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Our Ref : CI/TPD18016726/Z

09th January 2019

Fatal Accident Investigation Team

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

MECHANICAL INSPECTION REPORT OF TIPPER TRUCK XE 694L

1. We refer to your request on 13th September 2018 to conduct a physical inspection of a tipper truck bearing registration number XE 694L (herein referred to as "**Tipper Truck**"), which was involved in a fatal road traffic accident on 29th August 2018.
2. The objective of this inspection is to determine if there was any possible mechanical failure to the Tipper Truck that may have contributed to the accident.
3. Following the request, we had carried out a physical inspection of the Tipper Truck on 11th October 2018 at the premises of Traffic Police vehicle pound, 517 Airport Road Singapore 539942. We now set out below our observations and comments with respect to this inspection.

General Condition

4. The mileage of the Tipper Truck at the time of our inspection was not recorded due to the malfunctioning of the selector button to switch to the ODO meter for overall distance meter reading.
5. The Tipper Truck was observed to have sustained minor impact at its front left bumper. Only minor scratch marks was observed on the front left bumper as a result of the accident.
6. This was likely due to the consistency of the accident's case facts that on 29th August 2018; the Tipper Truck was travelling out from the compound of a company (HSC Pipeline Engineering Pte Ltd) of unit number 36. Upon reaching the exit of the unit, the Tipper Truck stopped to give way to vehicles along Sungei Kadut Avebue to clear. As the Tipper Truck moved forward, a cyclist cycled in front of the Tipper Truck from his left to right of the driver's perspective. The cyclist was hit and believed to been run over by the front right tyre of the Tipper Truck. See photo 1 to 6 below.



Photo 1 shows the mileage of the Tipper Truck at the time of our inspection was not recorded due to the malfunctioning of the selector button to switch to the ODO meter for overall distance meter reading.



Photo 2 shows a general view of the front portion of the Tipper Truck at the time of our inspection. The Tipper Truck was observed to have sustained minor impact at its front left bumper. Only stain marks was observed on the front left bumper as a result of the accident.



Photo 3 shows a general view of the front portion of the Tipper Truck at the time of our inspection. The Tipper Truck was observed to have sustained minor impact at its front left bumper. Only stain marks was observed on the front left bumper as a result of the accident.



Photo 4 shows a minor stain mark on the front left side bumper as a result of the accident.



Photo 5 shows a general view of the front right portion of the Tipper Truck at the time of our inspection. The Tipper Truck was observed to be in good condition unaffected by the accident.



Photo 6 shows a general view of the Tipper Truck's rear body at the time of our inspection. There was no damage found to the rear portion of the Tipper Truck.

Tyres and Wheel Rims

7. The 2 front tyres and 8 rear tyres of the Tipper Truck were observed to be in serviceable condition and sufficiently inflated for vehicular operation. We 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 10 tyres. The tyre brand, tyre size and remaining tread depth of the 10 tyres of the Tipper Truck were recorded as follows:-

Firenza SML68A
295/80 R22.5 (9mm)

Aeolus ADC 53
295/80 R22.5 (4mm)

Double Coin
295/80 R22.5 (4mm)



Firenza SML68A
295/80 R22.5 (9mm)

Firenza SSR 05A
295/80 R22.5 (4mm)

Double Coin
295/80 R22.5 (4mm)

8. The 10 tyres were observed to be wrapped around standard steel wheel rims that were found to be without any damages. See photo 7 – 12 below.



Photo 7 shows the condition of the front left tyre of the Tipper Truck, which was observed to be in serviceable condition with remaining tread depth of approximately 6mm. The tyre, which was wrapped around standard alloy wheel rim, was also observed to be sufficiently inflated for vehicular operation.



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



Photo 9 shows the condition of the centre left tyres of the Tipper Truck, which was observed to be in serviceable condition with remaining tread depth of approximately 3mm. The tyres, which were wrapped around standard alloy wheel rim, were also observed to be sufficiently inflated for vehicular operation.



Photo 10 shows the condition of the centre right tyres of the Tipper Truck, which were observed to be in serviceable condition with remaining tread depth of approximately 4mm.



Photo 11 shows the condition of the rear left tyres of the Tipper Truck, which was observed to be in serviceable condition with remaining tread depth of approximately 9mm. The tyres, which were wrapped around standard alloy wheel rim, were also observed to be sufficiently inflated for vehicular operation.



Photo 12 shows the condition of the rear right tyres of the Tipper Truck, which were observed to be in serviceable condition with remaining tread depth of approximately 8mm.

Engine Compartment & Operating Fluids

9. Upon examination of the Tipper Truck's engine compartment, we had observed that all the parts and components inside the engine compartment to be intact and unaffected by the accident. The brake fluid, engine oil, power steering fluid and engine coolant were all found to be of sufficient level for operating purposes. Visually, there was also no contamination found to these fluids.
10. Further examination of the engine compartment found that there was no sign(s) or indication(s) of fresh fluid leakage and/or fluid stain within the engine compartment of the Motor Lorry.
11. Our subsequent checks on the underside of the Tipper Truck also revealed no sign of fluid stain. Visually, the various undercarriage components of the Motor Lorry were all observed to be intact and without any visible damage. See photo 13 – 16 below.



Photo 13 shows a general view of the Tipper Truck's engine compartment, which was accessed by lifting the front cabin of the Tipper Truck. The various parts and components inside the engine compartment were unaffected by the accident. There was also no sign(s) or indication(s) of fresh fluid leakage and/or fluid stain within the engine.



Photo 14 shows the power steering fluid reservoir of the Tipper Truck at the time of our inspection. It was observed to be of sufficient level and without any visible contamination (arrowed).



Photo 15 shows the engine coolant reservoir of the Tipper Truck at the time of our inspection. The engine coolant was observed to be of sufficient level and without any visible contamination (arrowed).



Photo 16 shows the engine dip stick of the Tipper Truck at the time of our inspection. The engine oil was observed to be of sufficient level and without any visible contamination (circled).

Steering System & Braking System

12. The mechanical components of the Tipper Truck steering system were all found to be visually intact and undamaged. The steering wheel, steering tie rods, drive shafts and ball joints of the Tipper Truck were observed to be intact and securely attached to the front left wheel and front right wheel.
13. Static test on the steering system of the Tipper Truck also revealed no abnormality to the steering system. We did not experience any abnormal free play and/or other resistance when turning the steering wheel left and right to full lock positions. Our visual examination of the various steering components which had included the rack and pinion, tie rods, tie rod ends and ball joints had revealed that these components were all generally in good condition. See photo 17 & 18 below.



Photo 17 shows the various undercarriage components at the front left wheel of the Tipper Truck, in particular the steering tie rod end (arrowed). The various undercarriage components of the Tipper Truck were all found to be intact without any visible damage. There was also no sign of fluid stain(s) observed on the various undercarriage components.



Photo 18 shows the various undercarriage components at the front right wheel of the Tipper Truck, in particular the steering tie rod end (arrowed). The various undercarriage components of the Tipper Truck were all found to be intact without any visible damage. There was also no sign of fluid stain(s) observed on the various undercarriage components.

14. The braking system of the Tipper Truck was noted to be of a full air-assisted braking system. Briefly, in this system, compressed air is used to press onto the brake shoes (for drum brakes) or onto the brake pads (for disc brakes), through the respective braking mechanism, thus slowing the rotation of the wheels.
15. 2 numbers of air tanks in particular were observed to be also in serviceable condition. Air built up to an acceptable level which is level 9 (On the display panel) for both air tanks for operational ready status after a warming up session prior the operational test. Both air tanks were monitored for about 10 minutes for an observation of any abnormalities. Both air tanks pressure found to be normal without any drop in pressure during the course of our monitoring session. This would indicate that there was no leak of air pressure from the air braking system of the Tipper Truck. See photo 19 below.



Photo 19 shows the compressed air meters for braking system. This shows that there's no dropped of pressure. Hence, revealed that no air leakage at the time of our inspection.

16. A static brake test(s) was able to be carried at time of our inspection. This is to determine on whether there was any leakage of compressed air that could have affected the braking efficiency of the Tipper Truck. The air pipes, air tanks and connecting valves had all appeared to be in good general condition and securely fitted upon our static brake test. The static brake test was of a satisfactory result. Its brake pedal responded by releasing excessive compressed air upon stepping on the brake pedal suggesting that its braking system was in serviceable condition at the material time of accident. The brake fluids, was found to be of sufficient level for operating purposes. Visually, there was also no contamination found to these fluids.
17. Checks on the brake shoes (brake pads) at the rear wheels of the Tipper Truck revealed that the brake shoes (brake pads) were in serviceable condition with sufficient frictional material for operational purposes. In general, our visual inspection of the mechanical components of the Tipper Truck's braking system appear to suggest that its braking system was in serviceable condition at the material time of accident. See photo 20 to 22 below.



Photo 20 shows the various undercarriage components at the rear wheels of the Tipper Truck. There was no sign(s) of brake fluid leakage along the brake hoses and brake pipes.



Photo 21 shows the brake shoes (brake pads) at the rear wheels of the Tipper Truck revealed that the brake shoes (brake pads) were in serviceable condition with sufficient frictional material for operational purposes.



Photo 22 shows the air pressure tank of the Tipper Truck. It was observed to be unaffected by the accident. No air leakage was found at time of our inspection.

Electronic Safety / Warning Indicators

18. The Tipper Truck was not fitted with any electronic safety feature(s) like Anti-Brake Lock System (ABS), Supplemental Restraint System (SRS) etc. There was hence no test carried out on the functionality of these systems.

Operational Behaviour of the Motor Lorry

19. A short operational test of the Tipper Truck, to primarily determine whether there was any abnormality to its various operating systems like its engine system, its transmission system, steering system and braking system was subsequently carried out. The test was conducted by driving the Tipper Truck forward, stopping, before reversing and coming to a stop again.

20. During the operational test, the various transmission gears of the Tipper Truck were able to be engaged without any difficulty by stepping on the clutch pedal and manually shifting the gear lever. There were no abnormal sound heard and/or abnormal behaviour of the Tipper Truck'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 Tipper Truck was able to slow down and come to a complete stop upon depressing of the brake pedal. See photo 23 below.



Photo 23 shows the operational test on the Tipper Truck. It was observed to be in serviceable condition. Operational test such as moving forward, turn left & right and also braking test on the Tipper Truck was conducted successfully.

Conclusion

21. From our physical inspection of the Tipper Truck, it appears that its engine system, steering system, braking system and transmission system were all in serviceable condition. We did not find any evidence(s) to suggest that there was possible mechanical failure to the Tipper Truck that may have caused and/or contributed to the accident. This is also taking into consideration that the operational test of the Tipper Truck, which we had conducted, did not produce any sign(s) or symptom(s) to suggest that there was any abnormality to its various operating systems.
22. The 2 front tyres and 8 rear tyres fitted on the Motor Lorry were also found to be in serviceable condition. We 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 10 tyres. The 10 tyres were also observed to be sufficiently inflated for vehicular operation with remaining tread depth of approximately 3mm to 9mm each.



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