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Your Ref: TP/IP/01937/2018 14 February 2018
Our Ref : CI/TPD18002844/D

Accident Enquiry & Investigation Team
Traffic Police Department
Singapore Police Force
10 Ubi Avenue 3
Singapore 408865

MECHANICAL INSPECTION REPORT OF POLICE MOTOR CAR QX 1021E

1. I refer to your request on 06 February 2018 to conduct a physical inspection of a Police motor car bearing registration number QX 1021E (herein referred to as "**Police Car**"), which was involved in a road traffic accident on 10 January 2018.

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 08 February 2018 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.

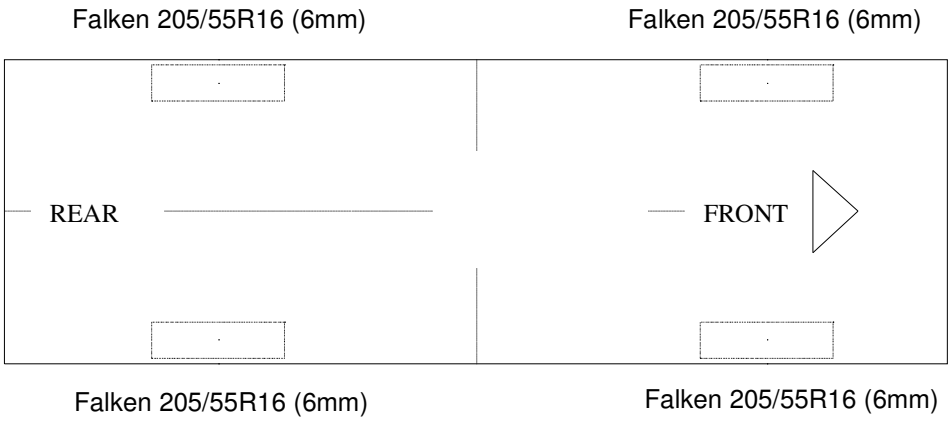
General Condition

4. The mileage of the Police Car at the time of my inspection was 142,663km.

5. The Police Car was observed to have sustained damage at its left front portion and left centre portion. Its left front fender, left front door, left wing mirror and front bonnet were amongst the body parts that were damaged as a result of the accident. Its roof blinker (at the left side) and front left undercarriage were also observed to be damaged.

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 – 9 below.

Photo 1 shows a general view of the front right body of the Police Car at the time of my inspection. The Police Car was observed to have sustained damage at its left front portion and left centre portion. The right portion was unaffected by the accident. The mileage of the Police Car at the time of my inspection was recorded to be 142,663km.

Photo 2 shows a general view of the front left body of the Police Car at the time of my inspection. The Police Car was observed to have sustained damage at its left front portion and left centre portion (circled). Its left front fender, left front door and front bonnet were damaged as a result of the accident. Its front left undercarriage was also observed to have been affected. The mileage of the Police Car at the time of my inspection was recorded to be 142,663km.

Photo 3 shows a closer view of the damaged area of the Police Car at the time of my inspection. Its left front fender, left front door, left wing mirror and front bonnet were damaged as a result of the accident.

Photo 4 shows the damage to the roof blinker of the Police Car as a result of the accident.

Photo 5 shows a general view of the Police Car's rear body at the time of my inspection. There was no damage observed to the rear portion of the Police Car.

Photo 6 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 6mm. 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 7 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 6mm. The tyre was also observed to be sufficiently inflated for vehicular operation with no tear, cut or burst mark(s).

Photo 8 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 6mm. The tyre, which was wrapped around alloy wheel rim, was also observed to be sufficiently inflated for vehicular operation. 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 9 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 6mm. 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 except for the front left steering tie rod, which was observed to be bent. See photo 10 – 14 below.

Photo 10 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 11 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 (as indicated by my finger) and without any visible contamination.

Photo 12 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 and without any visible contamination.

Photo 13 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 14 shows the front underside of the Police Car. 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. The Police Car's steering system could not be operationally tested as its front left steering tie rod was bent due to the accident. I was however able to carry out a static test on the steering system of the Police Car by turning the steering wheel left and right to full lock positions. My observations from this test revealed no abnormality to the steering system. I did not experience any abnormal free play and/or other resistance. My visual examination of the other undamaged steering components, which had included the steering rack and pinion, tie rod ends and ball joints revealed that these components were all generally in good condition. See photo 15 - 19 below.

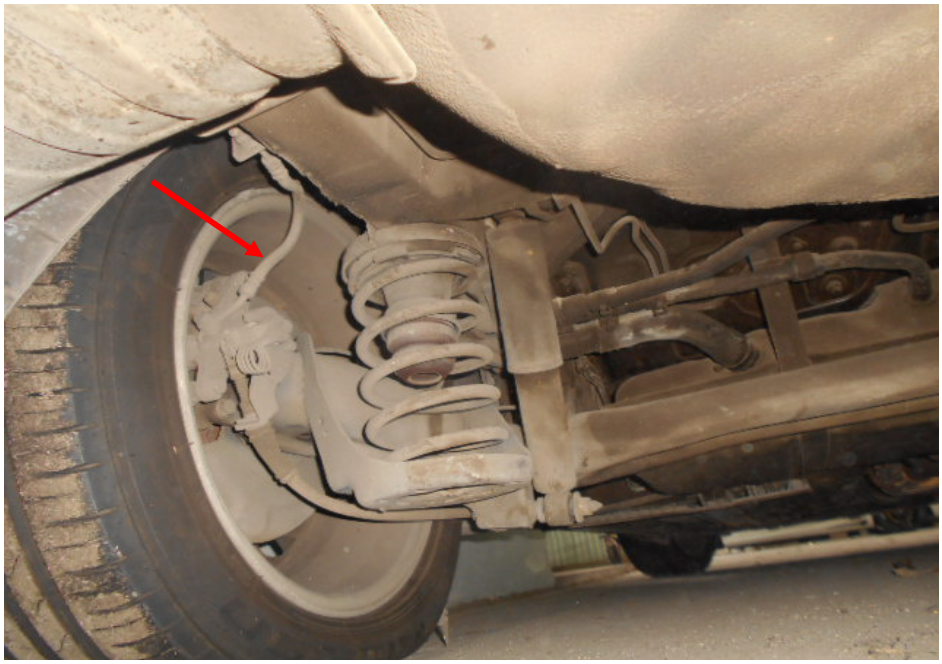


Photo 15 shows the brake hose/pipe (arrowed) at the rear left wheel of the Police Car. I did not observe any leakage of brake fluid at the time of my inspection of the Police Car. Static tests of the Police Car's braking system had indicated that there was no internal leakage of pressure/vacuum.

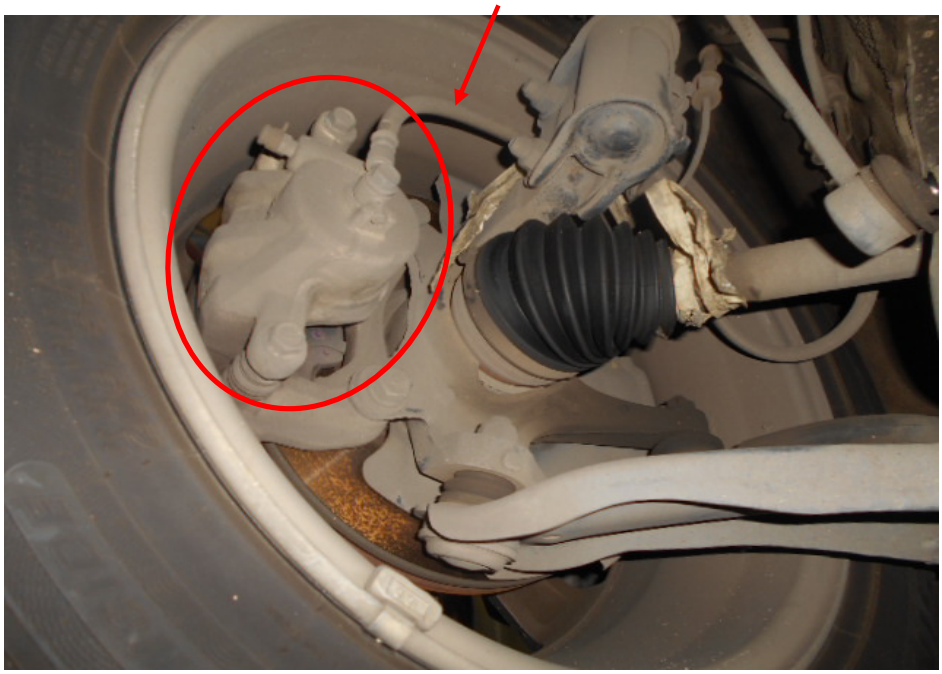


Photo 16 shows the brake hose/pipe (arrowed) at the front right wheel of the Police Car. No leakage of brake fluid was observed. Visual examination of the various components of the braking system like the brake caliper (circled), brake booster, brake pedal etc had revealed all to be intact and without visible damage. The braking system of the Police Car was likely to be in serviceable condition.

Photo 17 shows the front left wheel of the Police Car turned to its full right. During my static 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.

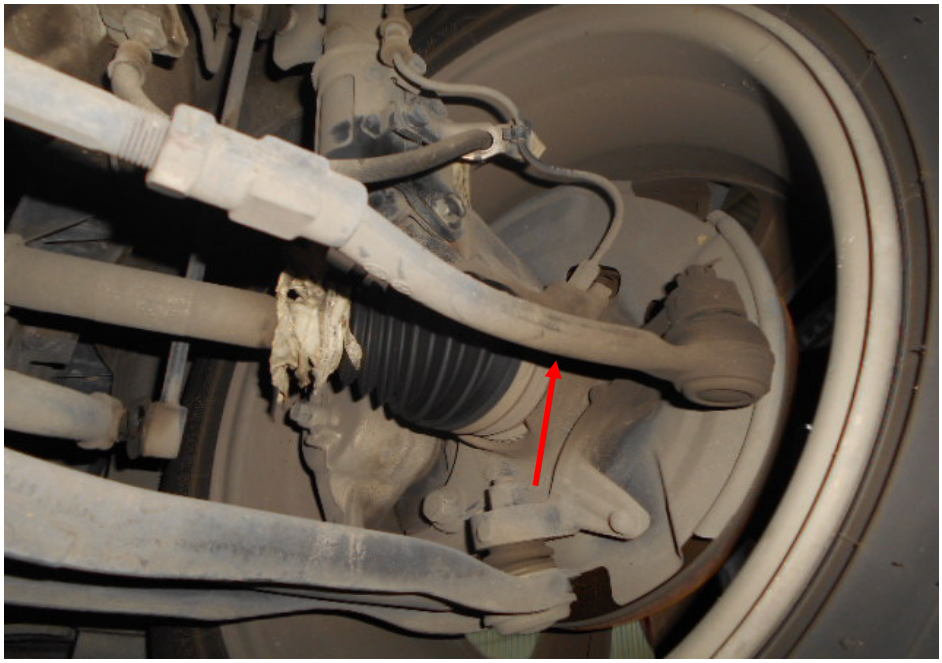


Photo 18 shows the various undercarriage components at the front right wheel of the Police Car, in particular the front right steering tie rod (arrowed). The steering components were all found to be intact except for the front left steering tie rod. This would suggest that the steering system of the Police Car was likely to be in serviceable condition. There was also no sign of fluid stain(s) observed on the various undercarriage components at the front right wheel of the Police Car.

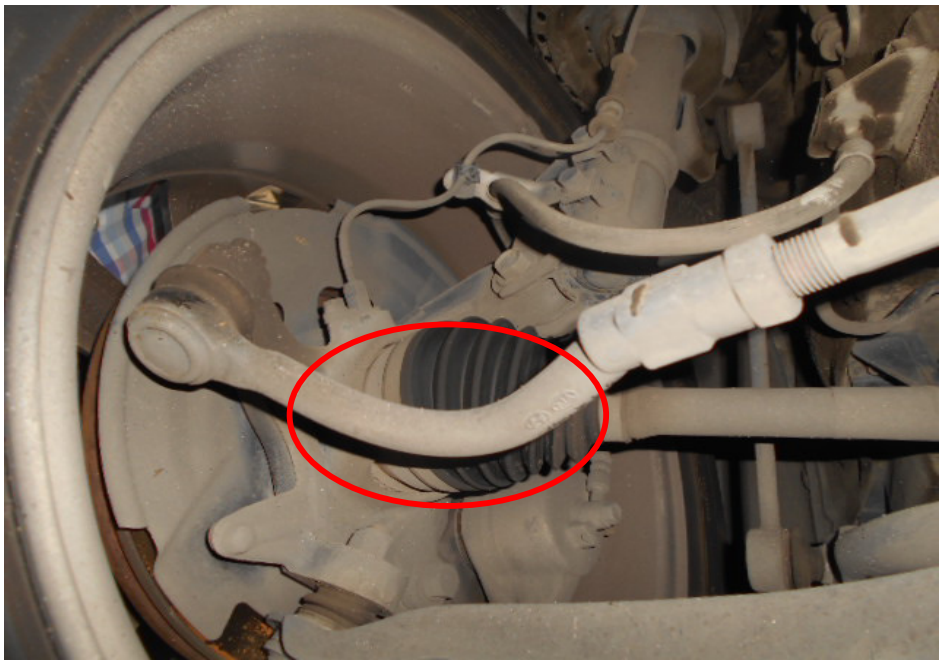


Photo 19 shows the various undercarriage components at the front left wheel of the Police Car. The front left steering tie rod was observed to be bent (circled). Such nature of damage is likely caused by an impact onto the front left wheel rim hence this damage is likely due to the accident. Given this damage, I was not able to carry out any operational test on the steering system of the Police Car.

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 20 & 21 below.

Photo 20 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 21 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. No operational test was carried out to the steering system due to the damage of the Police Car's front left steering tie rod.

Conclusion

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

17. Although the steering system of the Police Car was unable to be operationally tested due to damage to its front left steering tie rod, my static test of the steering system had indicated no evidence to suggest any abnormality to the steering system of the Police Car.

18. 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.

19. 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 6mm each.

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