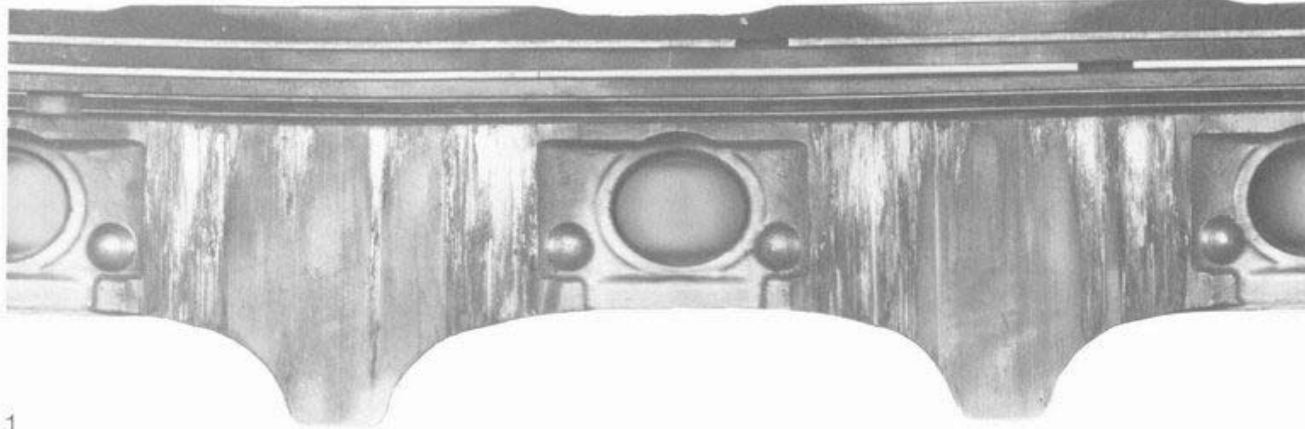


1.4



1



2

1 Piston Skirt

1-4 Diagonal seizures on the skirt near the gudgeon pin bore

Symptoms The piston in figure 1-with recessed pin bosses-seized only in the transition area from these recesses to the skirt .Seizures occurred only diagonally.In the directions of major and minor thrust the skirt is mostly without seizure marks.Highly polished areas can be seen immediately next to the actual seizures.The connecting rod can be moved around the axis of the gudgeon pin only with difficulty, the pin bore exhibits seizure score marks particularly at the sides.

Cause and Effect This damage occurs mostly with pistons for shrink-fit clamp-type connecting rods i.e. where the pin is fixed into the connecting rod and moves only in the piston .Because of the very limited oscillating movement of the connecting rod,and therefore of the pin,lubrication conditions are critical.Drilled holes or radial and axial lubrication grooves provide a supply of oil during normal operation.

Problems occur ,nonetheless ,when a new engine is put into service and the gudgeon pin and the pin bores,which rub on each other ,are not enough lubricated.A seizure in the pin bore often occurs before the oil can penetrate into the interspace.The additional heat produced at this time causes excessive expansion of the piston in the area of the gudgeon pin bore.Particularly with rigid box-shaped pistons(Figure 2)hard bearing on the cylinder is then brought about,causing glossy areas on the skirt next to the gudgeon pin bore.If the load on the engine is further increased ,the film of lubrication on the cylinder wall breaks down,which leads to seizure.

A danger also results from an excessive interference of the shrink fit between the gudgeon pin and the connecting rod small-end.This can deform the gudgeon pin to an oval shape.

In the case of a "floating" gudgeon pin with too small a press fit between connecting rod bushing and gudgeon pin movements similar to the ones of a shrink-fit connecting rod may be produced.However,even more critical friction between gudgeon pin and piston is to be expected because the press fit for the floating pin is dimensioned smaller(see also 4.3)

Remedy With shrink-fit connecting rods,always oil the gudgeon pin and the pin bores before fitting the parts together,If this subassembly is not immediately installed into the engine ,oil the pin bores well once again before assembling the engine .Avoid excessive interference of the gudgeon pin/connecting rod fit(18-30 μm are recommended).After the piston ,gudgeon pin and connecting rod have been assembled ,check that the piston can move completely freely on the gudgeon pin.