

Your Ref: TP/IP/64873/2018
Our Ref : CI/TPD18022478/Z

28th February 2019

Fatal Accident Investigation Team

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

MECHANICAL INSPECTION REPORT OF MOTOR TRAILER XD 2654U

1. We refer to your request on 06th December 2018 to conduct a physical inspection of a motor trailer bearing registration number YN 3671Z (herein referred to as "**Motor Trailer**"), which was involved in a fatal road traffic accident on 23rd December 2018.
2. The purpose of this inspection is to primarily determine if there was any possible mechanical failure to the Motor Trailer that may have contributed to the accident.
3. Following the request, we carried out a physical inspection of the Motor Trailer on 04th January 2019 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 Trailer at the time of our inspection was not recorded as its ignition system and front cabin was severely damaged by the collision.
5. The Motor Trailer had sustained extensive impact damage at its frontal portion. The impact force was relatively significant, causing its entire front cabin to be buckled and crumpled. Several mechanical parts and components at the frontal portion were also severely damaged as a result of the accident.
6. The dashboard, windshield, steering wheel, seats, floor panel and roof panel inside the front cabin were all observed to be pushed/buckled inwards, towards the rear of the Motor Trailer.

7. This was likely due to the consistency of the accident's case facts that on 23rd November 2018 (Friday) at about 0915hrs, the Motor Trailer was travelling along Jalan Buroh. While doing so, the driver claimed that the brakes were ineffective or experienced malfunction while he was trying to stop. As the Motor Trailer was unable to stop in time, it had collided onto the rear of a Tipper Truck which further caused a chain collision with 3 other vehicles. See photo 1 to 7 below.



Photo 1 shows a general view of the frontal portion of the Motor Trailer at the time of our inspection. The Motor Trailer was observed to have sustained extensive impact damage at its frontal portion. The impact force was relatively significant, causing its entire front portion to be buckled and crumpled pushed inwards towards to rear portion of the Motor Trailer.



Photo 2 shows a closer view of the frontal left portion of the Motor Trailer at the time of our inspection. A number of mechanical parts and components at the frontal portion were also severely damaged as a result of the accident.



Photo 3 shows a general view of the front right portion of the Motor Trailer at the time of our inspection. The Motor Trailer was observed to have sustained extensive impact damage at its front right portion. The impact force was relatively significant, causing its entire front portion to be buckled and crumpled.



Photo 4 shows from a right side view of the Motor Trailer at the time of our inspection. The Motor Trailer was observed to have sustained extensive impact damage at its front portion. The impact force was relatively significant, causing its entire front cabin to be buckled and crumpled.



Photo 5 shows the interior of the front cabin. The dashboard, steering wheel, seats, floor panel and roof panel inside the front cabin were all observed to be pushed/buckled inwards, towards the rear of the Motor Trailer. This is consistent to the nature of this accident where the direction of impact onto the Motor Trailer was from the front to rear direction.



Photo 6 shows a general view of the rear right portion of the Motor Trailer at the time of our inspection. The rear portion was observed to be relatively unaffected by the accident.



Photo 7 shows a general view of the rear portion of the Motor Trailer at the time of my inspection. The rear portion was observed to be relatively unaffected by the accident.

Tyres and Wheel Rims

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

Agate HF668 295/80R 22.5 (7mm)

Agate HF668 295/80R 22.5 (7mm)

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Amberstone 700 295/80R 22.5 (8mm)

Chao Yang AZ670 295/80R 22.5 (7mm)

9. The 6 tyres were observed to be wrapped around alloy wheel rims that were found to be without any damage. See photo 8 – 11 below.



Photo 8 shows the condition of the rear right tyres of the Motor Trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 8mm. There was no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of this 2 tyres. The 2 tyres, which were wrapped around alloy wheel rim, were also observed to be sufficiently inflated for vehicular operation.



Photo 9 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 7mm. There was no tear, cut or burst mark(s) on the outer and the inner sidewalls as well as across the tread of these 2 tyres, which were also observed to be sufficiently inflated for vehicular operation.



Photo 10 shows the condition of the front left tyre of the Motor Trailer, which was observed to be in serviceable condition with remaining tread depth of approximately 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 this tyre.



Photo 11 shows the condition of the front right tyre of the Motor Trailer. The front right tyre was observed to be in serviceable condition with remaining tread depth of approximately 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 this tyre.

Engine Compartment & Operating Fluids

10. The engine compartment of the Motor Trailer, which was located beneath the front cabin, could not be closely inspected given the extensive damages to the front cabin. Our visual checks from the underside of the Motor Trailer had however appear to indicate that the engine assembly and transmission assembly were both intact and unaffected by the collision.
11. However, a component such as radiator was visually observed to be severely damaged as a result of the accident. Hence, believe to sustained leakage to the engine cooling system.
12. With regard to the operating fluids, we were unable to inspect most of the fluids. This is due to their reservoir tanks and/or dip stick being within the damaged area of the Motor Trailer. However, for power steering fluid it shows an insufficient level due to damage sustained to the reservoir tank as a result of the accident.
13. Visual checks on the underside of the Motor Trailer had revealed its various undercarriage components to be intact and without visible damage. See photo 12 & 13 below.



Photo 12 shows the underside of the Motor Trailer, at the area where the engine is located. We were not able to closely inspect the engine compartment of the Motor Trailer due to the extensive damage to its front cabin. Our visual checks from the underside had however appear to indicate that the engine assembly and transmission assembly were both intact and unaffected by the collision.



Photo 13 shows the transmission assembly (arrowed) of the Motor Trailer intact and unaffected by the collision.

Steering System & Braking System

14. We were not able to conduct any tests on the steering system and braking system of the Motor Trailer. This was mainly due to the extensive damage of the Motor Trailer's front cabin, which had affected several mechanical components of the steering system and braking system like the steering wheel, steering box, brake booster and brake pedal amongst others. Power steering fluids was also observed to be insufficient likely due to the damages to the power steering reservoir as a result of the accident. See photo 14 & 15 below.

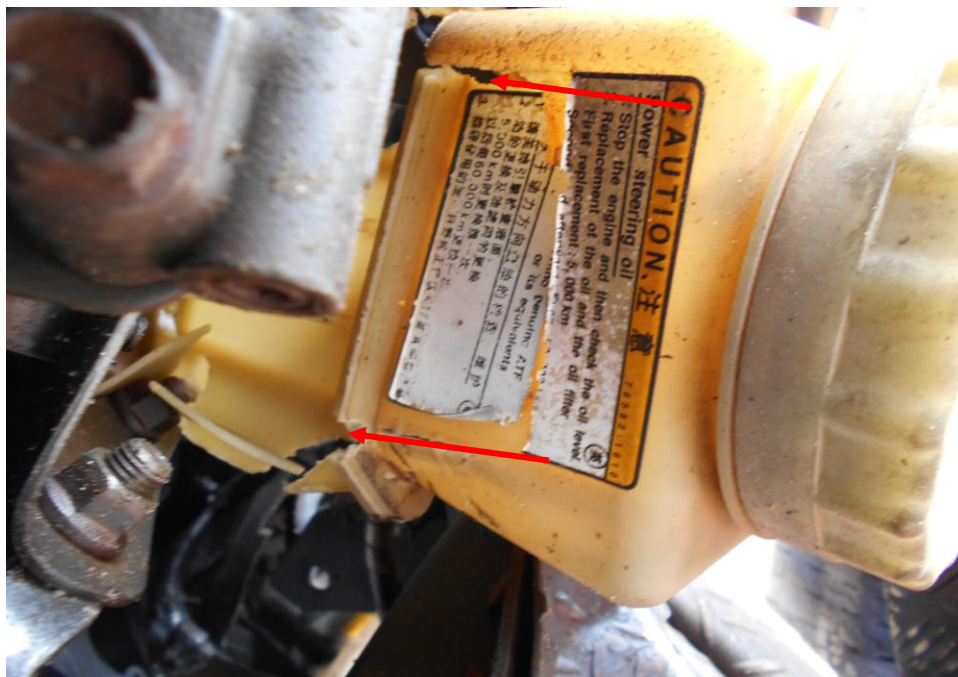


Photo 14 shows the damaged power steering reservoir which caused fluid leakage that disabling the operational of the steering system due to the accident.

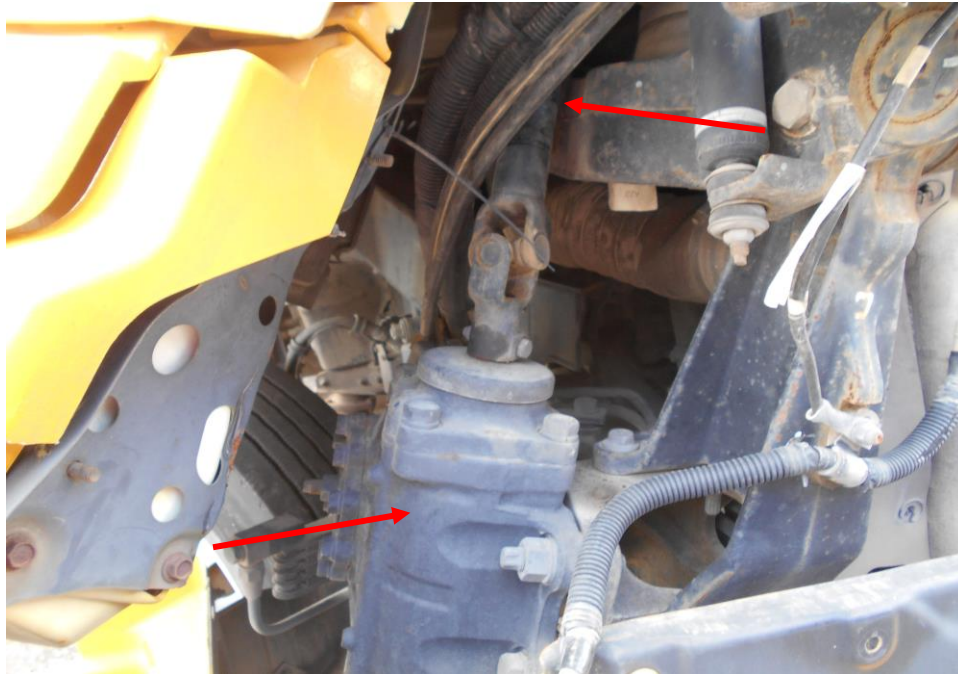


Photo 15 shows the damaged steering wheel box & shaft due to the accident.

15. We were however able to carry out visual checks on the unaffected mechanical components of the steering system & braking system. The steering shaft and steering rack of the Motor Trailer 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. The brake hoses & piping were observed to be without any damages. It was noted to be intact & secured to all wheels at time of our inspection. See photo 16 - 20 below.

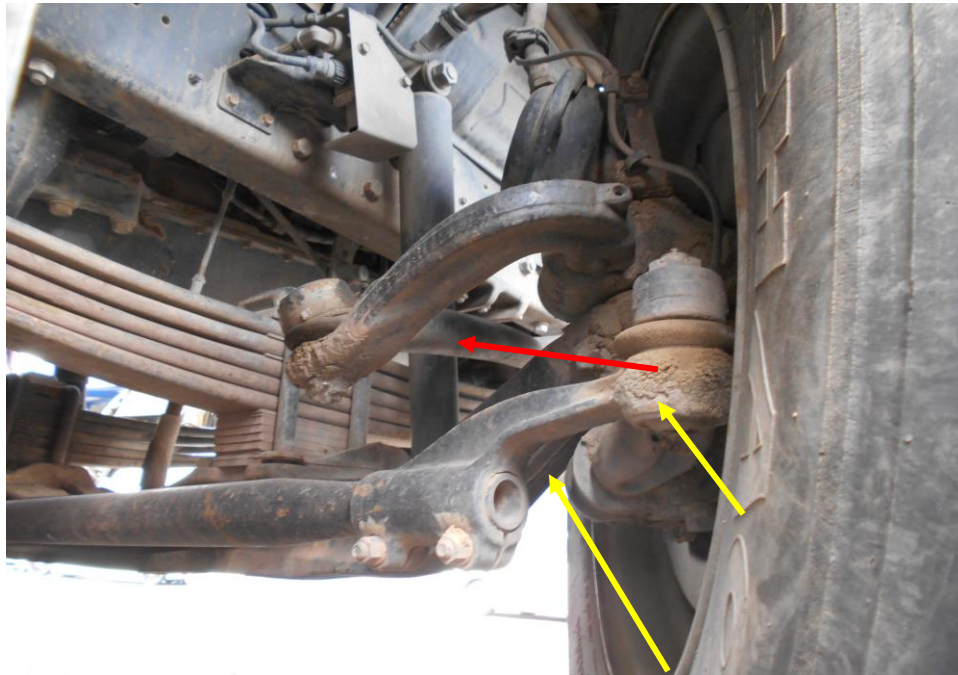


Photo 16 shows the undamaged steering shaft (red arrow) of the front right wheel of the Motor Trailer. The steering shaft and steering rack (yellow arrow) of the Motor Trailer were however observed to be intact and securely attached to the front right wheel. The steering ball joints were also observed to be in a serviceable condition.

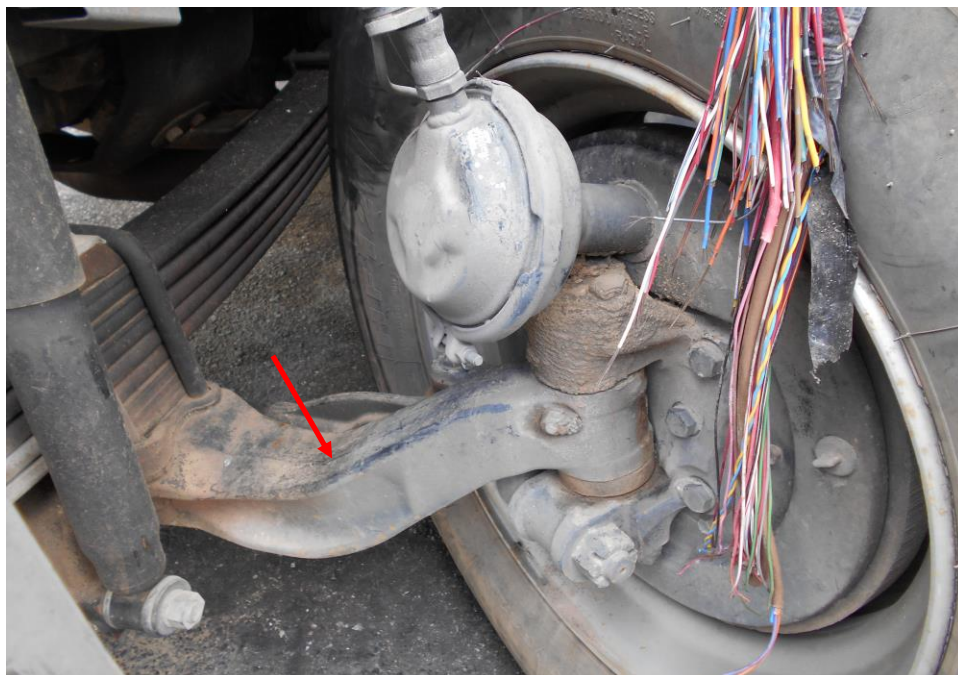


Photo 17 shows the undercarriage components at the front left wheel of the Motor Trailer. The various undercarriage components of the Motor Trailer were all observed to be intact and without any visible damage. This had included the steering rack (arrowed) of the Motor Trailer.



Photo 18 shows the brake hose (arrowed) at the rear right wheel of the Motor Trailer. At the time of our inspection, we did not find any sign(s) of brake fluid leakage along the brake hoses and brake pipes.

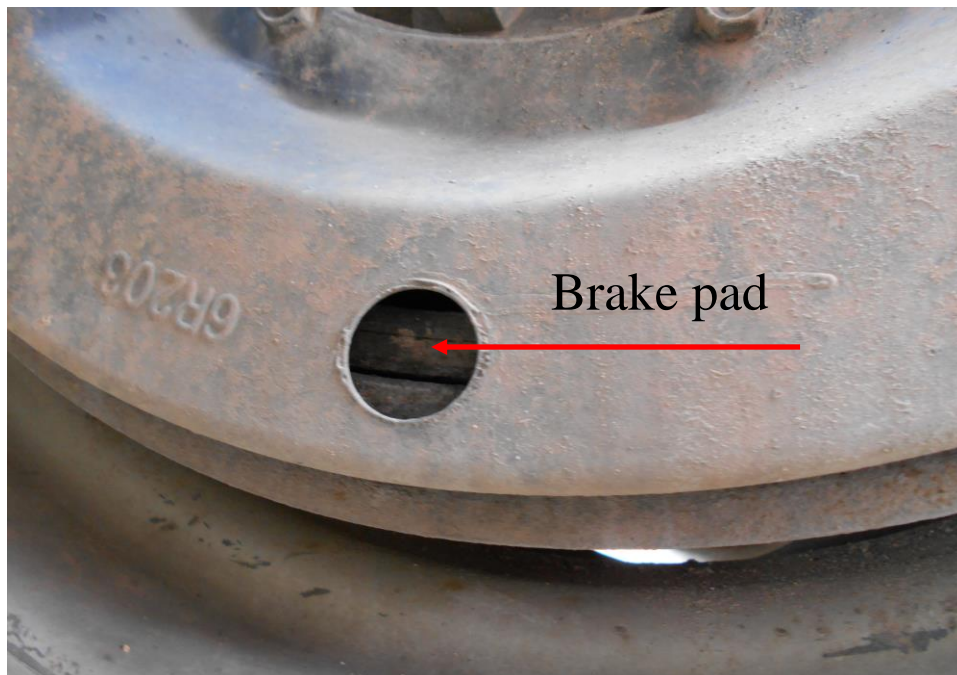


Photo 19 shows the sufficient rear right brake frictional material which was observed to be in serviceable condition.

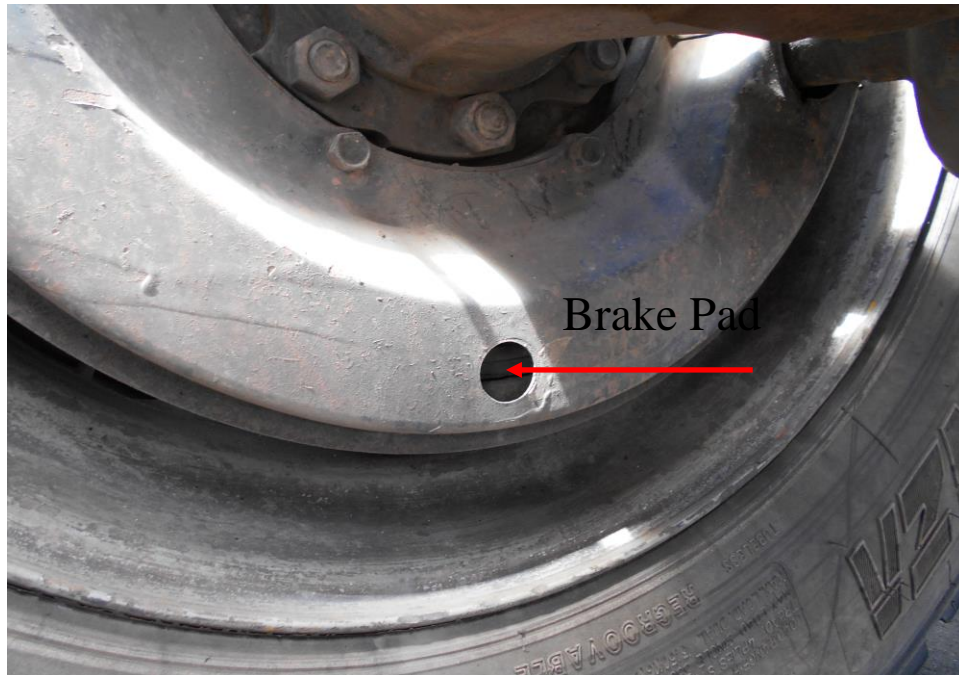


Photo 20 shows the sufficient rear right brake frictional material which was observed to be in serviceable condition.

Electronic Safety / warning indicators

16. The Motor Trailer 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. In any case, as the test would involve cranking of the Motor Trailer's engine, the severe damages to the ignition system itself did not allow me to perform this test. See photo 21 below.



Photo 21 shows the damaged electrical module which caused ignition failure that disabled the ignition system & related systems due to the accident.

Operational Behaviour of the Motor Trailer

17. No operational test to primarily determine whether there was any abnormality to the engine system, transmission system steering system and braking system of the Motor Trailer could be conducted given the extent of damage that it had sustained.

Conclusion

18. For this particular case, we were unable to determine whether there was any possible mechanical failure to the Motor Trailer that may have contributed to the accident. This was mainly due to the extent of damage that it had sustained as a result of the accident.

19. The 2 front tyres and 4 rear tyres of the Motor Trailer were found to be in serviceable condition. 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 6 tyres. The 6 tyres were also observed to be sufficiently inflated for vehicular operation with remaining tread depth of approximately 7mm to 8mm each.

20. Our findings were based solely on a static and visual inspection of the Motor Trailer. No operational test could be carried out to the Motor Trailer given the extent of damage that it had sustained as a result of the accident.

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