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14th November 2019

Fatal Accident Investigation Team

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

MECHANICAL INSPECTION REPORT OF MOTOR TRAILER VR 3460

1. I refer to your request on 23rd October 2019 to conduct a physical inspection of a Motor Trailer bearing registration number VR 3460 (herein referred to as "**Motor Trailer**"), which was involved in a fatal road traffic accident on 27th September 2019.
2. The objective of this inspection is to determine if there was any possible mechanical failure to the Motor Trailer that may have contributed to the accident.
3. Following the request, I had carried out a physical inspection of the Motor Trailer on 13th November 2019 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 Motor Trailer at the time of my inspection was 1169265 km.
5. There was no visible damage observed on the Motor Trailer at the time of my inspection.

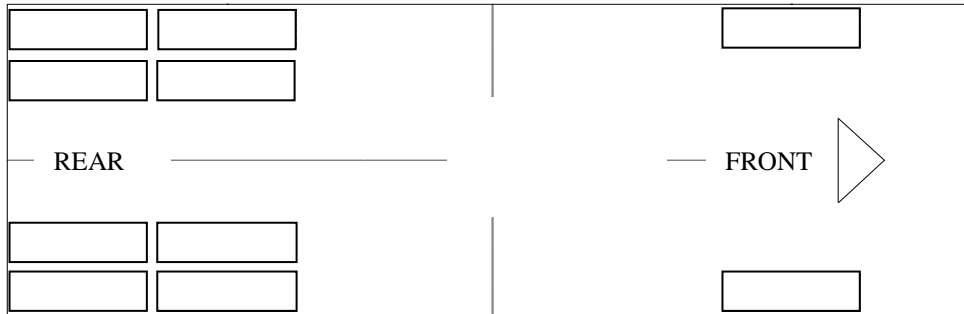
Tyres and Wheel Rims

6. The 2 front tyres and 8 rear tyres of the Motor Trailer and 12 tyres of the trailer 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 10 tyres of the Motor Trailer and the 12 tyres of the trailer. The tyre brand, tyre size and remaining tread depth of the 10 tyres of the Motor Trailer and 12 tyres of the trailer were recorded as follows:-

Motor Trailer

Nextyre 295/80 R22.5 (12.8mm)

Destone 295/80 R22.5 (12.4mm)

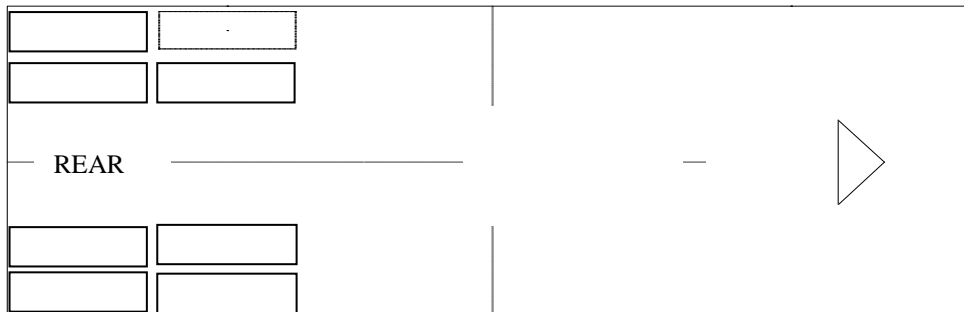


Nextyre 295/80 R22.5 (11mm)

Firestone 295/80 R22.5 (11.7mm)

Trailer

Akina 295/80 R22.5 (10.6mm)



Akina 295/80 R22.5 (12.1mm)

7. The 10 tyres of the Motor Trailer and 12 tyres of the Trailer were observed to be wrapped around standard steel wheel rims that were found to be without any damage. See photo 1 – 14 below.



Photo 1 shows a general view of the instrument cluster of the Motor Trailer at the time of my inspection. The mileage of the Motor Trailer was 1169265km



Photo 2 shows a general view of the front body of the Motor Trailer at the time of my inspection. There was no visible damage observed on the Motor Trailer.



Photo 3 shows a general view of the front right body of the Motor Trailer at the time of my inspection, observed to have been unaffected by the accident.



Photo 4 shows a general view of the front left body of the Motor Trailer at the time of my inspection, observed to have been unaffected by the accident.



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



Photo 6 shows a general view of the trailer's left body at the time of my inspection. There was no damage found to the body portion of the trailer.



Photo 7 shows a general view of the trailer's right body at the time of my inspection. There was no damage found to the body portion of the trailer.



Photo 8 shows a general view of the trailer's rear body at the time of my inspection. There was no damage found to the rear portion of the trailer.



Photo 9 shows the condition of the front right tyre of the Motor Trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 11.7 mm. 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 10 tyres that were fitted on the Motor Trailer.



Photo 10 shows the condition of the rear right tyre of the Motor Trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 11mm. The tyre, which was wrapped around standard steel wheel rim, was also observed to be sufficiently inflated for vehicular operation.



Photo 11 shows the condition of the rear left tyres of the Motor Trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 12.8mm. 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 10 steel wheel rims of the Motor Trailer.



Photo 12 shows the condition of the front left tyres of the Motor Trailer, which were observed to be in serviceable condition with remaining tread depth of approximately 12.4mm. 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 10 tyres that were fitted on the Motor Trailer.



Photo 13 shows the condition of the right tyres of the trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 12.1mm. The tyre, which was wrapped around standard steel wheel rim, was also observed to be sufficiently inflated for vehicular operation.

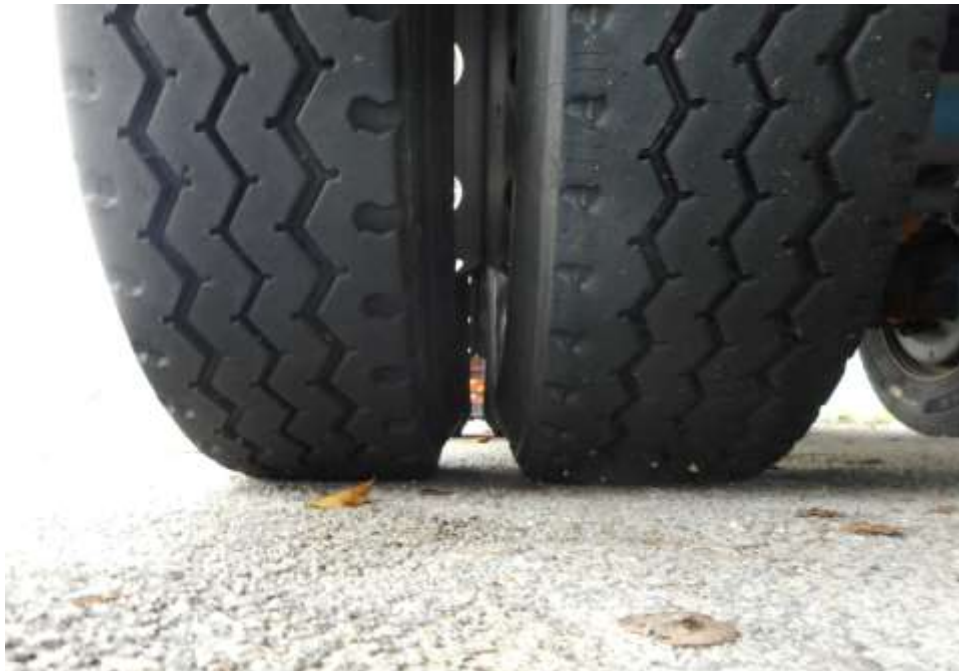


Photo 14 shows the condition of the left tyres of the trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 10.6mm. The tyres, which were wrapped around standard steel wheel rim, were also observed to be sufficiently inflated for vehicular operation. There was also no damage found on all 12 steel wheel rims of the Motor Trailer.

Engine Compartment & Operating Fluids

8. Upon examination of the Motor Trailer's engine compartment, 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, 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 Motor Trailer.
10. My subsequent checks on the underside of the Motor Trailer also revealed no fluid stain. Visually, the various undercarriage components of the Motor Trailer were all observed to be intact and without any visible damage. See photo 15 – 20 below.



Photo 15 shows a general view of the Motor Trailer's engine compartment, which was accessed by lifting the front cabin of the Motor Trailer. 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 16 shows the air in the air brake cylinders of the Motor Trailer 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 17 shows the engine coolant reservoir of the Motor Trailer at the time of my inspection. The engine coolant was observed to be of sufficient level (arrowed) and without any visible contamination.



Photo 18 shows the power steering fluid reservoir of the Motor Trailer at the time of my inspection. The power steering fluid was observed to be of sufficient level and without any visible contamination.



Photo 19 shows the engine oil dip stick of the Motor Trailer at the time of my inspection. The engine oil was observed to be of sufficient level and without any visible contamination.



Photo 20 shows the undercarriage of the Motor Trailer, at the area where the engine housing located. I did not find any sign(s) or indication(s) of fluid leak and/or fluid stain(s) on the underside of the Motor Trailer.

Steering System & Braking System

11. Static brake tests conducted on the Motor Trailer 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 Motor Trailer. The braking system of the Motor Trailer 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 Motor Trailer 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 21 - 28 below.



Photo 21 shows the brake pipe (arrowed) at the rear left and right wheel of the Motor Trailer. I did not observe any leakage of brake fluid at the time of my inspection of the Motor Trailer. My static tests of the Motor Trailer'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 Motor Trailer was likely to be in serviceable condition at the material time of accident.



Photo 22 shows the brake pipe (arrowed) at the front right wheel of the Motor Trailer. I did not observe any leakage of brake fluid at the time of my inspection of the Motor Trailer. My static tests of the Motor Trailer'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 Motor Trailer was likely to be in serviceable condition at the material time of accident.



Photo 23 shows the brake pipe (arrowed) at the front left wheel of the Motor Trailer. I did not observe any leakage of brake fluid at the time of my inspection of the Motor Trailer. My static tests of the Motor Trailer'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 Motor Trailer was likely to be in serviceable condition at the material time of accident.

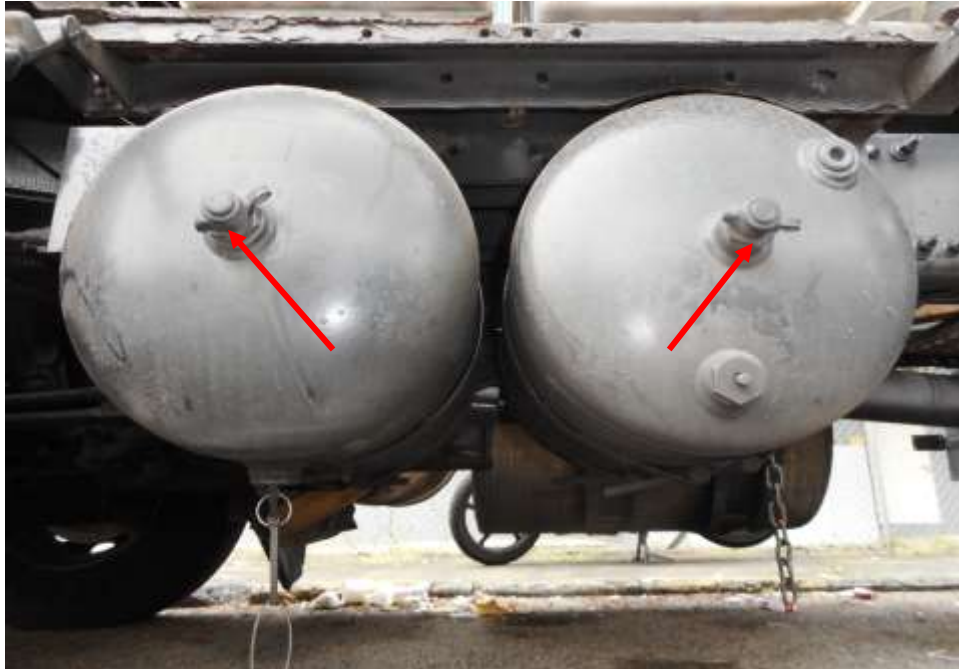


Photo 24 shows the air brake cylinders (arrowed) at the undercarriage of the Motor Trailer. I did not observe any leakage of air brake fluid at the time of my inspection of the Motor Trailer. My static tests of the Motor Trailer's braking system, along with my visual examination of the various mechanical components in the braking system had indicated that there was no internal leakage of pressure/vacuum. Hence the braking system of the Motor Trailer was likely to be in serviceable condition at the material time of accident.



Photo 25 shows the various undercarriage components at the front right wheel of the Motor Trailer, 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 Motor Trailer 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 26 shows the various undercarriage components at the front left wheel of the Motor Trailer, in particular the steering tie rod end (arrowed). The various undercarriage components of the Motor Trailer 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 27 shows the steering box component (arrowed) at the undercarriage of the Motor Trailer 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 28 shows the front left wheel of the Motor Trailer turned to its full right. 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 Motor Trailer was likely to be in serviceable condition at the material time of accident.

Electronic Safety / Warning Indicators

13. The Motor Trailer automatic self-test of the functionality of its various electronic operating systems like the Anti-Lock Brake System (ABS) 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 29 & 30.



Photo 29 shows the warning light for Anti-Lock Brake System (ABS) (arrowed) appearing on the instrument panel of the Motor Trailer during the self-test of its various electronic operating systems when its engine was cranked.



Photo 30 shows the ABS warning lights illuminated on the instrument panel of the Motor Trailer after the engine was cranked. This would suggest that there was an electrical fault to the ABS systems of the Motor Trailer.

Operational Behaviour of the Motor Trailer

14. A short operational test to the Motor Trailer, 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 Motor Trailer forward, stopping, before reversing and coming to a stop again.
15. During the operational test, the various transmission gears of the Motor Trailer 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 Motor Trailer'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 Trailer was able to slow down and come to a complete stop upon depressing of the brake pedal. See photo 2 & 28.

Conclusion

16. From my physical inspection of the Motor Trailer, 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 Motor Trailer that may have caused and/or contributed to the accident. This is also taking into consideration that the operational test of the Motor Trailer, 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.
17. The 2 front tyres, 8 rear tyres fitted on the Motor Trailer and the 12 tyres of the trailer 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 Motor Trailer 10 tyres and the 12 tyres of the trailer. The 10 tyres of the Motor Trailer and the 12 tyres of the trailer were also observed to be sufficiently inflated for vehicular operation with remaining tread depth of approximately 11mm – 12.8mm. & 10.6mm – 12.1mm.

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