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Your Ref: M2003462 21 July 2020
Our Ref :CS/TMI20007344/D

Tokio Marine Insurance Singapore Ltd
20 McCallum Street #09-01
Tokio Marine Centre
Singapore 069046
(Motor Claims Department)

TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE SJZ 1578M ON 14 JULY 2020

1. I refer to your request dated 16 July 2020.

2. My analysis, comments and opinions with respect to the cause of fire to the insured vehicle SJZ 1578M (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 16 July 2020 at the premises of M/s Lai Huat (Meng Kee) Motor Pte Ltd, 160 Sin Ming Drive #04-01, Sin Ming Autocity, Singapore 575722.

4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded: -

Vehicle Registration No.	: SJZ 1578M
Make / Model	: Toyota Estima Aeras G-Edition 2.4 A
Chassis No	: ACR500120756
Year of Registration	: 2010 (October)
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 interior compartment and rear portion were 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 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, engine top cover, battery, fuse box, various hoses and pipes amongst others.

Photo 4 shows the interior compartment of the Insured Vehicle, which was not affected by the fire incident.

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.

Circumstance of Incident

8. From the Police Report E/20200714/7048, which was made by one Lim Kok Ping (herein referred to as "**Mr Lim**"), I note that the fire to the Insured Vehicle had started at a time when it was parked. On 14 July 2020 at about 1855hrs, Mr Lim received a phone call from the Police informing him that the Insured Vehicle had caught fire. When he returned to where the Insured Vehicle was parked, the fire was already extinguished with SCDF and Police Officers at scene.

9. I manage to speak to Mr Lim on 17 July 2020 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.

10. According to Mr Lim, he last used the Insured Vehicle in the morning of 14 July 2020 (day of incident). He had driven the Insured Vehicle to have breakfast somewhere opposite his home. He did not experience any abnormality to the Insured Vehicle during this drive. At about 0900hrs, he drove the Insured Vehicle to the multi-story carpark at Block 101C Lorong 2 Toa Payoh where he reversed park the Insured Vehicle inside one of the parking lots. He secured the Insured Vehicle, and everything was intact when he left for his home at Block 99B Lorong 2 Toa Payoh.

11. At about 1855hrs, whilst he was at a badminton court near his home, he received a telephone call from the Police informing him that the Insured Vehicle had caught fire. Upon returning to where the Insured Vehicle was parked, Mr Lim observed that SCDF and Police Officers were at scene, and the fire was already extinguished. He also noticed that the frontal portion of the Insured Vehicle was burnt with the front windscreen broken due to the fire. From what he can remember, the 2 vehicles parked at the immediate left and right of the Insured Vehicle were undamaged as a result of the fire. However, some areas of the ceiling above the Insured Vehicle were blackened.

12. After providing details of the Insured Vehicle and relating the events leading up to the fire to the SCDF and Police Officers that were at scene, Mr Lim was advised to file a Police Report and tow the Insured Vehicle away. Arrangement was subsequently made to tow the Insured Vehicle to M/s Lai Huat (Meng Kee) Motor Pte Ltd where an own damage claim was filed by Mr Lim.

13. With regard to the history of the Insured Vehicle, I was able to gather from Mr Lim that the Insured Vehicle was purchased second hand about 5 years ago. He is the registered owner and the main driver of the Insured Vehicle. To the best of his recollection, there has not been any major mechanical and/or electrical problem with the Insured Vehicle apart from the usual wear and tear that a vehicle would experience. Because the Insured Vehicle did not have any major problem(s), Mr Lim has intention to extend the COE upon the expiry of the current COE in October this year.

14. Regarding the maintenance aspect, Mr Lim informed me that the last servicing carried out to the Insured Vehicle was in June this year. A normal routine servicing like changing of the engine oil and engine oil filter was done during this servicing. He also informed me that there was no modification(s) and/or additional electronic or electrical component(s) fitted on the Insured Vehicle.

15. Mr Lim had taken some photographs during his time at the incident scene and these were forwarded to me for review.

Investigation and Technical Analysis

16. The photographs provided to me were taken after the fire was extinguished. It had showed the Insured Vehicle reversed parked inside a parking lot. The location where the Insured Vehicle was parked did not appear to be a secluded area. Upon closer examination of the photographs, I did not observe any unusual foreign material(s) and/or object(s) on the ground in the immediate area of where the Insured Vehicle was parked. Also, from the photographs, the 2 vehicles that were parked at the immediate left and right of the Insured Vehicle had appeared to be unaffected by the fire.

17. It was also noted that the damage of burnt nature to the Insured Vehicle immediately after the fire was put out had corresponded to the damage as seen by me during my inspection of the Insured Vehicle ie the frontal portion of the Insured Vehicle was exteriorly affected. In general, the observations gathered from my review of the photographs that were taken by Mr Lim at the incident scene had corresponded to the description of events that he had related to me during our conversation on 17 July 2020. See photo 5 - 7 below.

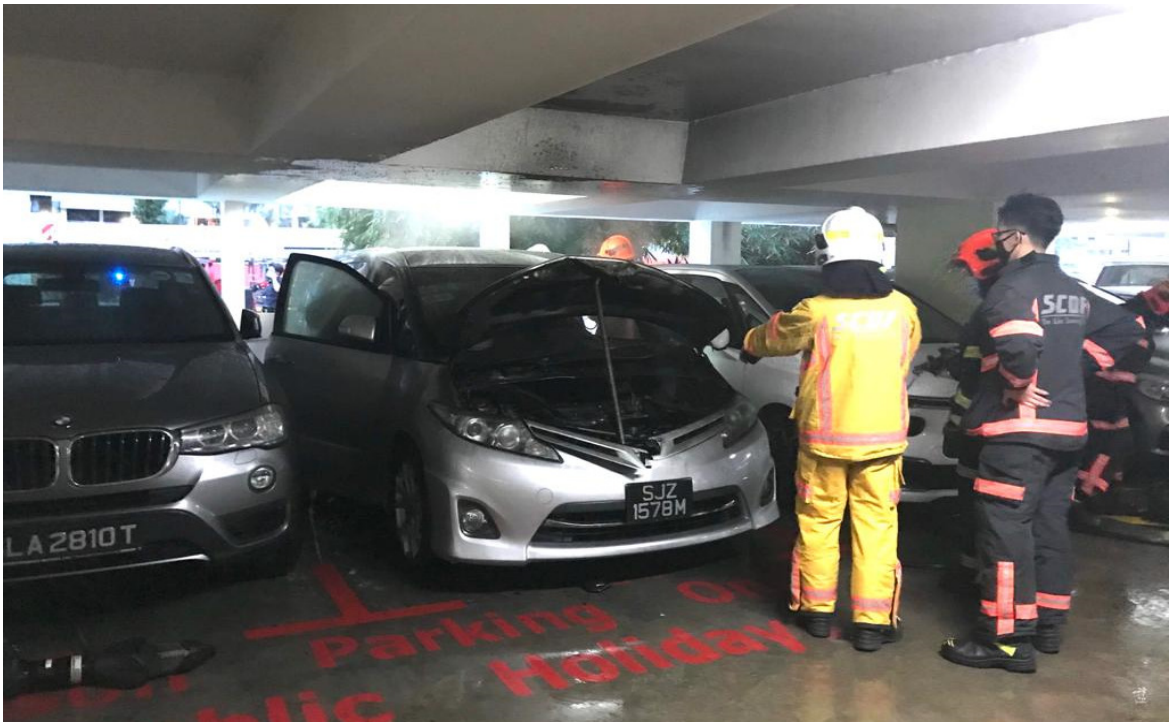


Photo 5 shows the Insured Vehicle at the incident scene after the fire was extinguished. The 2 vehicles that were parked at the immediate left and right of the Insured Vehicle appears to be unaffected by the fire. However, some areas of the ceiling above the Insured Vehicle were observed to be blackened.

Photo 6 shows the Insured Vehicle at the incident scene after the fire was extinguished. The 2 vehicles that were parked at the immediate left and right of the Insured Vehicle appears to be unaffected by the fire. However, some areas of the ceiling above the Insured Vehicle were observed to be blackened.

Photo 7 shows the Insured Vehicle at the incident scene. Upon closer examination of the photographs provided, I did not observe any unusual foreign material(s) and/or object(s) on the ground in the immediate area of where the Insured Vehicle was parked. In general, the observations gathered from my review of the photographs that were taken by Mr Lim at the incident scene had corresponded to the description of events that he had related to me during our conversation on 17 July 2020.

18. 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. The area around the rear left of the Insured Vehicle's front bonnet was found to be blackened. What is referred to as high heat intensity burned marks (whitish burn marks) were observed to have been formed within the blackened paint area. 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.

19. Following the characteristic of heat rising upwards, the underside of the front bonnet at the rear left area was also found with similar high intensity burn marks. Overall, the burn pattern of the front bonnet, in particular the high heat intensity burned marks, indicates that the origin of fire was around the rear left area of the Insured Vehicle's engine compartment. See photo 8 - 10 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, within an area of the front bonnet that was found with paint blackened. Such whitish burn marks are a result of exposure to prolong 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 of the engine compartment.

Photo 9 shows the underside of the Insured Vehicle's front bonnet. Similar high heat intensity burn marks (circled) were found on the underside rear left area of the Insured Vehicle's front bonnet. This was directly below the area where similar nature of high heat intensity burn marks were formed on the top side of the Insured Vehicle's front bonnet.

Photo 10 shows the engine compartment of the Insured Vehicle. Following the burn pattern, in particular the location where the high heat intensity burn marks were found on the front bonnet, and the characteristic of heat rising upwards, the fire to the Insured Vehicle can be determined to have originated around the rear left side (circled) of the engine compartment.

20. For a vehicular fire, the causation(s) typically include engine overheating, fluid leak, external factor and electrical nature. For this case, the possibility of the cause of fire to the Insured Vehicle being due to engine overheating and fluid leak would seem unlikely as the fire had started at a time when the Insured Vehicle was parked, and about 9 hours after the Insured Vehicle was last used. Temperature within the engine compartment would have cooled down after the engine was switched off for a long period of time.

21. The possibility of the fire being due to external factor (foreign material(s) stuck on hot surfaces, arson and sabotage amongst others) would also seem unlikely given that my 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 where the Insured Vehicle was parked at the material time was also not at a secluded location.

22. The possibility of the fire being due to electrical in nature would then seem more likely given that engine overheating, fluid leak and external factor would all seem unlikely. 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.

23. In fact, my examination of the rear left area of the engine compartment, which was the area where the fire to the Insured Vehicle had originated, revealed several stretches of original wire harnesses that were completely burned to its bare copper state. The battery wire cable for the positive terminal, in particular, was observed to be in bright reddish colour. This is an indication that the battery wire cable was 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 11 - 13 below.

Photo 11 shows the wirings around the area where the fire to the Insured Vehicle had originated. Several stretches of original wire harnesses around this area were found to be burnt to its bare copper state. The battery wire cable (arrowed) for the positive terminal was observed to be in bright reddish colour, indicating internal heating of copper wires, which is a sign of an electrical short circuit.

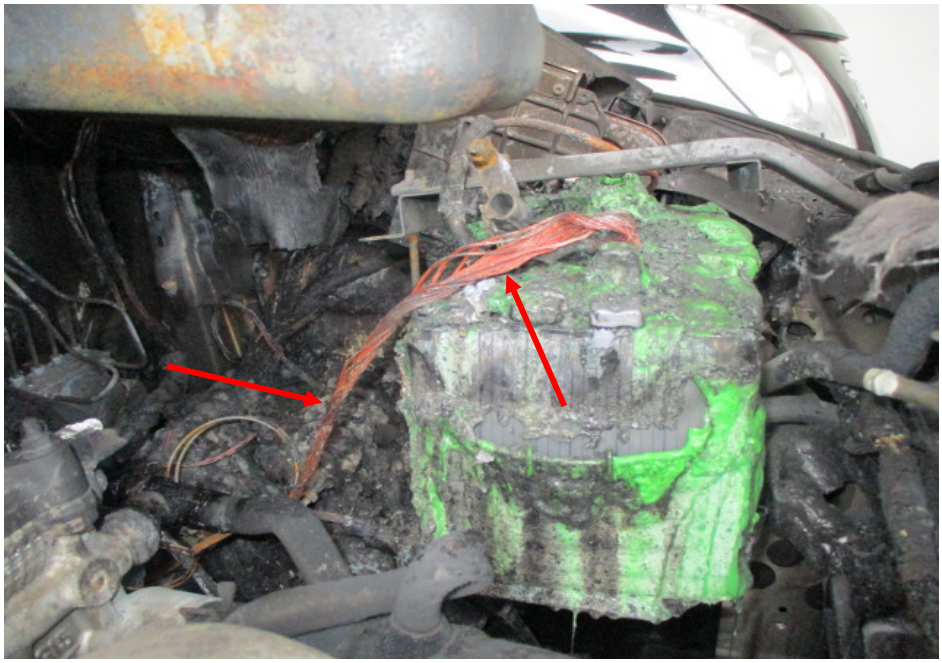
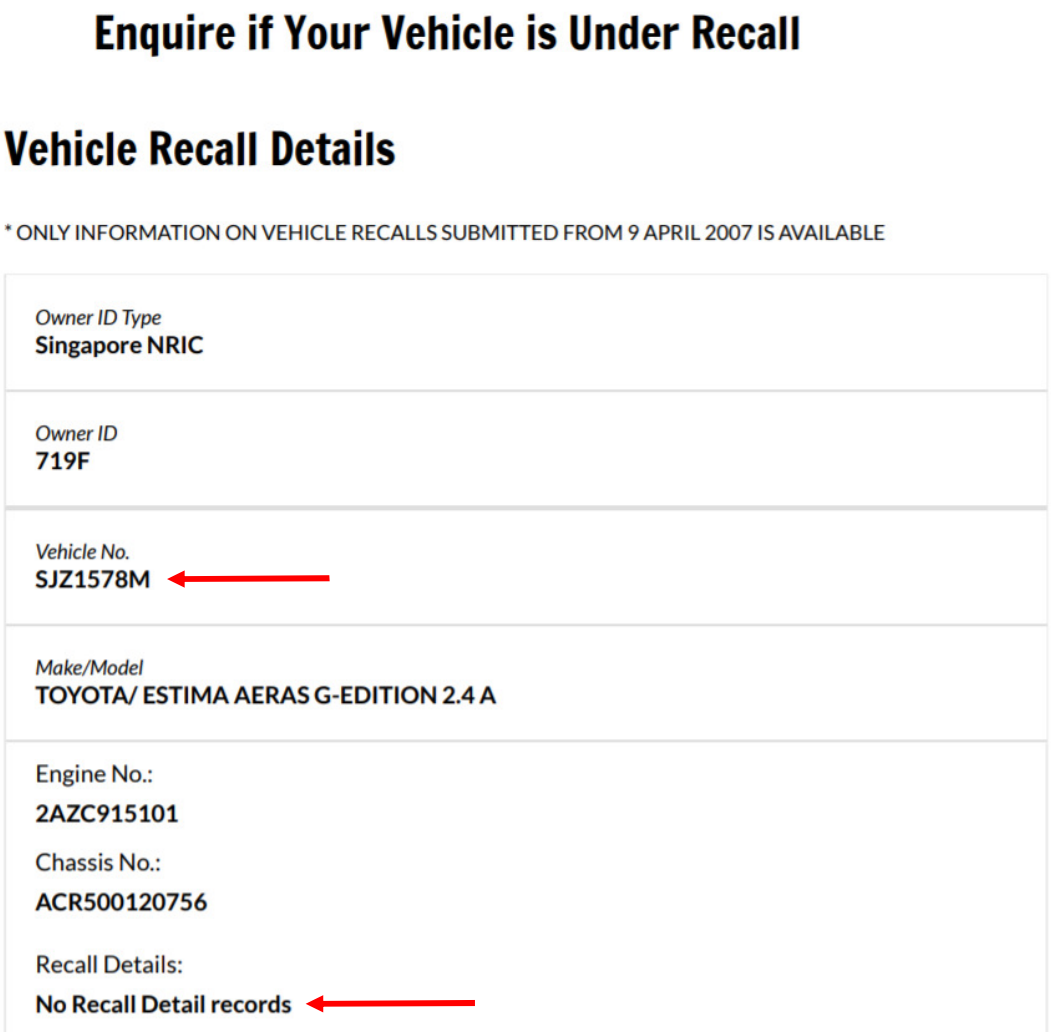


Photo 12 shows the condition of the battery wire cable (positive terminal) of the Insured Vehicle. The bright reddish colour (arrowed) of the wire cable indicates internal heating of copper wires which is a sign of an electrical short circuit occurring.

Photo 13 shows other stretches of original wire harnesses, around the rear left area of the Insured Vehicle's engine compartment, that were found burnt to its bare copper state. Such condition normally indicates internal heating of copper wires, which is a sign of an electrical short circuit. 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.

24. My checks with both local and international bodies and associations had revealed that at the time of writing this report, there is no manufacturer recall campaign which involved the Insured Vehicle. See search result from LTA below.



Enquire if Your Vehicle is Under Recall

Vehicle Recall Details

* ONLY INFORMATION ON VEHICLE RECALLS SUBMITTED FROM 9 APRIL 2007 IS AVAILABLE

Owner ID Type
Singapore NRIC

Owner ID
719F

Vehicle No.
SJZ1578M

Make/Model
TOYOTA/ ESTIMA AERAS G-EDITION 2.4 A

Engine No.:
2AZC915101

Chassis No.:
ACR500120756

Recall Details:
No Recall Detail records

Screenshot shows the LTA search result regarding manufacturer recall. From the search result, the Insured Vehicle was not involved in any 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 case, the fire had originated along the wirings at the rear left area of the engine compartment, in particular, the battery wire cable for the positive terminal. The burnt wirings were all original factory fitted wirings.

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 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.

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