



Your Ref: S8M00KSY
Our Ref :CS/ASM18011048/D

22 June 2018

M/s AXA Insurance Pte Ltd
8 Shenton Way #24-01
AXA Tower
Singapore 068811
(Motor Claims Department)

**TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE
INSURED VEHICLE SJJ 8000B ON 14 JUNE 2018**

1. I refer to your request dated 18 June 2018.
2. My analysis, comments and opinions with respect to the cause of fire to the insured vehicle SJJ 8000B (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 19 June 2018 at the premises of M/s SME Motor Pte Ltd, 1 Kaki Bukit Avenue 6 #02-15, 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.	: SJJ 8000B
Make / Model	: Alfa Romeo 159 2.2JTS Selespeed
Chassis No	: ZAR93900007255873
Year of Registration	: 2009 (September)
Mileage	: N.A (wiring affected)

5. The Insured Vehicle was noted to have sustained fire damage at its frontal body. Its engine compartment was observed to have been extensively burnt. The rear body and interior compartment were however unaffected by the incident.
6. Body parts that were observed to have been burnt and/or melted as a result of the fire had included the front bumper, front fenders, front bonnet, front headlamps, front grille and front windscreen amongst others. Parts inside the engine compartment like the radiator, intake manifold, air duct, cooling fan, hoses and pipes amongst others were all burnt and/or melted as a result of the incident. See photo 1 – 4 below.



Photo 1 shows a general view of the front right body of the Insured Vehicle at the time of inspection. The Insured Vehicle was observed to have sustained fire damage at its frontal body. Its front bumper, front bonnet, front grille, front right headlamp and front right fender were amongst the body parts that were found to have been burnt 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 inspection. The Insured Vehicle was observed to have sustained fire damage at its frontal body. Its front bumper, front left fender, front left headlamp, front bonnet and front windscreen were amongst the body parts that were found to have been burnt as a result of the fire.



Photo 3 shows the engine compartment of the Insured Vehicle at the time of inspection. Almost all the parts inside the engine compartment were observed to be burnt and/or melted as a result of the fire. These parts had included its radiator, air condenser, cooling fan, intake manifold, fuse box, battery, air duct, hoses and pipes amongst others.



Photo 4 shows the interior compartment of the Insured Vehicle, which was unaffected by the incident.

7. I did not find any additional electronic and/or electrical component(s) fitted on the Insured Vehicle at the time of my inspection. I did however find the Insured Vehicle to be fitted with a non-original rear exhaust muffler. See photo 5 below.



Photo 5 shows the rear exhaust muffler of the Insured Vehicle. The rear exhaust muffler fitted on the Insured Vehicle is non-original. The brand of the rear exhaust muffler was observed to be "Novitec".

Circumstance of Incident

8. From the police report G/20180614/2030, which was made by one Chan Jun Chiat Clarence (herein referred to as "**Mr Chan**"), I note that the fire to the Insured Vehicle had started at a time when he was driving the Insured Vehicle. Mr Chan first saw smoke coming out from the air conditioning vents and stopped the Insured Vehicle to check. Thick smoke was then seen coming out from the front bonnet. Mr Chan immediately called SCDF for assistance.
9. I manage to speak to Mr Chan on 20 June 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.
10. According to Mr Chan, on 14 June 2018 at about 0820hrs, he was driving the Insured Vehicle heading to his office at Tagore Industrial Park. He had just exited from the carpark of his home when he detected burning smell as he was driving along Hougang Street 22. Smoke was also seen coming out from the centre air conditioning vents.

11. Mr Chan immediately stopped the Insured Vehicle towards the left side of the road, in front of a church. He switched off the engine and alighted to check. He saw smoke coming out from the gaps of the front bonnet and immediately call SCDF for assistance. Whilst waiting for SCDF to arrive, Mr Chan recall seeing a small flame at the underside of the Insured Vehicle, near the front left tyre. SCDF officers soon arrive and extinguished the fire.
12. After relating the earlier events to the SCDF personnel and the police officers who had attended to the incident scene, Mr Chan was advised to tow the Insured Vehicle away. Arrangement was subsequently made to tow the Insured Vehicle to SME Motor Pte Ltd at Kaki Bukit.
13. With regard to the history of the Insured Vehicle, I was able to gather from Mr Chan that he is the registered owner and main driver of the Insured Vehicle. He purchased the Insured Vehicle second hand in January this year. He had sent the Insured Vehicle for a routine servicing in February this year and replaced the battery in April this year. As far as he can recall, he has not experienced any major mechanical and/or electrical problem with the Insured Vehicle since taking possession of it in January 2018.
14. Mr Chan informed me that he has not done any modification and/or fitted any electrical components on the Insured Vehicle. He is aware of the non-original rear exhaust muffler, which he advised was fitted by the previous owner. There is also a LTA certification letter for the non-original rear exhaust muffler.
15. According to Mr Chan, it was the first time that he was using the Insured Vehicle for that day. He last used the Insured Vehicle the day before and parked it at the carpark after returning home from work at about 1900hrs. Mr Chan informed me that on the day of incident, he did not drive off immediately after starting the engine of the Insured Vehicle. He had sat inside the Insured Vehicle replying messages with the engine running. He estimates this to be for about 3mins to 5mins. Thereafter he drove off and detected the burning smell almost immediately after exiting the carpark. Mr Chan had taken some photographs during his time at the incident location and these were forwarded to me for review.

Investigation and Technical Analysis

16. The photographs provided to me had showed the Insured Vehicle stopped along the left side of a single lane dual direction roadway. White smoke can be seen coming out from the gaps surrounding the front bonnet.

17. Upon further examination of the photographs, I had noted that there was no unusual foreign material(s) and/or object(s) on the ground in the immediate area of where the Insured Vehicle had stopped. The damage of burnt nature to the Insured Vehicle immediately after the fire was put out had corresponded to the damages as seen by me during my inspection of the Insured Vehicle.

18. In general, the observations gathered from my review of the photographs that were taken by Mr Chan at the incident scene had corresponded to his description of the events that he had related to me during our conversation on 20 June 2018. See photo 6 – 9 below.



Photo 6 shows the Insured Vehicle at the incident location with white smoke emitting out from the gaps surrounding its front bonnet. There was no unusual foreign material(s) and/or object(s) on the ground in the immediate area of where the Insured Vehicle had stopped.



Photo 7 shows the Insured Vehicle at the incident location with smoke coming out from its frontal portion. In general, the observations gathered from my review of the incident scene photographs had corresponded to the information gathered from Mr Chan when I spoke to him.



Photo 8 shows the Insured Vehicle at the incident location after the fire was extinguished. In general, the observations gathered from my review of the incident scene photographs had corresponded to the information gathered from Mr Chan when I spoke to him.



Photo 9 shows the engine compartment of the Insured Vehicle after the fire was extinguished by SCDF personnel. The damage of burnt nature to the Insured Vehicle had corresponded to the damages as seen by me during my inspection of the Insured Vehicle.

19. Given the circumstance of incident described by Mr Chan, the fire had occurred while the Insured Vehicle was being driven/engine in operation. Common causes of fire arising from a vehicle that is being driven and/or with its engine in operation include engine overheating, leakage of fluid onto hot surfaces or electrical nature.
20. Fire due to an overheated engine was unlikely as the Insured Vehicle was still able to be operated after smoke was first seen. The engine of the Insured Vehicle did not stall and Mr Chan himself had turned the engine off before alighting from the Insured Vehicle. In the event if the Insured Vehicle's engine had overheated, the mechanical parts inside the engine would first seize causing the engine to stall by itself. Mr Chan would have likely experienced engine stalling shortly after seeing the smoke.
21. Leakage of fluid within the engine compartment may cause a fire to be ignited when the leaked fluid comes into contact with hot surfaces, like an exhaust pipe. The leaked fluid could possibly reach temperature sufficient for it to self-ignite. However, given that the Insured Vehicle was parked for more than 12 hours and driven for less than 10mins before smoke was first seen, the temperature within the engine compartment would have unlikely been able to reach temperature that could result in leaked fluid to self-ignite.

22. Heat generated from engine operation would have also been able to dissipate out whilst the Insured Vehicle was moving, unlike in a situation where the traffic is of start stop condition. Fire due to self-igniting fluid leakage would then seem unlikely for this case.
23. Since engine overheating and leakage of fluid were both unlikely the cause of fire, the most probable cause would then be electrical in nature to the wirings of the Insured Vehicle. 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. Firstly, high heat intensity burn marks (whitish burn marks) were found on the firewall panel, towards the rear of the engine compartment. 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. Given this burn pattern, the origin of fire can then be determined to be at the rear centre area of the engine compartment.
25. Correspondingly, the underside of the front bonnet directly above the firewall panel was found with similar high heat intensity burn marks (whitish burn marks). This follows the characteristic of heat rising upwards. The burn pattern to the underside of the front bonnet further supports my earlier comment of the fire originating at the rear centre area of the engine compartment. See photo 10 & 11 below.
26. 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 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 same wirings were also noted to be bright reddish in colour immediately after the fire was extinguished as seen from the incident scene photographs taken by Mr Chan. Hence the physical condition of the wirings at the area where the fire had originated indicates that the cause of fire to the Insured Vehicle was due to electrical in nature. See photo 12 & 13 below.



Photo 10 shows the whitish burn marks (circled) that were found on the firewall panel, towards the rear of the Insured Vehicle's engine compartment. 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.



Photo 11 shows the whitish burn marks (circled) that were found on the underside of the front bonnet, directly above the firewall panel where similar high heat intensity burn marks (whitish burn marks) were found. This burn pattern to the underside of the front bonnet supports my comment of the fire originating at the rear centre area of the engine compartment of the Insured Vehicle.

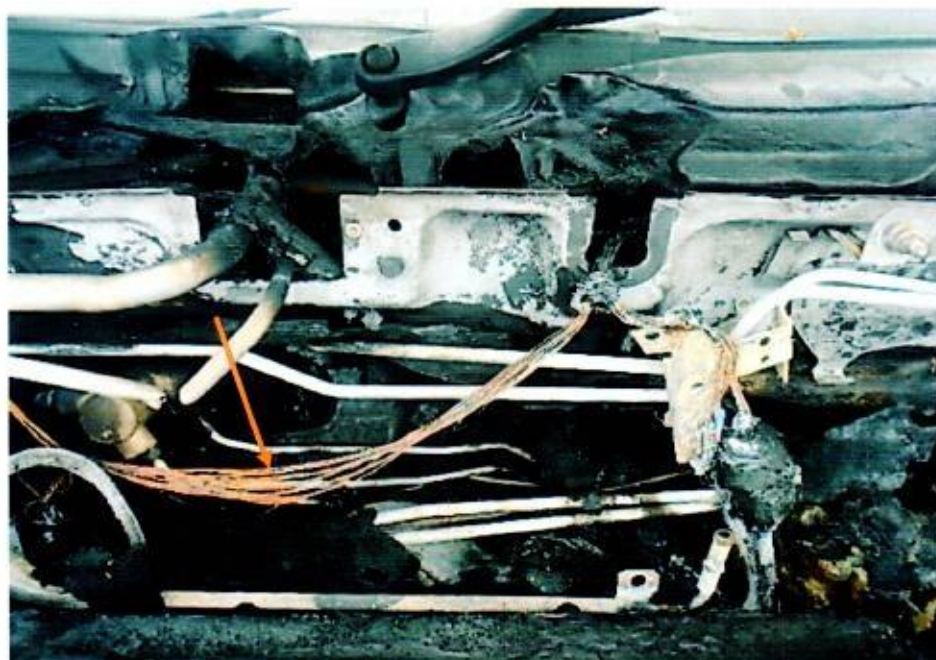


Photo 12 shows the wirings at the rear centre area of the Insured Vehicle's engine compartment. The wirings (arrowed) were found to be completely burned to its bare copper state. The bright reddish colour of the copper wires suggest that the wirings were exposed to high heat. Such condition normally indicates internal heating of copper wires which is a sign of an electrical short circuit occurring.



Photo 13 shows the engine compartment of the Insured Vehicle immediately after the fire was extinguished. This was from photographs taken by Mr Chan at the incident location. The same wirings (arrowed) as photograph 12 were noted to be bright reddish in colour immediately after the fire. Such condition suggest that the wirings were exposed to high heat, indicating internal heating of copper wires. This is a sign of an electrical short circuit occurring.

27. With regard to the servicing and maintenance of the Insured Vehicle, Mr Chan had provided me several documents relating to this. Upon review of these documents, I note that the Insured Vehicle was last servicing on 21 February 2018. Its engine oil, engine oil filter, air condition filter, front brake discs and front brake pads were all replaced during this servicing. The battery was also replaced on 09 April 2018.

28. Other than this, I had also noted that the Insured Vehicle was serviced on 10 August 2017 by the previous owner. The engine oil and engine oil filter were replaced along with an engine mounting, a brake light bulb and 4 pieces of tyres. Generally, my review of the documents provided by Mr Chan revealed that the Insured Vehicle was regularly maintained. See photo 14 below relating to the last servicing on 21 February 2018.

M/S : Q

H/P 9666 1101

TAX INVOICE NO IV1310062

DATE 21/02/2018

A/C CODE Q0025

VEH REG SJJ8000B

MILEAGE 152844KM

MAKE/MODEL ALFA ROMEO 159 2.2

JTS SELESPEED 16v

JOB NO ASJC1309945

SALESMAN

TIME IN

TIME OUT


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Driveshaft RHS dust cover torn

Item No	Descriptions	Quantity	Unit Price S\$	Amount S\$
AR159SVC	<u>AR 159/BRERA/SPIDER 2.2JTS QUICK SERVICE</u>	1 PKG	219.00	219.00
1	Agip 5w40 synthetic engine oil	5.5 LIT		
2	Oil filter AR159 2.2/Brera 2.2/Spider 2.2	1 PC		
3	Labour charge to replace engine oil and oil filter	1 PC		
4	Aircon filter AR 159 / Brera / Brera Spider	1 PC	60.00	60.00
5	Brake disc front AR 159/Brera/Spider 3.2v6 Q4 (330mm) and QV 2.2	1 PAIR	480.00	480.00
6	Brake pad front (330mm big 4pot) AR 147 GTA/156 GTA/GT 3.2v6/159 2.2 QV and AR 159/ Brera/Spider 3.2v6	1 SET	250.00	250.00
7	Labour charge to replace front brake discs and brake pads	1 PC	50.00	50.00

Photo 14 shows the last servicing that was carried out to the Insured Vehicle. This was on 21 February 2018. In general, my review of the documents relating to the servicing and maintenance aspect of the Insured Vehicle indicates that the Insured Vehicle was regularly maintained.

29. Regarding the non-original rear exhaust muffler, Mr Chan could provide me a letter from LTA certifying that the Insured Vehicle was fitted with a "Novitec" brand rear exhaust muffler. The chassis number stated on the letter was the same chassis number for the Insured Vehicle. See photo 15 below showing the letter from LTA.


Land Transport Authority

10 Sin Ming Drive Singapore 575701
Hotline: 1800 - CALL LTA (1800 - 2255 582)
FAX: (65) 6553 5329

Date: 20 DEC 2011 VIR No.:201112208963V0

Mr/Ms/Messrs
YAW CHIA HAN
6B MENG SUAN ROAD
SINGAPORE 779307

Dear Sir/Madam

INSPECTION ACKNOWLEDGEMENT LETTER

EXHAUST SYSTEM
Vehicle Registration No: SDW249G
Chassis No: ZAR93900007255873 ←
Engine No: 939A50001749637
Applicant: YAW CHIA HAN

This is to acknowledge that your vehicle has passed the inspection on 20 DEC 2011.

The accessory details are as follows:
Make :NOVITEC
Model Name :NOVITEC
EEC/ECE/JASMA/JMCA Number :E1 039376
Type Number: 200734-E

Thank you for presenting the above vehicle for inspection.

Registrar of Vehicles

(This is a computer-generated letter. No signature is required.)

Photo 15 shows the letter from LTA certifying that the Insured Vehicle was fitted with a "Novitec" brand rear exhaust muffler. The chassis number (arrowed) stated on the letter was the same chassis number for the Insured Vehicle.

30. My subsequent 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:	Singapore NRIC
Owner ID:	6590H

Vehicle Details

Vehicle Registration number:	SJJ8000B
Make:	ALFA ROMEO
Vehicle Model:	ALFA 159 2.2JTS.SELESPEED
Engine No.:	939A50001749637
Chassis No.:	ZAR93900007255873

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

31. 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 area of the engine compartment. The wiring was an original factory wiring harness.
32. 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.
33. There was no additional electronic and/or electrical component(s) fitted on the Insured Vehicle at the time of my inspection of the Insured Vehicle. It was however fitted with a non-original rear exhaust muffler, which was approved by LTA. The fitting of this non-original rear exhaust muffler did cause and/or contribute to the fire.



34. 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, AMRTE, AFF SAE, M.MATAI, AFF.Inst.AEA
Senior Technical Investigator
Technical Investigation & Reconstructionist (SAE-A)

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