LKK Auto Consultants Pte Ltd

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

Your Ref : SHC 6289J
Our Ref : CI/TP20006266/N

13 December 2019

M/s Premier Taxis Pte. Ltd.
23 Changi South Avenue 2
Singapore 486443.

TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE SHC 6289J ON 25 MAY 2020

1. We refer to your letter dated 26 May 2020 and the instructions therein.

2. Our analysis, comments and opinions with respect to the cause of fire to the insured vehicle SHC 6289J (herein referred to as **"Insured Vehicle"**) are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected on 26 May 2020 at the premises of Premier Taxis Pte. Ltd. (herein referred to as **"Premier")** located at 23 Changi South Avenue 2, Singapore 486443. A static inspection was carried out to the Insured Vehicle where the following general information was recorded:-

Vehicle Registration No.	: SHC 6289J
Make / Model	: KIA OPTIMA 1.7 (A) DIESEL
Chassis No	: KNAGM414MF5554572
Year of Registration	: November 2014
Mileage	: N.A. (battery melted)

4. The Insured Vehicle was noted to have sustained fire damage that was confined to its front portion. The entire engine compartment of the Insured Vehicle was observed to be severely burnt while the interior compartment was observed to be slightly affected by the fire, particularly the dashboard.

5. The fire had resulted in the body parts at the front portion of the Insured Vehicle to be burnt. This had included its front bumper, front bonnet, front grille, front headlamps, front windscreen, front rims and front tyres amongst others. See photos 1 – 6 below.

Photo 1 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 2 shows the general view of the front portion of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front portion. Its front bumper, front bonnet, front grille, front headlamps, front windscreen, front rims and front tyres were amongst the body parts that were found to have been affected as a result of the fire.

Photo 3 shows a closer view of the front portion of the Insured Vehicle at the time of our inspection. The fire damage to the Insured Vehicle was confined to its front portion. Its front bumper, front bonnet, front tyres and front headlamps were amongst the body parts that were found to have been affected by the fire.

Photo 4 shows the general view of the front windscreen of the Insured Vehicle at the time of our inspection. The front windscreen was seriously affected by the fire.

Photo 5 shows the engine compartment of the Insured Vehicle at the time of our inspection. The entire 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 6 shows the interior compartment of the Insured Vehicle, which was slightly affected by the fire, particularly the dashboard (arrowed).

6. 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

7. For this particular case, the fire appears to have originated within the engine compartment of the Insured Vehicle, somewhere around the rear centre portion of the engine compartment. This can be determined from the burn pattern and the high heat intensity burn marks (whitish burn marks) and also the rust that had developed on the underside of the front bonnet, at the bottom centre portion.

8. 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 bottom centre portion, is an indication that the rear centre 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 and also the rust that had developed on the underside of the front bonnet, at the bottom centre portion 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 bottom centre 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 rear centre portion of the engine compartment.

9. Upon closer examination of the rear centre portion of the engine compartment, which was where the fire to the Insured Vehicle had likely started, we had found greenish residue on several burnt stretches of original factory fitted wirings around the rear centre portion of the engine compartment. 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. 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 original factory fitted wirings around the rear centre portion of the engine compartment, which is in the immediate vicinity where the fire to the Insured Vehicle had likely started. We had found greenish residue on several burnt stretches of these wirings (circled). 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.

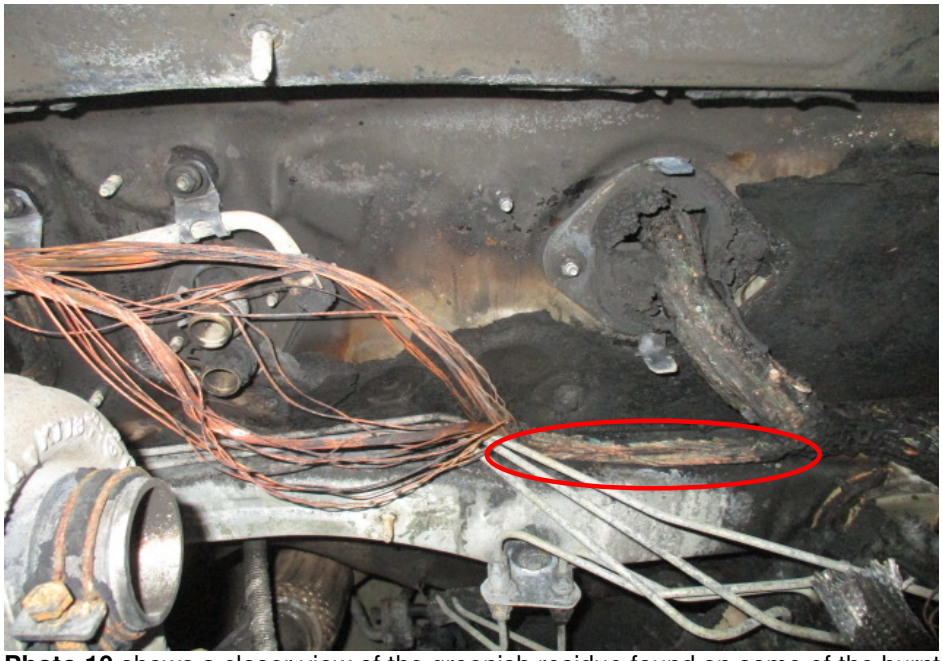


Photo 10 shows a closer view of the greenish residue found on some of the burnt stretches of original factory fitted wirings (circled). The presence of such greenish residue suggests occurrence of an electrical short circuit.

Photo 11 shows a close up view of the greenish residue found on some of the burnt stretches of original factory fitted wirings (arrowed). The presence of such greenish residue suggests occurrence of an electrical short circuit.

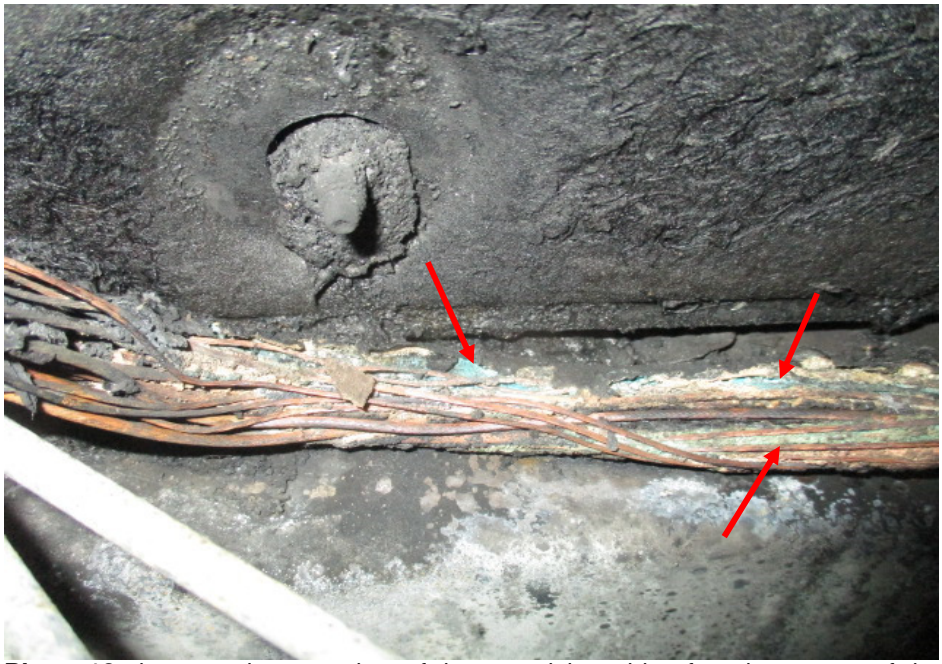


Photo 12 shows a close up view of the greenish residue found on some of the burnt stretches of original factory fitted wirings (arrowed). The presence of such greenish residue suggests occurrence of an electrical short circuit.

10. From the Singapore Accident Statement which was made by Mr Soon Tze Chek (herein referred to as **"Mr Soon"**), we note that the fire to the Insured Vehicle had started at a time when it was parked. Mr Soon was first alerted of the fire when he saw white smoke coming out of the front bonnet of the Insured Vehicle.

11. 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 Soon, he had accepted a booking at 0800 hours and drove the Insured Vehicle to Greenwich Drive from Yishun. He then drove back home alone to Yishun via Hougang. Mr Soon reached his house carpark located at Block 257 Yishun Ring Road and proceeded to park the Insured Vehicle. He switched off the engine and stepped outside of the Insured Vehicle when he received a booking notification on his mobile phone. He got into the Insured vehicle and started the engine when he saw white smoke emitting from the top portion of the front bonnet. Mr Soon immediately switched off the engine and proceeded to the boot compartment to retrieve a fire extinguisher when he heard a small explosion and flames emitting from the front bonnet. He stepped away from the Insured Vehicle and called the SCDF. While waiting for the SCDF he called Premier's reporting office but could not get through.

13. The police and 2 fire bikes arrived in 10 minutes followed by a fire engine moments later. The fire was extinguished shortly after. Mr Soon called Premier's 'Driver Relationship Officer' who then made towing arrangements. The police took down Mr Soon's statement. The tow truck arrived about an hour later. Mr Soon went home after the Insured Vehicle was towed to Premier.

14. Mr Soon filed an insurance report the following day, on 26 May 2020 at 1020 hours at Premier.

15. With regard to the history of the Insured Vehicle, we were able to gather from Mr Soon that he has been driving the Insured Vehicle for 5 years. He also mentioned he has a night driver however he has not been driving the Insured Vehicle for the past 3 months. Mr Soon informed us that he had no issues whilst driving the Insured Vehicle. There was no loss of power to the Insured Vehicle. He mentioned that the last servicing was done in March 2020 at Premier as the Insured Vehicle was due for the yearly mandatory inspection in April 2020.

16. Mr Soon also informed us that ever since he drove the Insured Vehicle, he has not done any modification(s) and/or additionally fitted any electrical or electronic component(s) to the Insured Vehicle.

17. Mr Soon told us that he neither noticed any warning lights nor abnormally high temperatures whilst driving the Insured Vehicle.

Incident Scene Videos

18. Mr Soon was unable to take any pictures of the Insured Vehicle during the fire. However, we were able to obtain videos of the incident taken from the in- vehicle recording device of the Insured Vehicle. In general, the information that could be gathered from these videos had corresponded to the events that were related to us by Mr Soon. See screenshots 1 & 2 below.

Screenshot 1 shows white smoke emitting from the front bonnet of the Insured Vehicle after Mr Soon had parked at his house carpark. Mr Soon is seen standing in front of the Insured Vehicle (arrowed).

Screenshot 2 shows the Insured Vehicle on fire (arrowed) after Mr Soon entered and switched on the engine. He immediately switched off the engine.

19. Pertaining to the maintenance aspect, the Insured Vehicle is serviced at Premier.

20. During the course of our investigations, we were also able to obtain from Mr Lawrence Ong, who is a senior manager at Premier, documents relating to the servicing of the Insured Vehicle. The Insured Vehicle was last serviced on 24 March 2020, 2 months before the incident occurred. The servicing package had included the changing of engine oil, oil filter and air filter. The left hand joint assembly, right hand joint assembly and lambda sensor were also replaced. Refer to Invoice 1 below.

Premier Automotive Services Pte Ltd
23 Changi South Avenue 2
#04-02
Singapore 486443
GST: 200707743D ROC: 200707743D
Phone: (65) 6214 8880
Fax: (65) 6214 4498

Tax Invoice

PREMIER AUTOMOTIVE SERVICES

Date	Page
Mar 24, 2020	1

Invoice Number IV2003004556

Sold To:
Premier Taxis Pte Ltd
23 Changi South Avenue 2
#03-03
Singapore 486443

Ship To:
Premier Taxis Pte Ltd
23 Changi South Avenue 2
#03-03
Singapore 486443

Shipment / DO No.	Order Date	Vehicle No.	Case ID	PO Number	Terms
SM2003005773		SHC6289J	PAUTO-2003003988		30D

S/N	Item Number	Description	Qty. Shp.	Unit Price	Total Discoun	Total Amount
1	S22	Kia Optima Service Package			0.00	558.00
0	LP OWS HYPER MAX	5W40 C3 (Engine Oil - 1000 Ltrs IBC)	5	0.00	0.00	0.00
0	26320 2A500	Service Kit Oil Filter (Optima / I30) (OE0073)	1	0.00	0.00	0.00
0	28113 3S100	Filter-Air Cleaner (KO 1 / 2)	1	0.00	0.00	0.00
0	97133 3SAA0	Filter Assy-Air (KO 1 / 2)	1	0.00	0.00	0.00
0	49500 2T610R	Joint Assy-Cv Lh (KO2-FL) (Recon)	1	0.00	0.00	0.00
0	49501 2T660R	Joint Assy-Cv Rh (KO2-FL) (Recon)	1	0.00	0.00	0.00
0	39350 4A410	Sensor-Lambda (Optima / I30)	1	0.00	0.00	0.00

Comments:
Kia Optima2 PTAXI-2003005806

Subtotal	558.00
Less discount	0.00
Total amount	558.00
GST 7%	39.06
Grand total	597.06

Authorised By:

Invoice 1 shows the servicing and repairs done on the Insured Vehicle on 24 March 2020 at Premier (arrowed). The servicing package had included the changing of engine oil, oil filter and air filter. The left hand joint assembly, right hand joint assembly and lambda sensor of the Insured Vehicle were replaced (circled).

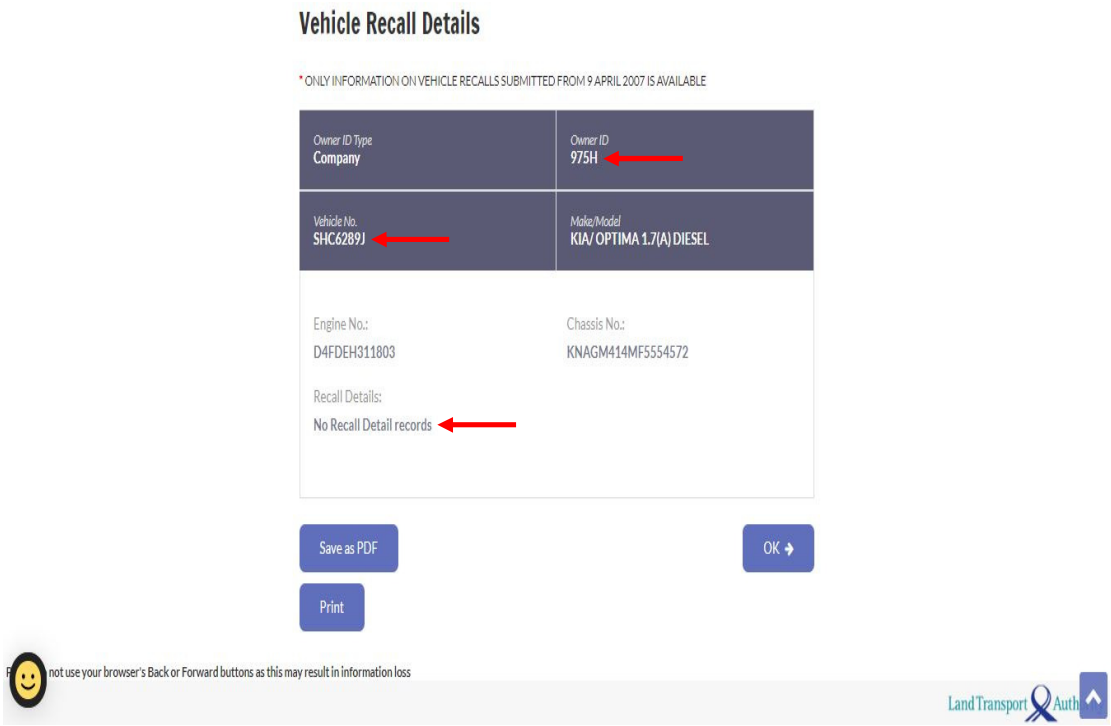
21. Based on the vehicle service record invoice provided, we are of the opinion that it is unlikely that the fire could have been caused by poor maintenance of the Insured Vehicle.

22. 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 Soon had mentioned to us there were no indications of abnormally high temperatures when he was driving the Insured Vehicle on the day of the incident.

23. 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 as the fire occurred as Mr Soon was parking the Insured Vehicle. The location where the Insured Vehicle caught fire was also observed to be not at a secluded location.

24. 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 9 above.

25. 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 be related to this incident. See search result from LTA below.



Conclusion

26. 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 original factory fitted wirings inside the engine compartment, somewhere around the rear centre portion of the engine compartment.

27. 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.

28. 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.

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 possibly be related to this incident.

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)