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General Investigation Team B

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

MECHANICAL INSPECTION REPORT OF MOTOR TAXI SHB 9616J

1. I refer to your request on 03 August 2017 to conduct a physical inspection of a motor taxi bearing registration number SHB 9616J (herein referred to as "**Motor Taxi**"), which was involved in a road traffic accident on 24 July 2017.
2. The objective of the inspection is to determine if there was any possible mechanical failure to the Motor Taxi that may have contributed to the accident.
3. Following the request, I had carried out 2 physical inspections of the Motor Taxi. The first inspection was on 04 August 2017 at the premises of Traffic Police vehicle pound, 517 Airport Road Singapore 539942 while the second inspection was on 22 December 2017 at the premises of Transcab Auto Services Pte Ltd, No. 2 Ang Mo Kio Street 63 Singapore 560111.
4. I now set out below my observations and comments with respect to these inspections.

General Condition

5. The mileage of the Motor Taxi was recorded to be 739,101km at the time of the 2 inspections.
6. The Motor Taxi had sustained impact damage at its frontal portion and rear portion. Its front bumper, front bonnet, front grille, front bumper reinforcement and front support panel were amongst the body parts at the frontal portion that were damaged. Its rear bumper, rear bootlid, rear taillamps, rear end panel, rear right fender and rear windscreen were amongst the body parts at the rear portion that were damaged as a result of the accident.

Tyres and Wheel Rims

7. The condition of the Motor Taxi'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 sufficiently inflated for vehicular operation except for the rear left tyre, which was observed to be deflated as a result of the accident. The tyre brand, tyre size and remaining tread depth of the 4 tyres were recorded as follows:-



8. The 4 tyres were observed to be wrapped around standard wheel rims. The rear left wheel rim and front right wheel rim were observed to be dented while the rear right wheel rim and front left wheel rim were observed to be without any significant damage. See photo 1 – 8 below.



Photo 1 shows a general view of the front left body of the Motor Taxi at the time of my first inspection. The Motor Taxi was observed to have sustained damages at its frontal portion and rear portion. The front number plate, front bonnet, front grille, front bumper reinforcement and front support panel were amongst the body parts at the frontal portion that were damaged. The mileage of the Motor Taxi was recorded to be 739,101km.



Photo 2 shows a general view of the front right body of the Motor Taxi at the time of my inspection. The Motor Taxi was observed to have sustained damages at its frontal portion and rear portion.



Photo 3 shows a general view of the Motor Taxi's rear right body at the time of my inspection. The rear bumper, rear bootlid, rear taillamps, rear right fender, rear bootlid lamps and rear windscreen were amongst the body parts at the rear portion of the Motor Taxi that were observed to have been damaged as a result of the accident.



Photo 4 shows the condition of the front left tyre of the Motor Taxi, which was observed to be in serviceable condition with remaining tread depth of approximately 5mm. The tyre, which was wrapped around standard wheel rim, was also observed to be sufficiently inflated for vehicular operation. There was no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of the tyre.



Photo 5 shows the condition of the front right tyre of the Motor Taxi, which was observed to be in serviceable condition with remaining tread depth of approximately 5mm. The tyre, which was wrapped around standard wheel rim, was also observed to be sufficiently inflated for vehicular operation. A slight dent was observed on the front right wheel rim as a result of the accident.



Photo 6 shows a general view of the rear left wheel rim and rear left tyre of the Motor Taxi. The rear left wheel rim was observed to be dented (circled) while the rear left tyre was observed to be deflated. Both were a result of the accident.



Photo 7 shows the condition of the rear left tyre of the Motor Taxi, which was observed to be in serviceable condition with remaining tread depth of approximately 6mm. The tyre was observed to be deflated as a result of the accident.



Photo 8 shows the condition of the rear right tyre of the Motor Taxi, which was observed to be in serviceable condition with remaining tread depth of approximately 7mm. The tyre, which was wrapped around standard wheel rim, was also observed to be sufficiently inflated for vehicular operation.

Engine Compartment & Operating Fluids

9. Upon examination of the Motor Taxi's engine compartment, I had observed parts that were mainly towards the front of the engine compartment pushed inwards as a result of the impact force onto the frontal body of the Motor Taxi. Parts like the front support panel, air condenser and radiator were affected.
10. The brake fluid, power steering fluid and engine oil were all found to be of sufficient level for operating purposes. Visually, there was also no contamination found to these fluids. The engine coolant was however observed to have leaked from the Motor Taxi's radiator, which was damaged due to the accident.
11. My checks on the underside of the Motor Taxi revealed fluid stains on the engine oil sump and some undercarriage components of the Motor Taxi. This was due to the leakage of engine fluid. I also note the presence of dirt and dust particles accumulated around the fluid stain areas, indicating that the fluid leak was pre-existing for a period of time and not a result of the accident.
12. Visually, the undercarriage components of the Motor Taxi were all observed to be intact and without any visible damage. See photo 9 – 14 below.



Photo 9 shows a general view of the Motor Taxi's engine compartment. The parts that were mainly towards the front of the engine compartment (circled) were pushed inwards as a result of the impact force onto the front body of the Motor Taxi. Parts like the front support panel, air condenser and radiator were affected.



Photo 10 shows the brake fluid reservoir of the Motor Taxi at the time of my inspection. The brake fluid was observed to be of sufficient level and without any visible contamination.



Photo 11 shows the engine coolant reservoir tank of the Motor Taxi at the time of my inspection. The engine coolant was observed to be of insufficient level. This was due to leakage of engine coolant from the Motor Taxi's damaged radiator.

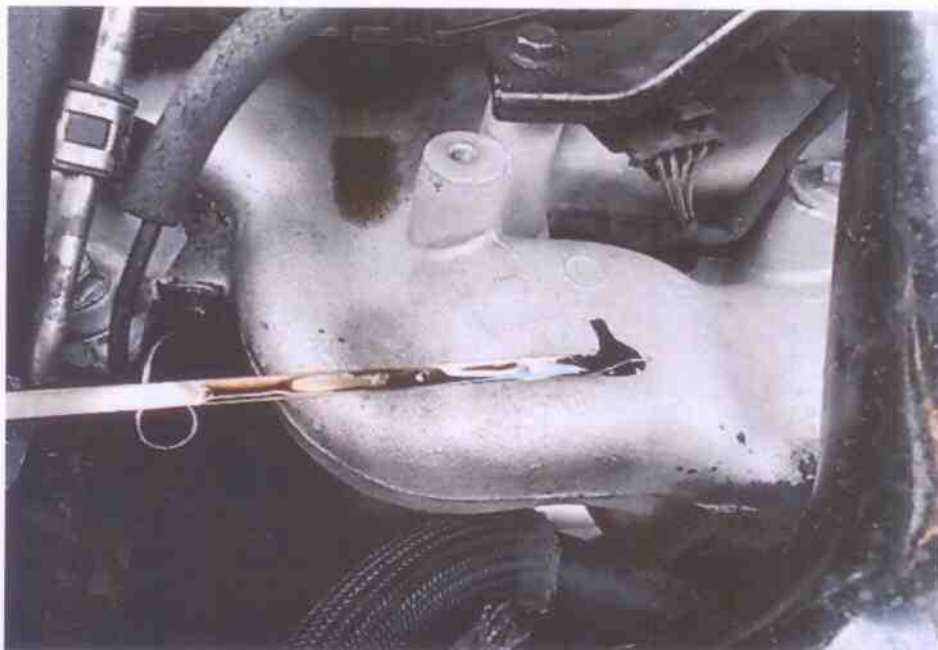


Photo 12 shows the engine oil dip stick of the Motor Taxi at the time of my inspection. The engine oil was observed to be of sufficient level and without any visible contamination.



Photo 13 shows the power steering fluid reservoir tank of the Motor Taxi at the time of my inspection. The power steering fluid was observed to be of sufficient level and without any visible contamination.



Photo 14 shows the underside of the Motor Taxi. Fluid stains were observed on the engine oil sump (circled) and some undercarriage components of the Motor Taxi. This was due to the leakage of engine fluid. I also note the presence of dirt and dust particles accumulated around the fluid stain areas, indicating that the fluid leak was pre-existing for a period of time and not a result of the accident.

Braking System & Steering System

13. As the ignition system of the Motor Taxi was affected due to the accident, arrangement was made to tow the Motor Taxi on 22 December 2017 from Traffic Police vehicle pound to the premises of Transcab Auto Services Pte Ltd, No. 2 Ang Mo Kio Street 63 Singapore 560111. The Investigation Officer had escorted the Motor Taxi during the towing process/journey. The purpose of this arrangement was to carry out simple rectification works in order to start the engine of the Motor Taxi so that static and operational tests could be carried out to the various operating systems of the Motor Taxi.
14. I was at the premises of Transcab Auto Services Pte Ltd to observe the rectification work carried out to the Motor Taxi. This was to ensure that the rectification did not involve work that would alter the mechanical condition of the Motor Taxi. The following paragraphs are my observations during this second inspection on 22 December 2017 after the ignition system of the Motor Taxi was rectified, and its engine was able to start.
15. Static brake tests conducted on the Motor Taxi 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 Taxi. The braking system of the Motor Taxi 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.
16. Static test on the steering system of the Motor Taxi 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 revealed that these components were all generally in good condition. See photo 15 - 19 below.



Photo 15 shows a general view of the Motor Taxi during the second inspection on 22 December 2017 at the premises of Transcab Auto Services Pte Ltd.



Photo 16 shows the brake hose/pipe (arrowed) at the rear left wheel of the Motor Taxi. There was no brake fluid leak observed. Static tests of the Motor Taxi's braking system had indicated that there was no internal leakage of pressure/vacuum. Hence the braking system was likely to be in serviceable condition at the material time of accident. The undercarriage components of the Motor Taxi were also all found to be intact and without any visible damage.



Photo 17 shows the brake hose/pipe (arrowed) at the front right wheel of the Motor Taxi. There was no brake fluid leak 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 18 shows the front left wheel of the Motor Taxi 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 the left and right. This would suggest that the steering system of the Motor Taxi was likely to be in serviceable condition at the material time of accident.



Photo 19 shows the various undercarriage components at the front right wheel of the Motor Taxi, in particular the steering tie rod (arrowed). The various steering components were all found to be intact, suggesting that the steering system of the Motor Taxi was likely to be in serviceable condition at the material time of accident.

Electronic Safety / Warning Indicators

17. The Motor Taxi'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 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.

Operational Behaviour of the Motor Taxi

18. A short operational test of the Motor Taxi, to primarily determine whether there was any abnormality to its engine system, its transmission system and braking system was subsequently carried out.
19. During the operational test, the Motor Taxi's transmission system 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 Taxi'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 Taxi was able to come to a complete stop upon depressing of the brake pedal.

Others

20. A 62sec video recording showing the occurrence of this accident was provided to me for review in preparation of this report. The following paragraphs discuss the notable events as seen from the video recording in relation to the observations gathered from my physical inspection of the Motor Taxi, in particular whether the accident could have been a result of possible mechanical failure.
21. From the video recording, the Motor Taxi was first seen with its frontal portion in contact with a white coloured mini bus. The Motor Taxi then began moving forward, pushing the mini bus backwards onto the walkway behind the parking lot where the mini bus was parked. Tyre screeching sounds were heard with smoke seen coming out from the rear of the Motor Taxi during this time. The Motor Taxi subsequently moved backwards, mounted the walkway and collided onto the concrete wall of the housing block before coming to a complete stop.
22. Several notable observations could be made from the video recording. The first was just before the Motor Taxi started moving backwards, its reverse lights appeared and remained illuminated as the Motor Taxi moved backwards, all the way towards the wall of the housing block. The illumination of the reverse lights indicates that the automatic transmission of the Motor Taxi was manually shifted to reverse mode by the driver.
23. The second notable observation was that the brake lights of the Motor Taxi did not appear to illuminate through-out the entire video recording. This could be due to 2 possible reasons. First possible reason was that the driver did not step on the brake pedal; the second possible reason was that the bulbs of the brake lights had blown and therefore although the driver had stepped on the brake pedal, the brake lights did not illuminate.
24. During my inspection of the Motor Taxi, I had observed that the bulbs of the Motor Taxi's brake lights were in working condition. The brake lights at the rear left taillamp, rear right taillamp and the third brake light illuminated when the brake pedal of the Motor Taxi was depressed. Co-relating this observations with the observations from the video recording, it would appear that the brake pedal of the Motor Taxi was not depressed by the driver at the material time of accident. See photo 20 & 21.



Photo 20 shows the third brake light (circled) of the Motor Taxi. The bulbs of the Motor Taxi's brake lights were observed to be in working condition at the time of my inspection. The brake lights at the rear left taillamp, rear right taillamp and the third brake light illuminated when the brake pedal of the Motor Taxi was depressed.



Photo 21 shows the brake light (circled) for the Motor Taxi's third brake lamp illuminated upon stepping on the brake pedal.

25. Generally, the events seen in the video recording does not appear to suggest that the Motor Taxi had experienced any mechanical fault at the material time of accident.

Conclusion

26. From my physical inspections of the Motor Taxi, it appears that its engine system, steering system, braking system and transmission system were all in serviceable condition. At the time of my inspections, I did not find any evidence(s) to suggest that there was possible mechanical failure to the Motor Taxi that may have caused and/or contributed to the accident.
27. A short operational test of the Motor Taxi did not produce any sign(s) or symptom(s) to suggest that there was any abnormality to its engine system, its transmission system and its braking system.
28. The 4 tyres of the Motor Taxi were all found to be in serviceable condition. They were also observed to be sufficiently inflated for vehicular operation with remaining tread depth of approximately 5mm to 7mm.



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