



FAILURE INFORMATION

SEIZURE NEXT TO THE PISTON PIN BORES (45° SEIZURE MARKS)

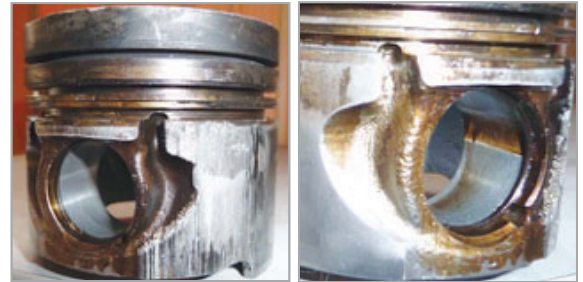
Description of the Failure

-In such a failure, as seen in Figure 1, the pistons are subject to seizure at 45° of the piston in areas closer to the piston pin bore at the piston skirt.

-There is usually no mark of seizure on contact surfaces of the piston skirt, marks of normal operation are seen on these surfaces.

-The piston pin is not free, it is compressed in the removed connecting rods.

-Marks of seizure can be seen when the piston pin bores are examined.



Causes of the Failure

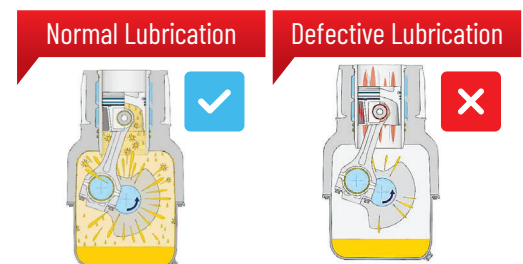
As the piston pin and the oil film around it is deteriorated and torn, these areas get overheated, unlubricated, dry operation occurs and causes marks of seizure. The causes of unlubricated operation at these areas and heating as a result of tear oil film are;

1 - Connecting rod is assembled defectively in pistons with shrink-fit connecting rods. After the shrink-fit connecting rod is assembled, moving the connecting rod before it is cooled down causes initial seizure and marks of seizure in the pin bore, expansion of unlubricated operation in this area and more important engine failures.

2 - If the piston pin bores and the piston are not lubricated adequately during the engine overhauling operation, marks of seizure due to unlubricated dry operation occur during the initial operation to the vehicle and the marks of seizure in this area proceed and result in engine failure.

3 - Lubrication of the pistons and the cylinder inside the engine is performed by the oil splashed as a result of the connecting rods hitting the oil inside the engine's crankcase. Operating the engine at idle for a long time to heat it up causes decrease in the engine lubrication and dry operation of the piston in the pin bore, accordingly seizure failures inside and around the pin bore.

4 - A sudden loading on a recently-started engine, applying too much force right after starting causes expansion of the piston upon faster heating than the engine liner and as a result, seizure failure around the piston pin bore.



Recommendations

1 - During restoration of the engines, where the connecting rod is assembled as shrink-fit, after the piston and the piston pin are assembled to the heated connecting rod, the connecting rod should not be moved. After the piston, the piston pin and the connecting rod have cooled down, they should be lubricated and it should be checked whether the piston pin moves freely in the piston pin bores.

2 - Oil should be pressurized into the engine and oil should reach every area where oil circulates. The engine's oil pressure should be measured.

3 - The engine should not be operated at idle for a long time. No excessive force should be applied right after the engine start.

4 - The engine brake should not be used too often.

5 - After the engine overhauling operation, instead of idle operation, the vehicle should be driven at medium speed without many stop-and-goes in the traffic.

6- Oil pump should be checked. Faulty oil pump should be replaced.

