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Our Ref: DJB/RJB/0011-13

2nd April 2013

Mr M. Ball,
More-BHP Limited,
Unit 6,
ATECH Court,
Off Lancaster Fields,
Crewe,
CW1 6FF

SINGLE EXPERT ENGINEERS EXAMINATION REPORT

FOR THE COUNTY COURT

Mr Suglani and More-BHP Limited

INTRODUCTION

01. My name is David Bellamy and I am an Independent Automotive Engineering Consultant and Assessor/Valuer. I am an Advanced Automotive Engineer, a Member of the Institute of the Motor Industry, an Associate Member of the Society of Operations Engineers and an Associate Member of the Institute of Road Transport Engineers. I have over 35 years experience in this field. Full details of my qualifications and experience entitling me to give expert opinion evidence are contained within the body of this Report.

INSTRUCTIONS

02. On the 18th March 2013 at the request of More-BHP, I attended Volkswagen, Birmingham and there examined a Volkswagen Tiguan 2.0 TDi, 4 motion, registration mark AK57 HAY to ascertain if possible, cause of engine failure.

BRIEF HISTORY

03. I understand that on or about the 20th February 2013, your customer Naresh Suglani submitted his Volkswagen Tiguan, registration mark AK57 HAY to your premises for a stage 1 re-

map (Tri-core Protected), for re-mapping of the electronic control unit to increase the engine power output and improve the torque. Appendix 1 of my Report is a copy of the Invoice No. 4165.

04. I understand that Mr Suglani had not contacted a Volkswagen dealer regarding this engine performance upgrade and what effect if any it would have on any claim brought under the terms of the Manufacturer or Dealer Warranty. Whilst the current registration mark AK57 HAY is on the vehicle, the year of manufacture is 2011 and the date of first registration in the UK, 31st May 2011. The original vehicle registration mark was FP11 ZVV. The current cherished number plate was installed on the vehicle 3rd January 2012.

05. HPI Data Check is Appendix B attached to my Report and the vehicle is currently showing a finance interest ALD Automotive Limited and the agreement date was 12th December 2011.

06. According to More-BHP, Mr Suglani's requirement was "my main aim is to increase Bhp to gain more speed, but also to have much more torque."

07. More-BHP Limited applied the stage 1 re-mapping to Mr Suglani's car as requested and following a test drive Mr Suglani left very pleased with the result.

08. After a period of what appeared to be satisfactory usage, I understand the engine began to emit a knocking noise. Mr Suglani recorded the noise and published it on the internet.

09. Mr Suglani presented the vehicle at Volkswagen, Birmingham on 7th March 2013. The vehicle was scanned using the appropriate Volkswagen diagnostic equipment, but when it came to the equipment code, there was no number. On the basis of this, Volkswagen Birmingham concluded that re-mapping had been carried out. Due to the modifications to the engine management system, Volkswagen Birmingham indicated that they are unable to proceed with a claim under the terms of the Manufacturer's Warranty.

10. Volkswagen Birmingham have dismantled the engine. More-BHP examined the engine on 15th March 2013 and have asked me to compile a Court compliant report on the matter.

INSPECTION – at VW Birmingham, 18th March 2013

11. During the course of my examination I have taken a number of digital images and these are contained within the body of the report


12. Photographs DJB1 and DJB2 are general views of the subject vehicle and the location of my inspection.

13. VIN number details are shown in photographs DJB3.

14. With the battery disconnected and with the odometer reading not shown, photograph DJB4 is a view of the job card with the recorded mileage 20,659 miles.

15. The overall appearance of the vehicle is clean and tidy and I note that the sport alloy wheels have been fitted. However the offside rear tyre shows a large bulge indicating sidewall separation. This is shown in photograph DJB5.

16. I was introduced to the Technician responsible for this repair job and it was clear that repair work was well underway. Photograph DJB6 is a view of the re-building work and essentially, VW Birmingham have obtained a short engine, (cylinder block, crankshaft, four connecting rods and



pistons.) They have re-fitted the original cylinder head into the assembly shown in photograph DJB6. This will shortly be re-fitted to the vehicle.

ORIGINAL CYLINDER BLOCK ASSEMBLY

17. The assembly is shown in photographs DJB7a and DJB7b, the engine number and data in DJB8.

18. I examined the cylinder bores without detecting any damage and the No.4 and No.3 bores are shown in photograph DJB9.

19. I located the pistons and connecting rods and these are shown in photograph DJB10 after they were cleaned.

20. It is noticeable that the No.4 connecting rod big end bearing shells have failed and these are shown in DJB11. Clearly, these bearing shells have been starved of lubricant and have seized and spun within the No.4 connecting rod cap as shown in DJB12.

21. The adjacent No.3 big end bearing shells are shown in photograph DJB13 and the whole set in DJB14. When the engine was running, there would have been a regular knocking noise from No.4 big end bearing failure.

22. I examined all four pistons which showed no signs of excessive carbon build up, the piston rings were nicely bedded in and none of the rings were stuck in their grooves. Piston skirt bearing panels showed no scuffing or partial seizure. A piston crown and skirt is shown in photographs DJB15 and DJB16.

23. I examined the crankshaft big end bearing journals and found that the No.4 had corresponding damage with big end bearing shells as shown in photograph DJB17 and in close up, DJB18. For comparison purposes, crankshaft big end bearing No.1 is shown in photograph DJB19 and is undamaged.

24. Looking at the engine sump reservoir, photograph DJB20 shows metal bearing debris from the failed No.4 big end bearing had collected in the sump.

25. I examined the engine oil pump and balance shaft assembly. I removed the oil pump and drive shaft as shown in photograph DJB21 and these were in working order.

26. On looking at the balance shaft end, shown in DJB22, this appeared to be heat discoloured. However, on removing the housing there was no bearing damage and the discolouration was heat treatment from new.

27. I next examined the four fuel injectors, nozzles and seals. This is shown in photographs DJB23 and DJB24. Injector identification is shown in photograph DJB25. I found no damage to the nozzles and three of the injectors had clear and well seated sealing washers, one of which is shown in photograph DJB26. However, the No.2 injector sealing washer is discoloured as shown in DJB27 and has been leaking combustion gas.

28. I next examined the cold start glow plugs shown in photograph DJB28 and in close up, DJB29. Like the injector nozzles, glow tips can become damaged with abnormally high combustion temperatures, but all of these components appeared to be serviceable.

29. I next examined the air intake manifold as shown in photograph DJB30. The manifold was beginning to show a build up of carbonated sludge deposit as shown in DJB31.

30. Having completed my inspection of the available engine components I asked the Technician if he had any diagnostic trouble codes stored in the engine electronic control unit. Apparently there were no codes stored and he kindly downloaded the diagnostic log for the vehicle which is Appendix D of this report. The diagnostic session had been undertaken on the 7th March 2013, noted on page 1. For the first system test with DTC memory entries, shown on page 3, did not register an equipment code.

CONCLUSIONS

31. Having studied the documentation and examined the various parts and components of this engine as set out in my Report, it is clear that:

- a. Naresh Suglani decided to have the engine performance enhanced to More-BHP Stage 1 Remap (Tricore Protected) at a cost of £249.00 on or about 20th February 2013 and following the work, it seems his main aim was to increase bhp to gain more speed, but also have much more torque for the engine, but he failed to check this modification with the Manufacturer and Dealer to secure the Warranty.
- b. Following the modifications it would appear that the test drive was satisfactory and Mr Suglani settled the account – (Appendix A)
- c. On the 7th March 2013, the vehicle was at Volkswagen Birmingham with the engine producing a knocking noise, mileage was 20,659 some fifteen days after the re-map work.
- d. On 14th March 2013, Volkswagen Birmingham wrote to More-BHP in an e-mail which is Appendix E in my Report. It would appear that Volkswagen will not carry out a Warranty repair free of charge because of the re-mapping.
- e. More-BHP Limited have produced a letter detailing the re-map and their involvement in this matter and this is my Appendix C. The performance improvements are recorded on page 3 of the attached graph. The Volkswagen Tiguan is a permanent four wheel drive vehicle and More-BHP do not have a dynamometer suitable for this type of transmission. However, they took the vehicle for a test drive and using live data logging, the vehicle performed as they expected.

32. The graph produced is not the actual vehicle, but a Volkswagen vehicle with a two litre TDI engine.

33. The manufacturers data performance (HPI) for the VW Tiguan are:-

- a. Max power bhp 138 at 4,200 rpm.
- b. Max torque at 236 lb-ft (319,9730 Nm) at 1750 rpm.
- c. Max speed 114 mph.
- d. 0-60 mph – 10.5 seconds.

34. The graph produced by More-BHP Limited at the back of Appendix C shows that the vehicle used to produce this map in standard form showed:-

- a. Max power bhp 140.9
- b. Max torque 363.3 Nm.
- c. Max speed not stated.
- d. 0 – 60 mph – not stated.

35. After applying a stage 1 re-map, the following was achieved:-

- a. Max power bhp 187.6871 to give 160.3832 bhp at the drive wheels.
- b. Max torque 401.2909 Nm at the flywheel to give 367,8693 Nm at the wheels.

35. Although the Tiguan was not tested for actual values on a four wheel rolling road dynamometer, the performance enhancement would be reasonable to estimate at max power bhp up from 140 to 180 at the flywheel, a gain of 20 bhp.

36. Max torque improvement from 320 Nm to somewhere in the region of 400 Nm. These modifications should provide a slightly increased maximum vehicle speed and 0 to 60mph time.

37. On the 21st March 2013, More-BHP sent the map files to BFT, a tuning company in North Yorkshire for investigation. This is Appendix F in my Report. I do not need to repeat their report.

38. The modern mass produced motor vehicle is a complex and sophisticated piece of machinery with many computer driven operating systems and hundreds of parts. Even brand new vehicles cannot be guaranteed to be in perfect working order or give total reliability in all circumstances during the warranty period.

39. To cater for unexpected problems with new vehicles, Motor Manufacturers will give a Warranty against parts and labour repair costs and the duration of that Warranty generally extends to three years. Repairs carried out under Warranty are dealt with by the Manufacturer's Dealer network who are reimbursed the cost of repair by the Manufacturer.

40. Naresh Suglani purchased this vehicle as a used vehicle even though it was still under Manufacturer's Warranty.

41. In respect of the engine bearing failure this was isolated to only one of the four big end bearing shell pairs which are, of course, furthest away from the engine oil pump.

42. As my photographs show, only the No.4 bearings have suffered total failure and there is little if any evidence to indicate the cause of this failure. In these indeterminate situations, a particularly close inspection must be made of the other bearings for signs of cumulative damage.

43. As none of the other bearings show any signs of wear, in my considered opinion the No.4 set of big end bearing shells suffered a momentary lack of lubrication, possibly during an engine cold start as it can take as much as 15 to 20 seconds to establish a sufficient oil flow through the

engine dependent upon the ambient temperature. If the engine is accelerated to high speed very soon after a cold start and before sufficient oil flow is established, the chances are that some, but not all bearings have not achieved adequate lubrication to prevent the start of overlay material wiping. This damage culminates in that shown in No.4 big end bearing shells of this engine.

44. It is therefore, essential when cold starting an engine particularly in freezing ambient temperatures, to allow the engine to run for 30 seconds or so before driving off and this will establish adequate lubrication through all of the crankshaft bearings and the cylinder head. Obviously, the bearing which is furthest away from the oil pump is likely to be affected if this reasonable warming up period is not carried out.

45. Finally, I am of the opinion that the stage 1 mapping of Naresh Suglani's Volkswagen Tiguan did not contribute in any way, shape or form to the bearing damage sustained. Connection between More-BHP and Mr Suglani's vehicle was purely electronic and the connection between the mapping process and this bearing failure is purely coincidental.

46. I reserve the right to amend this Report should further information come to light.

STATEMENT OF TRUTH

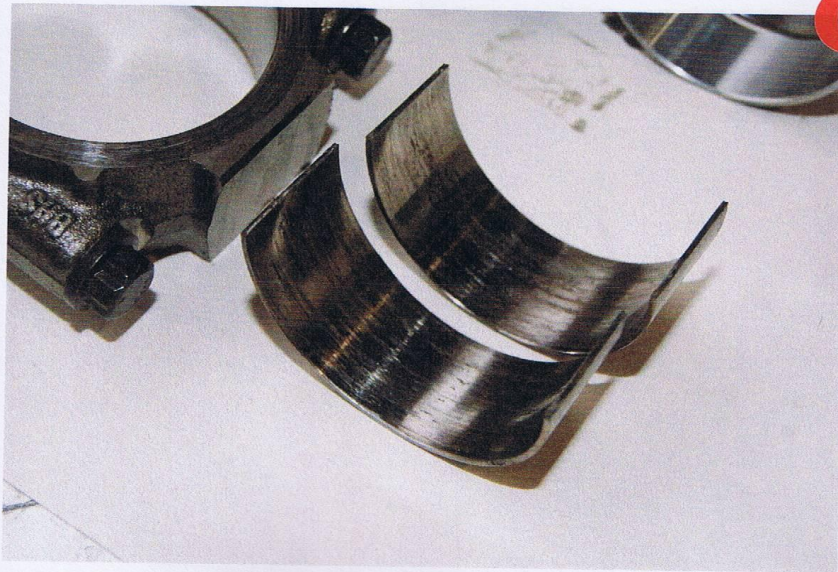
47. I understand that my overriding duty is to the Court and I have complied with that duty. I am aware of the requirements of CPR Part 35, its practice direction and the Protocol for Instruction of Experts to give Evidence in Civil Claims.

48. I confirm that I have made clear which facts and matters referred to in this Report, are within my own knowledge and which are not. Those that are within my own knowledge, I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on matters to which they refer.

Signed



David J. Bellamy
AAE., MIMI., AMSOE., AMIRTE



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Hi,

In response to the comments made by our mutual customer Mr Suglani I can confirm that we have not placed blame at your door in any way.

The facts stated are that there is a noise from the engine caused by failed little end bearings.

Is what we have said is that due to the modification to the engine management system we are unable to proceed with a claim under the terms of the manufacturer's warranty.

We are not in a position to apportion blame for the failure of the component due to the intervention and would not do so. I can only provide the facts as they are.

As far as you paying for the repair goes – This would be up to you to agree with the customer but following our conversations it is clear that you are not going to do this as you believe the failure not to be as a result of a defective component supplied. I would imagine that the only recompense you would offer is if the upgrade was defective?

I hope this helps clear up any confusion.

Regards

Mark Price

Service Manager

Birmingham Volkswagen