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You're Ref: TP/IP/01307/2023
Our Ref: CI/TPD23001598/P

9th March 2023

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

MECHANICAL INSPECTION REPORT OF MOTOR CAR SLQ 7295M

1. I refer to your request on 7th February 2023 to conduct a physical inspection of a Motor Car bearing registration number SLQ 7295M (herein referred to as "**Motor Car**"), which was involved in a road traffic accident on 15th January 2023.

2. The objective of the inspection is to 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 22nd February 2023 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.

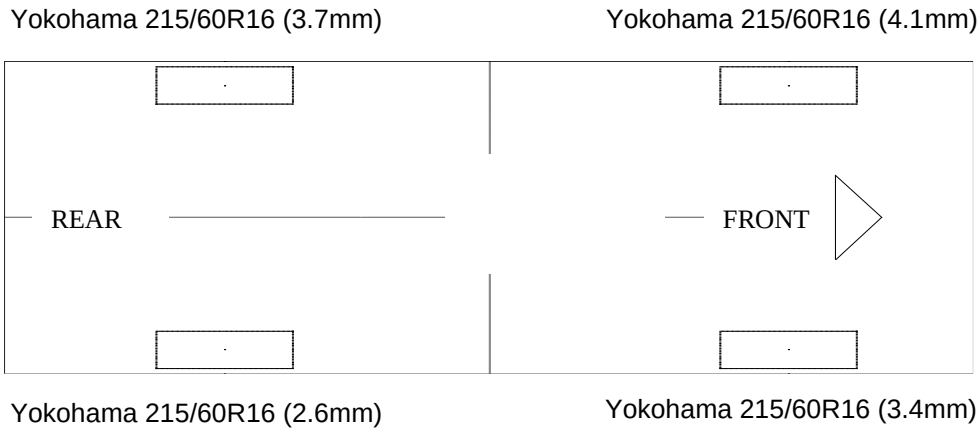
General Condition

4. The mileage of the Motor Car at the time of my inspection was 258,359km.

5. The Motor Car was observed to have sustained damage at its left portion. Its left front and rear fender, left front door, left rear view mirror was the body parts that were damaged as a result of the accident.

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 4 tyres were observed to be wrapped around standard alloy wheel rims that were found to be without any damage. See photo 1 – 13 below.

Photo 1 shows the mileage of the Motor Car at the time of my inspection. The mileage observed was 258,359km.

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

Photo 3 shows a general view of the Motor Car's left body at the time of my inspection. The Motor Car was observed to have sustained damage at its left portion. Its front and rear left fender, left front door, left rear view mirror was the body parts that were damaged as a result of the accident.

Photo 4 shows a close up 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 sustained damage. Its left front fender (circled) was the body parts that were damaged as a result of the accident.

Photo 5 shows a close up 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 sustained damage. Its front left door (circled) was the body parts that were damaged as a result of the accident.

Photo 6 shows a close up 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 sustained damage. Its left rear view mirror (circled) was the body parts that were damaged as a result of the accident.

Photo 7 shows a close up 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 sustained damage. Its left rear fender (circled) was the body parts that were damaged as a result of the accident.

Photo 8 shows the general view of the Motor Car's right body at the time of my inspection. The Motor Car right was observed to be unaffected by the accident.

Photo 9 shows the general view of the Motor Car's rear body at the time of my inspection. The Motor Car rear was observed to be unaffected by the accident.

Photo 10 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 3.4mm. The tyre was also observed to be sufficiently inflated for vehicular operation with no tear, cut or burst mark(s).

Photo 11 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 2.6mm. The tyre was also observed to be sufficiently inflated for vehicular operation with no tear, cut or burst mark(s).

Photo 12 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 3.7mm. The tyre, which was wrapped around alloy wheel rim, was also observed to be sufficiently inflated for vehicular operation. The 4 tyres of the Motor Car were wrapped around standard alloy wheel rims.

Photo 13 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 4.1mm. 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 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.

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 14 – 18 below.

Photo 14 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 15 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 16 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 17 shows the engine oil level 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 18 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 abnormality to the steering system. I experienced abnormal free play when the steering wheel was spinning 360 degrees when turning the steering wheel left and right to full lock positions and also observed that the front left and right wheels was not moving at all when the steering wheel was turning. 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 visually intact, however we observed that on the front left lower control arm of the Motor Car has sustained tyre rubbing marks on it, from our understanding in normal steering operations the range of motion for the front left tyre will not touch the front left lower control arm of the Motor Car.

13. For this particular case, the Motor Car was hit at the front left wheel well area and the induced impact from the accident had likely also hit the front left tyre of the Motor Car causing the tyre that was connected to the steering rack and pinon to move inwards and exceeded its normal range of motion causing the tyre to rub against the front left lower control arm which had caused the tyre marks on the surface of the front left lower control arm.

14. In addition, the exceeded range of motion sustained from the induced impact had caused internal damages to the steering rack and pinon and the whole steering column that had likely resulted in the abnormal free play of the steering wheel spinning 360 degrees when it was turned to its left and right and also observed that the front left and right wheels was not moving at all when the steering wheel was turned either ways. See photo 19 - 24 below.

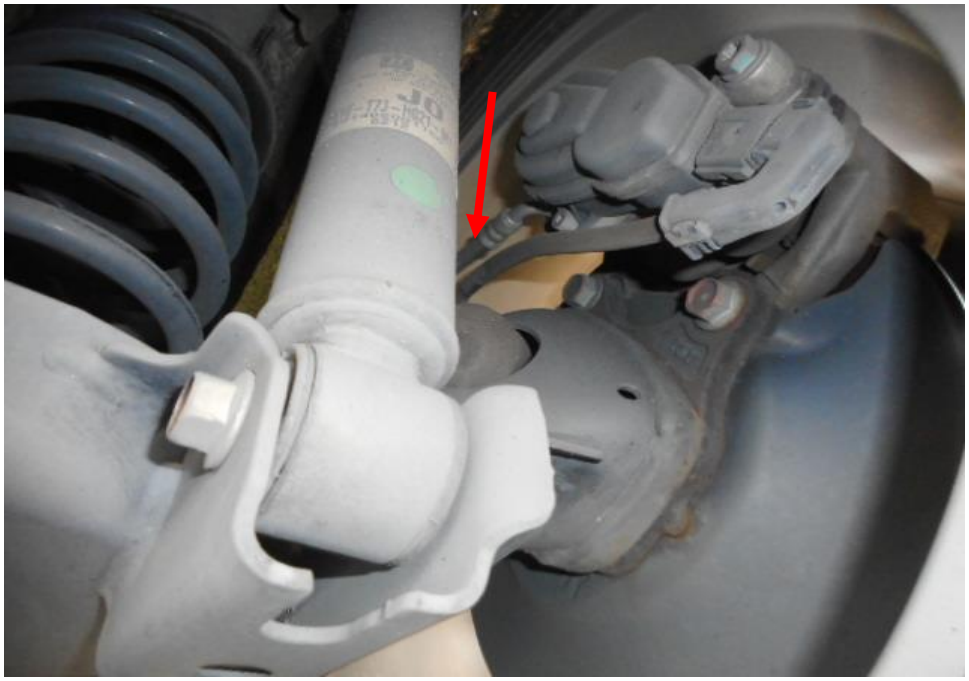


Photo 19 shows the brake hose/pipe (arrowed) at the rear right wheel of the Motor Car. No leakage of brake fluid was observed. Visual examination of the various components of the braking system like the drum brake, brake booster, brake pedal etc. had revealed all to be intact and without visible damage.

Photo 20 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 21 shows the brake hose/pipe (arrowed) at the front right 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.

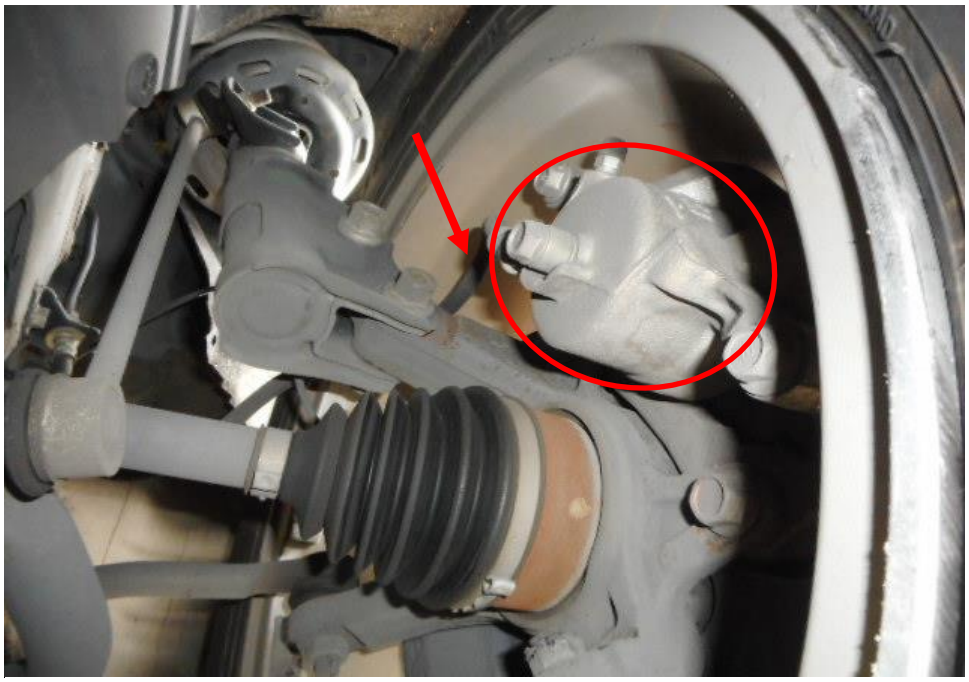


Photo 22 shows the brake hose/pipe (arrowed) at the front left wheel of the Motor Car. No leakage of brake fluid was observed. Visual examination of the various components of the braking system like the brake caliper (circled), brake booster, brake pedal etc had revealed all to be intact and without visible damage.

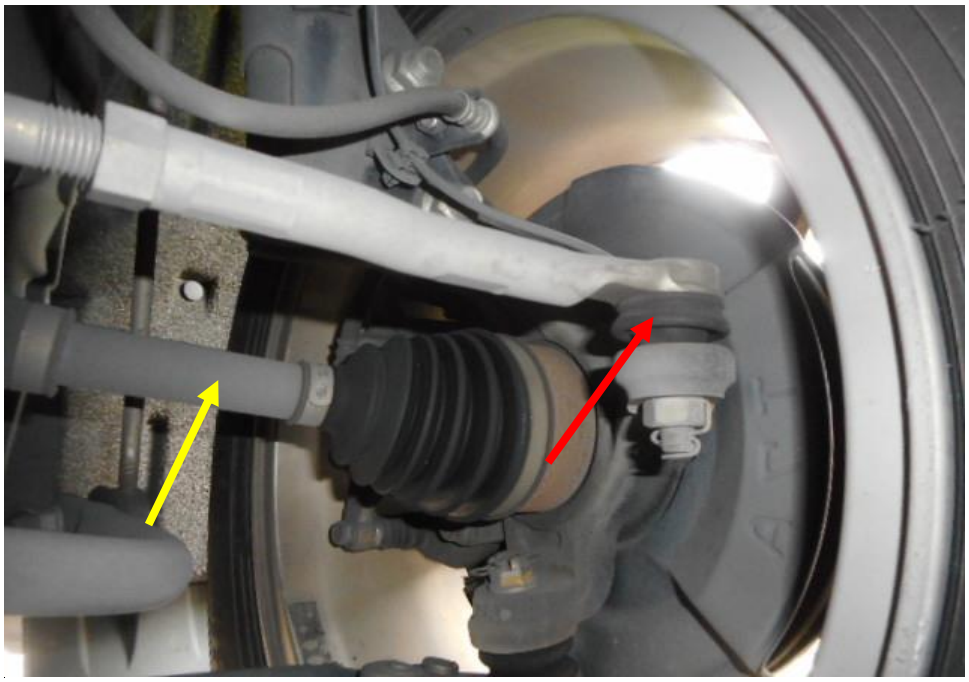


Photo 23 shows the various undercarriage components at the front right wheel of the Motor Car, in particular the steering tie rod (red arrow) and in particular the drive shaft (yellow arrow). The various steering components were all found to be intact, suggesting that the steering system of the Motor Car was likely to be in serviceable condition at the material time of accident. There was also no sign of fluid stain observed on the various undercarriage components at the front right wheel of the Motor Car.

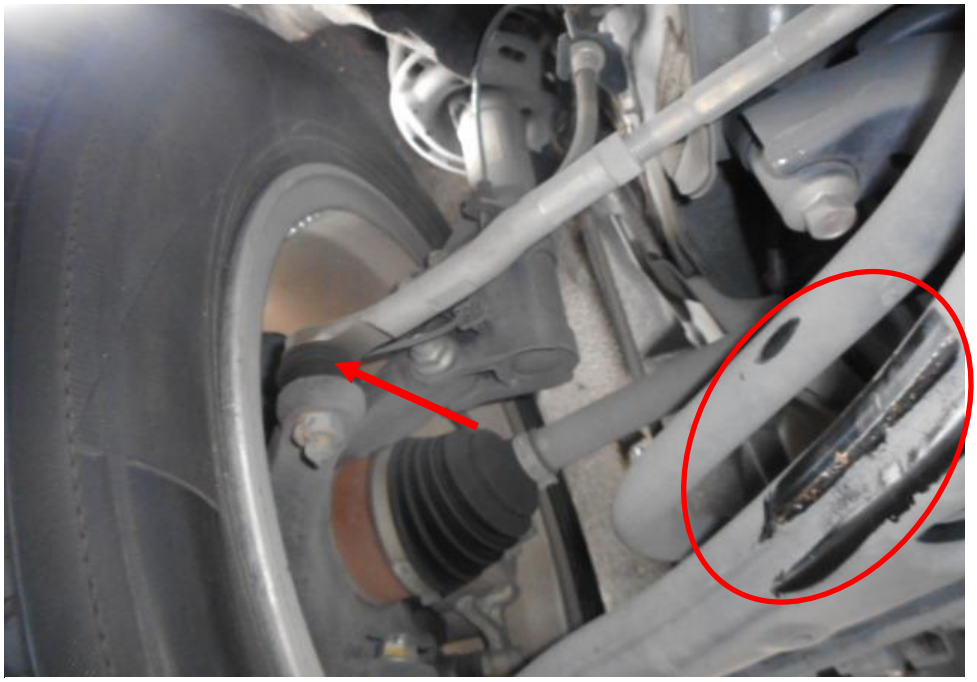


Photo 24 shows the various undercarriage components at the front left wheel of the Motor Car, which had included the steering tie rod (arrowed). The various undercarriage components of the Motor Car were all found to be intact without any visible damage. However, the left lower control arm was observed with tyre rubbing marks (circled) as a result of the induced impact from the accident that had caused the front left tyre that was connected to the steering rack and pinon to exceed its range of motion.

Electronic Safety / Warning Indicators

15. Motor Car 's automatic self-test of the functionality of its electronic operating systems like the Anti-Lock Brake System (ABS), 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.

16. However, the Electronic Power Steering System (EPS), Traction Control System (TCS), and Supplemental Restraint System (SRS) are all part of the steering system components and they had all remained illuminated up after the engine had cranked up due as a result of the induced impact from the accident that had damaged the rack and pinon, the steering column where these components are located inside. See photo 25 & 26 below.

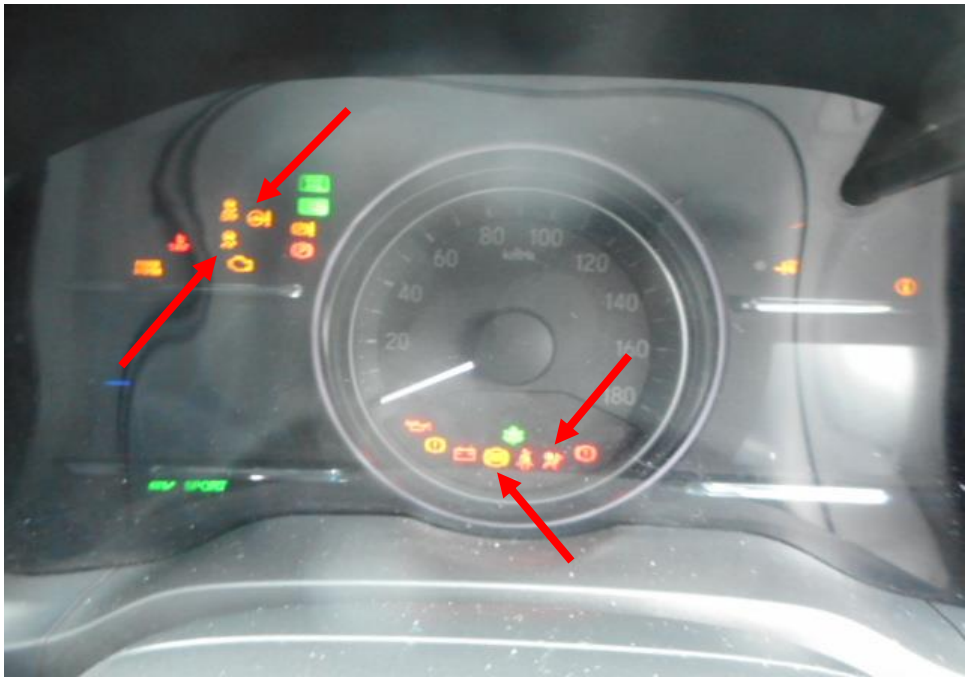


Photo 25 shows the warning light for Anti-Lock Brake System (ABS), Electronic Power Steering System (EPS), Traction Control System (TCS), and Supplemental Restraint System (SRS) (arrowed) appearing on the instrument panel of the Motor Car during the self-test of its various electronic operating systems when its engine was cranked.

Photo 26 shows the Electronic Power Steering System (EPS), Traction Control System (TCS), and Supplemental Restraint System (SRS) (arrowed) warning lights remained illuminated on the instrument panel of the Motor Car after the engine was cranked. This was due to the damages sustained to the steering rack and pinon, steering column where these components are located inside.

Seat Belts

17. The Front right, front left, rear right and rear left seat belts of the "Motor Car" were tested and all the seat belts were able to be fastened securely into the respective pre-tensioners that were fitted at the sides of each seat.

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 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.

20. For this particular case, only operational and static test was unable to be carried out on the steering system due to the induced damages sustained to the steering rack and pinon, steering column and its systems as a result of the accident.

Conclusion

21. From my physical inspection of the Motor Car, it appears that its engine system, transmission 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 accident.

22. For this particular case, the steering system and its steering components was unable to be tested due to the damages sustained as a result of the accident.

23. 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.

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 2.6mm to 4.1mm.

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