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Our Ref : CI/TPD23005774/P

20th June 2023

Fatal Accident Investigation Team

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

MECHANICAL INSPECTION REPORT OF TIPPER TRUCK WD 3581B

1. I refer to your request on 28th April 2023 to conduct a physical inspection of a Tipper Truck bearing registration number WD 3581B (herein referred to as "**Tipper Truck**"), which was involved in a road traffic accident on 23th January 2023.
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, I had carried out a physical inspection of the Tipper Truck on 6th June 2023 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.

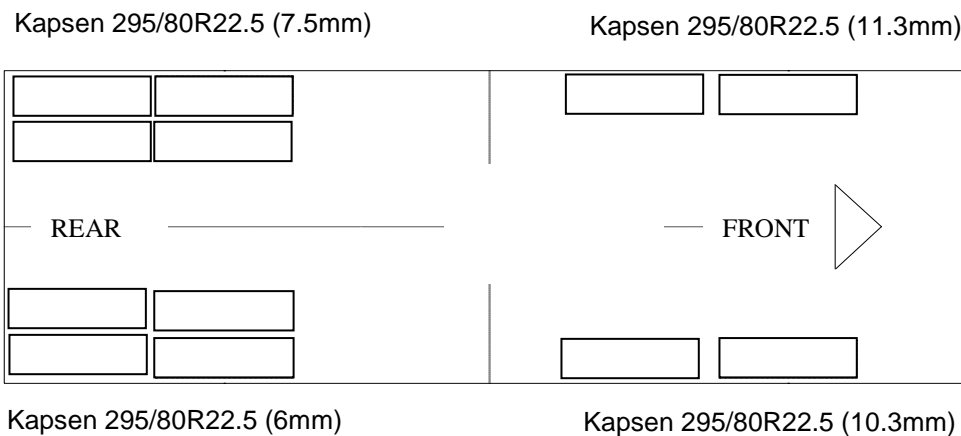
General Condition

4. The mileage of the Tipper Truck at the time of my inspection was 107,592km.
5. The Tipper Truck was observed to sustain damaged on its Tipper Truck's front portion. Its front windscreen and front bumper portion was damaged at the time of my inspection.

Tyres and Wheel Rims

6. The 4 front tyres and 8 rear tyres of the Tipper Truck were observed to be in serviceable condition and sufficiently inflated for vehicular operation. 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 12 tyres of the Tipper Truck. The tyre brand, tyre size and remaining tread depth of the 12 tyres of the Tipper Truck were recorded as follows:-

Tipper Truck



7. The 12 tyres of the Tipper Truck were observed to be wrapped around standard steel wheel rims that were found to be without any damage. See photo 1 – 11 below.



Photo 1 shows a general view of the instrument cluster of the Tipper Truck at the time of my inspection. The mileage of the Tipper Truck was 959,845km



Photo 2 shows a general view of the front body of the Tipper Truck at the time of my inspection. The Tipper Truck was observed to sustain damaged at its front portion. Its front windscreen and front bumper portion was damaged at the time of my inspection.



Photo 3 shows a general view of the front body of the Tipper Truck at the time of my inspection. The Tipper Truck was observed to sustain damaged on its front portion. Its front windscreen (circled) was damaged at the time of my inspection.



Photo 4 shows a general view of the front body of the Tipper Truck at the time of my inspection. The Tipper Truck was observed to sustain damaged on its front portion. Its front bumper (circled) was damaged at the time of my inspection.



Photo 5 shows a general view of the front right body of the Tipper Truck at the time of my inspection. The Tipper Truck was observed to be intact and unaffected by the accident.



Photo 6 shows a general view of the front left body of the Tipper Truck at the time of my inspection. The Tipper Truck was observed to be intact and unaffected by the accident.



Photo 7 shows a general view of the Tipper Truck's rear body at the time of my inspection. The Tipper Truck was observed to be intact and unaffected by the accident.



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 10.3mm. The tyre, which was wrapped around standard steel 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 12 tyres that were fitted on the Tipper Truck.



Photo 9 shows the condition of the rear right tyres 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 steel wheel rim, was also observed to be sufficiently inflated for vehicular operation.



Photo 10 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 7.5mm. The tyres, which were wrapped around standard steel wheel rim, were also observed to be sufficiently inflated for vehicular operation. There was also no damage found on all 12 steel wheel rims of the Tipper Truck.



Photo 11 shows the condition of the front left tyres of the Tipper Truck, which were observed to be in serviceable condition with remaining tread depth of approximately 11.3mm. 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 12 tyres that were fitted on the Tipper Truck.

Engine Compartment & Operating Fluids

8. Upon examination of the Tipper Truck's engine compartment, I had observed all the parts and components inside the engine compartment to be intact and unaffected by the accident. I have observed that the engine oil, the brake fluid, 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.
9. Further examination of the engine compartment revealed, there was no sign(s) or indication(s) of fresh fluid leakage and/or fluid stain within the engine compartment of the Tipper Truck.
10. My subsequent checks on the underside of the Tipper Truck also revealed no fluid stain. Visually, the various undercarriage components of the Tipper Truck were all observed to be intact and without any visible damage. See photo 12 – 17 below.



Photo 12 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 compartment



Photo 13 shows the air in the air brake cylinders of the Tipper Truck at the time of my inspection. The air in the cylinder was observed to be of sufficient level & serviceable at the time of the accident.



Photo 14 shows the engine coolant reservoir of the Tipper Truck at the time of my inspection. The engine coolant was observed to be of sufficient level (arrowed) and without any visible contamination.



Photo 15 shows the power steering fluid reservoir of the Tipper Truck at the time of my inspection. The power steering fluid was observed to be of sufficient level (arrowed) and without any visible contamination.



Photo 16 shows the engine oil dip stick of the Tipper Truck at the time of my inspection. The engine oil was observed to be of insufficient level at the time of our inspection.



Photo 17 shows the undercarriage of the Tipper Truck, at the area where the engine housing located. I observed old fluid stains on the underside of the Tipper Truck.

Steering System & Braking System

11. Static brake tests conducted on the Tipper Truck revealed no abnormality. The air 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 Tipper Truck. The braking system of the Tipper Truck was likely to be in serviceable condition at the material time. This was also taking into consideration that the air brake was of sufficient level, and also that there was no sign(s) of air leakage along the brake hoses, brake pipes and air cylinders.
12. Static test on the steering system of the Tipper Truck 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 had revealed that these components were all generally in good condition. See photo 18 - 26 below.



Photo 18 shows the brake pipe (arrowed) at the rear right wheel of the Tipper Truck. I did not observe any leakage of brake fluid at the time of my inspection of the Tipper Truck. My static tests of the Tipper Truck's braking system, along with my visual examination of the various mechanical components in the braking system, had indicated that there was no internal leakage of pressure/vacuum. Hence the braking system of the Tipper Truck was likely to be in serviceable condition at the material time of accident.



Photo 19 shows the brake pipe (arrowed) at the rear left wheel of the Tipper Truck. I did not observe any leakage of brake fluid at the time of my inspection of the Tipper Truck. My static tests of the Tipper Truck's braking system, along with my visual examination of the various mechanical components in the braking system, had indicated that there was no internal leakage of pressure/vacuum. Hence the braking system of the Tipper Truck was likely to be in serviceable condition at the material time of accident.

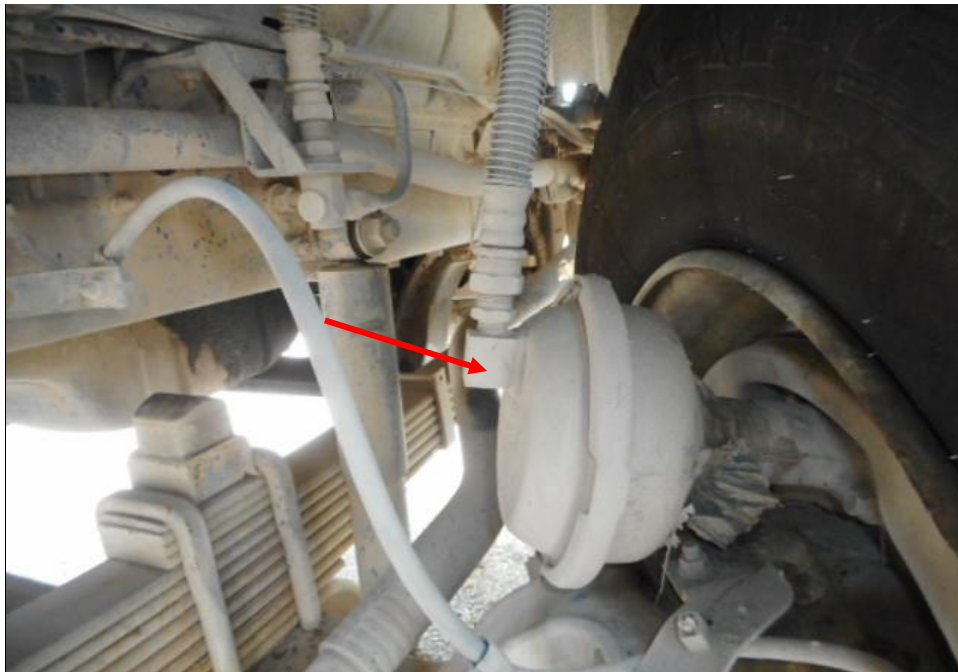


Photo 20 shows the brake pipe (arrowed) at the front right wheel of the Tipper Truck. I did not observe any leakage of brake fluid at the time of my inspection of the Tipper Truck. My static tests of the Tipper Truck's braking system, along with my visual examination of the various mechanical components in the braking system, had indicated that there was no internal leakage of pressure/vacuum. Hence the braking system of the Tipper Truck was likely to be in serviceable condition at the material time of accident.



Photo 21 shows the brake pipe (arrowed) at the front left wheel of the Tipper Truck. I did not observe any leakage of brake fluid at the time of my inspection of the Tipper Truck. My static tests of the Tipper Truck's braking system, along with my visual examination of the various mechanical components in the braking system had indicated that there was no internal leakage of pressure/vacuum. Hence the braking system of the Tipper Truck was likely to be in serviceable condition at the material time of accident.



Photo 22 shows the air brake cylinders (arrowed) at the undercarriage of the Tipper Truck. I did not observe any leakage of air brake fluid at the time of my inspection of the Tipper Truck. My static tests of the Tipper Truck's braking system, along with my visual examination of the various mechanical components in the braking system had indicated that there was no internal leakage of pressure/vacuum. Hence the braking system of the Tipper Truck was likely to be in serviceable condition at the material time of accident.



Photo 23 shows the various undercarriage components at the front right wheel of the Tipper Truck, in particular the steering tie rod end (arrowed). The various steering components were all found to be intact, suggesting that the steering system of the Tipper Truck was likely to be in serviceable condition at the material time of accident. There was also no sign of fluid stain(s) observed on the various undercarriage components.



Photo 24 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 25 shows the steering box component (arrowed) at the undercarriage of the Tipper Truck was found to be intact without any visible damage. There was also no sign of fluid stain(s) observed on the various undercarriage components.



Photo 26 shows the front left wheel of the Tipper Truck 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 full left and full right. This would suggest that the steering system of the Tipper Truck was likely to be in serviceable condition at the material time of accident.

Electronic Safety / Warning Indicators

13. The Tipper Truck's automatic self-test of the functionality of its electronic operating systems like the Anti-lock brake system (ABS) during cranking of the engine had indicated that the system 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 27 & 28 below.



Photo 27 shows the warning light for Anti-lock brake system (ABS) (arrowed) appearing on the instrument panel of the Tipper Truck during the self-test of its various electronic operating systems when its engine was cranked.



Photo 28 shows no warning lights illuminated on the instrument panel of the Motor Lorry after the engine was cranked. This would suggest that there was no abnormality to the electronic operating system of the Motor Lorry, like the ABS and etc.

Seat Belts

14. The Front right and front left seat belts of the “Tipper Truck” were tested and all the seat belts were able to be fastened securely into the respective pre-tensioners that were fitted at the sides of each seat.

Operational Behaviour of the Tipper Truck

15. A short operational test to 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.
16. 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 sounds 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 2 & 26.

Conclusion

17. From my physical inspection of the Tipper Truck, it appears that its engine system, steering system, braking system and transmission system were all in serviceable condition. I 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 I had conducted, did not produce any sign(s) or symptom(s) to suggest that there was any abnormality to its various operating systems.
18. The 4 front tyres, 8 rear tyres fitted on the Tipper Truck were 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 Tipper Truck 12 tyres. The 12 tyres of the Tipper Truck were observed to be sufficiently inflated for vehicular operation with remaining tread depth of approximately 6mm – 11.3mm.



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