3.7 Damage to the piston pin circlips

3.7.1 General information about damage to the piston pin circlips

Wire circlips or what are known as Seeger-type circlips are used as retainers for the piston pins. It is possible for both types to break, or jump or be knocked out of the groove in the piston.
If the circlips fracture or their ends break off, this is due to excessive loads or improper handling while inserting the circlips. The circlips are only subjected to axial loads if the piston pin has an axial movement forced upon it. This occurs if the connecting rod is misaligned or is oscillating in a mostly asymmetric fashion, which causes the piston pin axis and the crankshaft axis to no longer be parallel. The piston pin then strikes in a very rapidly alternating sequence against the piston pin circlips and gradually forces them out of the groove. They are then forced on as far as the cylinder running surface, where they are worn away. Ultimately the circlips will break up. Some fragments become trapped between the piston and the cylinder, while other parts are thrown back and forth under inertia forces in the recess of the piston pin bosses, where they cause substantial material washout. It is also not uncommon for fragments to move through the inner bore in the piston pin right through to the other side of the piston, where they then also cause substantial damage.