

Your Ref: TP/IP/56223/2021  
Our Ref : CI/TPD22002075/N

9 March 2022

**Fatal Accident Investigation Team**

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

**INSPECTION REPORT OF PERSONAL MOBILITY AID PMA  
TRAFFIC POLICE POUND REPORT NO. 3986/21**

1. We refer to your request dated 22 December 2021 to conduct a physical inspection of a Personal Mobility Aid bearing Traffic Police Pound Report no. 3986/21 (herein referred to as "**PMA**"), which was involved in a fatal road traffic accident on 25 November 2021.
2. The purpose of this inspection is to primarily determine if there was any possible mechanical failure to the PMA that may have contributed to the accident.
3. Following the request, we had carried out a physical inspection of the PMA on 7 March 2022 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 PMA was observed to have sustained damages at its right body. The body parts that were found to have been damaged include its right handlebar grip, right bottom cowling and right armrest, amongst others as a result of the accident. See photos 1 – 7 below.

**CASE PROPERTY LABEL**

Sr No. .... Date: 2-5 NOV 2021

Division: 3986/21 Station No: ←

Report No: 3986/21

Offence: DTA Case No: T06354

I.O In-Charge Case: PMD E-Bike

Items:

1. F/ 2021112510096
- 2.
- 3.

NP 302 (96)

**Photo 1** shows the identification of the PMA with reference to Traffic Police Pound Report No. 3986/21 (arrowed).



**Photo 2** shows a general view of the frontal portion of the PMA at the time of our inspection. The PMA was observed to have sustained damages at its right body.



**Photo 3** shows a general view of the right body of the PMA at the time of our inspection. The PMA was observed to have sustained damages at its right body.



**Photo 4** shows a general view of the rear portion of the PMA at the time of our inspection. The PMA was observed to have sustained damages at its right body. The body parts that were found to have been damaged include its right handlebar grip, right bottom cowling and right armrest, amongst others as a result of the accident.





**Photo 5** shows a closer view of the right bottom cowling (circled) of the PMA which was observed to be damaged due to the accident.



**Photo 6** shows a closer view of the grazed right armrest (circled) of the PMA as a result of the accident.



**Photo 7** shows a closer view of the right handlebar grip (circled) of the PMA which were observed to be damaged due to the accident

### **Tyres and Wheel Rims**

5. The PMA's 3 Polyurethane (PU) solid tyres were observed to be in serviceable condition. The tread pattern of the 3 tyres was clearly visible. We did not observe any tear, burst mark(s) and/or punctured hole(s) on the sidewalls as well as across the tread of the 3 tyres. However we found the left sidewall of the left rear tyre to be grazed. The tyre size and remaining tread depth of the 3 tyres were recorded as follows:-



200 X 50 (3mm) (RLT)  
(Grazed)

200 X 50 (3mm)

200 X 50 (3mm) (RRT)

6. The 3 tyres were wrapped around plastic wheel rims. At the time of our inspection, we did not observe any visible damage on the front wheel rim and right rear wheel rim of the PMA. However we found marks of grazing nature on the left rear wheel rim of the PMA. See photos 8 - 11 below.



**Photo 8** shows the condition of the PMA's front tyre. The front tyre was observed to be in serviceable condition with remaining tread depth of approximately 3mm. There was no tear, burst mark(s) and/or punctured hole(s) on the sidewalls as well as across the tread of the front tyre.





**Photo 9** shows the condition of the PMA's right rear tyre. The right rear tyre was observed to be in serviceable condition with remaining tread depth of approximately 3mm. There was no tear, burst mark(s) and/or punctured hole(s) on the sidewalls as well as across the tread of the right rear tyre.



**Photo 10** shows the condition of the PMA's left rear tyre. The left rear tyre was observed to have remaining tread depth of approximately 3mm. The left rear tyre was also observed to be sufficiently inflated for vehicular operation. However we found the left sidewall of the left rear tyre to be grazed.



**Photo 11** shows the left rear wheel rim and tyre of the PMA at the time of our inspection. Marks of grazing nature were observed on the left rear wheel rim and left sidewall of the left rear tyre of the PMA (circled).

### **Drive Motor**

7. The PMA is controlled by an electric drive motor which is powered by a wireless battery pack to drive the rear tyres. The motor was originally installed on the rear portion of the rear tyres & found adequately acceptable. The motor of the PMA was found to be intact without any misalignment or damages. It was also observed to be in operational condition. The wireless battery pack of the PMA was also found to be intact without any misalignment. See photos 12 & 13 below.





**Photo 12** shows the general view of the electric drive motor (arrowed) of the PMA which was observed to be intact with no misalignment or damages. It was also observed to be in operational condition.



**Photo 13** shows the wireless battery pack of the PMA (arrowed) which was found to be intact without any misalignment.

**Steering System & Braking System**

8. Our checks on the various steering components of the PMA revealed that its steering system was in serviceable condition. Its steering handlebar was found to be intact and undamaged. Turning the handle bar towards the left and right did not produce any abnormal free play and/or resistance.
9. The braking system of the PMA was observed to be of a regenerative type, where it uses the electricity generated in the PMA's drive motor to rapidly slow down the PMA when the speed direction lever is returned to the centre (neutral drive) stop position. The PMA is also equipped with an electric/mechanical disc park brake located at the end of the drive motor which activates mechanically after the regenerative brake slows the PMA to a near stop or when power is removed from the drive system of the PMA. The brake for the rear wheels is engaged by releasing either the forward or reverse control levers under the handlebar grips.
10. Our visual examination of the various components in the PMA's braking system like the forward control lever, reverse control lever and electric/mechanical disc park brake (red handled) lever revealed all to be intact and without damage.
11. A static brake test was conducted on the PMA's forward braking system. The test was conducted by lifting the rear wheels above ground. The PMA was switched on and the forward control lever (right hand lever) was pushed to rotate the rear wheels in a forward motion. The forward control lever was then released in order to stop the spinning rear tyres. The result was satisfactory. It stopped after the forward control lever returned to the centre (neutral drive) position.
12. A static brake test was conducted on the PMA's reverse braking system. The test was conducted by lifting the rear wheels above ground. The PMA was switched on and the reverse control lever (left hand lever) was pushed to rotate the rear wheels in a reverse motion. The reverse control lever was then released in order to stop the spinning rear tyres. The result was satisfactory. It stopped after the reverse control lever returned to the centre (neutral drive) position.
13. A short operational test of the PMA, to primarily determine whether there was any abnormality to its drive system and braking system was subsequently carried out.

14. During the operational test, the red handled lever was able to be pulled downwards to engage the electric/mechanical disc park brake and the drive system of the PMA was able to be shifted to forward mode and reverse mode without any difficulty. There were no abnormal sounds heard and/or abnormal behaviour of the PMA's drive system. It was able to move forward and backward normally. The braking system was also found to be in working condition as the PMA was able to slow down upon releasing the forward control lever or reverse control lever (regenerative braking) and come to a complete stop (electric/mechanical disc park brake). See photos 14 – 30 below.



**Photo 14** shows the steering handlebar (arrowed) of the PMA. The steering handlebar of the PMA was found to be intact and undamaged. Turning the PMA's steering handlebar towards the left and right did not produce any abnormal free play. The steering system of the PMA was in serviceable condition at the time of our inspection.





**Photo 15** shows the front wheel of the PMA turned towards its full right. Turning the PMA's steering handlebar towards the right did not produce any abnormal free play and/or resistance. This would indicate that the steering system of the PMA was in serviceable condition at the time of our inspection.



**Photo 16** shows the front wheel of the PMA turned towards its full left. Turning the PMA's steering handlebar towards the left did not produce any abnormal free play and/or resistance. This would indicate that the steering system of the PMA was in serviceable condition at the time of our inspection.



**Photo 17** shows a close up view of the forward control lever and reverse control lever of the PMA (arrowed), which are all part of the components in the regenerative braking system of the PMA. Our visual checks of these various components had revealed all to be intact with no visible damage.



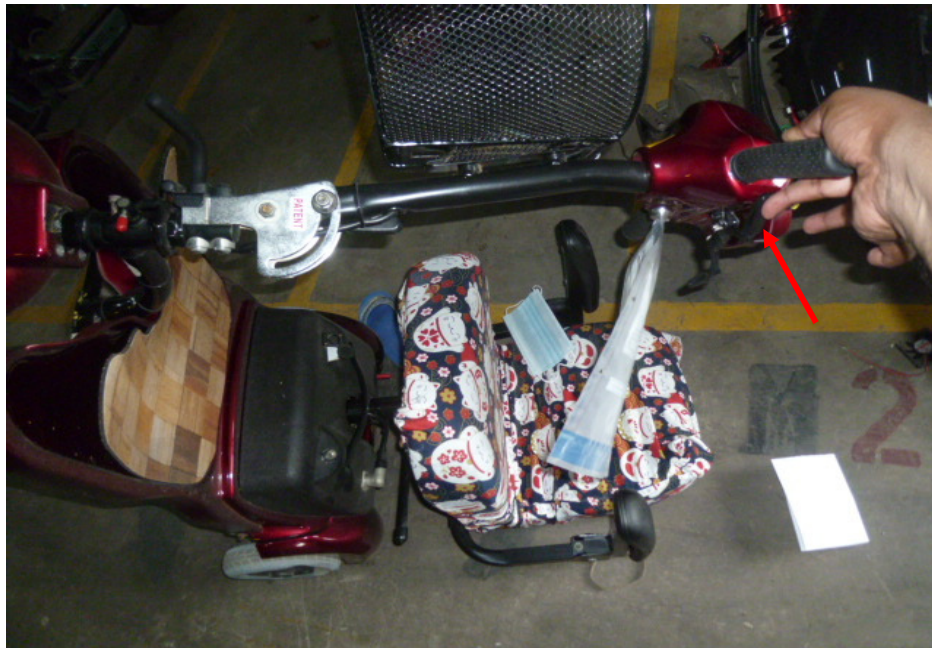
**Photo 18** shows a close up view of the electric/mechanical disc park brake lever (arrowed) of the PMA. Our visual check of this component had revealed it to be intact with no visible damage.





**Photo 19** shows a static brake test conducted on the PMA's forward braking system. The test was conducted by lifting the rear wheels above ground. The PMA was switched on and the forward control lever (right hand lever) was pushed to rotate the rear wheels in a forward motion. The forward control lever was then released in order to stop the spinning rear tyres. The result was satisfactory. It stopped after the forward control lever returned to the centre (neutral drive) position.





**Photo 20** shows a static brake test conducted on the PMA's reverse braking system. The test was conducted by lifting the rear wheels above ground. The PMA was switched on and the reverse control lever (left hand lever) was pushed to rotate the rear wheels in a reverse motion. The reverse control lever was then released in order to stop the spinning rear tyres. The result was satisfactory. It stopped after the reverse control lever returned to the centre (neutral drive) position.



**Photo 21** shows the red handled lever was able to be pulled downwards (arrowed) to engage the electric/mechanical disc park brake for the operational test.

**Conclusion**

15. From our physical inspection of the PMA, it appears that its drive system, steering system and braking system were all in serviceable condition. We did not find any evidence(s) to suggest that there was possible mechanical failure to the PMA that may have caused and/or contributed to the accident.
16. The 3 (PU) solid tyres of the PMA were also found to be in serviceable condition with remaining tread depth of approximately 3mm each, which had included the grazed left rear tyre. 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 3 tyres.

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