Green Heat Treating? No Sweat!

Bob McCulley, Comprehensive Heat Treat Specialists

While manning my booth at the joint ASM Heat Treating Conference/Gear Expo in Indianapolis, I noticed a young lady looking at our brochures. I asked if I could help her, due in part to the puzzled look on her face. Her reply—"How can heat treating be green?"—was exactly the question I was looking for.

Allow me to introduce myself. My name is Bob McCulley, and I have spent my life, since the age of twenty, in different roles of supervision in a variety of manufacturing environments. Twenty-six of those years were spent with Chrysler Corp. I was lucky enough to land a job in the heat treat department at Chrysler's Kokomo Transmission Plant in 1988. This heat treat department is without a doubt one of the largest in North America, if not the world. During my last few years at Chrysler, I had the privilege of helping lead a joint effort between management and the UAW that strove to bring the heat treating process up to world class standards. Starting in 2002, The Heat Treat Team was rewarded with both national and international awards, along with several benchmarks from Underwriters Laboratories.

I am now retired from Chrysler and have formed a company to service the heat treat industry, Comprehensive Heat Treat Specialists. We offer a program of green rewards, which we feel will help the industry meet the environmental responsibilities we all share and will soon be mandated. The experiences and knowledge gained during my tenure at KTP give me the ability to answer the young lady's question.

My response to her question was with a series of questions: If a heat treat reduces natural gas consumption by 25-35 percent and has a matching reduction in greenhouse gas emissions, is that green? Does reducing quench oil consumption by capturing and recycling fit into the green concept? When a company uses lubricants and cleaners that are designated as Earth-friendly, are they promoting the green directive?

Her response to these questions was in the affirmative, and she expressed her surprise that heat treating processes could indeed be operated with environmental consciousness. Recognizing the need is only the first step.

To expand on how to approach green heat treating, we need to differentiate between the two major types of heat treating operations: commercial and captive. First, we have the commercials. These folks live and breathe heat treating as their primary business. The bottom line of their operations determines if they open the doors next week. Captive heat treaters heat treat as part of a process to manufacture a product. Heat treating is a necessary operation for them, but it's not the final product. The bulk of contacts we received at the ASM/Gear Expo were captive heat treaters. That is where we will focus our discussion here in this article.

Heat treat is that smoky, hot area at the back of the plant. We only go there when we have quality issues or to see the fire trucks. How did the concept of heat treating being a necessary evil develop, and what can we do about it? Every heat treat department had a beginning with new equipment, trained personnel and a set of operating guidelines. What happened? The answer is simple; time marches on, equipment wears, trained personnel leave, there are layoffs, transfers, lost records, and

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there is no shortage of explanations for the problems. The real shortage is in viable solutions to the problems. I personally have seen employee education—of both hourly workers and management—resolve most of these issues, but there is a lot of work involved.

There is no rocket science here; the very items that can improve bottom line operating costs are the same items that can reduce waste and pollution. It is up to management to bite the bullet and absorb the initial costs of training. The rewards are real, and they are there to cash in on.

At Chrysler, we taught a class in combustion. The class was composed of instrument men (pyrometer men), skilled trades and supervision. It was taught over an eight-week period and totaled 64 hours. The cost incurred was $36,000 or about $2,000 per student. The class was split 50/50 between classroom and the shop floor where they worked on burner tuning, optimizing gas and air train piping and general maintenance. At the end of the first month, half-way through the class, we recorded a drop in natural gas usage of $30,000. This was done while operating at the same production levels. The class paid for itself before it was completed. As it worked out, the state paid for the class on a training grant, and all the participants were awarded three college credit hours by a local technical college. Does this meet the criteria for immediate payback? Don't lose sight of the fact that the natural gas saved reduced our greenhouse emissions by the same amount. In fact, our reductions met the reduction requirements for the entire corporation that year. Just remember that natural gas consumption is only one facet of the total conservation effort.

In closing, let's return to the question that started this article: How can heat treating be green? There are many viable options for both the commercial and captive heat treaters that offer reduced operating costs through green practices. Quench oil recovery and recycling, non-permitted surface treatments (shotblast and shotpeen), peak electrical energy reduction devices and Earth-friendly lubricants and solvents are just to name a few. I suppose that one word really sums up what we need to strive for, and that is ownership. Someone needs to ask the pertinent questions regarding current and past practices and where we want to strive to be in the future. That someone has to be management at the highest levels. Allocating funds for training and setting best practice methodology in the short term will be rewarded when we see the economic upturn, and survival mode is no longer the standard operating procedure. We must become cognizant of and responsible for our actions, or future generations will bear the brunt of our excesses.