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Our Ref : CI/TPD20004861/P

20th July 2020

Fatal Accident Investigation Team

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

MECHANICAL INSPECTION REPORT OF MINI BUS PC 8744D

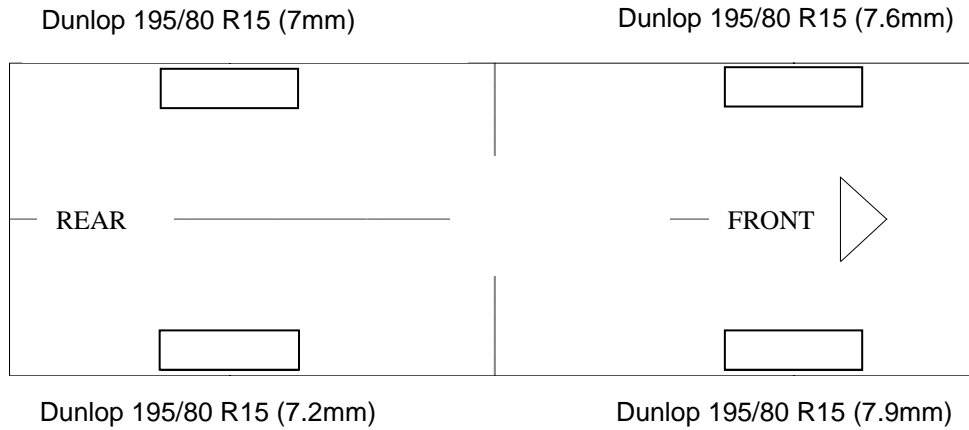
1. I refer to your request on 2nd April 2020 to conduct a physical inspection of a Mini Bus bearing registration number PC 8744D (herein referred to as “**Mini Bus**”), which was involved in a fatal road traffic accident.
2. The objective of this inspection is to determine if there was any possible mechanical failure to the Mini Bus that may have contributed to the accident.
3. Following the request, I had carried out a physical inspection of the Mini Bus on 17th July 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 Mini Bus at the time of my inspection was 17,535km.
5. The Mini Bus appeared to have sustained damage at its frontal portion. Its front windscreen, front bumper, front bonnet, left rear view mirror and front left head lamp were damaged at the time of my inspection.

Tyres and Wheel Rims

6. The 4 tyres of the Mini Bus 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 4 tyres. The tyre brand, tyre size and remaining tread depth of the 4 tyres of the Mini Bus were recorded as follows:-



7. The 4 tyres 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 Mini Bus at the time of my inspection. The mileage of the Mini Bus was 17,535km

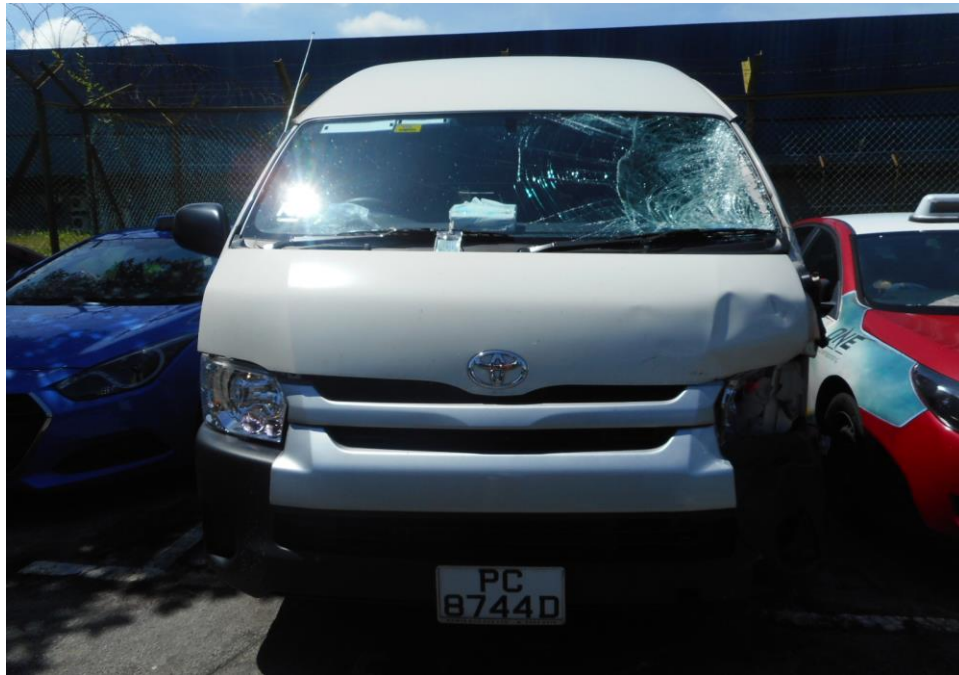


Photo 2 shows a general view of the Mini Bus's frontal portion at the time of my inspection. It appeared to have sustained damage at its frontal portion. Its front windscreen, front bumper, front bonnet, left rear view mirror and front left head lamp were damage at the time of my inspection.

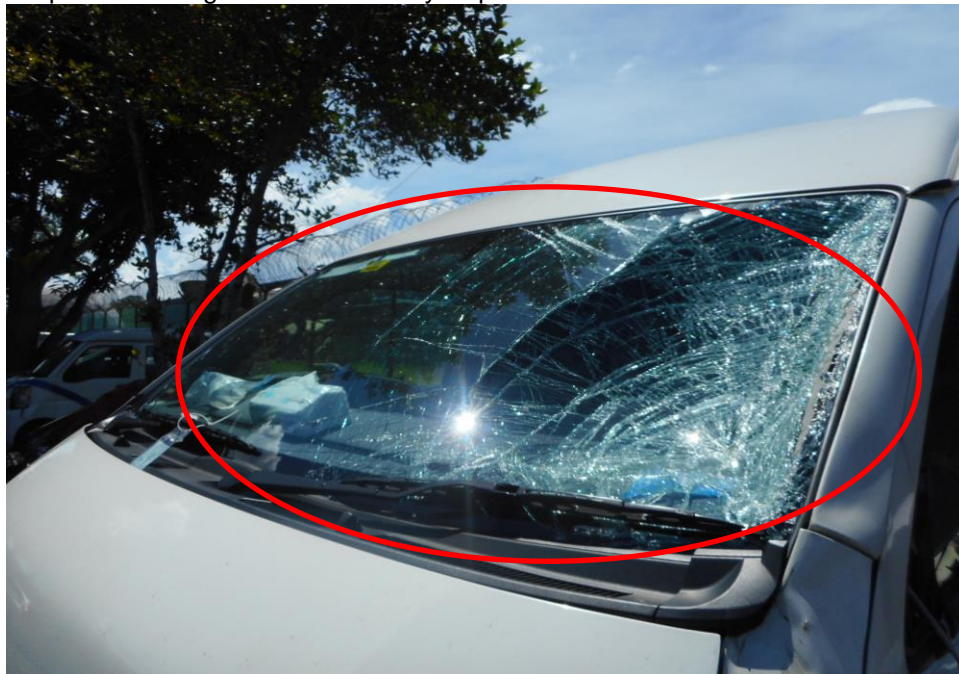


Photo 3 shows a close up view of the Mini Bus's frontal portion at the time of my inspection. It appeared to have sustained damage at its frontal portion. Its front windscreen (circled) were damage at the time of my inspection.



Photo 4 shows a close up view of the Mini Bus's frontal portion at the time of my inspection. It appeared to have sustained damage at its frontal portion. Its front bonnet (red circle), front bumper (yellow arrow), left rear view mirror (red arrow) and front left head lamp (yellow circle) were damage at the time of my inspection.



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



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



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



Photo 8 shows the condition of the front right tyre of the Mini Bus, which was observed to be in serviceable condition with remaining tread depth of approximately 7.9mm. 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 4 tyres that were fitted on the Mini Bus.



Photo 9 shows the condition of the rear right tyre of the Mini Bus, which was observed to be in serviceable condition with remaining tread depth of approximately 7.2mm. The tyre, which was wrapped around standard steel wheel rim, it was observed to be sufficiently inflated for vehicular operation.



Photo 10 shows the condition of the rear left tyres of the Mini Bus, which was observed to be in serviceable condition with remaining tread depth of approximately 7mm. 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 4 steel wheel rims of the Mini Bus.



Photo 11 shows the condition of the rear right tyres of the Mini Bus, which were observed to be in serviceable condition with remaining, tread depth of approximately 7.6mm. 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 4 tyres that were fitted on the Mini Bus.

Engine Compartment & Operating Fluids

8. Upon examination of the Mini Bus'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 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 Mini Bus.
10. My subsequent checks on the underside of the Mini Bus also revealed no fluid stain. Visually, the various undercarriage components of the Mini Bus were all observed to be intact and without any visible damage. See photo 12 – 17 below.



Photo 12 shows a general view of the Mini Bus's engine compartment, which was accessed by lifting the front cabin of the Mini Bus. 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 brake fluid reservoir of the Mini Bus at the time of my inspection. The brake fluid was observed to be of sufficient level (arrowed) and without any visible contamination.



Photo 14 shows the engine coolant reservoir of the Mini Bus at the time of my inspection. The engine coolant was observed to be of sufficient level and without any visible contamination.



Photo 15 shows the engine oil dip stick of the Mini Bus at the time of my inspection. The engine oil was observed to be of sufficient level and without any visible contamination.



Photo 16 shows the power steering fluid of the Mini Bus at the time of my inspection. The power steering fluid was observed to be of sufficient level (arrowed) and without any visible contamination.



Photo 17 shows the undercarriage of the Mini Bus, at the area where the engine housing and transmission housing are located. . I did not find any sign(s) or indication(s) of fluid leak and/or fluid stain(s) on the underside of the Mini Bus.

Steering System & Braking System

11. Static brake tests conducted on the Mini Bus 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 Mini Bus. The braking system of the Mini Bus was likely to be in serviceable condition at the material time. This was also 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.
12. Static test on the steering system of the Mini Bus 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 - 24 below.



Photo 18 shows the various undercarriage components at the front right wheel of the Mini Bus, 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 Mini Bus 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 19 shows the various undercarriage components at the front left wheel of the Mini Bus, in particular the steering tie rod end (arrowed). The various undercarriage components of the Mini Bus 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 20 shows the brake pipe (arrowed) at the rear right wheel of the Mini Bus. I did not observe any leakage of brake fluid at the time of my inspection of the Mini Bus. My static tests of the Mini Bus'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 Mini Bus was likely to be in serviceable condition at the material time of accident.



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

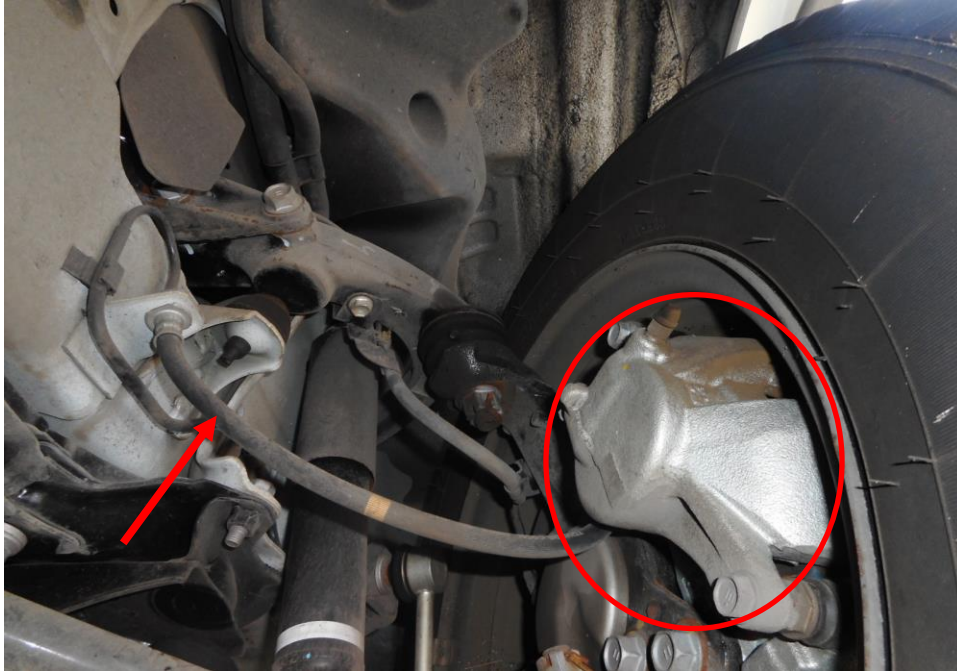


Photo 22 shows the brake hose/pipe (arrowed) at the front right wheel of the Mini Bus. No leakage of brake fluid was observed. Visual examination of the various components of the braking system like the brake caliper (circled), brake booster, brake pedal etc had revealed all to be intact and without visible damage at the time of accident. There was also no sign of fluid stain(s) observed on the various undercarriage components.



Photo 23 shows the brake hose/pipe (arrowed) at the front left wheel of the Mini Bus. No leakage of brake fluid was 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 at the time of accident. There was also no sign of fluid stain(s) observed on the various undercarriage components.



Photo 24 shows the front right wheel of the Mini Bus 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 Mini Bus was likely to be in serviceable condition at the material time of accident.

Electronic Safety / Warning Indicators

13. Mini Bus's automatic self-test of the functionality of its electronic operating systems like the Anti-Lock Brake System (ABS) and Supplemental Restraint System (SRS) 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. However the Traction Control (TC) light remained illuminated on, likely caused by the result of the accident. System See photo 25 & 26 below.



Photo 24 shows the warning light for Anti-Lock Brake System (ABS) and Supplemental Restraint System (SRS) and Traction Control System (TC) (arrowed) appearing on the instrument panel of the Mini Bus during the self-test of its various electronic operating systems when its engine was cranked.



Photo 25 shows no warning lights illuminated on the instrument panel of the Mini Bus after the engine was cranked. This would suggest that there was no abnormality to the electronic operating system of the Mini Bus, like the ABS and SRS etc. However the Traction Control System (TC) light remained illuminated on likely caused by the result of the accident.

Seat Belts

14. The Front right and front left seat belts of the "Mini Bus" 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 Mini Bus

15. A short operational test of the Mini Bus, 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 Mini Bus forward, stopping, before reversing and coming to a stop again.
16. During the operational test, the various transmission gears of the Mini Bus 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 Mini Bus'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 Mini Bus was able to slow down and come to a complete stop upon depressing of the brake pedal. Refer to photo 2 & 24

Conclusion

17. From my physical inspection of the Mini Bus, 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 Mini Bus that may have caused and/or contributed to the accident. This is also taking into consideration that the operational test of the Mini Bus, 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 tyres fitted on the Mini Bus 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 4 tyres. The 4 tyres were also observed to be sufficiently inflated for vehicular operation with remaining tread depth of approximately 7mm – 7.9 mm.

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