

Your Ref: M1902714
Our Ref :CS/TMI19007038/D

29 April 2019

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 SKC 8078C ON 16 APRIL 2019

1. I refer to your request dated 22 April 2019.
2. My analysis, comments and opinions with respect to the cause of fire to the insured vehicle SKC 8078C (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 22 April 2019 at the premises of M/s Chin Meng Motors, No. 1 Kaki Bukit Avenue 6 #01-40/63 Autobay @ Kaki Bukit, Singapore 417883.
4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded: -

Vehicle Registration No.	: SKC 8078C
Make / Model	: Toyota Corolla Altis 1.6 Auto
Chassis No	: MR053REE104123238
Year of Registration	: 2011 (October)
Mileage	: N.A (battery and wirings affected)

5. The Insured Vehicle was noted to have sustained fire damage that was confined to its frontal portion. The engine compartment of the Insured Vehicle was observed to be severely burnt while the interior compartment was observed to be partially burnt at the front area.
6. The fire had resulted in the body parts at the frontal portion of the Insured Vehicle to be burnt. This had included its front bonnet, front left fender, front support panel, front headlamps, front windscreen, front dashboard and roof upholstery amongst others. Parts inside the engine compartment like the radiator, air intake, various hoses and pipes etc were also burnt and/or melted.

7. Apart for the fire damage, the Insured Vehicle was also observed to have sustained impact damage at its frontal portion. From the impact damage pattern, the direction of impact was from the front to rear of the Insured Vehicle whereby the body parts at the frontal portion were pushed/shifted inwards. The driver's airbag and front left passenger airbag were also activated.
8. 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. See photo 1 – 4 below.



Photo 1 shows a general view of the front right portion 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 bonnet and front windscreen were amongst the body parts that were found to have been affected as a result of the fire. Apart for the fire damage, the Insured Vehicle was also observed to have sustained impact damage at its frontal portion. Its front bumper, front fenders, front grille and front bonnet were all observed to have been damaged. The impact damage pattern suggests that the direction of impact was from the front to rear of the Insured Vehicle.



Photo 2 shows a general view of the front left portion of the Insured Vehicle at the time of my inspection. The fire damage to the Insured Vehicle was confined to its front portion. Its front bonnet, front left headlamp and front left fender were amongst the body parts that were found to have been affected as a result of the fire. Apart from the fire damage, the Insured Vehicle was also observed to have sustained impact damage at its frontal portion.



Photo 3 shows the engine compartment of the Insured Vehicle at the time of my inspection. The 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.

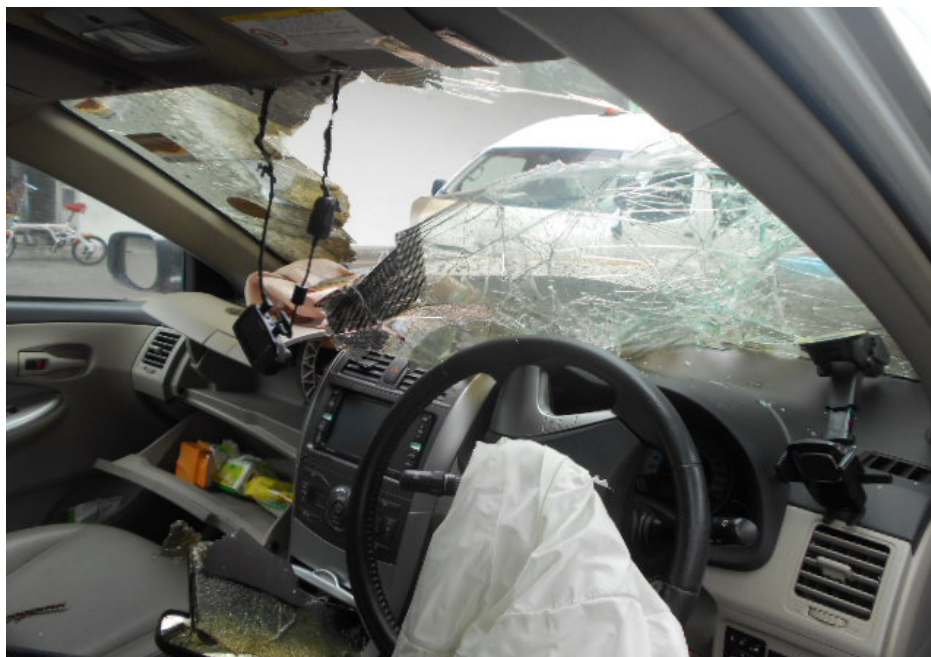


Photo 4 shows the interior compartment of the Insured Vehicle, which was observed to be partially burnt at the front area. The front dashboard and roof upholstery were amongst the parts that were found to have been burnt and/or melted as a result of the fire.

Circumstance of Incident

9. From the Singapore Accident Statement, which was made by Mr Lim Zi Zhao (herein referred to as “**Mr Lim**”), it was reported that the Insured Vehicle was involved in a chain collision along PIE towards Changi Airport at about 1620hrs on 16 April 2019. The Insured Vehicle was then towed to the workshop and on the same day at about 2100hrs, the Insured Vehicle self-ignited at the workshop.
10. I spoke to Mr Lim on 23 April 2019, where through telephone conversation, I was able to gather further information pertaining to the entire incident as well as information pertaining to the history of the Insured Vehicle.
11. According to Mr Lim, on 16 April 2019 at about 1620hrs, he was driving the Insured Vehicle along the extreme right lane of PIE in the direction of Changi Airport. He was from SAFTI Camp heading back to his home at Bedok North Street 3. Just after the Thomson Flyover, he was involved in a 4-vehicle chain collision accident where the Insured Vehicle was the last vehicle. Mr Lim informed me that he only managed to record the registration number of 2 vehicles as the first vehicle drove off before he could record its registration number. The damage to the Insured Vehicle was at the frontal portion for this accident.

12. Towing crew from EMAS subsequently towed the Insured Vehicle from PIE to a public carpark at Toa Payoh where towing crew arranged by M/s Chin Meng Motors then towed the Insured Vehicle to the premise of M/s Chin Meng Motors, at #01-40/63 Autobay @ Kaki Bukit. Mr Lim had earlier called M/s Chin Meng Motors after the accident when he checked the authorized workshop list of his insurer where M/s Chin Meng Motors is amongst the list of authorized workshops. Mr Lim informed me that he did not follow the tow truck to M/s Chin Meng Motors.
13. On the same day at about 2200hrs, he received a phone call from M/s Chin Meng Motors informing him that the Insured Vehicle had caught fire. Mr Lim thereafter went to the premise of M/s Chin Meng Motors where he noticed that the Insured Vehicle was parked in front of the premise of M/s Chin Meng Motors with its frontal portion burnt. He was informed that the Insured Vehicle had caught fire at about 2100hrs and the fire was put out by some workers from neighbouring units. SCDF and Police were not activated.
14. With regard to the history of the Insured Vehicle, I was informed by Mr Lim that he purchased the Insured Vehicle from a used car dealer about a year ago. He is the registered owner and main driver of the Insured Vehicle. The Insured Vehicle is used for work and leisure purposes. As far as he can recall, there has not been any major mechanical and/or electrical issue(s) with the Insured Vehicle since taking possession of it. The last servicing carried out was on November 2018. Mr Lim was able to provide me a tax invoice relating to this servicing.
15. During my conversation with Mr Lim, he informed that during his drive along PIE prior to the accident, he did not encounter any abnormality to the operating behaviour of the Insured Vehicle. He estimates a total of about 3 hours from the time of accident to the time the Insured Vehicle was towed to M/s Chin Meng Motors. Mr Lim also informed me that he took some photographs whilst at the accident scene along PIE, and also when at the premise of M/s Chin Meng Motors after the Insured Vehicle had caught fire. These photographs were duly forwarded to me for my review.

Investigation and Technical Analysis

16. Firstly, my review of the tax invoice relating to the servicing revealed that the Insured Vehicle was serviced at M/s Complete VMS Pte Ltd on 30 November 2018. Based on the tax invoice, the engine oil, oil filter, air con filter and air filter were replaced during this servicing. The mileage of the Insured Vehicle at the time of this servicing was 115,680km. See photo 5 below.

COMPLETE VMS PTE LTD

176 Sin Ming Drive, #03-14 / 07, Sin Ming Autocare Complex, S575721
Tel: 6455 0012 Fax: 6554 0012 Email: main@completevms.com.sg
Business Reg. No. 200416180E GST Reg. No.: 200416180E



LIM ZI ZHAO
BLK 547 BEDOK NORTH STREET 3 #07-1456
SINGAPORE 460547

Contact : 92267714

Tax Invoice : VMQ13899

Invoice Date : 30/11/2018

Vehicle Num. : SKC8078C

Make/Model : TOYOTA ALTIS 1.6

Mileage(Km) : 115680

POWVO/RO# :

Ref./Remark :

S/N	Quantity	Particular	Unit Price	Amount S\$
	1	ENGINE OIL		
	1	OIL FILTER		
1.	1	AIR FILTER	25.00	25.00
2.	1	AIRCON FILTER	35.00	35.00
		SHELL HELIX 5W40 FULLY SYS, OIL FILTER, CAR WASH		148.00

Photo 5 shows the tax invoice relating to the servicing of the Insured Vehicle that I had reviewed. Based on the information seen in the tax invoice, the engine oil, oil filter, air con filter and air filter were replaced on 30 November 2018. The mileage of the Insured Vehicle at the time of this servicing was 115,680km.

17. The photographs provided to me by Mr Lim had showed the Insured Vehicle at the accident scene and at the premise of M/s Chin Meng Motors after the fire was extinguished. I note that at the accident scene along PIE, the Insured Vehicle had sustained impact damage at its frontal portion. There was no damage of fire nature seen on the Insured Vehicle. There was also no leaked fluid seen on the road surface where the Insured Vehicle had come to a stop. A Citycab motor taxi and a Comfort motor taxi were in front of the Insured Vehicle, and from the photographs these motor taxis were involved in the accident. See photo 6 - 8 below.



Photo 6 shows the accident scene at PIE towards Changi Airport. From the photographs provided by Mr Lim, a Citycab motor taxi was directly in front of the Insured Vehicle.



Photo 7 shows the accident scene at PIE towards Changi Airport. From the photographs provided by Mr Lim, a Comfort motor taxi was directly in front of the Citycab motor taxi.



Photo 8 shows a general view of the Insured Vehicle at the accident scene along PIE towards Changi Airport. From my review of the photographs provided by Mr Lim, I note that the Insured Vehicle had sustained impact damage at its frontal portion. There was no damage of fire nature seen on the Insured Vehicle at the accident scene. There was also no leaked fluid seen on the road surface where the Insured Vehicle had come to a stop.

18. Upon reviewing the photographs showing the Insured Vehicle at the premise of M/s Chin Meng Motors after the fire was extinguished, I note that the Insured Vehicle was parked at the porch area directly in front of the shutter door leading to the workshop of M/s Chin Meng Motors. Upon close examination of the photographs, there appears to be no unusual foreign material(s) and/or object(s) found on the ground in the immediate area of where the Insured Vehicle was parked.
19. Generally, the impact damage seen on the Insured Vehicle after the fire was similar to the damage that was seen on the Insured Vehicle whilst it was at the accident scene along PIE. The overall damage (fire nature and impact nature) was similar to the damage observed when I had inspected the Insured Vehicle. See photo 9 below.

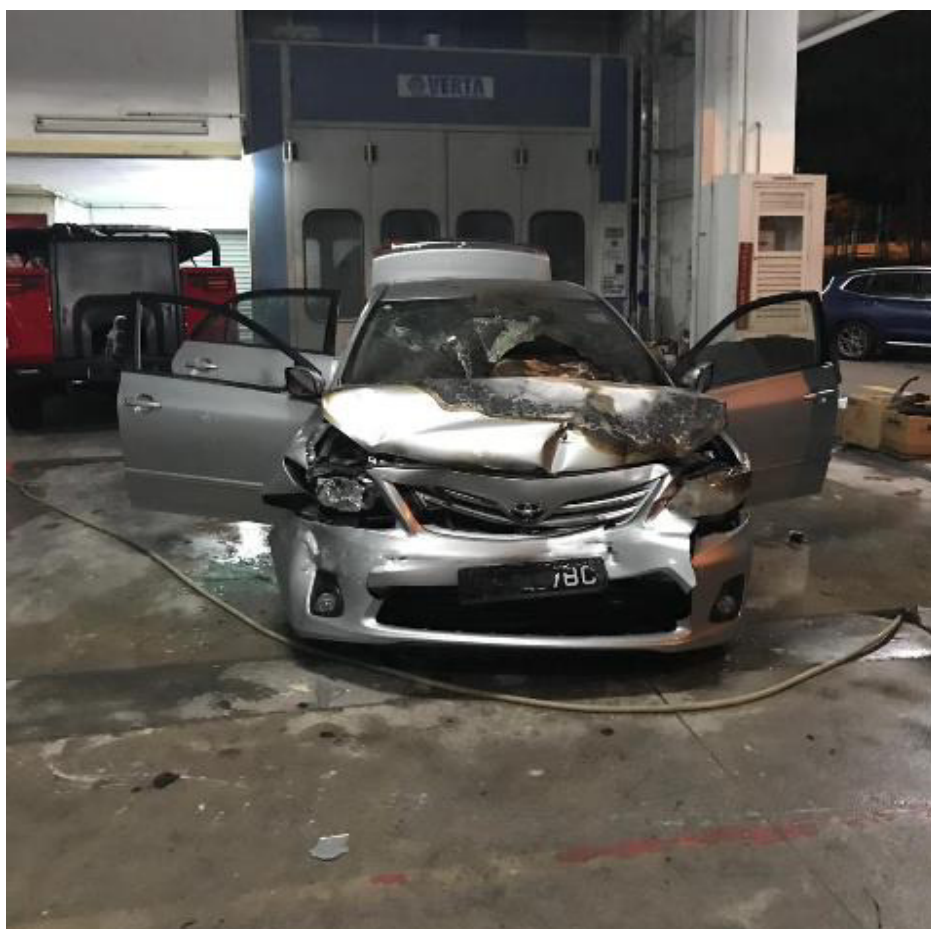


Photo 9 shows a general view of the Insured Vehicle at the premise of M/s Chin Meng Motors. This was after the fire was extinguished. Upon close examination of the photographs, there appears to be no unusual foreign material(s) and/or object(s) found on the ground in the immediate area of where the Insured Vehicle was parked.

20. During my inspection of the Insured Vehicle at M/s Chin Meng Motors on 22 April 2019, I had managed to obtain video recordings from CCTV cameras that were placed outside the premise of M/s Chin Meng Motors. From the video recordings, a blue coloured tow truck could be seen first reversing into the porch area. The shutter doors of M/s Chin Meng Motors were closed at that time. After removing the tow fork from the Insured Vehicle, the tow truck was seen driving off. This was approximately about 2045hrs or thereabouts.
21. At about an hour later, smoke was seen coming out from the engine compartment, from the gaps created by the buckling of the Insured Vehicle's front bonnet that was a result of the accident. A short while later, flames appeared at the engine compartment area and moved onto the front bonnet of the Insured Vehicle. The flames were eventually put out by some members of public using water. Notably, between the time when the tow truck left the premise of M/s Chin Meng Motors till the time when smoke was first seen coming from the Insured Vehicle, there was no abnormal event ie no one walked by or walked near to the Insured Vehicle. The Insured Vehicle was basically untouched during this period. See screenshot 1 – 4 below taken from the video recordings that I had reviewed.



Screenshot 1 shows the Insured Vehicle having just arrived at the premise of M/s Chin Meng Motors. The tow truck driver could be seen preparing to remove the tow fork from the front wheels of the Insured Vehicle. The shutter doors of M/s Chin Meng Motors were observed to be closed at that time.



Screenshot 2 shows the tow truck about to leave the Insured Vehicle. This was approximately 2045hrs thereabouts. The Insured Vehicle was observed to be intact with nothing amiss.



Screenshot 3 shows smoke emitting from the engine compartment of the Insured Vehicle (note the blur at the bottom part of the front windscreen as compared to the same area in screenshot 2 above). This was about an hour after the tow truck had left. There was no abnormal event seen from the video recording leading up to the time when smoke was first seen.



Screenshot 4 shows fire at the frontal portion of the Insured Vehicle. The flames were initially seen coming from the engine compartment of the Insured Vehicle before moving onto its front bonnet. The fire was eventually put out by some members of public using water.

22. Based on the information gathered following my ground investigations, the fire to the Insured Vehicle occurred when the Insured Vehicle was parked/stationary. In this aspect, common causes of fire are electrical in nature and external factor like arson.
23. External factor for this case was unlikely as from the CCTV cameras, the Insured Vehicle was parked and untouched from the time it arrived at the premise of M/s Chin Meng Motors till the time smoke was first seen. Since there was no abnormal external activity seen from the CCTV cameras, the cause of fire to the Insured Vehicle would then be due to electrical nature. In fact, the physical condition of the wirings as seen during my inspection of the Insured Vehicle also supports the cause of fire being due to electrical in nature. The following paragraphs discusses the physical evidence relating to this.
24. High heat intensity burned marks (whitish burn marks) were found at the centre left area 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. Note that rust had indeed formed at the centre left area of the Insured Vehicle's front bonnet.

25. Correspondingly, the underside of the front bonnet at the centre left area was also found with similar high heat intensity burn marks (whitish burn marks). Rust had also started to develop at this area. Following the characteristic of heat rising upwards, the burn pattern of the front bonnet would then indicate that the origin of fire was at the centre left area of the Insured Vehicle's engine compartment.
26. My examination of the centre left area of the engine compartment, during my inspection of the Insured Vehicle, revealed greenish residue on several stretches of original factory fitted wirings. The presence of 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 indicates that the cause of fire to the Insured Vehicle was due to electrical in nature. See photo 10 - 14 below.



Photo 10 shows the whitish burn marks (circled) that were found on the centre left area of the Insured Vehicle's front bonnet. Such whitish burn marks are a result of exposure to prolonged heat intensity. Rust (arrowed) 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. Following the characteristic of heat rising upwards, the fire to the Insured Vehicle can then be determined to have originated around the centre left area of the engine compartment.



Photo 11 shows a general view of where the fire to the Insured Vehicle had originated, which was around the centre left area of the engine compartment (red circle). This was established basing on the burn pattern (whitish burn marks and rust) that was found on the top side and the underside (yellow arrow) of the Insured Vehicle's front bonnet.



Photo 12 shows the wirings around the centre left area of the engine compartment, which was where the fire to the Insured Vehicle had originated. Greenish residue was found on several stretches of wirings (arrowed). These wirings were originally fitted wirings. The presence of such greenish residue suggests occurrence of an electrical short circuit.

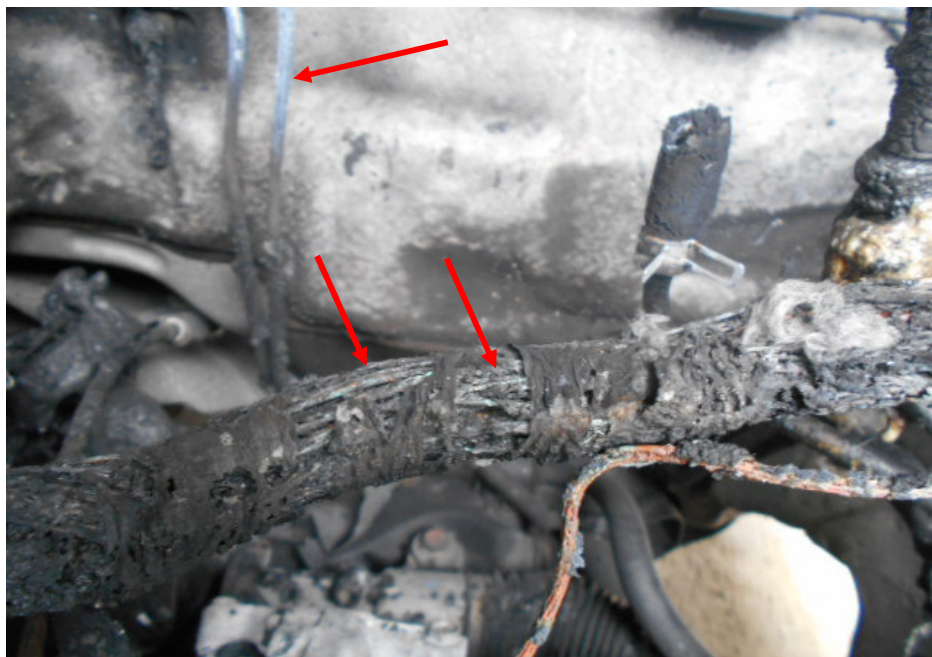


Photo 13 shows a closer view of the wirings around the centre left area of the engine compartment. Greenish residue was found on the wirings (red arrow). The presence of such greenish residue suggests occurrence of an electrical short circuit. These wirings are original factory fitted wirings.

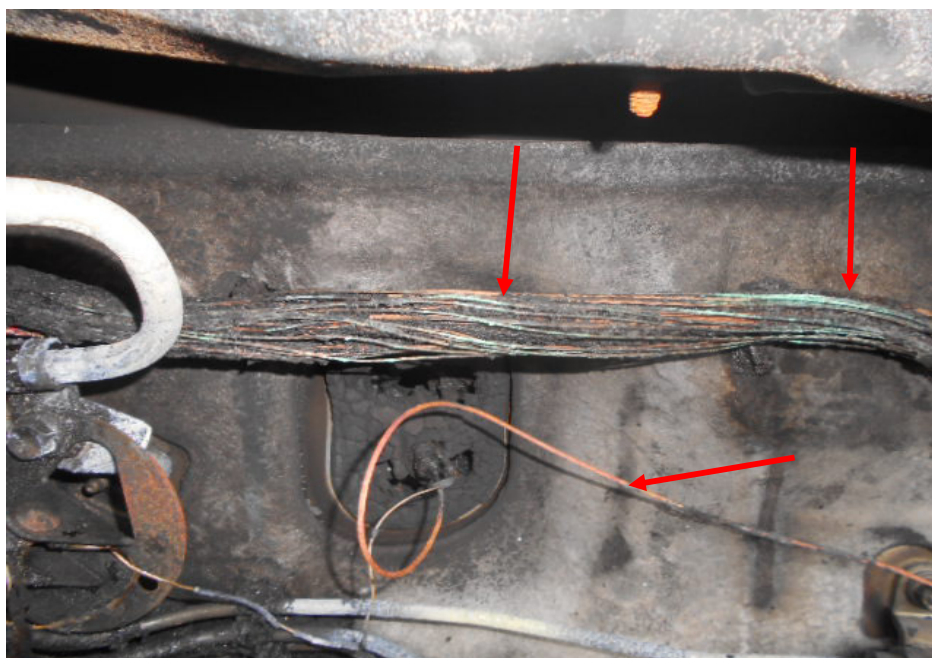


Photo 14 shows another stretch of original factory fitted wirings that were found with greenish residue. The presence of greenish residue indicates internal heating of copper wires, a sign of an electrical short circuit occurring. The greenish residue is normally left behind from oxidation as a result of chemical reaction involving the copper wires.



Photo 15 shows another stretch of wirings with greenish residue (arrowed) at the centre left area of the Insured Vehicle's engine compartment. The physical condition of the wirings as seen during my inspection of the Insured Vehicle supports the cause of fire being due to electrical in nature.

27. For this case, the Insured Vehicle was involved in an accident prior to the fire. The impact force arising from the collision had resulted in several body parts at the frontal portion to be pushed/shifted inwards. One of these parts was the battery. This could have caused slight instability to the current/voltage within the electrical system of the Insured Vehicle, ultimately leading to the fire a few hours after the accident.
28. My checks with both local and international bodies and associations revealed that the Insured Vehicle was involved in a manufacturer recall campaign that was started in year 2015. The purpose of the recall was for issues to the airbags. From the LTA records, rectification to address the purpose of the recall was carried out to the Insured Vehicle in January 2018. It was also noted that the issues to the airbags did not pose any fire risk. 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:	Singapore NRIC
Owner ID:	1373G
Vehicle Details	
Vehicle Registration number:	SKC8078C ←
Make:	TOYOTA
Vehicle Model:	COROLLA ALTIS 1.6 AUTO
Engine No.:	1ZRX127071
Chassis No.:	MR053REE104123238
Recall Details	
1	Recall Extension No.: R2015080146X03
	Manufacturer Recall Date: 23 Jun 2015
	Estimated Completion Year of Recall: 2020
	Brief Description (As Provided by Motor Dealer): The subject vehicles are equipped with front passenger airbag inflators which may have been manufactured in such a way as to have the potential for the intrusion of moisture over time. Depending on the circumstances, this could create excessive internal pressure when the airbag is deployed and cause the inflator to rupture. ←
	Date Rectified: 08 Jan 2018 ←
	For more details, contact BORNEO MOTORS (SINGAPORE) PTE LTD
Hotline Information: TOYOTA CUSTOMER SERVICE at 66311111	

Screenshot shows the LTA search result regarding the manufacturer recall campaign involving the Insured Vehicle. The Insured Vehicle was involved in a manufacturer recall campaign that was started in year 2015. The purpose of the recall was for issues to the airbags. From the LTA records, rectification to address the purpose of the recall was carried out to the Insured Vehicle in January 2018. It was also noted that the issues to the airbags did not pose any fire risk.

Conclusion

29. 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 wirings around the centre left area of the engine compartment. The wirings were original factory wirings.

30. I am further of the view that the fire could have possibly been related to the accident that the Insured Vehicle was involved in, a few hours before the fire. The impact from the collision could have caused slight instability to the current/voltage within the electrical system of the Insured Vehicle, ultimately leading to the fire.
31. 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.
32. 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.
33. My investigations also revealed that the Insured Vehicle was involved in a manufacturer recall campaign. Rectification to address the purpose of the recall was carried out to the Insured Vehicle in 2018. From the records, the purpose of the recall does not pose a fire risk.

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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