



Haynes
shows you how

BMW 3-Series 320i & 320xi (12-14), 325i, 325xi, 330i & 330xi (06) & 328i & 328xi (07-14) Haynes Online Manual

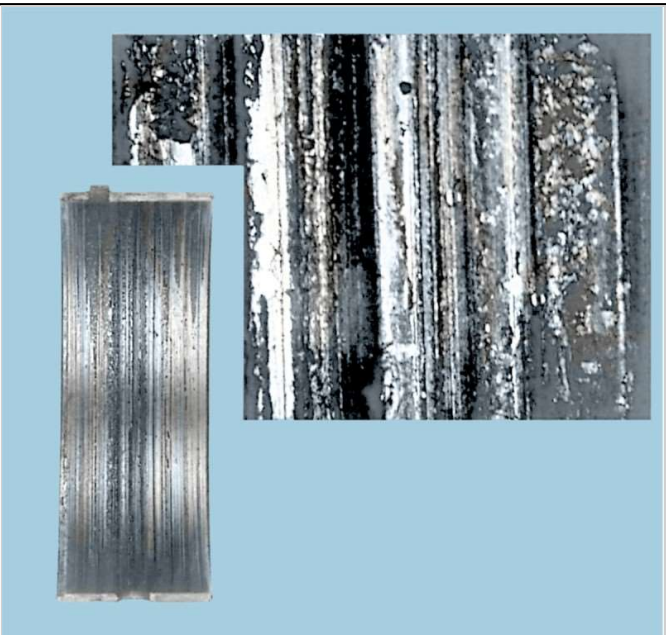
13 Engine Bearing Analysis

Debris

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



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



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



Damaged lining caused by dirt left on the bearing back.



Misassembly

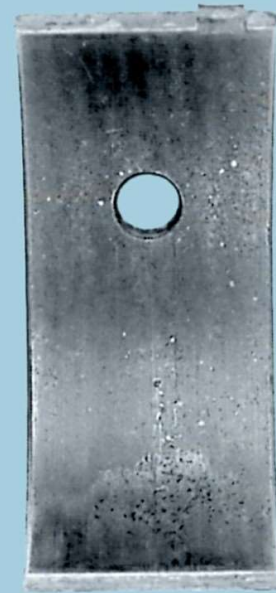
Result of a lower half assembled as an upper - blocking the oil flow



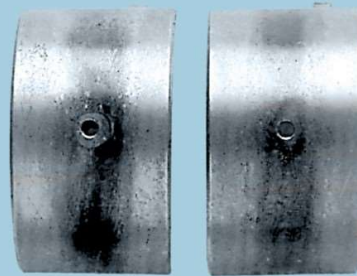
Excessive oil clearance is indicated by a short contact arc



Result of a wrong, reversed, or shifted cap

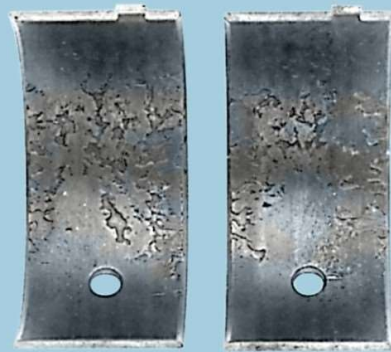


Polished and oil-stained backs are a result of a poor fit in the housing bore

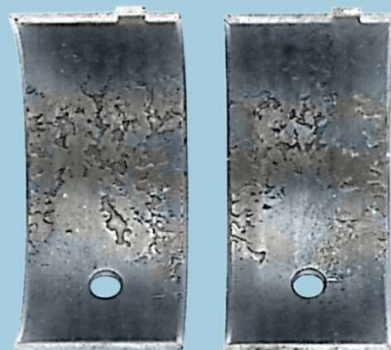


Overloading

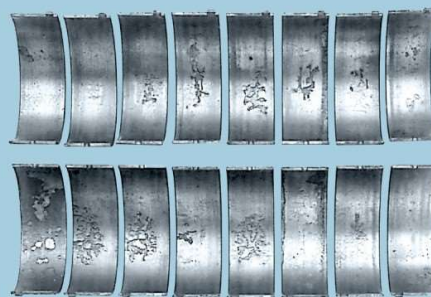
Damage from excessive idling which resulted in an oil film unable to support the load imposed



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

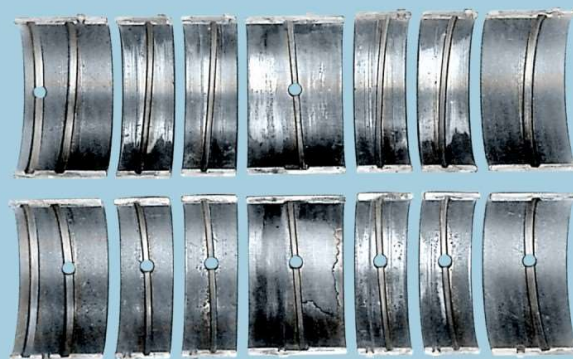


The damage shown in these upper and lower connecting rod bearings was caused by engine operation at a higher-than-rated speed under load

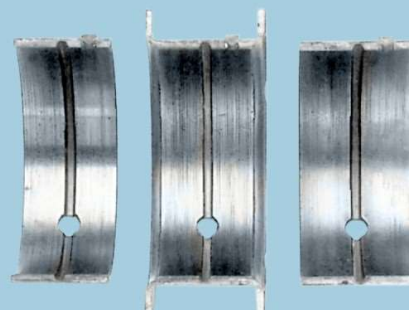


Misalignment

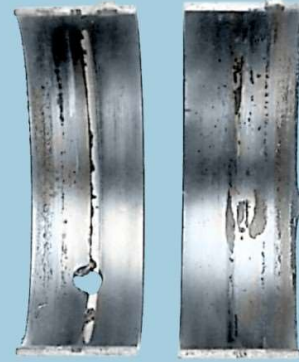
A warped crankshaft caused this pattern of severe wear in the center, diminishing toward the ends



A poorly finished crankshaft caused the equally spaced scoring shown



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



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



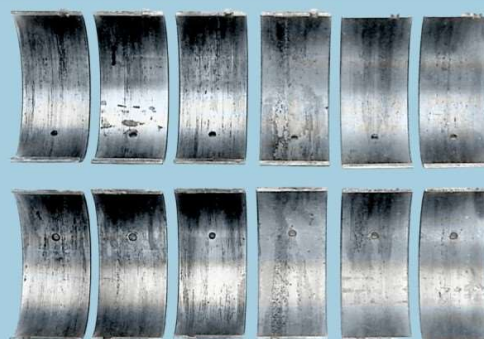
Corrosion

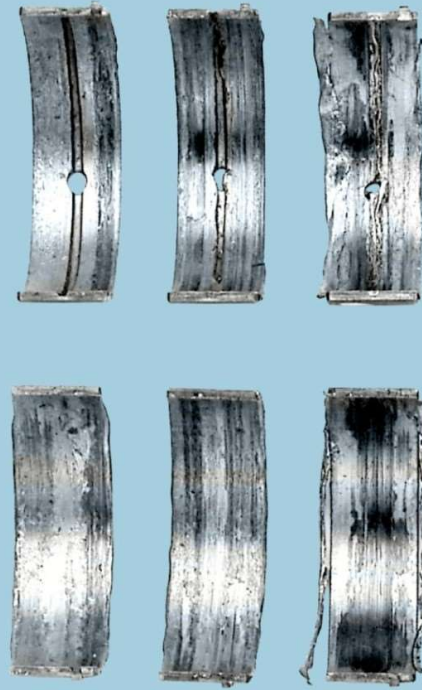
Corrosion is an acid attack on the bearing lining generally caused by inadequate maintenance, extremely hot or cold operation, or inferior oils or fuels. Microscopic detail of corrosion



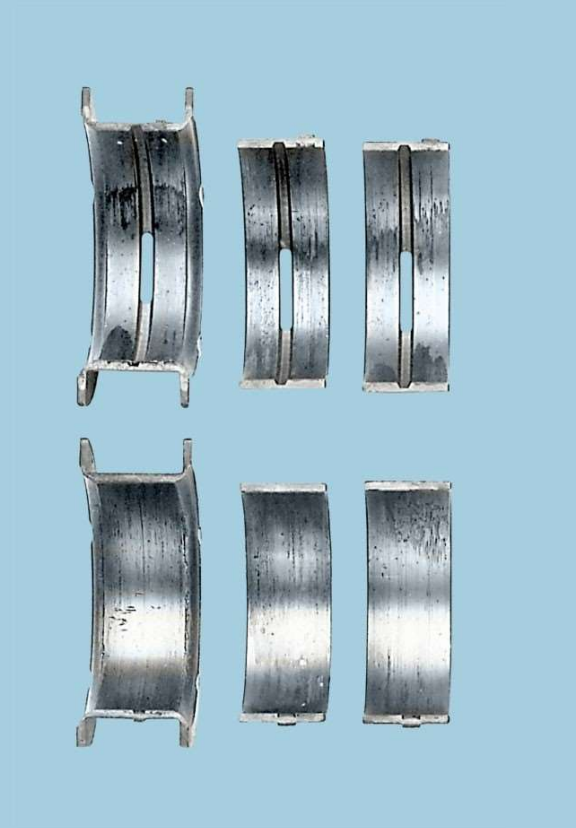
Lubrication

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



Result of a low oil supply or oil starvation

Severe wear as a result of inadequate oil clearance



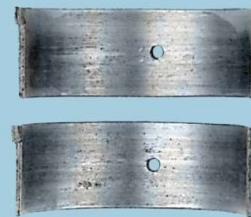
Example of cavitation - a surface erosion caused by pressure changes in the oil film



Damage from excessive thrust or insufficient axial clearance



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



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