

## **Case History Summary Data Eltool Corp.**

The following case summaries of actual applications will provide a better understanding of the capabilities of our Titespot® Coolant Driven Angle Heads. For more information, contact our Engineering Dept. toll free 1-877-435-8665 or visit us on the web at [www.eltool.com](http://www.eltool.com).

### **Case Summary #1: Machining bleeder ports in overhead door closers**

**Piston bore dia: 1.355"**

**Drill size: .118**

**Drill depth: .438**

**Drill speed: 4000 rpm**

**Drill feed: 5 ipm**

**Material: Cast aluminum**

**Coolant pressure: 300 psi**

**Coolant volume: 8 gpm**

**Angle head: Cat 40 shank, Size 1 head**

**Machining Center: Mazak FH5800 HMC**

**Comment: Eliminated secondary drilling operation, increased throughput, reduced scrap rate to zero.**



## **Case Summary #2: Internal 3D contour milling of a forged aluminum aerospace component**

**End mill size: .375 roughing, .250 finishing**

**Depth of cut: .050**

**Stepover: .070**

**Cutter speed: 10000 rpm**

**Cutter feed: 20 ipm (finishing)**

**Coolant pressure: 1500 psi**

**Coolant volume: 13 gpm**

**Angle head: Cat 50 shank, Size 3 head (special 16" length)**

**Machining center: Hurco VMX 50 HMC**

**Comment: Indexable feature allowed contour grinding with one head and program**

## **Case Summary #3: Drilling two rows of bleeder ports in the piston bore of a hydraulic motor housing**

**Drill dia: .196**

**Drill speed: 3-4000 rpm**

**Drill feed: 3-4 ipm**

**Coolant pressure: 1000 psi**

**Coolant volume: 8 gpm**

**Material: Ductile iron**

**Machining center: Mazak HMC Model 5800**

**Angle head: Cat 40 shank, Size 2 head**

**Comment: Eliminated secondary operation and parts indexer. Steps required to complete part reduced from 5 to 1.**



### **Case Summary #5: Rough and finish machining of bearing seats on a large hydraulic pump housing**

**Cutter size: 3.5" flycutter with diamond insert for finish cut**

**Depth of cut: .040 per pass**

**Cutter speed: 4500 rpm**

**Cutter feed: 4 ipm**

**Coolant pressure: 1000 psi**

**Coolant volume: 5 gpm**

**Angle Head: Cat 50 shank, Size 3M (Milling style) head**

**Machining center: Mazak HMC Model 6800**

**Comment: Indexability feature of angle head eliminated need for multiple angle heads or part indexer**

### **Case Summary #7: Drilling a cross hole in a chess piece (IMTS demonstration)**

**Drill size: .125**

**Feed rate: 10 ipm**

**Material: 6061-T6 aluminum**

**Coolant pressure: 145 psi**

**Coolant volume: 2 gpm**

**Machine: Daewoo Lynx 210A Lathe**

**Angle Head: Straight shank, Size 2 head**

**Comment: Light duty applications such as this one require relatively low coolant pressure.**

### **Case Summary #8: Drilling in a transmission housing**

**Drill: 1/4" carbide**

**Feed rate: 25 ipm**

**Material: Cast aluminum**

**Coolant pressure: 1000 psi**

**Coolant volume: 8 gpm**

**Feed rate: 25 ipm**

**Machining center: Makino A88 HMC**

**Angle Head: Cat 50 shank, Size 2 head**

**Comment: At 300 psi coolant pressure, feed rate was 8 ipm**

## **Case Summary #9: Drilling a boss on a helicopter drive shaft**

**Drill size: .500**

**Feed rate: 5 ipm**

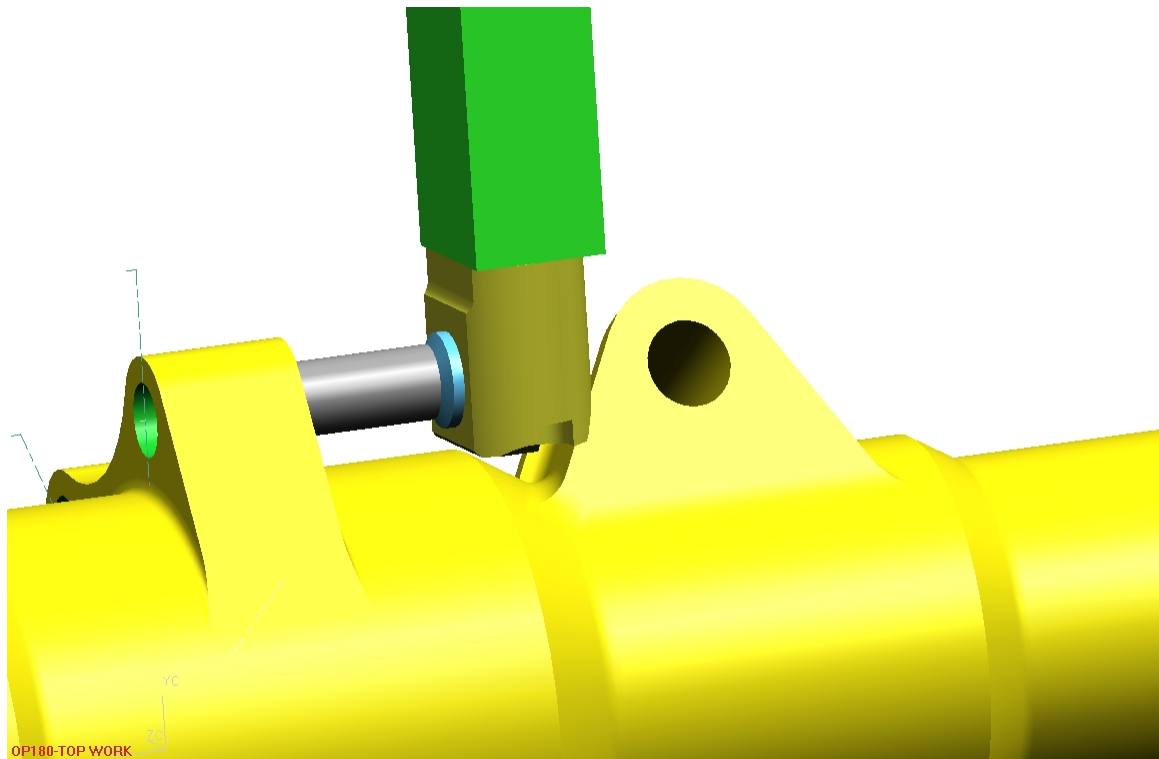
**Material: 4140 Rc32**

**Coolant pressure: 1000 psi**

**Coolant volume: 8 gpm**

**Angle Head: Cat 50, Size 2M head with 5:1 gearbox.**

**Comment: Space limitations dictated use of compact Coolant Driven Angle Head vs. bulky mechanically driven head**



## **Case Summary #10: Milling targeting system housing in Titanium**

**Mill: 3/8 Ball nose carbide**

**Depth of cut: .050**

**Feed rate: 42 ipm**

**Coolant pressure: 1000 psi**

**Coolant volume: 8 gpm**

**Material: Titanium**

**Machining center Makino HMC Model A88**

**Angle Head: Cat 50 shank, 12" long Size 3M head ER-16 Collet**

**Comment: Ability of the Coolant Driven Head to provide sufficient rigidity over 12" "reach" was deciding factor vs. mechanically driven head.**

## **Case Summary #11: Machining slots in a transmission housing**

**Feature: slot, .590W X .300D X 10" long (180 degrees apart 4 places, 2 each end of part)**

**Coolant pressure: 1000 psig**

**Coolant volume: 8 gpm**

**Angle Head: Size 3M (Milling Style), 10" length, ER-16 Collet, Cat 50 Shank**

**Depth of cut/ feed rate: 1st pass: Down middle, .360W X .300 D, 24 IPM**

**2<sup>nd</sup> pass: .100 each wall, 28 IPM**

**3<sup>rd</sup> pass: .015 each wall, 40 IPM**

**Material: Cast aluminum**

**Machine: Makino HMC Model A71**

**Total machining time: 8 minutes**

**Comment: Indexability, rigidity of 10" long Coolant Driven Angle Head as compared to bearing mounted mechanical head were deciding factors.**



## **Case Summary #12: Milling "bayonet" slots in an aluminum and stainless steel aircraft locknut**

**Cutter diameter: .125" 2 flute (aluminum) and 4 flute (steel) carbide end mill**

**Depth of cut: .065" (2 places 180 degrees apart)**

**Speed: 5400 rpm**

**Feed: 12 ipm (aluminum) and 6 ipm (steel)**

**Coolant pressure: 500 psi**

**Coolant volume: 9 gpm**

**Angle Head: Straight shank, Size 2M milling style**

**Machine: Mori Seiki Turning Center Model ZL 200 MC**

**Comment: Indexable feature of the angle head allowed milling at two radial positions with one angle head and one set-up.**

