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Your Ref: TP/IP/36381/2019 8th July 2019
Our Ref : CI/TPD19011282/P

**General Investigation Team**
Traffic Police Department
Singapore Police Force
10 Ubi Avenue 3
Singapore 408865

**MECHANICAL INSPECTION REPORT OF MOTOR CAR SGQ 1003M**

1. I refer to your request on 20th June 2019 to conduct a physical inspection of a motor car bearing registration number SGQ 1003M (herein referred to as "**Motor Car**"), which was involved in a road traffic accident on 09th June 2019.

2. The purpose of this inspection is to primarily determine if there was any possible mechanical failure to the Motor Car that may have contributed to the accident.

3. Following the request, I had carried out a physical inspection of the Motor Car on 4rd July 2019 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 94,193km

5. The Motor Car had sustained extensive damage. Body parts at its front portion and undercarriage were observed to have been damaged as a result of the accident.

6. Parts towards the front of the engine compartment and undercarriage were also damaged. This had included its front windscreen, front bonnet, front bumper, front number plate, left and right fenders, front left and right headlamp and its undercarriage front right steering tie rod. See photo 1 – 8 below


**Photo 1** shows a general view of the front portion of the Motor Car at the time of my inspection. The Motor Car was also observed to have sustained extensive damage at its frontal and undercarriage portion, damaged parts had included its front windscreen, front bonnet, front bumper, front number plate, left and right fenders, front left and right headlamp and Its undercarriage front right steering tie rod. were amongst the body parts that were observed to have been damaged as a result of the accident.

**Photo 2** shows a close up view of the front windscreen of the Motor Car at the time of my inspection. The front windscreen of the Motor Car was observed to have been damaged as a result of the accident

**Photo 3** shows a close up view of the front right portion of the Motor Car at the time of my inspection. The Motor Car was also observed to have sustained extensive damage at its frontal portal, damaged parts had included its, front bonnet, front bumper, right fender, front right headlamp (arrowed) were amongst the body parts that were observed to have been damaged as a result of the accident.

**Photo 4** shows a close up view of the front left portion of the Motor Car at the time of my inspection. The Motor Car was also observed to have sustained extensive damage at its frontal portal, damaged parts had included its, front bumper, left fender, front left headlamp and front number plate (arrowed) were amongst the body parts that were observed to have been damaged as a result of the accident.

**Photo 5** shows a general view of the front right portion of the Motor Car at the time of my inspection. The right side windscreen (arrowed) of the Motor Car was observed to have been damaged as a result of the accident.

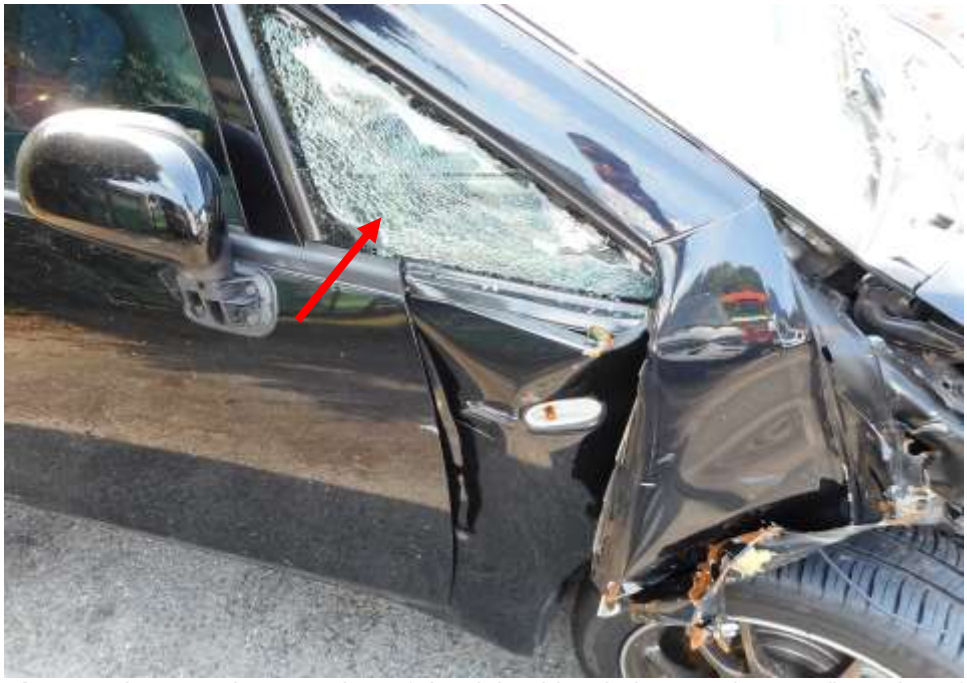


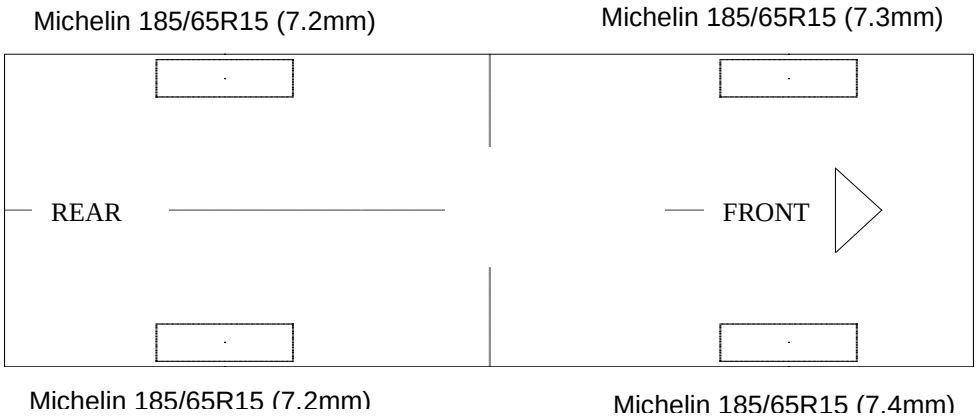
**Photo 6** shows a close up view of the right side windscreen (arrowed) portion of the Motor Car at the time of my inspection. of the Motor Car was observed to have been damaged as a result of the accident.


**Photo 7** shows a general view of the left side portion of the Motor Car at the time of my inspection. The Motor Car was observed to have been undamaged by the accident.


**Photo 8** shows a general view of the rear portion of the Motor Car at the time of my inspection. The rear portion of the Motor Car was observed to have been unaffected by the accident.

**Tyres and Wheel Rims**

7. 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:-

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8. The 4 tyres were observed to be wrapped around standard alloy wheel rims that were found to be without any damage. See photo 9 – 12 below.

**Photo 9** 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 7.4mm. There was no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of this tyre.

**Photo 10** 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 7.2mm. There was no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of this tyre.

**Photo 11** 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 7.2mm. There was no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of this tyre.

**Photo 12** shows the condition of the front left tyre of the Motor Car, which was observed to be in serviceable condition with remaining tread depth of approximately 7.3mm. There was no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of this tyre.

## Engine Compartment & Operating Fluids

9. 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 accident. The brake fluid, engine oil and engine coolant were all found to be of sufficient level for operating purposes. Visually, there was also no contamination found to these fluids.

10. 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.

11. 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 13 – 16 below.

**Photo 13** shows a general view of the Motor Car's engine compartment. The various parts and components inside the engine compartment were unaffected by the accident. There was also no sign(s) or indication(s) of fluid leakage and/or fluid stain within the engine compartment.

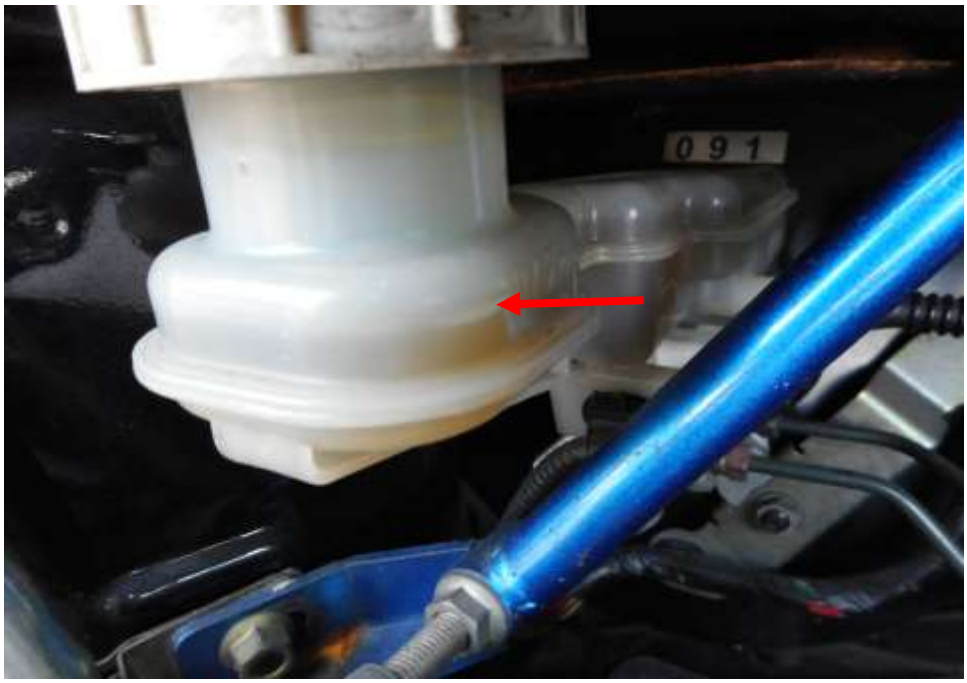


**Photo 14** shows the brake fluid reservoir of the Motor Car at the time of my inspection. The brake fluid was observed to be of sufficient level (arrowed) and without any visible contamination.

**Photo 15** 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 sufficient level (arrowed) and without any visible contamination.

**Photo 16** shows the engine oil dip stick 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.

**Steering System & Braking System**

12. 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 also 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.

13. 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 rack and pinion, tie rods, tie rod ends and ball joints had revealed that these components were all generally in good condition. However it was observed that the right steering tie rod was found to be damaged as a result of the accident. See photo 17 - 24 below.

**Photo 17** shows the undercarriage components at the front right wheel of the Motor Car. My checks on the underside of the Motor Car revealed damage to the steering tie rod (arrowed) as a result of the accident.

**Photo 18** shows the various undercarriage components at the front left wheel of the Motor Car, which had included the steering tie rod (red arrow) and front left drive shaft (yellow arrow). The various undercarriage components of the Motor Car were all found to be intact without any visible damage.

**Photo 19** shows the brake hose (arrowed) at the front right wheel of the Motor Car. I did not observe any leakage of brake fluid at the 4 wheels of the Motor Car. My visual inspection of the various mechanical components of the Motor Car's braking system, including its brake caliper (circled), revealed all to be intact and without visible damage.

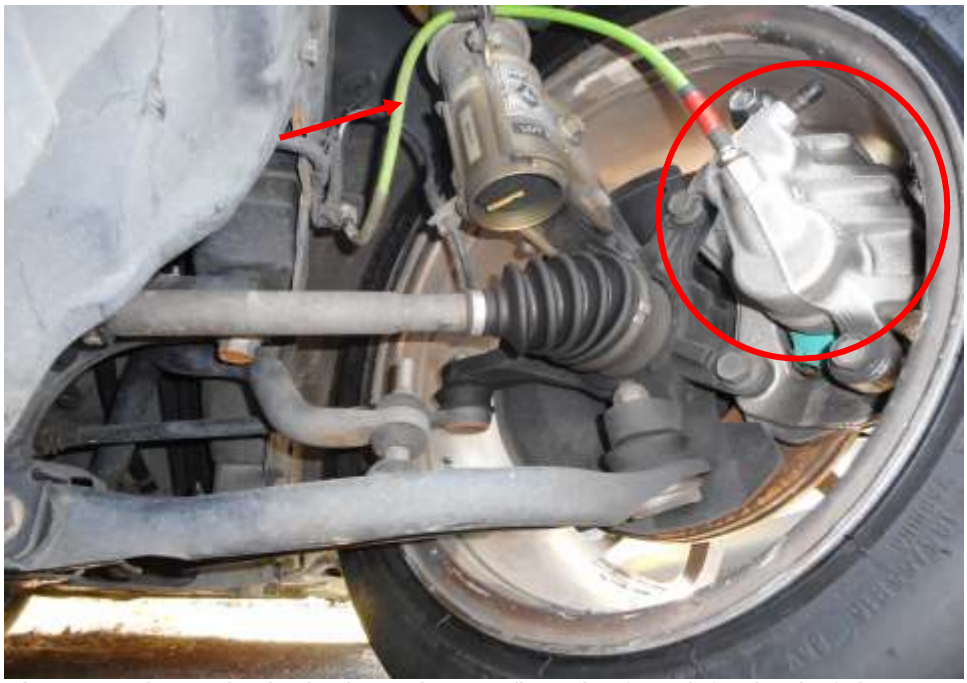

**Photo 20** shows the brake hose (arrowed) at the front left wheel of the Motor Car. I did not observe any leakage of brake fluid at the 4 wheels of the Motor Car. My visual inspection of the various mechanical components of the Motor Car's braking system, including its brake caliper (circled), revealed all to be intact and without visible damage.

**Photo 21** 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 22** 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 23** 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.

**Photo 24** 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 full left and full right. This would suggest that the steering system of the Motor Car was likely to be in serviceable condition at the material time of accident.

## Electronic Safety / Warning Indicators

14. The Motor Car's automatic self-test of the functionality of its various electronic operating systems like the Anti-Lock Brake System (ABS) and Electric Power Steering System (EPS) during cranking of the engine had indicated that these systems 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 25 & 26 below.

15. However the Supplemental Restraint System (SRS) light remained illuminated on was due to the absence of the original steering wheel including its airbag component which caused the light to be triggered after cranking of the engine. See photo 27 below.


**Photo 25** shows the warning light for Anti-Lock Brake System (ABS), Electronic Power Steering (EPS) and Supplemental Restraint System (SRS) 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 26** shows only the Supplemental Restraint System (SRS) lights remained illuminated on the instrument panel of the Motor Car after the engine was cranked. However the ABS and EPS light disappear and this would suggest that there was no abnormality to this various electronic operating systems of the Motor Car.


**Photo 27** shows the aftermarket steering without its airbag component which triggered the warning lights of the Supplemental Restraint System (SRS) to remain illuminated on the instrument panel (arrowed) of the Motor Car after the engine was cranked.

## Operational Behaviour of the Motor Car

16. Although the front right tie rod was bend due to the impact from the incident, however I was able to conduct a short operational test of the Motor Car, it was 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. The test was conducted by driving the Motor Car forward, stopping, before reversing and coming to a stop again.

17. 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 1 & 24)

18. With regard to the steering system, we were able to turn the steering wheel without any difficulty. However, the front wheels could not be turned to full lock position due to the bent front right tie rod due to the accident.

## Conclusion

19. From my physical inspection of the Motor Car, it appears that its engine system, steering system, braking system and transmission system were all in serviceable condition. I did not find any evidence(s) to suggest that there was possible mechanical failure to the Motor Car that may have caused and/or contributed to the accident. This is also taking into consideration that the 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 various operating systems.

20. 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 7.2mm to 7.4mm.

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