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Your Ref: TP/IP/10579/2019 25th July 2019
Our Ref : CI/TPD19008270/P

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

MECHANICAL INSPECTION REPORT OF MOTOR BUS SBS 7637T

1. I refer to your request on 29th April 2019 to conduct a physical inspection of a motor Bus bearing registration number SBS 7637T (herein referred to as "**Motor Bus**"), which was involved in a fatal road traffic accident on 21st February 2019.

2. The objective of this inspection is to determine if there was any possible mechanical failure to the Motor Bus that may have contributed to the accident.

3. Following the request, I had carried out a physical inspection of the Motor Bus on 23rd July 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.

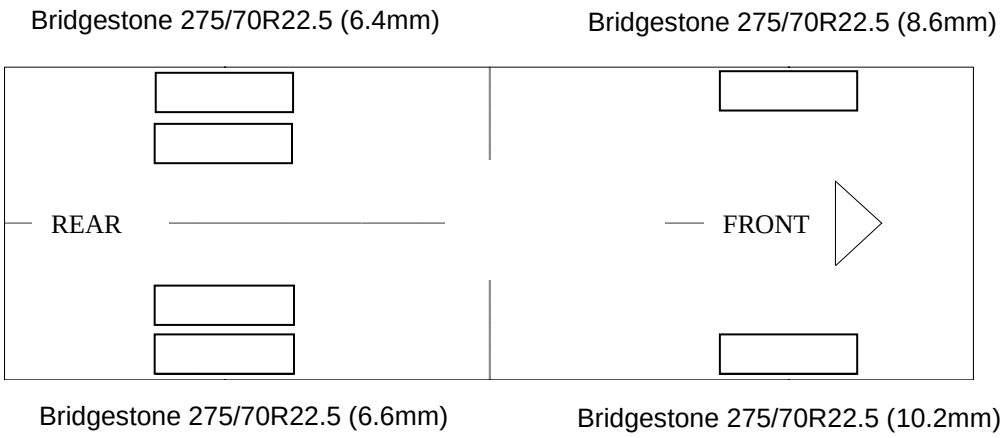
General Condition

4. The mileage of the Motor Bus at the time of my inspection was 543,623km.

5. The Motor Bus did not appear to sustain any visible damage at the time of my inspection.

Tyres and Wheel Rims

6. The 2 front tyres and 4 rear tyres of the Motor 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 6 tyres. The tyre brand, tyre size and remaining tread depth of the 6 tyres of the Motor Bus were recorded as follows:-



7. The 6 tyres were observed to be wrapped around standard steel wheel rims that were found to be without any damage. See photo 1 – 9 below.

Photo 1 shows a general view of the instrument cluster of the Motor Bus at the time of my inspection. The mileage of the Motor Bus was 543,623km

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

Photo 3 shows a general view of the right body of the Motor Bus at the time of my inspection. The Motor Bus was observed to be in good general condition and unaffected by the accident.

Photo 4 shows a general view of the left body of the Motor Bus at the time of my inspection. The Motor Bus was observed to be in good general condition and unaffected to by the accident.

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

Photo 6 shows the condition of the front right tyre of the Motor Bus, which was observed to be in serviceable condition with remaining tread depth of approximately 10.2 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 6 tyres that were fitted on the Motor Bus.

Photo 7 shows the condition of the rear right tyre of the Motor Bus, which was observed to be in serviceable condition with remaining tread depth of approximately 6.6mm. The tyre, which was wrapped around standard steel wheel rim, was also observed to be sufficiently inflated for vehicular operation.

Photo 8 shows the condition of the rear left tyres of the Motor Bus, which was observed to be in serviceable condition with remaining tread depth of approximately 6.4mm. 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 Bus.

Photo 9 shows the condition of the front left tyres of the Motor Bus, which were observed to be in serviceable condition with remaining tread depth of approximately 8.6mm. 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 6 tyres that were fitted on the Motor Bus.

Engine Compartment & Operating Fluids

8. Upon examination of the Motor 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, 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 Bus.

10. My subsequent checks on the underside of the Motor Bus revealed that the undercarriage components and the air brake components was damaged which caused an air leak to the system as impact marks was found undercarriage due to the towing process of the Motor Bus from the accident scene to the Traffic Police Vehicle Pound. See photo 10 – 17 below.

Photo 10 shows a general view of the Motor Bus's engine compartment, which was accessed by lifting the front cabin of the Motor 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 11 shows the air readings from the air brake cylinders of the Motor Bus at the time of my inspection. The air in the cylinder (arrowed) was observed to be of insufficient level at the time of my inspection as damage to the air brake hoses and as components was found which caused an air leak, due to the towing process of the Motor Bus.

Photo 12 shows undercarriage of the Motor Bus at the time of my inspection. The hoses and the components of the air brakes (arrowed) were observed to been damaged and dislodged from the Motor Bus at the time of my inspection due to the towing process of the Motor Bus.

Photo 13 shows undercarriage of the Motor Bus at the time of my inspection. The undercarriage components of Motor Bus (arrowed) was observed to have received impact marks and damaged at the time of my inspection due to the towing process of the Motor Bus.

Photo 14 shows undercarriage of the Motor Bus at the time of my inspection. The undercarriage components of Motor Bus (arrowed) was observed to have received impact marks and damaged at the time of my inspection due to the towing process of the Motor Bus.

Photo 15 shows the engine coolant reservoir of the Motor Bus at the time of my inspection. The engine coolant was observed to be of sufficient level and without any visible contamination.

Photo 16 shows the power steering fluid reservoir of the Motor 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 engine oil dip stick of the Motor Bus at the time of my inspection. The engine oil was observed to be of sufficient level and without any visible contamination.

Steering System & Braking System

11. Static brake tests could not be conducted on the Motor as because there was damage to the air brake hoses and its components which caused an air leak to the bus air brake system due to the towing process of the Motor Bus. Refer to photo 11 – 14

12. The rear undercarriage components and rear braking systems of the Motor Bus could not be visually inspected due to the Motor Bus height lifter system (unable to operate) as it uses the air from the air brake cylinder to lift, which was damaged in the towing process of the Motor Bus. However the visual inspection of the front brake components revealed to be intact.

13. Static test on the steering system of the Motor 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 - 22 below.

Photo 18 shows the brake pipe (arrowed) at the front right wheel of the Motor Bus was observed to be intact at the time of my inspection.

Photo 19 shows the brake pipe (arrowed) at the front left wheel of the Motor Bus was observed to be intact at the time of my inspection.

Photo 20 shows the various undercarriage components at the front left wheel of the Motor Bus, in particular the steering tie rod end (arrowed). The various undercarriage components of the Motor 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.

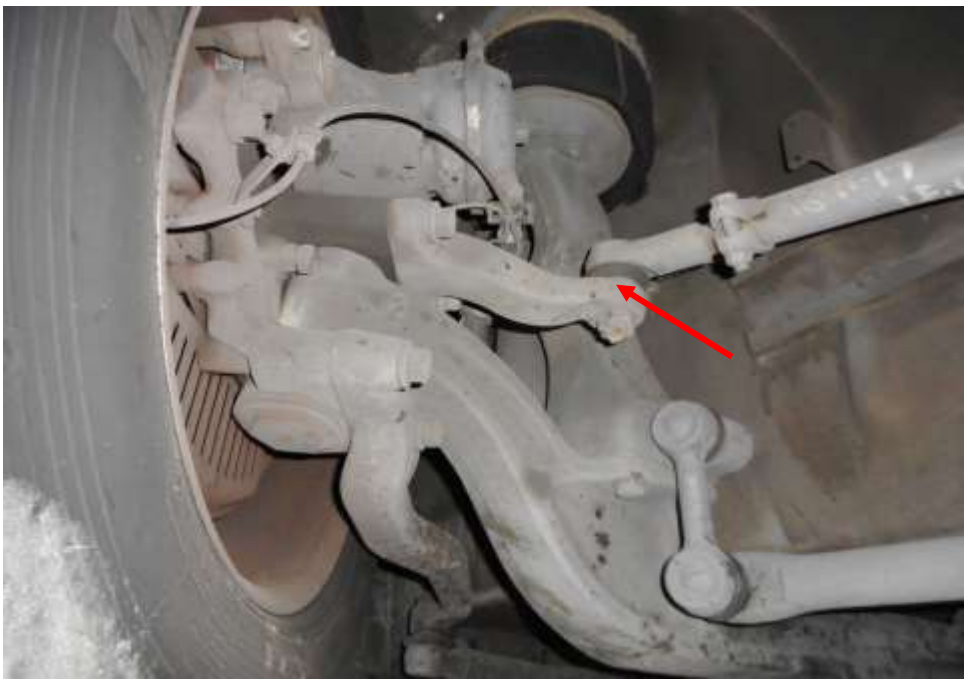


Photo 21 shows the various undercarriage components at the front right wheel of the Motor Bus, in particular the steering tie rod end (arrowed). The various steering components were all found to be intact, suggesting that the steering system of the Motor Bus was likely to be in serviceable condition at the material time of accident. There was also no sign of fluid stain(s) observed on the various undercarriage components.

Photo 22 shows the steering box component (arrowed) at the undercarriage of the Motor Bus was found to be intact without any visible damage. There was also no sign of fluid stain(s) observed on the various undercarriage components.

Electronic Safety / Warning Indicators

14. The Motor Bus 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 these systems were in working condition and without abnormality. See photo 23 & 24.

Photo 23 shows the warning light for Anti-Lock Brake System (ABS) appearing on the instrument panel of the Motor Bus during the self-test of its various electronic operating systems when its engine was cranked.

Photo 24 shows no warning lights illuminated on the instrument panel of the Motor Bus after the engine was cranked. This would suggest that there was no abnormality to the various electronic operating systems of the Motor Bus, like the ABS.

Operational Behaviour of the Motor Bus

15. Operational test to primarily determine whether there was any abnormality to the engine system, transmission system and braking system of the Motor Bus could not be conducted given the extent of damage that it had sustained (undercarriage components air brake system affected).

Conclusion

16. For this particular case, I was unable to determine whether there was any possible mechanical failure to the Motor Bus that may have contributed to the accident. The extent of damage that it had sustained had prevented me from carrying out any operational test(s) and/or static test(s) to its engine system, transmission system, and suspension system. However static test conducted to its steering system revealed no abnormality and was likely to be in serviceable condition at the material time.

17. The 2 front tyres and 4 rear tyres fitted on the Motor 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 6 tyres. The 6 tyres were also observed to be sufficiently inflated for vehicular operation with remaining tread depth of approximately 6.4mm – 10.2mm.

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