will perform better than brake discs that have not undergone brake fade.
6. SGS brake disc structure test analysis showed that the brake disc in the occurrence vehicle had experienced high temperatures. The brake disc friction performance test conducted by Taiwan Brake Technology Corp. showed that when a used brake disc's brake drum reached 350°C in friction performance tests, the brake disc's friction coefficient did not drop significantly. This can prove that the bus's brake disc experienced brake fade.
7. It is not possible to confirm, via brake tests on similar vehicles and how the driver operated the vehicle in actuality, whether the brake disc did not have sufficient braking force due to the first brake fade (where the temperature exceeded 350°C).

8. All passengers successfully left the bus through the roof escape hatch or through the hole in the upper windshield, aside from two passengers who were too severely injured to move and one passenger who remained in the bus to accompany the injured passengers. The severely injured passengers were removed from the bus with assistance from firefighters who arrived at the scene. There were no safety issues related to escape and evacuation in this occurrence.
9. A review of the inspection records for the Yilan Special Highway No. 1 by the Yilan Branch of the Forestry and Nature Conservation Agency, MOA, showed that the same inspection photos were used for different inspection dates. This indicates that the inspection procedures failed to accurately document the damage and repairs to the pavement every month. Moreover, the investigation team inspected the condition of the pavement between the 6K and 5K points of the Yilan Special Highway No. 1 on March 18, 2024, and found issues such as potholes, cracks, and thin overlay separation. However, the inspection records did not include the aforementioned pavement damage.

II. Safety Recommendations

To Chung Yuan Transportation Co., Ltd.

1. Ensure drivers under the company's employment have the necessary driving skills and sufficient familiarity with their vehicles and driving safety concepts by strengthening education and training or establishing relevant assessment mechanisms. Furthermore, enhance drivers' knowledge of the correct way to perform long downhill drives.
2. Ensure that drivers' working times, driving times, and rest times comply with the relevant provisions of the Labor Standards Act and

the Motor Vehicle Transportation Industry Management Regulations, as well as keep accurate records of drivers' vehicle movements and work attendance status, thereby preventing drivers from driving while fatigued.

3. Implement safety management self-inspections, properly fill out all documents required for safety assessments, and keep all relevant records, order to fulfill the requirements of the Highway Bureau, MOTC, regarding operators' self management.

To the Yilan Branch of the Forestry and Nature Conservation Agency, MOA

1. Conduct proper inspections to damage to the roadway on Yilan Special Highway No. 1 and ensure that the inspection results are recorded accurately. Perform repairs to roadways and other related facilities in a timely manner in order to improve driving safety and comfort.

To the Highway Bureau, MOTC

1. Formulate a tourist bus carrier driver competency assessment document to provide clear assessment criteria for transportation companies, which will help companies hire drivers with the necessary awareness of safety concepts and suitable skills. This will ensure drivers have the requisite safety knowledge and professional skills, which in turn will ensure only suitable drivers will be selected for jobs.
2. Before laws and regulations regarding the installation of driver identification systems on tourist buses are officially promulgated, safety assessments conducted must ensure effective oversight over companies' management regarding drivers' work, and the results of

such assessments shall clearly record the results of working hour inspections.

To the Ministry of Transportation and Communications

1. For tourist bus carriers, add a requirement for passengers sitting in rear seats to wear seat belts when the companies are providing tourist bus-related services, which should apply to all roadways except for freeways and expressways. (This is an existing safety recommendation and still controlled by relevant sub-projects. This is the third time it has been proposed. Please refer to safety recommendation number TTSB-HSR-22-11-009 of the previous case when handling this recommendation.)
2. Promote the installation of driver identification systems on tourist buses to enhance the management on driving time and rest time for transportation companies and supervision agencies. (This is an existing safety recommendation and still controlled by relevant sub-projects. This is the second time it has been proposed. Please refer to safety recommendation number TTSB-HSR-24-04-003 of the previous case when handling this recommendation.)

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.