LKK Auto Consultants Pte Ltd

Company Registration No. 199607198R

51 UBI AVE 1, #01-25 PAYA UBI INDUSTRIAL PARK, SINGAPORE 408933 TEL : (065) 62563561 FAX : (065) 67414108

Your Ref: S0M02C8S
Our Ref : CS/ASM20000382/P

10th January 2020

M/s AXA Insurance (Singapore) Pte. Ltd.
8 Shenton Way #26-01
Singapore 068811
(Motor Claims Department)

TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE SGK 8626B ON 31st December 2019

1. We refer to your letter dated 6th January 2020 and the instructions therein.

2. Our analysis, comments and opinions with respect to the cause of fire to the insured vehicle SGK 8626B (herein referred to as **"Insured Vehicle"**) are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 7th January 2020 at the premises of SME Motor Pte Ltd located at 1 Kaki Bukit Avenue 6, Blk D #02-15, AutoBay@Kaki Bukit, Singapore 417883.

4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded:-

Vehicle Registration No.	: SGK 8626B
Make / Model	: TOYOTA ESTIMA 2.4A AERAS (A) SR
Chassis No	: ACR500077040
Year of Registration	: DEC 2009
Mileage	: N.A (wiring affected)

5. The Insured Vehicle was noted to have sustained fire damage that was confined to its front right portion. The interior compartment, left, right and rear portion was observed to be unaffected by the fire.

6. The fire had resulted in the body parts at the front right portion of the Insured Vehicle to be burnt. This had included its front windscreen, right headlamp, bonnet, bumper and several parts inside the engine compartment were also observed to sustain heat damage. This includes the timing cover, fuse box, coolant fluid reservoir, brake fluid reservoir and its factory wiring harness. See photos 1 – 12 below.

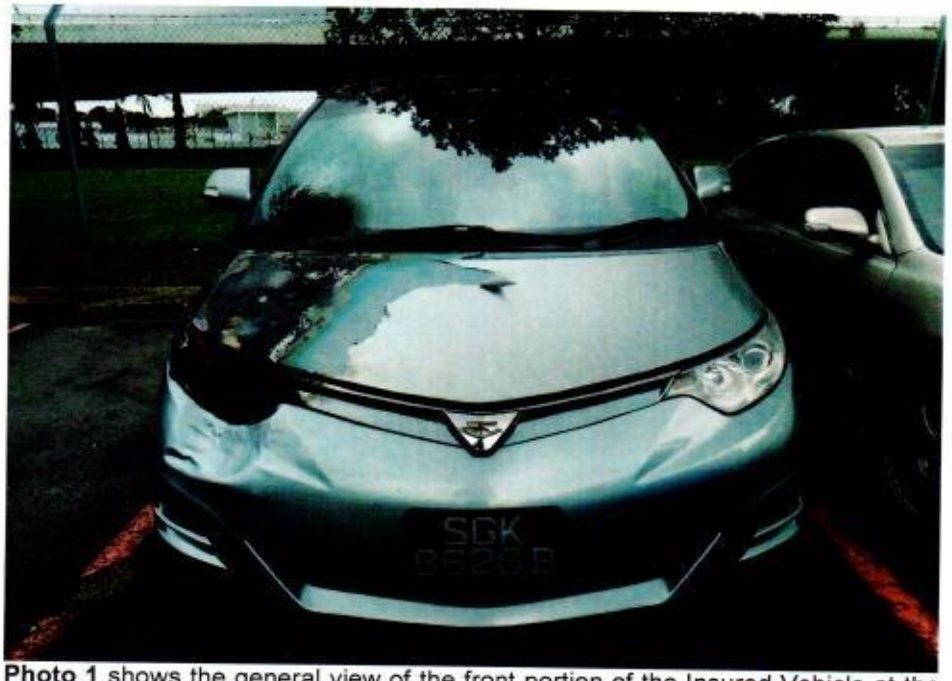


Photo 1 shows the general view of the front portion of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front right portion. Its front windscreen, right headlamp, bonnet, bumper and several parts inside the engine compartment were also observed to sustain heat damage. This includes the timing cover, fuse box, coolant fluid reservoir, brake fluid reservoir and its factory wiring harness., are amongst the body parts that were found to have been affected as a result of the fire.

Photo 2 shows the close-up view of the front portion of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front right portion. As observed its front windscreen (circled) had suffered heat and smoke damage as a result of the fire.

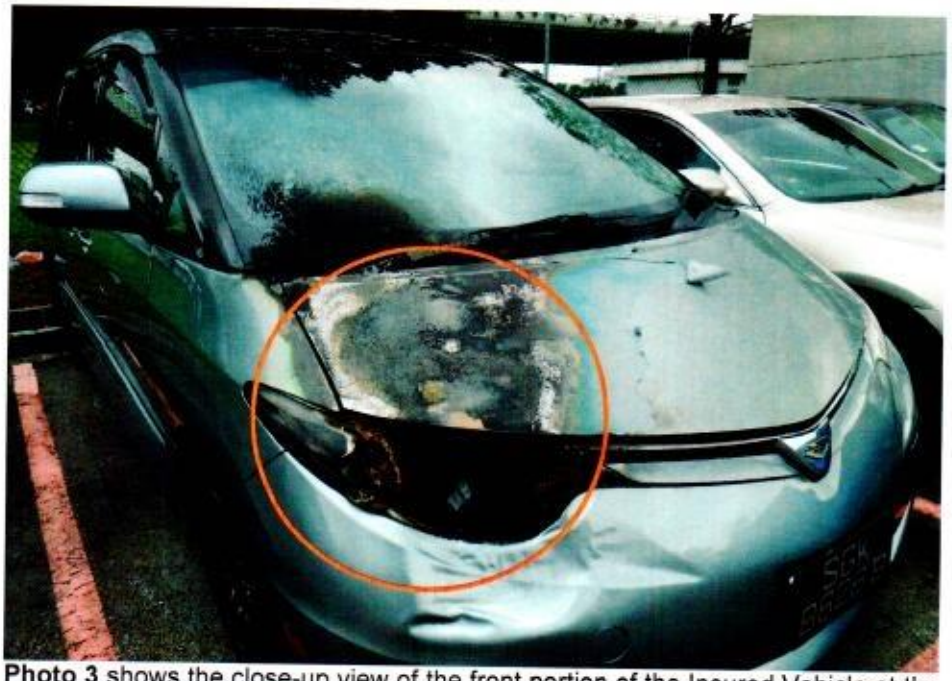


Photo 3 shows the close-up view of the front portion of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front right portion. As observed whitish burn marks (circled) on the surface are a result of exposure to prolonged heat intensity as a result of the fire.

Photo 4 shows the general view of the engine compartment of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front right portion. Its front windscreen, right headlamp, bonnet, bumper and several parts inside the engine compartment were also observed to sustain heat damage. These includes the timing cover, fuse box, coolant fluid reservoir, brake fluid reservoir and its factory wiring harness, are amongst the body parts that were found to have been affected as a result of the fire.

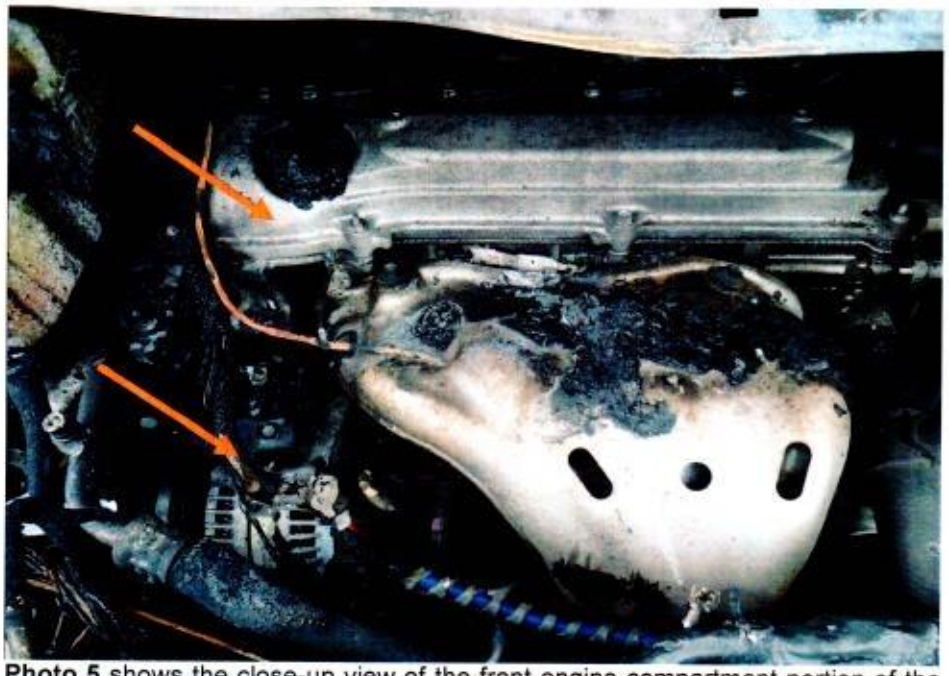


Photo 5 shows the close-up view of the front engine compartment portion of the Insured Vehicle at the time of our inspection. Its timing cover and its factory wiring harness (arrowed) were damaged as a result of the fire.

Photo 6 shows the close-up view of the front engine compartment portion of the Insured Vehicle at the time of our inspection. Its brake fluid reservoir (arrowed) was damaged as a result of the fire.

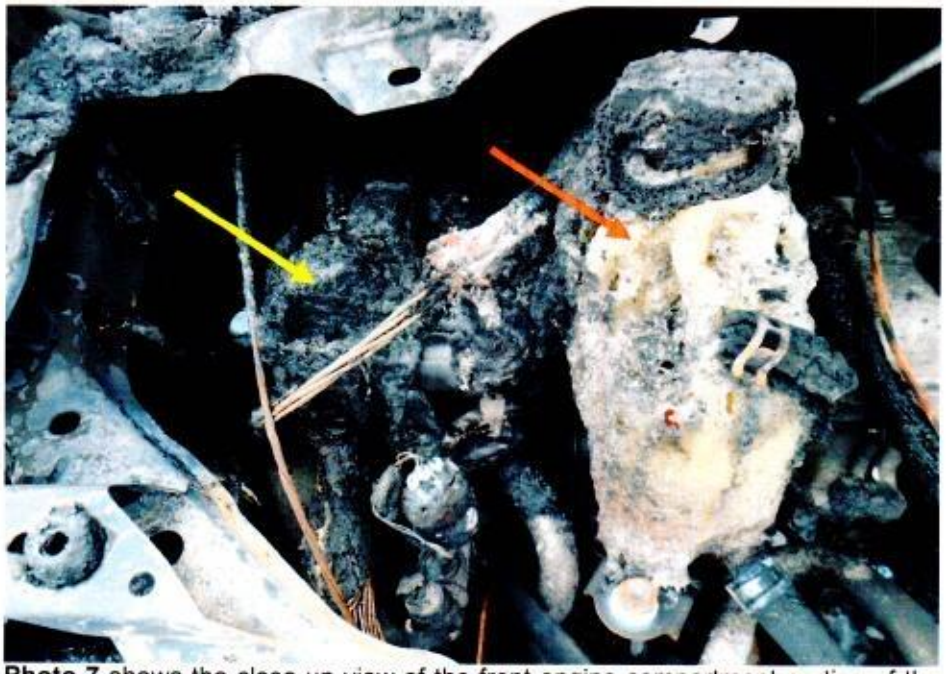


Photo 7 shows the close-up view of the front engine compartment portion of the Insured Vehicle at the time of our inspection. Its coolant fluid reservoir (red arrow) and fuse box (yellow arrow) were damaged as a result of the fire.

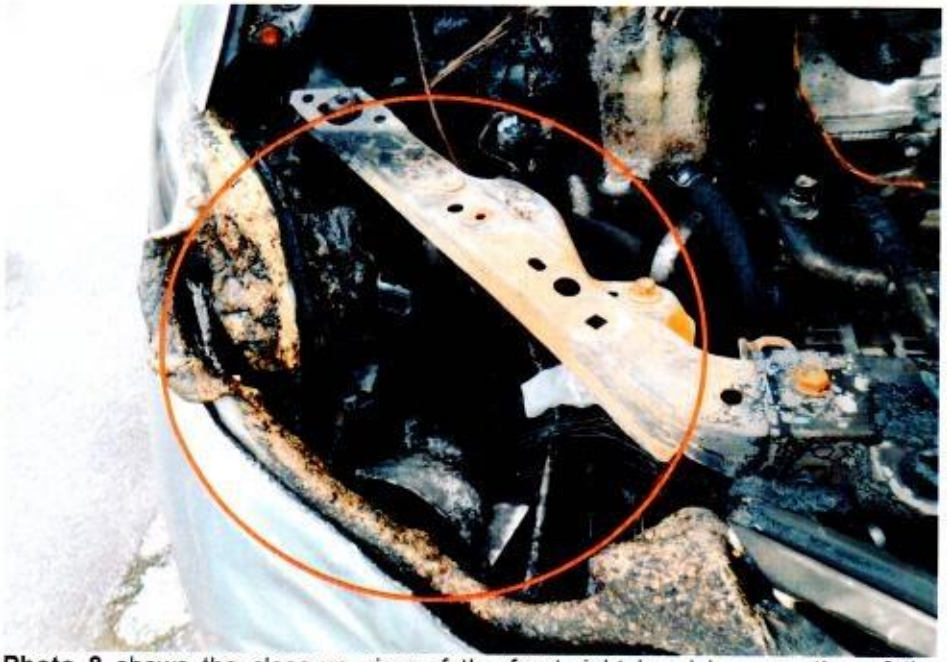


Photo 8 shows the close-up view of the front right head lamp portion of the Insured Vehicle at the time of our inspection. The whole of the head lamp including its housing and its factory wiring harness (circled) were damaged and melted down as a result of the fire.

Photo 9 shows the right portion of the Insured Vehicle, which was observed to be unaffected by the fire.

Photo 10 shows the rear portion of the Insured Vehicle, which was observed to be unaffected by the fire.

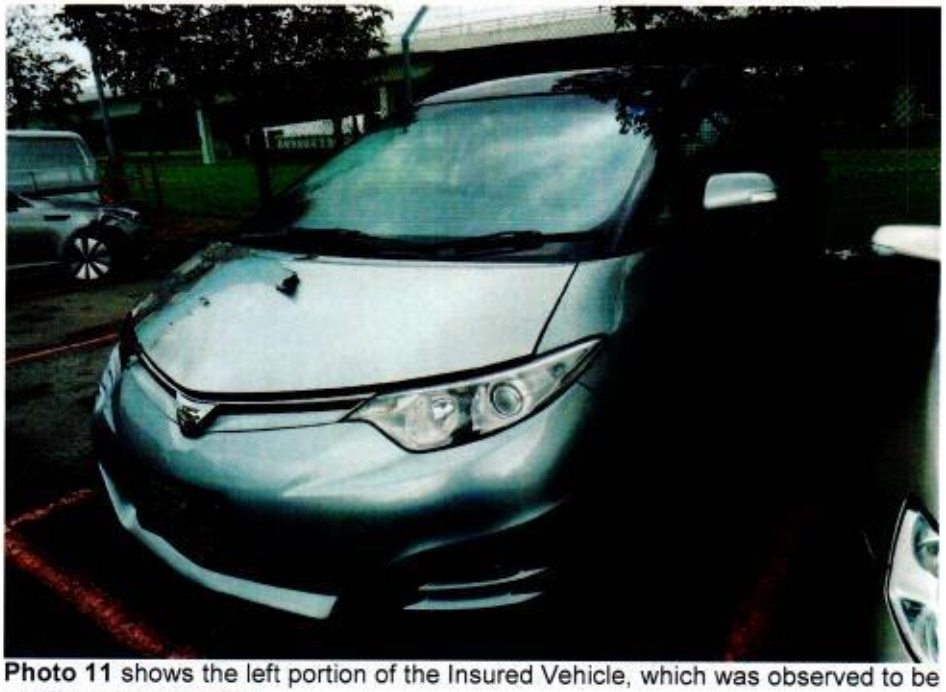


Photo 11 shows the left portion of the Insured Vehicle, which was observed to be unaffected by the fire.

Photo 12 shows the interior compartment of the Insured Vehicle, which was observed to be unaffected by the fire.

7. At the time of inspection of the Insured Vehicle, we observed a set of aftermarket audio head unit system with a pair of audio tweeters, an electronic throttle pedal controller unit and a voltage stabilizer left unfitted on the battery of the Insured Vehicle. See photo 13-17 below.

Photo 13 shows the aftermarket audio head unit (arrowed) of the Insured Vehicle, which was observed to be unaffected by the fire.

Photo 14 shows pair of audio tweeter (left side) (arrowed) of the Insured Vehicle, which was observed to be unaffected by the fire.

Photo 15 shows pair of audio tweeter (right side) (arrowed) of the Insured Vehicle, which was observed to be unaffected by the fire.

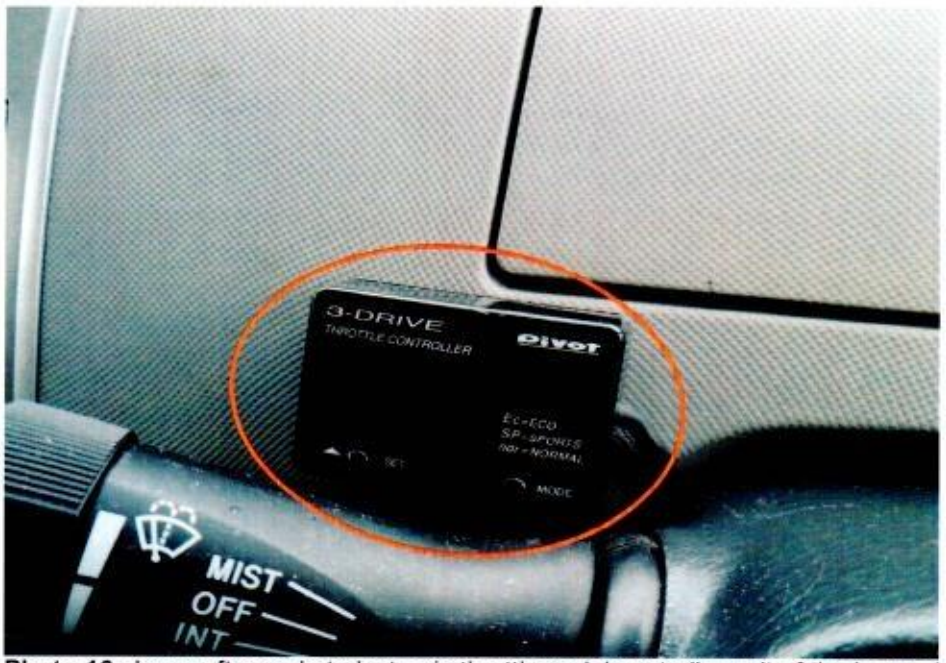


Photo 16 shows aftermarket electronic throttle pedal controller unit of the Insured Vehicle, which was observed to be unaffected by the fire.

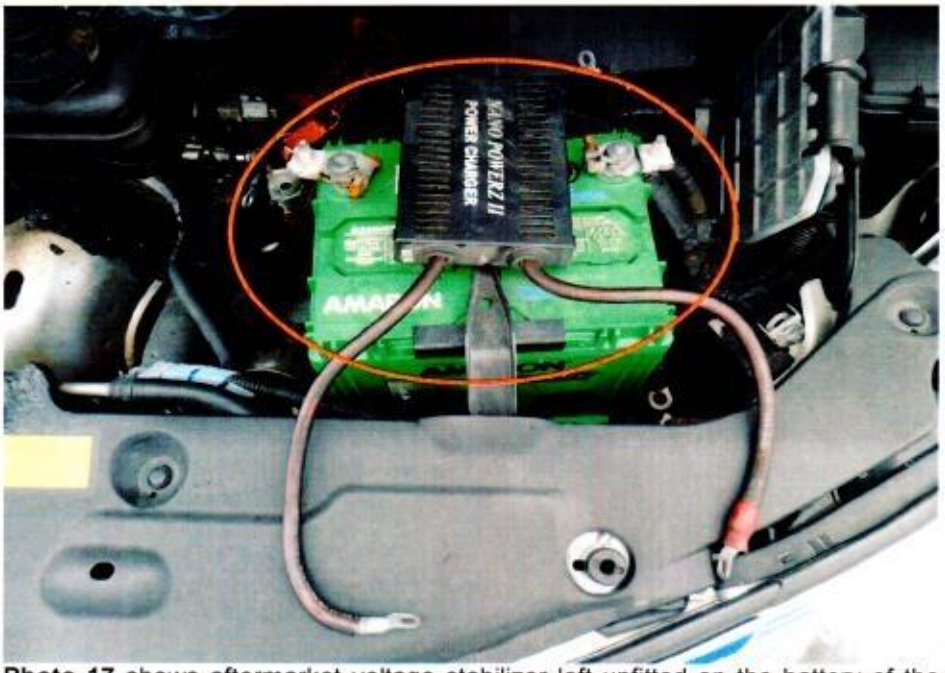


Photo 17 shows aftermarket voltage stabilizer left unfitted on the battery of the Insured Vehicle, which was observed to be unaffected by the fire. At the time of inspection.

Investigation and Technical Analysis

8. For this particular case, the fire appears to have been of electrical nature originated from the right portion of the Insured Vehicle, where the headlamp assembly with the light bulbs are located as the nature of fire damage was confined to these particular areas. This can be determined from the burn pattern of the front right headlamp assembly components which were observed to have been partly melted from the high heat intensity and the high heat intensity burn marks (whitish burn marks) found on the metal parts around the Insured Vehicle. Rust had also developed on these metal brackets.

9. The whitish burn marks are a result of exposure to prolonged heat intensity. Rust would normally start to develop around these areas soon after a fire as prolonged exposure to high heat intensity usually causes steel/metal material body parts to be exposed to natural environmental condition. The rust that had developed on the metal brackets is an indication that the front right position of the Insured Vehicle had sustained exposure to prolonged high heat intensity. See photos 18 - 21 below.

Photo 18 shows the burnt front right headlamp of the Insured Vehicle at the time of our inspection. The headlamp (circled) was complete burned and melted away. Due to heat rises, the prolonged high heat intensity confined to this area caused high heat intensity the surrounding area has suffered heat damage and melted.

Photo 19 shows the exterior front bonnet of the Insured Vehicle, which is situated above the burnt headlamp at the time of our inspection. Due to heat rises, the prolonged high heat intensity confined to this area caused high heat intensity burn marks (whitish burn marks) and rust development on the surface of the metal bonnet of the Insured Vehicle. (circled).

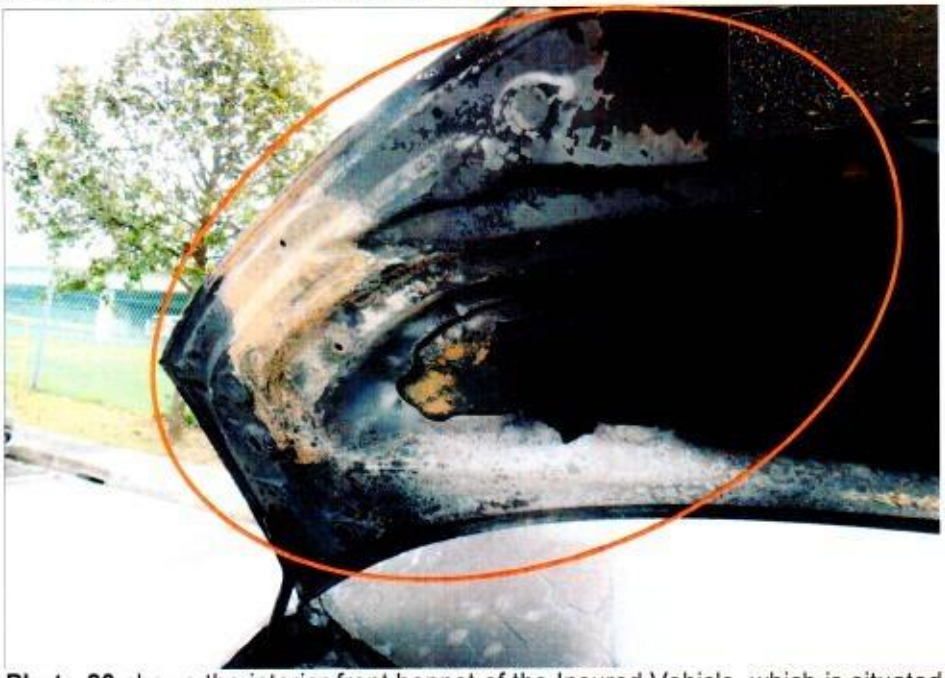


Photo 20 shows the interior front bonnet of the Insured Vehicle, which is situated above the burnt headlamp at the time of our inspection. Due to heat rises, the prolonged high heat intensity confined to this area caused high heat intensity burn marks (whitish burn marks) and rust development on the surface of the metal bonnet of the Insured Vehicle. Rust had also developed on the surface. (circled).

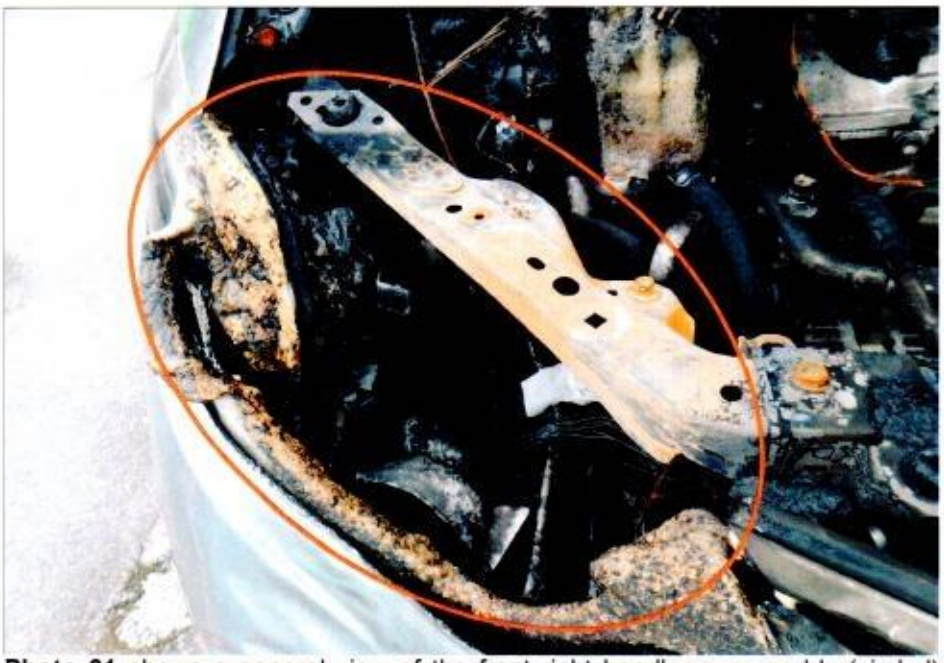


Photo 21 shows a general view of the front right headlamp assembly (circled) and the various surrounding components. The headlamp assembly and various components was observed to be melted from the high heat intensity. Rust development was also observed on the metal brackets of the Insured Vehicle.

10. Upon closer examination of the front right portion of the Insured Vehicle which was where the fire had likely started, we had found traces of greenish residue on the wirings leading from the halogen light bulb to the fuse box. Both the halogen light bulb and fuse box were factory fitted. The presence of greenish residue indicates internal heating of copper wires, a sign of an electrical short circuit occurring. The greenish residue is normally left behind from oxidation as a result of chemical reaction involving the copper wires. This physical evidence would then appear to suggest that the cause of fire to the Insured Vehicle could have possibly been due to electrical in nature. See photos 22 - 25 below.

Photo 22 shows general view of the wirings leading from the halogen light bulb to the fuse box. Both the halogen light bulb and fuse box were factory fitted. The presence of greenish residue indicates internal heating of copper wires, a sign of an electrical short circuit occurring. The greenish residue is normally left behind from oxidation as a result of chemical reaction involving the copper wires.

Photo 23 shows the close-up view of the headlamp. Observed was greenish residue on the wiring harness leading (arrowed) from the headlamp light bulb (circled). to the fuse box Observed was greenish residue on the wiring harness. The presence of greenish residue indicates internal heating of copper wires, a sign of an electrical short circuit occurring. The greenish residue is normally left behind from oxidation as a result of chemical reaction involving the copper wires.

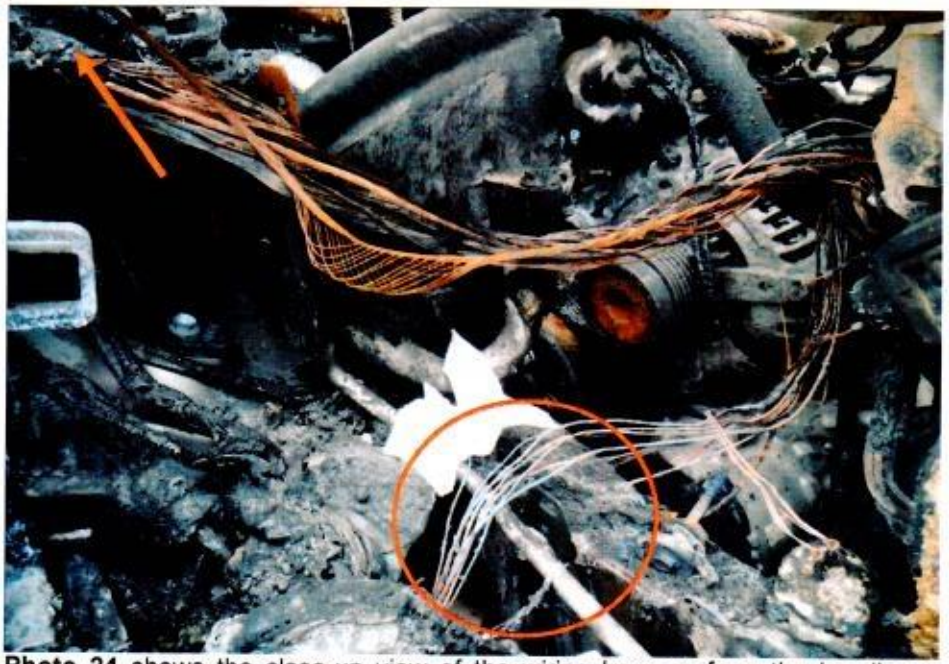


Photo 24 shows the close-up view of the wiring harness from the headlamp. Observed was greenish residue on the wiring harness (circled) leading from the headlamp light bulb to the fuse box (arrowed) Observed was greenish residue on the wiring harness. The presence of greenish residue indicates internal heating of copper wires, a sign of an electrical short circuit occurring. The greenish residue is normally left behind from oxidation as a result of chemical reaction involving the copper wires.

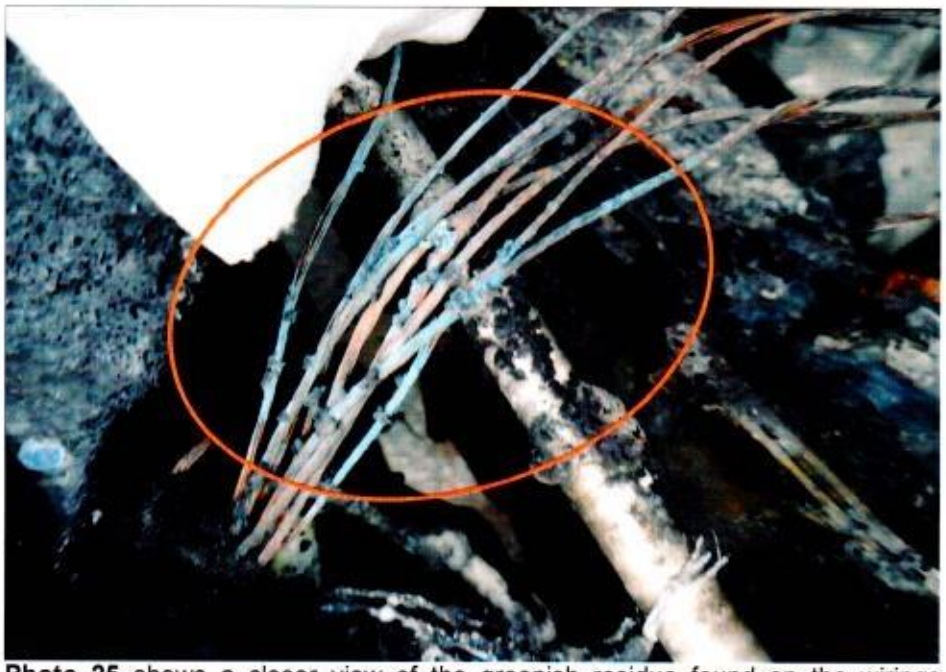


Photo 25 shows a closer view of the greenish residue found on the wirings (circled) of the light bulb leading to the fuse box of the Insured Vehicle. This seems to suggest the occurrence of an electrical short circuit.

11. We managed to speak to Mdm Chua on 10th January 2020 where we were able to gather further information pertaining to the incident as well as information pertaining to the history of the Insured Vehicle.

12. From the Singapore Accident Statement, which was made by Mdm Chua (herein referred to as **"Mdm Chua"**), we note that the fire to the Insured Vehicle had started at a time when it was parking stationary at a carpark. Mdm Chua first spotted white smoke emitting from the front bonnet of the Insured Vehicle.

13. According to Mdm Chua, at about 0945hrs on 31st December 2019, she was travelling from home Potong pasir to Tekka market. She parked the Insured Vehicle at the basement carpark of Tekka market and turned the ignition off. Shortly after she locked and walked away from the Insured Vehicle, she noticed white smoke emitting from the front bonnet area of the insured vehicle.

14. Mdm Chua upon spotting the smoke emitting out from the front bonnet, a passer-by advised her to open the bonnet to check out the cause, upon opening the bonnet she notice that there was flames emitting. Subsequently she proceeded to request for SCDF assistance and rang the fire alarm at the scene.

15. Mdm Chua mentioned that, In the midst of waiting for SCDF assistance. A passer-by at the vicinity came to render assistance. Subsequently the SCDF and arrived shortly and the fire was extinguished fairly quickly, then after Mdm Chua had her statement taken by the SCDF officers.

16. Mdm Chua rang up her husband the owner of the Insured Vehicle and he subsequently made towing arrangements on the same day with his Insurance company (AXA). The Insured Vehicle was towed to SME Motor Pte. Ltd. where they made an insurance report on the following work day on 1st January 2020 at 1620 hours.

17. Mdm Chua mentioned that she had not experienced any mechanical or electrical/electronic problems with the Insured Vehicle till the day of the incident. He also mentioned that there were neither warning lights displayed nor was there an abnormal rise in temperature throughout the period the Insured Vehicle prior to the fire.

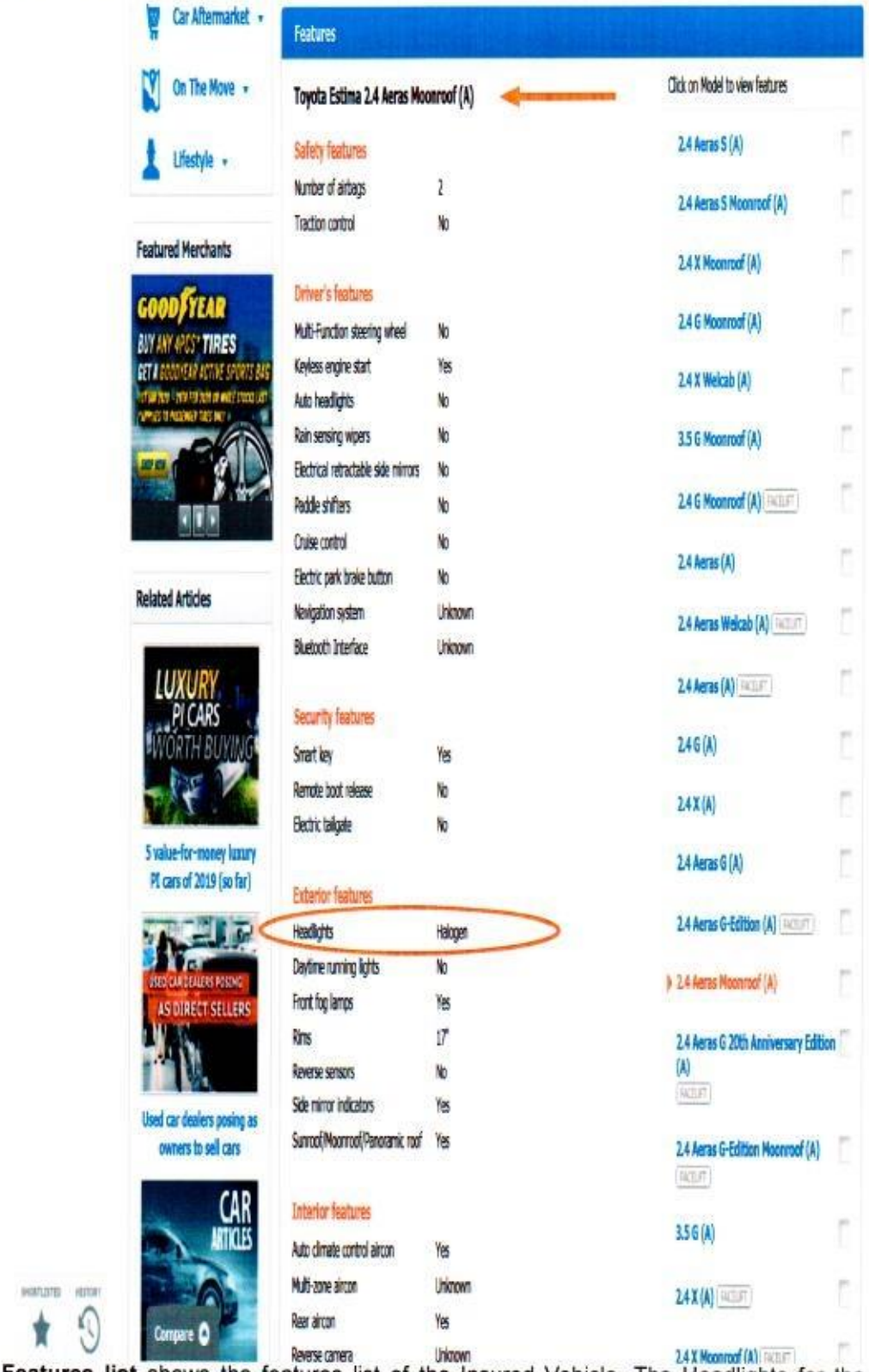
18. With regards to the history of the Insured Vehicle, we were able to gather from Mdm Chua that the Insured Vehicle was purchased pre-owned about 2 years back and her husband Mr Ang Eng is the registered owner of the Insured Vehicle. Mdm Chua informed us that she and her husband share the use of the Insured vehicle. Informed us that they did not keep any servicing and LTA inspection records and informed that there was no major overhaul done to the Insured Vehicle.

19. Fire due to an overheated engine was unlikely as the Insured Vehicle was driven from Mdm Chua's home to Tekka market without any abnormalities and bring it to a complete stop. In the event if the Insured Vehicle's engine had overheated, the mechanical parts inside the engine would first seize causing the engine to stall. Mdm Chua would have likely experienced engine stalling shortly rendering the Insured Vehicle undriveable.

20. The possibility of the fire being due to external factors (foreign material(s) stuck on hot surfaces, arson and sabotage amongst others) would also seem unlikely as the fire occurred as Mdm Chua was driving the Insured Vehicle before parking it stationary in a carpark. The location where the Insured Vehicle caught fire was also observed to be not at a secluded location.

21. The possibility of the fire being due to electrical in nature would then seem more likely given that engine overheating and external factors would both seem unlikely. The fire being due to electrical nature is also supported by the condition of the wirings that were found leading from the halogen light bulb to the fuse box on the Insured Vehicle, which was earlier discussed in paragraph 10 above.

22. Our checks with both local and international bodies and associations had revealed that at the time of writing this report, there is no manufacturer recall of electrical nature to similar make and model vehicle as the Insured Vehicle that may possibly be related to this incident. The factory headlamp features show the Insured Vehicle of the particular year did came fitted with halogen light bulbs as standard.



Features list shows the features list of the Insured Vehicle. The Headlights for the Insured Vehicle of the make and model (arrowed) shows that it came factory fitted with Halogen lights (circled) as found on the Insured Vehicle at the time of inspection.

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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:	146E

Vehicle Details

Vehicle Registration number:	SGK8626B
Make:	TOYOTA
Vehicle Model:	ESTIMA 2.4 AERAS A SR
Engine No.:	2AZC471043
Chassis No.:	ACR500077040

Recall Details

No Recall Detail records

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Land Transport Authority
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Recall shows the check of vehicle recall on LTA website. There was no recall on the Insured Vehicle at the time to the fire incident.

Conclusion

22. Having investigated and technically analysed the damages of burnt nature to the Insured Vehicle, we are of the view that the cause of fire to the Insured Vehicle was of short circuit from the halogen light bulbs wirings to the fuse box that caused the fire. For this particular case, the fire had originated from the front right headlight of the Insured Vehicle.

23. We did not find any evidence which had suggested that the cause of fire to the Insured Vehicle was due to poor maintenance and/or recurring electrical problem.

24. Our investigations had also revealed that at the time of writing this report, there is no manufacturer recall to similar make and model vehicle as the Insured Vehicle that may possibly be related to this incident.

Sherwin Beh
Technical Investigator

Ang Bryan Tani
AMSOE, AMIRTE, AFF SAE, M.MATAI, AFF.Inst.AEA
Senior Technical Investigator
Technical Investigation & Reconstructionist (SAE-A)