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

MECHANICAL INSPECTION REPORT OF MOTOR LORRY YN 5091J

1. We refer to your request on 5 August 2019 to conduct a physical inspection of a motor lorry bearing registration number YN 5091J (herein referred to as **"Motor Lorry"**), which was involved in a fatal road traffic accident on 6 July 2019.

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

3. Following the request, we had carried out a physical inspection of the Motor Lorry on 18 September 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

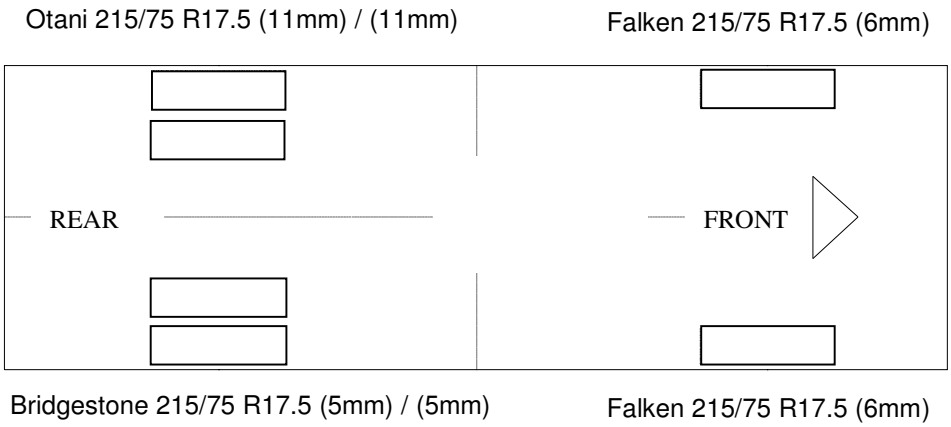
4. The mileage of the Motor Lorry at the time of our inspection was 148, 638km.

5. The Motor Lorry had sustained relatively moderate impact damage that was confined to its frontal portion. Its front bumper was observed to be dislodged; its front bonnet as well as front panel was observed to have been dented; its front windscreen was observed to be shattered while its left headlight was observed to be cracked.

Tyres and Wheel Rims

6. The 2 front tyres and 4 rear tyres of the Motor Lorry 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.

7. The tyre brand, tyre size and remaining tread depth of the 6 tyres of the Motor Lorry were recorded as follows:-



8. The 6 tyres were observed to be wrapped around standard alloy wheel rims that were found to be without any damage. See photos 1 – 7 below.

Photo 1 shows a general view of the front body of the Motor Lorry at the time of our inspection. The Motor Lorry had sustained relatively moderate impact damage that was confined to its frontal portion. Its front bumper was observed to be dislodged; its front bonnet as well as front panel was observed to have been dented, its front windscreen was observed to be shattered while its left headlight was observed to be cracked. The mileage of the Motor Lorry at the time of our inspection was 148, 638km.

Photo 2 shows a closer view of the shattered front windscreen of the Motor Lorry at the time of our inspection.

Photo 3 shows a closer view of the deformed front bumper and cracked left headlight (circled) as well as the dented front panel (arrowed) of the Motor Lorry at the time of our inspection.

Photo 4 shows the condition of the front left tyre of the Motor Lorry, which was observed to be in serviceable condition with remaining tread depth of approximately 6mm. The tyre, which was wrapped around standard alloy 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 Lorry.

Photo 5 shows the condition of the front right tyre of the Motor Lorry, which was observed to be in serviceable condition with remaining tread depth of approximately 6mm. The tyre, which was wrapped around standard alloy wheel rim, was also observed to be sufficiently inflated for vehicular operation.

Photo 6 shows the condition of the rear left tyres of the Motor Lorry, which was observed to be in serviceable condition with remaining tread depth of approximately 11mm. The tyres, which were wrapped around standard alloy wheel rim, were also observed to be sufficiently inflated for vehicular operation. There was also no damage found on all 6 alloy wheel rims of the Motor Lorry.

Photo 7 shows the condition of the rear right tyres of the Motor Lorry, which were observed to be in serviceable condition with remaining tread depth of approximately 5mm. 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 Lorry.

Engine Compartment & Operating Fluids

9. Upon examination of the Motor Lorry's engine compartment, we had observed all the parts and components inside the engine compartment to be intact and unaffected by the accident. The brake fluid, automatic transmission fluid (ATF), 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.

10. Further examination of the engine compartment revealed no sign(s) or indication of fluid leakage and/or fluid stain within the engine compartment of the Motor Lorry.

11. Our subsequent checks on the underside of the Motor Lorry also revealed no fluid stain. Visually, the various undercarriage components of the Motor Lorry were all observed to be intact and without any visible damage. See photos 8 – 12 below.

Photo 8 shows a general view of the Motor Lorry's engine compartment, which was accessed by lifting the front cabin of the Motor Lorry. 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 (photograph shows the engine compartment as viewed from the left front side of the Motor Lorry).

Photo 9 shows the brake fluid reservoir of the Motor Lorry at the time of our inspection. The brake fluid was observed to be of sufficient level and without any visible contamination.

Photo 10 shows the engine coolant of the Motor Lorry at the time of our inspection. The engine coolant was observed to be of sufficient level and without any visible contamination.

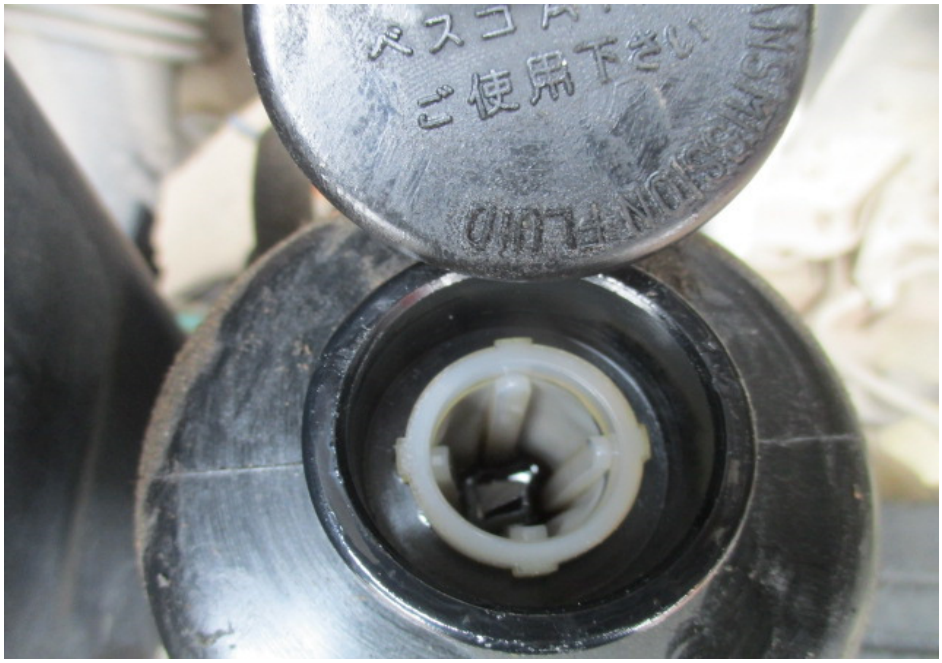


Photo 11 shows the auto transmission fluid (ATF) reservoir of the Motor Lorry at the time of our inspection. The power steering fluid was observed to be of sufficient level and without any visible contamination.

Photo 12 shows the engine dip stick of the Motor Lorry at the time of our inspection. The engine oil was observed to be of sufficient level and without any visible contamination.

Steering System & Braking System

12. Static brake tests conducted on the Motor Lorry 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 Motor Lorry. The braking system of the Motor Lorry 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.

13. Static test on the steering system of the Motor Lorry also revealed no abnormality to the steering system. We did not experience any abnormal free play and/or other resistance when turning the steering wheel left and right to full lock positions. Our 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 photos 13 - 17 below.

Photo 13 shows the brake pipe (arrowed) at the rear right wheel of the Motor Lorry. We did not observe any leakage of brake fluid at the time of our inspection of the Motor Lorry. Our static tests of the Motor Lorry's braking system, along with our 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 Lorry was likely to be in serviceable condition at the material time of accident.

Photo 14 shows the front right wheel of the Motor Lorry turned to its full right. During our steering system test, we did not experience any abnormal free play and/or resistance when we had turned the steering wheel towards full left and full right. This would suggest that the steering system of the Motor Lorry was likely to be in serviceable condition at the material time of accident.

Photo 15 shows the front left wheel of the Motor Lorry turned to its full left. During our steering system test, we did not experience any abnormal free play and/or resistance when we had turned the steering wheel towards full left and full right. This would suggest that the steering system of the Motor Lorry was likely to be in serviceable condition at the material time of accident.

Photo 16 shows the various undercarriage components at the front right wheel of the Motor Lorry, 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 Lorry 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 17 shows the various undercarriage components at the front left wheel of the Motor Lorry, in particular the steering tie rod end (arrowed). The various undercarriage components of the Motor Lorry 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.

Electronic Safety / Warning Indicators

14. The Motor Lorry's automatic self-test of the functionality of its various electronic operating systems like the Anti-Brake Lock System (ABS) during cranking of the engine had indicated that these systems were in working condition and without abnormality. This can be established from the warning lights disappearing from the instrument panel after the self-test. See photos 18 & 19 below.

Photo 18 shows the warning lights for the various electronic operating systems of the Motor Lorry appearing on its instrument panel during the self-test when the engine is cranked, in particular the ABS light (arrowed).

Photo 19 shows the ABS warning light was not illuminated on the instrument panel of the Motor Lorry after the engine was cranked. This would suggest that there was no abnormality to the various electronic operating systems of the Motor Lorry, like the ABS.

Operational Behaviour of the Motor Lorry

15. A short operational test of the Motor Lorry, 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 Lorry forward, stopping, before reversing and coming to a stop again.

16. During the operational test, the transmission system of the Motor Lorry was able to be shifted to drive mode and reverse mode without any difficulty. There were no abnormal sounds heard and/or abnormal behaviour of the Motor Lorry'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 Lorry was able to slow down and come to a complete stop upon depressing of the brake pedal.

Conclusion

17. From our physical inspection of the Motor Lorry, it appears that its engine system, steering system, braking system and transmission system were all in serviceable condition. We did not find any evidence(s) to suggest that there was possible mechanical failure to the Motor Lorry that may have caused and/or contributed to the accident. This is also taking into consideration that the operational test of the Motor Lorry, which we 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 2 front tyres and 4 rear tyres fitted on the Motor Lorry were also 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 each.

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