LKK Auto Consultants Pte Ltd
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Your Ref : 6971213085SG
Our Ref : CI/AIG20002946/N

21 February 2020

M/s AIG Asia Pacific Insurance Pte. Ltd.
78 Shenton Way #08-16
CHARTIS Building
Singapore 079120
(Motor Claims Department)

TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE SKS 938P ON 7 FEBRUARY 2020

1. We refer to your letter dated 12 February 2020 and the instructions therein.

2. Our analysis, comments and opinions with respect to the cause of fire to the Motor Vehicle SKS 938P (herein referred to as **"Insured Vehicle"**) are set out below.

Inspection of the Motor Vehicle

3. The Insured Vehicle was physically inspected on 18 February 2020 at the premises of Wearnes Automotive Singapore (herein referred to as **"Wearnes"**) located at 45 Leng Kee Road, Singapore 159103.

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

Vehicle Registration No.	: SKS 938P
Make / Model	: VOLVO V60 D2
Chassis No	: YV1FW84ABF1244899
Year of Registration	: Mar 2015
Mileage	: N.A (battery melted)

5. The exterior front body and engine compartment of the Insured Vehicle sustained visible fire damage. This included its front windscreen, front bonnet, left 'A' pillar and left side panel.

6. The fire had resulted in minimal damage to the engine compartment of the Insured Vehicle. Some of the components inside the engine compartment were found to be severely burnt and/or melted as a result of the fire. See photos 1 – 6 below.

Photo 1 shows the general view of the rear body of the Insured Vehicle at the time of our inspection. The rear portion of the Insured Vehicle was observed to be unaffected by the fire.

Photo 2 shows the general view of the left front 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 'A' pillar and left side panel.

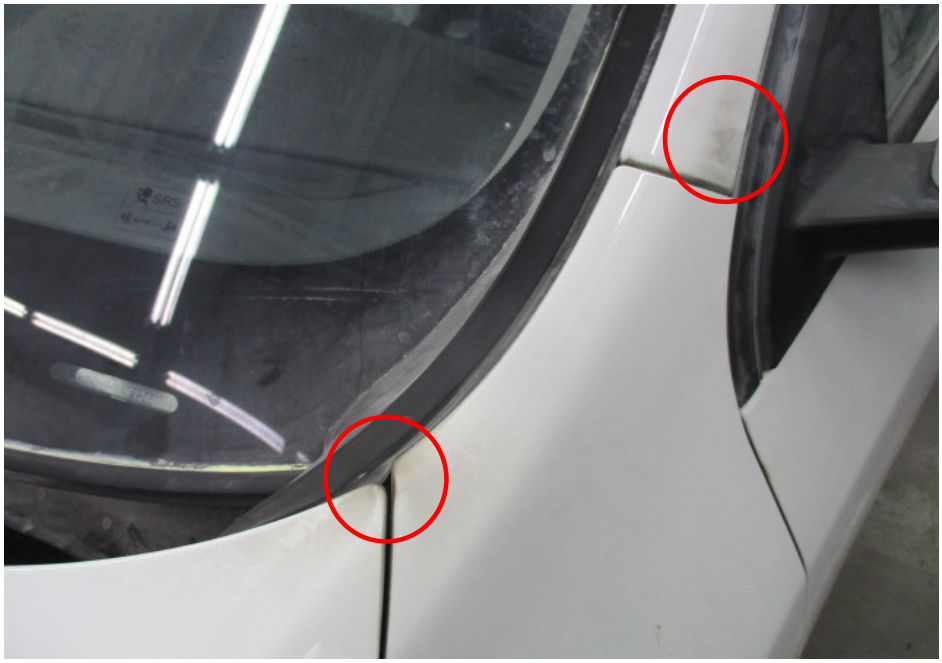


Photo 3 shows a closer view of the left front portion of the Insured Vehicle at the time of our inspection. The exterior body of the Insured Vehicle had sustained visible fire damage. This included its front windscreen, front bonnet, left 'A' pillar and left side panel (circled).

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 minimal fire damage.

Photo 5 shows the interior compartment of the Insured Vehicle at the time of our inspection. The interior compartment of the Insured Vehicle was relatively unaffected by the fire.

Photo 6 shows a general view of the engine compartment of the Insured Vehicle at the time of our inspection. Some of the components inside the engine compartment were found to be severely burnt and/or melted as a result of 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 left rear portion of the engine compartment. This can be determined from the burn pattern found on the left rear portion of the front bonnet of the Insured Vehicle and also the burn marks that had developed on the underside of the front bonnet, at the left bottom portion. These burn marks are an indication that the left rear portion of the engine compartment had sustained exposure to high heat intensity. See photos 7 - 9 below.

Photo 7 shows the burn pattern that was found on the left rear portion of the front bonnet of the Insured Vehicle (circled).

Photo 8 shows the burn marks that were found on the left bottom portion of the underside of the front bonnet of the Insured Vehicle (circled). Such burn marks are a result of exposure to heat intensity, which may indicate where the fire had started. Hence the fire to the Insured Vehicle can be determined to have originated towards the left rear portion of the engine compartment.

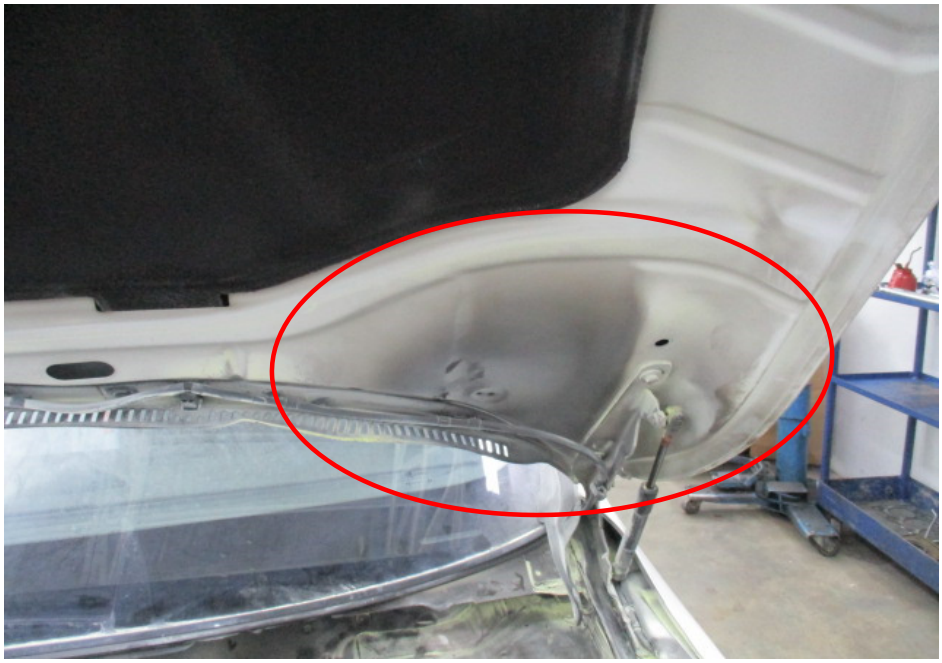


Photo 9 shows a close up view of the burn marks that were found on the left bottom portion of the underside of the front bonnet of the Insured Vehicle (circled).

9. Upon closer examination of the left rear portion of the engine compartment which was where the fire to the Insured Vehicle had likely started, we had found several stretches of wirings with greenish residue. These wirings were original factory fitted wirings leading from the wiring harness of the Insured Vehicle. 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 appear to suggest that the cause of fire to the Insured Vehicle could have possibly been due to electrical in nature. See photos 10 – 14 below.

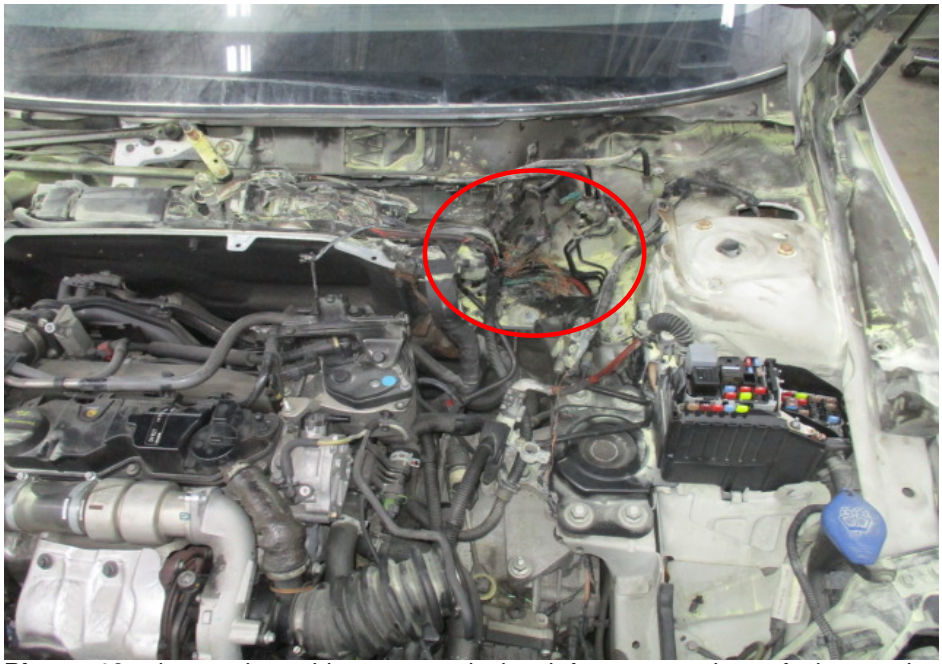


Photo 10 shows the wirings around the left rear portion of the engine compartment which is near to the vicinity where the fire to the Insured Vehicle had likely started. We observed greenish residue on the wirings leading from the wiring harness of the Insured Vehicle (circled). The presence of greenish 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.

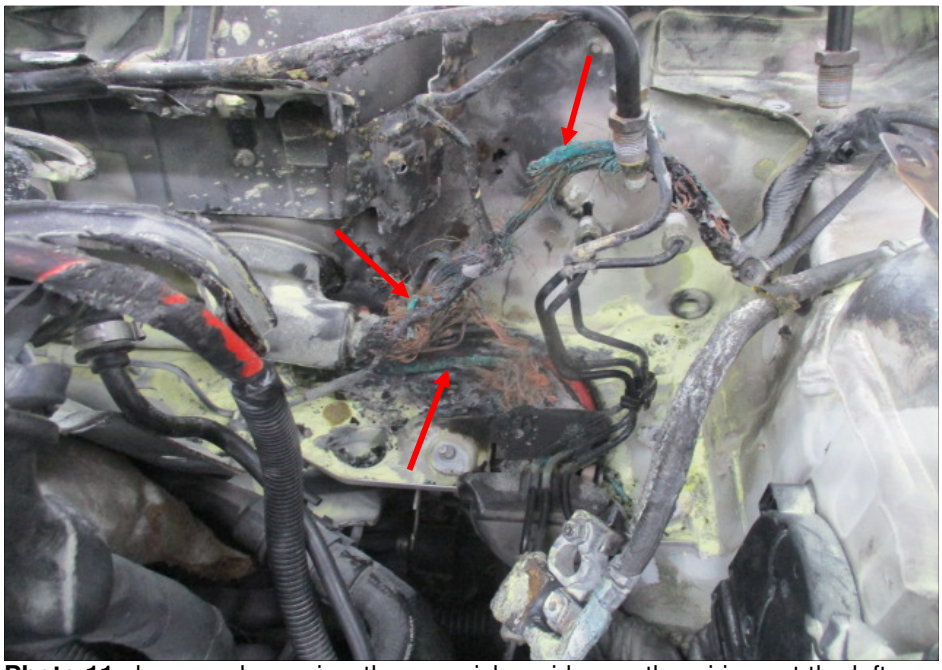


Photo 11 shows a closer view the greenish residue on the wirings at the left rear portion of the engine compartment leading from the wiring harness (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.

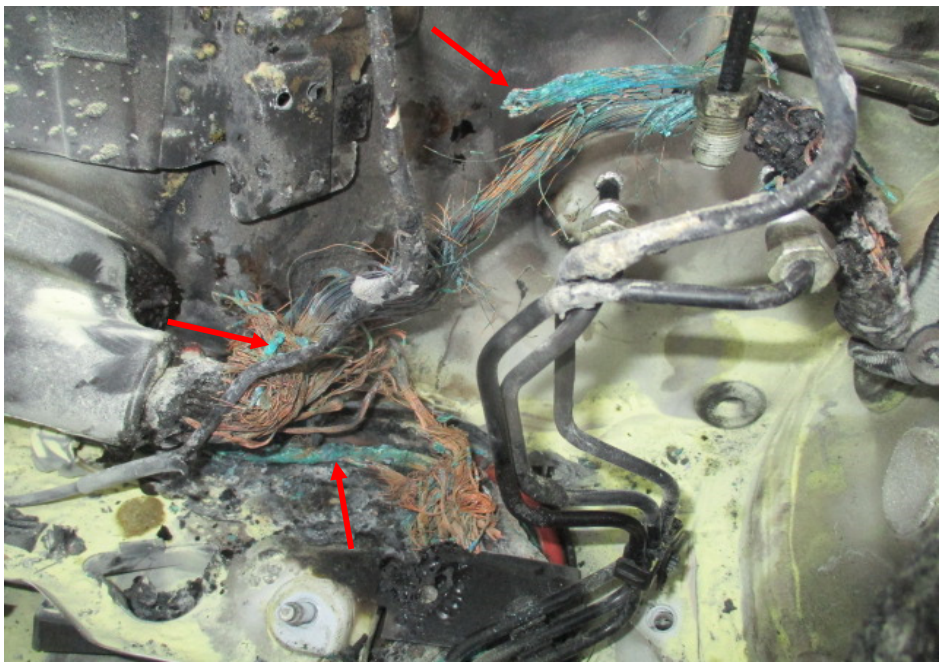


Photo 12 shows a close up view of the greenish residue on the wirings leading from the wiring harness of the Insured Vehicle (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.

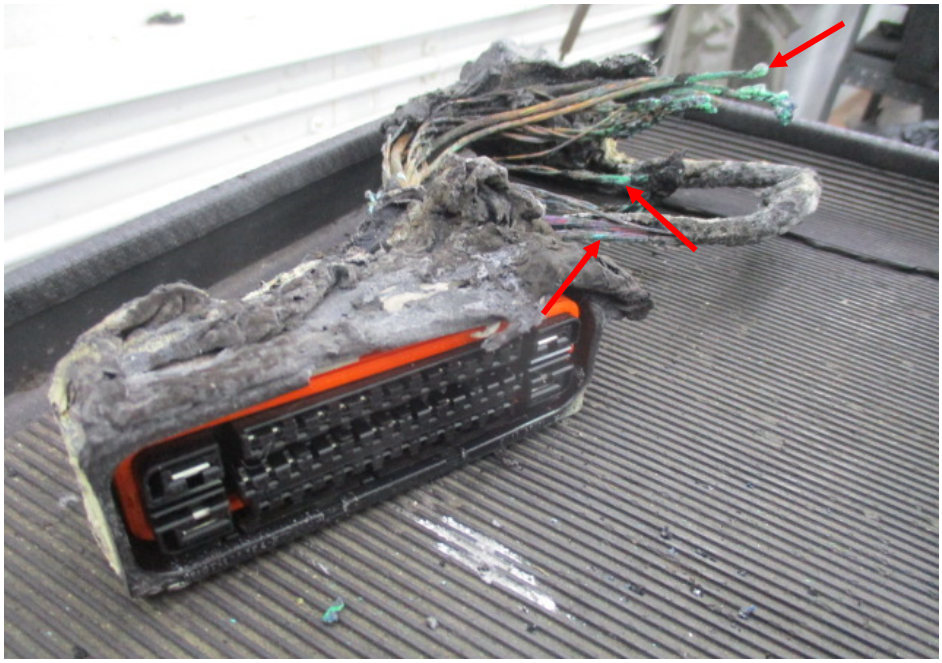


Photo 13 shows a close up view of the greenish residue on the wirings leading from the dismantled wiring harness of the Insured Vehicle (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.

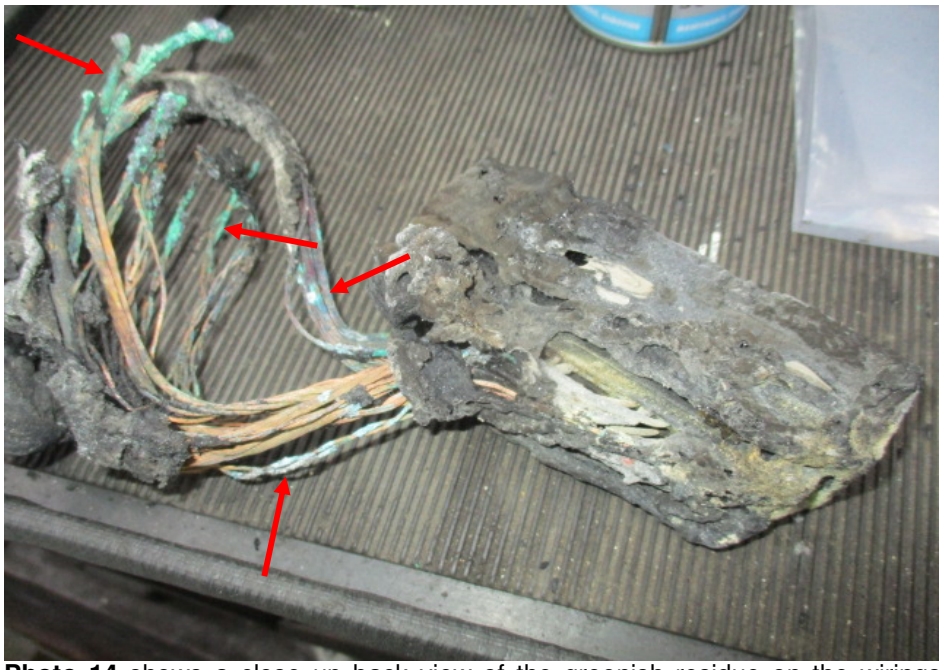


Photo 14 shows a close up back view of the greenish residue on the wirings leading from the dismantled wiring harness of the Insured Vehicle (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.

10. From the Singapore Accident Statement, which was made by Mr Tan Boon Kiat Kenneth (herein referred to as **"Mr Tan"**), we note that the fire to the Insured Vehicle had started at a time when he was driving. Mr Tan was first alerted of the fire when he saw white smoke emitting from the left portion of the front bonnet of the Insured Vehicle.

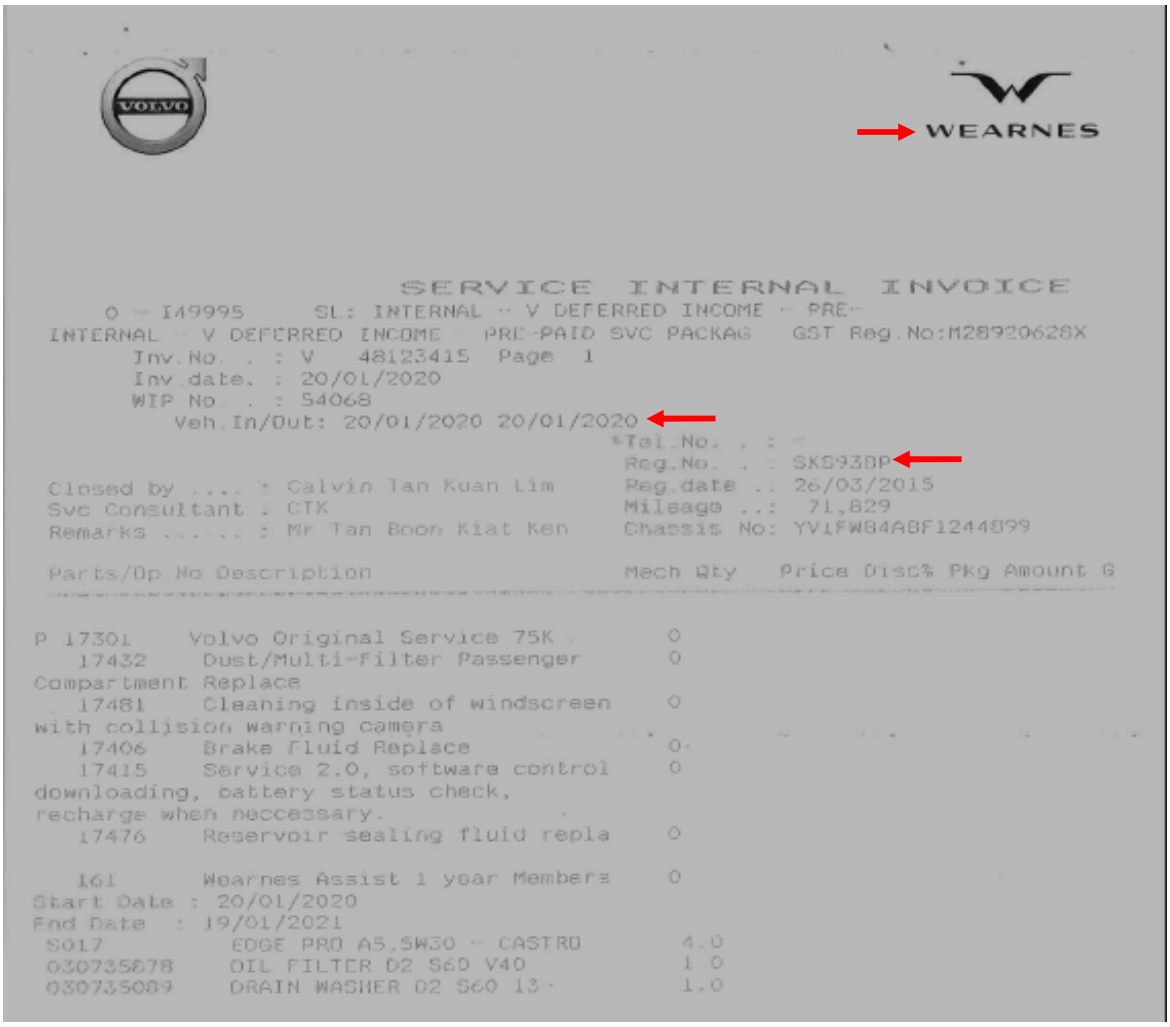
11. We managed to speak to Mr Tan where we were able to gather further information pertaining to the incident as well as information pertaining to the history of the Insured Vehicle.

12. According to Mr Tan, at about 0900 hours on 7 February 2020 he had left his home located at Jalan Bukit Merah and was headed to his office located at Block 112A Depot Road. Mr Tan was alone at the time of the incident. When he reached his office carpark he noticed white smoke emitting from the left portion of the front bonnet. Mr Tan mentioned that shortly after, the engine was cut off and he smelt something. He alighted from the Insured Vehicle and realized the smoke had turned black and flames soon erupted from underneath the front bonnet.

13. A passer- by who saw the Insured Vehicle on fire immediately ran to a nearby guardhouse and grabbed a fire extinguisher. Mr Tan called the SCDF. By the time the SCDF arrived about less than 10 minutes later, the fire was extinguished. SCDF conducted a preliminary investigation and Mr Tan called Wearnes to make towing arrangements after the preliminary investigation was over. The tow truck arrived about an hour later and the Insured Vehicle was towed to Wearnes. Mr Tan hitched a ride to Wearnes and made an insurance report there at 1351 hours.

14. With regards to the history of the Insured Vehicle, we were able to gather from Mr Tan that the Insured Vehicle was purchased new from Wearnes in 2015. He is the owner and only driver of the Insured Vehicle.

15. Pertaining to the maintenance aspect, Mr Tan mentioned that he sends the Insured Vehicle for periodic servicing. He services the Insured Vehicle at Wearnes. The last servicing was done on 20 January 2020. The servicing package included changing of engine oil and oil filter. The battery, brake fluid, reservoir sealing fluid, drain washer, dust multi filter and aircon filter were replaced. Refer to invoices 1 – 3 below.



WEARNES

SERVICE INTERNAL INVOICE

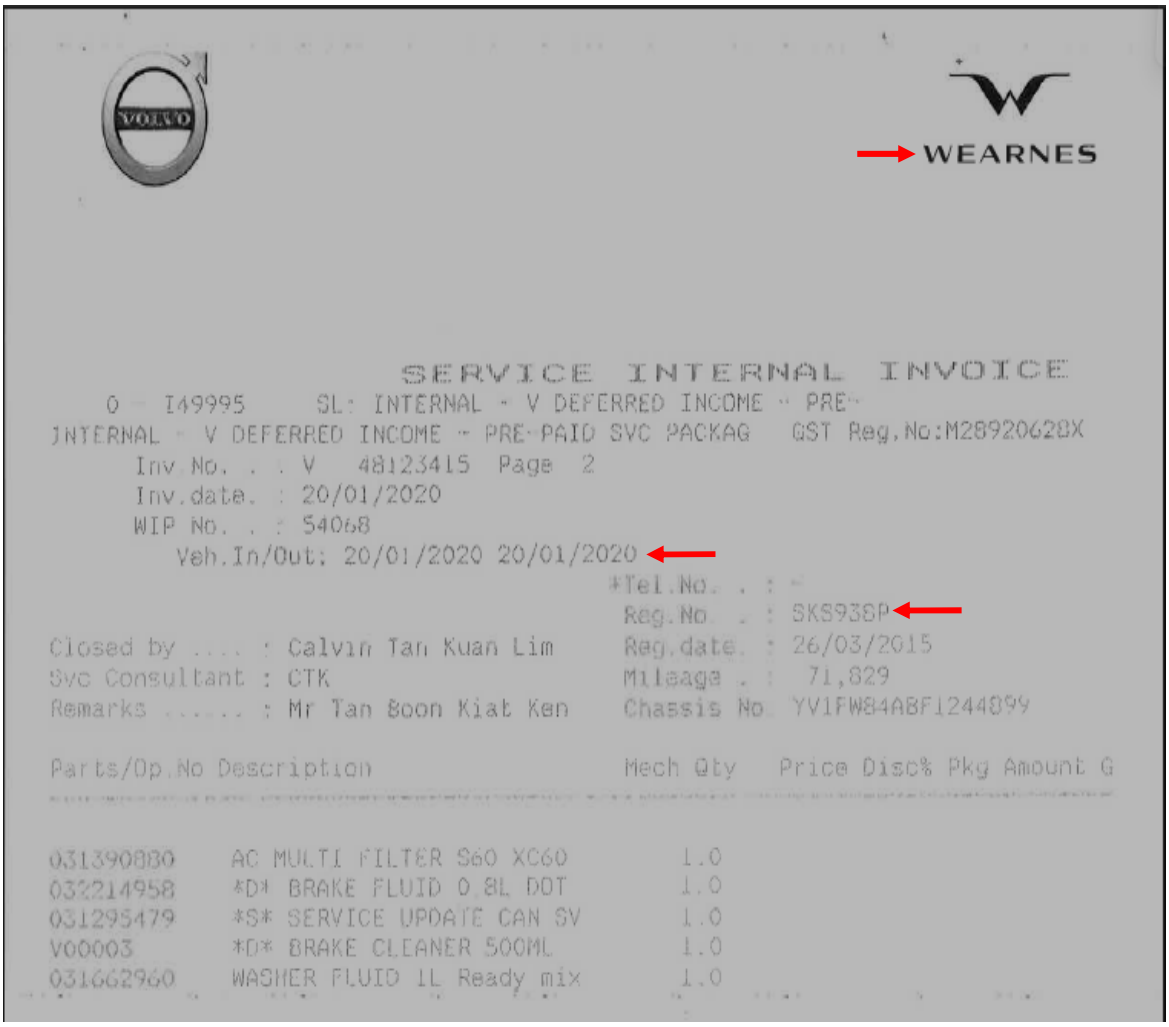
0 - I49995 SL: INTERNAL - V DEFERRED INCOME - PRE-
INTERNAL - V DEFERRED INCOME PRE-PAID SVC PACKAG GST Reg.No:M28920628X
Inv.No. . : V 48123415 Page 1
Inv.date. : 20/01/2020
WIP No . : 54068
Veh.In/Out: 20/01/2020 20/01/2020
*Tel.No. . : -
Reg.No. . : SKS938P
Closed by .... : Calvin Tan Kuan Lim Reg.date .: 26/03/2015
Svc Consultant : CTK Mileage ..: 71,829
Remarks ..... : Mr Tan Boon Kiat Ken Chassis No: YV1FW84A8F1244099

Parts/Op No	Description	Mech	Qty	Price	Disc%	Pkg	Amount	G
P 17301	Volvo Original Service 75K		0					
17432	Dust/Multi-filter Passenger Compartment Replace		0					
17481	Cleaning inside of windscreen with collision warning camera		0					
17406	Brake Fluid Replace		0					
17415	Service 2.0, software control downloading, battery status check, recharge when neccessary.		0					
17476	Reservoir sealing fluid repla		0					
161	Wearnes Assist 1 year Members		0					

Start Date : 20/01/2020
End Date : 19/01/2021

S017	EDGE PRO A5,5W30 - CASTRO		4.0					
030735678	OIL FILTER D2 S60 V40		1.0					
030735089	DRAIN WASHER D2 S60 13		1.0					

Invoice 1 shows the last servicing done on the Insured Vehicle at Wearnes on 20 January 2020 (arrowed). The servicing package included changing of engine oil and oil filter. The dust multi filter, brake fluid, reservoir sealing fluid and drain washer were replaced.



WEARNES

SERVICE INTERNAL INVOICE

0 I49995 SL: INTERNAL - V DEFERRED INCOME - PRE-
INTERNAL - V DEFERRED INCOME - PRE-PAID SVC PACKAG GST Reg.No:M28920628X
Inv.No. . : V 48123415 Page 2
Inv.date. : 20/01/2020
WIP No. . : 54068
Veh.In/Out: 20/01/2020 20/01/2020
*Tel.No. . : -
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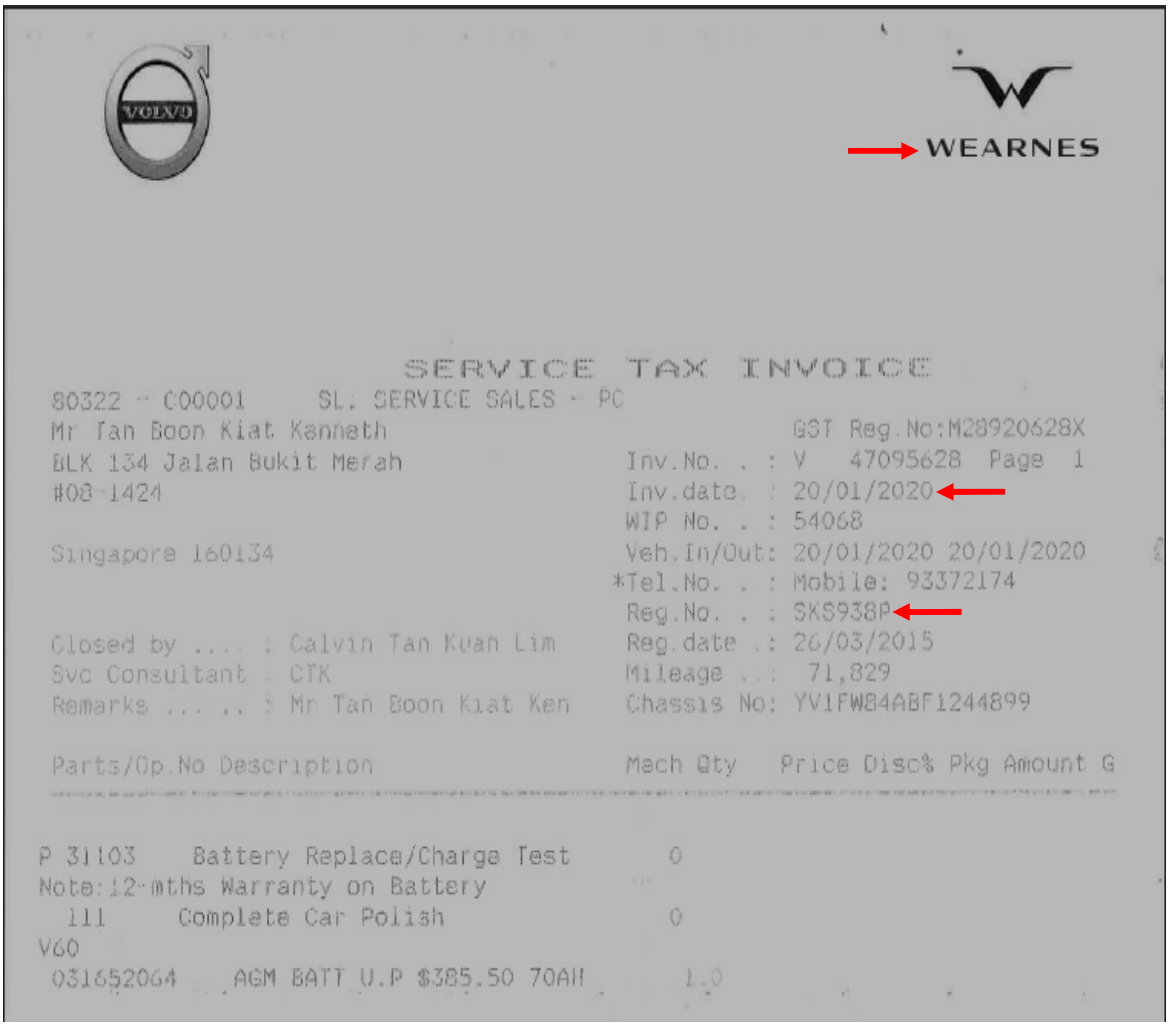
Closed by .... : Calvin Tan Kuan Lim Reg.date. : 26/03/2015
Svc Consultant : CTK Mileage . : 71,829
Remarks ..... : Mr Tan Boon Kiat Ken Chassis No YV1FW84ABF1244099

Parts/Op.No	Description	Mech	Qty	Price	Disc%	Pkg	Amount	G
031390830	AC MULTI FILTER S60 XC60		1.0					
032214958	*D* BRAKE FLUID 0.8L DOT		1.0					
031295479	*S* SERVICE UPDATE CAN SV		1.0					
V00003	*D* BRAKE CLEANER 500ML		1.0					
031662960	WASHER FLUID 1L Ready mix		1.0					

Invoice 2 shows the last servicing done on the Insured Vehicle at Wearnes on 20 January 2020 (arrowed). The aircon filter was replaced.



WEARNES

SERVICE TAX INVOICE

80322 - C00001 SL: SERVICE SALES - PC
Mr Tan Boon Kiat Kenneth
BLK 134 Jalan Bukit Merah
#08-1424
Singapore 160134

GST Reg.No:M28920628X
Inv.No. . : V 47095628 Page 1
Inv.date : 20/01/2020
WIP No. . : 54068
Veh.In/Out: 20/01/2020 20/01/2020
*Tel.No. . : Mobile: 93372174
Reg.No. . : SKS938P
Reg.date .: 26/03/2015
Mileage ..: 71,829
Chassis No: YV1FW84ABF1244899

Closed by .... : Calvin Tan Kuan Lim
Svc Consultant : CTK
Remarks ... .. : Mr Tan Boon Kiat Ken

Parts/Op.No	Description	Mech Qty	Price	Disc%	Pkg	Amount	G
P 31103	Battery Replace/Charge Test	0					
Note:12-mths Warranty on Battery							
111	Complete Car Polish	0					
V60							
031652064	AGM BATT U.P $385.50 70AH	1.0					

Invoice 3 shows the last servicing done on the Insured Vehicle at Wearnes on 20 January 2020 (arrowed). The battery was replaced.

16. Mr Tan 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. There was also no abnormal rise in temperature of the Insured Vehicle when he was driving the Insured Vehicle. He did however mentioned that on the day of the incident, all the warning lights were displayed on the speedometer before the engine was cut off but he added that could be a safety feature of the Insured Vehicle.

17. Mr Tan 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

18. We were able to obtain photographs which were taken by Mr Tan at the incident location. The photographs were taken after the fire to the Insured Vehicle was extinguished.

19. In general, the information that could be gathered from these photographs had corresponded to the events that were related to us by Mr Tan. 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 of the carpark where the Insured Vehicle was positioned. See photos 15 - 17 below.

Photo 15 shows the SCDF conducting preliminary investigations post- incident.

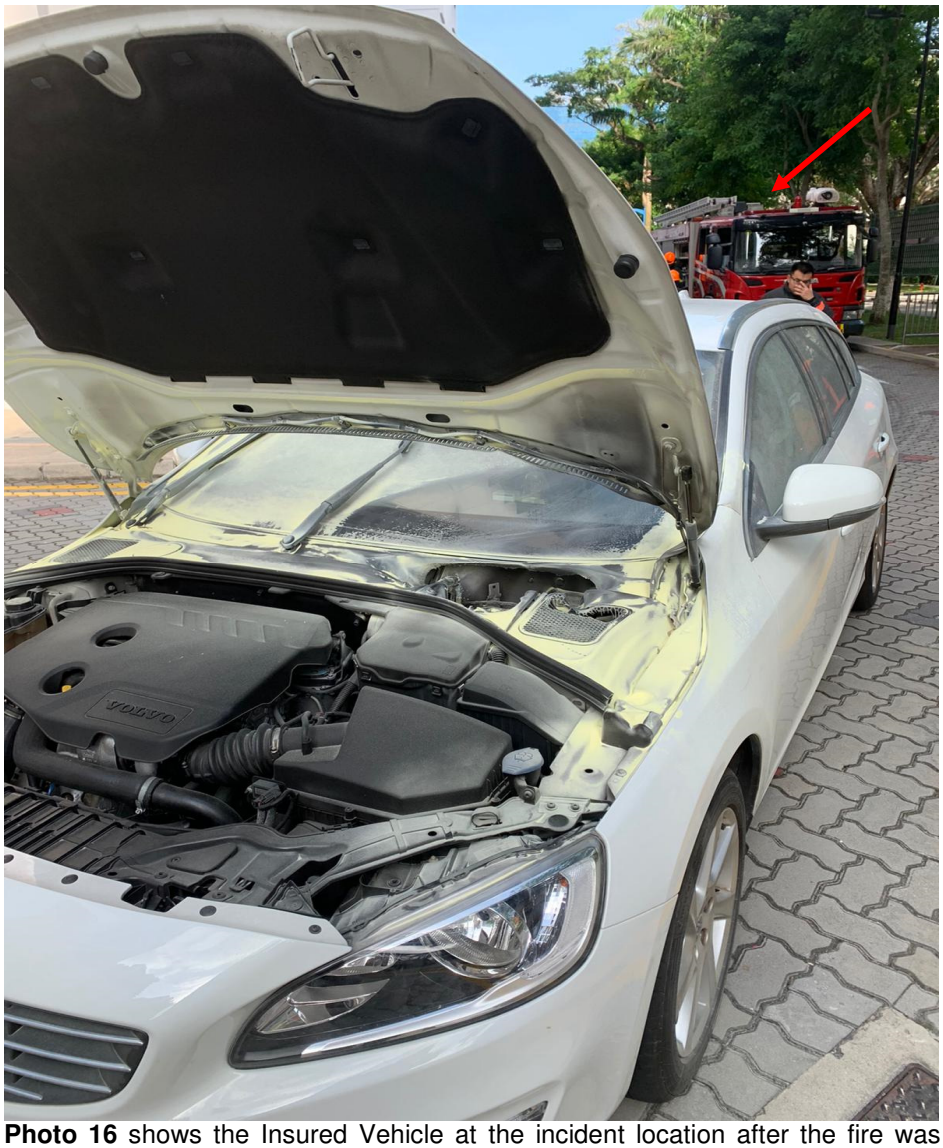


Photo 16 shows the Insured Vehicle at the incident location after the fire was extinguished. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Tan, which is the SCDF had responded to the incident (arrowed).

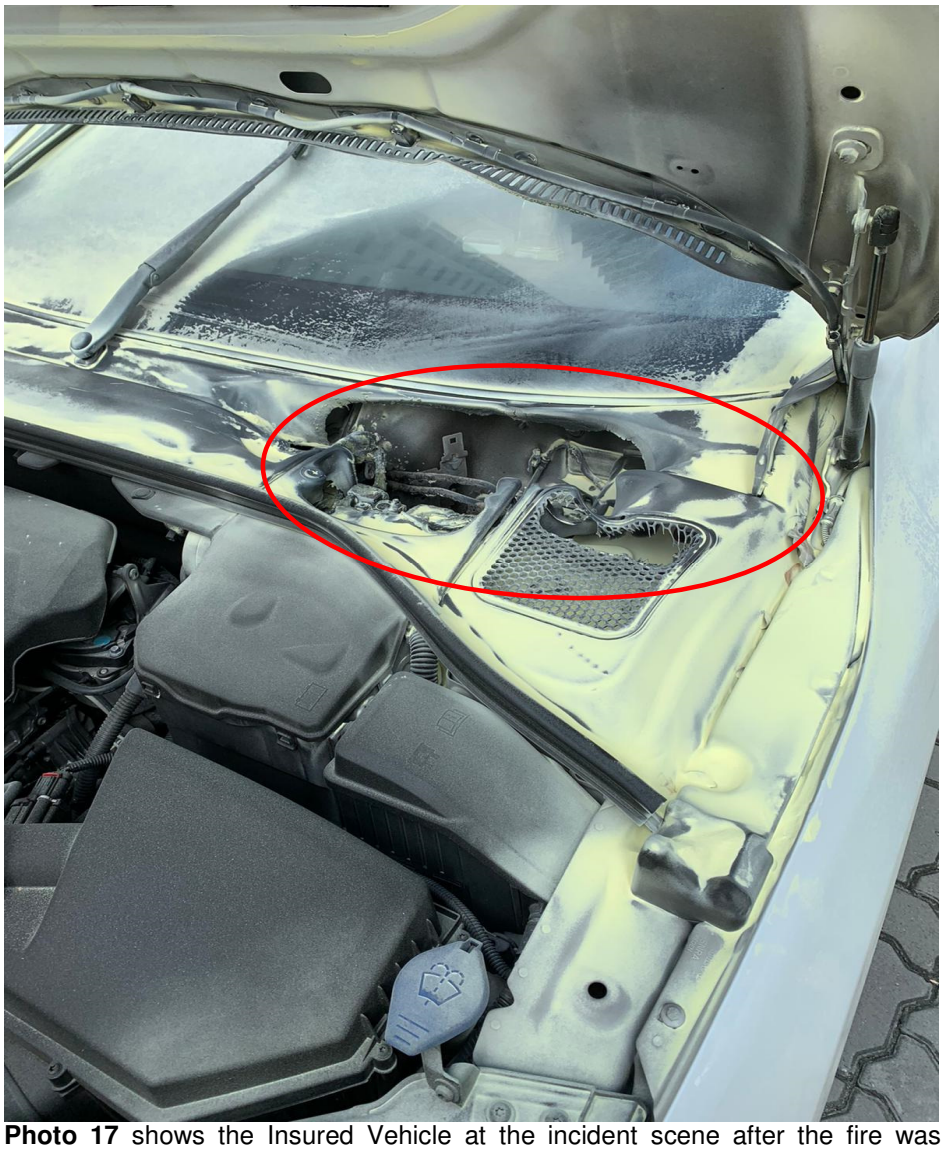


Photo 17 shows the Insured Vehicle at the incident scene after the fire was extinguished. In general, the information that could be gathered from these photographs had corresponded to the events that were related to us by Mr Tan. The burn pattern and concentration of fire extinguisher residue observed at the left rear portion of the engine compartment (circled) is an indication that the fire had started from the left rear portion of the engine compartment.

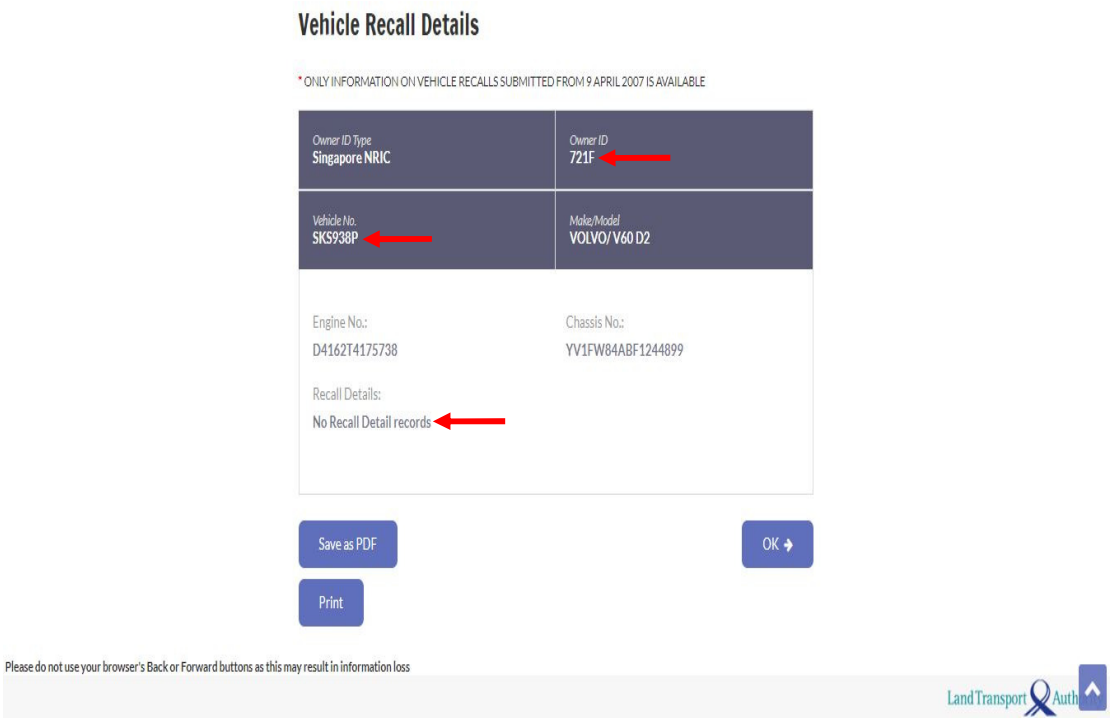
20. Based on the vehicle service record invoices provided, we are of the opinion that it is unlikely that the fire could have been caused by poor maintenance of the Insured Vehicle.

21. Given the circumstances of incident as reported, the possibility of the cause of fire to the Insured Vehicle being due to engine overheating would seem unlikely as Mr Tan had mentioned to us there were no indications of abnormally high temperatures on the Insured Vehicle.

22. 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 near 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.

23. 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 in nature is also supported by the burnt wirings found in the engine compartment of the Insured Vehicle, which was earlier discussed in paragraph 9 above.

24. Our checks with both local and international bodies and associations revealed that at the time of writing this report, there is no manufacturer recall of similar make and model vehicle as the Insured Vehicle that may possibly be related to this incident. See search result from LTA below.



Conclusion

25. Having investigated and technically analysed the damages of burnt nature 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, leading from the wiring harness. The wirings were original factory wirings of the Insured Vehicle.

26. 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.

27. There was 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.

28. At the time of writing this report, there was also no manufacturer recall of similar make and model vehicle as the Insured Vehicle that could possibly be related to this particular incident.

Muhd Nazril
Technical Investigator

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