# EXTERNAL REVIEW PANEL
# ON SAF SAFETY

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## COMMENTS ON THE COMMITTEE OF INQUIRY'S PRELIMINARY FINDINGS ON THE DEATH OF CFC LIU KAI

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# INTRODUCTION

1. A Committee of Inquiry (COI) was convened by the Armed Forces Council on 3 Nov 2018 to investigate the circumstances leading to the death of Corporal First Class (CFC) Liu Kai. The External Review Panel on SAF Safety (ERPSS) was invited to participate in the COI by, first, having one of its members serve on the committee and, second, examining and commenting on the COI's findings.

2. As requested by the Ministry of Defence, we have provided, in this statement, our comments on the COI's findings. We understand that investigations are still ongoing and will comment further if there are any substantial changes to the COI's findings.

# OUTLINE OF THE COI'S PRELIMINARY FINDINGS

## Summary of the Incident

3. On 3 Nov 18 at around 0958 hrs, a Bionix Armoured Fighting Vehicle reversed into CFC Liu's Land Rover while he was supporting a two-sided Company Mission Exercise in the Jalan Murai Training Area. CFC Liu, a Transport Operator, was tasked to drive an SAF Regular Captain, who was assigned as a trainer for the exercise and also the vehicle commander of the Land Rover. The COI's preliminary finding of the sequence of events leading to the collision was as follows:

| S/NO | SEQUENCE OF EVENTS |
|---|---|
| 1 | At around 0958hrs, the Bionix crew spotted several exercise vehicles passing by at the junction ahead of it and stopped as ordered by the Bionix vehicle commander. Responding to this, the Land Rover driven by CFC Liu also stopped. |
| 2 | The trainer instructed CFC Liu to move the Land Rover forward and overtake the Bionix. CFC Liu had started to do so when shots were fired by the exercise vehicles. He then stopped the Land Rover at its final position without overtaking the Bionix. This was at most 19.8m behind the Bionix. |
| 3 | The Bionix started to reverse, as part of the extrication drill ordered by the Bionix Vehicle Commander in response to the shots. The Bionix's rear guide gestured at the Land Rover to move away. The rear guide subsequently attempted, through the intercom system, to get the Bionix to stop. |
| 4 | The trainer tapped CFC Liu and signalled for CFC Liu to reverse, and CFC Liu engaged the reverse gear. |

| | |
|---|---|
| 5 | Both the trainer and CFC Liu shouted and gestured for the Bionix to stop. The trainer also attempted to reach for the handset of the radio set in the Land Rover. |
| 6 | The Bionix reversed into the Land Rover and partially mounted the driver's side before coming to a stop, trapping CFC Liu in his seat. The time of the collision was about 8 seconds after the Bionix started reversing. |

4. CFC Liu succumbed to his injuries and was pronounced dead at around 1035 hrs. The cause of death was traumatic asphyxia[1].

## Findings on the Incident

5. The COI's findings included the following:

a. The distance between the Land Rover and the Bionix was shorter than the required safety distance. The Land Rover was moving forward to overtake the Bionix but came to a stop after hearing gunshots. At this point, the Land Rover was at most 19.8m from the Bionix, which was less than the required safety distance of 30m.

b. The Bionix steered onto the Land Rover's path while reversing from the simulated enemy encounter. The Land Rover was initially not in the Bionix's reverse path. However, while reversing, the Bionix operator made a slight left steer to straighten the Bionix's path. This brought it onto a collision course with the Land Rover.

c. The rear guide had repeatedly given the order to stop reversing through the intercom via his Combat Vehicle Crew helmet. The COI noted that there were no reported problems with the intercom system for the duration of the exercise prior to this incident. They also obtained an independent technical assessment report on the intercom system. Police investigations are ongoing with respect to the communications between the Bionix crew, and the equipment.

[1] Traumatic asphyxia is a form of death due to the sudden mechanical compression of the chest, resulting in restricted chest movements and breathing in of air. If the compressive force is large, traumatic asphyxia is often associated with injuries to the heart, lungs, air passages and large blood vessels.

**Training and Safety Management**

6. The COI established that the Company Mission Exercise was conducted in accordance with the approved lesson plans and safety regulations. There were however, three areas that the COI felt could be improved even though they would not have made a difference in this incident due to the extent of CFC Liu's injuries.

a. Execution of Safety Management Plan. The execution of the post-incident safety management plan was hampered by poor communication signals in the training area, which led to some delays in contacting the Chief Safety Officer and coordination difficulties with some responders.

b. Medical Response. The SAF's medical response is based on the concept of rapid evacuation to the next echelon of care. However, such a response may not be adequate when a casualty cannot be evacuated promptly, as in CFC Liu's case.

c. Safety Awareness for Attached Personnel. It was observed that the Transport Operators (TOs) assigned to support the exercise were not involved in the exercise brief and were briefed separately by their respective vehicle commanders. This was because the TOs were assigned only shortly before the exercise, after the exercise brief had been conducted.

## COI'S RECOMMENDATIONS

7. The COI proposed several safety-related recommendations for MINDEF/SAF's consideration. The recommendations included:

a. Install secondary means of emergency communications for Bionix rear guides.

b. Install rear view cameras for Bionix operators.

c. Improve servicemen's ability to gauge safety distances.

d. Improve the serviceability of high wear-and-tear communications equipment.

e. Enhance safety management and execution, including medical response and safety awareness of attached personnel.

## ERPSS' COMMENTS

8. Based on the information provided in the preliminary inquiry report, ERPSS agrees with the COI:

a. On the findings listed in para 5.

b. That there are potential improvements that could be made to the safety management and emergency response system.

9. ERPSS supports the preliminary recommendations raised by the COI, which we believe are appropriate responses to the issues that were surfaced.

10. ERPSS notes that the Army commissioned a separate External Review Panel on Combat Vehicle Safety (ERPCVS) in Nov 18 to look into combat vehicle training and safety management. While the ERPCVS' recommendations were not directly related to the accident, ERPSS feels they would be helpful in strengthening general combat vehicle safety in the SAF.

11. In addition, ERPSS feels that it is important to ensure that the vehicles and equipment used for training are in good working condition. This requires both a stringent maintenance regime as well as diligent pre-ops checks by the users. ERPSS notes that the Army has initiated a review of its vehicle and equipment maintenance regime, although this review was not specifically recommended by the COI or ERPCVS.

## CONCLUSION

12. ERPSS agrees with the COI's preliminary findings and recommendations. We note that the Army is in the process of implementing the COI's recommendations as well as a range of additional improvements. ERPSS supports these actions and believes they are important steps that should be taken to enable the SAF to train more safely. In addition, ERPSS feels that the Army should continue to invest more effort to improve the working condition of vehicles and equipment used for training.

Submitted by:

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