

Your Ref: 2100500025
Our Ref : CI/AIG18004447/N

23 February 2018

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 GBF 6895P ON 25 JANUARY 2018**

1. We refer to your letter dated 12 February 2018 and the instructions therein.
2. Our analysis, comments and opinions with respect to the cause of fire to the insured vehicle GBF 6895P (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 23 February 2018 at the premises of Borneo Motors (herein referred to as "**BM**") located at 2 Pandan Crescent, Singapore 128461.
4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded:-

Vehicle Registration No.	: GBF 6895P
Make / Model	: TOYOTA HIACE VAN TURBO 5 DR MANUAL
Chassis No	: JTFHT02P100214720
Year of Registration	: February 2017
Mileage	: 15,225km

5. The exterior body of the Insured Vehicle had sustained minor fire damage at the right rear portion. The engine compartment of the Insured Vehicle had not sustained any visible fire damage. However the interior compartment and rear cabin of the Insured Vehicle was observed to be partially burnt and/or melted.
6. The fire had resulted in the components in the interior compartment and rear cabin of the Insured Vehicle to be partially burnt and/or melted. Affected parts had included the seats, sun visors, roof upholstery, cabin lights and side panels, amongst others. See photos 1 – 8 below.



Photo 1 shows the general view of the front portion of the Insured Vehicle at the time of our inspection. The front portion of the Insured Vehicle was relatively unaffected by the fire.



Photo 2 shows the general view of the right rear portion of the Insured Vehicle at the time of our inspection. The exterior body of the Insured Vehicle had sustained minor fire damage at the right rear portion (circled).



Photo 3 shows the general view of the rear portion of the Insured Vehicle at the time of our inspection. The rear portion of the Insured Vehicle was relatively unaffected by the fire.



Photo 4 shows a general view of the engine compartment of the Insured Vehicle at the time of our inspection. The engine compartment of the Insured Vehicle was relatively unaffected by the fire.



Photo 5 shows the interior compartment of the Insured Vehicle, which was covered in fire extinguisher residue at the time of our inspection. Some of the interior components were partially melted and/or burned as a result of the fire. These had included the seats, sun visors, roof upholstery, cabin lights and side panels, amongst others.



Photo 6 shows a closer view of the sun visors (arrowed) and the cabin lighting (circled) that were partially melted and/or burnt as a result of the fire.



Photo 7 shows a closer view of the roof upholstery (arrowed) of the rear cabin that was partially melted and/or burnt as a result of the fire.



Photo 8 shows a closer view of the cabin lighting (circled) and side panels (arrowed) of the rear cabin of the Insured Vehicle that were partially melted and/or burnt as a result of the fire.

7. At the time of physical inspection of the Insured Vehicle, we had found several additionally fitted electronic and/or electrical component(s) on the Insured Vehicle. These included a vehicle speed limiter device, 3 aftermarket on/off switches, 2 LED light strips, 1 LED rear cabin light strip, 1 mini fan and 1 exhaust fan. When we turned on the 1st aftermarket switch, we observed that the LED strip that was fitted along the right side panel of Insured Vehicle lit up. We did not observe anything when we turned on the 2nd and 3rd switches. All these fitted components were not the standard type for the Insured Vehicle. See photos 9 - 14 below.



Photo 9 shows the vehicle speed limiter device fitted underneath the glove compartment of the Insured Vehicle upon our inspection (circled).



Photo 10 shows the 3 aftermarket on/off switches fitted above the foot pedals of the Insured Vehicle upon our inspection (circled).



Photo 11 shows a closer view of the 3 aftermarket on/off switches fitted above the foot pedals of the Insured Vehicle (circled) upon our inspection.



Photo 12 shows the 1st LED light strip fitted on the right side panel of the rear cabin (circled) after the 1st switch was turned on. The mini fan was fitted directly behind the centre console of the Insured Vehicle (arrowed).



Photo 13 shows the 2nd LED light strip fitted on the left side panel of the rear cabin of the Insured Vehicle which had sustained fire damage (arrowed).



Photo 14 shows a close up view of the rear cabin LED light strip of the Insured Vehicle which had sustained fire damage (circled).

Investigation and Technical Analysis

8. For this particular case, we observed many containers containing flammable fluids and hazardous chemicals used for pest control purposes that were stored at the rear cabin of the Insured Vehicle. Such items included pesticides, insecticides and rodent poison pellets, amongst others. There were also fogging machines and a jerrycan containing petrol which were removed from the Insured Vehicle by the driver of the Insured Vehicle, Mr Seah Cheng Ghee (herein referred to as "**Mr Seah**") when he saw a small fire at the right side of the rear cabin of the Insured Vehicle. Basing on the circumstances of the fires' origin according to Mr Seah at the material time of incident as well as examining the area where the extent of fire damage was most severe, we can determine that the fire had likely started from the right side of the rear cabin of the Insured Vehicle.

9. Furthermore, there was a higher concentration of burn marks on the right side panel as compared to the left side panel of the rear cabin of the Insured Vehicle. There were also high heat intensity burn marks (whitish burn marks) found on the wooden shelves and metallic items that were stored around the immediate vicinity to where the fire had likely started. These whitish burn marks are a result of exposure to prolonged heat intensity. Rust would normally start to develop around the metallic items soon after a fire as the prolonged exposure to high heat intensity usually causes the bare steel/metal material of these items to be exposed to natural environmental condition. The rust that had developed on the surfaces of the metallic items stored at the immediate vicinity where these whitish burn marks were found would also support our findings of where the fire to the Insured Vehicle had originated.
10. Upon closer examination of the right side of the rear cabin of the Insured Vehicle as well as around the immediate vicinity to where the fire had likely started, we found several partially melted and/or burnt containers that contained flammable fluids. The top portion of some of these partially melted and/or burnt containers were wet with fluid. We also found a partially melted and/or burnt plastic bag containing metal hooks placed in the centre of coils made out of metal wires. We had also found faint traces of greenish residue on the LED light strips that were fitted along the side panels of the rear cabin of the Insured Vehicle. The presence of such 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. These physical evidences would then appear to suggest that the cause of fire to the Insured Vehicle could have possibly been due to electrical in nature or due to a fluid leak. See photos 15 - 24 below.



Photo 15 shows the many containers containing flammable fluids and hazardous chemicals stored at the rear cabin of the Insured Vehicle which were used for pest control purposes. Such items included pesticides, insecticides and rodent poison pellets, amongst others.



Photo 16 shows a closer view of the pesticides, insecticides and rodent poison pellets which were stored on the wooden shelf at the right side of the rear cabin of the Insured Vehicle in the immediate vicinity where the fire had likely started (circled). We also found high heat intensity burn marks (whitish burn marks) found on these wooden shelves (arrowed). The top portion of some of these partially melted and/or burnt containers were wet with fluid (circled).



Photo 17 shows a close up view of the top portion of 1 of the partially melted and/or burnt containers wet with fluid (circled).



Photo 18 shows the higher concentration of burn marks on the right side panel (red circle) as compared to the left side panel (yellow circle) of the rear cabin of the Insured Vehicle. There were also high heat intensity burn marks (whitish burn marks) found on the wooden shelves (arrowed) and metallic items that were stored around the immediate vicinity to where the fire had likely started.



Photo 19 shows a closer view of the high heat intensity burn marks (whitish burn marks) found on the wooden shelves (circled) that were stored around the immediate vicinity to where the fire had likely started. These whitish burn marks are a result of exposure to prolonged heat intensity.



Photo 20 shows the rust that had developed on the surfaces of the metallic items (circled) and vehicle body (arrowed) at the immediate vicinity where the fire had likely started. Prolonged exposure to high heat intensity usually causes the bare steel/metal material of these items and vehicle body to be exposed to natural environmental condition. The rust that had developed on these surfaces would also support our findings of where the fire to the Insured Vehicle had originated.



Photo 21 shows upon closer examination of the right side of the rear cabin of the Insured Vehicle as well as around the immediate vicinity to where the fire had likely started, we found a partially melted and/or burnt plastic bag containing metal hooks placed in the centre of coils made out of metal wires (circled).



Photo 22 shows a close up view of the partially melted and/or burnt plastic bag (arrowed) containing metal hooks placed in the centre of coils made out of metal wires.



Photo 23 shows a close up view of the faint traces of greenish residue there were found on the LED light strip that was fitted along the left side panel of the rear cabin of the Insured Vehicle (arrowed). The presence of such greenish residue suggests occurrence of an electrical short circuit.



Photo 24 shows a close up view of the faint traces of greenish residue there were found on the wirings of the rear cabin LED light strip of the Insured Vehicle (arrowed). The presence of such greenish residue suggests occurrence of an electrical short circuit.

11. From the Singapore Police Report and Accident Statement which was made by Mr Seah Cheng Ghee, who is the driver for LS 2 Services Pte. Ltd. (herein referred to as "LS 2"), we note that the fire to the Insured Vehicle had started at a time when he was driving the Insured Vehicle back home. On 25 January 2018 at 1730 hours, he had entered carpark B35, the open carpark located at Balam Road. As the carpark gantry was raised, he drove over the hump. He heard a noise coming from the rear cabin of the Insured Vehicle. Shortly after there was a burning smell emitting from the rear cabin. He immediately stopped at the side, switched off the engine and opened the right side door. That was when he saw a small fire at the right corner of the rear cabin of the Insured Vehicle. He quickly opened the rear door and removed the highly flammable items which included 2 fogging machines and a jerrycan filled with petrol.
12. A passer-by handed him a fire extinguisher and Mr Seah managed to put out the fire in 5 minutes. The police and SCDF arrived soon after. Firefighters sprayed the rear cabin to make sure that the fire was completely extinguished. The police took Mr Seah's statement. Mr Seah also assisted the SCDF in their preliminary investigations which took more than 2 hours.
13. As the fire had not affected the engine, Mr Seah was able to park the Insured Vehicle once the SCDF left. The following morning, a senior SCDF official arrived to conduct further investigations. Mr Seah then drove the Insured Vehicle to BM. He arrived at 1500 hours. He was told to make a police report and return to BM on the following Monday, 29 January 2018 to submit the police report as well as file an insurance report as the reporting centre would be closed on weekends.
14. Mr Seah lodged a police report at the Macpherson Neighbourhood Police Post on 27 January 2018 at 1528 hours. He subsequently filed an insurance report at BM on 29 January 2018 at 1808 hours.
15. With regards to the history of the Insured Vehicle, the Insured Vehicle was purchased new in February 2017.

16. We asked Mr Seah regarding the vehicle speed limiter, 3 aftermarket on/off switches, 2 LED light strips, rear cabin LED light strip and mini fan that were fitted onto the Insured Vehicle. According to Mr Tan, all the additional electrical/electronic components with the exception of the vehicle speed limiter were installed by him. The 1st switch is for the 2 LED light strips that are fitted along the side panels of the rear cabin of the Insured Vehicle. The 2nd switch is for a mini fan that is fitted directly behind the centre console of the Insured Vehicle. The 3rd switch is for an exhaust fan that is fitted near the rear exhaust muffler of the Insured Vehicle. He also fitted the rear cabin LED light strip. He mentioned that he had the LED light strips installed as the existing rear cabin light was not illuminating enough whenever he had to perform night assignments. He was unable to see the items stored in the rear cabin and found it difficult to take them out at night.
17. Pertaining to the maintenance aspect, Mr Seah mentioned that the Insured Vehicle will be sent for periodic servicing. Since the Insured Vehicle was purchased new, the 1st and 2nd servicing were done at Borneo Motors as it was complimentary. The last servicing was done on 12 October 2017 at Auto Wheels Motorworks Pte. Ltd. (herein referred to as "**Auto Wheels**") located at 1 Bukit Batok Crescent #02-40 WCEGA Plaza, Singapore 658064. During the course of our investigations, we were able to obtain from Ms Sharon, an administrative assistant of LS 2, the latest servicing records of the Insured Vehicle. The servicing package included changing of engine oil and oil filter. Refer to Invoice 1 below.



Auto
Consultants
Pte Ltd

Company Registration No. 199607198R

51 UBI AVE 1, #01-25 PAYA UBI INDUSTRIAL PARK, SINGAPORE 408933 TEL : (065) 62563561 FAX : (065) 67414108

AUTO WHEELS MOTORWORKS PTE LTD
No 1 BUKIT BATOK CRESCENT
#02-40 WCEGA PLAZA
SINGAPORE 658064

TAX INVOICE

LS 2 SERVICES PTE LTD
Attention: DENNIS C. S. TAN - 96667035
NO 1 BUKIT BATOK CRESCENT,
#04-40 WCEGA PLAZA,
SINGAPORE 658064.
TEL: 62811843 FAX: 62811805 MANAGER 90620469

Invoice Date
12 Oct 2017

HP: 9081 1197
Tel: 6493 2208
Fax: 6795 4101

Invoice Number
INV-025222

Reference
T/HACE - GBF 6895 P

UEN / GST Reg. No.
201226886H

Post Control

Description	Quantity	Unit Price	Amount SGD
CURRENT MILEAGE : 9,392 KM			
SERVICING - ENOC 10W40 ENGINE OIL CHANGE, OIL FILTER CHANGE	1.00	150.00	150.00
		INCLUDES SALES GST 7%	9.81
		TOTAL SGD	150.00

Due Date: 12 Oct 2017

Received in Good Order & Condition
Goods Sold Are Not Refundable/Return

** Any defects or unsatisfied conditions after servicing are to be informed within THREE (3) DAYS from DATE OF INVOICE.
** Services rendered will be taken as accepted if no feedback is received within THREE (3) DAYS from DATE OF INVOICE.
** Interest rate of 5% per month, calculated on a daily basis, is levied on payment for OVERDUE AMOUNT(S)/ACCOUNT(S) owing to Auto Wheels Motorworks Pte Ltd after SEVEN (7) DAYS from DATE OF INVOICE.
** Cheques should be endorsed and made payable to "AUTO WHEELS MOTORWORKS PTE LTD".

Customer Signature/ Co. Stamp Auto Wheels Motorworks Pte Ltd
E & O. E.

Posting date:	10/17	Posting doc no:	INV-025222
GL Code	700270		
Project	1000082		
Posted by:	2	Checked by:	

Invoice 1 shows the latest servicing package done on the Insured Vehicle on 12 October 2017 at Auto Wheels (red arrows). The servicing package included changing of engine oil and oil filter (circled).

18. Mr Seah mentioned that he had not experienced any mechanical or electrical problems with the Insured Vehicle till the day of the incident as the Insured Vehicle was relatively new. 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.

Incident Scene Photographs

19. We were able review several photographs of the Insured Vehicle that were included in the Accident Statement taken after the fire had been extinguished. In general, the information that could be gathered from these photographs had corresponded to the events that were related to us by Mr Seah. See photos 25 - 27 below.



Photo 25 shows the rear cabin of the Insured Vehicle after the fire was extinguished. In general, the information that could be gathered from this photograph pertaining to the nature of fire damage had corresponded to the events that were related to us by Mr Seah, which is the fire had started from the right side of the rear cabin of the Insured Vehicle (circled).



Photo 26 shows a firefighter checking 1 of the fogging machines after the fire had been extinguished. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Seah, which is he removed the 2 fogging machines (arrowed) and the jerrycan containing petrol (circled) as soon as he saw the fire at the right side of the rear cabin of the Insured Vehicle.



Photo 27 shows the right rear portion of the Insured Vehicle after the Insured Vehicle was parked post- incident. In general, the faint burnt marks observed on the right rear portion (circled) had corresponded to the events that were related to us by Mr Seah, which is the fire had started from the right side of the rear cabin of the Insured Vehicle.

20. 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 Seah had mentioned to us there were no indications of abnormally high temperatures on the Insured Vehicle. Moreover, an overheated engine would have caused the Insured Vehicle to stall. However in this case, Mr Seah was the one who noticed a burning smell emitting from the rear cabin while he was driving and stopped the Insured Vehicle.

21. 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 the exterior body of the Insured Vehicle had not sustained any visible fire damage with the exception of the right rear portion which had sustained consequential fire damage. Furthermore, the location of where the Insured Vehicle was positioned was also observed to be not at a secluded location.
22. The possibility of the fire being due to a fluid leak would also seem unlikely given that flammable fluids would require a spark and/or an igniting source for it to catch fire. The fluids observed on the top portion of the partially melted and/or burnt containers could have been a result of fluid spillage from some plastic containers which had melted and/or toppled over due to the prolonged exposure to high heat intensity.
23. The possibility of the fire being due to electrical in nature would then seem more likely given that engine overheating, external factors and fluid leakage would seem unlikely. The fire being due to electrical nature is also supported by the faint traces of greenish residue that were found on several burnt stretches of the LED light strips that were fitted at the rear cabin of the Insured Vehicle, which was earlier discussed in paragraph 10 above.
24. Our checks with both local and international bodies and associations had revealed that at the time of writing this report, there is no manufacturer recall of electrical nature to similar make and model vehicle as the Insured Vehicle that may possibly pose a 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:	Company
Owner ID:	7477M
Vehicle Details	
Vehicle Registration number:	GBF48957
Make:	TOYOTA
Vehicle Model:	TOYOTA HIACE VAN TURBO 5 DR MANUAL
Engine No.:	1KD267PH60
Chassis No.:	JTH4T02P100214720
Recall Details	
No Recall Detail records	

OK

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 of the LED light strips in the rear cabin. The LED light strips were not original factory components 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. We found the Insured Vehicle to be fitted with additional electrical/electronic components which included a vehicle speed limiter device, 3 aftermarket on/off switches, 2 LED light strips, 1 LED rear cabin light strip, 1 mini fan and 1 exhaust fan. The abovementioned electrical/electronic components do not require prior approval from LTA.
28. We are further of the opinion that the additionally fitted electrical/electronic components found on the Insured Vehicle could have possibly caused overloading to the electrical system of the Insured Vehicle. However considering that the installation was carried out approximately 1 year prior to the fire incident, the overloading was likely to be minimal.
29. Our investigations had also revealed that at the time of writing this report, there is no manufacturer recall of electrical nature to similar make and model vehicle as the Insured Vehicle that may pose a fire risk.

**Muhd Nazril**

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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