

Your Ref : D19007774M/CT/RW/OD
Our Ref : CS/FCI19021814/N

13 December 2019

M/s First Capital Insurance Limited
36 Robinson Road #16-01
City House
Singapore 068877

**TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE
INSURED VEHICLE SHA 3438B ON 6 DECEMBER 2019**

1. We refer to your letter dated 10 December 2019 and the instructions therein.
2. Our analysis, comments and opinions with respect to the cause of fire to the insured vehicle SHA 3438B (herein referred to as “**Insured Vehicle**”) are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 11 December 2019 at the premises of ComfortDelGro Engineering Pte. Ltd. (herein referred to as “**CDGE**”) located 59 Loyang Drive, Singapore 508969. A static inspection was carried out to the Insured Vehicle where the following general information was recorded:-

Vehicle Registration No.	: SHA 3438B
Make / Model	: HYUNDAI I40 1.7 CRDI F/L AT ABS AIRBAG 4DR
Chassis No	: KMHLB41UMGU078522
Year of Registration	: October 2015
Mileage	: N.A. (battery melted)

4. 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 significantly affected by the fire.
5. The fire had resulted in the body parts at the front portion of the Insured Vehicle to be burnt. This had included its front bumper, front bonnet, front support panel, front grille, front headlamps, front windscreen, front rims and front tyres amongst others. See photos 1 – 6 below.



Photo 1 shows the general view of the rear portion of the Insured Vehicle at the time of our inspection. The rear portion of the Insured Vehicle was relatively unaffected by the fire.



Photo 2 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 bumper, front bonnet, front support panel, front grille, front headlamps, front windscreen, front rims and front tyres were amongst the body parts that were found to have been affected as a result of the fire.



Photo 3 shows the closer 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 bumper, front bonnet, front support panel, front tyres and front headlamps were amongst the body parts that were found to have been affected by the fire.



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 windscreen was extensive.



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 significantly affected by the fire.

6. 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

7. For this particular case, the fire appears to have originated within the engine compartment of the Insured Vehicle, somewhere around the centre rear 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 rear 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 bottom centre portion.
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 underside of the front bonnet, around the bottom centre portion, is an indication that the centre portion of the engine compartment had sustained exposure to prolonged high heat intensity. See photos 7 & 8 below.



Photo 7 shows the burn pattern and whitish burn marks that were found on the rear portion of the front bonnet of the Insured Vehicle (arrowed). 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 8 shows the rust that had developed on the underside of the front bonnet, around the bottom centre portion (circled). The development of rust is an indication that this area was subjected 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 rear portion of the engine compartment.

9. Upon closer examination of the centre rear portion of the engine compartment, which was where the fire to the Insured Vehicle had likely started, we had found greenish residue on several burnt stretches of original factory fitted wirings around the centre right portion of the engine compartment. The presence of such 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 9 - 12 below.



Photo 9 shows the original factory fitted wirings around the centre right portion of the engine compartment, which is in the immediate vicinity where the fire to the Insured Vehicle had likely started. We had found greenish residue on several burnt stretches of these wirings (circled). The presence of such 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.

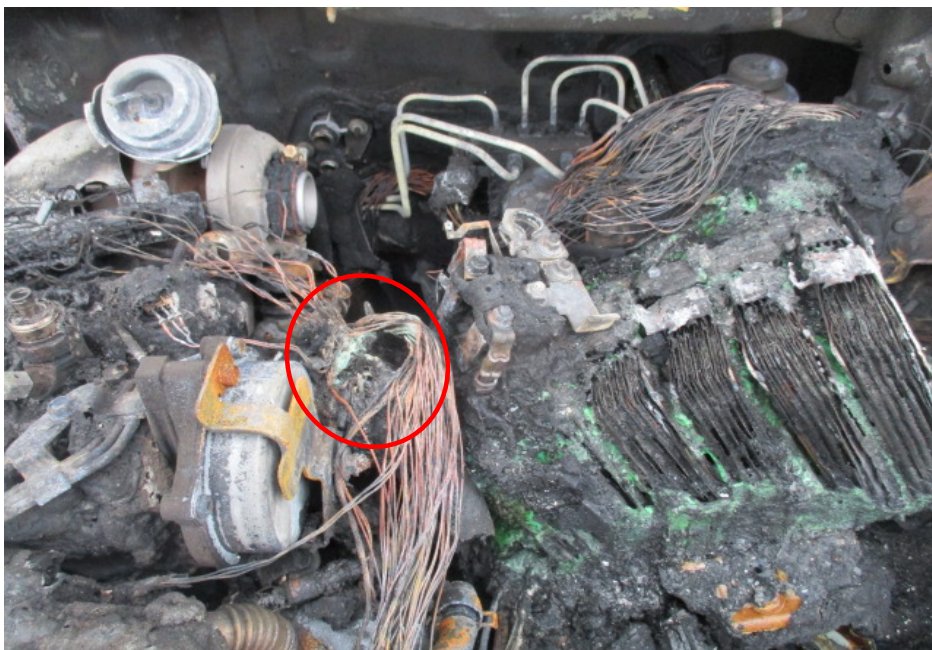


Photo 10 shows a closer view of the greenish residue found on some of the burnt stretches of original factory fitted wirings (arrowed). The presence of such greenish residue suggests occurrence of an electrical short circuit.

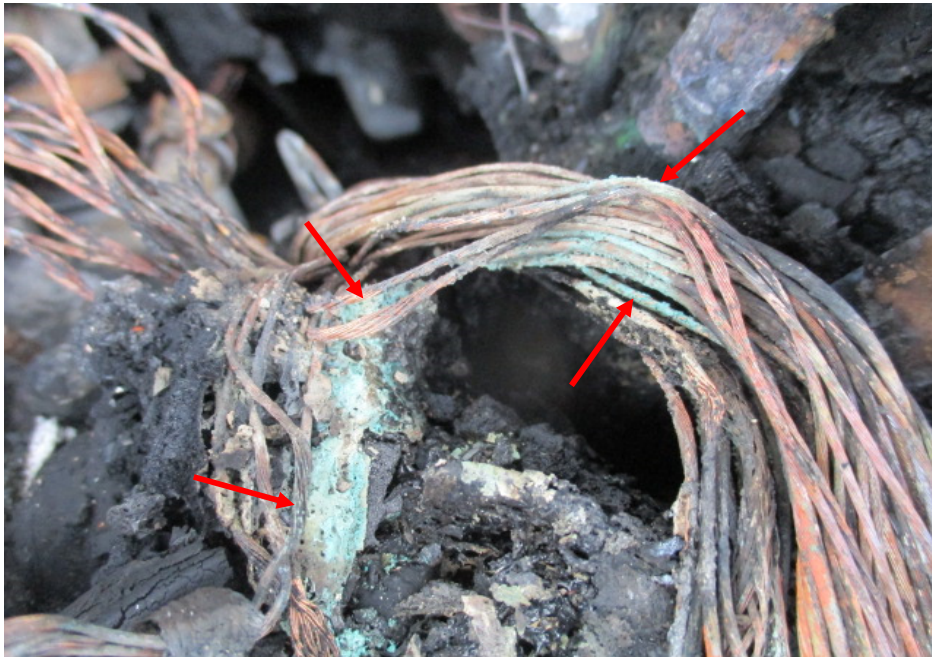


Photo 11 shows a close up view of the greenish residue found on some of the burnt stretches of original factory fitted wirings (arrowed). The presence of such greenish residue suggests occurrence of an electrical short circuit.

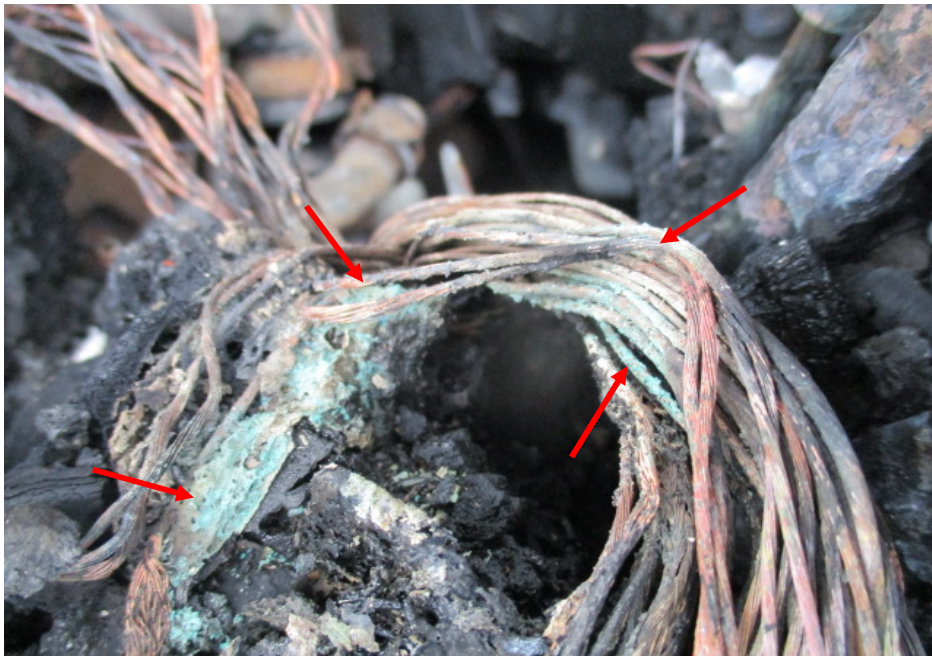


Photo 12 shows a close up view of the greenish residue found on some of the burnt stretches of original factory fitted wirings (arrowed). The presence of such greenish residue suggests occurrence of an electrical short circuit.

10. From the Singapore Accident Statement which was made by Mr Ho Seow Foo (herein referred to as “**Mr Ho**”), we note that the fire to the Insured Vehicle had started at a time when he was driving. Mr Ho was first alerted of the fire when he saw smoke coming out of the front bonnet of the Insured Vehicle.
11. 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 Ho, he drove his wife to Kong Ming Temple located at Bright Hill Road from Woodlands at 0845 hours on 6 December 2019. After turning into Sin Ming Avenue at about 0905 hours, he detected a strong diesel smell in the interior compartment. The Insured Vehicle stalled along Sin Ming Avenue about 5 minutes later. Mr Ho attempted to stop the Insured Vehicle by stepping on the brake pedal but it was very stiff. He then applied the handbrake to stop the Insured Vehicle. Mr Ho immediately noticed smoke emitting from both sides of the front bonnet. Seconds later, he heard a loud ‘pop’ sound and flames emerged from the engine bay.
13. Mr Ho mentioned that the SCDF arrived within 15 minutes and extinguished the fire some time later. Mr Ho called CDGE to inform them of the incident. Towing arrangements were made. The Insured Vehicle was towed to CDGE. Mr Ho filed an insurance report the following day, on 7 December 2019 at 0839 hours at CDGE.
14. With regard to the history of the Insured Vehicle, we were able to gather from Mr Ho that he had no issues whilst driving the Insured Vehicle. There was no loss of power to the Insured Vehicle. He mentioned that the last servicing was done on 17 November 2019 at CDGE where he reported that the air conditioning was not cold. Mr Ho added that after the servicing, there were no more problems with the aircon. He also mentioned there was no diesel smell in the interior compartment during his daily routine vehicular checks on the engine way or when he was washing the Insured Vehicle.
15. Mr Ho also informed us that ever since he drove the Insured Vehicle, he has not done any modification(s) and/or additionally fitted any electrical or electronic component(s) to the Insured Vehicle.
16. Mr Ho told us that he neither noticed any warning lights nor abnormally high temperatures whilst driving the Insured Vehicle.

Incident Scene Photograph

17. We were able to obtain a photograph of the Insured Vehicle which was taken after the fire had been extinguished. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Ho. Our close examination of this photograph also showed no unusual foreign material(s) and/or object(s) found on the ground in the immediate area of the road where the Insured Vehicle was positioned. See photo 13 below.



Photo 13 shows the Insured Vehicle after the fire was extinguished by 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 Ho, which is the fire had started from the engine compartment (arrowed).

18. Pertaining to the maintenance aspect, the Insured Vehicle is serviced at a ComfortDelGro workshop located in Loyang.
19. During the course of our investigations, we were also able to obtain from Mr Jumani bin Masudin, who is a service advisor at CDGE, documents relating to the servicing of the Insured Vehicle. The Insured Vehicle was last serviced on 17 November 2019, 2 weeks before the incident occurred. We noted in particular during this servicing, there was an issue with the air conditioning as reported by Mr Ho. The compressor washer was changed during this servicing. Since then there were no issues of similar nature recorded by Mr Ho.

20. The servicing package had included the changing of engine oil, oil filter, air filter, diesel fuel filter, right hand drive shaft assembly, coolant and radiator hose. Refer to Invoice 1 below.

Date: 11.12.2019 YTSS11F		TAXI SERVICE HISTORY		Time: 15:11:18 Page: 1	
Taxi Nos: SHA3438B		Model: I-40		Reg Date: 15.10.2015	
				Workshop: LY	
Serviced on: 17.11.2019 / 15:20:00		Time Out: 18.11.2019 / 14:47:09			
Remarks: (Next PM-24/12/2019 Time-10:30)					
Job Card Nos: 603078909		Type: JP		Odometer Reading: 591,650	
PM/PROBLEM REPORTED					

BRKD	BREAKDOWN				
HI1	HYUNDAI I-40 DOCKING 1				
1.0	Aircon Team Repair - Chong Yuen Meng				
1.1	A/Con Not Cold				
H000	Mechanic Team Repair - Nik Hisyam Bin Iskandar Tan				
S010	AllBelts (except T/Belt)				
S011	Engine/Transmission Service				
S020	All Hoses & Clips (Check/Adjust/Replace)				
S010	Brake System				
S011	Tyres (Pressure Check)				
S012	Tyre Rotation				
S011	Undercarriage, Steering linkage & joints				
S010	All Lightings				
S021	All harness & connectors				
S022	(i40) Check top hose bracket				
S023	Check diesel / engine oil leakage				
S025	Check vehicle boot hinges				
S030	llegal fittings, modifications & fusebox				
S031	All seat belts & camera				
S051	Check battery terminal secured				
S058	Check Fan Motor relay				
S059	Check CDI Wiring				
S060	Check Alt and Starter Harness				
S011	All coolant, fluid, water				
S021	Service A/C filter and Radiator				
S022	Clear A/C drain pipe				
QC	QC TEST BY LAT - Chong Yuen Meng				
MATERIAL CHANGED					

SN	DESCRIPTION	QTY			
1	I40VC OIL FILTER	1.000	EAC		
2	I40VC FILTER-AIR CLEANER	1.000	EAC		
3	I40VC DIESEL FUEL FILTER	1.000	EAC		
4	I40V3 DRIVE SHAFT ASSY RH (LONG)	1.000	EAC		
5	I40VC HOSE-RADIATOR UPR	1.000	EAC		
Date: 11.12.2019 TAXI SERVICE HISTORY Time: 15:11:18					
YTSS11F Page: 8					
7	PRESTONE ANTIFREEZE COOLANT PREMIX 50-50	1.000	BOT		
8	I40VC BRKT ASSY-ROLL ROD	1.000	EAC		
9	I40VC VALVE-EXPANSION	1.000	EAC		
10	I40VC VALVE CONTROL	1.000	EAC		
11	HYUNDAI DESICCANT-R/DRIER	1.000	EAC		
11	I40VC WASHER - COMPRESSOR	1.000	EAC		
REMARKS					

SN	DESCRIPTION				
4	HI1 - 20,000 KM				

Invoice 1 shows the servicing done on the Insured Vehicle at the CDGE workshop at Loyang on 17 November 2019 (red arrows). We noted in particular during this servicing, there was an issue with the air conditioning as reported by Mr Ho (black arrow). The compressor washer was changed during this servicing. Since then there were no issues of similar nature recorded by Mr Ho. The servicing package had included the changing of engine oil, oil filter, air filter, diesel fuel filter, right hand drive shaft assembly, coolant and radiator hose (circled).

21. 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.
22. 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 Mr Ho 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.
23. 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 Mr Ho was driving the Insured Vehicle. The location where the Insured Vehicle caught fire was also observed to be not at a secluded location.
24. 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 9 above.
25. 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:	Company
Owner ID:	621R
Vehicle Details	
Vehicle Registration number:	SHA3438B
Make:	HYUNDAI
Vehicle Model:	I40 1.7 CRDI F/L AT ABS AIRBAG 4DR
Engine No.:	D4FDFU547724
Chassis No.:	KVHHLB41UMGU078522
Recall Details	
No Recall Detail records	

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Conclusion

26. 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 in nature. For this particular case, the fire had originated along the original factory fitted wirings inside the engine compartment, somewhere around the centre portion of the engine compartment.
27. 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.
28. 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.
29. 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.
30. 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

Senior 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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