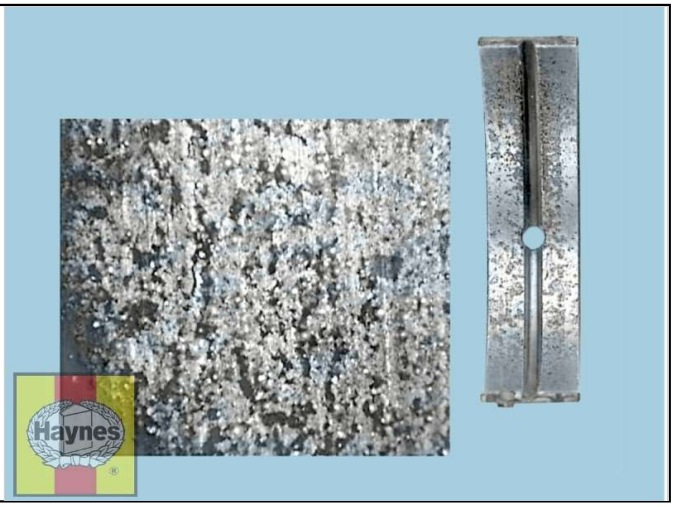
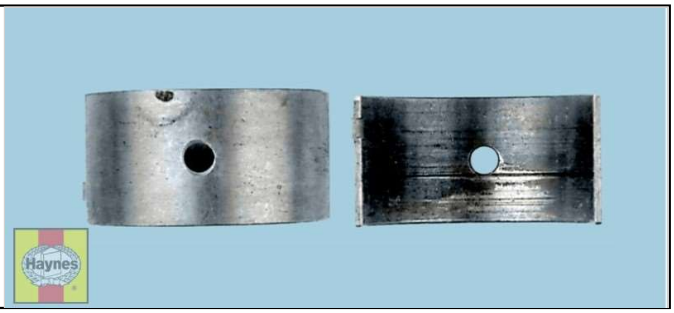
Engine Bearing Analysis

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

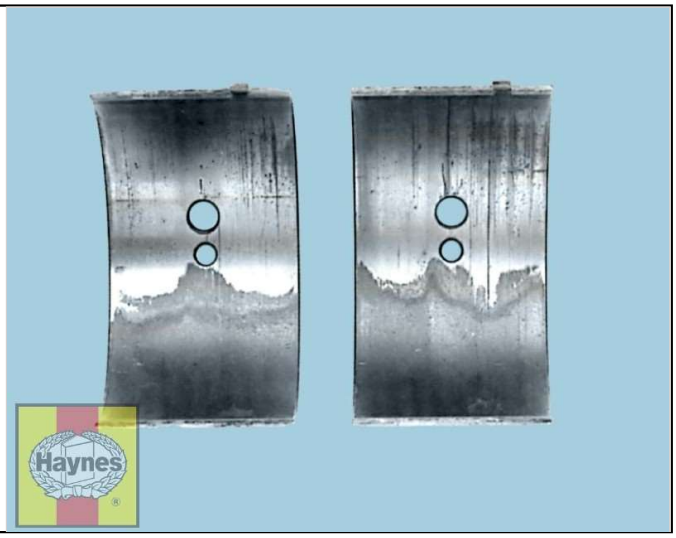
engine-bearing-misassembly-02.jpg

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 suppport 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 higer-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

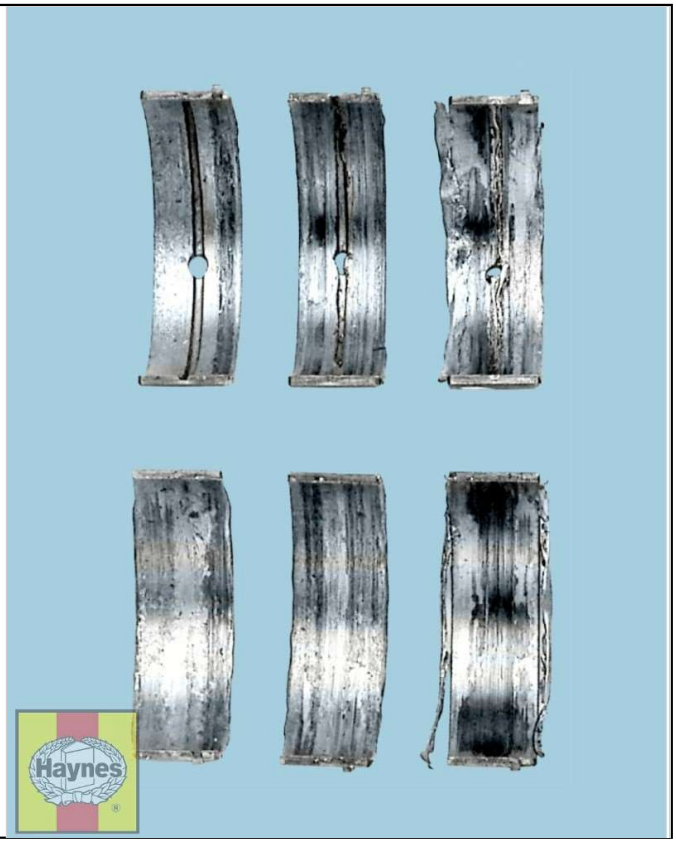
Corrosion

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

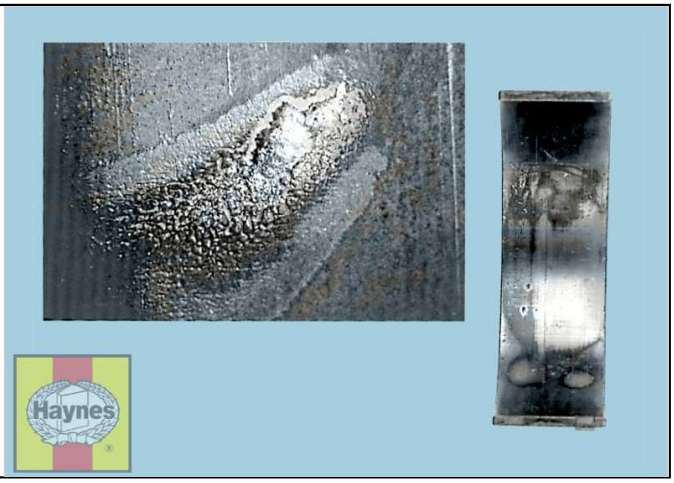
Lubrication

Result of dry start: The bearings on the left, farthest from the oild 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 dillution caused by excessive blow-by or a rich mixture	engine-bearing-lubricate-06.jpg