



Your Ref: 1201800010538
Our Ref : CS/FWD18015332/D

07 September 2018

FWD Singapore Pte Ltd
6 Temasek Boulevard #18-01
Suntec Tower Four
Singapore 038986
(Motor Claims Department)

**TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE
INSURED VEHICLE SLF 6990D ON 21 AUGUST 2018**

1. I refer to your request dated 23 August 2018.
2. My analysis, comments and opinions with respect to the cause of fire to the insured vehicle SLF 6990D (herein referred to as "**Insured Vehicle**") are set out below.

Inspection of the Insured Vehicle

3. The Insured Vehicle was physically inspected by me on 23 August 2018 at the premises of M/s Charn's Customcraft, Block 1010 Bukit Merah Lane 3 #01-105, Singapore 159724.
4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded: -

Vehicle Registration No.	: SLF 6990D
Make / Model	: Jeep Wrangler Unlimited Sahara 3.8 AT 4WD
Chassis No	: 1J4BE5H17BL563966
Year of Registration	: 2012 (May)
Mileage	: N.A (wiring affected)

5. The Insured Vehicle was observed to have sustained relatively severe fire damage at its frontal portion. The body panels at the frontal portion and several undercarriage components at the front underside were found to have been burnt and/or partially melted. Almost all the parts inside the engine compartment were severely burnt. The roof upholstery, carpets, seats, plastic trims and dashboard inside the interior compartment were also affected. The front windscreen was broken as a result of the incident. See photo 1 – 6 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 relatively extensive fire damage at its frontal portion. The body panels at the frontal portion like the front right fender, front right wheel arc and front windscreen were found to have been burnt.



Photo 2 shows a general view of the fire damage at the front left body of the Insured Vehicle. The body panels that were found to have been burnt, include the front left fender and front left wheel arc. The front left door window and front windscreen were also observed to have been broken.



Photo 3 shows the interior compartment of the Insured Vehicle. The seats, roof upholstery, carpet, dashboard and various plastic trims were all burnt and/or melted as a result of the fire.

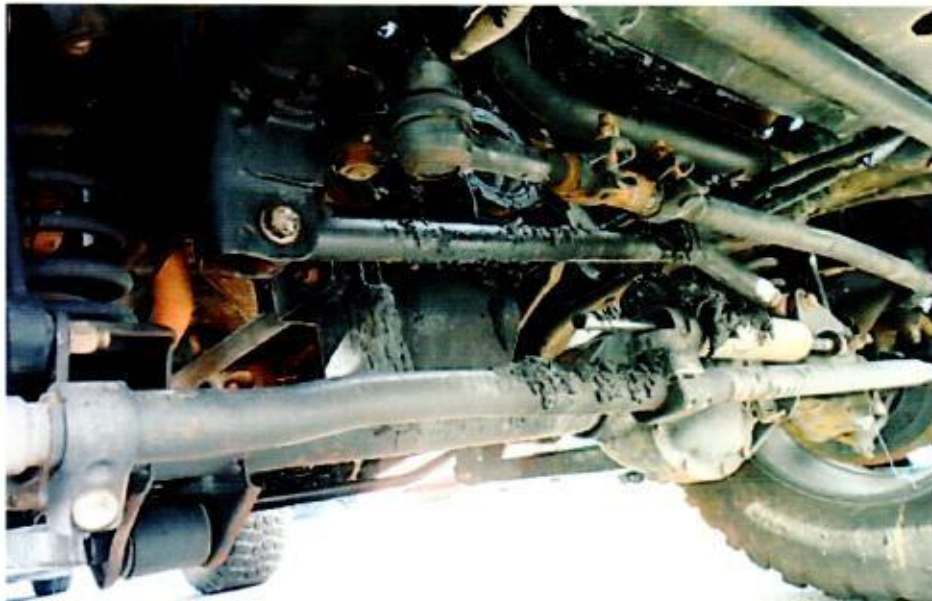


Photo 4 shows the underside of the Insured Vehicle, at its front centre area. Several undercarriage components at the front underside of the Insured Vehicle were observed to have been affected as a result of the fire.

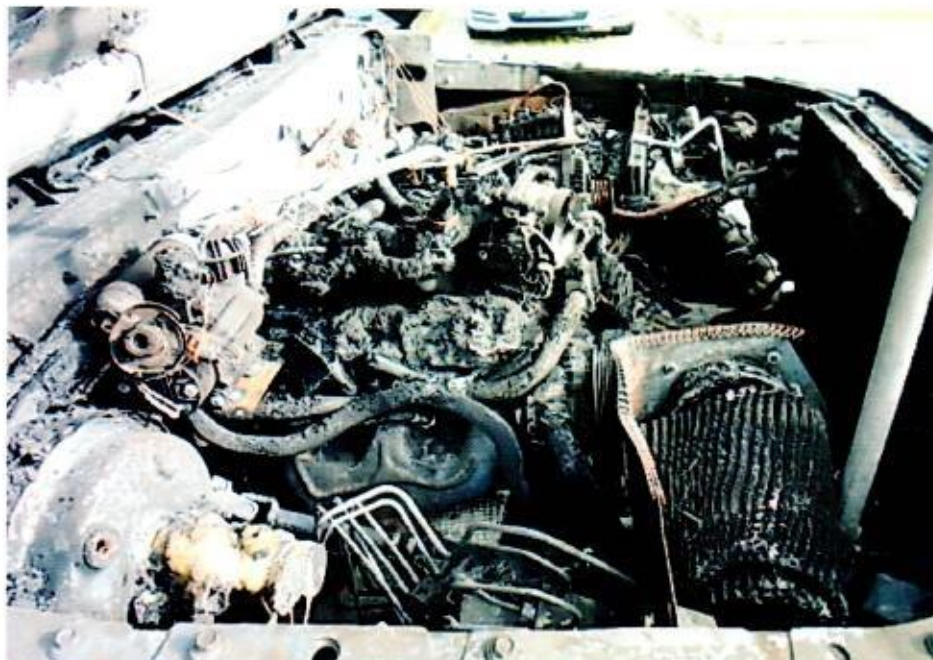


Photo 5 shows the engine compartment of the Insured Vehicle at the time of inspection. Almost all the parts inside the engine compartment were observed to have been burnt and/or melted as a result of the fire. These parts had included its radiator, air condenser, cooling fan, intake manifold, brake pump, battery, air duct, hoses and pipes amongst others.



Photo 6 shows a general view of the rear left body of the Insured Vehicle. The rear portion was observed to be unaffected by the fire.



6. At the time of inspection, I did not find any unusual skeletal remains which could have suggested that there was possible modification(s) and/or additionally fitted electronic and/or electrical component(s) on the Insured Vehicle.

Circumstance of Incident

7. From the Singapore Accident Statement, which was made by Mr Mosses Lee Siu Wen (herein referred to as "**Mr Lee**"), I note that the fire to the Insured Vehicle had started at a time when he was driving the Insured Vehicle. A motorist had first alerted Mr Lee that there was smoke coming out from under the Insured Vehicle.
8. I spoke to Mr Lee on 04 September 2018, where 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.
9. According to Mr Lee, on 21 August 2018 at about 0700hrs, he was driving the Insured Vehicle heading to his son's school, which is located along Margaret Drive. His wife was also on board the Insured Vehicle at that time. It was the first time that Mr Lee was driving the Insured Vehicle for that day. He had started the journey from his home, at Marsiling Lane. He estimates his driving time to be about 25mins. Mr Lee informed that during the journey there was no abnormality to the Insured Vehicle, it was operating normally as per usual.
10. Along Margaret Drive, a motorcyclist rode up to the side of the Insured Vehicle and the rider informed Mr Lee that there was smoke coming out from the underside of the Insured Vehicle. Mr Lee immediately steered the Insured Vehicle to the left side of the road and stopped. He recalls switching off the engine and pulling the key out of the ignition slot before alighting to check. When he bent down, he saw flames at the front underside of the Insured Vehicle. This was towards the front centre, under the engine area.
11. Mr Lee then went to take a fire extinguisher from the Insured Vehicle and at the same time told his wife and son to alight from the Insured Vehicle. Mr Lee sprayed the fire extinguisher at the area where flames were seen. By then, workers from a nearby construction site came to assist by spraying water using water hoses from the construction site. However, their efforts to put out the fire was not successful, and the flames soon spread to the interior compartment of the Insured Vehicle.

12. SCDF officers soon arrived and extinguished the fire. After relating the earlier events to the SCDF officers, Mr Lee was advised to tow the Insured Vehicle away and it was eventually arranged to be towed to Charn's Customcraft, at Bukit Merah after clearance was also obtained from the police officers who had attended to the incident scene.
13. With regard to the history of the Insured Vehicle, I was informed by Mr Lee that he is the registered owner and main driver of the Insured Vehicle. The Insured Vehicle was purchased from a used car dealer about 2 years ago. As far as he can recall, there has not been any mechanical or electrical problem(s) with the Insured Vehicle. Mr Lee informed me that the transmission assembly of the Insured Vehicle was overhauled about 2 months ago. The last routine servicing was around end of June 2018.
14. During my conversation with Mr Lee, I was informed that he had taken some photographs whilst at the incident scene. These photographs, together with documents relating to the servicing and maintenance of the Insured Vehicle, were duly forwarded to me for my review.

Investigation and Technical Analysis

15. The photographs provided by Mr Lee were all taken after the fire was extinguished. It had showed the Insured Vehicle stopped adjacent to the road kerb with SCDF and police vehicles stopped behind the Insured Vehicle. The damage of fire nature to the Insured Vehicle, as seen from the photographs provided, was observed to be similar to what I had observed during my inspection of the Insured Vehicle.
16. In general, the observations gathered from my review of the photographs that was taken by Mr Lee at the incident scene had corresponded to the description of events that he had related to me during our conversation on 04 September 2018. See photo 7 – 9 below.



Photo 7 shows a general view of the Insured Vehicle at the incident scene after the fire was extinguished. The Insured vehicle could be seen stopped adjacent to the road kerb with SCDF and police vehicles stopped behind the Insured Vehicle. In general, the observations gathered from my review of the photographs that was taken by Mr Lee at the incident scene had corresponded to the description of events that he had related to me during our conversation on 04 September 2018.



Photo 8 shows a general view of the engine compartment of the Insured Vehicle after the fire was extinguished. The damage of fire nature to the engine compartment, as seen from the photograph provided, was observed to be similar to what I had observed during my inspection of the Insured Vehicle.



Photo 9 shows the interior compartment of the Insured Vehicle after the fire was extinguished. The damage of fire nature to the interior compartment, as seen from the photograph provided, was observed to be similar to what I had observed during my inspection of the Insured Vehicle.

17. During the course of my investigations, I managed to obtain from Mr Lee, several documents relating to the servicing and maintenance aspect of the Insured Vehicle.
18. Upon reviewing these documents, I note that the Insured Vehicle was last serviced on 23 June 2018. During this servicing, the engine oil and engine oil filter were replaced along with the fan belt. I note that the auto transmission fluid was replaced twice in a space of about 1 month. Once on 07 April 2018 and the other on 05 May 2018. This was likely due to issues with the transmission system leading up to a complete overhaul of the transmission system in 07 June 2018.
19. Several components of the cooling system like the water pump, thermostat and coolant were replaced on 27 July 2018, about 1 month prior to the fire incident. This job was done at the local distributor agent, Chrysler Jeep Automotive of Singapore Pte Ltd. In general, the Insured Vehicle can be considered to be regularly maintained based on the servicing and maintenance documents provided by Mr Lee. See photo 10 below showing the last servicing of the Insured Vehicle done on 23 June 2018.

[illegible]

Photo 10 shows the document relating to the last servicing of the Insured Vehicle on 23 June 2018. From the description column, the engine oil, engine oil filter and fan belt were replaced. The Insured Vehicle can be considered to be regularly maintained based on the servicing and maintenance documents provided by Mr Lee that I had reviewed.

20. For this case, fire due to an overheated engine was unlikely as the Insured Vehicle was still able to be operated after smoke was first seen. Mr Lee was still able to drive the Insured Vehicle, bring it to a complete stop along the side of a roadway before alighting to check. 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. Mr Lee would have likely experienced engine stalling shortly after seeing the smoke, rendering the Insured Vehicle undriveable. Also, Mr Lee had recalled that it was him who had switched off the engine and it was not a case where the engine had stalled by itself.

21. Furthermore, the engine of the Insured Vehicle was not located within an enclosed/covered area like in a normal saloon motor car. The engine area was relatively "open" from the underside of the Insured Vehicle, with no engine undercover covering the engine area. Heat generated from engine operation would have been easily dissipated out whilst the Insured Vehicle was moving, hence fire resulting from an engine overheat is unlikely. See photo 11 below.



Photo 11 shows the front underside of the Insured Vehicle. Unlike in a normal saloon motor car, the engine area of the Insured Vehicle was not located within an enclosed/covered area. The engine area was relatively "open" from the underside of the Insured Vehicle, with no engine undercover covering the engine area. Heat generated from engine operation would have been easily dissipated out whilst the Insured Vehicle was moving.

22. Leakage of fluid within the engine compartment may sometimes 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 as discussed in paragraph 21 above, the temperature within the engine compartment would have unlikely been able to reach temperature that could result in leaked fluid to self-ignite. 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. During my inspection of the Insured Vehicle, the stretch of wirings towards the left rear of its engine compartment were found to be in a condition that suggest electrical short circuit.
24. The wirings at the left rear area of the engine compartment were observed 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. The wirings were originally fitted wire harnesses of the Insured Vehicle.
25. The whitish burn marks that were found on the firewall panel of the Insured Vehicle, at the left rear area of the engine compartment directly behind the completely burnt to copper stretch of wirings, are typically known as intense burn marks. These marks are formed when steel/metal material body parts are exposed to prolong high heat intensity. Rust would also start to develop on these steel/metal material body parts soon after a fire. The physical evidence observed on the Insured Vehicle thus indicate that the fire to the Insured Vehicle had originated within its engine compartment, towards the left rear area of the engine compartment. The cause of fire was of electrical nature to the wirings at this area. See photo 12 – 14 below.



Photo 12 shows the intense burn marks (circled) observed on the firewall panel, at the left rear area of the Insured Vehicle's engine compartment.

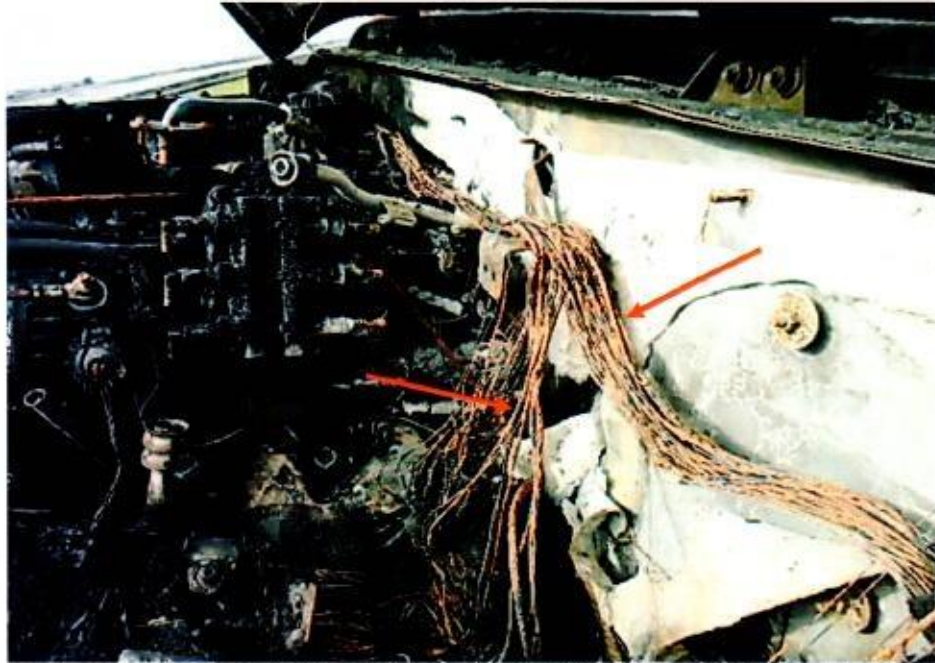


Photo 13 shows the stretch of wirings (arrowed) that were completely burned to its bare copper state, this was directly in front of the firewall wall panel where intense burn marks were found. The bright reddish colour of the copper wires suggest that the wirings were exposed to high heat. Such condition normally indicates internal heating of copper wires, which is a sign of an electrical short circuit occurring.



Photo 14 shows the stretch of wirings (arrowed) that were completely burned to its bare copper state. Such condition normally indicates internal heating of copper wires, which is a sign of an electrical short circuit occurring. This then indicates that the cause of fire to the Insured Vehicle was of electrical nature.

26. My checks with both local and international bodies and associations revealed that at the time of writing this report, there were 3 manufacturer recall campaigns that involved the Insured Vehicle. The was on year 2015, 2016 and 2017. The records also show that the Insured Vehicle had undergone the required rectifications for all 3 recall campaigns. Basing on the descriptions of all 3 recall campaigns, the cause of the recalls is mainly due to mechanical issues and airbag issues, none of which pose a fire risk. Hence the fire incident to the Insured Vehicle is unrelated to all these 3 recall campaigns. See photo 15 and 16 below showing the search result 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: 8975G

Vehicle Details

Vehicle Registration number: SLF6990D
Make: JEEP
Vehicle Model: WRANGLER UNLIMITED SAHARA 3.8 AT 4WD
Engine No.: BL563966
Chassis No.: 1J4BE5H17BL563966

Recall Details

1 Recall No.: R2015030100
Manufacturer Recall Date: 21 Feb 2015
Estimated Completion Year of Recall: 2018
Brief Description (As Provided by Motor Dealer): The power side view mirrors on your vehicle may experience a loss of right and/or left heated power mirror function.
Date Rectified: 23 Oct 2015
For more details, contact CHRYSLER JEEP AUTOMOTIVE OF SINGAPORE PTE LTD
Hotline Information: JACK LEE TECK HONG at 64793232

Photo 15 shows 1 of 3 manufacturer recall campaigns that involved the Insured Vehicle. The rectification for the first recall campaign was done on 23 October 2015. The cause of the recall was due to issues with the heating system of the wing mirrors with no fire risk.

2	Recall No.:	R2017040385
	Manufacturer Recall Date:	31 Mar 2017
	Estimated Completion Year of Recall:	2017
	Brief Description (As Provided by Motor Dealer):	The front passenger airbag inflator on the above vehicles may rupture, due to excessive internal pressure, during normal airbag deployment events.
	Date Rectified:	21 Apr 2018
For more details, contact CHRYSLER JEEP AUTOMOTIVE OF SINGAPORE PTE LTD		
Hotline Information:		JACK LEE TECK HONG at 64793232 KELVIN HOO JONG SAI at 64793232
3	Recall No.:	R2016090285
	Manufacturer Recall Date:	29 Jun 2016
	Estimated Completion Year of Recall:	2017
	Brief Description (As Provided by Motor Dealer):	The clockspring on the above vehicles may ingest dust if the vehicle is subjected to dusty environments.
	Date Rectified:	01 Apr 2017
For more details, contact CHRYSLER JEEP AUTOMOTIVE OF SINGAPORE PTE LTD		
Hotline Information:		JACK LEE TECK HONG at 64793232 KELVIN HOO JONG SAI at 64793232

Photo 16 shows the second and third manufacturer recall campaigns that involved the Insured Vehicle. The rectification for the second recall campaign was done on 01 April 2017 (seen under serial no. 3 in the photo) while the rectification for the third recall campaign (see under serial no. 2 in the photo) was done on 21 April 2018. The cause of the 2 recalls does not pose a fire risk.

Conclusion

27. 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 wirings inside the engine compartment, at the left rear area of the engine compartment. The wirings were original factory wirings.



28. 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.

29. There was no modification (s) and/or additional electronic and/or electrical component(s) fitted on the Insured Vehicle at the time of my inspection of the Insured Vehicle.

30. My investigations also revealed that at the time of writing this report, there were 3 recall campaigns that involved the Insured Vehicle however the cause of all 3 recalls does not pose a fire risk and are unrelated to this incident.

Ang Bryan Tani

AMSOE, AMIRTE, AFF SAE, M.MATAI, AFF.Inst.AEA

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