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27 November 2017

Accident Enquiry & Investigation Team

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

MECHANICAL INSPECTION REPORT OF POLICE MOTOR CAR QX 509Y

1. I refer to your request on 15 November 2017 to conduct a physical inspection of a Police motor car bearing registration number QX 509Y (herein referred to as "**Police Car**"), which was involved in a road traffic accident on 09 November 2017.
2. The purpose of this inspection is to primarily 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 23 November 2017 at the premises of Indeco Engineers Pte Ltd, 39 Defu Lane 12 Singapore 539139. 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 not recorded due to damage to its ignition system.
5. The Police Car had sustained extensive impact damage along its left body. The impact force was relatively significant causing severe damage to its front bumper, front left headlamp, front left fender, front left wheel house, front bonnet, left wing mirror, left front door, left rear door, left rear fender and rear bumper amongst others. Almost all the undercarriage components at the front left wheel and front right wheel were also damaged as a result of the accident.
6. Several parts and components towards the left side of the engine compartment were also observed to have been damaged as a result of the impact force. See photo 1 – 4 below.



Photo 1 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 extensive impact damage along its left body. The impact force was relatively significant causing severe damage to its front bumper, front left headlamp, front left fender, front left wheel house, front bonnet and front left door amongst others.



Photo 2 shows a closer view of the extent of damage along the left body of the Police Car. Its left wing mirror, front left fender and front left door were amongst the body parts that were severely damaged as a result of the impact force.



Photo 3 shows the left rear body of the Police Car. Its rear left door, left rear fender and rear bumper had also sustained damage arising from the accident.



Photo 4 shows a general view of the rear body of the Police Car. The rear body and right side body of the Police Car were observed to be relatively unaffected from the accident.

Tyres and Wheel Rims

7. The Police Car's 4 tyres were all found to be deflated. The 4 tyres were wrapped around alloy wheel rims that were also found to be damaged. The rear tyres, still wrapped around their wheel rims, were found in the rear boot compartment of the Police Car while the front tyres were found to be wrapped around their wheel rims, attached to the body of the Police Car. The 4 wheel rims had mainly sustained grazing marks on their outer spokes. The front left wheel rim was observed to be broken as well.
8. The front left tyre and one of the rear tyres were found to be cut at their outer sidewall, which were a result of the accident. The remaining tread depth of all the tyres was approximately 5mm each with their tread pattern still clearly visible. Although the 4 tyres of the Police Car were found to be deflated, they were likely to be in serviceable condition prior to the accident as the deflation was a result of the accident. See photo 5 – 12 below.



Photo 5 shows the condition of the front left tyre of the Police Car, which was observed to be deflated. The outer sidewall of the tyre was found to be cut. The wheel rim was also observed to be broken with marks of grazing nature on its outer spokes, all of which were a result of the accident.



Photo 6 shows a closer view of the outer sidewall of the front left tyre, where the rubber was found to be cut. The wheel rim was also observed to be broken with marks of grazing nature on its outer spokes, all of which were a result of the accident.



Photo 7 shows the tread of the front left tyre of the Police Car. Although the front left tyre was found to be deflated, it can still be considered to be in serviceable condition prior to the accident as the remaining tread depth of the tyre was approximately 5mm with its tread pattern clearly visible.



Photo 8 shows the condition of the front right tyre of the Police Car, which was observed to be deflated. The front right wheel rim was also observed to be damaged with marks of grazing nature on its outer spokes. The deflation of the tyre and damage to the wheel rim were both a result of the accident.



Photo 9 shows the tread of the front right tyre of the Police Car. Although the front right tyre was found to be deflated, it can still be considered to be in serviceable condition prior to the accident as the remaining tread depth of the tyre was approximately 5mm with its tread pattern clearly visible.



Photo 10 shows the 2 rear tyres of the Police Car that were found in the rear boot compartment. Both the tyres were found to be wrapped around their wheel rims and deflated. Both wheel rims were also found to be damaged as a result of the accident, with marks of grazing nature on their outer spokes.



Photo 11 shows the cut observed on the outer sidewall of one of the tyres that were found in the rear boot compartment of the Police Car. The cut to the tyre and damage to the wheel rim were both arising from the accident.



Photo 12 shows the tread of the 2 tyres that were found in the rear boot compartment of the Police Car. Although the 2 tyres were found to be deflated, both tyres can still be considered to be in serviceable condition prior to the accident as the remaining tread depth of the tyres were approximately 5mm with its tread pattern clearly visible.

Engine Compartment & Operating Fluids

9. Upon examination of the engine compartment, I had observed that several parts towards the left of the engine compartment were affected by the impact from the collision. I was however still able to carry out checks to the various operating fluids of the Police Car.
10. The engine oil, engine coolant, brake fluid and transmission fluid were all observed to be of sufficient level and without any visible contamination for operating purposes. Further examination of the engine compartment revealed no sign(s) or indication of fluid leakage and/or fluid stain within the engine compartment of the Police Car.
11. My subsequent checks on the underside of the Police Car revealed damage to the undercarriage components at both the front left wheel and front right wheel. Components like the front suspension, front lower arm, front drive shaft, front steering tie rod and front stabilizer bar were all damaged from the accident. See photo 13 – 19 below.



Photo 13 shows a general view of the engine compartment of the Police Car. Several parts towards the left side (circled) of the engine compartment was damaged as a result of the accident.



Photo 14 shows the engine oil dip stick of the Police Car. The engine oil was found to be sufficient level and without contamination for operating purposes.



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 and without any visible contamination.



Photo 16 shows the transmission fluid dip stick of the Police Car. The transmission fluid was found to be sufficient level and without contamination for operating purposes.



Photo 17 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 18 shows the undercarriage components at the front left wheel of the Police Car. My checks on the underside of the Police Car revealed damage to the undercarriage components at the front left wheel of the Police Car. Components like the front left suspension, front left lower arm, front left drive shaft (red arrow), front stabilizer bar and front left steering tie rod (yellow arrow) were all found to be have been damaged.

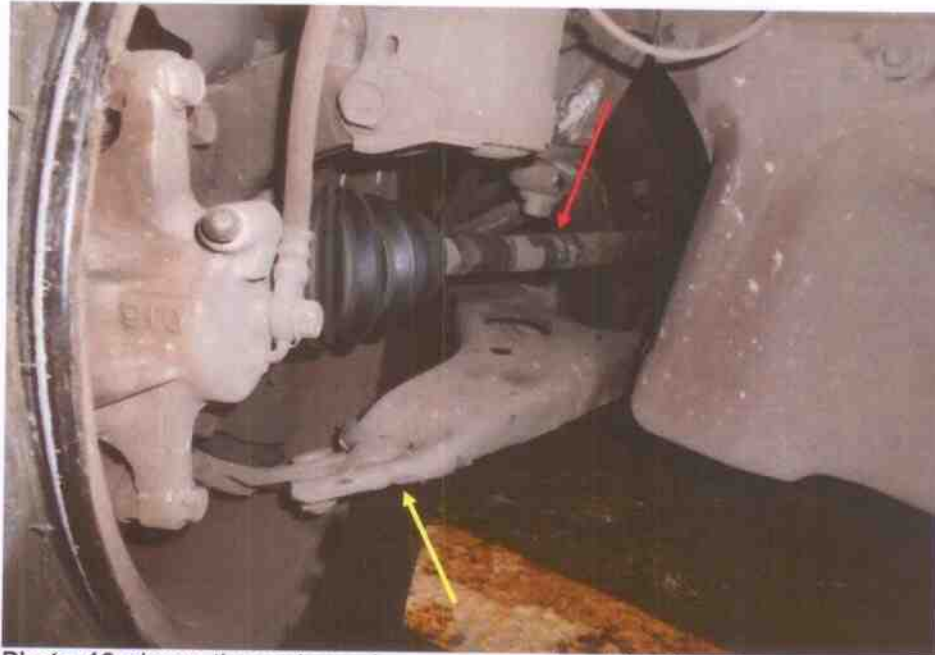


Photo 19 shows the undercarriage components at the front right wheel of the Police Car. My checks on the underside of the Police Car revealed damage to the undercarriage components at the front right wheel of the Police Car. Components like the front right suspension, front right lower arm (yellow arrow), front right drive shaft (red arrow) and front right steering tie rod were all found to be have been damaged.

Steering System & Braking System

12. For this inspection, I was not able to conduct any tests on the steering system of the Police Car. This was largely due to the damage to the steering tie rod and other undercarriage components at the front left wheel and front right wheel of the Police Car. Refer to photograph 18 and 19 above.
13. With regard to the braking system, I was also not able to carry out any static tests. This was due to the engine unable to be started (damage to ignition system). However my visual examination of the mechanical parts of the braking system like the brake booster, brake pipes/hoses and brake pedal revealed all the parts to be intact and undamaged. The braking system of the Police Car was therefore 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. See photo 20 & 21 below.

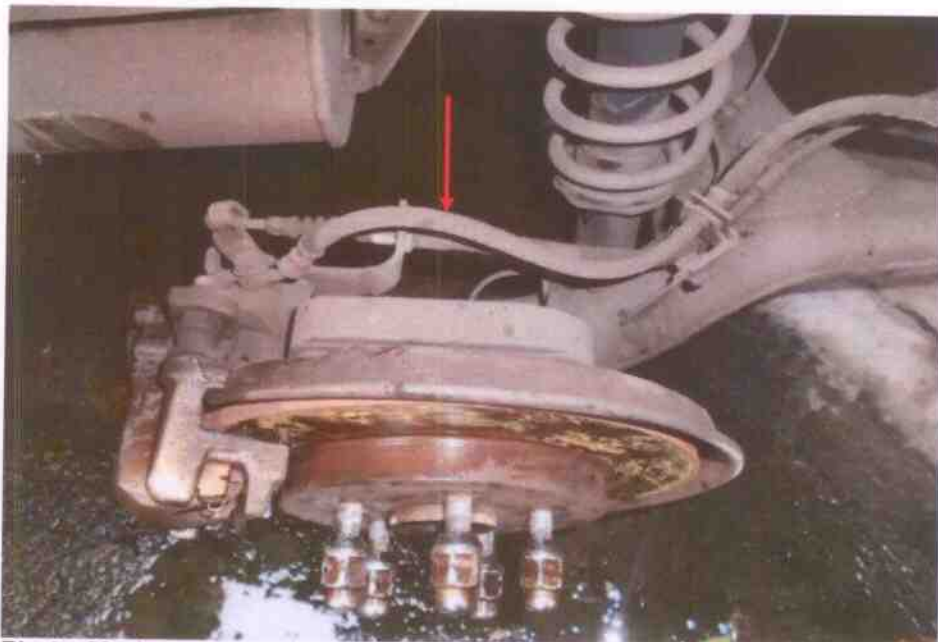


Photo 20 shows the brake hose (arrowed) at the rear right wheel of the Police Car. I did not observe any leakage of brake fluid at the time of my inspection of the Police Car. My visual examination of the mechanical parts of the braking system like the brake booster, brake pipes/hoses and brake pedal revealed all the parts to be intact and undamaged.



Photo 21 shows the undercarriage components at the front left wheel of the Police Car, in particular the brake hose (arrowed) and brake caliper (circled). The Police Car's braking system was likely to be in serviceable condition as my visual examination of the various mechanical parts in the braking system did not produce any observations that had suggested otherwise. This was also taking into consideration that the brake fluid was of sufficient level for operating purposes.

Electronic Safety / Warning Indicators

14. The Police Car's automatic self-test of the functionality of its various electronic operating systems like the Anti-Brake Lock System (ABS) and Supplemental Restraint System (SRS) during cranking of the engine was not able to be initiated as the engine of the Police Car could not be started due to damage to its ignition system.

Operational Behaviour of the Police Car

15. Operational test to primarily determine whether there was any abnormality to the engine system, transmission system, steering system and braking system of the Police Car could not be conducted given the extent of damage that it had sustained (engine could not be started and undercarriage components affected).

Conclusion

16. For this particular case, I was unable to determine whether there was any possible mechanical failure to the Police Car that may have contributed to the accident. The extent of damage that it had sustained had prevented me from carrying out any operational test(s) and/or static test(s) to its engine system, transmission system, steering system and braking system.
17. The braking system of the Police Car was however likely to be in serviceable condition given that my visual examination of the various mechanical parts in the braking system revealed all the parts to be intact and undamaged. This was also taking into consideration that the brake fluid was of sufficient level for operating purposes.
18. The 4 tyres of the Police Car were found to be in serviceable condition with remaining tread depth of approximately 5mm each despite all 4 tyres being deflated as a result of the accident.



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