

Your Ref: M1904454  
Our Ref :CS/TMI19010772/D

10 July 2019

**Tokio Marine Insurance Singapore Ltd**

20 McCallum Street #09-01

Tokio Marine Centre

Singapore 069046

(Motor Claims Department)

**TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE SJP 4824K ON 17 JUNE 2019**

1. I refer to your request dated 17 June 2019.
2. My analysis, comments and opinions with respect to the cause of fire to the insured vehicle SJP 4824K (herein referred to as "**Insured Vehicle**") are set out below.

**Inspection of the Insured Vehicle**

3. The Insured Vehicle was physically inspected on 17 June 2019 at the location of Block 259 Compassvale Road, multi-storey carpark deck 1B. This location was where the incident had occurred.
4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded: -

Vehicle Registration No.	: SJP 4824K
Make / Model	: Hyundai Avante 1.6A
Chassis No	: KMH DU41BR9U719571
Year of Registration	: 2009 (March)
Mileage	: N.A (battery melted)

5. The Insured Vehicle was noted to have sustained severe fire damage that was confined to its frontal portion. The entire engine compartment of the Insured Vehicle was observed to be extensively burnt while the interior compartment was observed to be partially burnt and/or melted at the front area.
6. The fire had resulted in the body parts at the frontal portion of the Insured Vehicle to be burnt. This had included its front bumper, front bonnet, front fenders, front support panel, front grille, front headlamps, front windscreen, front dashboard and roof upholstery amongst others. See photo 1 – 4 below.



**Photo 1** shows a general view of the front right portion of the Insured Vehicle at the time of my inspection. The fire damage to the Insured Vehicle was confined to its frontal portion. Its front bumper, front bonnet, front grille, front right headlamp and front right fender were amongst the body parts that were found to have been affected as a result of the fire.



**Photo 2** shows a general view of the front left portion of the Insured Vehicle at the time of my inspection. The fire damage to the Insured Vehicle was observed to be relatively severe. Its front bumper, front bonnet, front left headlamp and front left fender were amongst the body parts that were found to have been affected as a result of the fire.



**Photo 3** shows the engine compartment of the Insured Vehicle at the time of my inspection. The entire engine compartment of the Insured Vehicle was observed to be severely burnt. Most of the parts inside the engine compartment were found to be burnt and/or melted as a result of the fire.



**Photo 4** shows the interior compartment of the Insured Vehicle, which was observed to be partially burnt and/or melted at the front area. The front windscreen, front dashboard, plastic trims and roof upholstery were amongst the parts that were found to have been burnt and/or melted as a result of the fire.

7. At the time of my inspection of the Insured Vehicle, I did not find any additionally fitted electronic and/or electrical component(s) on the Insured Vehicle. There was also no modification(s) fitted on the Insured Vehicle.

### **Circumstance of Incident**

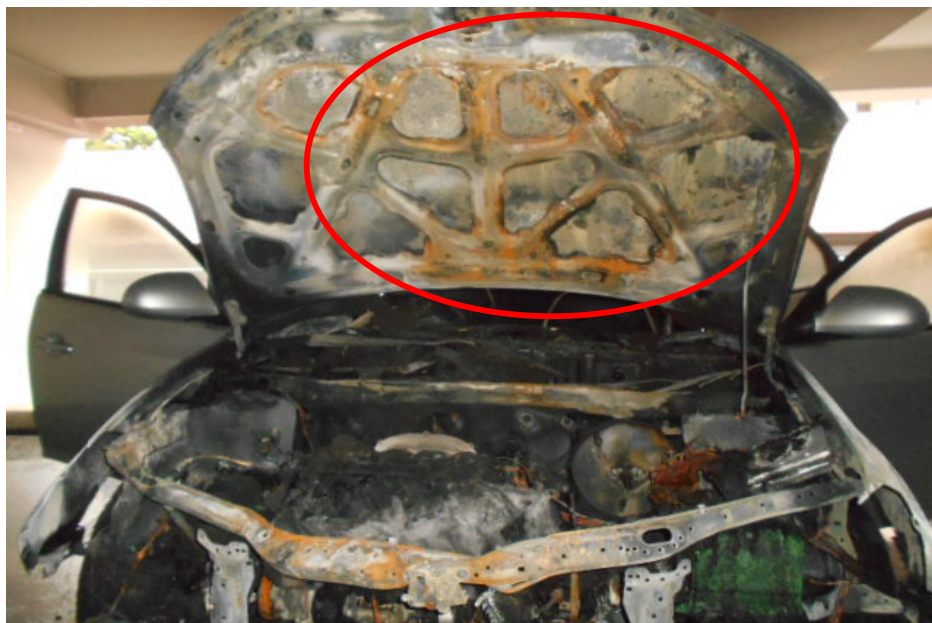
8. From the Police Report F/20190619/2138, which was made by one Tan Xin Lei (herein referred to as "**Ms Tan**"), I note that the fire to the Insured Vehicle had started at a time when it was parked. On 14 June 2019 at about 1430hrs, Ms Tan parked the Insured Vehicle at Block 259 Compassvale Road multi-storey carpark. She then went to Bangkok for a holiday trip on the morning of 17 June 2019. On the same day in the afternoon, whilst she was in Bangkok, Ms Tan received a telephone call from her daughter and from a Police Officer informing her that the Insured Vehicle had caught fire.
9. A detailed statement pertaining to the incident as well as information pertaining to the history of the Insured Vehicle was provided by Ms Tan on 28 June 2019 to the in-house investigator from Tokio Marine Insurance Singapore Ltd. This statement was made available to me for review. Relevant and key information gathered from the statement are appended in the below paragraphs.
10. According to Ms Tan, the Insured Vehicle was purchased about 4 months ago. She is the registered owner of the Insured Vehicle. No one else uses/drives the Insured Vehicle apart from her. Since taking possession of the Insured Vehicle, she has not done any modification(s) and/or fitted any additional electric/electronic component(s) to the Insured Vehicle. She also did not send the Insured Vehicle for any servicing as she was informed by the sales person that the Insured Vehicle was serviced about one week prior to her taking possession. The battery of the Insured Vehicle was also replaced during this servicing.
11. I note from the statement provided by Ms Tan that she last drove the Insured Vehicle on 13 June 2019. This was when she drove to her sister's house, located around the vicinity of River Valley. Thereafter, the Insured Vehicle was parked at her sister's house till the next day (14 June 2019), when she drove the Insured Vehicle back to her home at Compassvale Road. During these drives, she did not experience any abnormality to the operating behaviour of the Insured Vehicle. There was also no warning indicator light(s) lit up on the Insured Vehicle's instrumental cluster.



12. After arriving at her home, Ms Tan parked the Insured Vehicle inside one of the parking lots at Block 259 Compassvale Road multi-storey carpark deck 1B. This was on 14 June 2019 at about 1430hrs. The Insured Vehicle was not utilized/driven thereafter, and it subsequently caught fire on 17 June 2019 when she was in Bangkok.

### **Investigation and Technical Analysis**

13. Given the circumstance of incident described by Ms Tan, the fire had occurred while the Insured Vehicle was parked, not utilized/driven for a significant period of time (approximately 3 days). Common causes of fire arising from a vehicle that was parked with its engine switched off are fire due to external factor (arson etc) or fire due to electrical in nature. For this case, the physical condition of the wrings as seen during my inspection of the Insured Vehicle indicates that the cause of fire was due to electrical in nature. The following paragraphs 14 to 17 discusses the physical evidence relating to this.
14. Firstly, the burn pattern and the rust that had developed on the underside of Insured Vehicle's front bonnet indicates that the fire had originated within the engine compartment of the Insured Vehicle, somewhere around the centre and towards the rear of the engine compartment.
15. The presence of rust on a steel/metal material body panel of a vehicle that was involved in a fire incident is a consequence of that body panel being exposed to natural environmental condition after layers of paint and its related compounds were melted due to prolong exposure of that particular body panel to high heat intensity. This follows the characteristic of heat rising upwards, and therefore exposing the underside of the Insured Vehicle's front bonnet to high heat intensity. I was hence able to identify the origin of fire basing on the physical evidence seen on the body panels of the Insured Vehicle, in particular from the development of rust that was seen on the underside of the Insured Vehicle's front bonnet. See photo 5 & 6 below.

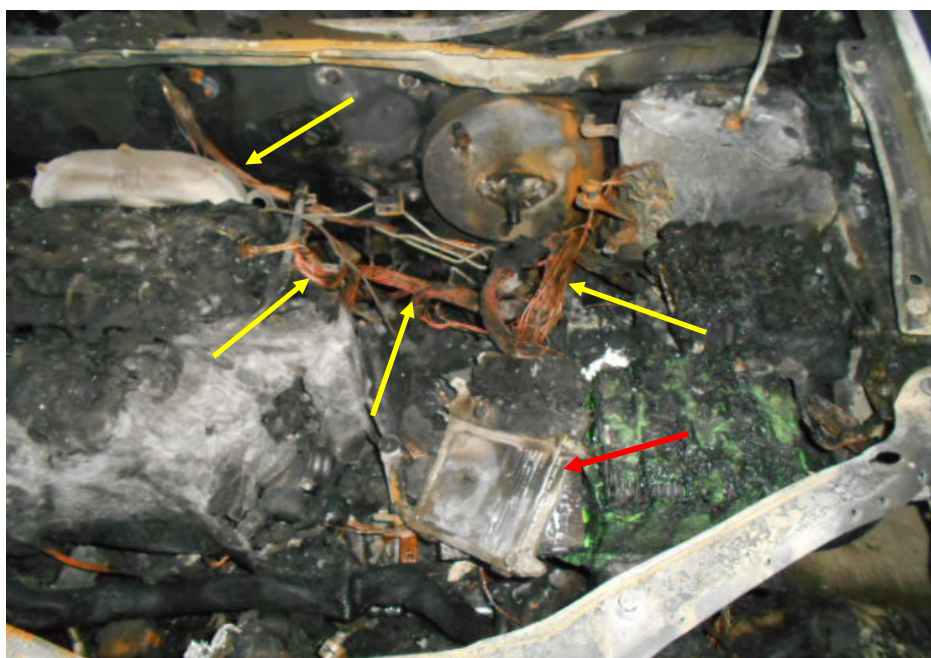


**Photo 5** shows the rust (circled) that was found on the underside of the Insured Vehicle's front bonnet. The presence of rust on a steel/metal material body panel of a vehicle that was involved in a fire incident is a consequence of that body panel being exposed to natural environmental condition after the layers of paint and its related compounds were melted due to prolong exposure of high heat intensity to that body panel. Such physical evidence can normally indicate where the fire of a vehicle had originated.



**Photo 6** shows a general view of where the fire to the Insured Vehicle had originated, which was somewhere around the centre and towards the rear of the engine compartment (circled). This was established from the burn pattern and the rust that had developed on the underside of Insured Vehicle's front bonnet, as well as taking into consideration the characteristic of heat rising upwards.

16. Upon examination of the area around the centre and towards the rear of the engine compartment, which was where the fire to the Insured Vehicle had originated, I had found several stretches of wirings that were completely burned to its bare copper state. These wirings were original wire harnesses connecting the Engine Control Module (ECM) of the Insured Vehicle to multiple sub-control units, sensors and actuators for vehicular operation. The bright reddish colour of the copper wires suggest that the wirings were exposed to high heat. Such condition normally indicates internal heating of copper wires which is a sign of an electrical short circuit occurring. This had suggested that the cause of fire to the Insured Vehicle was due to electrical in nature. See photo 7 – 10 below.



**Photo 7** shows the wirings around the centre and towards the rear of the engine compartment, which was where the fire to the Insured Vehicle had started. Several stretches of wirings (yellow arrow) were found to be burnt to its bare copper state. The bright reddish colour of the copper wires suggest that the wirings were exposed to high heat. Such condition normally indicates internal heating of copper wires which is a sign of an electrical short circuit. The wirings were original wiring harnesses connecting the Engine Control Module (ECM) (arrowed) of the Insured Vehicle to multiple sub-control units, sensors and actuators for vehicular operation.





**Photo 8** shows a closer view of the wirings that were found to be burnt to its bare copper state. Such condition normally indicates internal heating of copper wires which is a sign of an electrical short circuit occurring. These wirings were all original wiring harnesses of the Insured Vehicle.



**Photo 9** shows a closer view of another stretch of bright reddish coloured copper wires that were found within the engine compartment of the Insured Vehicle. Such condition normally indicates internal heating of copper wires, which is a sign of an electrical short circuit. The wirings were original wiring harnesses of the Insured Vehicle.





**Photo 10** shows a closer view of the wirings (arrowed) that were found to be burnt to its bare copper state. These wirings were all original wiring harnesses leading to the Engine Control Module (ECM) (circled) of the Insured Vehicle.

17. Although the engine of the Insured Vehicle was switched off at the material time of incident, some electrical current would still be flowing within the electrical system as several electrical and/or electronic components on the Insured Vehicle would require current to remain in operation and/or in standby mode. These components may include the alarm system, clock, radio and cabin light amongst others. In other words, even if the engine of a vehicle is switched off, it may still be possible for an electrical short circuit to occur.
18. My checks with both local and international bodies and associations revealed that the Insured Vehicle was involved in 2 manufacturer recall campaigns. The first was in April 2016 for issue relating to the deployment of the frontal airbag. Rectification to address this issue was carried out on November 2017.
19. The second manufacturer recall campaign was on February 2018 for issue relating to the connection of a multifunction connector that may trigger warning lights to illuminate on the instrument cluster. From the records, rectification to address the purpose of the second manufacturer recall has not been performed on the Insured Vehicle, as at the time of writing this report. See screenshot 1 & 2 below showing the search result from LTA.

## Enquiry on Vehicle Recall - Vehicle Specific

\* ONLY INFORMATION ON VEHICLE RECALLS SUBMITTED FROM 9 APRIL 2007 IS AVAILABLE

Vehicle Owner Particulars	
Owner ID Type:	Singapore NRIC
Owner ID:	8118I
Vehicle Details	
Vehicle Registration number:	SJP4824K
Make:	HYUNDAI
Vehicle Model:	HD AVANTE 1.6 A
Engine No.:	G4FC9U623811
Chassis No.:	KMH DU41BR9U719571
Recall Details	
1	Recall No.: R2018040521
	Manufacturer Recall Date: 23 Feb 2018
	Estimated Completion Year of Recall: 2020
	Brief Description (As Provided by Motor Dealer): The multifunction connector is not connected firmly in the factory or damaged due to external impact and some vehicles may experience warning lights illuminated on the cluster.
	Date Rectified: -
	For more details, contact KOMOCO MOTORS PTE LTD
	Hotline Information: ISMAIL BIN TAIB at 64735588 CALVIN KAN CHEE KIN at 64735588
2	Recall No.: R2016050243
	Manufacturer Recall Date: 12 Apr 2016

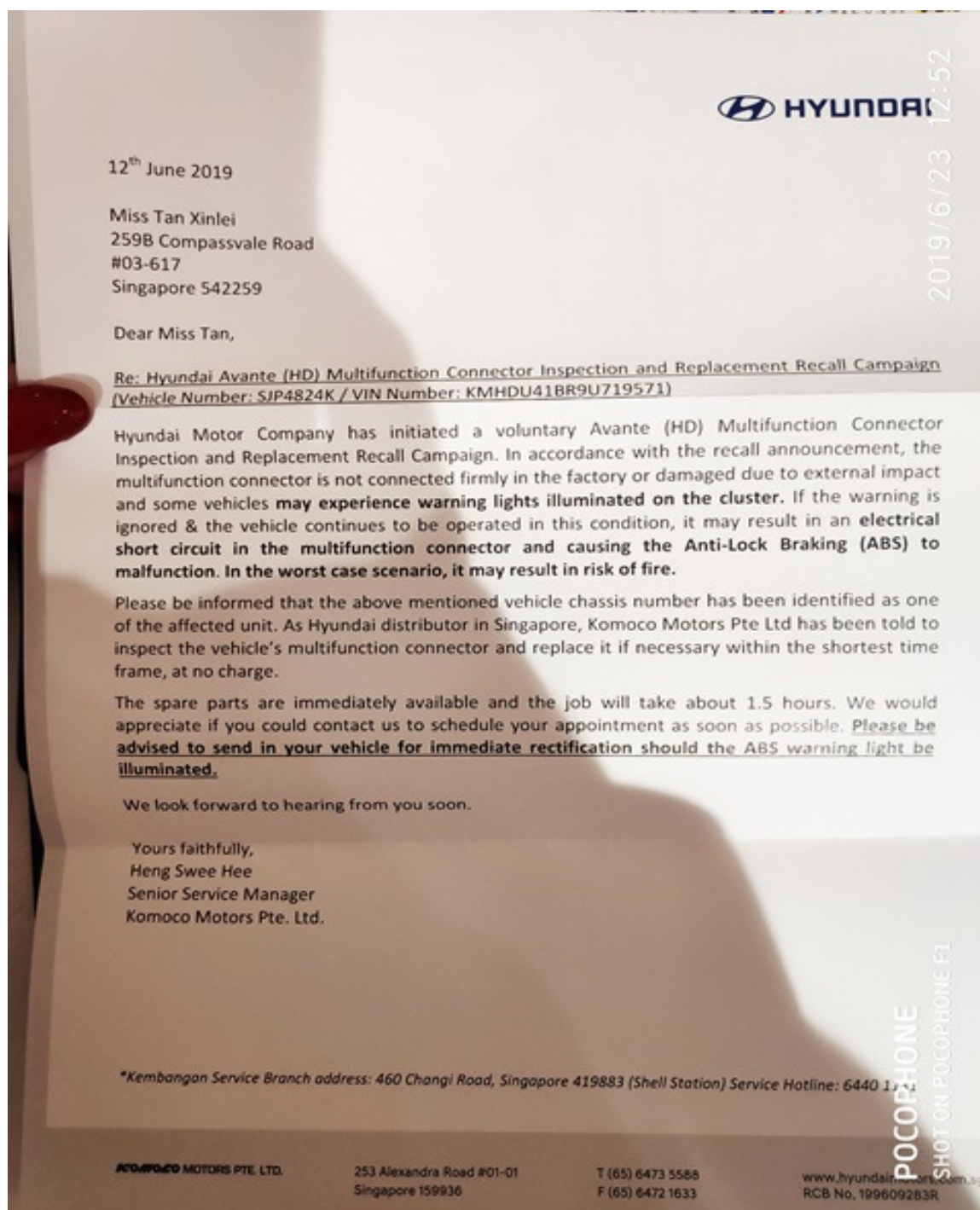
**Screenshot 1** shows the LTA search result regarding the manufacturer recall campaign involving the Insured Vehicle that was initiated on 23 February 2018 (second manufacturer recall). From the description of this recall, the connection of a connector on the Insured Vehicle may trigger warning lights to be illuminated on the instrument cluster. From the records, I also note that rectification to address the purpose of this manufacturer recall has not been performed on the Insured Vehicle, as at the time of writing this report.

2	Recall No.:	R2016050243
	Manufacturer Recall Date:	12 Apr 2016
	Estimated Completion Year of Recall:	2018
	Brief Description (As Provided by Motor Dealer):	Supplementary Restraint System (SRS) deployment software that could inadvertently deploy the frontal airbags when it is not deemed necessary. There is a risk of frontal airbag deployment when vehicle is travelling at low speed or stationary.
	Date Rectified:	21 Nov 2017
	For more details, contact KOMOCO MOTORS PTE LTD	
	Hotline Information:	ISMAIL BIN TAIB at 64735588 CALVIN KAN CHEE KIN at 64735588

**Screenshot 2** shows the LTA search result regarding the manufacturer recall campaign involving the Insured Vehicle that was initiated on 12 April 2016 (first manufacturer recall). The records of LTA had indicated that rectification to address the frontal airbag deployment issue for this manufacturer recall was carried out to the Insured Vehicle on 21 November 2017. This manufacturer recall can be considered to have not contributed and/or caused this fire incident since rectification to address the issue was carried out to the Insured Vehicle, and also because the issue for this manufacturer recall does not pose a fire risk.

20. Investigations carried out by the in-house investigator from Tokio Marine Insurance Singapore Ltd revealed that Ms Tan Xin Lei, the registered owner of the Insured Vehicle, was in fact notified of the second manufacturer recall campaign by way of a letter from Komoco Motors Pte Ltd, the local distributor for Hyundai model vehicles. A copy of the letter was provided to me for review.
21. Firstly, I note that the letter was dated 12 June 2019 and addressed to Ms Tan Xin Lei, the registered owner of the Insured Vehicle. The mailing address indicated in the letter had corresponded to the address indicated in the Police Report that was made by Ms Tan. The letter was advising Ms Tan about the manufacturer recall campaign for the multifunction connector issue, which was the same as recorded in the LTA search result for manufacturer recall involving the Insured Vehicle. Notably, the letter also highlighted the risk of a fire due to an electrical short circuit if the issue was not rectified. Ms Tan was advised to contact Komoco Motors Pte Ltd to schedule an appointment to rectify the issue. See screenshot 3 below showing the letter that was addressed to Ms Tan.





**Screenshot 3** shows the letter that was addressed to Ms Tan Xin Lei, the registered owner of the Insured Vehicle. The letter was pertaining to the manufacturer recall campaign for the multifunction connector issue of the Insured Vehicle, same as the records shown in the LTA search result for manufacturer recall involving the Insured Vehicle. Ms Tan was advised to contact Komoco Motors Pte Ltd to schedule an appointment to rectify the issue. The letter also highlighted the risk of a fire due to an electrical short circuit.

22. My research on multifunction connector revealed that a multifunction connector is a generic term or name for a connector that allows for connection to multiple functions/purposes. It refers to a connector that transmit electrical current and/or electronic data between multiple devices or systems via wirings. For this case, given that the condition of the wirings seen on the Insured Vehicle suggest that the cause of fire was due to electrical in nature (refer to paragraph 16 above), the fire to the Insured Vehicle could then be possibly related to the manufacturer recall campaign for the multifunction connector issue that involved the Insured Vehicle. This is also taking into consideration that rectification to address the issue was not carried out to the Insured Vehicle as at the time of incident; and also, if not rectified an electrical short circuit leading to a fire may occur.

### **Conclusion**

23. Having investigated and technically analysed the damages of burnt nature to the Insured Vehicle, I am of the view that the cause of fire to the Insured Vehicle was of electrical in nature. For this particular case, the fire had originated along the wirings inside the engine compartment, somewhere around the centre and towards the rear of the engine compartment. The wirings were original factory wirings connecting the Engine Control Module (ECM) of the Insured Vehicle to multiple sub-control units, sensors and actuators for vehicular operation.

24. This fire incident could possibly be related to a manufacturer recall campaign that involved the Insured Vehicle as the purpose of the recall was due to a multifunction connector issue that may result in an electrical short circuit leading to a fire. Rectification to address the issue of the multifunction connector was not carried out to the Insured Vehicle prior to this fire incident.

25. There was no modification(s) or additional electronic and/or electrical component(s) fitted on the Insured Vehicle at the time of my inspection of the Insured Vehicle.

### **Ang Bryan Tani**

AMSOE, AMIRTE, AFF SAE, M.MATAI, AFF.Inst.AEA

Senior Technical Investigator

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