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REPORT ON POSSIBLE REASONS FOR A CAR TO STOP WHILE DRIVING

Danny Raj Muniappan JLX 215

Central Chambers Law Corp File Ref: TBA
Envista Ref: 125387-G4S3
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For:

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Purpose

1. On 10th June 2021, Envista Forensics Pte Ltd (Envista) received this assignment from Mr Ramasamy K Chettiar of Central Chambers Law Corporation. The scope of this assignment was to give an opinion as to how an Audi car being driven along the SLE came to stop.

Background

2. An accident involving an Audi S4 car and a motorcycle took place along Seletar Highway (SLE) on 24th July 2017. The Audi S4 car was with the registration number SFJ 1223 T, and the registration number of the motorcycle was JLX 215, a Malaysian registered motorcycle.

3. On 24th July 2017, when Mr. Danny Raj Muniappan (Mr. Danny) was riding the motorcycle along the SLE and while overtaking another car, the motorcycle impacted the subject Audi S4 car. The Audi S4 car was stationery on the right most lane of the highway at the time of the incident.

Investigation

General

4. Video footage that was captured by an in-car video at the dashboard and at the rear was provided to Envista. The unknown car was seen moving and as it reached near and behind the parked Audi S4 in lane 1, the unknown car was seen to be switching lanes, probably to avoid the Audi S4.

5. The video captured from the rear in-car camera for first 11 seconds approximately, the motorcycle was seen to be approaching the unknown car. In the next approximately 7 seconds into the footage the motorcycle was seen overtaking the unknown car, followed by a thud sound.

6. At 20 seconds, the unknown car came to a momentary halt and at approximately the 21-second mark the motorcycle was seen colliding with the Audi S4 car stopped in front. The rider was seen hitting the Audi car boot that was open, whereas the pillion rider was seen thrown off from the motorcycle. This pillion rider was thrown into the air and landed in front of the Audi S4 by several metres.

Documents Reviewed

7. The following documents and materials were reviewed and/or referenced as part of Envista's investigation, and/or contain information pertinent to the analysis and conclusions presented herein:

    - In-car video footages for approximately 1 minute

- Registration Details of the Audi S4 car (Vehicle Registration number SFJ 1223T)
- Police Report filed by Mr. Muniappan Govindaraju (rider's father) dated 6th September 2017
- Copies of invoices from NGS Trading for service work carried out on the Audi S4 car
- 2010 Audi A4 Owner's manual

Findings

8. Envista was provided copies of invoices for maintenance work carried out to the Audi S4 for the period between 12th November 2015 and 27th September 2017, and a summary is provided in Table 1.

No	Date	Remarks
1	12th November 2015	Front bumper, radiator grille and headlamps replaced. Oil filter and engine oil renewed. Mileage: 142743 km
2	2nd January 2016	10 number upper and lower arm bushes replaced.
3	13th May 2016	Oil filter and engine oil renewed.
4	19th May 2016	Water pump, coolant, thermostat, hoses and 4 in 1 pipe replaced.
5	3rd June 2016	Oil separator, hoses, intake manifold gaskets and fan belts replaced.
6	15th July 2016	Tow -king trolley charges 120 dollars. Filter, Megatronic, gasket and transmission fluid replaced, and programming was done.
7	6th August 2016	Rear boot locker and damper replaced.
8	11th September 2016	Oil filter and engine oil replaced. Mileage: 161872 km
9	5th December 2016	Front and rear brake pads and sensor replaced. Left side intake manifold was also replaced.
10	10th January 2017	Air valve, combi valve and its gasket and power steering fluid were renewed. Engine oil and filter were also renewed. Mileage: 172810 km.
11	29th March 2017	Spark plugs replaced
12	21st June 2017	Front and rear wheel bearings, front brake pad, front caliper piston repair kit, pump bearing and radiator replaced.
13	27th September 2017	Two tyres replaced.

Table 1 – Summary of Service/Repairs

9. Although the incident occurred on 24th July 2017, the service details provided do not include any details of servicing which would be expected to have been carried out on or immediately after the accident date.

Analysis

10. In the course of driving, a car can stop due to several reasons:
    a. Empty fuel tank
    b. Fuel mixture[1] is not adequate
    c. Fuel pump failure
    d. Alternator failure
    e. Dead battery
    f. Clutch problems
    g. Dirty air filter
    h. Faulty coolant sensor
    i. Faulty sensors
    j. Faulty engine control system
    k. Inherent issues

These are individually analysed in detail below.

Empty Fuel Tank

11. If the Audi S4 ran out of fuel in the tank, this would have stopped the car on the road. This incident occurred on 24th July 2017 and there were no invoices indicating towing, repairs or servicing to have been performed on the Audi S4 car to suggest the car broke down as opposed to running out of fuel. Therefore, it is possible that the Audi S4 car could have ran out of fuel and stopped on SLE.

Fuel Mixture Not Adequate

12. If fuel mixture injected into the engine cylinders is incorrect, then the Audi S4 would have stopped. This can be caused by damaged fuel lines, blown gasket heads, or other engine issues. The invoices provided did not indicate servicing of fuel lines or pump. However, intake manifold gaskets were replaced on 3rd June 2016 and the left side manifold was replaced on 5th December 2016. It was not clear if the right side manifold became defective and caused the vehicle to stop or not, apart from the other components in this system.

Fuel Pump Failure

13. If the fuel pump was not working correctly, then the engine will not get the fuel it needs to run, which can result in the engine stalling. Once the engine stopped, the engine cannot be started again if the fuel pump failed. The invoices provided did not indicate any maintenance carried out on the fuel pump.

[1] Air and fuel mixture has to be in the correct proportion for it to combust within the engine. When this is mixed in the proper ratio, this is referred as fuel mixture.

Alternator Failure

14. The alternator is responsible for charging the car battery and running many essential functions in the engine. If the alternator fails or becomes defective, the car will stop. However, there are usually plenty of warning signs of impending alternator failure, including dimmed lights and battery not charging indicators. The invoices provided did not indicate any maintenance required to the alternator.

Dead Battery

15. Similar to a faulty alternator, if the battery becomes dead or the connections were covered with films of oxides and a proper circuit could not be established, the engine electronic controller will not be able to function, the spark plugs will not be able to ignite the fuel mixture and the Audi S4 would have stopped. None of the invoices provided indicated any maintenance or replacement of batteries during the period.

Clutch Problems

16. The gear box appears to have been controlled by an electronic controller and in the event any malfunction occurs with the sensors or the controller, then the Audi S4 could have stopped on the road. According to the invoices, a controller termed as “Megatronic” was replaced and reprogrammed on 15th July 2016. Furthermore, this invoice also indicates an item ‘Tow-king trolley charges – SGD 120’. This means the Audi S4 had stalled and had to be towed to the workshop. Based on the repair, this would suggest that the cause of the stalling was the gear box controller.

Dirty Air Filter

17. In the event air filter was dirty, then sufficient air would not have been available for combustion in the engine and this could have led to the car stopping. The invoices provided did not indicate air filters being replaced within the period between 12th November 2015 and 27th September 2017. Therefore, this is a valid reason for the car to stop along SLE.

Faulty Coolant Sensor

18. Generally, if the engine coolant temperature reached an upper set value, the dashboard will display an overheating alarm. The driver must stop the car until the coolant cools down. In order to direct sufficient air to the radiator and engine, a front spoiler is generally installed in Audi S4 cars. If the coolant sensor and/or the front spoiler was defective, the alarm would not have been displayed in the dashboard until the engine overheated and stalled. However, there were no copies of invoices for the kind of repairs effected on this car after the incident. Therefore, the cause of the car stopping for this reason cannot be ruled out.

Faulty Sensors

19. In addition to the coolant sensor discussed in paragraph 18, there are numerous other sensors on the engine and within the Audi S4 to warn the driver of various malfunctioning of the car

such as brake system malfunctioning, engine coolant level low, coolant temperature high, engine oil pressure too low, steering malfunction, etc. In order to display these warnings, sensors are installed in the car and if one or more of these sensors were faulty, then appropriate warnings would not have been displayed if a failure occurred. None of the invoices indicated regular checking of these sensors. Therefore, the cause of the Audi S4 stopping for this reason cannot be ruled out.

Faulty Engine Control System

20. The engine control system is an electronic controller ("computer"), which processes information received from the sensors in the car and controls performance of the car appropriately. This function is controlled by a program within the controller. In the event this program is corrupted, or any of the hardware within the controller is defective, the engine control system would malfunction causing the car to stop.

Inherent Issues

21. Full details of all work or repairs carried out on the subject Audi S4 car were not available. To determine whether this model and year of car (Audi S4 car manufactured in 2010) had many known inherent defects, Envista referred to online forums such as www.vwtuning.co, www.shopdap.com and www.audioworld.com. Commonly identified issues from these forums for this model of car are:

    a. Transmission (e.g. gearbox, clutch)
    b. Water pump, thermostat
    c. PCV valve, excess oil burn
    d. Carbon build up
    e. Bad Injector, bad coil packs and spark plug misfires

22. Based on this information, the clutch discussed in paragraph 16 could have been due to an inherent issue with the transmission. If the transmission components replaced on 15th July 2016 were due to such inherent issues, this causing the car to stop on SLE cannot be ruled out.

23. Water pump and thermostat were also considered to have caused numerous issues based on these forums. These water pumps are believed to have been with a plastic impeller, which is responsible for water circulation, and this impeller is claimed to have been failing very often. If this occurred on the day of the incident, the car would have overheated and stopped. Similarly, thermostats were known to have stuck open and if this were the case, the coolant would have overheated. On 19th May 2016 the water pump and thermostat were replaced, and on 21st June 2017 the radiator was replaced, which included the water pump again. The fact that the water pump had failed twice in a year suggests that this is a recurring problem.

24. Positive crankcase ventilation valve (PCV valve) is employed to capture unburnt gas and send them back into the combustion chamber for proper combustion. When this does not function properly, it can cause carbon build up in the engine and also lead to excessive engine oil consumption. Carbon build up in the engine can restrict sufficient air supply for combustion. If the engine was run with excessive carbon build up or lack of engine oil, this can lead to engine

seizures. The invoice for 10th January 2017 states that the "air valve" was replaced. Whether the air valve refers to the PCV valve is not known. However, it indicates that the Audi S4 car did have inherent issues.

25. Injectors and coil packs can fail. Bad injectors can cause carbon build up on the engine. This eventually can prevent sufficient air for combustion. Initially when this happens, the engine will misfire and eventually it can cause the car to stop. Coil packs supply high voltage to the spark plugs (which ignite the fuel-air mixture in the engine cylinders) and any fault on the coil packs can lead to spark plugs not getting power supply and combustion will not occur. If the coil pack fails, then the car will stop.

Conclusions

26. It is Envista's professional opinion that:

1. There was no invoice provided that related directly to repairs carried out due to any type of failure that led to the car stopping on the SLE on 24th July 2017.

2. Empty fuel tank, inadequate fuel mixture, defective fuel pump, defective alternator, dead battery, oxidized connectors, clutch issues, dirty air filter, faulty coolant sensor, other faulty sensors, faulty engine control system and inherent issues with this model of Audi S4 car are commonly observed faults that can stop it from running. One or a combination of these issues could have caused the Audi S4 to stop along SLE on the day of the incident.

3. If the subject Audi S4 did not require any repairs following stopping (as stated in point 1 above, no receipts were provided for any such repair), empty fuel tank, lack of coolant, oxidised battery terminal and/or a dirty air filter are likely to be the cause of the Audi S4 car stopping on the SLE. The causes can be either singular or a combination that had led to the stopping. All the reasons herein would have alerted a reasonable driver that the Audi S4 car would stop if the problem is not rectified.

Closure

27. This report is for the exclusive use of our client and is not intended for any other purpose. Our report is based on information made available to us at the time of our investigation. Should additional information become available, we reserve the right to determine the impact, if any, of the new information on our opinions and conclusions and to revise our opinions and conclusions if necessary and warranted by the discovery of additional information.

28. Thank you for allowing Envista to provide this service. If you have any questions or need additional assistance, please call or email.

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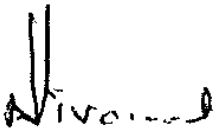

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