

Your Ref: 5294413474SG  
Our Ref : CI/AIG23004932/N

12 May 2023

**M/s AIG Asia Pacific Insurance Pte. Ltd.**

78 Shenton Way #08-16  
CHARTIS Building  
Singapore 079120  
(Motor Claims Department)

**TECHNICAL INVESTIGATION REPORT OF ENGINE DAMAGE TO THE INSURED VEHICLE SJW 1567K**

1. We refer to your request dated 27 April 2023 to conduct an investigation and analysis to determine the cause of damage to the engine of the insured vehicle SJW 1567K (herein referred to as **"Insured Vehicle"**).
2. The following documents/data were provided to us 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) 66 coloured photographs showing the damage to the Insured Vehicle;
  - c) Work Order 1320143 from Island Recovery Services Pte. Ltd., reflecting the details of the towing work carried out to the Insured Vehicle.

**Reported Incident**

3. On 25 April 2023 at about 1320hrs, the driver of the Insured Vehicle, Mr Tan Kah Pin (herein referred to as **"Mr Tan"**) was driving along Seletar Aerospace Park. He had gone for lunch at Seletar Mall. He works at ST Engineering. The traffic was normal, weather was sunny and the road surface was dry. He was driving along the 1st lane. There were only a few cars on the road. He did not remember going over any object. Suddenly he heard a rotating noise coming from the undercarriage. Mr Tan immediately moved to the extreme left lane, turned on the hazard lights and switched off the engine. He got out of the Insured Vehicle and went to inspect the frontal portion of the Insured Vehicle. He did not notice any damages on the front bumper. He did not find any deformity to the front bumper.

4. Mr Tan mentioned that he did not bend down to check the undercarriage. However he suspected that he may have ran over an object or he would not have heard the sound coming from the undercarriage of the Insured Vehicle. Mr Tan got into the Insured Vehicle and attempted to start the engine but to no avail. Mr Tan mentioned that he did not notice any error message on the dashboard of the Insured Vehicle. There were no warning lights or unusual sounds coming from the Insured Vehicle. So he called Cycle & Carriage (herein referred to as “**C&C**”) and made towing arrangements. While he was waiting for the tow truck it had begun to rain. So he just waited in the Insured Vehicle. He managed to wind down the window but wound it back up as the rain was getting heavy. The tow truck arrived in less than an hour. The tow truck driver gave Mr Tan a card for a complimentary taxi service but Mr Tan decided to walk instead as his office was only about 10 minutes away from the incident location.
5. Later that day around 1600 hours a representative from C&C called Mr Tan and asked him to come down to Pandan Loop to make an insurance report. On 26 April 2023 Mr Tan drove his sister’s car to Pandan Loop. He made the insurance report at 1019 hours. Mr Tan was told that he would be given a replacement car until the Insured Vehicle was repaired.
6. In preparation of this report, we had conducted a physical inspection of the Insured Vehicle.

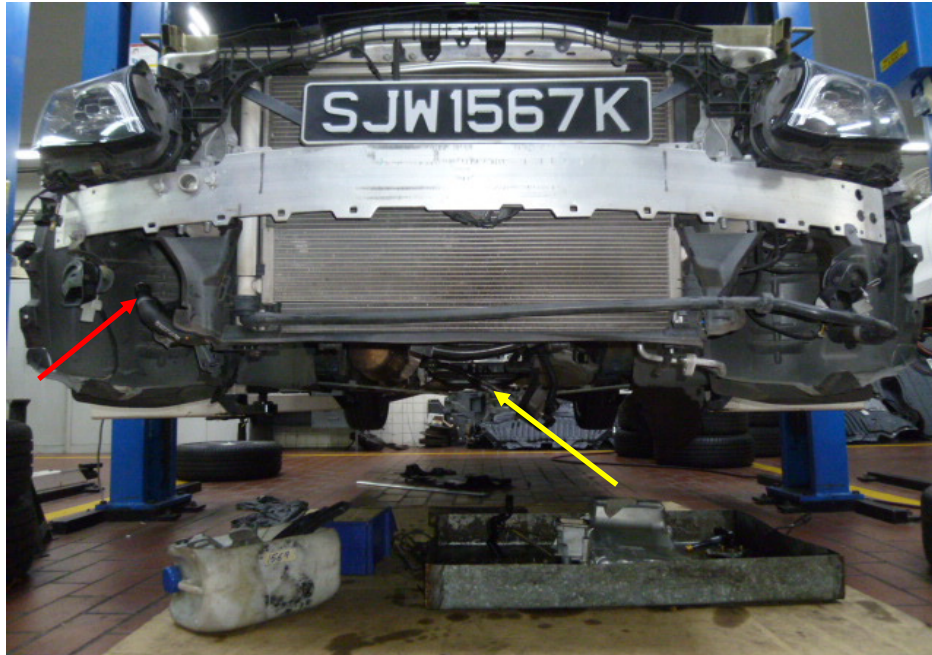
#### **Inspection of the Insured Vehicle**

7. We inspected the Insured Vehicle on 3 May 2023 at the premises of M/s Cycle & Carriage (herein referred to as “**C & C**”) located at 188 Pandan Loop, Singapore 128378. We now set out below our observations and comments with respect to our inspection.

8. The following general vehicle information was first recorded at the time of our inspection: -

Registration Number.	: SJW 1567K
Make & Model	: MERCEDES BENZ C200 AVANTGARDE
Year of Registration	: July 2019
Chassis Number	: WDD2050772R474222X
Speedo Reading	: 48,586km

9. The Insured Vehicle was observed to be in good general condition with no visible damage to the exterior body. We did however observe that the front bumper, undercarriage mounting and engine oil sump had been dismantled.
10. Upon examination of the dismantled undercarriage mounting of the Insured Vehicle, we had found damages. The undercarriage mounting was found to be dented. We also observed damages on the exhaust midpipe and rear undercarriage brace.
11. Upon examination of the dismantled engine oil sump, we had found a crack and a significantly sized puncture/hole on the underside of the engine oil sump. Engine oil was observed to have leaked from this damaged area. The undercarriage parts and components that were immediately after the punctured engine oil sump were further observed to be covered with engine oil stains. As a result of insufficient engine oil, the engine of the Insured Vehicle could not be started.
12. Upon examination of the engine components of the Insured Vehicle, we had found damages to the crankshaft. Upon further examination, we had found the crankshaft to be partially burnt and/or melted. The damage profile of these parts corresponds to the Insured Vehicle overheating. See photos 1 – 11 below.

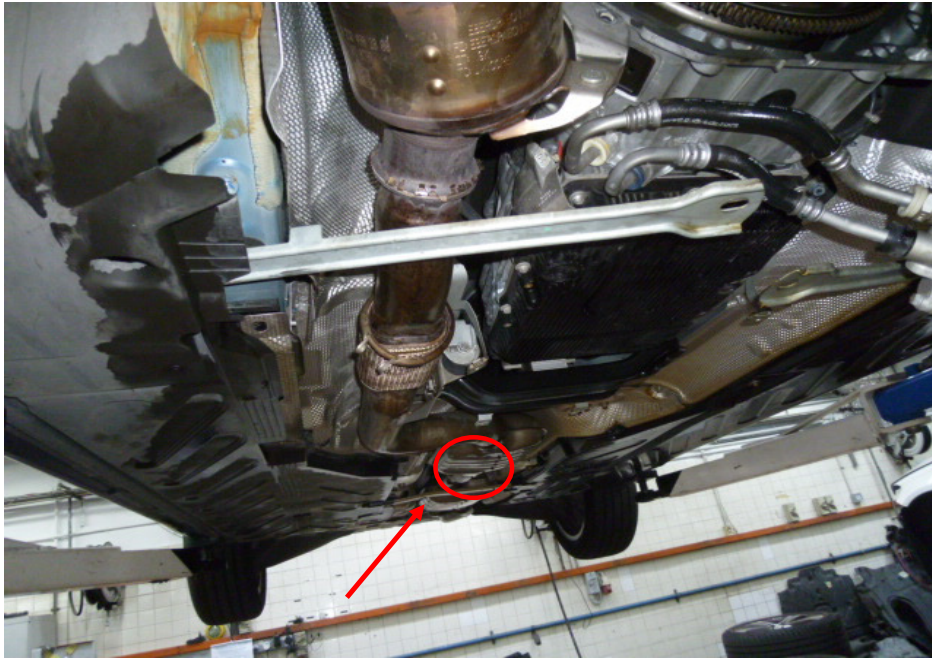


**Photo 1** shows the general view of the Insured Vehicle at the time of our inspection. The Insured Vehicle was observed to be in good general condition with no visible damage to the exterior body. We did however observe that the front bumper (red arrow) and undercarriage mounting (yellow arrow) had been dismantled.

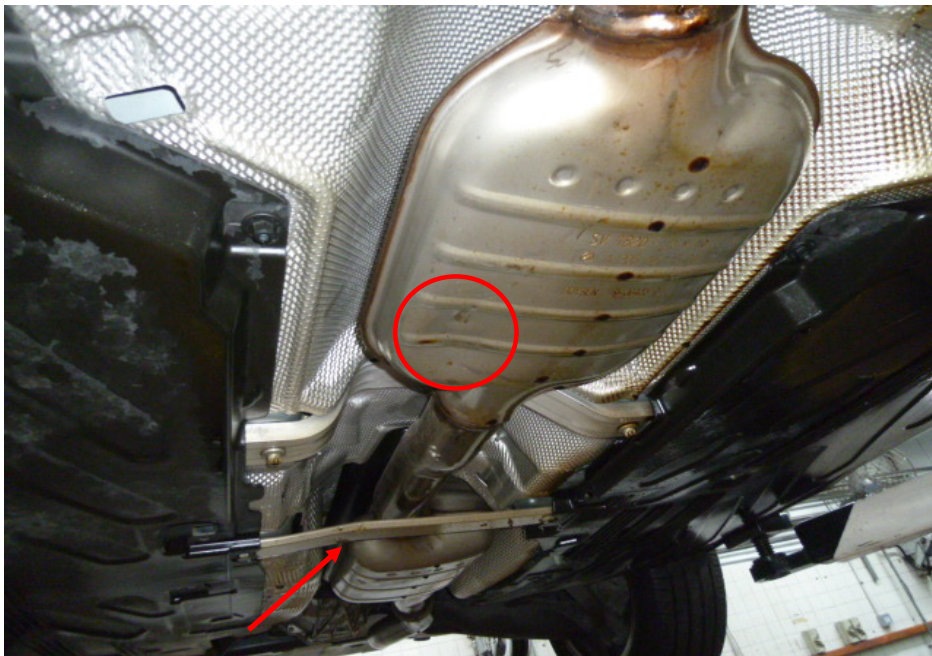


**Photo 2** shows the dented dismantled engine mounting (red arrow) of the Insured Vehicle at the time of our inspection.

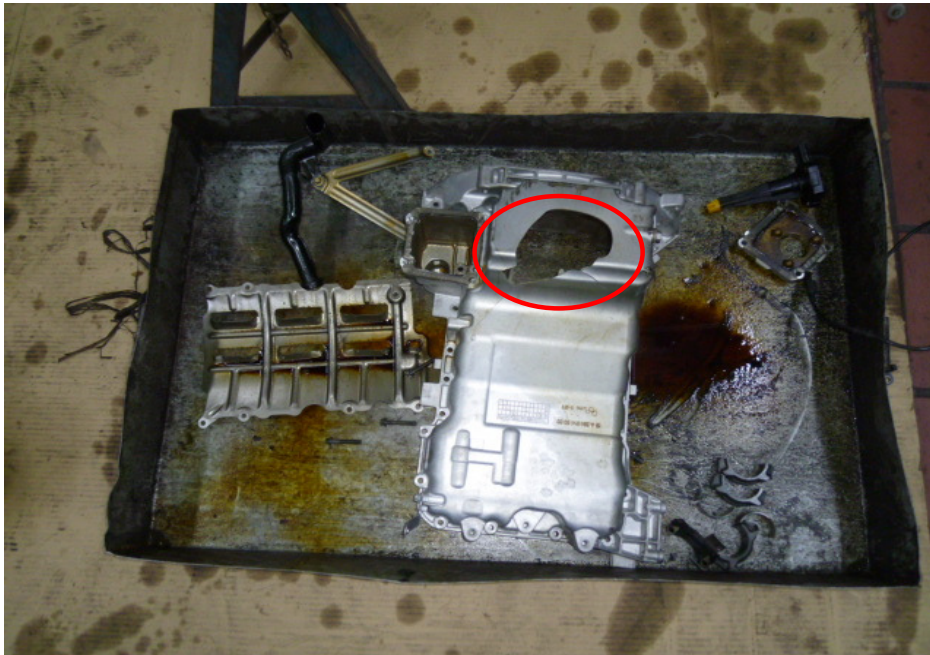




**Photo 3** shows the dents that were found on the midpipe (circled) and rear undercarriage brace (red arrow) of the Insured Vehicle.



**Photo 4** shows a closer view of the dents that were found on the midpipe (circled) and rear undercarriage brace (red arrow) of the Insured Vehicle.



**Photo 5** shows the dismantled broken engine oil sump (circled) of the Insured Vehicle at the time of our inspection.

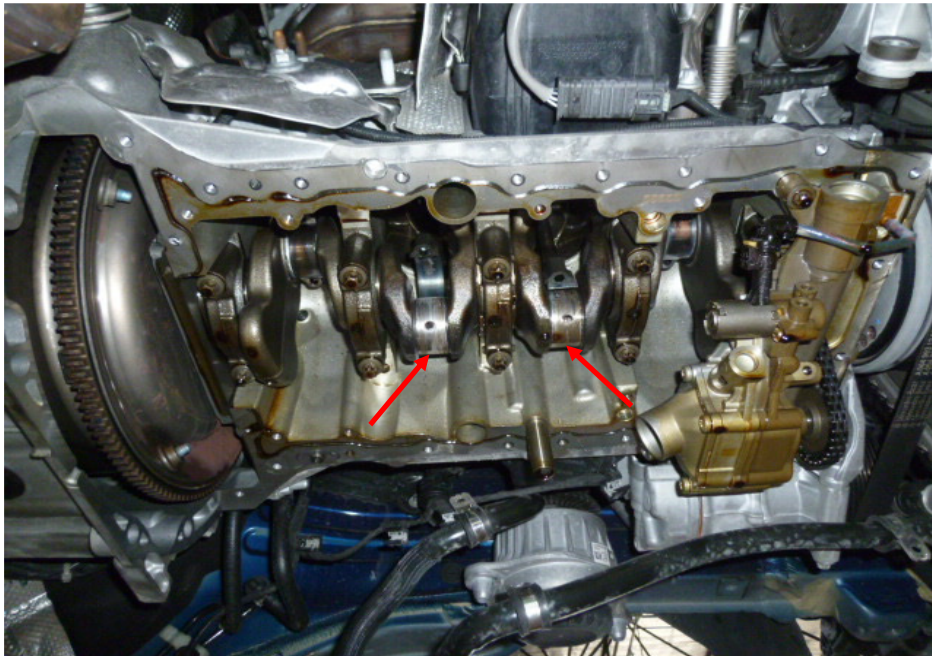


**Photo 6** shows a closer view of the crack (arrowed) on the underside of the engine oil sump of the Insured Vehicle. The damage profile of the engine oil sump corresponds to the possibility of the Insured Vehicle going over an object.

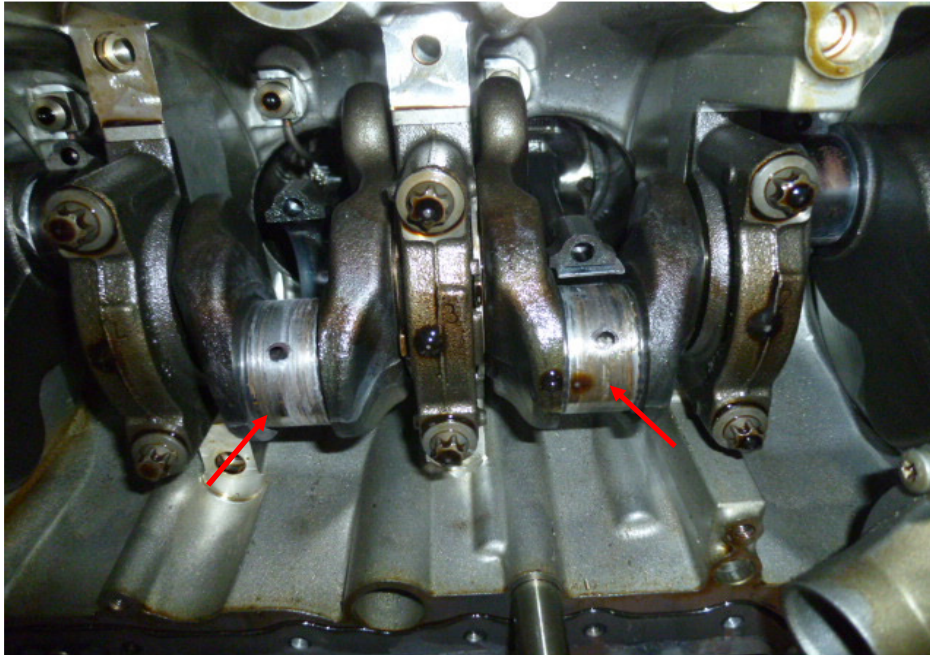




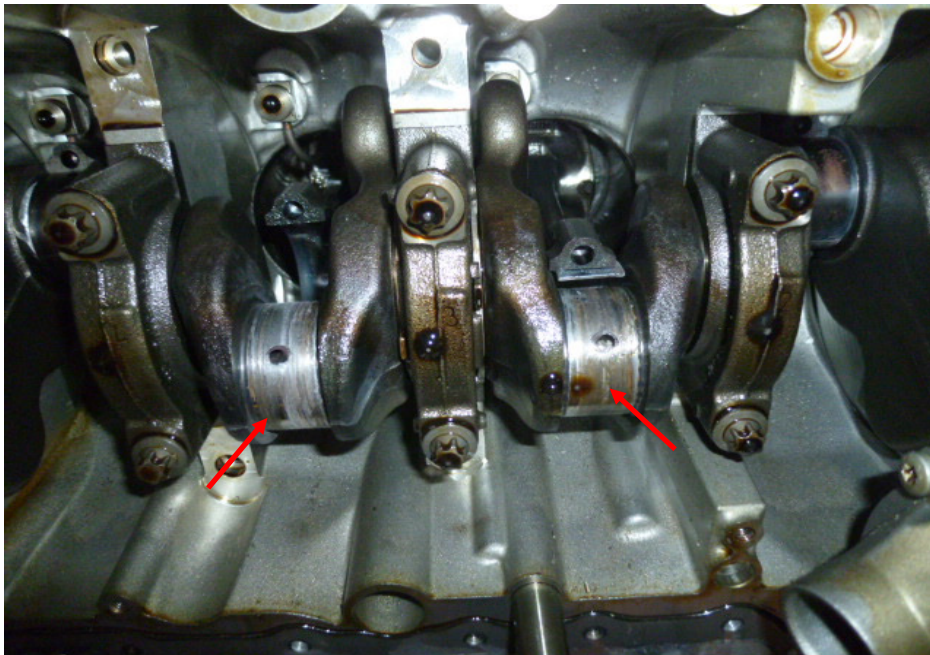
**Photo 7** shows the undercarriage parts and components that were immediately after the punctured engine oil sump, covered with engine oil stains (arrowed).



**Photo 8** shows the crankshaft of the Insured Vehicle which was observed to be partially burnt and/or melted (arrowed).

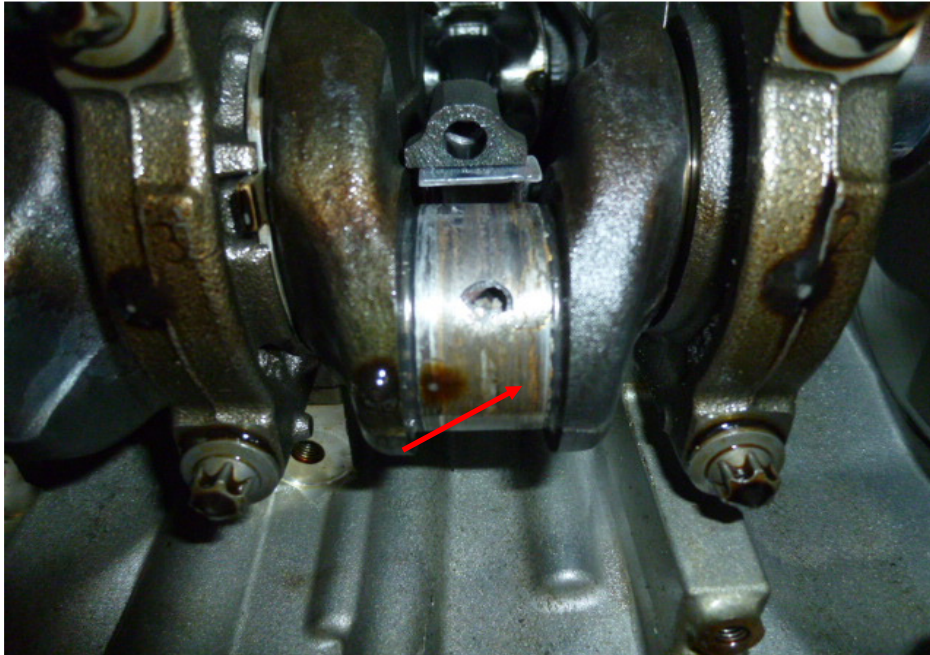


**Photo 9** shows a closer view of the crankshaft of the Insured Vehicle which was observed to be partially burnt and/or melted (arrowed).



**Photo 10** shows a closer view of the crankshaft of the Insured Vehicle which was observed to be partially burnt and/or melted (arrowed).





**Photo 11** shows a close up view of the burn marks observed on the crankshaft of the Insured Vehicle (arrowed).

### **Comments & Opinions**

13. 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.
14. For this case, the Insured Vehicle was continued to be driven to 525 West Camp Road, where it was only towed to C & C later that day after the engine of the Insured Vehicle could not be started up.
15. From the document relating to the towing work that was carried out by Island Recovery Services Pte. Ltd., it was recorded that the Insured Vehicle was towed from 525 West Camp Road.

16. Basing on the On- Board Diagnostics (OBD) report of the Insured Vehicle provided to us by C&C, at the mileage of 48,576km, the Insured Vehicle detected an error code P001164 which refers to an implausible signal from the intake camshaft sensor. Basing on the mileage displayed on the odometer of the Insured Vehicle upon our inspection at C&C, the approximate distance from the reported location where the Insured Vehicle had gone over an object to 525 West Camp Road where it was towed was approximately 10km. See Photos 12 - 33 below.




XENTRY		 Mercedes-Benz	
Temperatures			
Name	First occurrence	Last occurrence	
Intake air temperature (Intake manifold)	50.85Grad C	50.85Grad C	
Ambient temperature	33.00Grad C	33.00Grad C	
Engine temperature	85.50Grad C	85.50Grad C	
Fuel temperature (raw value)	84.00°C	84.00°C	
Intake air temperature	48.00Grad C	48.00Grad C	
Development data			
Name	First occurrence	Last occurrence	
Development data [Data_Record_2_CommonEnvData]	***** Data Record 2 *****	***** Data Record 2 *****	
Development data [Data_Record_3_Occurrence]	***** Data Record 3 *****	***** Data Record 3 *****	
Development data [Data_Record_4_Occurrence]	---	***** Data Record 4 *****	
Development data [Data_Record_5_Occurrence]	---	***** Data Record 5 *****	
Development data [Data_Record_6_Occurrence]	---	***** Data Record 6 *****	
Development data [Data_Record_7_Occurrence]	---	***** Data Record 7 *****	
Development data [Data_Record_8_Occurrence]	---	***** Data Record 8 *****	
Development data [Data_Record_9_Occurrence]	---	***** Data Record 9 *****	
Development data [Data_Record_10_Occurrence]	---	***** Data Record 10 *****	
Development data [Data_Record_11_Occurrence]	---	***** Data Record 11 *****	
Development data [Data_Record_12_Occurrence]	---	***** Data Record 12 *****	
Development data [Data_Record_13_Occurrence]	---	***** Data Record 13 *****	
Development data [Data_Record_14_Occurrence]	---	***** Data Record 14 *****	
Development data [Data_Record_15_Occurrence]	---	***** Data Record 15 *****	
Development data [Data_Record_16_Occurrence]	---	***** Data Record 16 *****	
Development data [Data_Record_17_Occurrence]	---	***** Data Record 17 *****	
Development data [Data_Record_18_Occurrence]	---	***** Data Record 18 *****	
Development data [Data_Record_19_Occurrence]	---	***** Data Record 19 *****	
Development data [Data_Record_20_Occurrence]	---	***** Data Record 20 *****	
Development data [Data_Record_21_Occurrence]	---	***** Data Record 21 *****	
Development data [Data_Record_22_Occurrence]	---	***** Data Record 22 *****	
Development data [Data_Record_23_Occurrence]	---	***** Data Record 23 *****	
Development data [Data_Record_24_Occurrence]	---	***** Data Record 24 *****	
Development data [Data_Record_25_Occurrence]	---	***** Data Record 25 *****	
Development data [Data_Record_26_Occurrence]	---	***** Data Record 26 *****	
Development data [Data_Record_27_Occurrence]	---	***** Data Record 27 *****	
Development data [Data_Record_28_Occurrence]	---	***** Data Record 28 *****	
Development data [Data_Record_29_Occurrence]	---	***** Data Record 29 *****	
Development data [Data_Record_30_Occurrence]	---	***** Data Record 30 *****	
Development data [Data_Record_31_Occurrence]	---	***** Data Record 31 *****	
Development data [Data_Record_32_Occurrence]	---	***** Data Record 32 *****	
Development data [Data_Record_33_Occurrence]	---	***** Data Record 33 *****	
Development data [Data_Record_34_Occurrence]	---	***** Data Record 34 *****	
Development data [Data_Record_35_Occurrence]	---	***** Data Record 35 *****	
Development data [Data_Record_36_Occurrence]	---	***** Data Record 36 *****	
Development data [Data_Record_37_Occurrence]	---	***** Data Record 37 *****	
Development data [Data_Record_38_Occurrence]	---	***** Data Record 38 *****	
Development data [Data_Record_39_Occurrence]	---	***** Data Record 39 *****	
Development data [Data_Record_40_Occurrence]	---	***** Data Record 40 *****	
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Development data [Data_Record_67_Occurrence]	---	***** Data Record 67 *****	
Development data [Data_Record_68_Occurrence]	---	***** Data Record 68 *****	
Development data [Data_Record_69_Occurrence]	---	***** Data Record 69 *****	
Development data [Data_Record_70_Occurrence]	---	***** Data Record 70 *****	
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Development data [Data_Record_73_Occurrence]	---	***** Data Record 73 *****	
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Development data [Data_Record_76_Occurrence]	---	***** Data Record 76 *****	
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Development data [Data_Record_82_Occurrence]	---	***** Data Record 82 *****	
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Development data [Data_Record_87_Occurrence]	---	***** Data Record 87 *****	
Development data [Data_Record_88_Occurrence]	---	***** Data Record 88 *****	
Development data [Data_Record_89_Occurrence]	---	***** Data Record 89 *****	
Development data [Data_Record_90_Occurrence]	---	***** Data Record 90 *****	
Development data [Data_Record_91_Occurrence]	---	***** Data Record 91 *****	
Development data [Data_Record_92_Occurrence]	---	***** Data Record 92 *****	
Development data [Data_Record_93_Occurrence]	---	***** Data Record 93 *****	
Development data [Data_Record_94_Occurrence]	---	***** Data Record 94 *****	
Development data [Data_Record_95_Occurrence]	---	***** Data Record 95 *****	
Development data [Data_Record_96_Occurrence]	---	***** Data Record 96 *****	
Development data [Data_Record_97_Occurrence]	---	***** Data Record 97 *****	
Development data [Data_Record_98_Occurrence]	---	***** Data Record 98 *****	
Development data [Data_Record_99_Occurrence]	---	***** Data Record 99 *****	
Development data [Data_Record_100_Occurrence]	---	***** Data Record 100 *****	
Supplemental information on time of occurrence			
Name	First occurrence	Last occurrence	
Frequency counter	---	1.00	
Main odometer reading	48576.00km	48576.00km	
Number of ignition cycles since the last occurrence of the fault	---	40.00	
P001164 The position of the intake camshaft (cylinder bank 1) deviates from the specified value. There is an implausible signal.			
Miscellaneous			
STORED			
Name	First occurrence	Last occurrence	
Self-adjustment in partial-load range, right cylinder bank	0.98	0.98	
Number of combustion misfires	0.00	0.00	
Specified value for positions of intake camshaft	14.00Grad KW	14.00Grad KW	
Specified value for positions of exhaust camshaft	-16.00Grad KW	-16.00Grad KW	
Vehicle speed	61.00	61.00	
Fill level of fuel tank	53.33%	53.33%	
Position of throttle valve	18.43%	18.43%	
Actual gear	---	---	
Driving distance with engine diagnosis indicator	0.00km	0.00km	
25.04.2023 16:10:40 03/2023 WDD2050772R474222 (205.077) Page '3' of '8'			
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Photo 12 shows the On- Board Diagnostics (OBD) report of the Insured Vehicle provided to us by C&C, at the mileage of 48,576km (black arrow), the Insured Vehicle detected an error code P001164 which refers to an implausible signal from the intake camshaft sensor (red arrow).



**Photo 13** shows 48,586km (circled), the mileage displayed on the odometer of the Insured Vehicle upon our inspection at C&C, the approximate distance from the reported location where the Insured Vehicle had gone over an object to 525 West Camp Road where it was towed was approximately 10km.

17. Given that there was engine oil leakage from the puncture/hole at the underside of the engine oil sump of the Insured Vehicle as a result of the Insured Vehicle going over an object, the amount of engine oil in the engine would have thus decreased when the Insured Vehicle was being driven to 525 West Camp Road. This would have then led to insufficient engine oil for lubrication and heat removal purposes, ultimately affecting the mechanical parts inside the engine. Hence, resulting in the loud rotating noise emitting from its engine as the Insured Vehicle was being driven to its final stop position.
18. The damage to the engine of the Insured Vehicle could have thus been avoided if it was not driven for this 10km. 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 an object.



19. During our interview with Mr Tan, we were also informed that at the first instance after going over the object, he did not notice any warning message displayed on the console screen. Furthermore, he did not feel any abnormality to the performance of the Insured Vehicle, which was also the reason why he did not stop the Insured Vehicle after going over the object.
20. Although the Insured Vehicle was brought to a stop after going over the object, its engine may have already been affected from the continued driving with insufficient engine oil.

### **Conclusion**

21. Having carried out a review and analysis of the material evidence, we are 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.
22. The insufficient engine oil was due to leakage of engine oil from the crack and puncturing of the engine oil sump that was caused by the Insured Vehicle going over the object. The continued driving of the Insured Vehicle had led to the engine operating with insufficient engine oil, ultimately affecting the mechanical parts inside the engine.
23. Our investigations revealed that the Insured Vehicle was driven for approximately 10km after going over the object before it was eventually brought to a stop by Mr Tan at 525 West Camp Road. The hole on the underside of the engine oil sump was relatively large which would have resulted in engine oil flowing out rather than seeping/dripping out. Hence there was engine damage as the Insured Vehicle had travelled for 10km, which we note is a relatively long distance.

24. 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 object 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 object.



**Muhd Nazril**  
*Technical Investigator*



**Ang Bryan Tani**  
*AMSOE, AMIRTE, AFF SAE, MATAI, AFF.Inst.AEA*  
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*Technical Investigation & Reconstructionist (SAE-A)*

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