

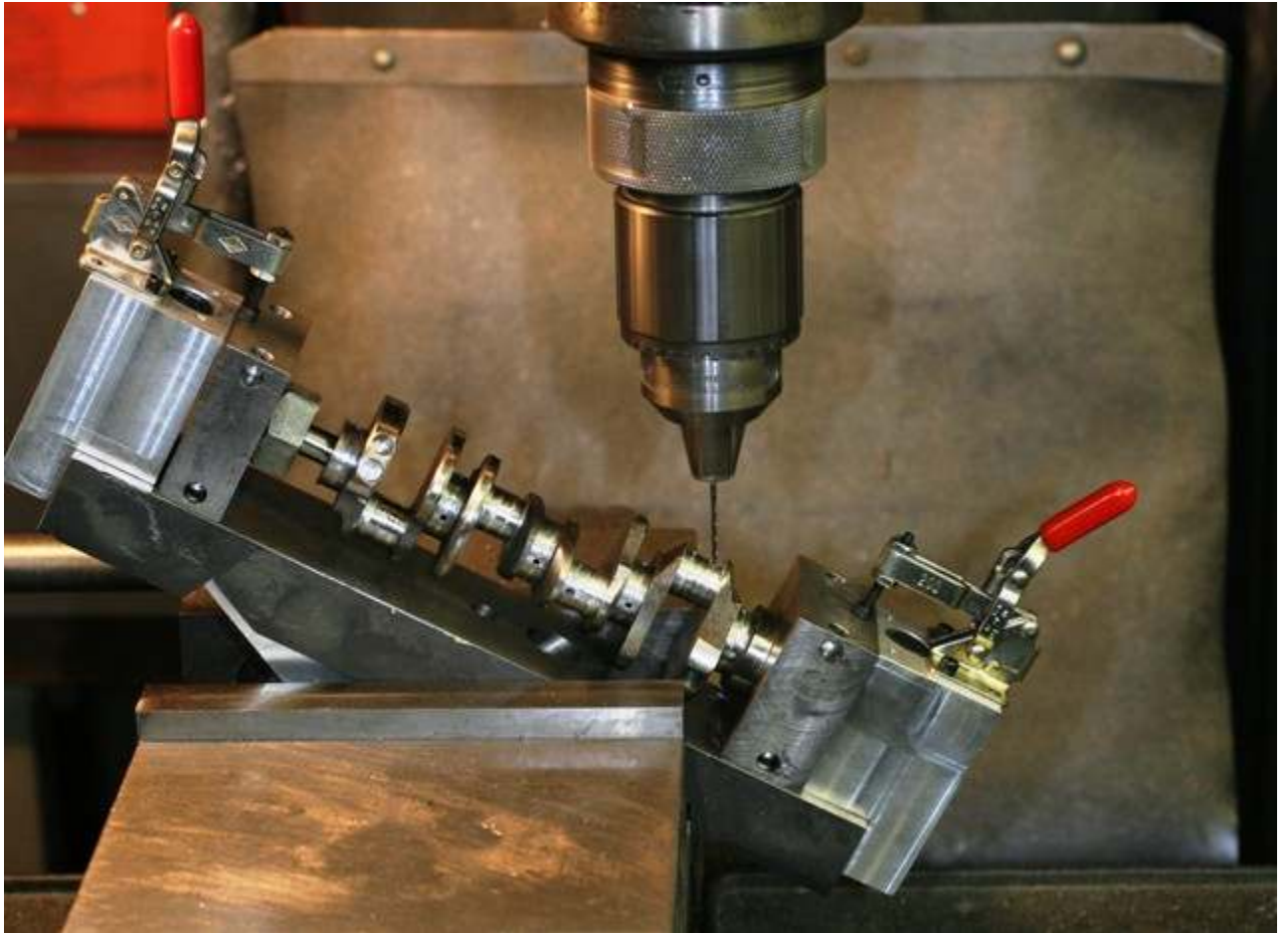
(10 Feb 2008)

Pic #1





Pic #3



It is now Sunday morning about 11:00. The majority of this week was spent making and improving the special crankshaft holding jig. I then needed to write a quite complicated program for the CNC mill to drill all the oil holes for the throws, on a production basis. Hole drilling for one crankshaft is not too difficult, but doing 50+ is somewhat more challenging. There are several obstacles that needed to be taken into consideration, like the angle of the hole, the long depth, and the small diameter drill that was needed. As you can see from all of the pictures, the jig is setting at an angle. It is either 28 degrees to the left or 28 degrees to the right. At first glance it may look quite simple, but remember, the angles are critical. Too little or too much will cause the drill to break through either side of the counterbalance. The oil hole diameter is .0625 and needs to be drilled to a depth of .950. This is very difficult, once again, because of the 4130 material that was selected for casting the crank. Keep in mind that the throws are 90 degrees apart, which means that after the first center drilled hole is finished, the crankshaft must be rotated 90 degrees for the next hole. This process must be repeated for all 8 holes. Once four holes have been finished for one side (Pic #1) the entire jig must be tilted 28 degrees to the right, then the entire process is repeated for the other four holes. When finished center drilling the entire drilling sequence is repeated for the .0625 oil hole. The CNC mill is setup for what is called, a "peck drilling cycle". This means that the drill comes down to the top of the previous center drilled holes, then the computer tells the spindle to go down only .050, then retracts to clear out the chips. This continues until the .950 depth is achieved, then the table moves to the next throw

and waits until I index the crankshaft 90 degrees. The entire process takes almost 20 minutes to drill 8 holes. If I could devote every minute of the work day, it should take about 2 days. Unfortunately, there are a lot of other items that need my attention. Running a small business is sometimes, very difficult, at best. One more thing, the drills do sometimes break and there is no easy way to remove it. I then need to setup my EDM to burn out the broken drill. I will really be glad when this initial run of crankshafts is finished.