



Your Ref: TP/IP/60337/2017
Our Ref : CI/TPD18001963/Z

27th February 2018

Fatal Accident Investigation Team

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

MECHANICAL INSPECTION REPORT OF MOTOR BUS SBS 3802J

1. We refer to your request on 05th February 2018 to conduct a physical inspection of a motor bus bearing registration number SBS 3802J (herein referred to as "**Motor Bus**"), which was involved in a fatal road traffic accident on 08th November 2017.
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, we had carried out a physical inspection of the Motor Bus on 26th February 2018 at the premises of Traffic Police vehicle pound, 517 Airport Road Singapore 539942. We now set out below our observations and comments with respect to this inspection.

General Condition

4. The mileage of the Motor Bus at the time of our inspection was not recorded due to a flat battery.
5. The Motor Bus was observed to have sustained relatively minor impact damage at its front left body. Its front left windshield was observed to be cracked; its front left lower bumper was observed to be misaligned likely due to the accident's impact.
6. The damages were consistent with the accidents case fact that the Motor Bus collided with a pedestrian onto its frontal portion hence sustained with such damages mentioned above. See photo 1 to 6 below.



Photo 1 shows a general view of the front body of the Motor Bus at the time of our inspection. The Motor Bus was observed to have sustained relatively minor damage at its front body. Its windshield was observed to be cracked.



Photo 2 shows a general view of the front right body of the Motor Bus at the time of our inspection. The Motor Bus was observed to have sustained relatively minor damage at its front body. Its windshield was observed to be cracked.



Photo 3 shows a general view of the front left body of the Motor Bus at the time of our inspection. The Motor Bus was observed to have sustained relatively minor damage at its front body. Its windshield was observed to be cracked.



Photo 4 shows a general view of the Motor Bus's rear right body at the time of our inspection. There was no impact damage found at the rear portion of the Motor Bus.



Photo 5 shows a close-up view of the Motor Bus's windshield. It was observed to be cracked likely due to the accident's impact.



Photo 6 shows a close-up view of the Motor Bus's left hand lower bumper. It was observed to be misaligned likely due to the accident's impact.

Tyres and Wheel Rims

7. The 8 tyres fitted on the Motor Bus were all observed to be in serviceable condition and sufficiently inflated for vehicular operation. We 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 8 tyres. The tyre brand, tyre size and remaining tread depth of the Motor Bus's 8 tyres were recorded as follows:-

Bridgestone R192 275/70 R22.5 (4mm)		Bridgestone R192 275/70 R22.5 (15mm)	Bridgestone R192 275/70 R22.5 (18mm)
REAR			
			
			FRONT 
			
Bridgestone R192 275/70 R22.5 (3mm)		Bridgestone R192 275/70 R22.5 (13mm)	Bridgestone R192 275/70 R22.5 (13mm)

8. The 8 tyres were observed to be wrapped around standard steel wheel rims that were found to be without any damage. See photo 7 – 12 below.



Photo 7 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 13mm.



Photo 8 shows the condition of the front left tyre of the Motor Bus, which was observed to be in serviceable condition with remaining tread depth of approximately 18mm.



Photo 9 shows the condition of the rear right tyres (centre axle) of the Motor Bus, which were observed to be in serviceable condition with remaining tread depth of approximately 13mm.



Photo 10 shows the condition of the rear left tyres (centre axle) of the Motor Bus, which were observed to be in serviceable condition with remaining tread depth of approximately 15mm. The tyres, which were wrapped around standard alloy wheel rims, were also observed to be sufficiently inflated for vehicular operation.



Photo 11 shows the condition of the rear right tyres of the Motor Bus, which were observed to be in serviceable condition with remaining tread depth of approximately 3mm. The tyres, which were wrapped around standard alloy wheels rims, were also observed to be sufficiently inflated for vehicular operation.



Photo 12 shows the condition of the rear left tyres (centre axle) of the Motor Bus, which were observed to be in serviceable condition with remaining tread depth of approximately 4mm. The tyres, which were wrapped around standard alloy wheel rims, were also observed to be sufficiently inflated for vehicular operation.

Engine Compartment & Operating Fluids

9. Upon examination of the engine compartment of the Motor Bus, we had observed all the parts and components inside the engine compartment to be intact and unaffected by the accident. The engine oil and steering fluid were all found to be of sufficient level for operating purposes. Visually, there was also no contamination found to these fluids.
10. Further examination of the engine compartment revealed no sign(s) or indication(s) of fluid leakage and/or fluid stain within the engine compartment of the Motor Bus.
11. Our subsequent checks on the underside of the Motor Bus reveals some fluid stain sighted under the engine compartment. Further investigation found that the fluid stain was a pre-existed prior the accident & not a fresh fluid. This was due to some dirt observed associated with the fluid stain. Conclusively, it is not likely to be related to the accident. Visually, the various undercarriage components of the Motor Bus were observed to be intact and without any visible damage except for the damages caused by the accident. See photo 13 – 18 below.



Photo 13 shows the engine compartment of the Motor Bus was located at the rear of the Motor Bus.



Photo 14 shows the Auto Transmission fluid of the Motor Bus. It was observed to be of sufficient level without any contamination at time of our inspection.



Photo 15 shows the engine fluid of the Motor Bus. It was observed to be of sufficient level without any contamination at time of our inspection.

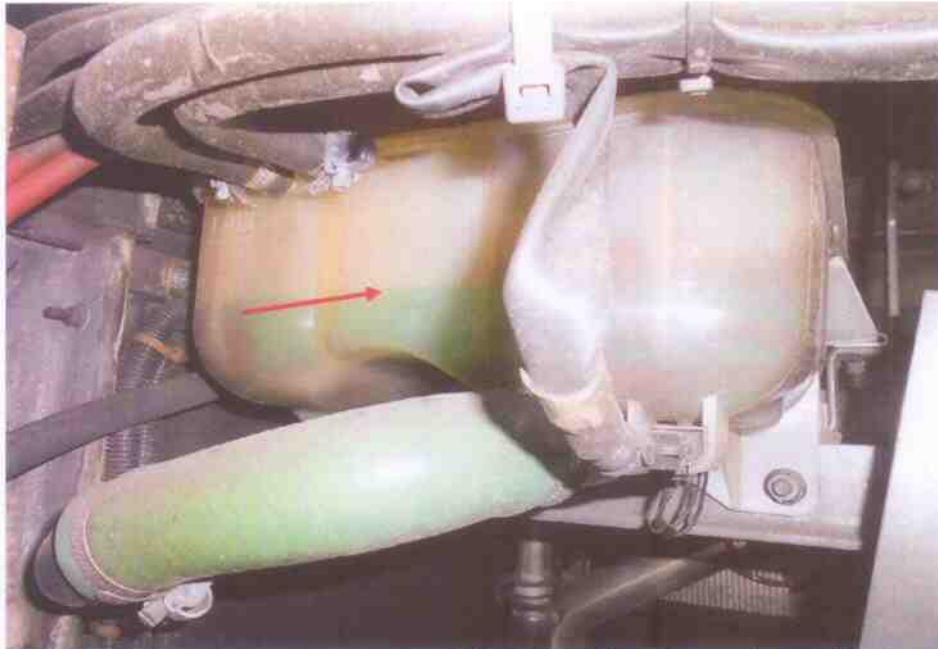


Photo 16 shows the engine coolant of the Motor Bus. It was observed to be of sufficient level without any contamination at time of our inspection.



Photo 17 shows the engine underside of the Motor Bus. It was observed to be sighted with fluid leakage. However it was noted to be a pre-existed fluid leakage due to the dust stain that associated with it.

Steering System & Braking System

12. The mechanical components of the Motor Bus's steering system were all found to be visually intact and undamaged. The steering shaft and steering rack of the Motor Bus were observed to be intact and securely attached to the front left wheel and front right wheel. The steering ball joints were also observed to be in a serviceable condition.
13. Although the steering system could not be tested at the time of our inspection (engine unable to be started), it is likely that the steering system of the Motor Bus was in serviceable condition since its mechanical components were all found to be generally intact and securely fitted. See photo 18 – 20 below.

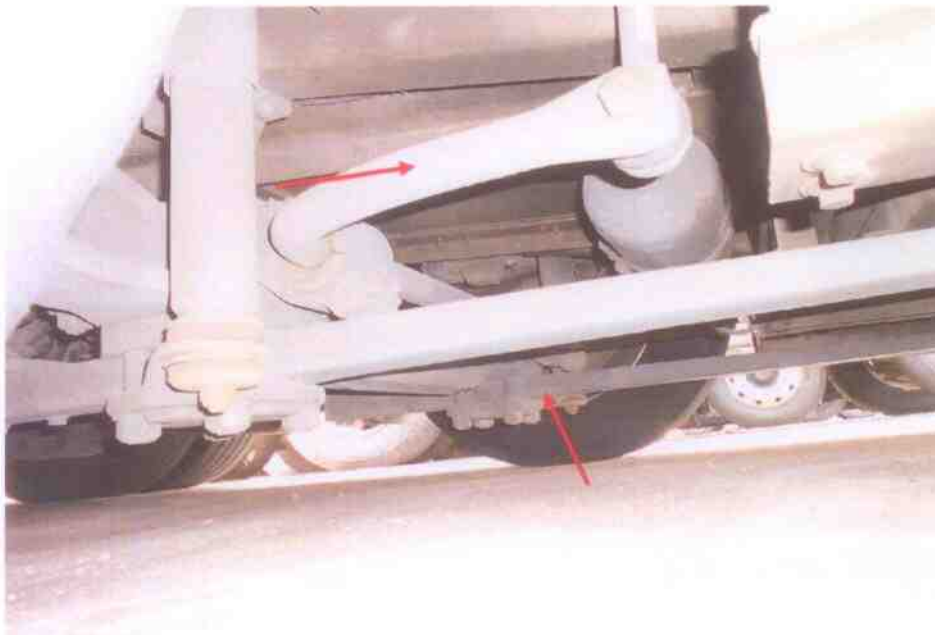


Photo 18 shows some of the mechanical components (arrowed) of the Motor Bus's steering system. Our visual checks on the various mechanical components of the steering system revealed all to be intact and in good condition. The steering system of the Motor Bus is hence likely to be in serviceable condition at the time of accident.

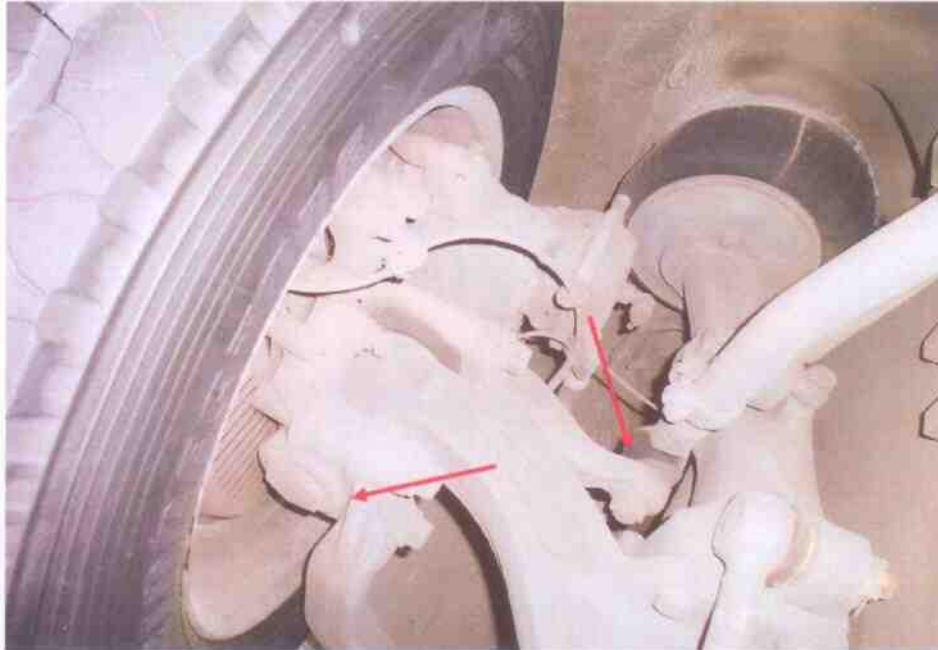


Photo 19 shows the undercarriage components at the front right wheel of the Motor Bus. The various undercarriage components of the Motor Bus were all observed to be intact and without any visible damage. This had included the steering rack and steering ball joints (arrowed) of the Motor Bus.

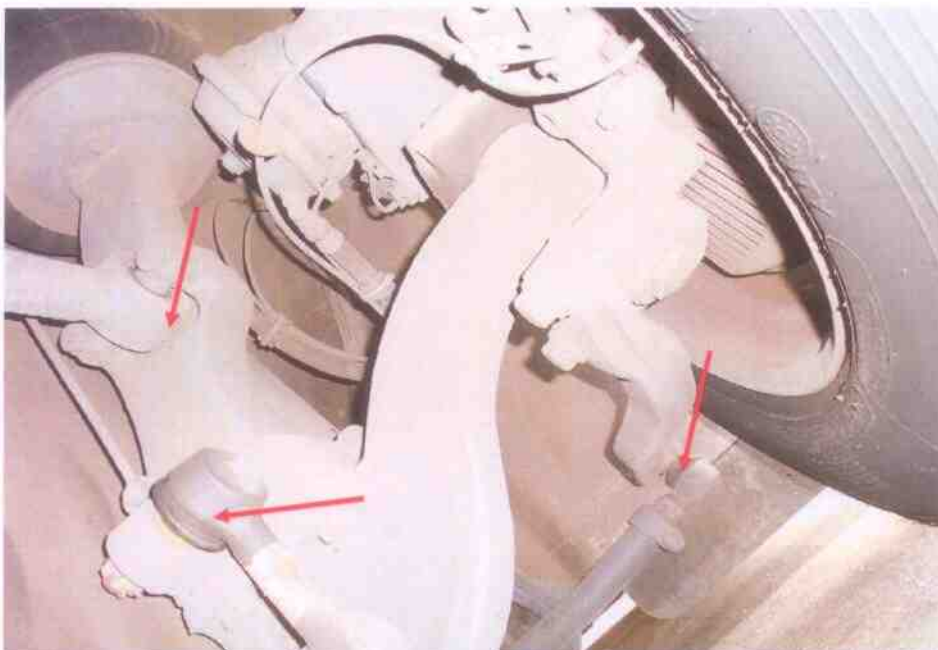


Photo 20 shows the undercarriage components at the front left wheel of the Motor Bus. The various undercarriage components of the Motor Bus were all observed to be intact and without any visible damage. This had included the steering rack and steering ball joints (arrowed) of the Motor Bus, which were observed to be securely attached to the front left wheel and front right wheel.

14. The braking system of the Motor Bus was noted to be of a full air-assisted braking system. Briefly, in this system, compressed air is used to press onto the brake shoes (for drum brakes) or onto the brake pads (for disc brakes), through the respective braking mechanism, thus slowing the rotation of the wheels.
15. Since the engine of the Motor Bus could not be started, we were hence not able to carry out test(s) on whether there was any leakage of compressed air that could have affected the braking efficiency of the Motor Bus. However the air pipes, air tanks and connecting valves had all appear to be in good general condition and securely fitted upon our visual examination of these parts.
16. In general, our visual inspection of the mechanical components of the Motor Bus's braking system appear to suggest that its braking system was in serviceable condition at the material time of accident. See photo 21 below.

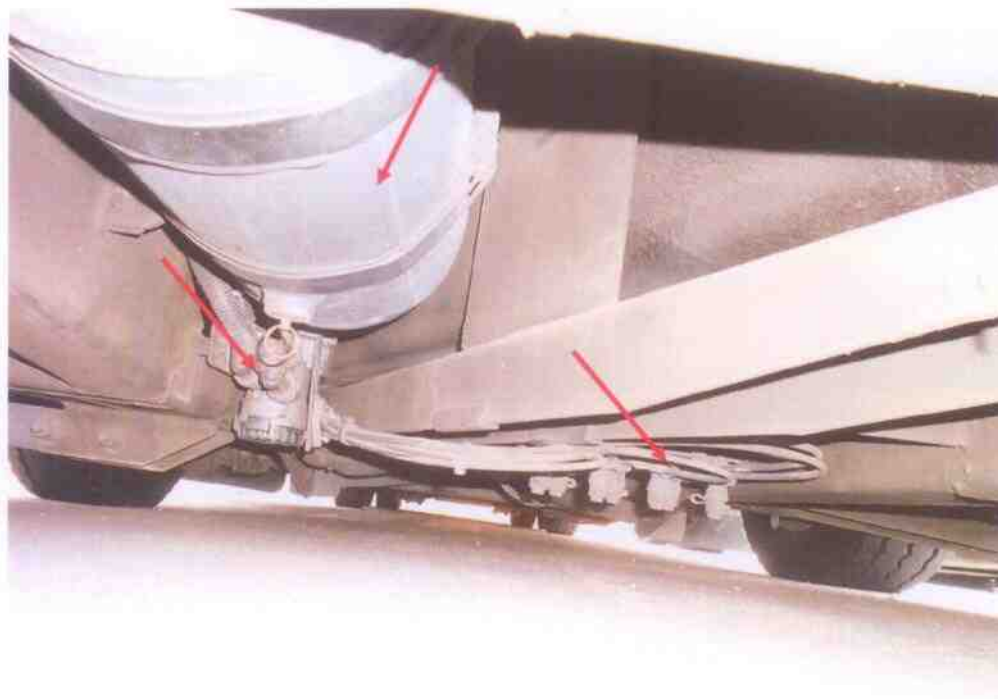


Photo 21 shows a general view of the air tank, valves, pipes and hoses, which are some of the components for the air-assisted braking system of the Motor Bus. This was at the underside of the Motor Bus's front body. We were however not able to carry out any operational test(s) to the braking system of the Motor Bus as its engine was unable to be started.

Electronic Safety / Operational indicators

17. The Motor Bus was not fitted with any electronic safety feature(s) like Anti-Brake Lock System (ABS), Supplemental Restraint System (SRS) etc. There was hence no test carried out on the functionality of these systems.
18. Other operational indicators were unable to be initialized due to the flat battery. Hence, no test was carried out to the Motor Bus additional devices. See photo 22 & 23 below.



Photo 22 shows the indicators at the driver's seat. Other operational indicators were unable to be initialized due to the flat battery. Hence, no test was carried out to the Motor Bus additional devices.



Photo 23 shows the indicators at the driver's seat. Other operational indicators were unable to be initialized due to the flat battery. Hence, no test was carried out to the Motor Bus additional devices.

Operational Behaviour of the Motor Bus

19. As the engine of the Motor Bus could not be started, we were hence not able to carry out any operational test(s) to primarily determine whether there was any operational abnormality to its engine system, transmission system, steering system and braking system.

Conclusion

20. At the time of our inspection of the Motor Bus, its steering system and braking system could not be tested as the Motor Bus's engine could not be started. However basing on our observations, it would appear that the steering system and braking system of the Motor Bus were in serviceable condition. This is taking into consideration that the various mechanical components of the steering system and braking system were found to be intact and undamaged.

21. Although our subsequent checks on the underside of the Motor Bus reveals that some fluid stain sighted under the engine compartment. Further investigation found that the fluid stain was a pre-existed prior the accident & not a fresh fluid. This was due to some dirt observed associated with the fluid stain. Conclusively, it is not likely to be related to the accident. Visually, the various undercarriage components of the Motor Bus were observed to be intact and without any visible damage except for the damages caused by the accident
22. The observation gathered from our physical inspection of the Motor Bus had indicated no evidence to suggest possible mechanical failure to the Motor Bus that may have contributed to the accident.
23. The 8 tyres fitted on the Motor Bus were also found to be in serviceable condition. There was no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of the 8 tyres. The 8 tyres were sufficiently inflated for vehicular operation with remaining tread depth of approximately 3mm to 18mm each.
24. Our findings were based solely on a static and visual inspection of the Motor Bus. No operational test(s) could be carried out to the Motor Bus as its engine could not be started at the time of our inspection.



Rohaizal A. Rahim
Technical Investigator



Ang Bryan Tani
AMSOE, AMIRTE, AFF SAE, M.MATAI, AFF.Inst.AEA
Senior Technical Investigator
Technical Investigation & Reconstructionist (SAE-A)

DISCLAIMER OF LIABILITY TO THIRD PARTIES:- This Report is made solely for the use and benefit of the Client named on the front page of this Report. No liability or responsibility whatsoever, in contract or tort, is accepted to any third party who may rely on the Report wholly or in part. Any third party acting or relying on this Report, in whole or in part, does so at his or her own risk.