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Your Ref: TP/IP/77337/2019 16th March 2020
Our Ref : CI/TPD20001940/P

Fatal Accident Investigation Team
Traffic Police Department
Singapore Police Force
10 Ubi Avenue 3
Singapore 408865

MECHANICAL INSPECTION REPORT OF MOTOR TRAILER CDC 8018

1. I refer to your request on 3rd February 2020 to conduct a physical inspection of a Motor Trailer bearing registration number CDC 8018 (herein referred to as "**Motor Trailer**"), which was involved in a fatal road traffic accident on 14th December 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 March 2020 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 14,897km.

5. There was no visible damage observed on Motor Trailer at the time of my inspection.

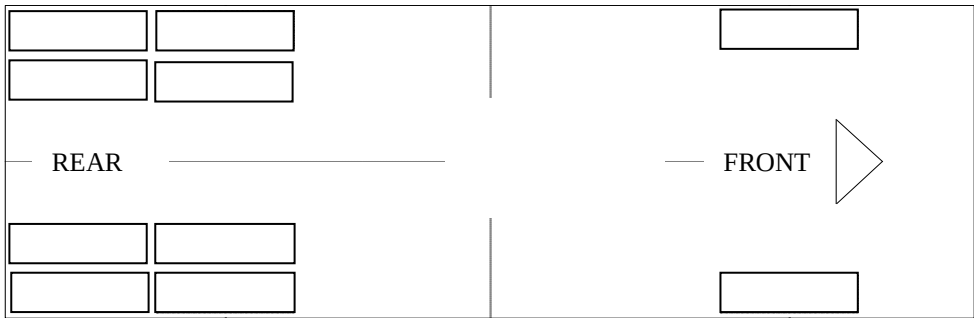
Tyres and Wheel Rims

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

Aufine 295/80 R22.5 (10.2mm)

Aufine 295/80 R22.5 (9.7mm)

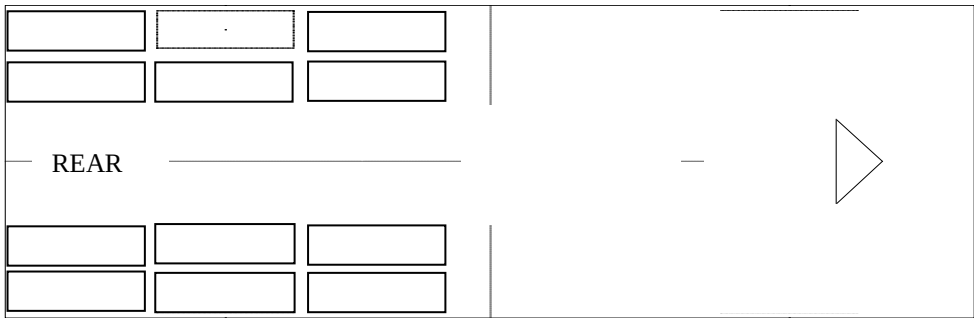


Aufine 295/80 R22.5 (12.3mm)

Aufine 295/80 R22.5 (9.7mm)

Trailer

Suretrac 295/80 R22.5 (12.5mm)



Suretrac 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 – 15 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 14,897km

Photo 2 shows a general view of the front body of the Motor Trailer at the time of my inspection. The Motor Trailer was observed to be intact and unaffected by the accident.

Photo 3 shows a general view of the front right body of the Motor Trailer at the time of my inspection. The Motor Trailer was observed to be intact and 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. The Motor Trailer was observed to be intact and unaffected by the accident.

Photo 5 shows a general view of the Motor Trailer's rear body at the time of my inspection. The Motor Trailer was observed to be intact and unaffected by the accident.

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

Photo 7 shows a general view of the trailer's left body at the time of my inspection. The Motor Trailer was observed to be intact and unaffected by the accident.

Photo 8 shows a general view of the trailer's right body at the time of my inspection. The Motor Trailer was observed to be intact and unaffected by the accident.

Photo 9 shows a general view of the trailer's rear body at the time of my inspection. The Motor Trailer was observed to be intact.

Photo 10 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 9.7 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 22 tyres that were fitted on the Motor Trailer.

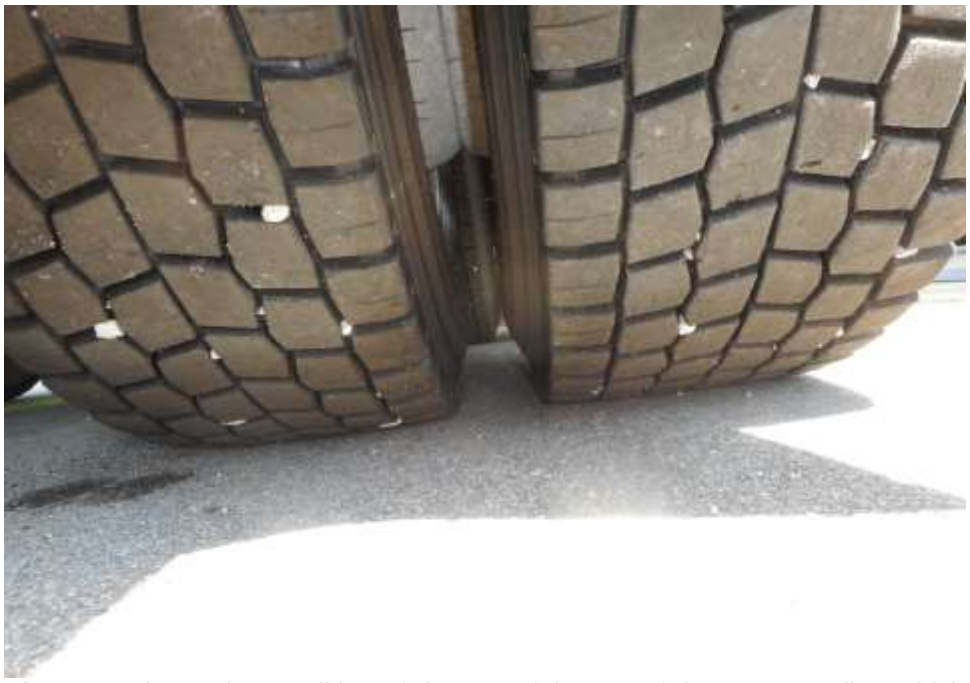


Photo 11 shows the condition of the rear right tyre of the Motor Trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 12.3mm. The tyre, which was wrapped around standard steel wheel rim, was also observed to be sufficiently inflated for vehicular operation.

Photo 12 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 10.2mm. 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 6 steel wheel rims of the Motor Trailer.

Photo 13 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 9.7mm. 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 6 tyres that were fitted on the Motor Trailer.

Photo 14 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 15 shows the condition of the left tyres of the trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 12.5mm. 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 22 steel wheel rims of the Motor Trailer.

Engine Compartment & Operating Fluids

8. The examination of the Motor Trailer's engine compartment, was not able to be conducted to the engine oil, power steering fluid and engine coolant as the front cabin above the engine could not be lifted up despite multiple attempts, due a fault in the lifting mechanism. However, I was able to observed the reading of the air brake cylinder on the instrument panel of the Motor Trailer to be of sufficient level for operating purposes.

9. 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 16 – 18 below.

Photo 16 shows the attempt to lifting the front cabin of Motor Trailer's to above engine compartment, however the front cabin could not lift due to a fault in the lifting mechanism.

Photo 17 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 18 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, or fluid stain(s) was observed on the underside of the Motor Trailer.

Steering System & Braking System

10. 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.

11. 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 19 - 26 below.

Photo 19 shows the brake pipe (arrowed) at the rear 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 20 shows the brake pipe (arrowed) at the rear 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.

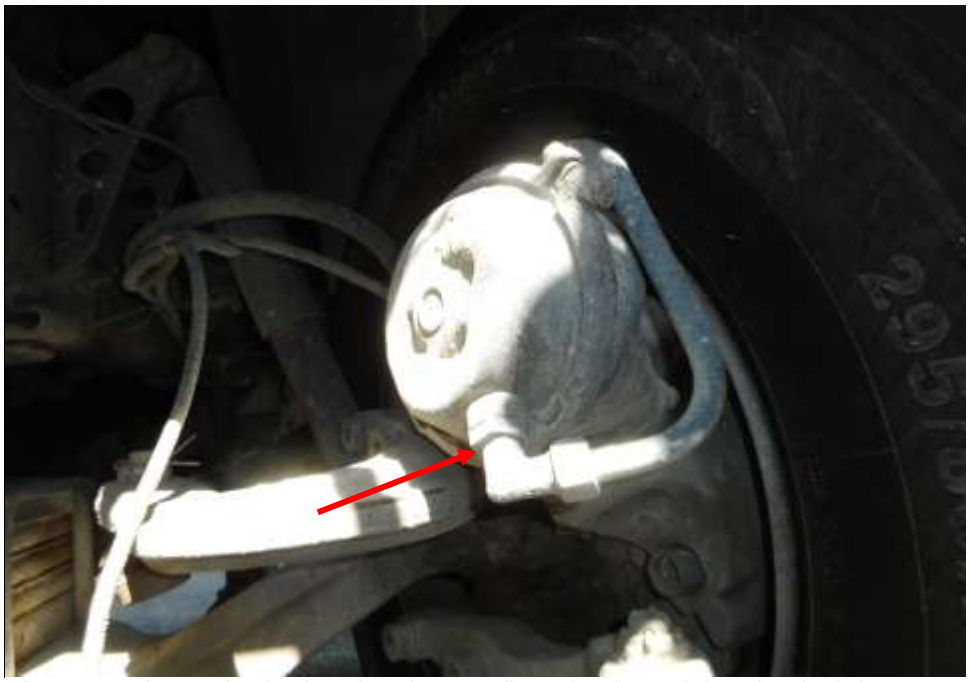


Photo 21 shows the brake pipe (arrowed) at the front right wheel of the Motor Trailer. I did not observe any leakage of brake fluid at the time of my inspection of the Motor Trailer. My static tests of the Motor Trailer's braking system, along with my visual examination of the various mechanical components 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 22 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 23 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 24 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.

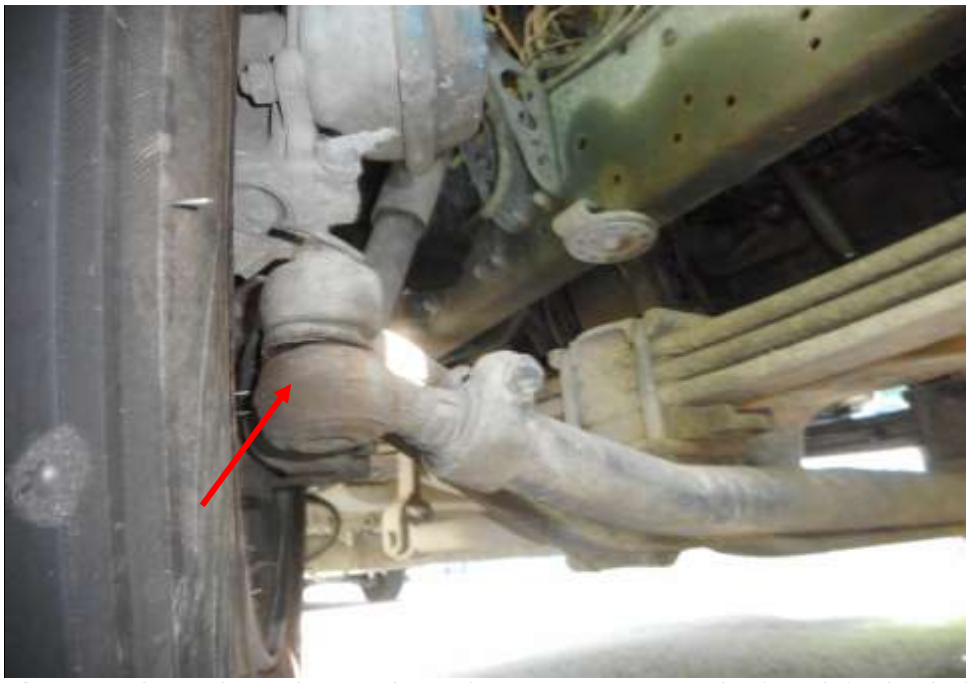


Photo 25 shows the various undercarriage components at the front left wheel of the Motor Trailer, in particular the steering tie rod end (arrowed). The various undercarriage components of the Motor Trailer were all found to be intact without any visible damage. There was also no sign of fluid stain(s) observed on the various undercarriage components.

Photo 26 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 27 shows the front right wheel of the Motor Trailer 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 Motor Trailer was likely to be in serviceable condition at the material time of accident.

Electronic Safety / Warning Indicators

12. The Motor Trailer automatic self-test of the functionality of its various electronic operating systems like the Anti-Lock Brake System (ABS) and Traction Control (TC) during cranking of the engine had remained lighted on the instrument panel after the self-test this due a fault in the electrical system of the Motor Trailer See photo 28 & 29 below.

Photo 20 shows the warning light for Anti-Lock Brake System (ABS) and Traction Control (TC) 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 21 shows warning lights of the Anti-Lock Brake System (ABS) and Traction Control (TC) (arrowed) remained illuminated on the instrument panel of the Motor Trailer after the engine was cranked. This due a fault in the electrical system of the Motor Trailer.

Operational Behaviour of the Motor Trailer

13. 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.

14. During the operational test, the various transmission gears of the Motor Trailer were able to be engage 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 & 27.

Conclusion

15. 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.

16. 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 9.7mm – 12.3mm. & 12.1mm – 12.5mm.

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