



Haynes
shows you how

BMW 3-Series and Z4 (99-05) Includes 2006 325ci/330ci Coupe and Convertible models Haynes Online Manual.

Engine Bearing Analysis

Debris

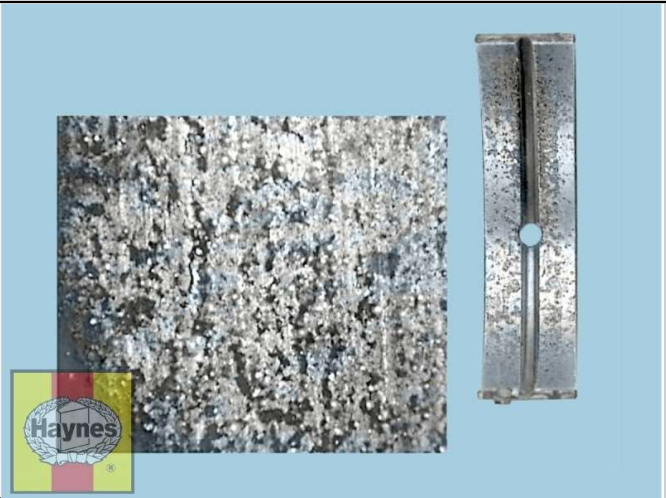
Babbitt bearing embedded with debris from machinings. Microscopic detail of debris.

 engine-bearing-debris-01.jpg

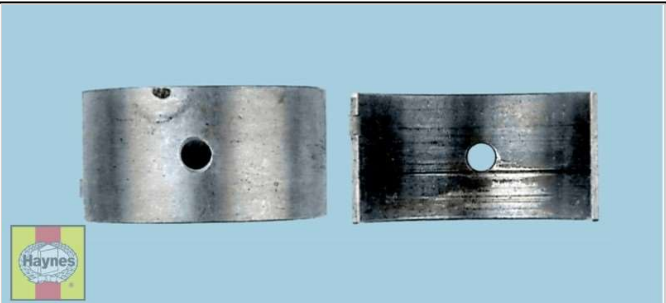
Overplated copper alloy bearing gouged by cast iron debris. Microscopic detail of gouges.

 engine-bearing-debris-02.jpg

Aluminum bearing embedded with glass beads. Microscopic detail of glass beads.



Damaged lining caused by dirt left on the bearing back.



Misassembly

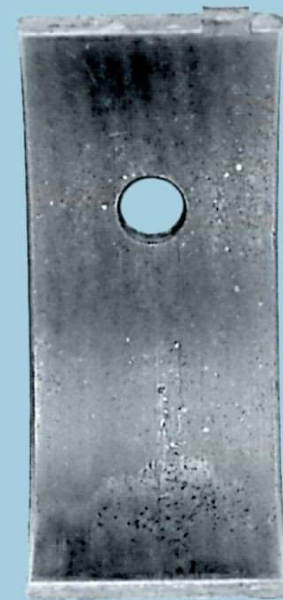
Result of a lower half assembled as an upper - blocking the oil flow

 engine-bearing-misassembly-01.jpg

Excessive oil clearance is indicated by a short contact arc

 engine-bearing-misassembly-02.jpg

Result of a wrong, reversed, or shifted cap



Polished and oil-stained backs are a result of a poor fit in the housing bore

 engine-bearing-misassembly-04.jpg

Overloading

Damage from excessive idling which resulted in an oil film unable to support the load imposed

 engine-bearing-overload-01.jpg

Damaged upper connecting rod bearings caused by engine lugging; the lower main bearings (not shown) were similarly affected



The damage shown in these upper and lower connecting rod bearings was caused by engine operation at a higher-than-rated speed under load

 engine-bearing-overload-03.jpg

Misalignment

A warped crankshaft caused this pattern of severe wear in the center, diminishing toward the ends

 engine-bearing-misalign-01.jpg

A poorly finished crankshaft caused the equally spaced scoring shown

 engine-bearing-misalign-02.jpg

A tapered housing bore caused the damage along one edge of this pair

 engine-bearing-misalign-03.jpg

A bent connecting rod led to the damage in the "V" pattern

 engine-bearing-misalign-04.jpg

Corrosion

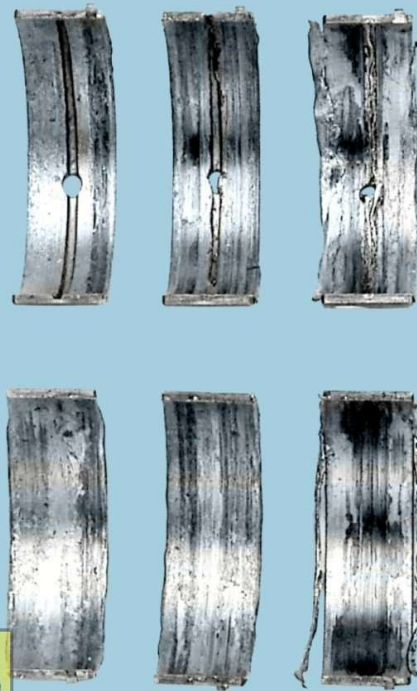
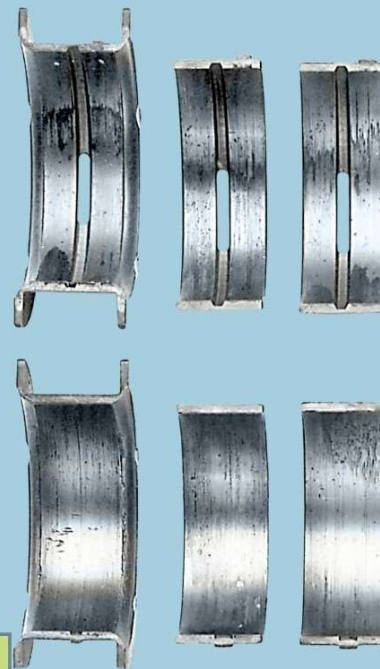
Corrosion is an acid attack on the bearing lining generally caused by inadequate maintenance, extremely hot or cold operation, or inferior oil or fuels. Microscopic detail of corrosion



Lubrication

Result of dry start: The bearings on the left, farthest from the oil pump, show more damage

 engine-bearing-lubricate-01.jpg

Result of a low oil supply or oil starvation**Severe wear as a result of inadequate oil clearance**

Example of cavitation - a surface erosion caused by pressure changes in the oil film



Damage from excessive thrust or insufficient axial clearance

 engine-bearing-lubricate-05.jpg

Bearing affected by oil dilution caused by excessive blow-by or a rich mixture

 engine-bearing-lubricate-06.jpg