



Your Ref: 539536
Our Ref : CS/MSG17023436/N

15 December 2017

M/s MSIG Insurance (Singapore) Pte. Ltd.

16 Raffles Quay #24-01
Hong Leong Building
Singapore 048581
(Motor Claims Department)

**TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE
INSURED VEHICLE SJH 5370M ON 1 DECEMBER 2017**

1. We refer to your letter dated 11 December 2017 and the instructions therein.
2. Our analysis, comments and opinions with respect to the cause of fire to the insured vehicle SJH 5370M (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 13 December 2017 at the premises of Chew Goon Motor (herein referred to as "**Chew Goon**") located at Block 10 Ang Mo Kio Industrial Park 2A, Ang Mo Kio Autopoint, #01-15/16/17, Singapore 568047.
4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded:-

Vehicle Registration No.	: SJH 5370M
Make / Model	: HYUNDAI I30 (FD) 1.6 DOHC AUTO
Chassis No	: KMHDC51DR9U102887
Year of Registration	: 2008 (August)
Mileage	: N.A. (battery melted)

5. The Insured Vehicle was noted to have sustained fire damage that was confined to its front portion. The entire engine compartment of the Insured Vehicle was observed to be severely burnt while the interior compartment was observed to be partially burnt and/or melted.

6. The fire had resulted in the body parts at the front portion of the Insured Vehicle to be burnt. This had included its front bonnet, front grille, front windscreen, front windscreen wipers, front left tyre, front left wheel rim, right side panel, left side panel and dashboard amongst others. The driver window glass was observed to be smashed. The left side of the front bonnet of the Insured Vehicle was slightly buckled, likely due to rescue damage. See photos 1 – 7 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 portion. Its front bonnet, front grille, front windscreen, front windscreen wipers, front left tyre, front left wheel rim, right side panel, left side panel and dashboard were amongst the body parts that were found to have been affected as a result of the fire. The left side of the front bonnet of the Insured Vehicle was slightly buckled (circled), likely due to rescue damage.



Photo 2 shows the general view of the right side of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front portion. Its front bonnet, right side panel and right headlight were amongst the body parts that were found to have been affected as a result of the fire. The driver window glass was observed to be smashed (circled).



Photo 3 shows the general view of the left side of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front portion. Its front bonnet, left side panel, left headlight, front left tyre and front left wheel rim were amongst the body parts that were found to have been affected as a result of the fire. The left side of the front bonnet of the Insured Vehicle was slightly buckled (circled), likely due to rescue damage.



Photo 4 shows the general view of the front windscreen of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front portion. Its front windscreen, front windscreen wipers, front wiper panel garnish and front windscreen water nozzles were amongst the body parts that were found to have been affected as a result of the fire.

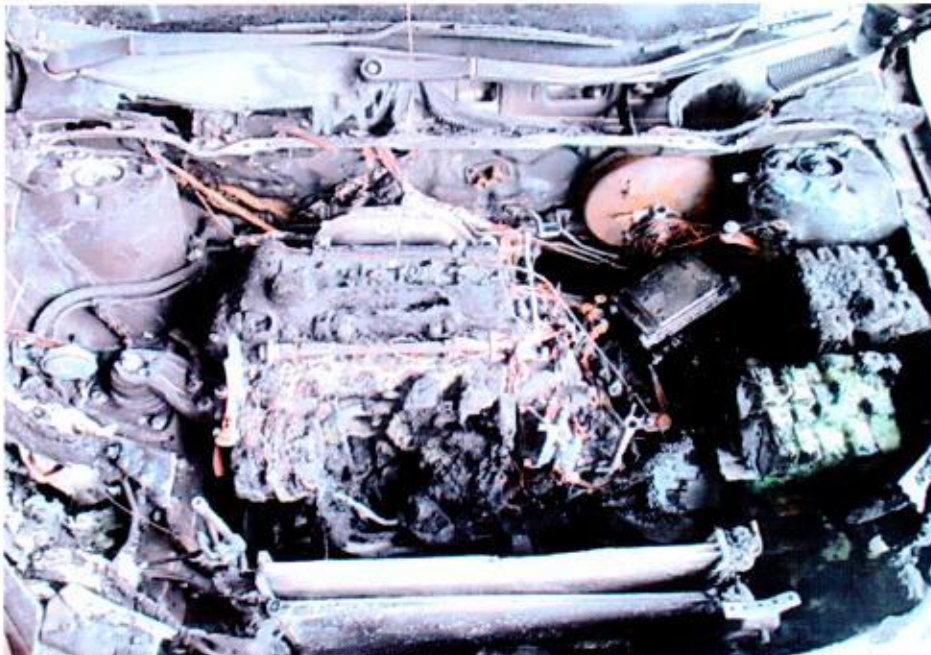


Photo 5 shows the engine compartment of the Insured Vehicle at the time of our inspection. The entire engine compartment of the Insured Vehicle was observed to be severely burnt. Most of the parts inside the engine compartment were found to be burnt and/or melted as a result of the fire.



Photo 6 shows the interior compartment of the Insured Vehicle, which was observed to be partially burnt and/or melted. The dashboard and front windscreen were amongst the parts that were found to have been partially burnt and/or melted as a result of the fire. The driver window glass was observed to be smashed. Upon closer inspection, we found glass shards on the edges of the driver window (red arrows) as well as on the driver seat (circled).



Photo 7 shows a closer view of the damaged front windscreen and dashboard (circled) of the Insured Vehicle (as viewed from the interior compartment).

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

Investigation and Technical Analysis

8. For this particular case, the fire appears to have originated within the engine compartment of the Insured Vehicle, somewhere around the centre portion of the engine compartment. This can be determined from the burn pattern and the high heat intensity burn marks (whitish burn marks) found on the centre portion of the front bonnet of the Insured Vehicle and also the rust that had developed on the underside of the front bonnet, at the centre area.
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 underside of the front bonnet, around the centre area, is an indication that the centre portion of the engine compartment had sustained exposure to prolonged high heat intensity.
10. Furthermore, we found fire extinguisher residue around these areas. In general the location of the fires' origin was determined given that the damage of fire nature was confined to these particular areas on the Insured Vehicle. See photos 8 - 10 below.



Photo 8 shows the burn pattern and whitish burn marks (circled) that were found on the centre portion of the front bonnet of the Insured Vehicle. Such whitish burn marks are a result of exposure to prolonged heat intensity, which may indicate where the fire had started. Rust would also begin to develop on these areas soon after the fire.

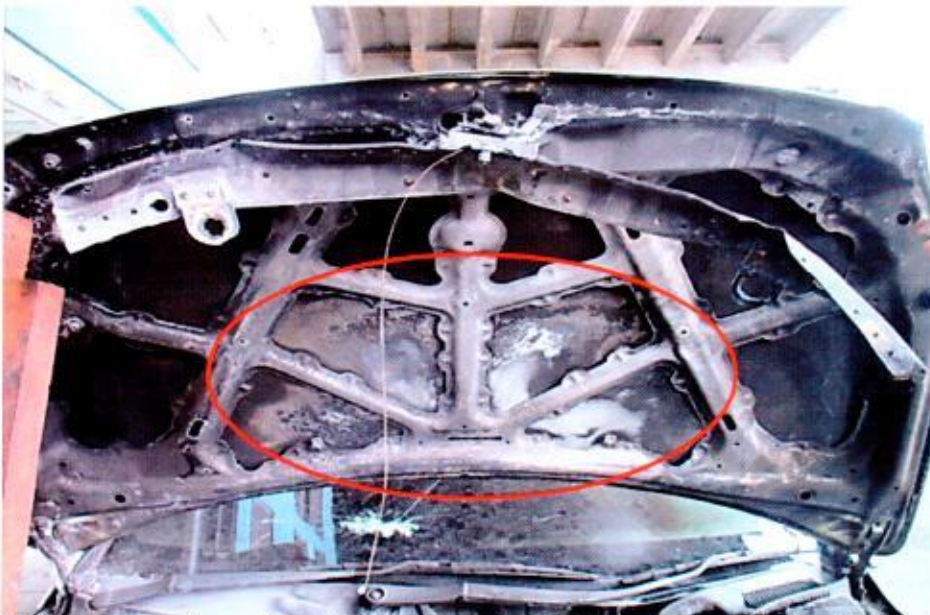


Photo 9 shows the rust (circled) that had developed on the underside of the front bonnet, around the centre area. The development of rust is an indication that the area was exposed to prolonged exposure to high heat intensity, which had caused the steel/metal material of the front bonnet to be exposed to natural environmental condition. Hence the fire to the Insured Vehicle can be determined to have originated towards the centre portion of the engine compartment.

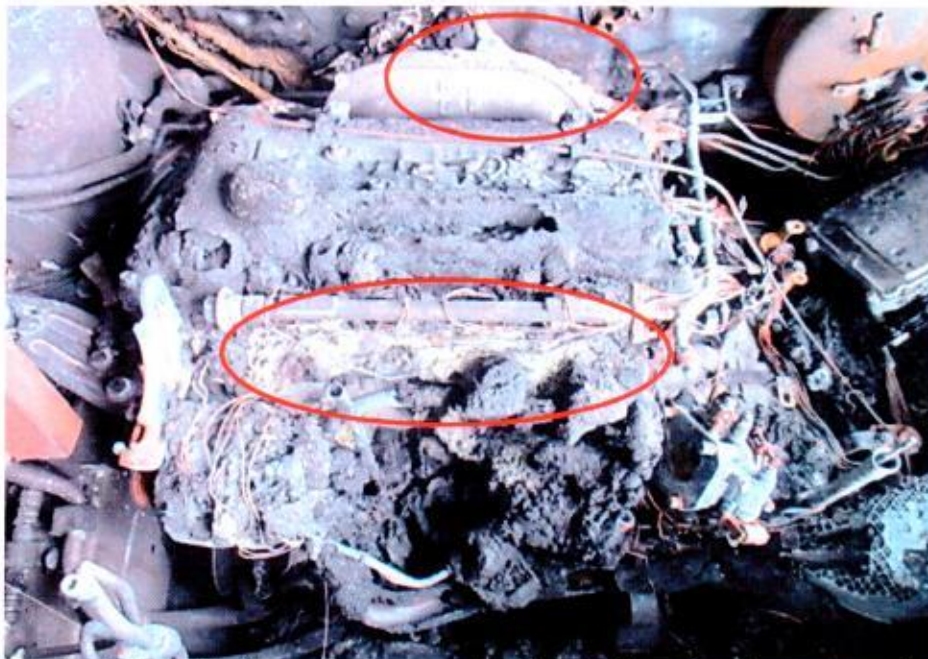


Photo 10 shows the fire extinguisher residue (circled) found on the centre portion of the engine compartment of the Insured Vehicle. The nature of fire damage is an indication as to where the fire started.

11. Upon closer examination of the centre portion of the engine compartment, which was where the fire to the Insured Vehicle had likely started, we had found traces of greenish residue on several stretches of burnt wirings. 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 11 - 14 below.

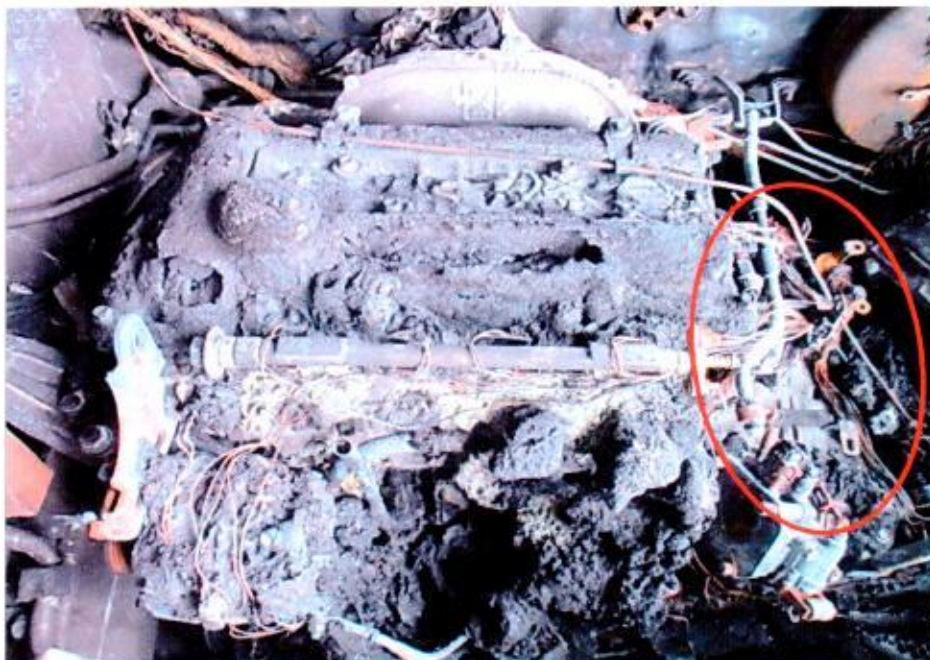


Photo 11 shows a view of the centre portion of the engine compartment which is where the fire to the Insured Vehicle had likely started. We observed greenish residue on some of the wirings (circled) at the centre portion of the engine compartment.



Photo 12 shows a closer view of the greenish residue found on some of the wirings (circled) at the centre portion of the engine compartment. The presence of such greenish residue suggests occurrence of an electrical short circuit.

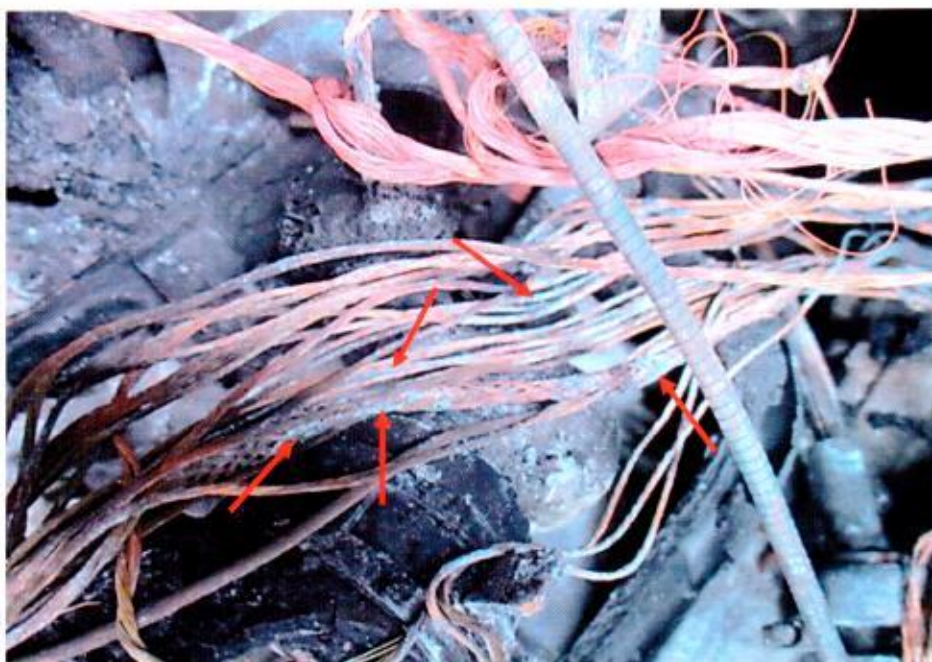


Photo 13 shows a close up view of the greenish residue found on some of the wirings (red arrows) at the centre portion of the engine compartment. The presence of such greenish residue suggests occurrence of an electrical short circuit.

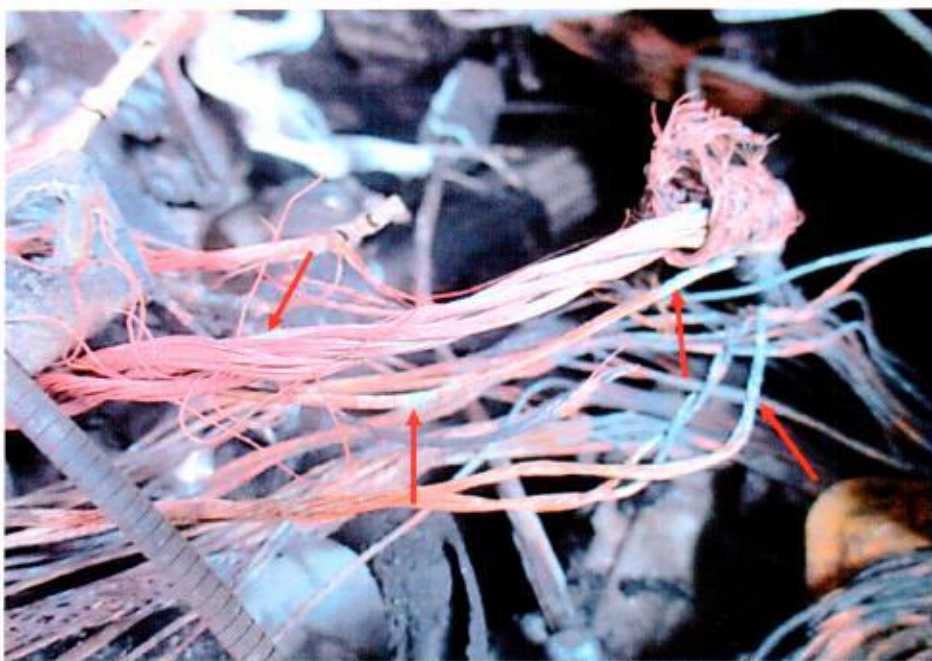


Photo 14 shows a close up view of the greenish residue found on some of the wirings (circled) at the centre portion of the engine compartment. The presence of such greenish residue suggests occurrence of an electrical short circuit.

12. From the Singapore Police Report No. F/20171202/2028 and Accident Statement which was made by Mr Chia Kian Boon Edwin (herein referred to as "**Mr Chia**"), we note that the fire to the Insured Vehicle had started at a time when it was parked. Mr Chia was first alerted of the fire when he received a call from the police.
13. We managed to speak to Mr Chia on 14 December 2017 where we were able to gather further information pertaining to the incident as well as information pertaining to the history of the Insured Vehicle.
14. According to Mr Chia, at about 1800hrs on 1 December 2017, he alongside his wife and son had parked the Insured Vehicle at lot 518 of the basement 4 carpark of the Marina Bay Sands Expo and Convention Centre. Mr Chia and his wife had earlier picked up their son from Ang Mo Kio and were headed to the Mastercard Theatre at Marina Bay Sands for the 'Sound of Music' concert.
15. At 2100 hours, he received a call from the police asking him to verify if he was the owner of the Insured Vehicle. The police informed him that the Insured Vehicle had caught fire at about 2000 hours and it had been extinguished. Mr Chia was required to make his way to the incident location immediately.
16. When Mr Chia arrived at the incident location, the water sprinklers were still activated. The police and SCDF were present. The area was cordoned off. Mr Chia gave a statement to SCDF personnel. The firefighters informed Mr Chia that the front bonnet had to be pried open to gain access to the engine bay as the Insured Vehicle was locked at the time the fire started. Since the fire had damaged the Insured Vehicle's central locking system, the SCDF Fire Investigator requested Mr Chia's permission to break the driver window glass in order to manually unlock the Insured Vehicle as he needed to conduct preliminary investigations as well as inspect the nature of fire damage to the interior compartment of the Insured Vehicle.
17. While the SCDF personnel were conducting preliminary investigations, Mr Chia gave a statement to the police. At about 2130 hours, Mr Chua called the MSIG insurance hotline to make towing arrangements. Mr Chia noticed that 4 vehicles parked in closest proximity to the Insured Vehicle at the time of incident were covered in fire extinguisher residue, ash and soot. However Mr Chia neither found any obvious consequential damage on these vehicles neither was he informed of any damages by the vehicle owners who arrived at the incident location while Mr Chia was waiting for the tow truck.

18. Nevertheless, he exchanged contact numbers and particulars with the vehicle owners. Mr Chia mentioned that the owner of the 5th vehicle which was parked directly behind the Insured Vehicle at the time of incident took several photographs of both vehicles and drove off. The tow truck arrived by 2300 hours and the Insured Vehicle was towed to Chew Goon.
19. Mr Chia lodged a police report at the Ang Mo Kio North Police Centre the following day on 2 December 2017 at 1031 hours. He brought the police report along for the purpose of making an insurance report at Chew Goon on 4 December 2017 at 1501 hours.
20. With regard to the history of the Insured Vehicle, we were able to gather from Mr Chia that the Insured Vehicle was purchased second-hand in 2013 with 5 years of COE left. He is the registered owner and main driver of the Insured Vehicle. His wife drives the Insured Vehicle occasionally. Mr Chia mentioned that over a year ago he noticed that the temperature of the Insured Vehicle was unusually high. Hence he brought the Insured Vehicle to Fong Huat Air-con & Wiring Service (herein referred to as "**Fong Huat**") located at 10 Ang Mo Kio Industrial Park 2A, #04-05 Ang Mo Kio Autopoint, Singapore 568047. Any possible overheating issues were rectified by Fong Huat.
21. Pertaining to the maintenance aspect, Mr Chia sends the Insured Vehicle for periodic servicing. He services the Insured Vehicle at Fong Huat.
22. During the course of our investigations, we were also able to obtain from Chia, a document relating to the latest servicing of the Insured Vehicle done at Fong Huat on 4 September 2017. The servicing package included changing of engine oil, oil filter, air filter, air-con filter, spark plugs, front brake pads, brake light bulb, right headlamp bulb and cleaning of the throttle body. He also had the front and rear brake systems checked and adjusted. Refer to invoice 1 below.

ASUS

FONG HUAT AIR-CON & WIRING SERVICE ←

BLOCK 10 #04-05 AMK AUTOPOINT, ANG MO KIO INDUSTRIAL PARK 2A
SINGAPORE 568047 TEL : 64820405, 64813230 FAX : 64813353
Reg No 43053200-L

CASH BILL : FH170408

CASH

INVOICE DATE : 04-Sep-17 ←
VEHICLE NUM : SJH5370M ←
MAKE/MODEL : Hyundai i30
MILEAGE(KM) : 162892-172892

S/N	QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT S \$
1	4lbs	Eneos fully synthetic engine oil 5w/40	20.00	80.00
2	1pc	Original oil filter	15.00	15.00
3	1pc	Air-con filter	35.00	35.00
4	1pc	Air-filter	35.00	35.00
5	4pcs	Original spark plugs	5.00	20.00
6	1set	Original front brake pad	160.00	160.00
7	1pc	Brake light bulb	3.00	3.00
8	1pc	O/s front head lamp halogen bulb	25.00	25.00
9		Threebond clean throttle body	60.00	60.00
		Labour charge	85.00	85.00
		servicing, check service adjust front rear brake system		
		change front brake pad		

COPY

TOTAL S\$: 518.00

TERMS : CASH

Customer's Signature/Co. Stamp : _____ For Fong Huat Air-Con & Wiring Service

*Spare parts sold are not returnable.

Page 1

Invoice 1 shows the latest servicing done on the Insured Vehicle on 4 September 2017 at Fong Huat (red arrows). The servicing package included the changing of engine oil, oil filter, air filter, air-con filter, spark plugs, front brake pads, brake light bulb, right headlamp bulb and cleaning of the throttle body. Mr Chia also had the front and rear brake systems checked and adjusted.

23. Mr Chia informed us that 2 weeks after the servicing was done, he noticed that the temperature of the Insured Vehicle had slightly increased but there were no warning lights or engine overheating light displayed. He brought the Insured Vehicle back to Fong Huat. The radiator fan was replaced.

24. Since then, he had not experienced any mechanical or electrical problems with the Insured Vehicle till the incident occurred. Mr Chia stressed that there were neither warning lights displayed nor was there an abnormal rise in temperature of the Insured Vehicle when he was driving the Insured Vehicle on the day of the incident. Unfortunately Mr Chia did not keep the receipts for the overheating rectification and radiator fan replacement works that were carried out by Fong Huat.

Site Inspection

25. With the information gathered, we visited the incident location on 14 December 2017 taking the reports made by Mr Chia and the information that we had gathered from him as references.

26. Firstly, we note that the incident had occurred at the basement 4 carpark of the Marina Bay Sands Expo and Convention Centre. The carpark spans over an area which connects the Convention Centre to the Mastercard Theatre. Mr Chia had parked the Insured Vehicle at lot 518 which is nearer to the Mastercard Theatre. Lot 518 was observed to be the middle lot.

27. We noticed the incident location was monitored by CCTV camera(s) however we were unable to view the footage without a written request to the Marina Bay Sands management. At the time of visit, we did not find any burnt marks and/or burnt residual remains on the ground where the Insured Vehicle was parked as there was a parked vehicle at the aforementioned lot. However, we did observe that the piping and metal railings above the lot where the Insured Vehicle was parked were blackened by soot. Apart from the soot, we did not observe any damaged or newly replaced property at the time of our visit to the incident location. See photos 15 – 20 below.



Photo 15 shows the basement 4 carpark which spans over an area that connects the Convention Centre to the Mastercard Theatre. Mr Chia had parked the Insured Vehicle at lot 518 which is nearer to the Mastercard Theatre. Lot 518 was observed to be the middle lot (arrowed). We noticed the incident location was monitored by CCTV camera(s) (circled) however we were unable to view the footage without a written request to the Marina Bay Sands management.



Photo 16 shows a closer view of the CCTV camera(s) (circled) at the incident location however we were unable to view the footage without a written request to the Marina Bay Sands management.



Photo 17 shows Mr Chia had parked the Insured Vehicle at lot 518 which is nearer to the Mastercard Theatre. Lot 518 was observed to be the middle lot (arrowed).



Photo 18 shows a close up view of lot 518 where the Insured Vehicle was parked on the day of incident. At the time of our visit, we did not find any burnt marks and/or burnt residual remains on the ground as there was a parked vehicle at the aforementioned lot.



Photo 19 shows although we did not find any burnt marks and/or burnt residual remains on the ground where the Insured Vehicle was parked as there was a parked vehicle at the aforementioned lot at the time of our visit, we observed that the piping and metal railings above the lot where the Insured Vehicle was parked were blackened by soot (red arrows).



Photo 20 shows a close up view of a metal railing above the lot where the Insured Vehicle was parked blackened by soot (red arrows).

Incident Scene Photographs

28. Although we were not able to obtain video footage of the incident, we were however able to obtain photographs which were taken by Mr Chia at the incident location. The photographs were taken after the fire to the Insured Vehicle was extinguished.

29. In general, the information that could be gathered from these photographs had corresponded to the events that were related to us by Mr Chia. Our review of these photographs showed 2 vehicles parked in closest proximity to the Insured Vehicle at the time of incident were covered in fire extinguisher residue, ash and soot. However we did not observe any obvious consequential damage on these vehicles.

30. Our close examination of these photographs also showed no unusual foreign material(s) and/or object(s) found on the ground in the immediate area of the parking lot where the Insured Vehicle was parked. See photos 21 - 24 below.



Photo 21 shows the Insured Vehicle after the fire was extinguished. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Chia, which is the Insured Vehicle was parked in the middle lot when the fire occurred.



Photo 22 shows the front portion of the Insured Vehicle after the fire was extinguished. The extensive damages observed had corresponded to the events that were related to us by Mr Chia, which is the fire had started from the engine compartment and that the front bonnet was pried open by the SCDF to gain access to the engine bay.



Photo 23 shows the vehicle parked at lot 519 which was to the right of the Insured Vehicle at the time of incident. We observed fire extinguisher residue on the top portion of its front number plate frame (circled) and ash on the ground (red arrows). In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Chia, which is the vehicles parked within closest proximity to the Insured Vehicle at the time of incident were covered in fire extinguisher residue, ash and soot. However there was no obvious consequential damage sustained.



Photo 24 shows the vehicle parked at lot 517 which was to the left of the Insured Vehicle at the time of incident. The front portion was covered with fire extinguisher residue, ash and soot. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Chia, which is the vehicles parked within closest proximity to the Insured Vehicle at the time of incident were covered in fire extinguisher residue, ash and soot. However there was no obvious consequential damage sustained.

31. Based on the vehicle service record invoice provided, we are of the opinion that it is unlikely that the fire could have been caused by poor maintenance of the Insured Vehicle.

32. Given the circumstances of incident as reported, the possibility of the cause of fire to the Insured Vehicle being due to engine overheating would seem unlikely as the fire had started after the Insured Vehicle was parked and the engine was switched off for a period of time (about 2 hours).
33. 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 given that our examination of the available incident scene photographs did not reveal any unusual material(s)/object(s) found on the ground near where the Insured Vehicle was parked. The location of where the Insured Vehicle was parked was also observed to be not at a secluded location.
34. 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 in the engine compartment of the Insured Vehicle, which was earlier discussed in paragraph 11 above.
35. 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.
36. 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. See search result from LTA below.

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:	1294D
Vehicle Details	
Vehicle Registration number:	5JH5370M
Make:	HYUNDAI
Vehicle Model:	I30 (FD) 1.6 DOHC AUTO
Engine No.:	G4FC8U402754
Chassis No.:	KMHDCS1DR9U102887
Recall Details	
No Recall Detail records	

OK

Land Transport Authority

Conclusion

37. Having investigated and technically analysed the damages to the Insured Vehicle, we are 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 portion. The wirings were original factory wirings of the Insured Vehicle.
38. 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.
39. The information gathered does not seem to suggest that the cause of fire was due to the work carried out by Fong Huat sometime prior to the incident. This is because after the overheating issues were rectified and the radiator fan was replaced by Fong Huat nearly 3 months ago, Mr Chia did not experience any mechanical or electrical problems or observe any more indications of abnormally high temperatures on the Insured Vehicle when he was driving on the day of the incident.
40. There were no modification(s) or additional electronic and/or electrical component(s) fitted on the Insured Vehicle at the time of our inspection of the Insured Vehicle.

41. Our investigations had also 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.
42. 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.

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

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