

You're Ref: TP/REG/20/2021
Our Ref: CI/TPD22001758/P

3rd March 2022

Investigation Branch

Traffic Police Department
Singapore Police Force
10 Ubi Avenue 3
Singapore 408865

Fatal Incident Investigation Team

Traffic Police Department
Singapore Police Force
10 Ubi Avenue 3
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MECHANICAL INSPECTION REPORT OF MOTOR CAR SGP 6680E

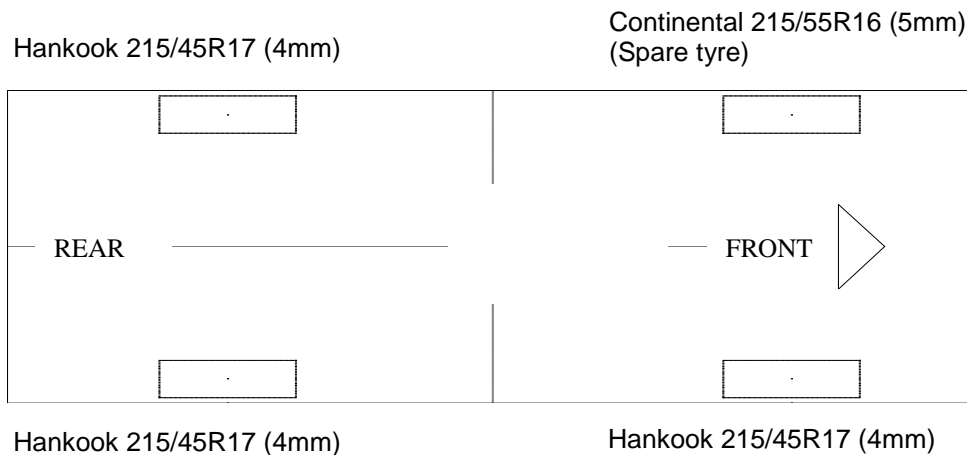
1. I refer to your request on 20th February 2022 to conduct a physical inspection of a Motor Car bearing registration number SGP 6680E (herein referred to as "**Motor Car**"), which was involved in an incident on 30th July 2021.
2. The objective of the inspection is to determine if there was any possible mechanical failure and water intrusion into the Motor Car's cabin that may have contributed to the incident.
3. Following the request, I had carried out a physical inspection of the Motor Car on 21st February 2022 at the premises of Traffic Police vehicle pound, 517 Airport Road Singapore 539942. I now set out below my observations and comments with respect to this inspection.

General Condition

4. The mileage of the Motor Car at the time of my inspection was 129,560km.
5. The Motor Car was observed to have sustained damage at its rear portion as well as water intrusion damages to its interior cabin due to holes on the cloth roof that was present prior to the incident. Its interior cloth roof, interior rear right seat, front driver seat mechanism and its rear bumper right portion were amongst the body part that were damaged as a result of the incident.

Tyres and Wheel Rims

6. The condition of the Motor Car's 4 tyres was observed to be in serviceable condition. I did not find any tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of the 4 tyres. The 4 tyres were also observed to be sufficiently inflated for vehicular operation. The tyre brand, tyre size and remaining tread depth of the 4 tyres were recorded as follows:-



7. The front left tyre was observed to be a steel rim spare tyre and the other 3 tyres were observed to be wrapped around standard alloy wheel rims and all were found to be without any damage. See photo 1 – 20 below.



Photo 1 shows the mileage of the Motor Car at the time of my inspection. The mileage observed was 129,560km.



Photo 2 shows a general view of the Motor Car's front body at the time of my inspection. The Motor Car front was observed to be unaffected by the incident.



Photo 3 shows the general view of the Motor Car's rear body at the time of my inspection. The Motor Car was observed to have sustained damage at its rear bumper portion. Its rear bumper right portion were amongst were the body parts that were damaged as a result of the incident.



Photo 4 shows a close up view of the Motor Car's rear portion at the time of my inspection. The Motor Car was observed to have sustained damage at its rear bumper portion. Its rear bumper right portion (circled) were the body parts that were damaged as a result of the incident.



Photo 5 shows a general view of the Motor Car's right body at the time of my inspection. The right portion of the Motor Car was observed to have been unaffected by the incident.



Photo 6 shows a general view of the Motor Car's left body at the time of my inspection. The left portion of the Motor Car was observed to have been unaffected by the incident.



Photo 7 shows a general view of the Motor Car's cloth roof portion at the time of my inspection. There was holes present prior to the incident at the rear right cloth roof portion (circled) of the Motor Car and water intrusion had likely started from these holes flowing down into the interior cabin of the Motor Car.



Photo 8 shows a close up view of the Motor Car's cloth roof portion at the time of my inspection. There was holes present prior to the incident at the rear right cloth roof portion (circled) of the Motor Car and water intrusion had likely started from these holes flowing down into the interior cabin of the Motor Car.



Photo 9 shows a general view of the Motor Car's interior cabin portion at the time of my inspection. Its cloth roof (red circle) and seats (yellow circle) at the rear right portion had suffered water intrusion damages due to water seeping down from the holes on the cloth roof above.



Photo 10 shows a close up view of the Motor Car's interior cabin portion at the time of my inspection. We have observed mouldy stains on its cloth roof (circled) at the rear right portion due to water intrusion from the water seeping down from the holes of the cloth roof above.



Photo 11 shows a close up view of the Motor Car's interior cabin portion at the time of my inspection. We have observed mouldy stains on inside of the cloth roof (circled) at the rear right portion due to water intrusion from the water seeping down from the holes of the cloth roof above.



Photo 12 shows a close up view of the Motor Car's interior cabin portion at the time of my inspection. We have observed mouldy stains on the seats (circled) at the rear right portion due to water intrusion from the water seeping down from the holes of the cloth roof above.



Photo 13 shows a close up view of the Motor Car's interior cabin portion at the time of my inspection. We have observed mouldy stains on the seats (arrowed) at the rear right portion due to water intrusion from the water seeping down from the holes of the cloth roof above.



Photo 14 shows a close up view of the Motor Car's interior cabin portion at the time of my inspection. We have observed mouldy stains on the seats (circled) at the rear right portion due to water intrusion from the water seeping down from the holes of the cloth roof above.

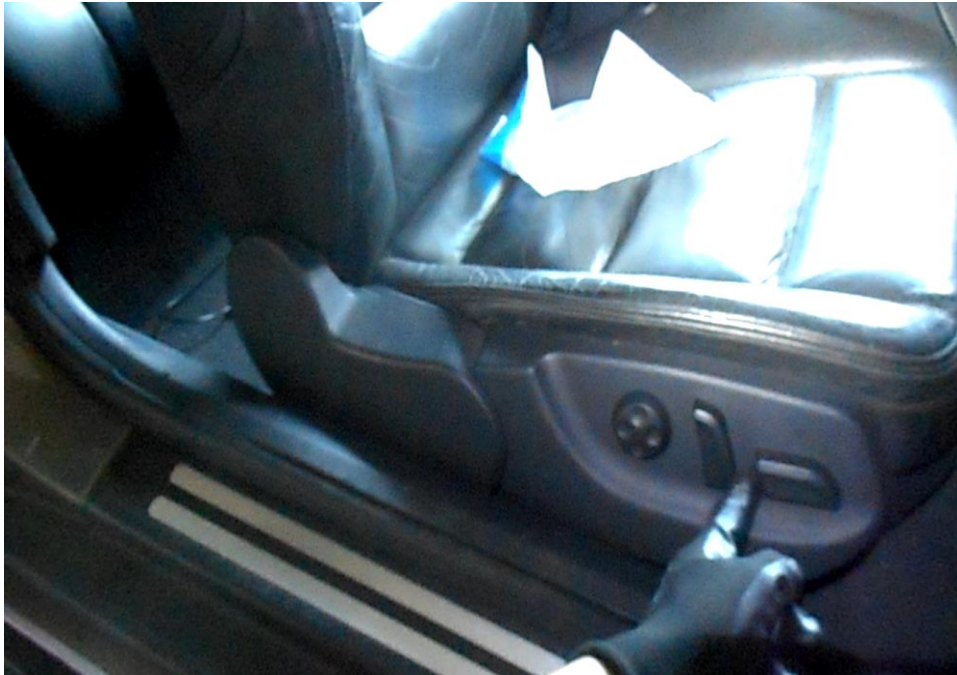


Photo 15 shows a general view of the Motor Car's front driver seat portion at the time of my inspection. We have conduct and test on the seat controls and a check on the electrical connectors of the seat. The seating controls was not responsive to our inputs and our visual checks on the electrical connectors of the seat, we had observed rust due to water corrosion on the pins of the connectors which had been caused by the water intrusion from the cloth roof above.

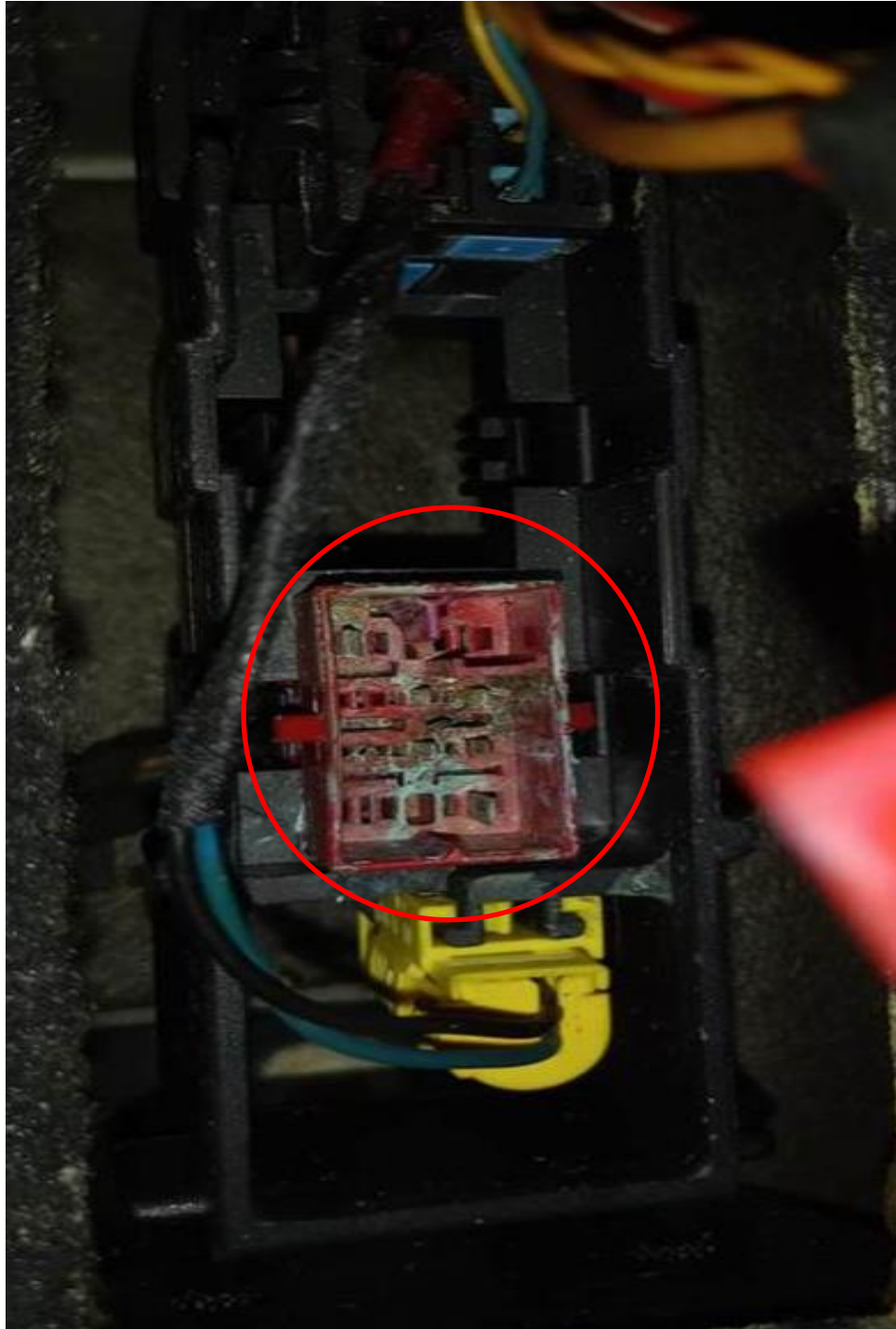


Photo 16 shows a close up view of the Motor Car's front driver seat portion at the time of my inspection. We have conduct and test on the seat controls and a check on the electrical connectors of the seat. The seating controls was not responsive to our inputs and our visual checks on the electrical connectors of the seat, we had observed rust due to water corrosion on the pins of the connectors (circled) which had been caused by the water intrusion from the cloth roof above.



Photo 17 shows the condition of the front right tyre of the Motor Car, which was observed to be in serviceable condition with remaining tread depth of approximately 4mm. The tyre was sufficiently inflated for vehicular operation with no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread. The 4 tyres of the Motor Car were wrapped around standard steel wheel rims without any damage.



Photo 18 shows the condition of the rear right tyre of the Motor Car, which was observed to be in serviceable condition with remaining tread depth of approximately 4mm. The tyre was also observed to be sufficiently inflated for vehicular operation with no tear, cut or burst mark(s).



Photo 19 shows the condition of the rear left tyre of the Motor Car, which was observed to be in serviceable condition with remaining tread depth of approximately 4mm. The tyre, which was wrapped around steel wheel rim, was also observed to be sufficiently inflated for vehicular operation. The 4 tyres of the Motor Car were wrapped around standard steel wheel rims.



Photo 20 shows the condition of the front left tyre (steel rim spare tyre) of the Motor Car, which was observed to be in serviceable condition with remaining tread depth of approximately 5mm. There was also no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of the Motor Car's 4 tyres.

Engine Compartment & Operating Fluids

8. Upon examination of the engine compartment of the Motor Car, I had observed all the parts and components inside the engine compartment to be intact and unaffected by the incident. The brake fluid and engine oil were all found to be of sufficient level for operating purposes. Visually, there was also no contamination found to these fluids. Only the engine coolant was observed to be at a low level.
9. Further examination of the engine compartment revealed no sign(s) or indication(s) of fluid leakage and/or fluid stain within the engine compartment of the Motor Car.
10. My subsequent checks on the underside of the Motor Car also revealed no sign(s) or indication(s) of fluid leak and/or fluid stain(s). Visually, the various undercarriage components of the Motor Car were all observed to be intact and without any visible damage. See photo 21 – 25 below.



Photo 21 shows a general view of the Motor Car's engine compartment. The various parts and components inside the engine compartment were unaffected by the incident. There was also no sign(s) or indication(s) of fluid leakage and/or fluid stain within the engine compartment.



Photo 22 shows the brake fluid reservoir of the Motor Car at the time of my inspection. The brake fluid was observed to be of sufficient level (arrowed) and without any visible contamination.



Photo 23 shows checks being carried out to the engine coolant of the Motor Car at the time of my inspection. The engine coolant was observed to be of low level (arrowed) and without any visible contamination.

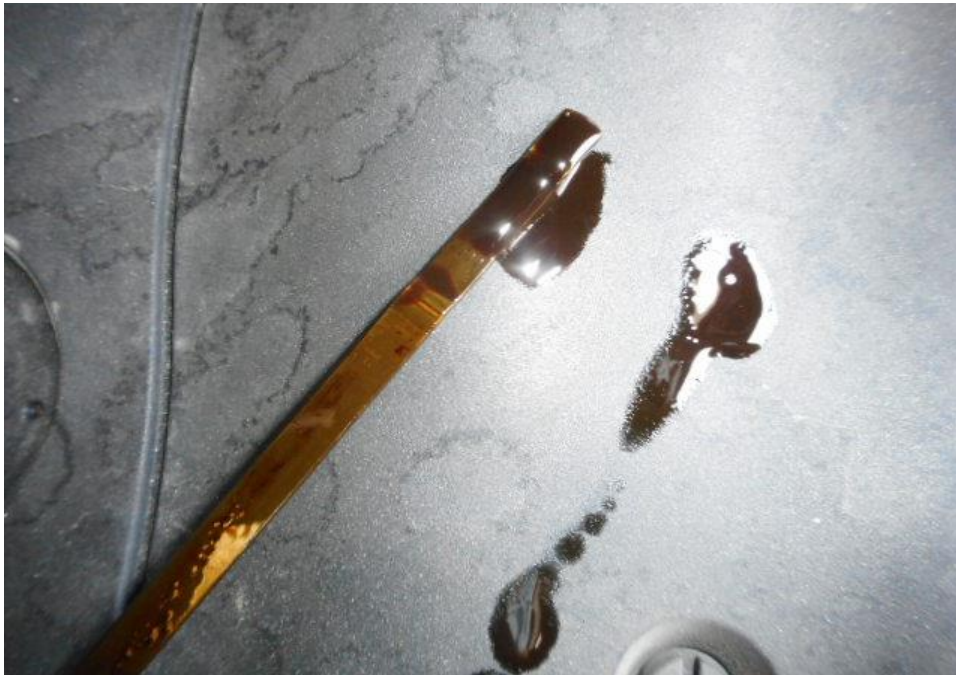


Photo 24 shows the engine oil dipstick of the Motor Car at the time of my inspection. The engine oil was observed to be of sufficient level and without any visible contamination.



Photo 25 shows the undercarriage of the Motor Car, at the area where the engine housing and transmission housing are located. I did not find any sign(s) or indication(s) of fluid leak and/or fluid stain(s) on the underside of the Motor Car.

Braking System & Steering System

11. Static brake tests conducted on the Motor Car revealed no abnormality. The brake booster had responded well to the various tests conducted. There was also no abnormal movement of the brake pedal when it was depressed. In general, the static brake tests had suggested that there was no internal leakage of pressure/vacuum in the braking system of the Motor Car. The braking system of the Motor Car was likely to be in serviceable condition at the material time. This was taking into consideration that the brake fluid was of sufficient level, and also that there was no sign(s) of brake fluid leakage along the brake hoses and brake pipes.
12. Static test on the steering system of the Motor Car also revealed no abnormality to the steering system. I did not experience any abnormal free play and/or other resistance when turning the steering wheel left and right to full lock positions. My visual examination of the various steering components which had included the steering rack and pinion, tie rods, tie rod ends and ball joints revealed that these components were all generally in good condition. See photo 26 - 32 below.



Photo 26 shows the brake hose/pipe (arrowed) at the rear right wheel of the Motor Car. No leakage of brake fluid was observed. Visual examination of the various components of the braking system like the drum brake, brake booster, brake pedal etc. had revealed all to be intact and without visible damage.



Photo 27 shows the brake hose/pipe (arrowed) at the rear left wheel of the Motor Car. I did not observe any leakage of brake fluid at the time of my inspection of the Motor Car. Static tests of the Motor Car's braking system had indicated that there was no internal leakage of pressure/vacuum. The undercarriage components of the Motor Car were also all found to be intact and without any visible damage.

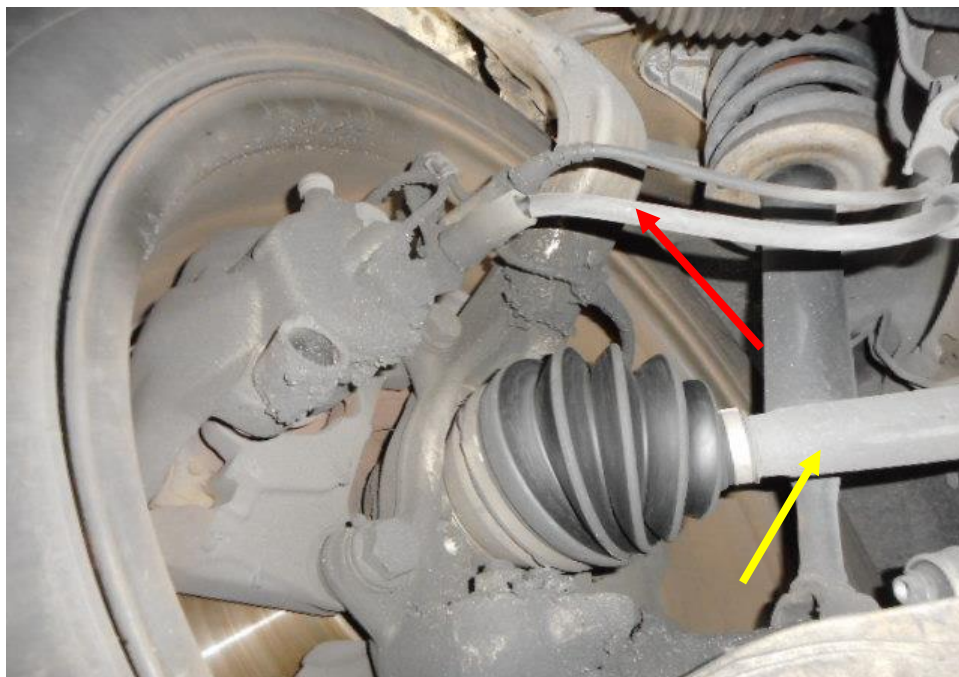


Photo 28 shows the brake hose/pipe (arrowed) and drive shaft (yellow arrow) at the front right wheel of the Motor Car. I did not observe any leakage of brake fluid or damages at the time of my inspection of the Motor Car. Static tests of the Motor Car's braking system had indicated that there was no internal leakage of pressure/vacuum. The undercarriage components of the Motor Car were also all found to be intact and without any visible damage.

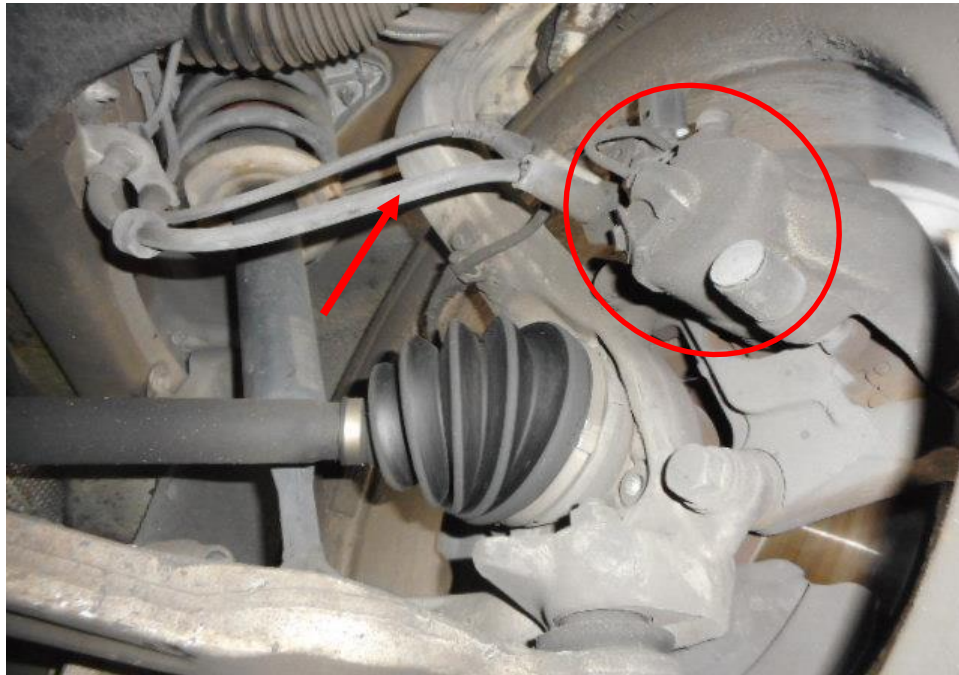


Photo 29 shows the brake hose/pipe (arrowed) at the front left wheel of the Motor Car. No leakage of brake fluid was observed. Visual examination of the various components of the braking system like the brake caliper (circled), brake booster, brake pedal etc had revealed all to be intact and without visible damage.



Photo 30 shows the front right wheel of the Motor Car turned to its full left. During my steering system test, I did not experience any abnormal free play and/or resistance when I had turned the steering wheel towards the left and right. This would suggest that the steering system of the Motor Car was likely to be in serviceable condition at the material time of incident.

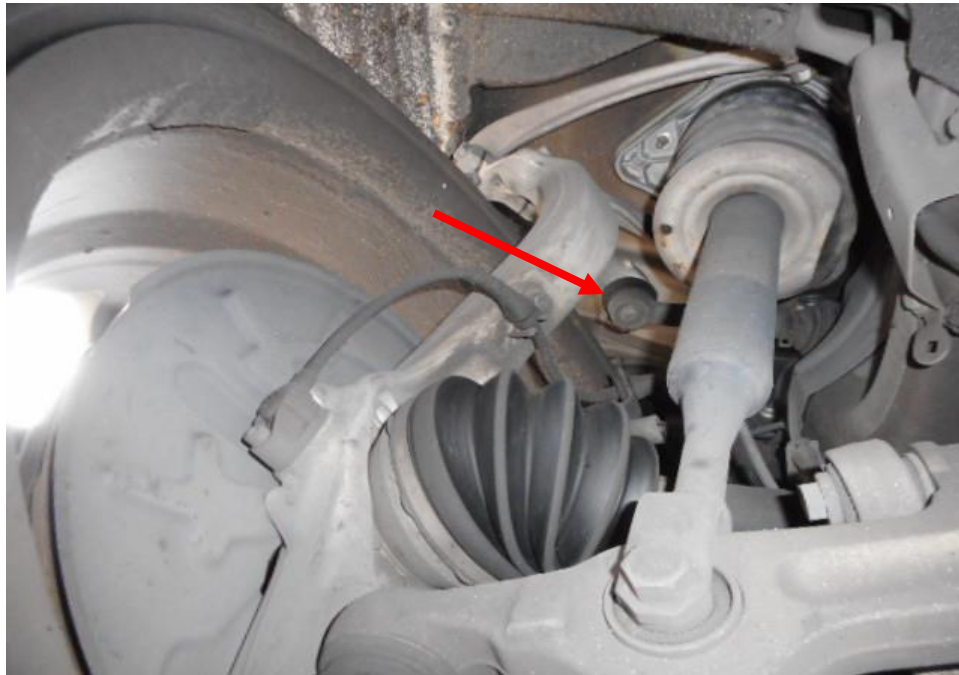


Photo 31 shows the various undercarriage components at the front right wheel of the Motor Car, in particular the steering tie rod (red arrow). The various steering components were all found to be intact, suggesting that the steering system of the Motor Car was likely to be in serviceable condition at the material time of incident. There was also no sign of fluid stain observed on the various undercarriage components at the front right wheel of the Motor Car.

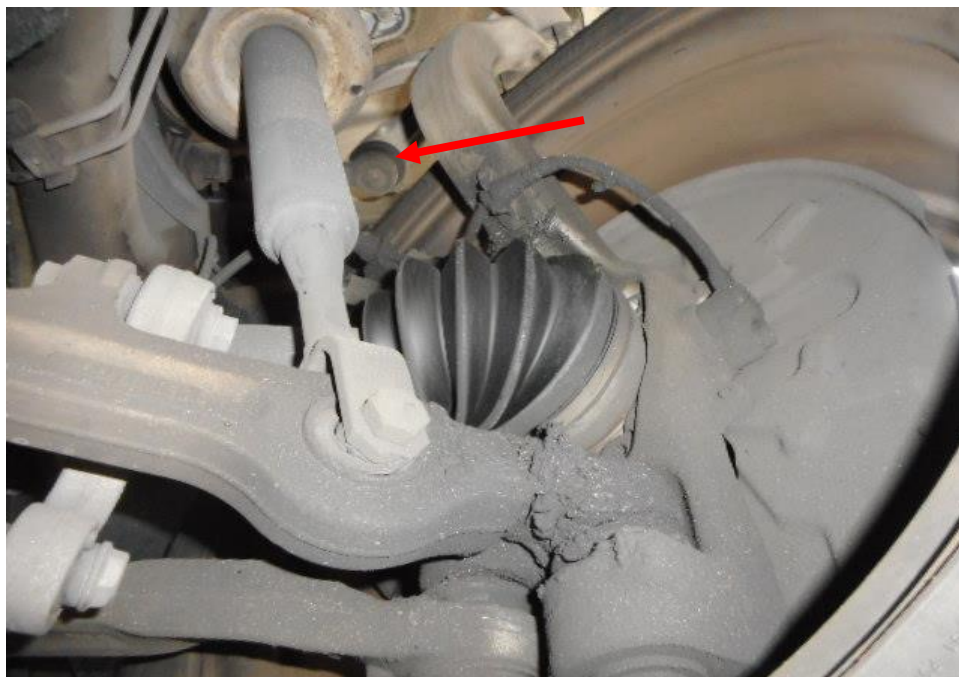


Photo 32 shows the various undercarriage components at the front left wheel of the Motor Car, which had included the steering tie rod (red arrow). The various undercarriage components of the Motor Car were all found to be intact without any visible damage.

Electronic Safety / Warning Indicators

13. The Motor Car's automatic self-test of the functionality of its electronic operating systems like the Anti-Lock Brake System (ABS), Electric Power Steering System (EPS), Traction Control System (TCS) and Supplemental Restraint System (SRS) during cranking of the engine had indicated that the system were in working condition and without abnormality. This can be established from the warning lights disappearing from the instrument panel after the self-test. See photo 33 & 44 below.



Photo 33 shows the warning light for Anti-Lock Brake System (ABS), Electric Power Steering System (EPS), Traction Control System (TCS) and Supplemental Restraint System (SRS) (arrowed) appearing on the instrument panel of the Motor Car during the self-test of its various electronic operating systems when its engine was cranked.



Photo 34 shows no warning lights illuminated on the instrument panel of the Motor Car after the engine was cranked. This would suggest that there was no abnormality to the electronic operating system of the Motor Car, like the ABS, EPS, TCS and SRS etc.

Others

14. From our understanding, the Motor Car was bought to the owner's private workshop SNL Future Pte Ltd for an assessment, they have provided did a diagnostic check on the Motor Car and the check had shown 2 fault codes by the code name of P0706/01798 which both are linked to each other regarding the transmission of the Motor Car. We have also did our own diagnostic checks to the Motor Car at the material time and returned results were a fault code name of 01798 stating "Transmission range sensor (F125), implausible signal) which is the same results as the private workshop. We have did our relevant checks to this fault code and it states that this error is due to a fault in the Transmission Control Unit (TCU) of the Motor Car.
15. We have identify the location of the Transmission Control Unit (TCU) in the Motor Car and it is located inside the transmission unit at the undercarriage portion which can only be access from the bottom of the Motor Car. Water intrusion at the top from the cabin to the Transmission Control Unit (TCU) at the bottom is not possible as we observed that the Transmission Control unit (TCU) is inside the transmission unit and its surroundings is well protected by metal heat insulator sheets and the surrounding area is observed without any rust, fluid stain or any leakages.

16. We have also did a check regarding the water intrusion from the ground of where the Motor Car was parked at during the incident. We have checked if there was any water ponding at where the Motor Car was parked during the incident. Prior to our checks to the area where the Motor Car was parked at, there had been rainfall and we observed that there was water ponding close to where the Motor Car was parked at but not at where it was parked during the incident.
17. We are in view that the fault to the Transmission Control Unit was already present in the Motor Car before it was being held at Traffic Police Pound for investigations. See photo 35 - 40

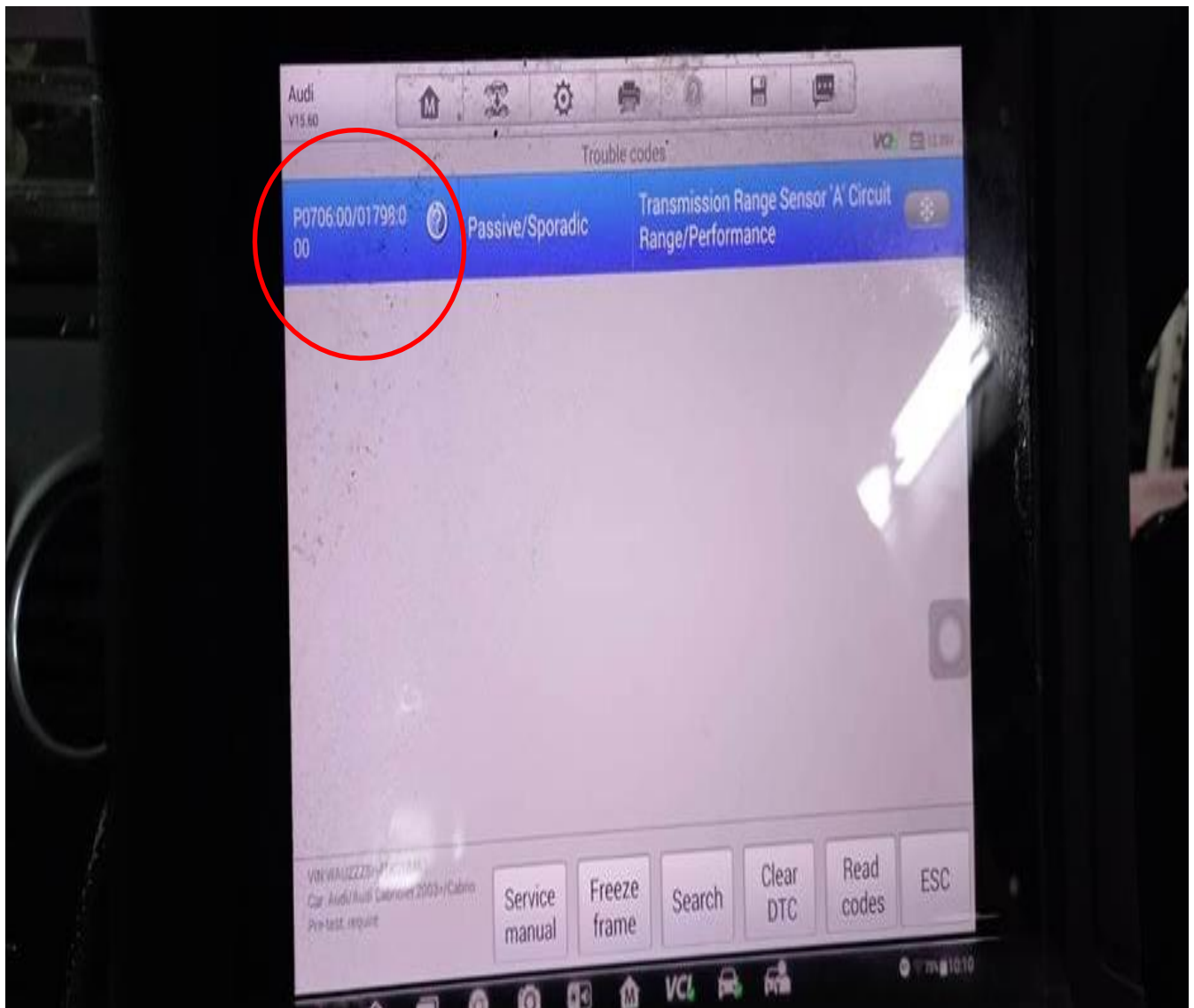


Photo 35 shows the diagnostic checks done by the private workshop on the Motor Car. The fault code trigger was P0706/01798 (circled) which are linked to a fault with the Transmission Control Unit (TCU).

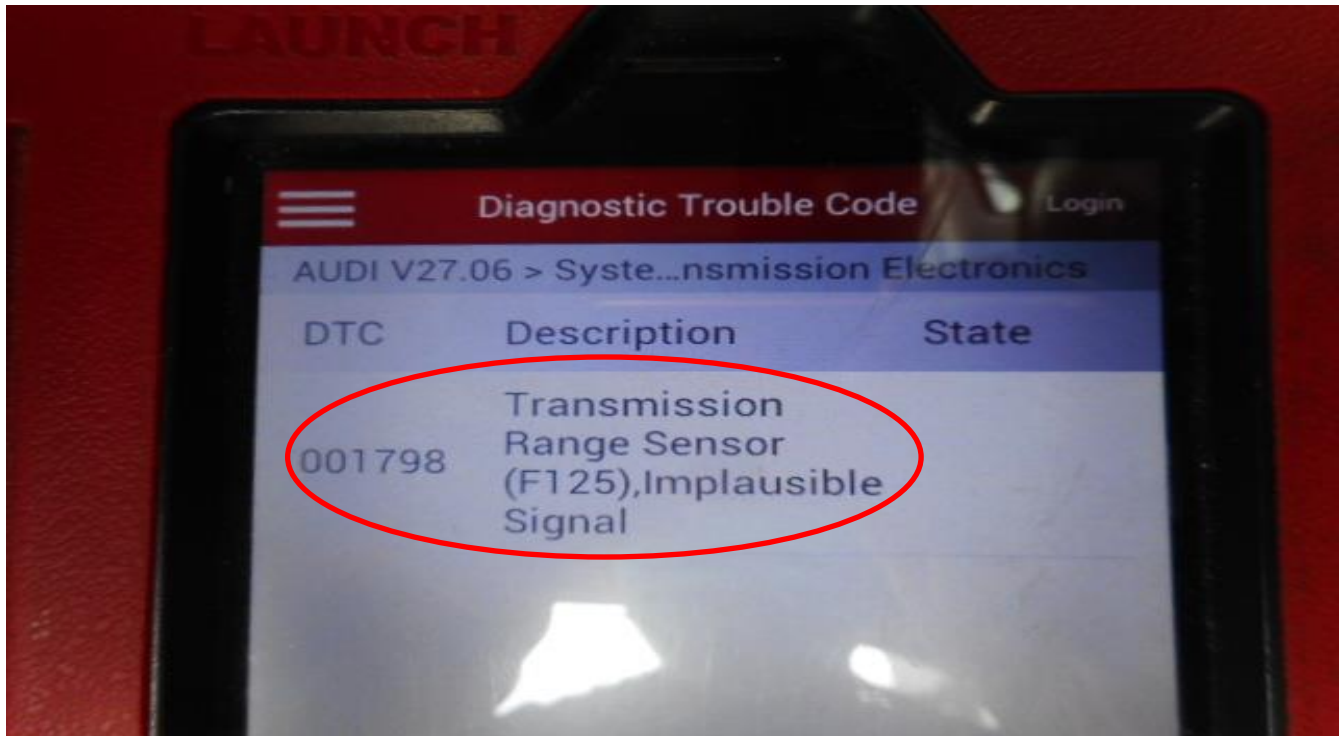


Photo 36 shows the diagnostic checks done by us on the Motor Car at the material time. The fault code trigger was 01798 "Transmission range sensor (F125), implausible signal (circled) which are linked to a fault with the Transmission Control Unit (TCU).

MULTITRONIC® TCM COMPONENT IDENTIFICATION

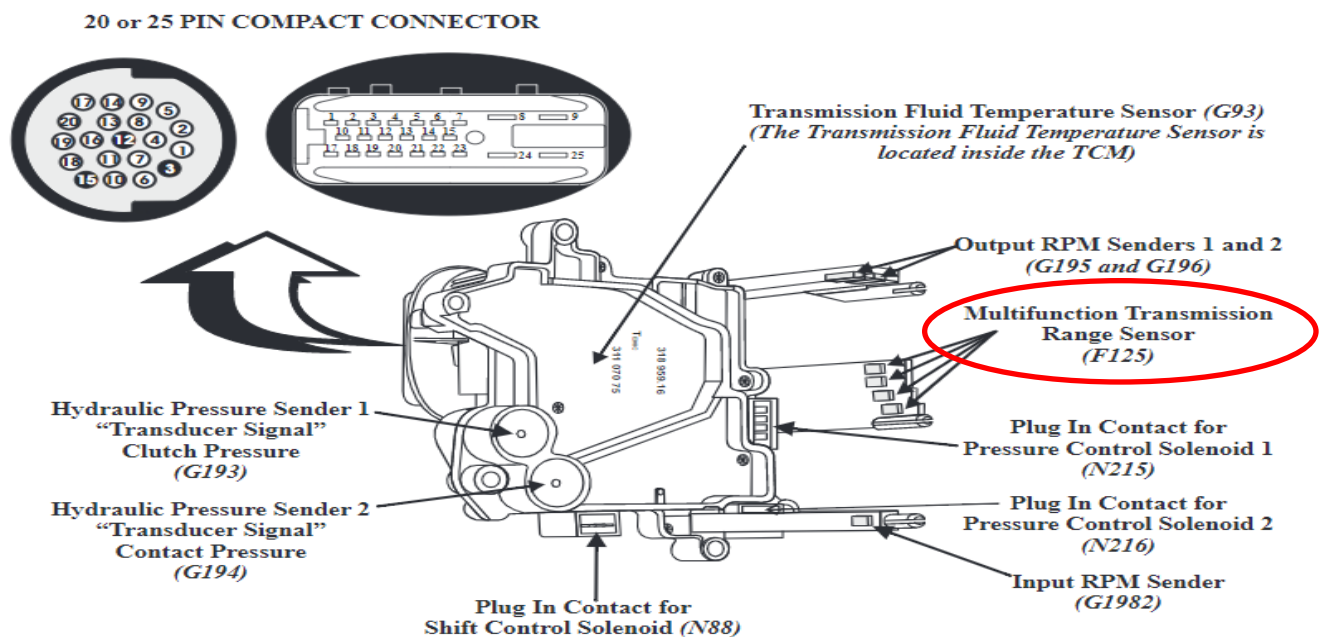


Photo 37 shows the diagram of the Transmission Control Unit (TCU) (yellow circle). We have identified the particular component that the fault code had mentioned which shows "Transmission range sensor (F125). (red circle)

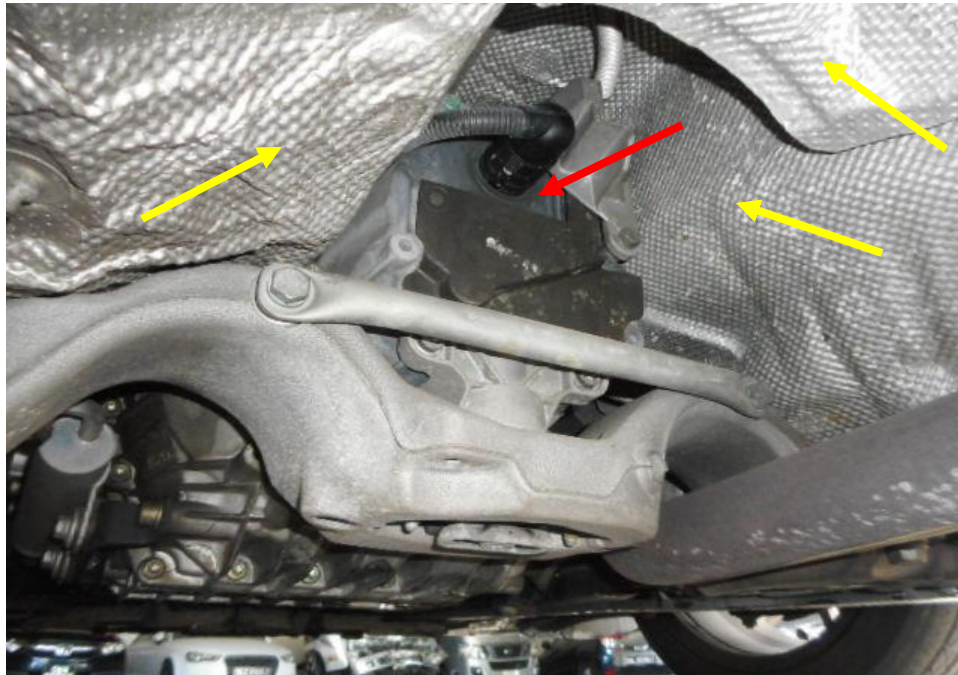


Photo 38 shows the undercarriage portion of the Motor Car at the time of our inspection. The Transmission Control Unit (TCU) (red arrow) is mounted at the undercarriage portion inside the transmission unit and it can only be accessed from the bottom of the Motor Car. We observed that the Transmission Control unit (TCU) and area surrounding it is well protected by metal heat insulator sheets (yellow arrow) and the surrounding area is observed without any rust or fluid stain and leakages.



Photo 39 shows the general view of the location where the Motor Car was parked at the time of incident. There was rainfall prior to our check and we had observed water ponding close (yellow circle) to where the Motor Car was parked but not at where it was parked at the material time of incident (red circle).



Photo 40 shows the close up view of the location where the Motor Car was parked at the time of incident. There was rainfall prior to our check and we had observed water ponding close (yellow circle) to where the Motor Car was parked but not at where it was parked at the material time of incident (red circle).

Operational Behaviour of the Motor Car

18. A short operational test of the Motor Car, to primarily determine whether there was any abnormality to its various operating systems like its engine system, its transmission system, steering system and braking system was subsequently carried out. The test was conducted by driving the Motor Car forward, stopping, before reversing and coming to a stop again.
19. During the operational test, the transmission system of the Motor Car was able to be shifted to drive mode and reverse mode without any difficulty. There was no abnormal sounds heard and/or abnormal behaviour of the Motor Car's engine system. It was able to move forward and backward normally. The braking system was also found to be in working condition as the Motor Car was able to slow down and come to a complete stop upon depressing of the brake pedal. (Refer to photo 2 & 30)

Conclusion

20. From my physical inspection of the Motor Car, it appears that its engine system, transmission system, steering system and braking system were all in serviceable condition. I did not find any evidence(s) to suggest that there was possible mechanical failure and/or abnormal behaviour to the Motor Car that may have caused and/or contributed to the incident.
21. A short operational test of the Motor Car, which I had conducted, did not produce any sign(s) or symptom(s) to suggest that there was any abnormality to its engine system, its transmission system and braking system.
22. We are in view that the damages caused by the built up of rust and corrosion on the electrical connectors of the driver's seat mechanism and built up mould and stains to the rear right seats was caused by water intrusion from the holes in the cloth roof of the Motor Car at the time of incident.
23. Investigations to the Transmission Control Unit (TCU) of the Motor Car shows that it is not related to the water intrusion into the cabin of the Motor Car and it is purely a case of wear and tear to the Transmission Control Unit (TCU), prior to or after the Motor Car was impounding in Traffic Police Vehicle Pound for investigations. Although we were able to test drive the vehicle, without any abnormalities to the Transmission system, the issue may appear at the higher gear range during longer driving.

24. The 4 tyres of the Motor Car were also found to be in serviceable condition. I did not find any tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of the 4 tyres. The 4 tyres were also observed to be sufficiently inflated for vehicular operation with remaining tread depth of approximately 4mm to 5mm.

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