Executive Summary

At 19:25 on January 25, 2025, a rental private passenger car operated by Sunshine-Lease Car Rental Co., Ltd., carrying 1 driver and 7 passengers, collided with the central median near the Yangmei Rest Area at the 71.3-kilometer mark on the southbound side of Freeway No. 1 and caught fire. Four occupants were killed, and four others were injured in the accident.

In accordance with the Transportation Occurrences Investigation Act, the TTSB is the independent transportation occurrence investigation agency responsible for conducting the investigation. The investigation team also included members from The Ministry of Transportation and Communications, (MOTC), the Highway Bureau of MOTC, the Freeway Bureau of MOTC, the Taoyuan City Government Fire Department, and Sunshine-Lease Car Rental Co., Ltd.

The draft for this investigation report was completed in March 2026, and , according to procedures, sent to relevant agencies (institutions) for their opinions. The investigation report was approved by the 85th Board Meeting on April 10, 2026.

After comprehensive investigation and analysis of the factual data, a total of 14 findings and 5 safety recommendations were obtained.

I. Investigation Findings

Findings Related to Probable Causes

1. Based on factors including the occurrence vehicle maintaining a steady speed of approximately 100 km/h while traveling through the crossover ramp, the driver’s braking response occurring 0.2 seconds

before impact, the driver's prior habit of using the Advanced Driver Assistance System (ADAS) on freeways, and the near identical vehicle deviation trajectory in field tests conducted by the investigation team, it is possible that the driver had the ADAS function activated at the time of the occurrence. If the ADAS function of the occurrence vehicle was activated, the ADAS failed to recognize the lane markings in time and automatically deactivated, causing the occurrence vehicle to begin deviating from the lane. The speed limit at this location is 60 km/h, and the occurrence vehicle was traveling at approximately 100 km/h at the time of the occurrence. The driver subsequently failed to promptly recognize and correct the vehicle's direction of travel or apply the brakes, causing the occurrence vehicle to collide with the central median without decelerating in time.

Findings Related to Risks

1. Regardless of whether the driver had activated the ADAS function, the driver remained responsible for being fully attentive to road conditions and speed limits, and being prepared to immediately take over control of the vehicle at any time. In particular, when traveling through rest area entrance and exit ramps, where merging and diverging traffic are more frequent and road facilities and traffic conditions are more complex than on the main freeway, drivers should remain vigilant and be ready to intervene in vehicle operation in response to unexpected driving conditions.

2. As both the inside and outside southbound lanes at the terminal section of the Wuyang Overpass section are straight lanes, with the inside lane directly connecting to the crossover ramp and the outside lane directly

connecting to the Yangmei Rest Area entrance ramp, drivers may be less likely to notice that they have already entered the ramp area. In addition, although the section is equipped with 80 km/h and 60 km/h speed limit signs and road markings, and the length for deceleration of the ramps at each merging and diverging area complies with applicable standards, drivers traveling from the Wuyang Overpass section at the posted speed limit of 100 km/h toward the terminal exit ramp must, within a short period of time, observe densely placed signs and traffic markers to quickly determine their subsequent route. Under such rapidly changing and information-intensive conditions, the driver's cognitive load may increase.

3. From the point at which the occurrence vehicle entered the short left-hand curve to the point of impact with the gore area, the vehicle traveled approximately 55 meters in only about 2 seconds. As the short left-hand curve is located immediately before the gore area, if the occurrence driver was speeding on this section and the vehicle deviated from its lane while passing through the curve, it would have been difficult to correct the vehicle's direction within such a short period of time.

4. When a vehicle travels in the inside lane of the Wuyang Overpass section and passes the central median separating the crossover ramp from the mainline before entering the short left-hand curve of approximately 35 meters in length, the driver may steer slightly to the right due to the narrow 0.5-meters left shoulder and the vehicle's proximity to the median on the left. If the driver is speeding, over-reliant on driver assistance systems, or fatigued, the driver's reaction time may be insufficient, increasing the likelihood of further deviation

to the right and departure from the lane. Furthermore, the distance from the end of the short curve to the gore area of the right median is only about 20 meters, and the width of the right shoulder of the ramp is 0.5 meters. The overall geometry of the roadway is unfavorable for vehicle operation, and the traffic control devices failed to effectively mitigate the above risks.

5. When a vehicle travels in the outside lane of the Wuyang Overpass section along the chevron-marked gore area before the entrance ramp to the small vehicle parking area of the Yangmei Rest Area, the left-side chevron markings connect directly to a short right-hand curve of approximately 20 meters in length. As neither the lane alignment nor the chevron markings are designed to guide drivers through this short right-hand curve, drivers who fail to promptly recognize the change in road alignment ahead may face the risk of their vehicle drifting to the left and sideswiping the median.

6. The number of occupants carried by the occurrence vehicle exceeded the approved seating capacity, resulting in the vehicle's passive safety systems being unable to effectively protect the occupants during the collision, even when properly deployed and used. In addition, the vehicle was not equipped with child safety seats as required, which may have reduced the level of protection and chances of survival for the child occupants.

7. Vehicles equipped with ADAS are becoming increasingly common. However, the Ministry of Transportation and Communications has not established advocacy or management measures requiring car-rental carriers to provide renters with ADAS-related guidance or information. Without adequate and professional information being communicated

during the vehicle rental process, renters may lack a proper understanding of how to use ADAS and may not fully understand the system's detection capabilities and operational limitations. The lack of information may increase the likelihood of over-reliance on driver assistance systems and, consequently, elevate the risk of accidents.

Other Findings

1. This occurrence is not directly related to the driver's past occurrences or violations. There is no evidence that alcohol or fatigue were involved in this occurrence. The occurrence vehicle had a valid license issued by the Highway Bureau. There is no evidence that maintenance of the vehicle was involved in this occurrence. At the time of the occurrence, lighting and visibility were good. There is no evidence to suggest that the occurrence was related to lighting or visibility.

2. A comparison between the owner's manual and the ADAS function test results, together with vehicle testing of the same model, showed that the system's operation was consistent with the functional limitations described in the owner's manual. When traffic markers are complex, cannot be effectively detected, or when road conditions and the surrounding environment are not conducive to system interpretation, the ADAS functions may disengage or fail to operate properly.

3. After the occurrence vehicle collided with the gore area of the median, the high-voltage battery pack was subjected to external compression forces during the impact. The battery casing became deformed and pressed against the internal battery cells, causing the separator between the positive and negative electrodes to rupture. Contact between the electrodes generated a large amount of heat, resulting in an immediate

fire. Flames erupted outward from the damaged area and ignited leaked fluids in the motor compartment, including motor oil and brake fluid, leading to intense burning from the rear section of the motor compartment to the area above the dashboard.

4. There is no evidence to suggest that the firefighters involved in the occurrence mishandled the rescue of the occupants of the occurrence vehicle or the fire in the electric vehicle.

5. Although the doors of the occurrence vehicle did not lock after the collision and were able to be opened, from a human factor perspective, the time and difficulty for users who have never used a concealed door handle before to open them may be increased. However, if an electric vehicle is involved in a collision, there may be a potential risk of high-voltage electric shock. Non-professional personnel lack personal protective equipment such as high-voltage gloves and boots, and are not suitable as first responders for on-site rescue.

6. If the Freeway Bureau were to introduce a road safety audit mechanism and conduct road safety audits throughout the different stages of road projects, including planning, design, and operation, potential traffic safety risks could be identified and mitigated through improvements to the geometric alignment of roads and traffic control devices. Such measures could effectively reduce the likelihood of traffic accidents and enhance overall driving safety.

II. Safety Recommendations

In the draft investigation report for this occurrence, the proposed "**Safety Recommendations**" directed to the Freeway Bureau were as

follows:

Review the traffic flow, crossover ramp, and geometric conditions of the entrance ramp to the rest area at the occurrence location, develop improvement plans for factors that may affect driving safety, and implement appropriate measures in a timely manner to enhance overall driving safety on the section concerned.

With regard to the implementation status of these safety recommendations by the Freeway Bureau, the completed and ongoing improvement measures are detailed in Section 4.2 of this occurrence investigation report. Accordingly, this investigation report will no longer include the safety recommendations.

To the Ministry of Transportation and Communications

1. Accelerate the introduction of roadway safety audit or inspection mechanisms, clearly define the items and relevant standards that should be inspected at each life cycle stage of roadway traffic system projects, and implement them to comprehensively improve roadway traffic safety.
2. In addition to promoting awareness of the functions and limitations of Advanced Driver Assistance Systems (ADAS) to vehicle manufacturers, distributors, and other car sales channels, car-rental carriers should also be included as target recipients of the advocacy efforts. This would help drivers of rental vehicles establish proper understanding and safety awareness regarding the use of ADAS, while ensuring that they understand the functional characteristics and

operational limitations of their rented vehicle.

To the Highway Bureau, MOTC

1. Introduce a road safety audit mechanism into new road construction projects and major road facility improvement projects to proactively identify potential driving safety risks arising from road planning and design, such as short curves, insufficient shoulder width, and complex traffic flow patterns. Implement improvements through road geometric alignment and traffic control devices in order to enhance overall road traffic safety.

To the Highway Bureau, MOTC

1. Strengthen public awareness efforts to ensure that vehicles are used in accordance with their approved passenger capacity in order to prevent overloading. Remind the public to properly install and use child safety seats for young children in accordance with applicable regulations, so as to enhance occupant protection in the event of an occurrence.

To Sunshine-Lease Car Rental Co., Ltd.

1. Evaluate the incorporation of procedures for explaining and providing guidance to renters regarding precautions for the use of Advanced Driver Assistance Systems (ADAS) into the vehicle handover process, and retain relevant documentation records to ensure that renters truly understand the system’s functions and limitations.