



RTMS NEW ROLL TECHNOLOGY PART 2

Heat treatment

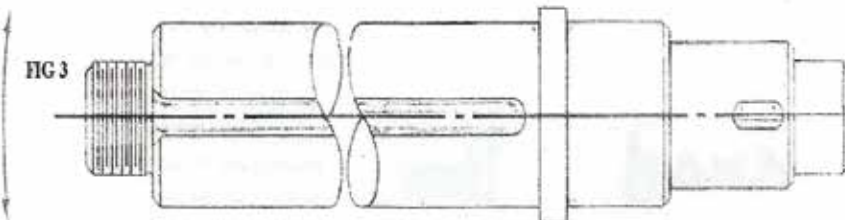
Material coupled together with the heat treatment is the most overlooked and underrated part of roll manufacturing.

Heat treating the roll can literally make or break the quality of your roll. If the same roll is heat treated in two different ways, there will be major differences in the hardness and resistance to wear. Recent advances and patent pending processes in heat treatment for roll tooling have resulted in significant improvements in the tooling. Make sure you demand only the best heat treat and material with manufacturing process when ordering roll tooling.

Bringing a roll to its finished size after heat treat is called hard turning. Rolls at this point stand at approximately 60 Rockwell. Old technology would now require many set-ups and manual interventions before a roll's faces and bore have been successfully ground. Such long-winded procedures sacrifice quality and create the opportunity for human error; whilst the accumulation of tolerances cause problems with parallelism and run-out. Grinding also incur many other problems: two of which are added magnetism in the roll and work hardening.

The new way

Many problems, but, thankfully, one solution - we simply start and complete the roll in one operation, in one machine, without grinding. How can this be done? The answer is that just one roll tooling manu



facturer is utilizing a specially designed CNC machine featuring low temperature

titanium impregnated ceramic tooling. How is the bore cut over the keyway, you ask? Bores have never been able to be cut, due to the keyway and, more particularly the fact that the key needs to be cut before heat treatment.

Because of this fact, the keyway is normally cut 0.030" oversize to ensure this key will fit after heat treatment. As explained last time, this 0.030" has been the arbitrary industry standard for years. This has been the major cause of roll failure, forever, but not anymore. Because of the keyway, bores have always been ground in a hugely damaging process that results in heat cracking and work hardening, whilst obliging the bores due to the keyway. In contrast, cutting the bores on a CNC lathe in the same operation as the rest of the roll eliminates any chance of operator error, run-out and the damaging features of grinding. This is all possible because the keyway is only cut (by EDM) once the roll is heat treated and bore complete.

Then, because the roll is already heat treated, the keyway can be cut much closer to the original size - typically, as small as 0.005" over normal size. An added bonus is this that process virtually eliminates tube, pipe and roll forming mill shaft wear. If you want to destroy the shaft and roll bore, use the old technology (Fig 3).

Face wearing (Fig 4) - as explained in the last article - is a result of traditional grinding, which destroys the roll face, causing it to wear quickly. It also allows the roll to shift, causing major problems with the outside tolerance of the finished tube, including roll marks.

The roll must be turned, not ground. By using the old technology and grinding using numerous stages - nine to be exact - to finish a roll causes total indicated run-out. The end result allows the finished tube's OD to get larger and smaller; in short, to be out of tolerance. The solution is the new CNC-based technology described above, where the roll is turned in one operation on the same machine; rather than the nine other steps, which affect its ability to have consistent tolerances. This new technology increases the life of the roll, shaft and mill; saving thousands of dollars in rolls; and infinite amounts of time.

So, who is the only company in the world offering a way out from the problems of the past? We at Roll Machining Technologies and Solutions can offer our unique roll technology **"Super Roll"**, and it's manufactured in Romeoville, Illinois, USA.

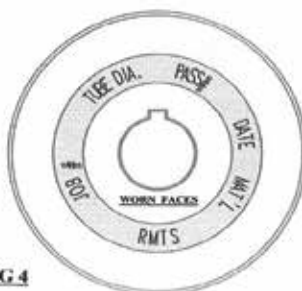


FIG 4