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Our Ref : CI/TPD19004303/P

16th May 2019

Accident Enquiry & Investigation Team

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

MECHANICAL INSPECTION REPORT OF POLICE MOTOR CAR QX 327E

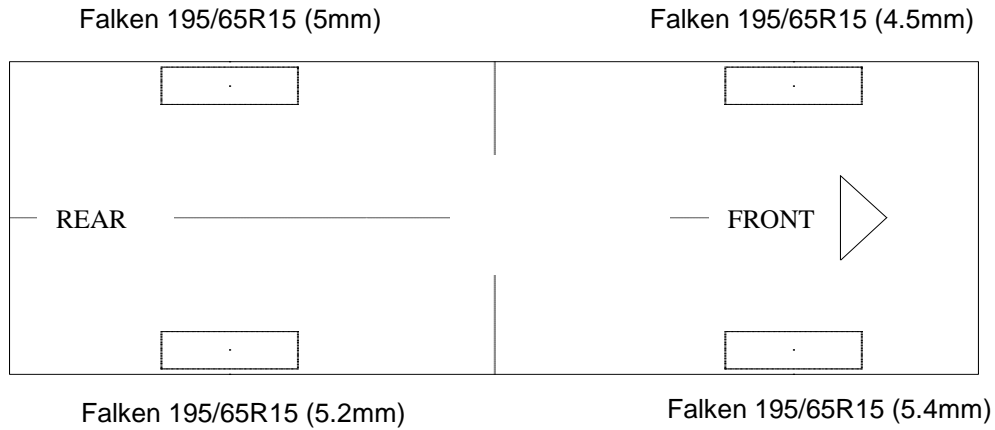
1. I refer to your request on 20th February 2019 to conduct a physical inspection of a Police motor car bearing registration number QX 327E (herein referred to as "**Police Car**"), which was involved in a road traffic accident on 03 January 2019.
2. The objective of the inspection is to determine if there was any possible mechanical failure to the Police Car that may have contributed to the accident.
3. Following the request, I had carried out a physical inspection of the Police Car on 14th May 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 Police Car at the time of my inspection was 312,139km.
5. The Police Car was observed to have sustained relatively moderate damage at its rear portion. Its rear windscreen, rear bonnet, rear bumper, rear left body panel, rear headlamp and rear bumper were amongst the body parts that were damaged as a result of the accident.

Tyres and Wheel Rims

6. The condition of the Police 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 significant damage apart for some relatively minor kerb grazing type of damage. See photo 1 – 12 below.



Photo 1 shows a general view of the Police Car's front body at the time of my inspection. The front portion of the Police Car was observed to have been unaffected by the accident.



Photo 2 shows a general view of the front body of the Police Car at the time of my inspection. The Police Car was observed to have sustained relatively moderate damage at its rear portion. Its rear windscreen, rear bonnet, rear bumper, rear left headlamp, rear left body panel and rear bumper were observed to have been damaged as a result of the accident. The mileage of the Police Car at the time of my inspection was recorded to be 312,139km.



Photo 2 shows a close up view of the damaged rear windscreen of the Police Car (circled) was damaged as a result of the accident.



Photo 4 shows a close up view of the damaged rear windscreen of the Police Car (circled) was damaged as a result of the accident.



Photo 5 shows a close up view of the damaged rear left headlamp of the Police Car (circled) was damaged as a result of the accident.



Photo 6 shows a close up view of the damaged rear bumper of the Police Car (circled) was damaged as a result of the accident.



Photo 7 shows a general view of the Police Car's left body at the time of my inspection. The left portion of the Police Car was observed to have been unaffected by the accident, other than the damage at the rear bonnet and bumper (arrowed)



Photo 8 shows a general view of the Police Car's right body at the time of my inspection. The right portion of the Police Car was observed to have been unaffected by the accident, other than the damage at the rear bonnet and bumper (arrowed)



Photo 9 shows the condition of the front left tyre of the Police Car, which was observed to be in serviceable condition with remaining tread depth of approximately 4.5mm. 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 Police Car were wrapped around standard alloy wheel rims that were without any significant damage apart for some relatively minor kerb grazing type of damage on the outer side of the wheel rims.



Photo 10 shows the condition of the front right tyre of the Police Car, which was observed to be in serviceable condition with remaining tread depth of approximately 5.4mm. 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 left tyre of the Police Car, which was observed to be in serviceable condition with remaining tread depth of approximately 5mm. The tyre, which was wrapped around alloy wheel rim, was also observed to be sufficiently inflated for vehicular operation.



Photo 12 shows the condition of the rear right tyre of the Police Car, which was observed to be in serviceable condition with remaining tread depth of approximately 5.2mm. 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 Police Car's 4 tyres.

Engine Compartment & Operating Fluids

8. Upon examination of the engine compartment of the Police 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 Police Car.
10. My subsequent checks on the underside of the Police Car also revealed no sign(s) or indication(s) of fluid leak and/or fluid stain(s). Visually, the various undercarriage components of the Police Car were all observed to be intact and without any visible damage. See photo 13 – 17 below.



Photo 13 shows a general view of the Police 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 Police Car at the time of my inspection. The brake fluid was observed to be of sufficient level and without any visible contamination.



Photo 15 shows checks being carried out to the engine coolant of the Police 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 Police Car at the time of my inspection. The engine oil was observed to be of sufficient level and without any visible contamination.



Photo 17 shows the undercarriage of the Police 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 Police Car.

Braking System & Steering System

11. Static brake tests conducted on the Police 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 Police Car. The braking system of the Police 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 Police 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 18 - 22 below.

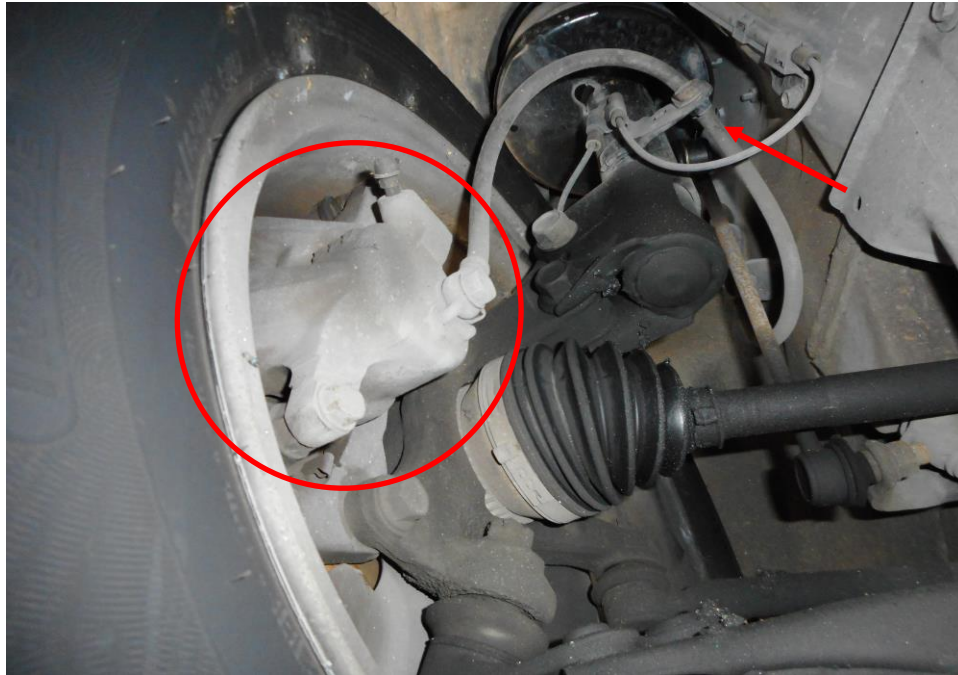


Photo 18 shows the brake hose/pipe (arrowed) at the front right wheel of the Police Car. No leakage of brake fluid was observed. Visual examination of the various components of the braking system like the brake caliper (circled), brake booster, brake pedal etc had revealed all to be intact and without visible damage.

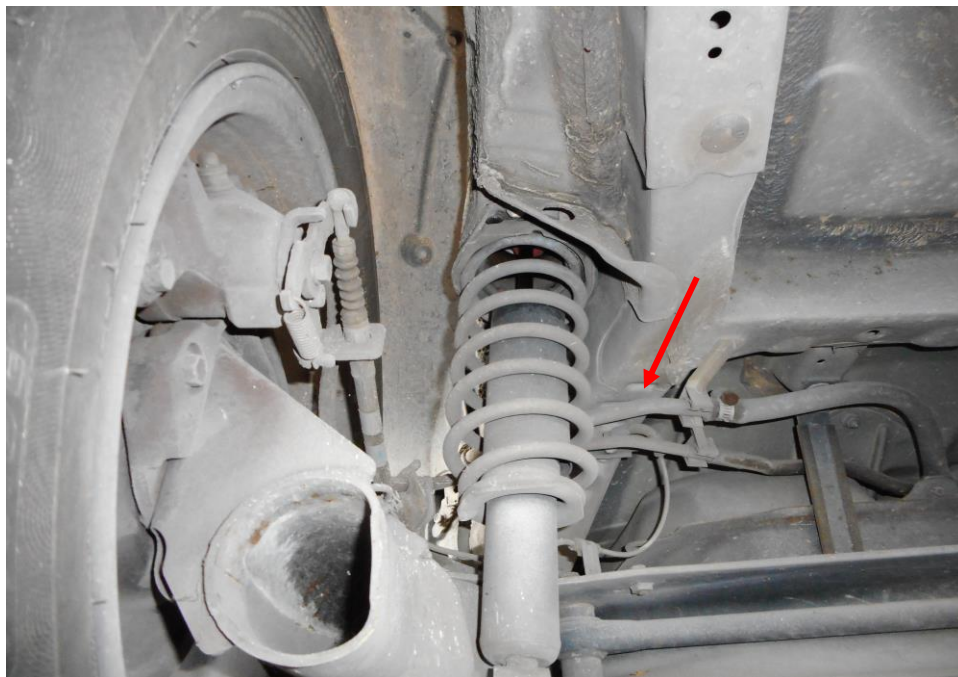


Photo 19 shows the brake hose/pipe (arrowed) at the rear left wheel of the Police Car. I did not observe any leakage of brake fluid at the time of my inspection of the Police Car. Static tests of the Police Car's braking system had indicated that there was no internal leakage of pressure/vacuum. The undercarriage components of the Police Car were also all found to be intact and without any visible damage.



Photo 20 shows the front right wheel of the Police Car turned to its full right. 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 Police Car was likely to be in serviceable condition at the material time of accident.



Photo 21 shows the various undercarriage components at the front right wheel of the Police Car, in particular the steering tie rod (arrowed). The various steering components were all found to be intact, suggesting that the steering system of the Police 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 Police Car.

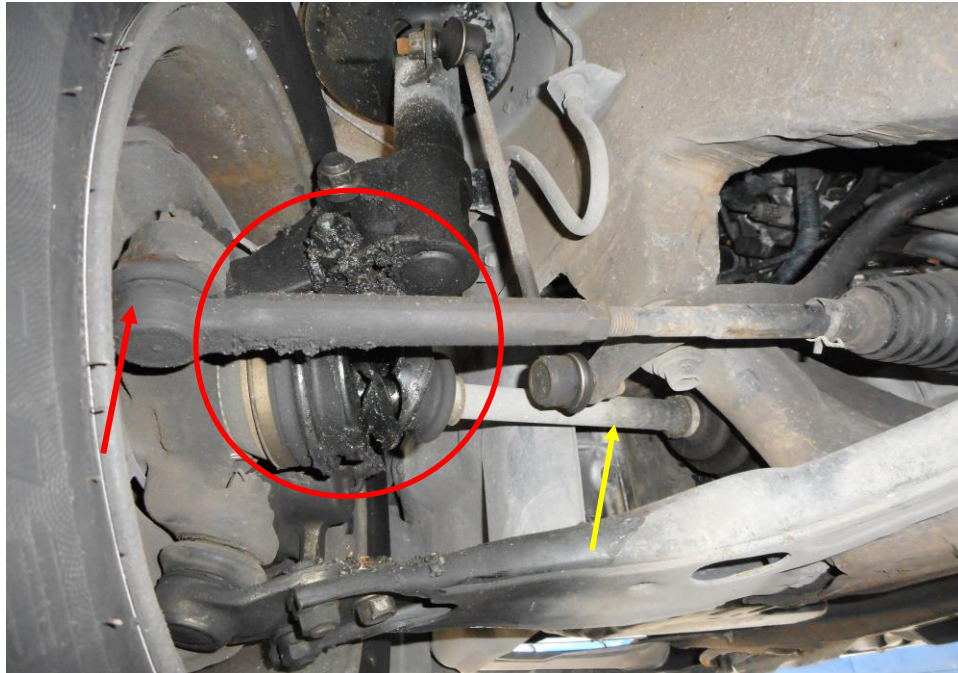


Photo 22 shows the various undercarriage components at the front left wheel of the Police Car, which had included the steering tie rod (red arrow) and front left drive shaft (yellow arrow) was inspected to be in good condition, other than the broken boot rubber of the outer CV joint (circled). The various undercarriage components of the Police Car were all found to be intact without any visible damage.

Electronic Safety / Warning Indicators

13. The Police Car's automatic self-test of the functionality of its various electronic operating systems like the Anti-Lock Brake System (ABS), Electric Power Steering System (EPS), Traction Control (TC) and Supplemental Restraint System (SRS) 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 23 & 24 below.



Photo 23 shows the warning light for Anti-Lock Brake System (ABS), Electric Power Steering System (EPS), Traction Control (TC) and Supplemental Restraint System (SRS) appearing on the instrument panel of the Police Car during the self-test of its various electronic operating systems when its engine was cranked.



Photo 24 shows no warning lights illuminated on the instrument panel of the Police Car after the engine was cranked. This would suggest that there was no abnormality to the various electronic operating systems of the Police Car, like the ABS, EPS, TC and SRS etc.

Operational Behaviour of the Police Car

14. A short operational test of the Police Car, to primarily determine whether there was any abnormality to its engine system, its transmission system and braking system was subsequently carried out.
15. During the operational test, the transmission system of the Police 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 Police 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 Police Car was able to slow down and come to a complete stop upon depressing of the brake pedal.

Conclusion

16. From my physical inspection of the Police 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 Police Car that may have caused and/or contributed to the accident.
17. A short operational test of the Police 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.

18. The 4 tyres of the Police 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 4.5mm to 5.4mm.

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