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Your Ref: CMTD1703331 10 October 2017
Our Ref : CI/SMO17019484/D

Sompo Insurance Singapore Pte Ltd
50 Raffles Place #05-01/06
Singapore Land Tower
Singapore 048623
(Motor Claims Department)

TECHNICAL INVESTIGATION REPORT OF ENGINE DAMAGE TO THE INSURED VEHICLE SKS 7683C

1. I refer to your request dated 05 October 2017 to conduct an investigation and analysis to determine the cause of damage to the engine of the insured vehicle SKS 7683C (herein referred to as "**Insured Vehicle**").

2. The following documents/data were provided to me in preparation of this report:-

    a) Singapore Accident Statement of the driver of the Insured Vehicle, where amongst other information, the circumstance of incident was described;

    b) 51 coloured photographs showing the damage to the Insured Vehicle;

    c) Work Order 200 200 608 from Eng Bee Recovery Pte Ltd, reflecting the details of the towing work carried out to the Insured Vehicle.

Reported Incident

3. On 22 September 2017 at about 0850hrs, the Insured Vehicle was travelling along Yishun Avenue 1 when it went over some stones which hit the bottom of the Insured Vehicle. The "check engine oil level when next refuelling" message appeared on the screen console of the Insured Vehicle. A cracking sound was heard and the Insured Vehicle was subsequently brought to a stop at a junction where there was less vehicle movement.

Damage to the Insured Vehicle

4. It was noted from the photographs provided to me that the engine oil sump, front engine undercover and centre engine undercover of the Insured Vehicle were damaged as a result of the incident.

5. The photographs had depicted both the front engine undercover and centre engine undercover torn, and engine oil sump broken. The damage profile of these 3 parts correspond to the Insured Vehicle going over an object. See photo 1 – 4 below.

Photo 1 shows a general view of the Insured Vehicle as seen from the photographs that were provided to me.

Photo 2 shows the torn front engine undercover (yellow arrow) and broken engine oil sump (red arrow) of the Insured Vehicle.

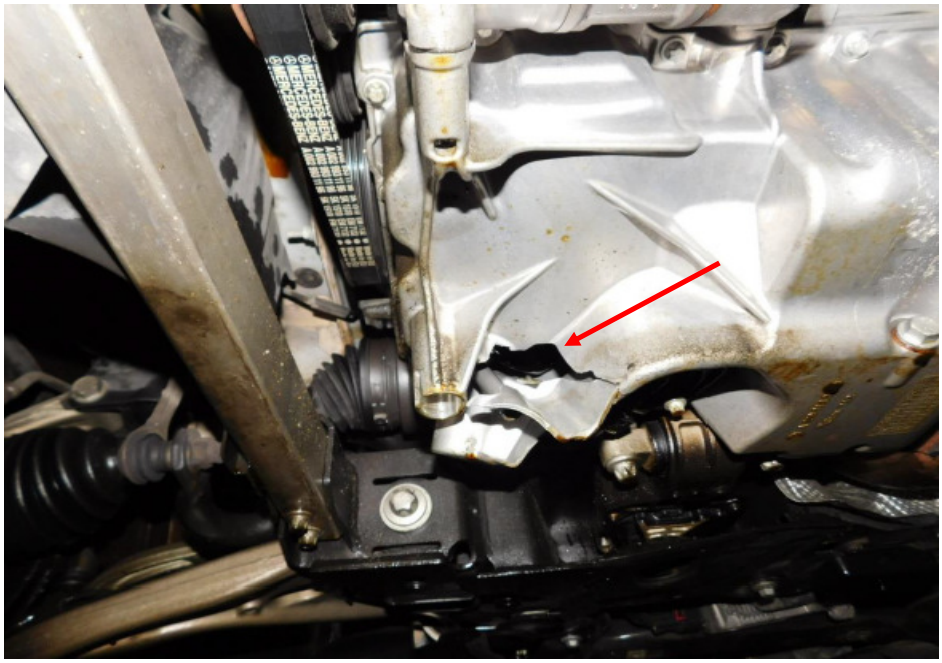

Photo 3 shows a closer view of the broken engine oil sump (red arrow) of the Insured Vehicle. The damage profile of the engine oil sump corresponds to the Insured Vehicle going over an object.

Photo 4 shows the centre engine undercover of the Insured Vehicle, which was observed to be torn (arrowed) and covered with fresh fluid stain. The damage profile of the centre engine undercover corresponds to the Insured Vehicle going over an object

6. The photographs provided had also showed scoring marks on the camshaft lobe and under surface of the engine top cover. Causation of such scoring marks is usually due to direct contact between moving/rotating mechanical parts inside the engine as a result of insufficient lubricant (engine oil), which was unable to form adequate oil film (protection layer) between the mechanical parts. See photo 5 & 6 below.

Photo 5 shows the scoring marks (arrowed) that were seen on the camshaft lobe of the Insured Vehicle (from the photographs that were provided to me). Such scoring marks are usually due to moving/rotating mechanical parts inside the engine coming into contact with each other as a result of insufficient lubricant (engine oil).

Photo 6 shows the scoring marks (arrowed) that were seen on the under surface of the engine top cover, at the area where the camshaft lobes sit (from the photographs that were provided to me). Such scoring marks are usually due to moving/rotating mechanical parts inside the engine coming into contact with each other as a result of insufficient lubricant (engine oil).

Comments & Opinions

7. For this case, the damage profile of the Insured Vehicle's underside corresponds to the Insured Vehicle going over an object(s), leading to the engine oil sump puncturing. However In such going over object(s) type of incidents, the engine of the vehicle will not be affected by the vehicle going over the object(s), provided that there was no further operation of the engine and/or continued driving after it had gone over the object(s), and also provided that there was no engine oil leakage.

8. Given that the Insured Vehicle's engine oil sump was found to have been punctured, the amount of engine oil would have decreased from leakage of engine oil, triggering the warning message of "check engine oil level" to appear on the console screen of the Insured Vehicle after it was continued to be driven, as per the circumstance of incident in the Singapore Accident Statement of the driver of the Insured Vehicle. As a result of the leakage, the engine oil became insufficient for lubricating and heat removal purposes during the continued driving of the Insured Vehicle, ultimately affecting the mechanical parts inside the engine, as per the cracking sound described by the driver.

9. In view of the vaguely reported incident location of along Yishun Avenue 1, I had on 10 October 2017, spoken to the driver of the Insured Vehicle. I was informed that, to the best of her recollection, a more approximate incident location would be along Yishun Avenue 1, just before Yishun Dam.

10. From the document relating to the towing work that was carried out by Eng Bee Recovery Pte Ltd, it was recorded that the Insured Vehicle was towed from the junction of Seletar Aerospace and Seletar Aerospace Link. Basing on Google Map, the approximate distance from the reported location where the Insured Vehicle had gone over the stones to the reported location where it was towed was approximately 3km. See screenshot extracted from Google Map below.

Screenshot extracted from Google Map shows the shortest distance from Yishun Avenue 1, just before Yishun Dam (red arrow) to Seletar Aerospace Link (black arrow). Co-relating this distance with this particular case, the Insured Vehicle had travelled a distance of at least 3km (yellow arrow) after it had gone over the stones before being eventually brought to a stop after a warning message had appeared on the console screen of the Insured Vehicle.

11. The damage to the engine of the Insured Vehicle could have thus been avoided if it was not driven for this 3km. Such damage can therefore be considered to be a consequential damage and not a direct damage as a result of the Insured Vehicle going over the stones.

12. During my conversation with the driver of the Insured Vehicle, I was also informed that at the first instance after being alerted by the warning message, she had brought the Insured Vehicle to a complete stop near the junction of Seletar Aerospace and Seletar Aerospace Link before switching off the engine and calling for assistance. Prior to this, she did not feel any abnormality to the performance of the Insured Vehicle, which was also the reason why she did not stop the Insured Vehicle after going over the stones.

13. During the course of my investigations, I was able to gather that the damage to the engine of the Insured Vehicle was first discovered after the Insured Vehicle was returned to the owner upon completion of repair for the damage caused by the Insured Vehicle going over the stones. This was on 02 October 2017 or thereabouts.

14. Given that the engine of the Insured Vehicle would have been operating with sufficient lubrication (engine oil) after the completion of the repair, it is unlikely that the damage to the engine had occurred after the completion of the repair.

15. Although the Insured Vehicle was brought to a stop upon the warning message first appearing, its engine may have already been affected from the continued driving with insufficient engine oil. My checks with Cycle & Carriage Industries Pte Ltd revealed that such warning message would not be stored in the Engine Control Module of the Insured Vehicle as the cause of the warning light appearing was not due to an electronic nature. Hence any electronic scan performed on the various control modules the Insured Vehicle is unable to retrieve details like, the time or mileage of when this warning message had first appeared.

Conclusion

16. Having carried out a review and analysis of the material evidence, I am of the opinion that the damage to the engine of the Insured Vehicle was due to operating of the engine with insufficient engine oil for lubrication and heat removal purposes. Due to the insufficient engine oil, the oil film (protection layer) between the mechanical parts was inadequate, resulting in direct contact between moving/rotating mechanical parts inside the engine.

17. The insufficient engine oil was due to leakage of engine oil from a punctured engine oil sump that was caused by the Insured Vehicle going over the stones. The subsequent driving had led to the engine operating with insufficient engine oil, which affected the mechanical parts inside the engine.

18. My investigations revealed that the Insured Vehicle was driven for approximately 3km after going over the stones before it was eventually brought to a stop by the driver upon a warning message first appearing on the console screen of the Insured Vehicle. Such warning message would not be stored in the Engine Control Module as the cause of the warning light appearing was not due to an electronic nature.

19. The damage to the engine of the Insured Vehicle could have been avoided if the Insured Vehicle was laid up immediately after it had gone over the stones instead of being continued to be driven. The damage to the engine can thus be considered to be a consequential damage and not a direct damage from the Insured Vehicle going over the stones.

20. Although the damage to the engine of the Insured Vehicle was first discovered after the Insured Vehicle was returned to the owner upon completion of repair for the damage caused by the Insured Vehicle going over the stones, it is unlikely that the damage to the engine had occurred after the completion of the repair as the engine of the Insured Vehicle would have been operating with sufficient engine oil after the aforesaid repair.

Ang Bryan Tani
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