

Your Ref: G0056197
Our Ref : CI/AVI19004628/N

1 March 2019

M/s Aviva Ltd.
4 Shenton Way #01-01
SGX Centre 2
Singapore 068807
(Motor Claims Department)

TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE SGT 8291K ON 26 FEBRUARY 2019

1. We refer to your letter dated 27 February 2019 and the instructions therein.
2. Our analysis, comments and opinions with respect to the cause of fire to the insured vehicle SGT 8291K (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 1 March 2019 at the premises of ComfortDelGro Engineering Pte. Ltd. (herein referred to as "**Comfort**") located at 205 Braddell Road, Singapore 579701.
4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded:-

Vehicle Registration No.	: SGT 8291K
Make / Model	: MERCEDES BENZ C 180 BLUEEFFICIENCY
Chassis No	: WDD2040312A745601
Year of Registration	: August 2012
Mileage	: N.A. (wiring affected)

5. The exterior front body of the Insured Vehicle sustained visible fire damage. This included its windscreen, front bonnet, headlights, front bumper and side panels.
6. The fire had resulted in extensive damage to the engine compartment of the Insured Vehicle. Most of the components inside the engine compartment were found to be severely burnt and/or melted as a result of the fire. The interior compartment was observed to have been relatively unaffected by the fire. See photos 1 – 6 below.



Photo 1 shows the rear view of the Insured Vehicle. The rear portion of the Insured Vehicle was observed to be relatively unaffected by the fire.



Photo 2 shows the general view of the right portion of the Insured Vehicle at the time of our inspection. The exterior body of the Insured Vehicle had sustained visible fire damage. This included its front windscreen, front bonnet, front bumper, right front panel and right headlight.



Photo 3 shows the general view of the left portion of the Insured Vehicle at the time of our inspection. The exterior body of the Insured Vehicle had sustained visible fire damage. This included its front windscreen, front bonnet, left headlight, front bumper and left front panel.



Photo 4 shows a closer view of the front windscreen of the Insured Vehicle at the time of our inspection. The front windscreen had sustained significant fire damage.



Photo 5 shows a general view of the engine compartment of the Insured Vehicle at the time of our inspection. Most of the components inside the engine compartment were found to be severely burnt and/or melted as a result of the fire.



Photo 6 shows the interior compartment of the Insured Vehicle, which was observed to be relatively unaffected by the fire.

7. At the time of inspection of the Insured Vehicle, we did not find any additionally fitted electronic and/or electrical component(s) on the Insured Vehicle. There also appears to be no modification(s) fitted on the Insured Vehicle.

Investigation and Technical Analysis

8. For this particular case, the fire appears to have originated within the engine compartment of the Insured Vehicle, somewhere around the right rear portion of the engine compartment. This can be determined from the burn pattern and the high heat intensity burn marks (whitish burn marks) found on the right rear portion of the bonnet of the Insured Vehicle and also the rust that had developed on the underside of the front bonnet, at the right rear portion.
9. The whitish burn marks are a result of exposure to prolonged 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. The rust that had developed on the underside of the front bonnet, around the right rear portion, is an indication that the right rear portion of the engine compartment had sustained exposure to prolonged high heat intensity. See photos 7 & 8 below.



Photo 7 shows the burn pattern and whitish burn marks that were found on the right rear portion of the front bonnet of the Insured Vehicle (circled). Such whitish burn marks are a result of exposure to prolonged heat intensity, which may indicate where the fire had started. Rust would also begin to develop on these areas soon after the fire.



Photo 8 shows the rust that had developed on the underside of the front bonnet, around the right rear portion (circled). The development of rust is an indication that this area was subjected to prolonged exposure to high heat intensity, which had caused the steel/metal material of the front bonnet to be exposed to natural environmental condition. Hence the fire to the Insured Vehicle can be determined to have originated towards the right rear portion of the engine compartment.

10. Upon closer examination of the right rear portion of the engine compartment, which was where the fire to the Insured Vehicle had likely started, we had found traces of greenish residue on several stretches of burnt 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 would then appear to suggest that the cause of fire to the Insured Vehicle could have possibly been due to electrical in nature. See photos 9 - 12 below.



Photo 9 shows the burnt wirings around the right rear portion of the engine compartment (circled), which is in the immediate vicinity where the fire to the Insured Vehicle had likely started.



Photo 10 shows a closer view of the burnt wirings around the right rear portion of the engine compartment, which is in the immediate vicinity where the fire to the Insured Vehicle had likely started. We noticed greenish residue on several stretches of burnt wirings (circled). 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 11 shows a close up view of the greenish residue found on several stretches of burnt wirings (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.



Photo 12 shows a close up view of the greenish residue found on several stretches of burnt wirings (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.

11. From the Police Report No. A/20190226/2029 and the Singapore Accident Statement, which was made by Mr Christopher Ng Weng Chuen (herein referred to as "**Mr Ng**"), we note that the fire to the Insured Vehicle had started at a time while he was driving. He was alerted of the fire when he saw smoke emitting from the engine compartment.
12. We managed to speak to Mr Ng where we were able to gather further information pertaining to the incident as well as information pertaining to the history of the Insured Vehicle.
13. According to Mr Ng, at about 0800hrs on 26 February 2019, he was driving from his home located at Punggol Walk to send his wife to work whose office is located in the Chinese Cultural Centre at Straits Boulevard. He travelled along the KPE / MCE towards Maxwell Road. Mr Ng mentioned that before the Maxwell Road exit he noticed white smoke from his right side mirror. He pulled over to the side and switched off the engine. He opened the driver door to look at the front bonnet. He noticed the smoke had subsided. He turned on the ignition and when he did not find any error codes or warning lights displayed on the speedometer, he started up the Insured Vehicle and continued driving.
14. As approached the traffic junction before the Chinese Cultural Centre, he saw white smoke emitting from the right portion of the front bonnet. He stopped the Insured Vehicle next to the Chinese Cultural Centre, dropped off his wife, switched off the engine and removed the key. Mr Ng mentioned that he did not unlock the front bonnet hatch. Mr Ng called for the SCDF whom arrived within 10 minutes as the Marina Bay Fire Station was nearby. The police arrived shortly after. The fire was extinguished in less than 15 minutes. Mr Ng made towing arrangements whilst the fire was being put out.
15. Mr Ng assisted the SCDF in their preliminary investigations and his statement was also taken by the police. The tow truck arrived an hour later and the Insured Vehicle was towed to Comfort. Mr Ng lodged a police report at the Marina Bay Neighbourhood Police Centre at 1020 hours and made the insurance report later that day at Comfort at 1110 hours.
16. With regards to the history of the Insured Vehicle, we were able to gather from Mr Ng that the Insured Vehicle was purchased second-hand in 2014. Mr Ng is the owner and only driver of the Insured Vehicle. To the best of his recollection, there has not been any major mechanical problem and/or electrical problem with the Insured Vehicle.

17. Pertaining to the maintenance aspect, Mr Ng sends the Insured Vehicle for periodic servicing.

18. During the course of our investigations, we were also able to obtain from Mr Ng, a document relating to the latest servicing of the Insured Vehicle done at Round Motor Repairs & Services located at 10 Ang Mo Kio Industrial Park 2A, #01-19, AMK Autopoint, Singapore 568047 on 1 February 2019. The servicing package included changing of engine oil and oil filter, coolant breather pipe and coolant hose. The brake fluid was bled and the rear left tyre was also patched. Refer to invoice 1 below.

ROUND MOTOR REPAIRS & SERVICES
Ch. Reg. No. 48917990K GST Reg. No. 48917990K
 10 Ang Mo Kio, Ind Park 2, #01-19 AMK Autopoint Singapore 568047
 Tel: 64612777 Fax: 64812555

Tax Invoice : CS-09903

To :
MR. CEDIS NG
 NP: 9792979
 Customer ID: CR0298

Date : 01-02-2019
Vehicle Model : C 180 BLUEEFFICIENT
Mechanic :
Current Service Mileage : 170,472
Vehicle No. : SGT8291K
Chassis No. : WDDCC463121145021
Next Service Mileage : 186,472
Next Service Date : 01-08-2019

	Qty.	UOM	Unit Price	Dis. %	Amount
Part Charges					
1) ENGINE OIL - MOBIL 1 TRISYNTHETIC GOLD	6.50	LT	27.00		175.50
2) OIL FILTER	1.00	UNIT	22.00		22.00
3) COOLANT BREATHER PIPE - RADIATOR TANK TO THERMOSTAT	1.00	UNIT	73.00		73.00
4) COOLANT HOSE	1.00	UNIT	48.00		48.00
5) BRAKE FLUID AND BLEEDING BRAKE SYSTEM	1.00	PACKAGE	80.00		80.00
6) TYRE PATCH - REAR LH	1.00	UNIT	10.00		10.00
Labour Charges					
1) ENGINE OIL SERVICE	1.00	JOB	40.00		40.00
2) RESETTING SERVICE INTERVAL	1.00		0.00		0.00
3) REMOVING AND REPLACING COOLANT HOSE AND BREATHER PIPE	1.00	JOB	30.00		30.00

SINGAPORE DOLLAR FIVE HUNDRED THIRTY-THREE AND CENTS ONLY

1. OILS SOLD ARE NOT RETURNABLE
 2. ALL CHARGES TO BE CASHED AND DRAWN IN FAVOUR OF ROUND MOTOR REPAIRS & SERVICES

For and on behalf of
ROUND MOTOR REPAIRS & SERVICES Received By:

E & O E

SUB TOTAL	:	498.50
ADD GST 7%	:	34.90
Gross Total	:	533.40
Net Total	:	533.40
Less Payment	:	
Balance	:	
Total Paid Amount	:	
BALANCE	:	533.40

Customer Signature

Invoice 1 shows the last servicing done on the Insured Vehicle at Round Motor Repairs & Services on 1 February 2019 (red arrows). The servicing package had included changing of engine oil and oil filter, coolant breather pipe and coolant hose. The brake fluid was bled and the rear left tyre was also patched (circled).

19. Mr Ng mentioned that after the servicing was done, he had not experienced any mechanical or electrical problems with the Insured Vehicle till the day of the incident. He mentioned that there were neither warning lights displayed nor was there an abnormal rise in temperature of the Insured Vehicle when he was driving the Insured Vehicle on the day of the incident.
20. Mr Ng mentioned that since the purchase of the Insured Vehicle, he has not done any modification(s) and/or additionally fitted any electrical or electronic component(s) to the Insured Vehicle.

Incident Scene Photographs

21. We were able to obtain from Mr Ng photos of the Insured Vehicle on fire well as photos which he had taken after the fire was put out. In general, the information that could be gathered from these photographs had corresponded to the events that were related to us by Mr Ng. Our close examination of these photographs also showed no unusual foreign material(s) and/or object(s) found on the ground in the immediate area where the Insured Vehicle was positioned. See photos 13 – 15 below.



Photo 13 shows the Insured Vehicle on fire before the arrival of the SCDF. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Ng which is the white smoke and subsequently the fire had started from the right rear portion of the engine compartment (circled).



Photo 14 shows the SCDF having just put out the fire on the Insured Vehicle. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Ng which is the police were also at the incident scene (arrowed).



Photo 15 shows the Insured Vehicle at the incident scene after the fire was extinguished. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Ng. Whitish burn marks were observed on the front bonnet, at the right rear portion (circled) which indicates that the fire had started in the right rear portion of the engine compartment.

22. Based on the vehicle service record invoice provided, we are of the opinion that it is unlikely that the fire could have been caused by poor maintenance of the Insured Vehicle.
23. Given the circumstances of the incident as reported, the possibility of the cause of fire to the Insured Vehicle being due to engine overheating would seem unlikely as Mr Ng had mentioned to us there were no indications of abnormally high temperatures on the Insured Vehicle when he was driving on that day.
24. The possibility of the fire being due to external factors (foreign material(s) stuck on hot surfaces, arson and sabotage amongst others) would also seem unlikely given that our examination of the available incident scene photographs did not reveal any unusual material(s)/object(s) found on the ground where the Insured Vehicle was positioned. The location of where the Insured Vehicle was positioned was also observed to be not at a secluded location.
25. The possibility of the fire being due to electrical in nature would then seem more likely given that engine overheating and external factors would both seem unlikely. The fire being due to electrical nature is also supported by the condition of the wirings that were found in the engine compartment of the Insured Vehicle, which was earlier discussed in paragraph 10 above.
26. Our checks with both local and international bodies and associations had revealed that at the time of writing this report, there was a manufacturer recall for the driver airbag on 20 December 2017. However the fault was rectified on 26 February 2018. See search result from LTA below.

Enquiry on Vehicle Recall - Vehicle Specific

* ONLY INFORMATION ON VEHICLE RECALLS SUBMITTED FROM 1 APRIL 2007 IS AVAILABLE

Vehicle Details	
Owner ID Type	Singapore NRIC
Owner ID	Y381
Vehicle Details	
Vehicle Registration number	SG702750
Make	MERCEDES BENZ
Vehicle Model	C180 BLUEEFFICIENCY
Engine No.	274925A000380
Chassis No.	W00040212403681
Recall Details	

Serial No.	42018010471
Manufacturer/Recall Date	30 Dec 2017
Estimated Completion Year of Recall	2018
Brief Description(s) Provided by Motor Dealer	It is possible that the driver sitting in the front seats of C-Class and GLK-Class cars in 2014-2017 and 2018 vehicles may inadvertently trigger without previous cause through vehicle malfunctions. If the steering column is not sufficiently grounded while at the same time the conductor tracks within the steering column or the steering column switch module have been damaged.
Date Recalled	28 Feb 2018
For more details, contact GANILER SOUTH EAST ASIA PTE. LTD.	
Hotline information	CYCLE & CARRIAGE CUSTOMER ASSISTANCE CENTRE at 6471-7111

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Local Transport Authority

Conclusion

27. Having investigated and technically analysed the damages to the Insured Vehicle, we are 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 inside the engine compartment, somewhere around the right rear portion. The wirings were original factory wirings of the Insured Vehicle.
28. We 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.
29. There were no modification(s) or additional electronic and/or electrical component(s) fitted on the Insured Vehicle at the time of our inspection of the Insured Vehicle.


Muhd Nazril
 Senior Technical Investigator


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

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