

Our Ref : CS/FWD19019268/N

4 November 2019

**M/s FWD Singapore Pte. Ltd.**

6 Temasek Boulevard  
#18-01  
Suntec Tower 4  
Singapore 038986

**TECHNICAL INVESTIGATION REPORT OF FIRE INCIDENT INVOLVING THE INSURED VEHICLE SJK 7251 V ON 29 OCTOBER 2019**

1. We refer to your letter dated 31 October 2019 and the instructions therein.
2. Our analysis, comments and opinions with respect to the cause of fire to the Motor Vehicle SJK 7251V (herein referred to as “**Insured Vehicle**”) are set out below.

**Inspection of the Motor Vehicle**

3. The Insured Vehicle was physically inspected on 4 November 2019 at the premises of Ah Lim Motor Co. (herein referred to as “**Ah Lim**”) located at 10 Ang Mo Kio Industrial Park 2A, Ang Mo Kio Autopoint, #01-09, Singapore 568047.
4. A static inspection was carried out to the Insured Vehicle where the following general information was recorded:-

Vehicle Registration No.	: SJK 7251 U
Make / Model	: SUBARU IMPREZA 5D 2.0 S-GT-S AWD 4AT
Chassis No	: GH8005034
Year of Registration	: Oct 2008
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, headlights, front bumper and side panels.
6. The fire had resulted in serious 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. 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 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, headlights, front bumper and side panels.



**Photo 3** shows the general view of the left frontal 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 side 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 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. Most 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 physical inspection of the Insured Vehicle, we had found several modifications and additionally fitted electronic and/or electrical component(s) on the Insured Vehicle. These included an auto timer, an aftermarket subwoofer, an aftermarket amplifier, 2 aftermarket twitters, 2 aftermarket speakers, an aftermarket in-car DVD player, engine strut bar (which had sustained minor fire damage), aftermarket 17- inch alloy rims and a non- standard rear exhaust muffler. All these fitted components were not the standard type for the Insured Vehicle. See photos 7 - 16 below.



**Photo 7** shows the auto timer that was found to be additionally fitted onto the Insured Vehicle upon our inspection.



**Photo 8** shows the 1st aftermarket twitter fitted (red arrow) and speaker (yellow arrow) onto the right 'A' pillar of the Insured Vehicle upon our inspection.



**Photo 9** shows the 2nd aftermarket twitter fitted (red arrow) and speaker (yellow arrow) onto the left 'A' pillar of the Insured Vehicle upon our inspection.





**Photo 10** shows the aftermarket in-car DVD player that was fitted at the centre portion of the front dashboard of the Insured Vehicle.



**Photo 11** shows the engine strut bar (arrowed) fitted on the Insured Vehicle. However it had sustained minor fire damage.

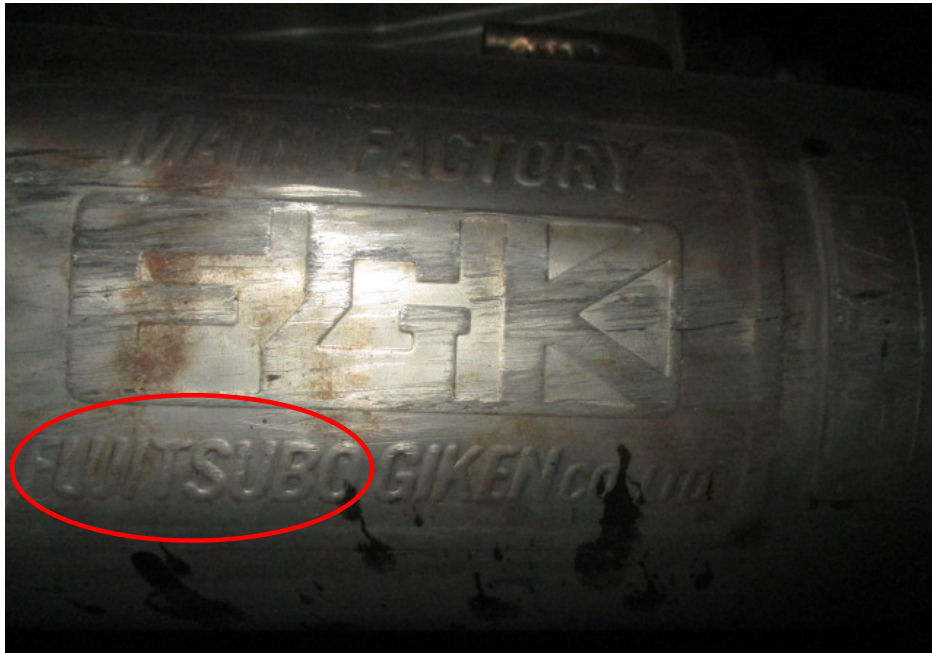


**Photo 12** shows the non-standard rim found to be fitted on the Insured Vehicle at the time of our inspection. The 17- inch alloy rims fitted on the Insured Vehicle were not the standard type for the Insured Vehicle.

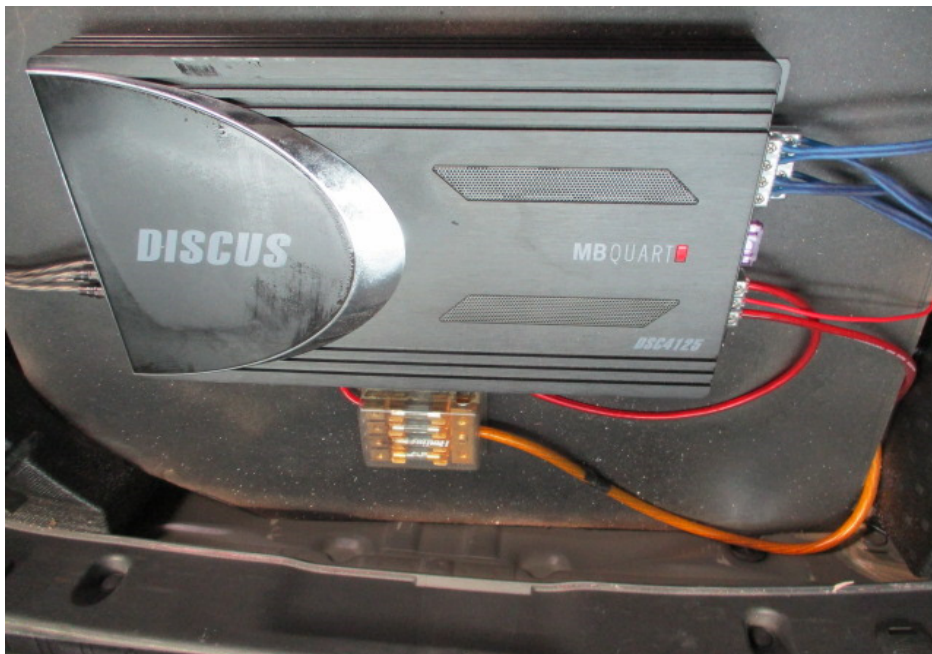


**Photo 13** shows a front view of the non-standard rear exhaust muffler that was found to be fitted on the Insured Vehicle at the time of our inspection.





**Photo 14** shows a close up side view of the non-standard rear exhaust muffler that was found to be fitted on the Insured Vehicle at the time of our inspection. The brand of the rear exhaust muffler was 'Fujitsubo' (circled).



**Photo 15** shows the aftermarket amplifier that was found to be additionally fitted onto the Insured Vehicle upon our inspection.

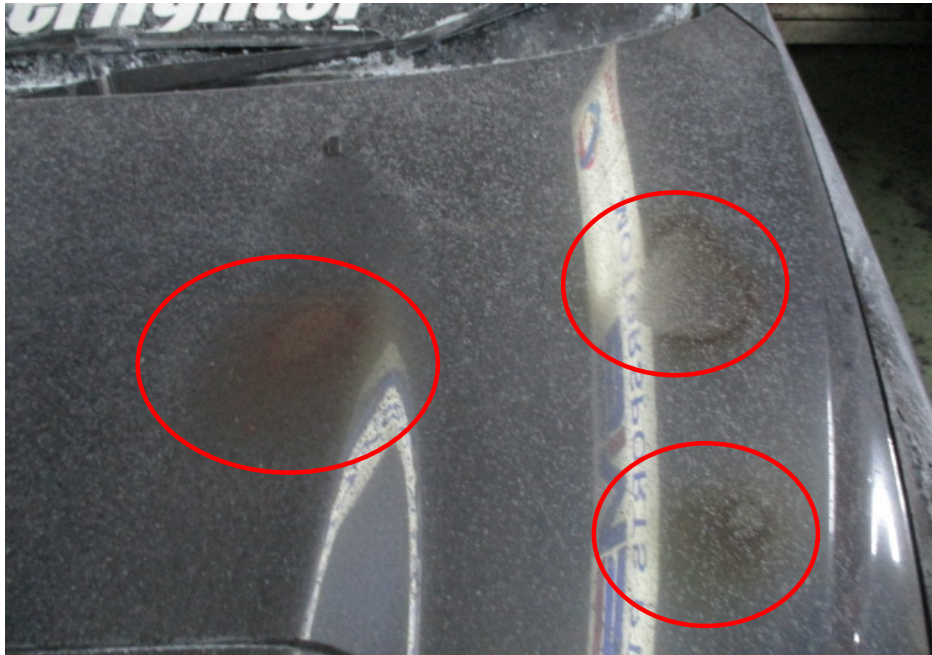


**Photo 16** shows the aftermarket subwoofer that was found to be additionally fitted onto the Insured Vehicle upon our inspection.

### **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 portion of the engine compartment due to the nature of the fire damage which was more extensive at the left portion. This can also be determined from the burn pattern and the high heat intensity burn marks (whitish burn marks) found on the left portion of the bonnet of the Insured Vehicle. The whitish burn marks are a result of exposure to prolonged heat intensity. See photos 17 - 19 below.





**Photo 17** shows the burn pattern that was found on the left portion of the front bonnet of the Insured Vehicle (circled).



**Photo 18** shows the whitish burn marks that were found on the left portion of the underside 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. Hence the fire to the Insured Vehicle can be determined to have originated towards the left portion of the engine compartment.



**Photo 19** shows the burn pattern and whitish burn marks that were found on the left front fender 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.

9. Upon closer examination of the left 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 battery 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 20 – 23 below.

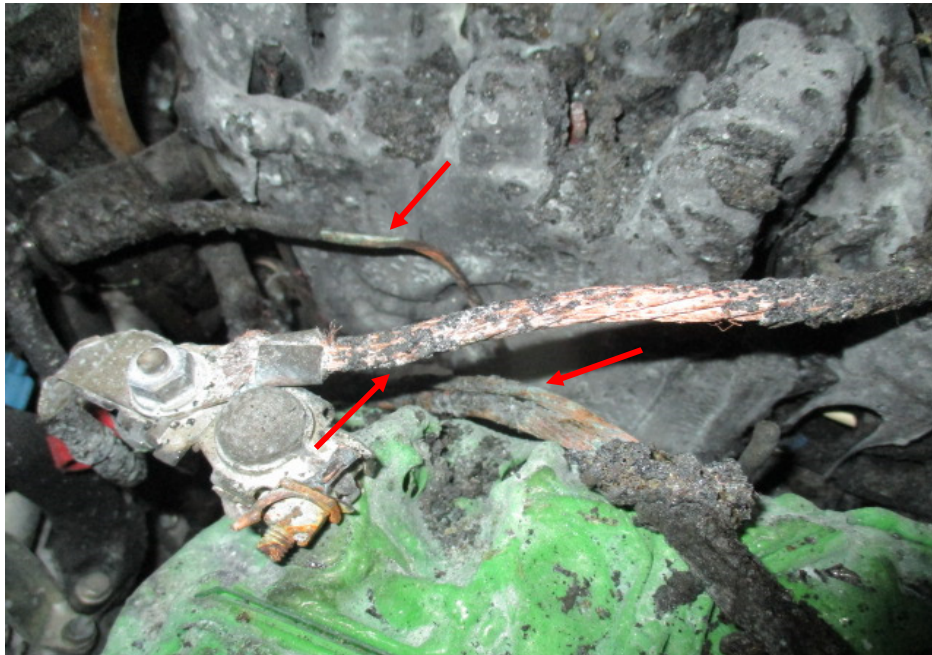




**Photo 20** shows the wirings around the left portion of the engine compartment which is near to the vicinity where the fire to the Insured Vehicle had likely started. We observed greenish residue on the wirings leading from the battery of the Insured Vehicle (circled). The presence of greenish residue 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 21** shows a closer view the greenish residue on the wirings at the left portion of the engine compartment (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.



**Photo 22** shows a close up view of the greenish residue on the wirings leading from the battery of the Insured Vehicle (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.



**Photo 23** shows a close up view of the greenish residue on the wirings leading from the battery of the Insured Vehicle (red arrows). The presence of such greenish residue suggests occurrence of an electrical short circuit.



10. From the Singapore Police Report No. J/20191030/2041 and Accident Statement, which was made by Mr Benjamin Kwek Wei Jie (herein referred to as “**Mr Kwek**”), we note that the fire to the Insured Vehicle had started at a time when he was driving. Mr Kwek was first alerted of the fire when his mother-in-law told him there was smoke emitting from the front bonnet of the Insured Vehicle.
11. We managed to speak to Mr Kwek on 5 November 2019 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 Kwek, at about 1840hrs on 29 October 2019 he had left his work site at the Central Business District and was headed to his mother-in-law's house located at Block 443A Bukit Batok West Avenue 8. When he reached the aforementioned location, both his in-laws were at the loading bay. He drove the Insured Vehicle forward before reversing into the loading bay. Before he reversed, his mother-in-law alerted him to smoke emitting from the front bonnet. He then noticed the smoke. He immediately switched off the engine and released the front bonnet hatch. As Mr Kwek walked to the front of the Insured Vehicle to open the front bonnet, he saw flames from the air scoop of the front bonnet. He quickly opened the front bonnet he saw fire at the left portion of the engine compartment.
13. Mr Kwek attempted to use a hose reel near the loading bay but the hose was too short. A rider who happened to pass by the incident location entered the area and got a fire extinguisher from the carpark and assisted Mr Kwek to put out the fire. Mr Kwek took a picture of the Insured vehicle post-incident. Mr Kwek proceeded to call his own workshop but was informed that they were not his insurance authorized workshop. He then called the FWD insurance hotline and made towing arrangements. The tow truck arrived within an hour and the Insured Vehicle was towed to Ah Lim.
14. The following day, on 30 October 2019 Mr Kwek went to Ah Lim to make an insurance report. He was told to lodge a police report as well. Mr Kwek subsequently went to the Bukit Batok Neighbourhood Police Centre and lodged a police report at 1225 hours. He then sent a copy of the police report to Ah Lim.
15. With regards to the history of the Insured Vehicle, we were able to gather from Mr Kwek that the Insured Vehicle was purchased second hand from a direct owner 1 year ago. Mr Kwek renewed the COE for another 10 years. He is the owner and main driver of the Insured Vehicle.

16. We asked Mr Kwek regarding the auto timer, aftermarket amplifier, aftermarket subwoofer, 2 aftermarket twitters, 2 aftermarket speakers, aftermarket in-car DVD player, engine strut bar, aftermarket 17- inch alloy rims and non- standard rear exhaust muffler. He mentioned that the aftermarket amplifier, aftermarket subwoofer, 2 aftermarket twitters, 2 aftermarket speakers, aftermarket in-car DVD player, engine strut bar and non- standard rear exhaust muffler were already fitted onto the Insured Vehicle when he purchased it.
17. He replaced the rims with aftermarket 17- inch alloy rims. As for the after-market rear exhaust muffler, Mr Kwek was able to provide us with the exhaust authentication certificate as well as the inspection acknowledgement letter issued by the LTA to prove that the after-market rear exhaust muffler had passed inspection on 22 September 2018. See photos 24 & 25.



**JASMA** 日本自動車マフラー協会

ST POWERED PTE LTD  
Name: BENJAMIN KWEK WEI J  
DC Number: S9047888E  
Vehicle No: SJK72510 Date of Installation: 22/09/18 S/N: FGK-2669  
Authorised Signature: [Signature] No.12-0024807

表示番号: 03 S13191 製品番号: 160-63061 製作社名: 藤壺技研 (FUJITSUBO) LTD  
車 名: スバル 製品構成: 2 分割  
登録番号: 03 S13191 適応型式: CBA GH8 エンジン型式: E120

ST POWERED PTE LTD  
Name: TAN GEOK WEI  
Vehicle No: SFA3007K Date of Installation: 11/04/13 S/N: FGK-2669  
Authorised Signature: [Signature]

**CANCELLED**

157 SFA 3007K 22 APR 2013  
INSPECTION CENTRE PTE LTD  
20130422 113700

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- 本書は再発行は致しませんので、紛失しないよう大切に保管して下さい。又、裏面の注意書き内容をご確認ください。

上記製品に対するお問い合わせ窓口  
お問い合わせ先 TEL 055-998-0130

Please carry this document  
In your car at all times

**Photo 24** shows the Fujitsubo rear exhaust muffler authentication certificate. The rear exhaust muffler was fitted onto the Insured Vehicle (arrowed) on 22 September 2018 and had passed inspection on the same date (circled).



Land Transport Authority

10 Sin Ming Drive Singapore 575701  
www.lta.gov.sg

22 Sep 2018

Our ref 2209182301N005056646

BENJAMIN KWEK WEI JIE  
APT BLK 292A BUKIT BATOK EAST AVENUE 6  
#09-204  
SINGAPORE 651292

Dear MR BENJAMIN KWEK WEI JIE

**INSPECTION ACKNOWLEDGEMENT FOR CHANGE OF VEHICLE PARTICULARS APPLICATION**

Please refer to the VIR No. VIR20180976349 for the following vehicle:

Vehicle No.	: SJK7251U
Applicant Name	: BENJAMIN KWEK WEI JIE
Make	: SUBARU
Model	: IMPREZA 5D 2.0 S-GT-S AWD 4AT
Chassis No.	: GH8005034
Engine No.	: EJ20D339636
Change Description	: CHANGE VEHICLE ACCESSORY
Remark	: CHECK OK

2. This is to acknowledge that your vehicle has passed the inspection on 22 Sep 2018

3. The new vehicle specification(s) is (are) as follows:

- Not Applicable

The accessory details are as follows:

Make: FUJITSUBO  
Model Name: FUJITSUBO  
EEC/ECE/JASMA/JMCA No.: 03S13191  
Type No.: 160-63061

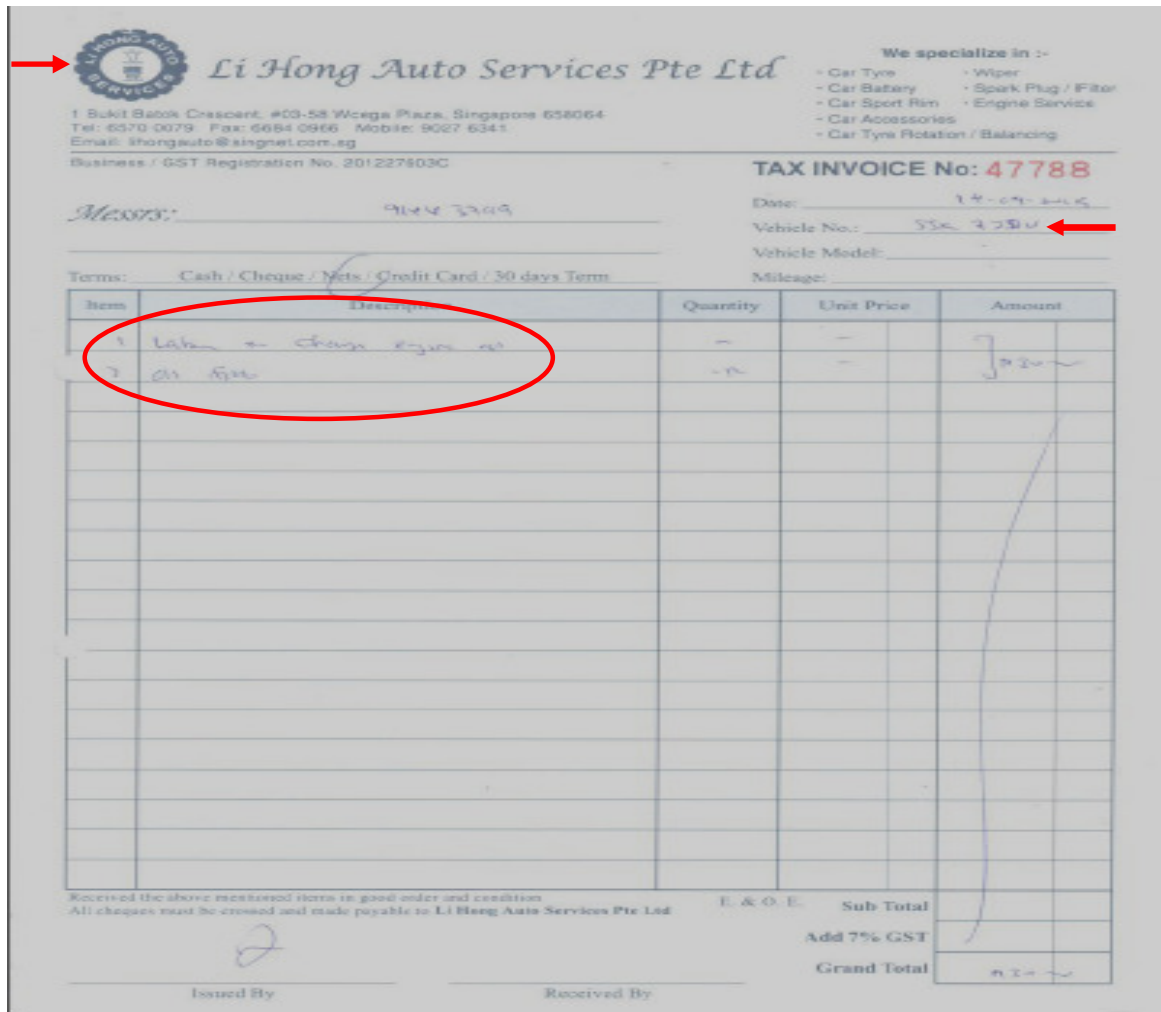
4. Your vehicle's particulars have been changed.

5. Thank you for presenting the above vehicle for inspection.

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**Photo 25** shows the inspection acknowledgement letter issued by the LTA to prove that the Fujitsubo rear exhaust muffler fitted onto the Insured Vehicle (red arrows) had passed inspection on 22 September 2018 (circled).

18. Pertaining to the maintenance aspect, Mr Kwek mentioned that he sends the Insured Vehicle for periodic servicing. He services the Insured Vehicle at Li Hong Auto Services Pte. Ltd located at 1 Bukit Batok Crescent, WCEGA Plaza, #03-58, Singapore 658064. The last servicing was done on 14 September 2019. The servicing package included changing of engine oil and oil filter. Refer to invoice 1 below.



**Li Hong Auto Services Pte Ltd**

1 Bukit Batok Crescent, #03-58 Weega Plaza, Singapore 658064  
Tel: 6570 0079 Fax: 6884 0966 Mobile: 9027 6341  
Email: lhhongauto@singnet.com.sg  
Business / GST Registration No. 201227803C

**TAX INVOICE No: 47788**

Date: 14-09-2019  
Vehicle No: SSK 278U  
Vehicle Model:  
Mileage:

Terms: Cash / Cheque / Nets / Credit Card / 30 days Term

Item	Description	Quantity	Unit Price	Amount
1	Lubrication & Change Engine Oil	1	-	-
2	Oil Filter	1	-	-
				S\$120.00
Sub Total				S\$120.00
Add 7% GST				S\$8.40
Grand Total				S\$128.40

Received the above mentioned items in good order and condition  
All cheques must be crossed and made payable to Li Hong Auto Services Pte Ltd

Issued By: [Signature] Received By: [Signature]

**Invoice 1** shows the last servicing done on the Insured Vehicle on 14 September 2019 (arrowed). The servicing package included changing of engine oil and oil filter (circled).

19. Mr Kwek 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 Kwek 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 Photograph**

21. We were able to obtain a photograph which was taken by Mr Kwek at the incident location. The photograph was taken after the fire to the Insured Vehicle was extinguished.
22. In general, the information that could be gathered from this photograph had corresponded to the events that were related to us by Mr Kwek. Our close examination of this photograph also showed no unusual foreign material(s) and/or object(s) found on the ground in the immediate area of the road where the Insured Vehicle was positioned. See photo 26 below.



**Photo 26** 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 Kwek. Whitish burn marks were observed on the underside of the front bonnet, at the left portion (circled) which indicates that the fire had started in the left portion of the engine compartment.

23. 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.
24. 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 Kwek 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 Kwek was the one who noticed smoke emitting from the front bonnet while he was driving and stopped the Insured Vehicle. Therefore, we are of the opinion that the fire was not caused by an overheated engine.
25. 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 photograph 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.
26. 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.
27. 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. However there was a previous recall campaign involving the Insured Vehicle on 28 March 2017. The purpose of the recall was for the Phase Stabilized Ammonium Nitrate (PSAN). However the issue was not rectified at the time of writing this report.



### 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:	888E
Vehicle Details	
Vehicle Registration number:	SJK7251U
Make:	SUBARU
Vehicle Model:	IMPREZA 5D 2.0 S-GT 5 AWD 4AT
Engine No.:	EJ20D339636
Chassis No.:	GH8005034
Recall Details	
1 Recall No.:	R2017050391
Manufacturer Recall Date:	28 Mar 2017
Estimated Completion Year of Recall:	2017
Brief Description (As Provided by Motor Dealer):	According to the determination that regional factors such as temperature and/or humidity accelerate the degradation of Phase Stabilized Ammonium Nitrate (PSAN) utilized as propellant and they may increase the risk to vehicle safety.
Date Rectified:	-
For more details, contact MOTOR IMAGE ENTERPRISES PTE LTD	
Hotline Information:	SUBARU SERVICE CENTRE TOA PAYOH BRANCH at 67038101/ 67038102 SUBARU SERVICE CENTRE LENG KEE BRANCH at 67038163

OK

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## Conclusion

28. 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, somewhere around the left portion of the engine compartment. The wirings were original factory wirings of the Insured Vehicle.

29. 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.

30. We found the Insured Vehicle to be fitted with additional electrical/electronic components which included an auto timer, an aftermarket amplifier, an aftermarket subwoofer, 2 aftermarket twitters, 2 aftermarket speakers and an aftermarket in-car DVD player. The abovementioned electrical/electronic components do not require prior approval from LTA.
31. 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. These components had included an auto timer, an aftermarket amplifier, an aftermarket subwoofer, 2 aftermarket twitters, 2 aftermarket speakers and an aftermarket in-car DVD player which are all LTA compliant. However considering that the installation was carried out for a period of time prior to the fire incident, the overloading was likely to be minimal.
32. We found the Insured Vehicle to be fitted with a non- standard engine strut bar, aftermarket 17- inch alloy rims and a non- standard rear exhaust muffler. The engine strut bar and tyre rims fitted do not require prior approval from LTA however the non-standard rear exhaust muffler would require prior approval from LTA. Mr Kwek has provided documents to prove that the non-standard rear exhaust muffler has been approved by the LTA.
33. Although the engine strut bar, aftermarket alloy rims and rear exhaust muffler fitted on the Insured Vehicle were not the standard type for the Insured Vehicle, we are of the view that these parts did not cause and/or contribute to the fire incident.
34. Our investigations had also revealed that at the time of writing this report, the manufacturer recall campaign in 2017 which had involved the Insured Vehicle did not possess a fire risk to the Insured Vehicle.



35. SCDF officers did not attend to the incident scene hence there will not be any SCDF fire report that may be forthcoming.

**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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