

AUTOMOTIVE CONSULTING ENGINEERS LTD



CONFIDENTIAL TECHNICAL REPORT

Client			
Your File Ref		Your Contact	
Date of Sale		Del Miles	
Failure Date		Failure Miles	
Policy No		Operator Name	
Vehicle		Engine cc	
VIN No		Reg No	
Odometer		Report No	
Inspected At			
Telephone Contact Name		Tel Number	
Opening Times	8.30am – 5.00pm	Visit Time	10.30am
Visit Date	04/02/11	Vat Registered	
REPAIRERS REPAIR COSTS QUOTED AS (ALL + VAT)			
LABOUR QUOTED AS			
PARTS QUOTED AS	Not presented at the time of our inspection.		
REPORTED CONDITION	Engine failure		
CONDITION OF VEHICLE			
The engine was insitu with the cylinder head removed. The cylinder head had already been to specialist repairers.			
REPORT			
R1	We can confirm that prior to our visit, we contacted **** at the repairers and were informed that the vehicle was ready for inspection. The inspection was delayed for 24 hours whilst the cylinder head was confirmed to be on site.		
R2	The detail of the inspection and investigation possible reflects the condition of the vehicle as detailed above.		
R3	We carried out an inspection to the engine in its partly dismantled state, the engine being of a 16-valve, 4-cylinder diesel type.		
R4	The cylinder head had been returned from the specialist and had been subject to repair work.		
R5	All 16 valves had been replaced prior to our inspection.		
R6	Careful examination of the cylinder head revealed it to be visually serviceable with no signs of any burning, cracking or erosion to the combustion faces and the valves did appear to be seated correctly at the time of the inspection, being of a replacement type.		

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REPORT CONTINUED:	
R7	The head face however, had not been skimmed and we would recommend, as good engineering practice, that the head face be skimmed and a pressure test be completed to the cylinder head.
R8	We also noted that the cams appeared serviceable with no signs of any excessive wear or damage to the cam lobes. The cam lobes were bright and did not show signs of lack of lubrication.
R9	The camshafts at the time of the inspection were situated in the cylinder head.
R10	The head gasket is of a shim type and showed no positive signs of breach, blow or splitting and appeared to have been serviceable prior to removal.
R11	The original timing belt from the vehicle was presented for inspection. The belt was intact and in good condition and showed no evidence of any root cracking. The belt however, was due for replacement.
R12	The tensioner for this belt was also presented and again appeared to be in a serviceable state, with no evidence of any excessive wear or damage.
R13	It is common practice during the timing belt replacement to replace both components as a matched pair.
R14	The replacement-timing belt that had been fitted and tensioner were not available for examination and had reportedly been sent to ****for examination. Although apparently *** have / are supplying new replacement parts as a good will gesture, it appears that they have not accepted liability.
R15	Examination of the pistons, which were still insitu, revealed evidence of valve to piston crown impact. The impact appeared nominal and did not show signs of any significant damage.
R16	We would recommend however, that the piston crowns are cleaned and checked for any minute fractures or cracks.
R17	We would conclude at this stage however, we do not consider this will have developed and the pistons still appeared visually serviceable.
R18	Examination of the cylinder bores revealed them to be polished and glazed with a normal carbon wear ridge to the bore tops. The bores showed no evidence of any significant damage, although the number 1 had a slight polish mark but this did not appear to be related to the failure, which had developed.
R19	The repairers suggested that the engine might have suffered a fluid lock causing the condition identified. We rotated the engine and confirmed that the piston heights were all even. There was no evidence of fluid lock as was being suggested.
R20	Examination of the turbo charger, which was still insitu, revealed it to be intact. There was no evidence of any excessive play to the turbo charger impeller.
R21	There were no signs of any excessive oil contamination to the induction system. As such, the theory that the engine had suffered a fluid lock appeared flawed and in our opinion, would not account for the valve to piston crown contact in any case.

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REPORT CONTINUED:

R22	A longstanding oil leak however, was noted at the rear of the engine, which was contaminated with dirt / road traffic film. The repairers indicated that 2 litres of engine oil had to be added to the engine when it originally arrived in their possession. This could not be confirmed at the time of our visit.
R23	The repairers then indicated that in their opinion, the tensioner had failed and had been retained by ***. They indicated the tensioner had over-ridden and lost tension. This could not be confirmed, as the failed components were not available for examination.
R24	Examination of the rockers revealed them all to be visibly intact and not showing signs of physical damage. However, we would recommend that the rockers be considered for replacement, as clearly shock-loading will have been transferred from the valves to the rockers in the failure.
R25	Examination of the rocker shafts also revealed them to be intact and bright but did appear to be distorted, although the contact at the repairers suggested that when fitted to the cylinder head, they would be straightened by tensioning the head, we anticipate they should not be in this condition and as such, should also be considered for replacement.
R26	The dirt contamination at the rear of the engine would suggest an oil leak had either developed from the cam cover or head gasket.

OPINION

O1	In our opinion based on the visible evidence, we would conclude that the damage noted to the pistons and as all the valves had to be replaced, would indicate a loss of relational valve timing had developed in service.
O2	The cause of this cannot be established, as all the components were not available.
O3	The repairer contends that the tensioner had failed causing this damage. However, apparently *** have declined the claim, although supplied the parts as good will.
O4	There appears to be only a few likely causes for such a condition: 1 - The tensioner had failed, although we would be surprised that *** would not consider this a matter of normal warranty. 2 - The belt/engine had been incorrectly timed during the replacement leading to the consequential damage. 3 - The belt had been incorrectly tensioned, again leading to the same damage. 4 - The belt tensioner had been incorrectly secured leading to the same damage.
O5	It is clear that the vehicle failed whilst in the repairers possession and that the failure related to a repair, which was undergoing by this repairer. As such, it is difficult to see how any other conclusion can be reached other than the condition must be related to the repair in progress. Clearly, whether the repairer has a cause to claim from *** is not within our brief.



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OPINION CONTINUED:

O6	We can confirm that the head repair, which has been completed, does appear to be of a good engineering standard on the work completed and see no reason why the cylinder head cannot be reused subject to the other work required to provide a good level of repair quality.
O7	The pistons although slightly marked, are considered visually serviceable, in our opinion, but we would recommend careful cleaning takes place to check for minute cracks or fractures to the piston crowns.
O8	We would also recommend the following be completed: 1) The cylinder head be skimmed and pressure tested, which is common practice when a cylinder head is removed for work. 2) The piston crowns are cleaned and checked for damage as a result of the valve to piston crown contact. 3) The two rocker shafts are replaced as we consider them to be distorted as a result of the valve to piston crown collision. 4) That the rockers should also be considered for replacement as good engineering practice, as clearly the valve to piston crown contact will have caused them to be subject to overload and are suspect.
O9	Although the repairers may contend that these components are serviceable, we can only consider them to be in need of replacement both to protect the repairers and the operator of the vehicle from future unforeseen failures, which could be as expensive or more so than this. The components suggested for replacement are reasonable to achieve a lasting and safe repair.
O10	We anticipate that the engine failure would have been evident in the form of sudden loss of power and failure of the engine to restart.

PARTS NEEDING REPLACEMENT

P1	Cylinder head repair, check pistons for cracking as a result of valve contact, replace rockers, rocker shafts, skim and pressure test cylinder head, belt, tensioner, gaskets and seals. All belt driven components should be considered for replacement.
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SERVICE HISTORY.

Not presented at the time of our inspection.

CONCLUSION

C1	We can only conclude that the engine has been subject to an engine timing issue, the exact cause of which is unclear as all components are not available in the failure, the most likely causes are listed in opinion O4. Three of which would be garage practice related and 1 due to a manufacturing defect. The vehicle failed whilst in the possession of the repairers and during a repair to the components considered as a likely cause in the subsequent failure or in that area. We would conclude that either a defect in the new components fitted had led to the failure or some defect in the repair process / practice had led to the damage.
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CONCLUSION CONTINUED:

C2	Clearly, we would have to consider this the responsibility of the repairers at this stage, as redress against the component manufacturer is outside of the owner's access we believe in a contract chain. With respect, The Courts clearly having the final word on this matter. No conclusive evidence of a component failure has been presented and it appears the manufactures have declined the claim. The costs of the repair may be claimable from the garages professional damage insurance if in place as a practice issue.
C3	Clearly, the owners contract is with the repairers and what redress they have with the supplier of the parts is outside of our brief and the owner's control.
C4	We would further conclude that the repair being completed will need to be adjusted to account for other components, which we consider to be reasonably required during the repair. These are listed as follows: 1) The head should be skimmed and pressure tested. 2) The piston crowns will need to be cleaned and checked for cracks. 3) The rocker shafts will need to be replaced. 4) The rockers will need to be replaced as good engineering practice.
C5	As this work will be difficult to confirm once completed, we consider it reasonable for invoices and confirmation by the cylinder head specialist to be provided for the additional work. The only other option is to have an engineer witness the repair, which is considered an expensive option.
C6	The repairer will need to guarantee or provide an independent warranty for the work in writing for a reasonable period of time, we consider this to be 6 months or 6000 miles, which ever is first to expire.
C7	If all the above is completed, we do not see why the engine repair cannot be completed to a good engineering standard.

DUTY and STATEMENT OF TRUTH

DUTY: It is the duty of an expert to help the Court on the matters within his expertise. This duty over-rides any obligation to the person from whom he has received instructions or by whom he is paid. "I understand my duty to the Court and have complied and will continue to comply with it and I am aware of the requirements of Part 35 and Practice Direction 35, this protocol and the practice direction on pre-action conduct." **STATEMENT OF TRUTH:** " 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 the matters to which they refer."

For and on behalf of Automotive Consulting Engineers Ltd

Engineer

BIOGRAPHY

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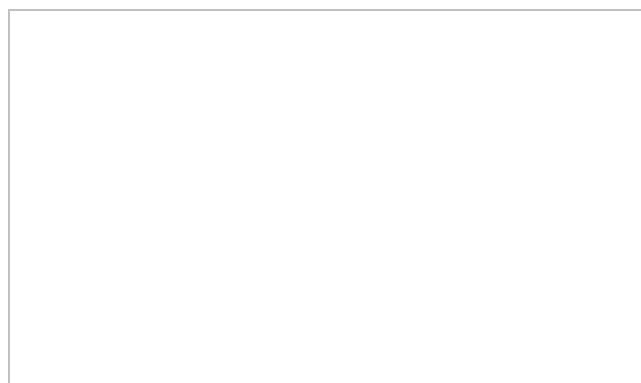
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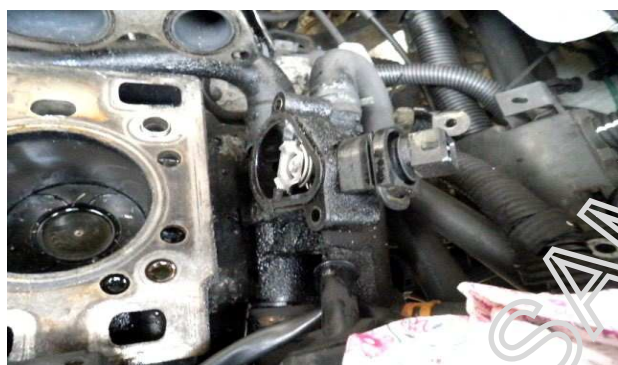
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Vehicle front and ID



Cylinder block



Evidence of oil leak



Rocker shaft



Rocker shaft



Original timing belt



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Cylinder head cam side



Cylinder head valve side



Original timing belt tensioner

Please Note: We confirm that the photos embedded have not been touched or enhanced, other than to adjust the image size to fit the table and brightness on dark images. The raw images are available for comparison.

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