

## **Executive Summary**

On June 28, 2020, a 27-passenger tourist bus affiliated with Fu-Chin Tourist Bus Company (hereafter the accident vehicle) was used for day trip passenger transport departing from Taichung City to Taipei City, New Taipei City, and Taoyuan City. At 12:06 PM, as the accident vehicle passing through the corner of Section 1 of Hushan Road and Shengli Street in Beitou District, Taipei City driving downhill from Yangmingshan, it hit a bus operated by the SanChung Bus Company from the rear, causing damage to both vehicles and injuring 24 passengers. This report was reviewed and approved at the 28th TTSB Board meeting on August 6, 2021.

### **Findings Related to Probable Causes:**

1. The driver of the accident vehicle was inexperienced in operating the gears and brakes properly when driving downhill over a long distance and did not understand the principles of brake system operation and warning. The driver did not switch to low gear when driving downhill for a long distance. Because of the continual application of the foot brake, the loss of pressure in the air brake system was faster than its recovery, causing air pressure insufficiency. Moreover, the driver continued to drive in spite of the “low pressure” warning of the brake system, causing the loss of air pressure brake efficacy and resulting the accident vehicle’s collision with the bus in front.

### **Findings related to the risks:**

1. Fu-Chin did not thoroughly assess and examining carefully the information regarding its affiliated drivers participating the driving safety education and training.
2. Fu-Chin did not effectively deliver training notices and relevant regulations such as those on driving and escape safety to its affiliated drivers program requested by Fu-Chin.
3. When the seat configuration in buses was altered in accordance with Appendix 15 of Article 23 of Road Traffic Safety Regulations, no requirement was made by the highway supervision agency to conduct the review and conformity assessment on seat safety due to configuration change. For example, Item 48 “Safety belt anchorage” and Item 49 “Seats” of the Vehicle Safety Testing Directions were not test verified and validated, thus failing to guarantee the safety of the reconfigured seats.
4. When conducting safety assurance inspections in accordance with Item 48 “Safety belt anchorage” and Item 49 “Seats” of the Vehicle Safety Testing Directions, the seat manufacturers did not adopt the same seat installation devices found on the operated

vehicle for inspections. This inconsistency and variance should not be repeated in future vehicle seat installations. When the conditions specified for the above two mentioned items were not simultaneously satisfied in the seat installation, the safety of the seats in the accident vehicle regarding the two mentioned items could not be assured.

5. According to the investigation, the report on the seat safety review regarding the two mentioned items did not specify the seat installation method. Furthermore, the Automotive Research & Testing Center and Vehicle Safety Certification Center failed to review and verify the seat installation method according to the requirements specified in the review and inspection report, thus hindering follow-up review by the Vehicle Safety Certification Center on the conformity of production.
6. The vehicle seat installation quality consistency inspection by the Vehicle Safety Certification Center concerned only quality management. Although the on-site inspection specified that the mass production vehicle equipment must be consistent in the contents and specifications specified in the aforementioned two items of inspection, the actual seat installation efficacy and adequacy in the vehicle was not examined. Consequently, the inspection report was inconsistent with the actual seat installation quality, rendering the seats in the accident vehicle unsafe.

### **Other investigation findings:**

1. The accident vehicle was mounted with a valid license issued by the supervision agency. In the investigation after the accident, no anomaly was discovered in the wheels, brakes, or steering system of the accident vehicle.
2. No anomaly was present in the road or traffic engineering of the site of the accident, and the weather conditions were favorable.
3. No evidence indicates that the driver of the accident vehicle was influenced by fatigue, medication, or alcohol consumption.
4. The driver possessed a valid professional bus driver's license and had completed tourist bus driver pre-employment seminars and regular training as required.
5. No violation of laws or regulations was identified in the training frequency and content provided to the drivers affiliated with Fu-Chin.
6. Before the accident occurred, the accident vehicle reached the speed of 51 km/h, exceeding the specified impact speed of 30–32 km/h in the dynamic impact test according to the Vehicle Safety Testing Regulations. Accordingly, although the speed of the accident vehicle was within the range acceptable in the Vehicle Safety Testing

Regulations, the downhill gravitational acceleration, excessive vehicle speed, and passengers hitting the seats in front of them because they did not fasten their seat belts may have contributed to the vehicle's impact force exceeding that in the Vehicle Safety Testing Regulations, causing seat disengagement.

## **Safety Recommendations**

### **To Ministry of Transportation and Communications:**

1. Review the items of the Vehicle Safety Testing Regulations on seats and specify necessary dynamic and static inspection methods and standards to prevent passenger seats from disengaging from the vehicle body despite satisfying the Vehicle Safety Testing Regulations.
2. Reinforce the seat installation quality consistency test by specifying seat installation and testing procedures and establishing document recording and tracking processes, thereby ensuring quality consistency between the inspection results and actual vehicle device installation, thus improving safety related seat quality inspection by the Vehicle Safety Certification Center.
3. Review Appendix 15 of Road Traffic Safety Regulations Article 23. When inspecting the seat reconfiguration in a large passenger vehicle, the vehicle system/component certification reports related to seat safety, along with the documents related to seat installation quality management, must be thoughtfully examined to ensure the safety of reconfigured seats.

### **To Directorate General of Highways, MOTC:**

1. Supervise tourist bus companies in reinforcing the knowledge of their affiliated drivers on the principles of brake system actions and warnings and their practical experience in operating gears and brakes when traveling downhill over a long distance. Mountain driving skills training and assessment must also be rigorously improved in tourist bus driver pre-employment seminars.

### **To Automotive Research & Testing Center:**

1. When seat manufacturers apply for vehicle safety inspections on Item 48 "Safety belt anchorage" and Item 49 "Seats," they must provide detailed data on seat specifications and installation/anchorage methods, and consistency between the data and the inspection performance must be verified.

**To Vehicle Safety Certification Center:**

1. Reinforce the review of Item 48 “Safety belt anchorage” and Item 49 “Seats” of the Vehicle Safety Testing Directions and ensure that seat installation methods are recorded in vehicle system/component certification reports in detail for quality consistency inspections.
2. Reinforce quality consistency inspections to safeguard consistency between manufacturers’ seat installation methods and vehicle system/component certification reports, thereby guaranteeing quality consistency.

**To Fu-Chin Tourist Bus Company:**

1. Reinforce large passenger vehicle drivers’ knowledge regarding the principles of brake system actions and warnings and their practical experience in gear and brake operations when driving downhill over a long distance.
2. Examine companies’ driver management systems to thoroughly understand their status in providing driving safety education and training. Confirm that all drivers can receive the training notices and safety promotion issued by the companies.

**To Shou Eel Industry Limited Company:**

1. The seat installation devices used for actual seat installation in large passenger vehicles must be identical to those used for inspection according to Item 48 “Safety belt anchorage” and Item 49 “Seats” of the Vehicle Safety Testing Directions, thereby safeguarding consistent seat installation quality.