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Our Ref :CS/FCI18006220/D

04 April 2018

M/s First Capital Insurance Limited
36 Robinson Road
#16-01 City House
Singapore 068877
(Motor Claims Department)

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**TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE
INSURED VEHICLE SHA 9380T ON 04 MARCH 2018**

1. I refer to your request dated 12 March 2018.
2. My analysis, comments and opinions with respect to the cause of fire to the insured vehicle SHA 9380T (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 13 March 2018 at the premises of M/s Ding Auto Pte Ltd, 31 Corporation Road, Singapore 649825.
4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded:-

Vehicle Registration No.	: SHA 9380T
Make / Model	: Hyundai I40
Chassis No	: KMHLB41UMGU080632
Year of Registration	: 2015 (November)
Mileage	: N.A (wiring affected)

5. The Insured Vehicle was noted to have sustained fire damage that was confined to its engine compartment. Most of the parts and components within the engine compartment were found to have been affected. Parts that were made of plastic or rubber type material were observed to be partially melted. This had included the various rubber hoses, wiper panel, battery, air intake duct, bonnet insulator and brake fluid reservoir amongst others.
6. Apart from the normal standard additional equipment(s) which can be found on a motor taxi, there appears to be no modification(s) and/or additional electronic and/or electrical component(s) fitted on the Insured Vehicle. See photo 1 – 4 below.



Photo 1 shows a general view of the front right body of the Insured Vehicle at the time of my inspection. The fire had affected most of the parts within the engine compartment. The damage to the front bumper (circled) was a result of firefighting operation.



Photo 2 shows a general view of the front left body of the Insured Vehicle at the time of my inspection. The fire had affected most of the parts within the engine compartment. The mileage of the Insured Vehicle could not be recorded due to its wirings being affected by the fire.



Photo 3 shows a general view of the Insured Vehicle's engine compartment at the time of my inspection. The engine compartment was observed to have sustained moderate fire damage. Parts that were made of plastic or rubber type material were observed to be partially melted. This had included the various rubber hoses, wiper panel, battery, air intake duct, bonnet insulator and brake fluid reservoir amongst others.



Photo 4 shows the interior compartment of the Insured Vehicle, which was unaffected by the incident. Apart from the normal standard additional equipment(s), there appears to be no modification(s) and/or additional electronic and/or electrical component(s) fitted on the Insured Vehicle.

Investigation and Technical Analysis

7. For this particular case, a single burn mark was found on the exterior body of the Insured Vehicle. This was at the top side of its front bonnet. Given this single burn mark on the exterior body, the fire can then be established to have originated within the engine compartment of the Insured Vehicle, somewhere around the rear centre of the engine compartment.
8. Correspondingly, high heat intensity burn marks (whitish burn marks) were found on the underside of the Insured Vehicle's front bonnet, directly below the area where the burn marks were formed on the top side of the front bonnet. These whitish burn marks are a result of exposure to prolong 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. See photo 5 & 6 below.



Photo 5 shows the burned marks (circled) that were found on the top side of the Insured Vehicle's front bonnet. Apart from these burned marks, there were no other marks of burnt nature found on the exterior body of the Insured Vehicle. Given this single burn mark on the exterior body, the fire can then be established to have originated within the engine compartment of the Insured Vehicle, somewhere around the rear centre of the engine compartment.



Photo 6 shows the whitish burn marks (red circle) that were found on the underside of the Insured Vehicle's front bonnet, directly under the area where the burn marks were formed on the top side of the front bonnet. Such whitish burn marks are a result of exposure to prolong heat intensity. The fire to the Insured Vehicle can then be established to have originated around the rear centre of the engine compartment (yellow circle).

9. My examination of the rear centre area of the engine compartment, during my inspection of the Insured Vehicle, revealed wirings that were completely burned to its copper state. The bright reddish colour of the copper wires suggest that the wirings were exposed to high heat. Such condition normally indicates internal heating of copper wires which is a sign of an electrical short circuit occurring. This would then appear to suggest that the cause of fire to the Insured Vehicle could have possibly been due to electrical in nature. See photo 7 – 10 below.
10. Heat from engine operation could cause the rubber insulation of the wires and/or wiring harness within the engine compartment to lose its flexibility and become hardened after a prolong period of time. The hardened rubber insulation may then become brittle and break off bits by bits, exposing live wires that may come into contact with each other and/or the metal body of the vehicle, creating sparks that could ignite a fire.
11. Unlike countries with different seasons, the hot local climate increases the heat within the engine compartment of locally used vehicles. This enhances the deterioration of any rubber material parts or components contained within the engine compartment.



Photo 7 shows the wirings at the rear centre area of the Insured Vehicle's engine compartment, which was where the fire had originated. The wirings (arrowed) were found to be completely burned to its bare copper state. The bright reddish colour of the copper wires suggest that the wirings were exposed to high heat. Such condition normally indicates internal heating of copper wires which is a sign of an electrical short circuit occurring. The wires were likely to be original factory fitted wire harnesses of the Insured Vehicle.



Photo 8 shows a closer view of the wirings at the rear centre area of the Insured Vehicle's engine compartment. The wirings were found to be completely burned to its bare copper state. Such condition normally indicates internal heating of copper wires which is a sign of an electrical short circuit occurring.



Photo 9 shows a closer view of another stretch of wirings at the rear centre area of the Insured Vehicle's engine compartment. The bright reddish colour of the copper wires suggest that the wirings were exposed to high heat. Such condition normally indicates internal heating of copper wires which is a sign of an electrical short circuit occurring. This would then appear to suggest that the cause of fire to the Insured Vehicle could have possibly been due to electrical in nature.



Photo 10 shows the burnt wirings at the rear centre area of the Insured Vehicle's engine compartment. The bright reddish colour of the copper wires suggest that the wirings were exposed to high heat, indicating internal heating of copper wires, which is a sign of an electrical short circuit occurring.

12. At the time of my inspection, I was able to inspect the engine layout of a similar make and model vehicle as the Insured Vehicle. Upon comparison, it was observed that the burnt stretch of wirings observed on the Insured Vehicle were original factory fitted wiring harness. See photo 11 below.

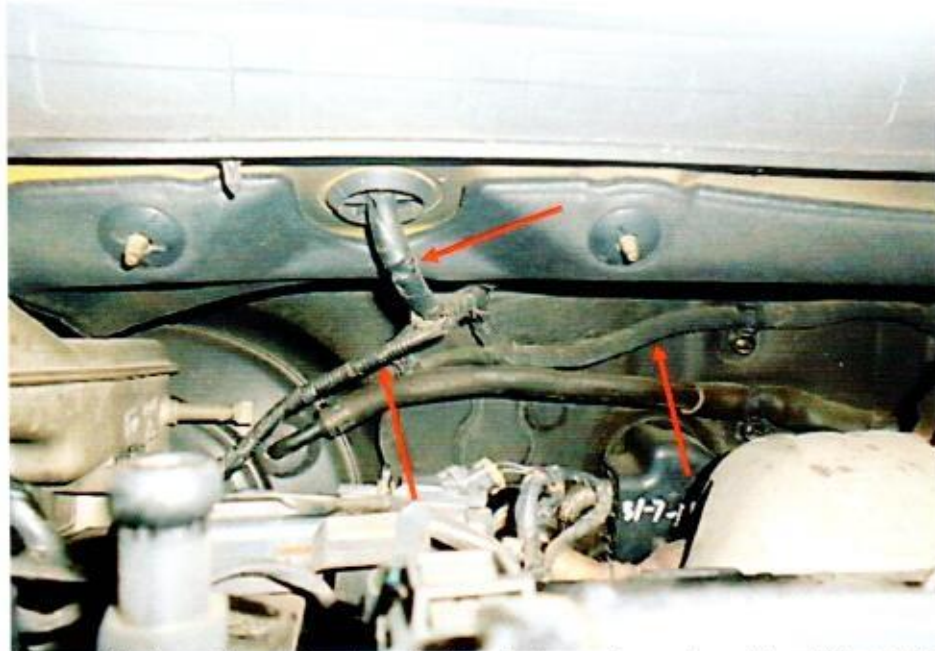


Photo 11 shows the engine layout of a similar make and model vehicle as the Insured Vehicle. This was at the rear centre area of the engine compartment. Upon comparison, it was observed that the burnt stretch of wirings observed on the Insured Vehicle were original factory fitted wiring harness (arrowed).

13. From the Singapore Accident Statement, which was made by one Lim Beng Hwa (herein referred to as "**Mr Lim**"), I note that the fire to the Insured Vehicle had started at a time when he was driving the Insured Vehicle. Mr Lim had first seen smoke coming out from the front bonnet as the Insured Vehicle was turning into a carpark along Jurong West Avenue 1.
14. I manage to speak to Mr Lim on 26 March 2018 and through telephone conversation, I was able to gather further information pertaining to the incident as well as information pertaining to the history of the Insured Vehicle.
15. According to Mr Lim, on 04 March 2018 at about 1950hrs, he was driving the Insured Vehicle heading back to his home at Jurong West Street 42. His family members were on board the Insured Vehicle and they were returning home after buying some furniture at Genting Lane area.

16. As the Insured Vehicle was turning into the carpark of Block 502 Jurong West Avenue 1, Mr Lim noticed smoke coming out from the gaps between the front bonnet, directly in front of him near to the front windscreen. At this point, the Insured Vehicle was at the gantry barrier of the aforesaid carpark. Upon seeing the smoke, Mr Lim drove the Insured Vehicle into the carpark after the gantry barrier was automatically lifted. He then immediately stopped the Insured Vehicle and told his family members to alight.
17. Mr Lim also alighted and went to get the fire extinguisher that was inside the rear boot compartment of the Insured Vehicle. When he returned to the front of the Insured Vehicle, he noticed flames coming out from the same area where smoke was first seen coming out. Mr Lim then sprayed the fire extinguisher at the flames, managing to contain the fire. SCDF officers soon arrived and took over the firefighting from Mr Lim. The front bonnet of the Insured Vehicle was forced opened by the SCDF officers. Further spraying by the SCDF officers was aimed at the rear of the Insured Vehicle's engine compartment till the flames were fully extinguished.
18. After relating the earlier events to the SCDF and police officers, Mr Lim was advised to tow the Insured Vehicle away. Arrangement was subsequently made to tow the Insured Vehicle to Ding Auto Pte Ltd, 31 Corporation Road.
19. With regard to the history of the Insured Vehicle, I was able to gather from Mr Lim that he is the hirer of the Insured Vehicle for the past 2 years. He does not have any relief driver and usually he will drive the Insured Vehicle daily from Monday to Saturday for a shift of about 12hrs to 14 hrs.
20. According to Mr Lim, on the day of the incident, he did not drive the Insured Vehicle. It was parked at the carpark near where he stays. At about 1630hrs, he and his family went to Genting Lane area to buy some furniture. Mr Lim drove the Insured Vehicle and parked it at Genting Lane till about 1900hrs when he started driving the Insured Vehicle home and was almost reaching home when the incident occurred.
21. Mr Lim further informed me that on the day of incident, prior to first driving the Insured Vehicle, he had done a pre-drive check, as per his normal routine before every driving shift. He did not find any abnormality and all the fluids were of sufficient level. To the best of his recollection, there has not been any major mechanical and/or electrical problem(s) with the Insured Vehicle. Even before the incident, he did not experience any abnormality.

22. With regard to the maintenance aspect of the Insured Vehicle, I was able to obtain the job details for the period 18 November 2017 to 22 February 2018. Upon reviewing the job details, I note that the Insured Vehicle was last serviced on 30 January 2018 at the mileage of 254,832km. The air con filter, oil filter and engine oil were replaced during this servicing. The last work carried out to the Insured Vehicle was on 22 February 2018, when several mechanical parts were replaced to rectify the complaint by Mr Lim of engine noisy, wheel noisy and vehicle vibrating during high speed.
23. In general, my review of the maintenance aspect of the Insured Vehicle revealed that it was regularly maintained at an interval of about once every month. There was also no major and/or recurring mechanical and/or electrical issue(s) to the Insured Vehicle for the period between September 2017 and the time of incident on 04 March 2018.
24. My checks with both local and international bodies and associations had revealed that at the time of writing this report, there was no manufacturer recall of similar make and model vehicle as the Insured Vehicle. See search result below obtained from LTA.

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:	2839G

Vehicle Details

Vehicle Registration number:	SHA9380T
Make:	HYUNDAI
Vehicle Model:	I40 1.7 CRDI F/L AT ABS AIRBAG 4DR
Engine No.:	D4FDFU564626
Chassis No.:	KMHLB41UMGU080632

Recall Details

No Recall Detail records

Screenshot shows the LTA search result regarding manufacturer recall involving the Insured Vehicle. Results gathered from my search revealed that the Insured Vehicle was not involved in any manufacturer recall campaign.

Conclusion

25. Having investigated and technically analysed the damages of burnt nature to the Insured Vehicle, I am 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 wiring inside the engine compartment, at the rear centre of the engine compartment. The wiring was an original factory wiring harness.
26. I 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. There were no modification(s) or additional electronic and/or electrical component(s) fitted on the Insured Vehicle at the time of my inspection of the Insured Vehicle other than the standard additional equipment(s) which can be found on a motor taxi.
28. My investigations also revealed that at the time of writing this report, there is no manufacturer recall of similar make and model vehicle as the Insured Vehicle.



Ang Bryan Tani

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