

6.8 Case Study No. 8
Hub for Mining Shovel

Component name:	Hub for Mining Shovel
Forging Process:	Open die
Size, mm (in.):	<i>Base</i> 685 (27) square X 750 (29-1/2) long TOP 1065 (42) diameter X 150 (6) long I.D. 520 (20-1/2)
Weight, kg (lb):	1760(3875)
Alloy:	Steel
Secondary Operations:	Finish machine
Heat treatment:	By forging company
Number of parts:	1
Alternate process:	Casting

When workers discovered several large cracks in the cast hub of a mining shovel, just days short of a catastrophic failure, they immediately sought a replacement. The hub is shown in Figure 6-8. Shovel functions, including lift, dig, lower and pivot 360 degrees, depend on the hub, which was the central pivot point. The cracks were apparently due to a combination of internal porosity and heat affected zone effects in the weld area.

The supplier of the casting advised that a replacement would require at least four weeks to produce. Estimated downtime cost, in terms of lost production, was approximately \$4000 per hour, which would accumulate to more than \$500,000, even if the four week minimum time estimate were met.

An open die forger was consulted and within four days (two working days) the shovel operator received a replacement hub. The delivered price was the same as that of the casting. In addition to the cost savings realized from reduced downtime, the forged hub may offer longer service life due to freedom from porosity and other internal defects.

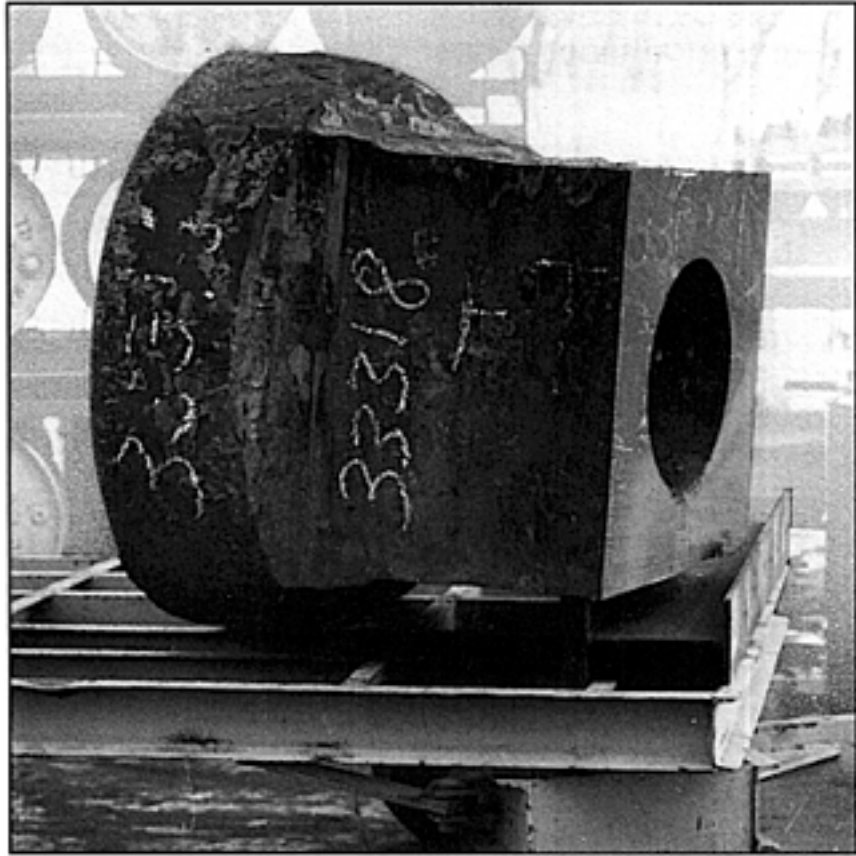


Figure 6-8