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Company Registration No. 199607198R
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Your Ref: C10022597
Our Ref : CI/AGI23006710/P

3rd July 2023

M/s Budget Direct Insurance
190 Clemenceau Avenue #03-01
Singapore Shopping Centre
Singapore 239924
(Motor Claims Department)

TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE SLM 9385U ON 29th MAY 2023

1. We refer to your letter dated 5th June 2023 and the instructions therein.

2. Our analysis, comments and opinions with respect to the cause of fire to the insured vehicle SLM 9385U (herein referred to as **"Insured Vehicle"**) are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 14th June 2023 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.	: SHC 688E
Make / Model	: HYUNDAI HD AVANTE 1.6A
Chassis No	: KMHDU41BR9U757930
Year of Registration	: MAY 2009
Mileage	: N.A (wiring affected)

5. The Insured Vehicle was observed to have sustained severe fire damage. Its engine compartment was completely burnt and interior compartment had sustained heat and smoke damage. Rust had accumulated around the engine compartment of the Insured Vehicle as a result of exposure to environmental condition for a period of time. See photos 1 – 6 below.

Photo 1 shows the rear portion of the Insured Vehicle, which was observed to be unaffected by the fire.

Photo 2 shows the rear right body of the Insured Vehicle, which was observed to be unaffected by the fire.

Photo 3 shows the rear left body of the Insured Vehicle, which was observed to be unaffected by the fire.

Photo 4 shows the general view of the front portion of the Insured Vehicle at the time of our inspection. The Insured Vehicle was observed to have sustained severe fire damage. Its engine compartment was completely burnt. Rust had accumulated around the engine compartment of the Insured Vehicle as a result of exposure to environmental condition for a period of time.

Photo 5 shows the engine compartment of the Insured Vehicle at the time of our 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 6 shows the interior view from the right side of the Insured Vehicle at the time of our inspection. The interior of the Insured Vehicle was observed to be affected by heat & smoke damage as the result of the fire.

6. At the time of inspection of the Insured Vehicle, we found aftermarket components and additionally fitted electronic component and its electrical wirings in the Insured Vehicle. The aftermarket components are the aftermarket wheel rims and aftermarket infotainment unit. The additionally fitted components are 2 audio speakers and 2 audio tweeters as well as 2 audio amplifiers located at the bottom of the both front seats of the interior compartment of the Insured Vehicle. See photo 7 - 12 below.

Photo 7 shows the tyre and wheel rims of the Insured Vehicle it was observed to be fitted with aftermarket wheel rims, which was observed to be unaffected by the fire.

Photo 8 shows the interior centre dashboard of the Insured Vehicle an aftermarket infotainment unit on the Insured Vehicle, which was observed to be unaffected by the fire.

Photo 9 shows the left side of the interior dashboard of the Insured Vehicle an additionally fitted audio speakers and tweeters (circled) on the Insured Vehicle, which was observed to be affected by the fire.

Photo 10 shows the right side of the interior dashboard of the Insured Vehicle an additionally fitted audio speakers and tweeters (circled) which was observed to be affected by the fire.

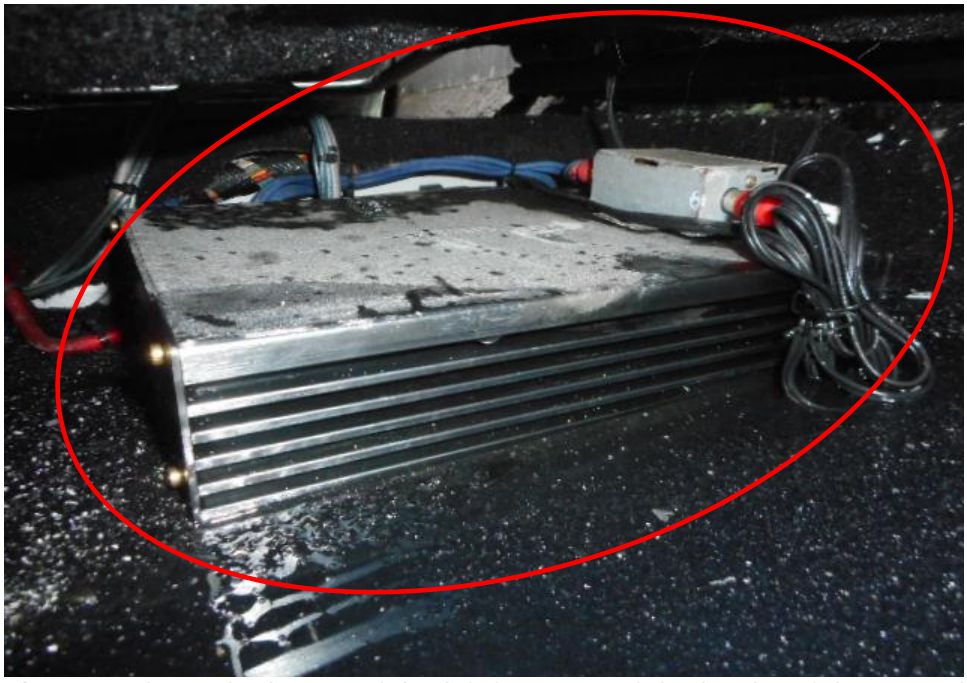

Photo 11 shows the bottom of the left front seat of the interior of the Insured Vehicle an additionally fitted audio amplifier (circled) which was observed to be unaffected by the fire.

Photo 12 shows the bottom of the right front seat of the interior of the Insured Vehicle an additionally fitted audio amplifier (circled) which was observed to be unaffected by the fire.

Investigation and Technical Analysis

7. For this particular case, the fire appears to have originated from the front right portion of the engine compartment of the Insured Vehicle. This can be determined from the burn pattern of the various components in the engine compartment and also the left and right tyres, which were observed to have been partly melted and burn 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 parts.

8. 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 13 - 15 below.

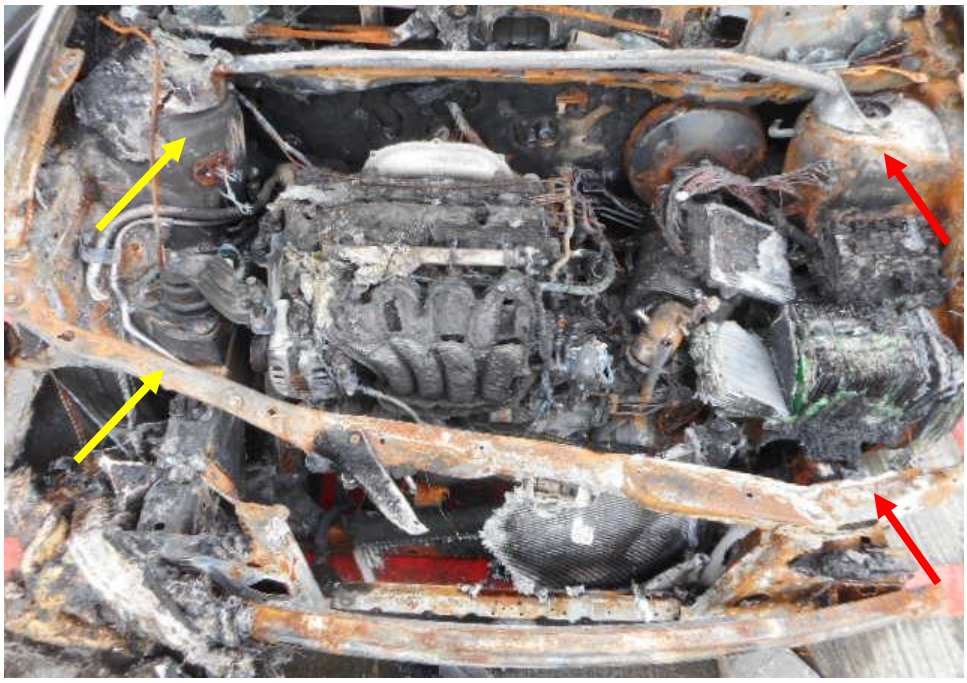

Photo 13 shows the engine compartment of the Insured Vehicle at the time of our inspection. The high heat intensity burn marks (whitish burn marks) and rust that had development all around the engine compartment indicates that the fire had originated from the engine compartment of the Insured Vehicle. However we observed that the right side of the engine compartment (red arrow) had sustained more high head intensity burn marks as compared to the left side engine compartment (yellow arrow)

Photo 14 shows the front left tyre which was closest to the engine compartment of the Insured Vehicle at the time of our inspection. The tyre had sustained high heat intensity burn and melted where rust that had development all around it indicates that the fire had originated from the right engine compartment of the Insured Vehicle.

Photo 15 shows the front right tyre which was also closest to the engine compartment of the Insured Vehicle at the time of our inspection. The tyre had sustained high heat intensity burn and melted however, there was no rust that development all around it indicates that the fire had originated from the right engine compartment of the Insured Vehicle.

9. Upon closer examination of the engine compartment of the Insured Vehicle which was where the fire had started, we had found traces of greenish residue on the wirings harnesses leading from the Electrical Control Unit (ECU) to the fuse box. These wirings were original wirings fitting from manufacturer. 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 the 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 16 - 19 below.

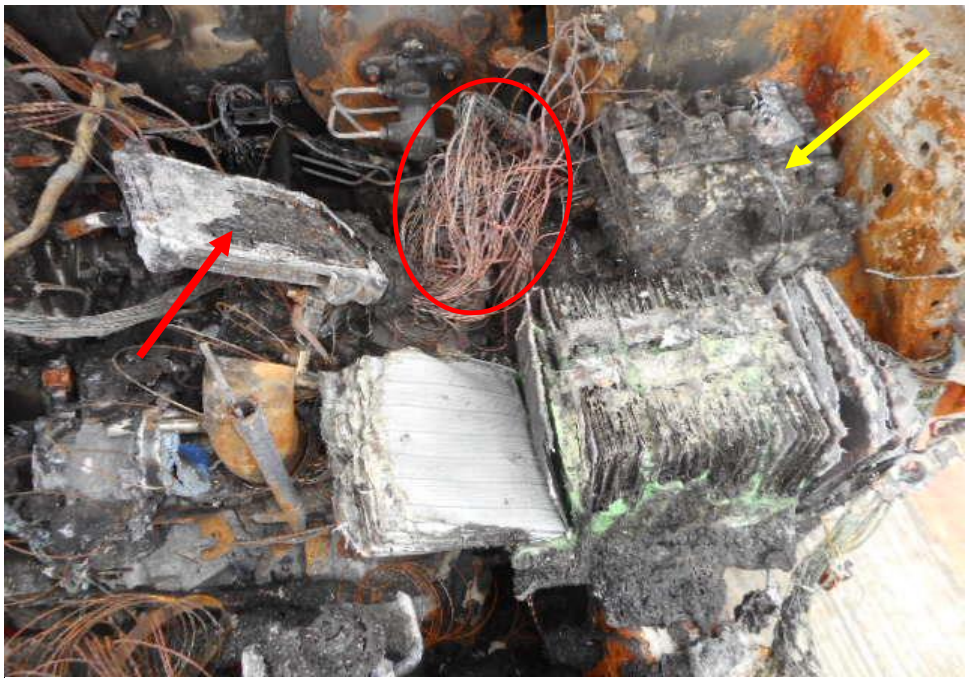

Photo 16 shows a general view of the original wiring harness in the engine compartment. There were greenish residue observed on the original wiring harness (circled) leading from the Electrical Control Unit (ECU) (red arrow) to the fuse box (yellow arrow). The presence of greenish residue indicates internal 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.

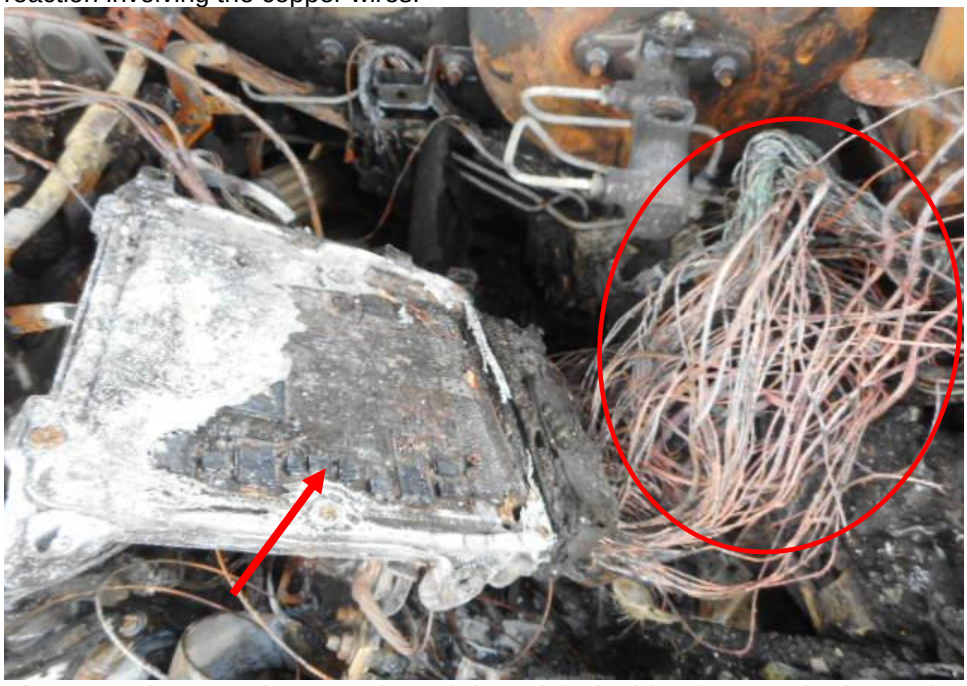

Photo 17 shows a close up view of the original wiring harness in the engine compartment. There were greenish residue observed on the original wiring harness (circled) leading from the Electrical Control Unit (ECU) (red arrow) to the fuse box. The presence of greenish residue indicates internal heating 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.

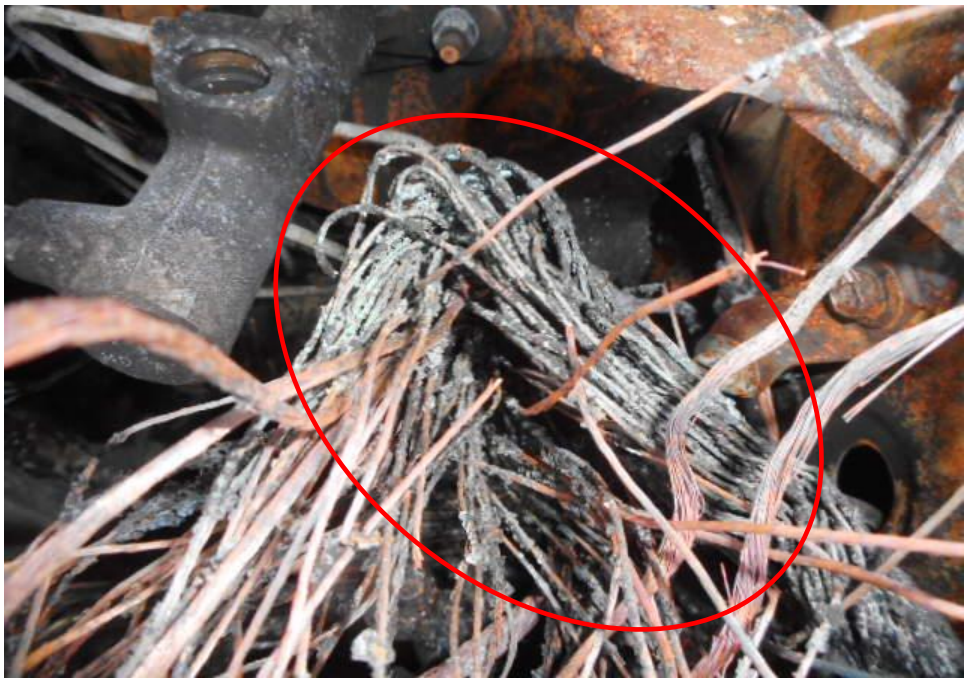

Photo 18 shows a close up view of the original wiring harness in the engine compartment. There were greenish residue observed on the original wiring harness (circled) leading from the Electrical Control Unit (ECU) to the fuse box. The presence of greenish residue indicates internal heating of copper 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.

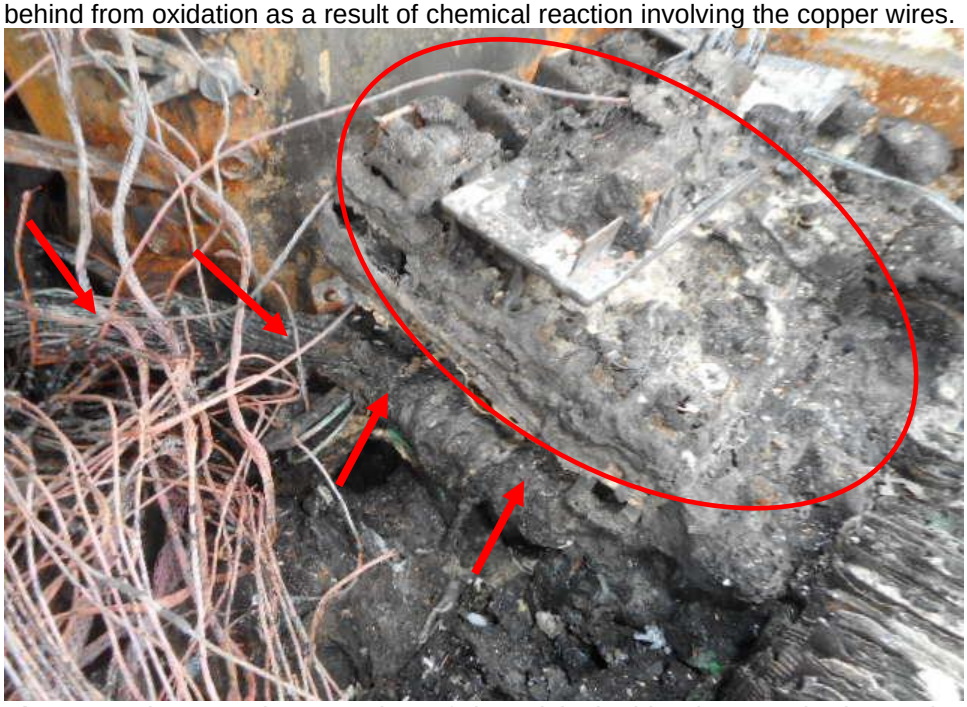

Photo 19 shows a close up view of the original wiring harness in the engine compartment. There were greenish residue observed on the original wiring harness (arrowed) leading from the Electrical Control Unit (ECU) to the fuse box (circled). The presence of greenish residue indicates internal heating 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.

10. From the Singapore Accident Statement, which was made by Mr Rayhan Bin Mohd ISA (herein referred to as **"Mr Rayhan"**), we note that the fire to the Insured Vehicle had started at a time when he was parking the Insured Vehicle at a parking lot. Mr Rayhan was first alerted of the fire when he detected burning smell in the cabin of the Insured Vehicle.

11. We managed to speak to Mr Rayhan on 15th June 2023 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. According to Mr Rayhan, on 29th May 2023, at about 2320 hours he was drove the Insured Vehicle from his house at Pasir Ris with his girlfriend in the Insured Vehicle to towards Block 157C Sengkang open air carpark which was his girlfriend's house . Mr Rayhan reached his girlfriend house and parked the Insured Vehicle and shut off the engine, shortly after he smelt burning smell in the cabin of the Insured Vehicle and saw smoke white smoke emitting out from the front left engine compartment area, he and his girlfriend immediately exited the Insured Vehicle.

13. Mr Rayhan mentioned that he opened the bonnet and saw that there were flames and smoke emitting out from front right engine compartment area of the Insured Vehicle. Mr Rayhan informed that a driver who was around the vicinity passed him a small bottle of fire extinguisher and he immediately started to extinguish the fire however, the fire was too strong and had started to spread to the whole engine compartment. Mr Rayhan and as girlfriend then went to a safe spot and called for SCDF assistance and they arrived within 8 minutes and the fire was put out shortly. Mr Rayhan was given a case number after his statement was taken by the SCDF officers.

14. Mr Rayhan subsequently contacted his company and made towing arrangements on the same day with his insurance company. The Insured Vehicle was towed to SME Motor Pte Ltd where Mr Rayhan made an insurance report the next day at 1730 hours.

15. Mr Rayhan mentioned that he 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 and when driven, prior to the fire.

16. With regards to the history of the Insured Vehicle, we were able to gather from Mr Rayhan that the Insured Vehicle was purchased pre-owned 1 week prior to the fire incident and he is the only driver of the Insured Vehicle.

17. Pertaining to the maintenance aspect, Mr Rayhan informed us that no periodical servicing was done to the Insured Vehicle as it was just bought 1 week ago prior to the fire incident.

18. Pertaining to the additionally fitted and aftermarket modifications, Mr Rayhan informed us that the aftermarket wheel rims, aftermarket infotainment unit the additionally fitted 2 audio speakers and 2 audio tweeters as well as 2 audio amplifiers was all fitted by the previous owner. Mr Rayhan provided us with the proof pictures and chat conversations of with the car dealer before the Insured Vehicle was bought over and transferred to Mr Rayhan. See photos 20 and 21 below.

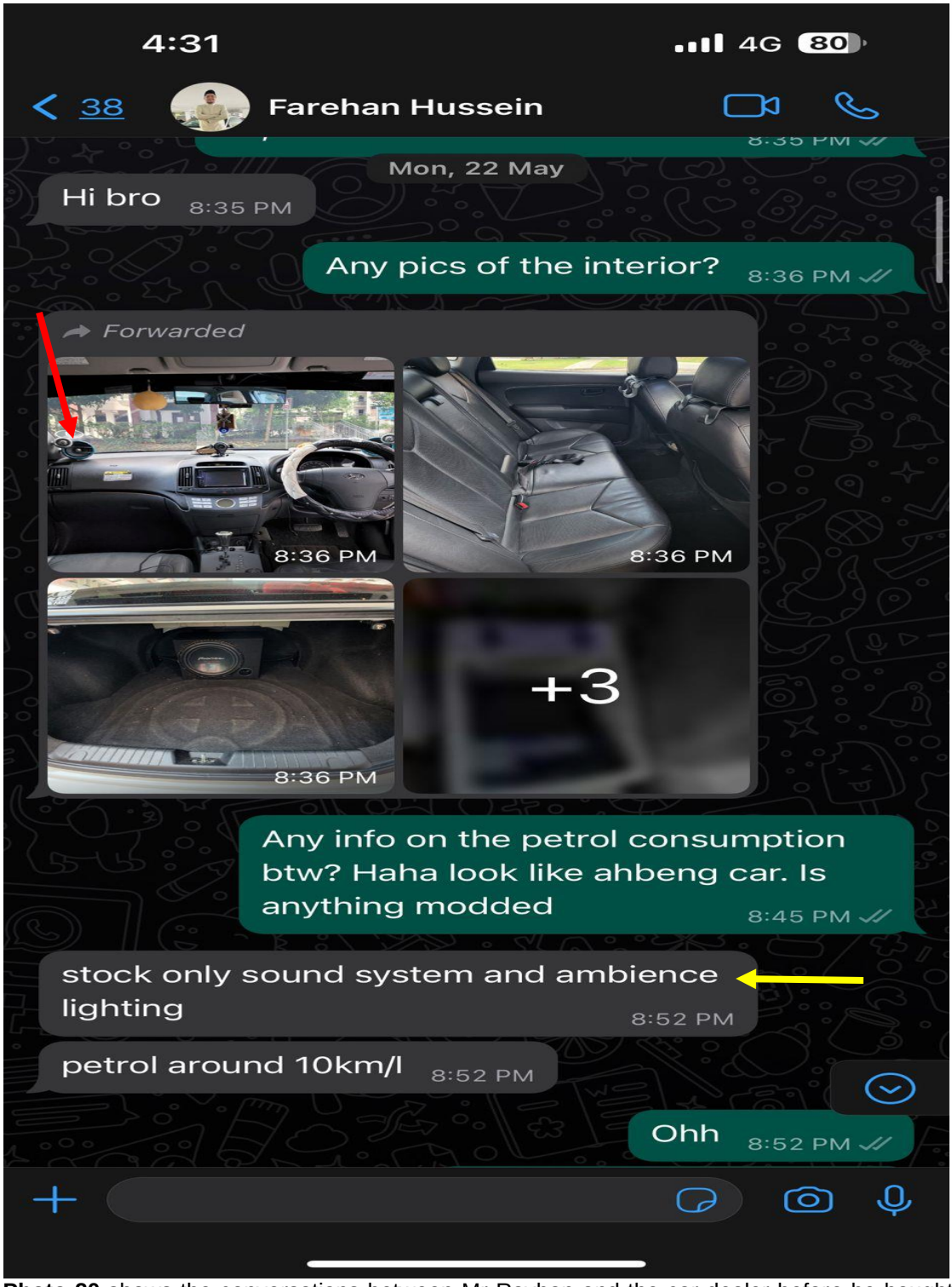

Photo 20 shows the conversations between Mr Rayhan and the car dealer before he bought the Insured Vehicle. In the conversations the car dealer had sent over the interior pictures for Mr Rayhan to view and it shows that the Vehicle had already been fitted with the additional audio speakers and audio tweeters (red arrow) and the car dealer had also mentioned that the Vehicle had already been fitted with additional sound system (yellow arrow).

Photo 21 shows photos that the car dealer had sent to Mr Rayhan before he bought the Insured Vehicle. The car dealer had sent over the interior pictures for Mr Rayhan to view and it shows that the Vehicle had already been fitted with the additional audio speakers and audio tweeters (arrowed) and also the aftermarket infotainment unit (yellow arrow).

Incident Scene Photographs

19. During the course of our investigations, we were able to obtain coloured photographs showing the Insured Vehicle at the incident location before, during and after the fire was extinguished by SCDF personnel. These were provided to us by Mr Rayhan.

20. Our examination of these photographs revealed that the fire had started from the front of the engine compartment of the Insured Vehicle. The photographs had also showed the Insured Vehicle on fire and similar extent of damage and burn pattern to the Insured Vehicle as per what we had observed during our physical inspection of the Insured Vehicle. Apart from the aforesaid, there was no further notable information that could be gathered from these photographs. See photos 22 - 24 below which were provided to us by Mr Rayhan.

Photo 22 shows the smoke and flames emitting from the front of the Insured Vehicle before the arrival of the SCDF. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Rayhan, location when the fire broke out.

Photo 23 shows the Insured Vehicle at the incident location as the fire was extinguished by SCDF personnel. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Rayhan, location when the fire broke out.

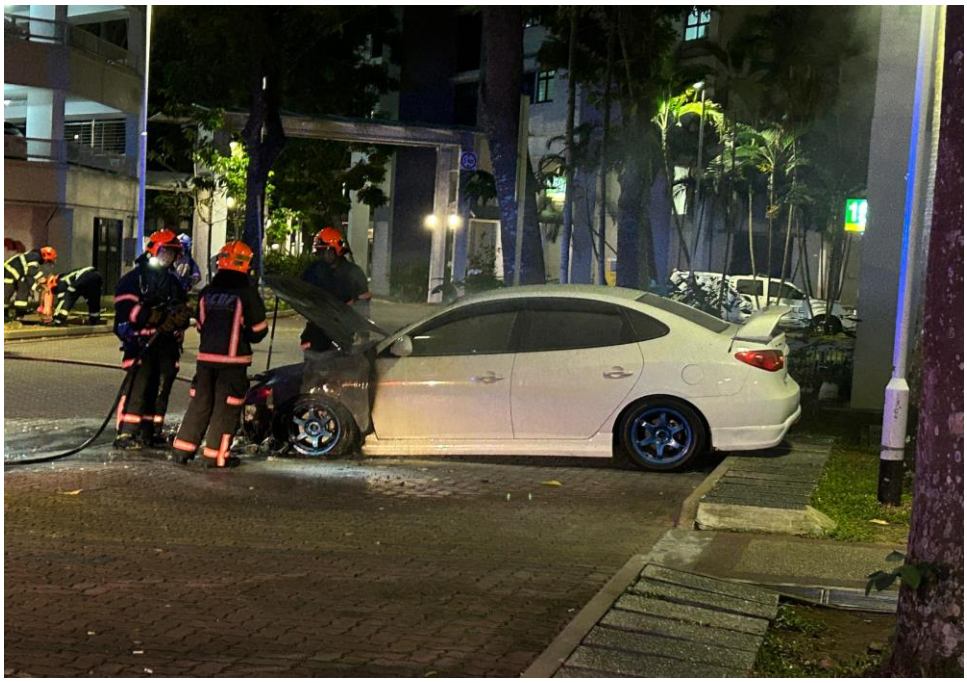

Photo 24 shows the Insured Vehicle at the incident location as after the fire was extinguished by SCDF personnel and conducting their inspection. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Rayhan, location when the fire broke out.

21. Given the circumstances of the incident as reported, the possibility of the cause of fire to the Insured Vehicle being due to engine overheating would seem unlikely as Mr Rayhan had mentioned to us there were no indications of abnormally high temperatures when he was driving the Insured Vehicle on the day of the incident. Moreover, fire due to an overheated engine was unlikely as the Insured Vehicle was still able to park the Insured Vehicle and turn its engine off.

22. 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 location where the Insured Vehicle caught fire was also observed to be not at a secluded location.

23. 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 wiring harness that were found leading from the Electrical Control Unit (ECU) to the fuse box on the Insured Vehicle, which was earlier discussed in paragraph 9 above.

24. Our checks with both local and international bodies and associations had revealed that at the time of writing this report, there was 3 manufacturer recall from 12th April 2016 to end 2024, 23rd February 2018 to end 2023 and 31st March 2020 to end 2023 for faulty Supplementary Restraint System, faulty multifunction connector causing warning lights illuminated on instrument cluster and lastly Anti-Lock Brake System module short circuit. All 3 recalls have been rectified. Given that the cause of fire was due to electrical nature, the manufacturer recall of 12th April 2016 to end 2024, 23rd February 2018 to end 2023 and 31st March 2020 to end 2023 whether rectified or not, it did not cause or contributed to the fire as the fire had started from the wiring harness that were found leading from the Electrical Control Unit (ECU) to the fuse box on the Insured Vehicle. See search result from LTA below.

Vehicle Recall Details

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

Owner ID Type **Singapore NRIC**	*Owner ID* **509F** ←
Vehicle No. **SLM9385U** ←	*Make/Model* **HYUNDAI/ HD AVANTE 1.6 A**
Engine No.: G4FC9U653096	Chassis No.: KMHDU41BR9U757930 ←

Recall Details

Recall No.: R2016050243

Manufacturer Recall Date:
12 Apr 2016

Estimated Completion Year of Recall:
2024

Brief Description (As Provided by Motor Dealer):
Supplementary Restraint System (SRS) deployment software that could inadvertently deploy the frontal airbags when it is not deem necessary. There is a risk of frontal airbag deployment when vehicle is travelling at low speed or stationary.

Date Rectified:
13 Feb 2017

Hotline Information:
ISMAIL BIN TAIB at 64735588
CALVIN KAN CHEE KIN at 64735588

For more details, contact KOMOCO MOTORS PTE LTD

Recall No.: R2018040521

Manufacturer Recall Date:
23 Feb 2018

Estimated Completion Year of Recall:
2023

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:
29 Mar 2019

Hotline Information:
ISMAIL BIN TAIB at 64735588
CALVIN KAN CHEE KIN at 64735588

For more details, contact KOMOCO MOTORS PTE LTD

Recall No.: R2020050849

Manufacturer Recall Date:
31 Mar 2020

Estimated Completion Year of Recall:
2023

Brief Description (As Provided by Motor Dealer):
Vehicles equipped with an ABS (Anti-Lock Brake System) module that remains energized when the vehicle is turned off. If moisture enters the electrical circuit of the ABS module a short circuit could gradually develop.

Date Rectified:
27 Jul 2020

Hotline Information:
ISMAIL BIN TAIB at 64735588
JOSEPH LEE BOON HOCK at 64735588

For more details, contact KOMOCO MOTORS PTE LTD

Conclusion

25. 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 electrical nature. For this particular case, the fire had originated along the wirings harnesses of the Electrical Control Unit (ECU) leading to the fuse box of the Insured Vehicle.

26. 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.

27. Upon investigation, the fire had started from the wirings harnesses of the Electrical Control Unit (ECU) leading to the fuse box of the Insured Vehicle. And not from the aftermarket wheel rims, aftermarket infotainment unit or the additionally fitted components are 2 audio speakers and 2 audio tweeters as well as 2 audio amplifiers.

28. Our investigations had also revealed that at the time of writing this report, all 3 recalls have been rectified. Given that the cause of fire was due to electrical nature, the manufacturer recall of 12th April 2016 to end 2024, 23rd February 2018 to end 2023 and 31st March 2020 to end 2023 whether rectified or not, it did not cause or contributed to the fire as the fire had started from the wiring harness that were found leading from the Electrical Control Unit (ECU) to the fuse box on the Insured Vehicle.

29. SCDF was activated to attend to the fire incident and a fire report pertaining to their findings will likely be forth coming. We have applied for this fire report and will forward a copy of the report once it is made available to us.

Sherwin Beh
Technical Investigator

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