

Your Ref: D20004337MVQC
Our Ref : CS4/FCI20011575/D

12 November 2020

MS First Capital Insurance Limited

36 Robinson Road
#16-01 City House
Singapore 068877
(Motor Claims Department)

TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE QX 84E ON 24 OCTOBER 2020

1. I refer to your request dated 26 October 2020.
2. My analysis, comments and opinions with respect to the cause of fire to the insured vehicle QX 84E (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 26 October 2020 at the premises of M/s Chin Meng Motors, 1 Kaki Bukit Avenue 6 #01-40/63, Autobay @ Kaki Bukit, Singapore 417883.
4. A static inspection was carried out to the Insured Vehicle. The following general information was first recorded: -

Vehicle Registration No.	: QX 84E
Make / Model	: Honda Odyssey 2.4A
Chassis No	: JHMRB18406C202168
Year of Registration	: 2006 (May)
Mileage	: N.A (wiring affected)

5. The Insured Vehicle was noted to have sustained fire damage that was confined to its frontal portion. Its engine compartment was also observed to have been severely affected. The front area of the interior compartment was slightly affected while the rear portion was unaffected by the incident.
6. The front bumper, front bonnet, front fenders, front headlamps, front grille and front windscreen were amongst the exterior body parts that were damaged as a result of the fire. Whereas for the engine compartment, I had observed almost all the parts inside the engine compartment burnt and/or melted. This had included the air intake, battery and fuse box amongst others. 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 damage to the Insured Vehicle was confined to its frontal portion. Its front bumper, front bonnet, front right headlamp, front grille, front right door and front right fender were amongst the exterior body parts that were found to have been affected as a result of the fire.



Photo 2 shows a general view of the front left body of the Insured Vehicle at the time of my inspection. The front left fender, front bonnet, front grille, front left headlamp and front windscreen were amongst the exterior body parts that were found to have been affected as a result of the fire.



Photo 3 shows the engine compartment of the Insured Vehicle at the time of my inspection. Almost all the parts inside the engine compartment were observed to have been burnt and/or melted. The parts include the air intake manifold, exhaust manifold, engine top cover, battery, wirings, fuse box, various hoses and pipes amongst others.



Photo 4 shows the interior compartment of the Insured Vehicle, which was slightly affected at the front area by the fire incident. The front windscreen, instrument panel and front area of the dashboard were amongst the parts within the interior compartment that were affected.

7. At the time of my inspection of the Insured Vehicle, I did not find any additionally fitted electronic and/or electrical component(s) on the Insured Vehicle. There was also no modification(s) fitted on the Insured Vehicle. The Insured Vehicle was however likely to be fitted with a video camera device at its front windscreen area.

Circumstance of Incident

8. From the Police Report E/20201024/7013, which was made by one Wong Yee Chiat (herein referred to as "**Mr Wong**"), I note that the fire to the Insured Vehicle had started at a time when he was driving the Insured Vehicle. As stated in the aforesaid Police Report, on 24 October 2020 at about 1145hrs, Mr Wong was driving the Insured Vehicle out of the premises of Ministry of Foreign Affairs when he smelted burning smell. He then quickly parked the Insured Vehicle and went to seek for assistance. Upon returning with his colleagues to where he had parked the Insured Vehicle, he observed that fire had already built up significantly. Together with his colleagues, they had tried to extinguish the fire using the available fire extinguishers however their attempts were unsuccessful. SCDF subsequently arrived and extinguished the fire.

Investigation and Technical Analysis

9. For this case, the origin of fire to the Insured Vehicle can be established basing on the burn pattern of the Insured Vehicle as seen at the time of my inspection. What is referred to as high heat intensity burned marks (whitish burn marks) were observed to have been formed on the underside of the Insured Vehicle's front bonnet, at the area towards the rear and slightly towards the left 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 causes steel/metal material body parts to be exposed to natural environmental condition, giving rise to the development of rust.
10. Since high heat intensity burned marks were formed on the underside of the front bonnet, and if following the characteristic of heat rising upwards, the origin of fire can then be determined to be around the rear left area of the Insured Vehicle's engine compartment. This is directly below the area where the high heat intensity burned marks were formed on the underside of the front bonnet. See photo 5 below.



Photo 8 shows the high heat intensity burn marks (circled) that were found on the rear left area of the Insured Vehicle's front bonnet. Such whitish burn marks are a result of exposure to prolonged heat intensity. Following the characteristic of heat rising upwards, the fire to the Insured Vehicle can then be determined to have originated around the rear left area (arrowed) of the Insured Vehicle's engine compartment.

11. For vehicular fire originating from the engine compartment, causation(s) typically include fluid leak onto hot surfaces or, an electrical short to the wirings. For this case, the possibility of the cause of fire to the Insured Vehicle being due to fluid leak would seem unlikely as the Insured Vehicle was just being driven when Mr Wong first detected burning smell. Temperature within the engine compartment would have unlikely been significantly high to cause any leaked fluid to self-ignite. Table below shows the range of self-igniting temperatures for the various types of fluid used for vehicular operation.

Fluids	Autoignition Temperature °F
Automatic Trans. Fluid	580 to 1120
Brake Fluid (DOT 3)	520 to 1065
Coolant	
Ethylene Glycol (100%)	950 to 1245
Ethylene Glycol (50%)	775 to >1200
Propylene Glycol (100%)	960 to 1020
Propylene Glycol (50%)	975 to 1065
Diesel Fuel	950 to >1200
Biodiesel (B100, B20)	705 to 1300
Ethanol	1260 to 1330
Gasoline (87-92 octane)	1135 to 1550
Gasoline blend (E85)	1300 to 1325
Lubricating Oil	580 to 1130
Power Steering Fluid	590 to >1200

12. Converting the lowest self-igniting temperature of 520°F for brake fluid (from the table above) into °C, it is noted that brake fluid requires a minimum temperature of approximately 271°C to self-ignite. The temperature within the engine compartment of the Insured Vehicle would not have been able to reach such high temperature in a short few minutes of driving period (refer to Police Report made by Mr Wong).
13. On the other hand, my examination of the area around the rear left of the engine compartment had revealed wiring conditions suggesting that the cause of fire was due to electrical in nature to the wirings within the engine compartment.

14. It was observed that several stretches of original wire harnesses were completely burned to its bare copper state and in bright reddish colour. This is an indication that the wires were exposed to high heat. Such condition normally indicates internal heating of copper wires, which is a sign of an electrical short circuit occurring. Hence, the condition of the wirings seen at the area where the fire had originated supports the cause of fire to the Insured Vehicle being due to electrical in nature. See photo 9 - 11 below.



Photo 9 shows the wirings around the rear left area of the Insured Vehicle's engine compartment, which was where the fire to the Insured Vehicle had originated. I had observed several stretches of original wire harnesses (arrowed) around this area to be burnt to its bare copper state, and in bright reddish colour. This indicates internal heating of copper wires, which is a sign of an electrical short circuit.

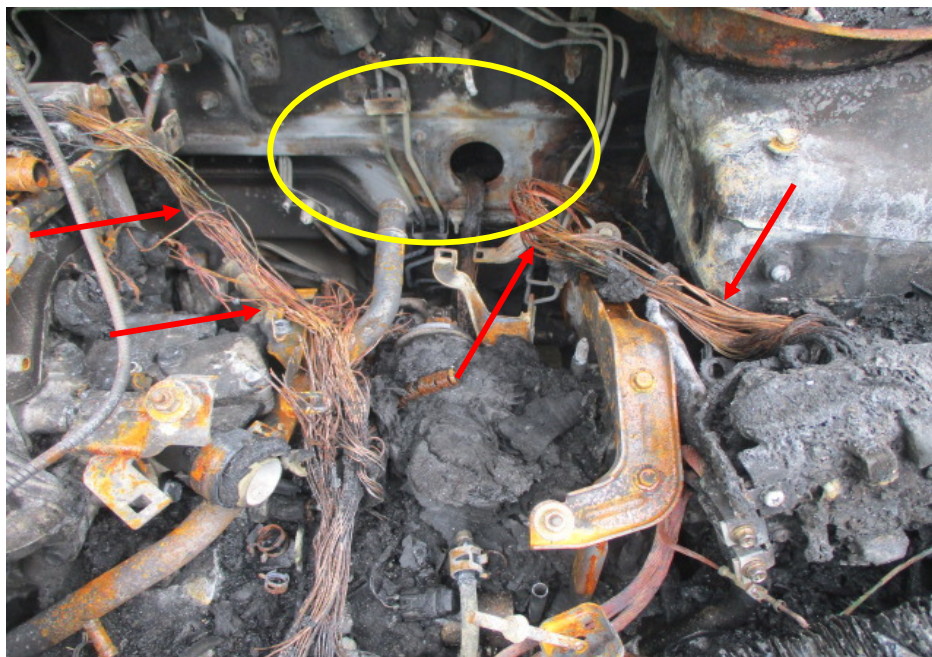


Photo 10 shows a closer view of the wirings (arrowed) at the rear left area of the engine compartment that was burnt to its bare copper state, and in bright reddish colour. This indicates internal heating of copper wires, which is a sign of an electrical short circuit. High heat intensity burned marks, same type of burned mark as seen on the underside of the front bonnet, was also seen on the firewall panel (yellow circle) at the rear left area of the engine compartment. This further supports my findings that the rear left area of the engine compartment was exposed to high heat intensity and was the area where the fire to the Insured Vehicle had originated.



Photo 11 shows a closer view of the wirings at the rear left area of the engine compartment that was burnt to its bare copper state, and in bright reddish colour.

15. My checks with both local and international bodies and associations had revealed that at the time of writing this report, there are 2 manufacturer recall campaigns which involved the Insured Vehicle, and from LTA records, rectifications to address the purpose of the 2 manufacture recalls were carried out to the Insured Vehicle. See search result from LTA below.

Vehicle No. QX84E ←
Make/Model HONDA/ ODYSSEY 2.4A
Engine No.: K24A63002168
Chassis No.: JHMRB18406C202168

Recall Details

Recall No.: R2016070264 ^
Manufacturer Recall Date: 09 Jun 2016
Estimated Completion Year of Recall: 2021
Brief Description (As Provided by Motor Dealer):

According to the equipment defect notifications filed by Takata, the propellant wafers in some of the subject inflators may degrade over time, which could lead to over-aggressive combustion in the event the airbag is activated. In the event of an inflator rupture, metal fragments could pass through the airbag cushion material possible causing serious injury or fatality to vehicle occupants.

Date Rectified:

30 Dec 2016 ←

Screenshot 1 shows the LTA search result regarding one of the 2 manufacturer recall campaigns that involved the Insured Vehicle. From LTA records, rectification to address the purpose of this manufacturer recall was carried out to the Insured Vehicle on 30 December 2016. It is also noted that the purpose of the recall did not pose a fire risk.

Recall No.: R2007040003

Manufacturer Recall Date:

13 Mar 2007


Estimated Completion Year of Recall:

2017

Brief Description (As Provided by Motor Dealer):

Due to lack of tightening force of Power Steering Pump's bolt, the bolt gets excessive stress and breaks if this is repeatedly used. However in worst case the belt may come off causing steering heavy.

Date Rectified:

18 Jun 2007 

Hotline Information:

KAH MOTOR CO SDN BHD at 68413838**For more details, contact KAH MOTOR COMPANY SDN. BERHAD.**

Screenshot 2 shows the LTA search result regarding the other manufacturer recall campaign that involved the Insured Vehicle. From LTA records, rectification to address the purpose of this manufacturer recall was carried out to the Insured Vehicle on 18 June 2007. Like the other manufacturer recall campaign, it is also noted that the purpose of this recall did not pose a fire risk.

Repair

16. As commented earlier in paragraph 10 above, the fire to the Insured Vehicle had originated from the engine compartment and as seen in photograph 3 above, the engine compartment was severely burnt with almost all the parts within the engine compartment burnt and/or melted. The engine compartment of the Insured Vehicle was therefore exposed to high heat intensity.
17. The front section of the Insured Vehicle's chassis is located within the engine compartment and was also burnt as a result of the fire. This chassis front section is an integral part of the main body frame (structure) of the Insured Vehicle. The exposure to high heat intensity would have severely weakened the material strength of the chassis front section. The integrity and strength of the main body frame (structure) of the Insured Vehicle is therefore compromised. The chassis front section would require replacement in order for the Insured Vehicle to be returned to a road worthy condition. However, replacing of a vehicle's chassis is not allowed under local authorities' guidelines. See screen shot 3 & 4 below



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Modifications that are not allowed

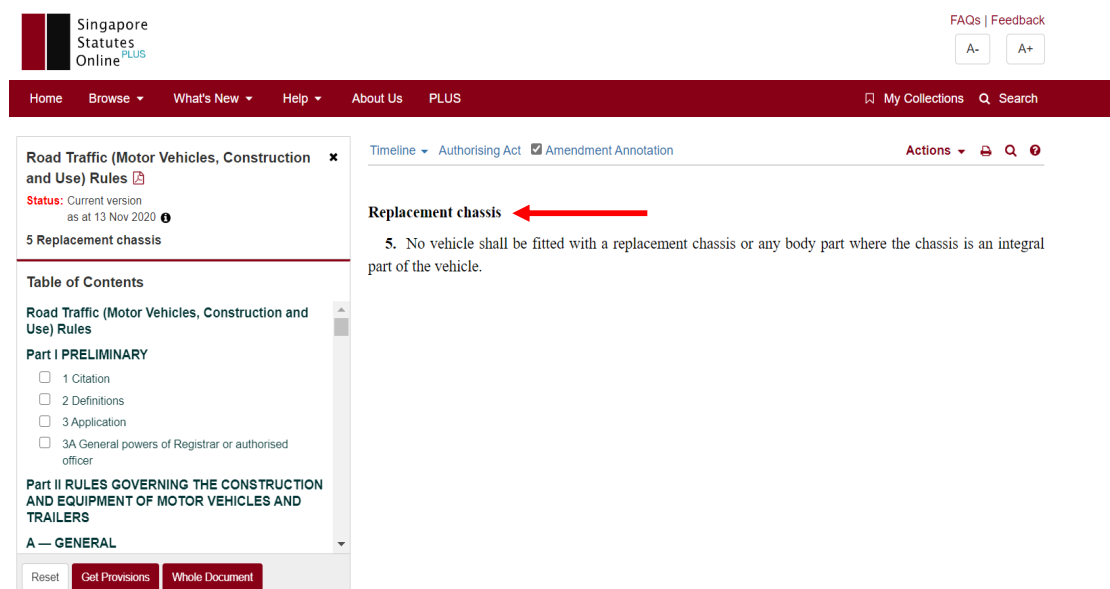
These modifications compromise the safety of the vehicle's occupants and other road users, or pose a nuisance to the public.

Air horns

Chassis

The chassis is an integral part of a vehicle and it cannot be modified. If it is damaged beyond repair, the vehicle must be scrapped.

Screenshot 3 shows LTA's modifications guideline pertaining to a vehicle's chassis. For this case, the front section of Insured Vehicle's chassis was severely burnt and would require replacement however replacing of the front chassis would not comply with LTA's guideline.



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Status: Current version as at 13 Nov 2020

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Replacement chassis

5. No vehicle shall be fitted with a replacement chassis or any body part where the chassis is an integral part of the vehicle.

Screenshot 4 shows the Motor Vehicles, Construction and Use Rules of the Road Traffic Act pertaining to a vehicle's chassis. For this case, the front section of Insured Vehicle's chassis was severely burnt and would require replacement however replacing of the front chassis would not comply with the Road Traffic Act.

Others

18. At the time of my inspection of the Insured Vehicle, I had found the Insured Vehicle fitted with the original standard in-car entertainment unit. Due to the fire, affecting the front dashboard of the Insured Vehicle, the in-car entertainment unit was also consequently affected. See photo 12 below.



Photo 12 shows the in-car entertainment unit (arrowed) of the Insured Vehicle. Due to the fire, affecting the front dashboard of the Insured Vehicle, the in-car entertainment unit was also affected.

19. The Insured Vehicle was likely to be fitted with a video camera at its front windscreen. This was determined given that I had found an additional connecting wire dangling around the rear-view mirror of the Insured Vehicle. However, there was no video camera device connected to this wire at the time of my inspection. See photo 13 below.



Photo 13 shows an additional wire dangling around the rear-view mirror of the Insured Vehicle, likely for a video camera device. However, there was no video camera device connected to this wire at the time of my inspection. The connecting socket of the wire (arrowed) was seen not connected to any device.

Conclusion

20. 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 case, the fire had originated along the wirings around the rear left area of the engine compartment. The wirings were all original factory fitted wirings.
21. There was 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. The Insured Vehicle was however likely to be fitted with a video camera device at its front windscreen area.
22. My investigations also revealed that at the time of writing this report, there were 2 manufacturer recall campaigns involving the Insured Vehicle and from LTA records, rectifications to address the purpose of the 2 manufacture recalls were carried out to the Insured Vehicle. In any case, the purpose of the 2 manufacturer recall campaigns did not pose any fire risk and hence the fire to the Insured Vehicle is not related to these 2 manufacturer recall campaigns.

23. As a result of the fire, the front section of the Insured Vehicle's chassis was severely burnt, weakening the material strength of the chassis front section. The integrity and strength of the main body frame (structure) of the Insured Vehicle is therefore compromised and would require replacement in order for the Insured Vehicle to be returned to a road worthy condition. However, replacing of a vehicle's chassis is not allowed under local authorities' guidelines. The Insured Vehicle is therefore recommended to be written off.

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

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