

## **Executive Summary**

At 21:11 on June 6, 2024, a private passenger car (hereinafter referred to as the vehicle) carrying one driver and two passengers crashed into the outer metal guardrail on the Huwei section of Freeway No. 1 southbound at 237K+520. It fell into the empty lot next to Yunlin County Township Rural Highway Yun No. 76 below Freeway No. 1. The vehicle broke into two parts, and the front half caught fire. The accident caused the death of one passenger in the right rear seat and minor injuries to the other two occupants.

In accordance with the Transportation Occurrence Investigation Act, the Taiwan Transportation Safety Board (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 Freeway Bureau of MOTC, the National Highway Police Bureau, the Yunlin County Fire Department, and Tesla Motors Taiwan Limited.

The draft of this investigation report was completed in July 2025 and, according to procedures, sent to relevant agencies (institutions) for their opinions. The investigation report was published after review and approval by the 78<sup>th</sup> Board Meeting on September 23, 2025.

After comprehensive investigation and analysis of the factual data, a total of 8 findings were obtained, with no safety recommendations.

### **I. Investigation Findings**

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

1. The driver was operating the vehicle at a speed exceeding 200 kilometers per hour. Under such high-speed conditions, in addition to the reduced tire grip and diminished vehicle controllability, the dynamic vision and field of view of the driver, as well as perception and reaction time, were also adversely affected. These factors collectively impaired the driver's ability to respond to sudden situations. Immediately prior to the accident, the driver attempted to evade a vehicle ahead, which may have led to improper maneuvering through untimely reaction and excessive steering.
2. The vehicle may have veered off to the left or right due to excessive steering by the driver, causing the center of gravity of the vehicle to shift continuously, ultimately placing the vehicle in an unstable posture, which led to skidding and loss of control. The vehicle then collided with the outer guardrail and ran off the road, causing the death of the passenger in the right rear seat.

### **Other Findings**

1. At the time the vehicle separated into front and rear halves, the seat belt buckle and latch plate were located in the front half of the vehicle, while the retractor and anchorage of the seat belt were situated in the rear half. The forces generated at the moment of impact caused the seat belt to be subjected to strong tension, resulting in compression at the buckle area and rupture around it. The load exerted on the seat belt exceeded its tensile strength, leading to the tearing of the strap. Consequently, the passenger in the right rear seat was no longer restrained and was ejected from the vehicle.
2. When the vehicle was travelling approximately 500 meters upstream

from the accident site, its speed reached between 200 and 216 kilometers per hour. The vehicle subsequently struck the Jersey barrier, resulting in the breakage of the vehicle body. At the time the vehicle veered off the freeway, its speed was between 96.5 and 101.6 kilometers per hour. Since the vehicle body had absorbed most of the energy during the separation process, it is assessed that the actual vehicle speed at the moment before the collision was higher than the calculation result stated above.

3. Under the side-impact testing standards of both the United Nations and the United States, the speed for testing is 32 kilometers per hour—significantly lower than the speed at which the vehicle struck the Jersey barrier. Even if the vehicle had met the United Nations and United States testing standards, such compliance would not guarantee that the vehicle could maintain structural integrity following the collision.
4. The point of impact on the vehicle was the rear door area, corresponding to the connection between the battery structure and the motor structure, as well as the alternation and welding point of the chassis material. Under the combined effect of vehicle speed and the inertia of the vehicle mass, the vehicle was unable to withstand the collision force after striking the Jersey barrier, ultimately resulting in structural failure of the body and its separation into two halves. In addition, in the accident that occurred on May 7, 2023, in Xitun District, Taichung City, the vehicle's speed was likely comparable to that in this case. In both incidents, the object of impact was a concrete Jersey barrier, and both vehicles fractured into two parts, with the fractures occurring in the rear portion of each vehicle.

5. Upon examination of the vehicle body damage, the point of impact with the Jersey barrier was located at the left rear side of the vehicle, which was also the connection point between the end of the high-voltage battery pack and the rear motor. As no batteries were installed in the rear section of the vehicle body, combustion did not occur there. However, the high-voltage battery pack in the front section of the vehicle body was subjected to external compression during the collision, causing deformation of the battery casing and intrusion into the internal battery cells. This resulted in the rupture of the separator between the positive and negative electrodes, leading to contact between the electrodes and a short circuit. When the vehicle subsequently veered off the roadway and struck the ground, the damage to the battery was further exacerbated, ultimately starting a fire.
6. Both the event data recorder and the onboard computer of the vehicle were destroyed due to the post-crash fire. Apart from the system warning records during the accident and the dynamic data for the period up to 1 minute prior to the collision with the guardrail provided by Tesla, no additional pre-crash data related to the vehicle could be retrieved.

## 摘要報告

民國 113 年 6 月 6 日 2111 時，1 輛自用小客車（以下簡稱事故車輛）車上載有事故車輛駕駛員（以下簡稱事故駕駛員）1 人、乘員 2 人，於國道 1 號南向 237K+520 處虎尾路段自撞外側金屬護欄後，墜落至國道 1 號下方雲林縣鄉道雲 76 線公路旁空地，車身斷裂為前後兩截，前半部起火燃燒，本次事故造成右後座乘員 1 人死亡，2 人輕傷。

依據中華民國運輸事故調查法相關內容，國家運輸安全調查委員會為負責本次事故調查之獨立機關。受邀參與本次事故調查之機關（構）包括：交通部、交通部高速公路局、內政部警政署國道公路警察局、雲林縣消防局、台灣特斯拉汽車有限公司等。

本事故調查報告草案於民國 114 年 7 月完成，依程序函送相關機關（構）提供意見；經彙整相關意見後，調查報告於民國 114 年 9 月 23 日經運安會第 78 次委員會審議通過後發布調查報告。

本次事故調查經綜合事實資料及分析結果，獲得之調查發現共計 8 項，無改善建議。

### 壹、調查發現

#### 與可能肇因有關之調查發現

1. 事故駕駛員以超過 200 公里/小時之速度駕駛事故車輛，在高速行駛之狀態下，除事故車輛輪胎抓地力及可操控性降低外，亦影響事故駕駛員的動態視力與視野範圍，以及其感知及反應時間，致降低事故駕駛員處理突發狀況的應變能力，而本次事故發生前事故駕駛員為閃避前方車輛，可能因反應不及而有過度轉向之不當操作。

2. 事故車輛可能因過度左右轉向，導致車輛重心持續轉移，最終使整車處於不穩定姿態下打滑失控，並撞擊外側護欄後衝出路外，造成右後座乘員死亡。

### 與風險有關之調查發現

無相關發現。

### 其他調查發現

1. 事故車輛車體前後分離時，安全帶之帶扣及鎖扣位於車身前半部，安全帶上方之捲收器及固定裝置位於車身後半部，撞擊瞬間所產生的力，使安全帶受到拉扯，織帶在帶扣位置受力而遭擠壓，並於周邊產生斷裂之狀況，安全帶所受的力應超過安全帶抗拉強度，而使織帶斷裂，造成右後座乘員失去約束而拋出車外。
2. 事故車輛行經事故地點上游 500 公尺處時，車速達 200 至 216 公里/小時，隨後撞擊紐澤西護欄並造成車身斷裂，自橋上衝出路外之車速為 96.5 至 101.6 公里/小時。由於車體在斷裂之過程已吸收大多數能量，故研判撞擊前瞬間之實際車速應高於上述計算結果。
3. 聯合國及美國之側向撞擊相關檢測基準中，測試速度為 32 公里/小時，與事故車輛之撞擊紐澤西護欄時之車速差距甚大，即便符合聯合國及美國之檢測基準亦無法確保車輛撞擊後可保持結構完整。
4. 事故車輛遭受撞擊位置為後車門處，屬電池結構末端與馬達結構之交接處，亦屬底盤之材質交替與焊接處，在車速及車體重量之慣性作用加成下，使得事故車輛在碰撞紐澤西護欄後無法承受此撞擊力，最終導致車身結構失效並斷裂為兩截。另民國 112 年 5 月 7 日臺中市西屯區事故中，其事故車輛車速與本案事故車輛可能相接近，撞擊物同為水泥紐澤西護欄，且車體皆斷裂為兩截，

斷裂位置皆為車身後半部。

5. 檢視車身損害情形，事故車輛撞擊紐澤西護欄位置為車身左後側，此處亦為高壓電池組末端與後電機（馬達）交接處，由於車身後半部無配置電池，未發生燃燒；然而，車身前半部之高壓電池組於撞擊時受到外力擠壓，電池外殼變形並擠向內部電池芯，造成電池正負極隔膜破裂，正負極接觸導致短路情形，後續事故車輛衝出路外撞擊到地面，進一步加劇電池損壞而引發火災。
6. 事故車輛之事件資料紀錄器及車載電腦因車輛起火燃燒而遭到燒燬，除特斯拉公司提供之事故期間系統警示紀錄及撞擊護欄 1 分鐘之前之動態數據外，未能取得其他事故前之事故車輛相關數據。