6. Other aviation components

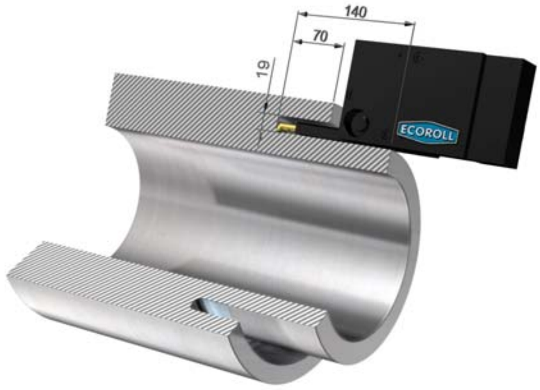


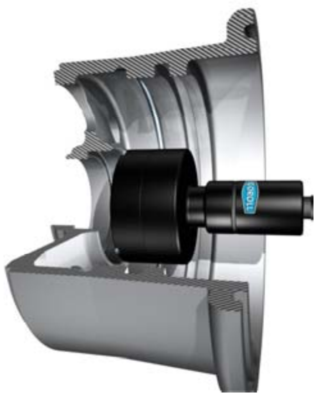
Fig. 6-1:Deep rolling of an airplane suspension strut

Landing gear columns of military airplanes are to be produced with concentric circular grooves**.** At a width of 19 mm and a depth of 70 mm cutting of the groove and especially the bottom is extremely difficult. Machining marks were inevitable and increased the already critical notch effect. Fatigue rips in the bottom radius were the consequence. All attempts to solve the problem through shot peening and other processes failed.

The hydrostatic ballpoint tool HG6-1 solved the problem (Fig. 6-1). It is a standard tool, that had to be modified only negligibly and therefore was available at short notice. This case stands as typical example, how important the combination of all three physical effects residual compressive stresses, local strength increased by cold working and elimination of the micro notches is.

Fig.6-2 until 6-4 document two deep rolling operations at airplane hubs. In the center hole, a fairly radius r = 3 mm is deep rolled with a tool RH equipped with three floating rollers. The tool works according to the plunge-in method described in chapter 2. If this spring-loaded. The rolling force is determined by in-feed. A profile groove with r =6 mm at the interior diameter of the rim is deep rolled with a mechanical, single roller tool EF90 in the according to the the process. Fatigue tests pointed the increase of high cycle fatigue strength to the quintuple value.

Process version: **plunge-in** **feed-in**



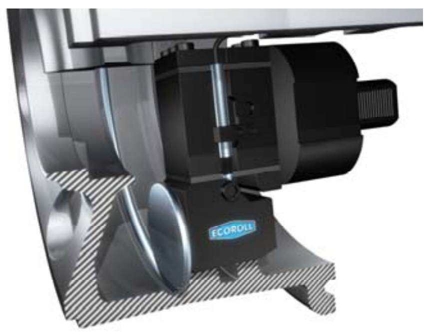


Fig. 6-2: deep rolling of the center bore Fig. 6-3 **.**

Fig. 6-4: deep rolling of a profile groove