Hot & Cold
By Wendell Smith

When those of you who attended our recent garage tour/picnic read the title of this article you are probably reminded of the hot humid temperature you experienced. You are probably thinking something like "that crazy guy will probably now be telling us that you will be more productive working in your shop if the ambient temperature is 120 degrees". This message is quite the contrary and does not pertain to the temperature of the human body. The message is that by subjecting various shop projects to extreme heat and cold temperatures, and shocking items thereby creating sudden temperature change, can often work to your advantage.

Going back to high school physics, we learned that metal and other objects expand with heat and contract when they become cold. These are the principles that serve as the premise of this article. If you are like me, this isn`t something you have occasion to put into practice every day or even every year. I sometimes have a tendency to concentrate my focus on using lubricants, such as WD-40, and forget there is another, often better, alternative when attempting to fit or remove tight bearings on a shaft, freeing up frozen bearings or bushings, or even taking off or removing stuck bolts.

Often a little heat from a torch working in combination with lubricants will expand metal enough to allow lubricants to enter a restricted area and free things up. However when a bearing, for example, is really frozen on a shaft or locked up, the best practice is to forget the oil. Get the item red hot by heating it with a torch then throw it into a bucket of cold water. Surprisingly this seems to work every time. I recently had one of the three mower blade bearings go out on my John Deere riding mower (nc). I was in a hurry so consequently, I didn`t try to repair the unit myself. I took the bearing hub to a reputable John Deere dealer that has a full service shop with hydraulic presses. They were unable to remove the frozen bearing from the shaft and sold me a complete new bearing assembly. After a few weeks of thinking about this situation I got out the torch and bucket of water and ***VOILA***, the frozen bearing came right off the shaft. I now have a spare cutter blade hub assembly for my mower.

The photos accompanying this article show me freeing up roller bearings and steel bushings on an old barn hay trolley system. I am building a cabin and one of my interior designs is to have a functional trolley system run the full length of the gable in the great room. I messed around using lubricating oils for a couple of weeks when attempting to free all six bearings on the unit. I was only able to get one bearing free with the oil approach. Using the heat/chill shock approach all bearings turned freely in short order.

Another application, for which I have found this approach useful, is with nut removal from a bolt. A similar approach, without water, works for removing broken stud bolts on an item such as an engine head. In this case, you place a nut directly over the stud bolt that is probably broken off flush with the head. You then arc weld the nut to the stud bolt, completely filling the inside of the nut with weld. Let the area cool naturally and the stud bolt will turn right out with a wrench.

I have directed all of my comments to removal and freeing things up. Do not overlook the reverse opportunity in using temperature differentials to your advantage when assembling parts. I remember during one of my first

conversations with SSR member Fred Guyton about 30 years ago. Fred was explaining the process he had used to install a new wheel bearing on an axle shaft. In this instance, he placed the axle in his deep freeze and let it chill while he warmed the new bearing assembly in the kitchen oven. Working fast after removing both items the bearing slipped right on the shaft; once the temperatures equalized a tight fit was achieved to keep the bearing from spinning on the shaft.

This procedure is suited for low carbon steels.