

Your Ref : D18/5600M/CT/EE/OD
Our Ref : CS/FC18013589/N

31 July 2018

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 SHD 4218Y ON 19 JULY 2018

1. We refer to your letter dated 25 July 2018 and the instructions therein.
2. Our analysis, comments and opinions with respect to the cause of fire to the insured vehicle SHD 4218Y (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 25 July 2018 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.	: SHD 4218Y
Make / Model	: HYUNDAI SONATA NF 2.0 CRDI AT ABS 2WD 4DR TURBO
Chassis No	: KMHET41VMCA825050
Year of Registration	: May 2012
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 right body of the Insured Vehicle at the time of our inspection. The rear portion of the Insured Vehicle was observed to be 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 rims, 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 left rear portion of the engine compartment. This can be determined from the burn pattern and the high heat intensity burn marks (whitish burn marks) as well as the rust that had developed on the underside of the front bonnet, at the bottom left 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 left portion, is an indication that the left rear portion of the engine compartment had sustained exposure to prolonged high heat intensity. See photo 7 below.



Photo 7 shows the rust that had developed on the underside of the front bonnet, around the bottom left 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 left rear portion of the engine compartment.

9. Upon closer examination of the left 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 left rear 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 8 - 10 below.

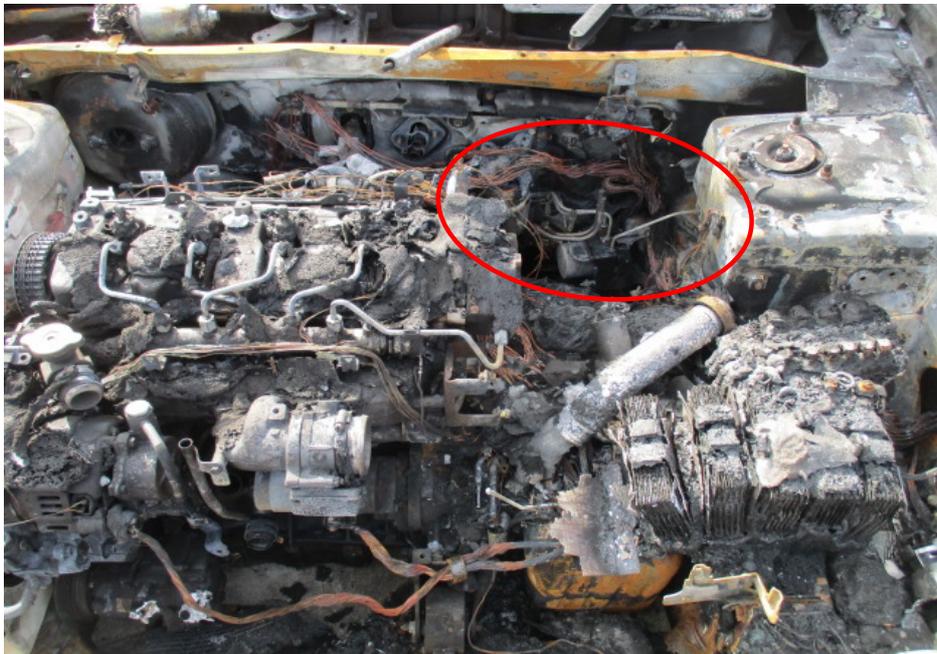


Photo 8 shows the original factory fitted wirings around the left rear portion of the engine compartment, which is in the immediate vicinity where the fire to the Insured Vehicle had likely started (circled). We had found greenish residue on several burnt stretches of these wirings. The presence of such 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 9 shows a closer view of the original factory fitted wirings around the left rear portion of the engine compartment. Greenish residue was found on some of these burnt stretches of original factory fitted wirings (circled). The presence of such greenish residue suggests occurrence of an electrical short circuit.

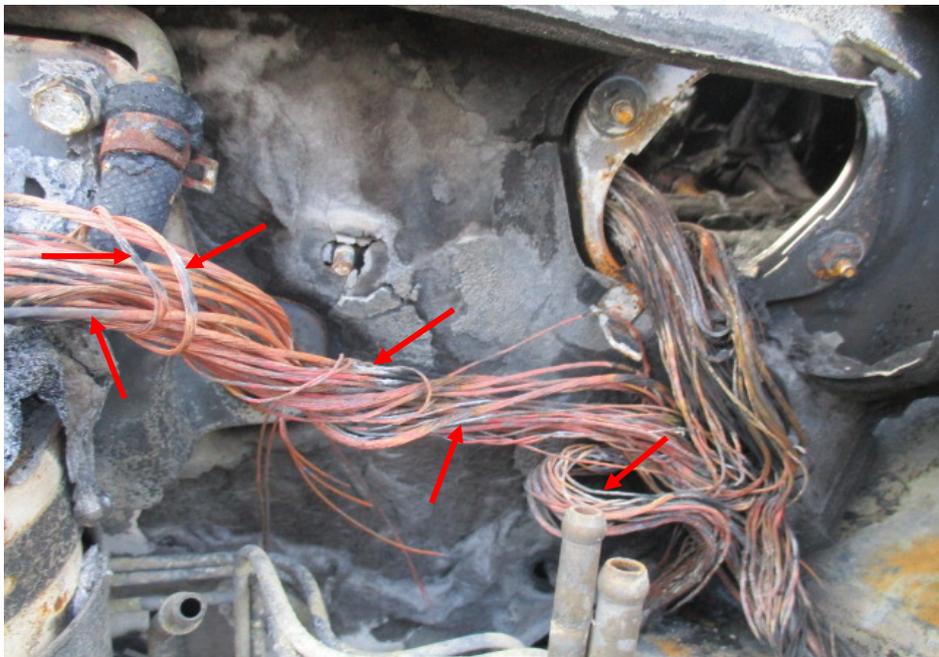


Photo 10 shows a close up view of the greenish residue found on some of the burnt stretches of original factory fitted wirings (arrowed). The presence of such greenish residue suggests occurrence of an electrical short circuit.

10. From the Singapore Accident Statement, which was made by Mr Ang Teck Gee (herein referred to as “**Mr Ang**”), we note that the fire to the Insured Vehicle had started at a time when he was driving. Mr Ang was first alerted of the fire when he saw smoke coming out of the front bonnet of the Insured Vehicle.
11. We managed to speak to Mr Ang 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 Ang, he sent the Insured Vehicle at 0840 hours on 19 July 2018 to CDGE for servicing. He collected the Insured Vehicle at 1115 hours and proceeded to Changi Airport for a pickup to Jurong West. As he was travelling along the PIE on the 1st lane just before the Jurong Town hall exit, he felt that the aircon of the Insured Vehicle was malfunctioning. He also realized that smoke was coming out of the front bonnet. He immediately switched lanes till he was on the road shoulder where he proceeded to stop the Insured Vehicle and switched off the engine.
13. Mr Ang mentioned that another taxi driver had stopped to assist him in taking out the fire extinguisher from the boot of the Insured Vehicle but Mr Ang noticed that the Insured Vehicle had caught fire. The other taxi driver started spraying the fire extinguisher at the front bonnet while Mr Ang and his 3 passengers evacuated the area. The SCDF arrived shortly and took over from there. The fire was extinguished soon after. Neither Mr Ang nor his passengers were injured.
14. The police took Mr Ang’s statement. He then contacted ComfortDelGro to report the incident. The tow truck arrived approximately 1 hour post- incident. Mr Ang hitched a ride with the towing personnel. The Insured Vehicle was towed to CDGE where Mr Ang made the insurance report.
15. With regards to the history of the Insured Vehicle, we were able to gather from Mr Ang that he is the hirer and only driver of the Insured Vehicle when it was purchased new in 2012. To the best of his recollection, there was no electrical/electronic problem with the Insured Vehicle. However he did mention that at times he felt a loss of power while driving the Insured Vehicle a few months prior and had highlighted this issue to CDGE when he sent the Insured Vehicle there for periodic servicing.
16. Mr Ang mentioned that he has not done any modification(s) and/or additionally fitted any electrical or electronic component(s) to the Insured Vehicle.

17. Mr Ang told us ever since he collected the Insured Vehicle from CDGE post-servicing on the day of the incident he neither noticed any warning lights nor abnormally high temperatures whilst driving the Insured Vehicle till the incident occurred.

Incident Scene Photographs

18. We were able to obtain from Mr Ang several photographs of the Insured Vehicle which were taken after the fire had been extinguished. In general, the information that could be gathered from these photographs had corresponded to the events that were related to us by Mr Ang. 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 road shoulder where the Insured Vehicle was positioned. See photos 11 & 12 below.



Photo 11 shows SCDF having arrived at the incident location and assisting Mr Ang in putting out the fire (arrowed).



Photo 12 shows the front portion of the Insured Vehicle post- incident. In general, the extensive damages sustained to the front portion of the Insured Vehicle had corresponded to the events that were related to us by Mr Ang, which is the fire had started from the engine compartment (circled).

19. Pertaining to the maintenance aspect, the Insured Vehicle is serviced at CDGE. During the course of our investigations, we were able to obtain from Mr Lim Tien Siong, who is a service advisor at CDGE, documents relating to the servicing of the Insured Vehicle for the past 3 months. We noted in particular during the servicing done on 2 May 2018, there was an issue of the engine check light coming on followed by a loss of intermittent power with the Insured Vehicle. The timing belt was also due to be replaced. The servicing package had included the changing of engine oil, oil filter, wiper blade assembly, wiper blades and brake pads. See Invoice 1 below.

Date: 19.07.2018 TAXI SERVICE HISTORY
Time: 13:16:34
YTSS11F
Page: 1

Taxi Nos: SHD4218Y Model: SONATA Reg Date: 10.05.2012
Workshop: LY

Serviced on: 02.05.2018 / 10:28:00 Time Out: 02.05.2018 / 15:53:17
Remarks: (Next Minor PM-07/06/2018 Time-15:30)
Job Card Nos: 602777412 Type: JP Odometer Reading: 619,189

PM/PROBLEM REPORTED

HSA HYUNDAI SONATA DOCKING (Minor)
3.2 Timing Belt [DUE] ←
6.4 Engine Check Light ON [INTERMITTENT NO POWER] ←
17.1 Wiper Blade/Washer [CHNAGE]
H000 Mechanic Team Repair -
Jin Changhao
QC QC TEST BY LAT -
Gan Jia Jie

MATERIAL CHANGED

SN	QTY	DESCRIPTION
1		SNTVC ^OIL FILTER (S)
1.000	EAC	
2		SNTVC ALT/POWER STEERING V-
BELT CRDI	1.000	EAC
3		SNTVC ^BELT-
VALVE TIMING CRDI		1.000 EAC
4		SNTVC WIPER BLADE 20ASSY
1.000	EAC	
5		SNTVC WIPER BLADE 24 (DRIVER)
1.000	PC	
6		SNTVC BRAKE PAD-
FRONT(G)		1.000 SET
7		(ALL) (EURO IV)^ENGINE OIL F SYN SAE 5W30
5.930	L	

Invoice 1 shows the servicing done on the Insured Vehicle on 2 May 2018 (circled). There was an issue of the engine check light coming on followed by a loss of intermittent power with the Insured Vehicle. The timing belt was also due to be replaced (arrowed). The servicing package had included the changing of engine oil, oil filter, wiper blade assembly, wiper blades and brake pads.

20. Mr Ang reported the same issue during the servicing done on 8 June 2018. The servicing package had included the changing of engine oil and oil filter. See Invoice 2 below.

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Serviced on: 08.06.2018 / 08:58:00 Time Out: 08.06.2018 / 12  
:12:05  
Remarks: ( Next Minor PM-19/07/2018 time-08:30 )  
Job Card Nos: 602801537 Type: JP Odometer Reading: 6  
26,535  
  
PM/PROBLEM REPORTED  
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HSA HYUNDAI SONATA DOCKING (Minor)  
6.4 Engine Check Light ON [ INTERMITTENT NO POWER ] ←  
H000 Mechanic Team Repair -  
Jin Changhao  
QC QC TEST BY LAT -  
Tan Chee Hoong  
  
MATERIAL CHANGED  
-----  
SN QTY DESCRIPTION  
1 SNTVC ^OIL FILTER (S)  
1.000 EAC  
2 (ALL) (EURO IV)^ENGINE OIL F SYN SAE 5W30  
5.910 L  
  
REMARKS  
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SN DESCRIPTION  
5 HSA - Minor Docking  
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Invoice 2 shows the servicing done on the Insured Vehicle on 8 June 2018 (circled). Mr Ang reported the same issue (arrowed). The servicing package had included the changing of engine oil and oil filter.

21. The Insured Vehicle was last serviced on 19 July 2018, the morning before the incident occurred. Mr Ang highlighted to us that he did not experience any loss of power while driving the Insured Vehicle to CDGE for servicing. Hence he did not report it. He only reported that the bonnet stand was worn. The bonnet absorber was replaced. The servicing package had included the changing of engine oil, oil filter and brake pads. See Invoice 3 below.



Serviced on: 19.07.2018 / 08:40:00 Time Out: 19.07.2018 / 11:16:20
 Remarks: (+INSP+Next Major PM-05/09/2018 time-08:3)
 Job Card Nos: 602811628 Type: JP Odometer Reading: 634,640

PM/PROBLEM REPORTED

HSA HYUNDAI SONATA DOCKING (Minor)
 17.4 Bonnet/Boot [front bonnet stand worn] ←
 H000 Mechanic Team Repair -

Khong Chun Hoo
 Date: 19.07.2018
 Time: 13:16:34

TAXI SERVICE HISTORY

YTSS11F
 Page: 5

QC QC TEST BY LAT -
 Gan Jia Jie

MATERIAL CHANGED

SN	QTY	DESCRIPTION
1	1.000 EAC	SNTVC ^OIL FILTER (S)
2	FRONT(G)	SNTVC BRAKE PAD- 1.000 SET
3	1.000 EAC	SNTVC BONNET ABSORBER
4	5.930 L	(ALL) (EURO IV)^ENGINE OIL F SYN SAE 5W30

REMARKS

SN	DESCRIPTION
6	HSA - Minor Docking

Invoice 3 shows the servicing done on the Insured Vehicle on 19 July 2018 (circled), the morning before the incident occurred. Mr Ang reported that the bonnet stand was worn (arrowed). The bonnet absorber was replaced. The servicing package had included the changing of engine oil, oil filter and brake pads.

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

23. 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 Ang 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. He had also sent the Insured Vehicle for servicing on the morning before the incident occurred. Moreover, an overheated engine would have caused the Insured Vehicle to stall. However in this case, Mr Ang was the one who noticed smoke emitting from the front bonnet while he was driving the Insured Vehicle, prompting him to stop at the road shoulder and immediately switching off the engine of the Insured Vehicle.
24. 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 Ang was driving the Insured Vehicle. The location where the Insured Vehicle caught fire was also observed to be not at a secluded location.
25. 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.
26. 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.

Conclusion

27. 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 left rear portion of the engine compartment.
28. 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.

29. 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.
30. 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.

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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