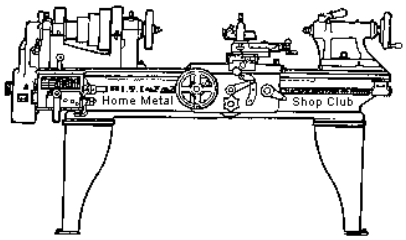
July 2021
Newsletter

Volume 26 - Number 07



http://www.homemetalshopclub.org/

The Home Metal Shop Club has brought together metal workers from all over the Southeast Texas area since its founding by John Korman in 1996.

Our members' interests include Model Engineering, Casting, Blacksmithing, Gunsmithing, Sheet Metal Fabrication, Robotics, CNC, Welding, Metal Art, and others. Members enjoy getting together and talking about their craft and shops. Shops range from full machine shops to those limited to a bench vise and hacksaw.

If you like to make things, run metal working machines, or just talk about tools, this is your place. Meetings generally consist of ***general announcements***, an ***extended presentation*** with Q&A, a ***safety moment***, ***show and tell*** where attendees share their work and experiences, and ***problems and solutions*** where attendees can get answers to their questions or describe how they approached a problem. The meeting ends with ***free discussion*** and a ***novice group*** activity, where metal working techniques are demonstrated on a small lathe, grinders, and other metal shop equipment.

President	Vice President	Secretary	Treasurer	Librarian
Vance Burns	*Ray Thompson*	*Joe Sybille*	*Gary Toll*	*Ray Thompson*
Webmaster/Editor	Photographer	CNC SIG	Casting SIG	Novice SIG
Dick Kostelnicek	*Jan Rowland*	*Martin Kennedy*	*Tom Moore*	*John Cooper*

This newsletter is available as an electronic subscription from the front page of our website. We currently have over 1027 subscribers located all over the world.

About the Upcoming 14 August 2021 Meeting

The next general meeting will be held on 14 August 2021 at 1:00 P. M. on-line with Zoom and in person at TxRxLabs, 6501 Navigation Street, Houston, Texas 77011 in Classroom #1. A week before the meeting invitees will receive from the webmaster the meeting ID and passcode to join the on-line meeting.

General Announcements

Videos of recent meetings can be viewed on the HMSC website.

The HMSC has a large library of metal shop related books and videos available for members to check out at each meeting. These books can be quite costly and are not usually available at local public libraries. Access to the library is one of the many benefits of club membership. The club has funds to purchase new books for the library. If you have suggestions, contact the Librarian *Ray Thompson*.

We need more articles for the monthly newsletter! If you would like to write an article, or would like to discuss writing an article, please contact the Webmaster Dick Kostelnicek. Think about your last project. Was it a success, with perhaps a few 'uh ohs' along the way? If so, others would like to read about it. And, as a reward for providing an article, you'll receive a free year's membership the next renewal cycle!

Ideas for programs at our monthly meeting are always welcomed. If you have an idea for a meeting topic, or if you know someone that could make a presentation, please contact Vice-President Ray Thompson.

Members are requested to submit to the club secretary the name, address, telephone number, and website address, if any, of any metal or other material stock supplier with whom the member has had any favorable dealings. A listing of the suppliers will appear on the homepage of the club website. Suppliers will be added from time to time as appropriate.

Recap of the 10 July 2021 General Meeting

By *Joe Sybille*

Seventeen participants attended the 1:00 P.M. virtual meeting. There were two visitors, Wilfred Nijs, and Mark Turnbaugh. President Vance Burns, led the meeting (right photo).

Presentation

There was no formal presentation today.

Safety Moment

The safety video depicted a forklift operator using a self-dumping forklift bucket to load scrap aluminum into a furnace for smelting. Upon loading, moisture laden aluminum reacts immediately with the furnace heat causing aluminum fragments to escape the furnace and engulf the area in front of the furnace, including the floor on which the forklift and operator are stationed. Apparently unfazed by the burning aluminum, the operator continues to maneuver the forklift for another load of aluminum. The operator appeared to wear no safety equipment for protection. The work routine depicted in the video showed a complete disregard for worker safety and for safety of the work environment.

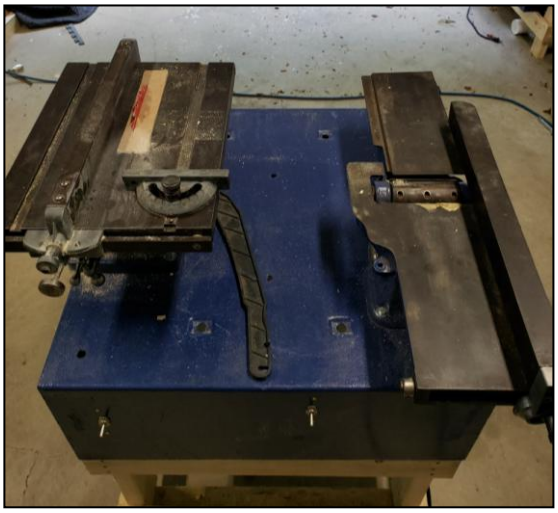
The safety video shown earlier reminded a participant of the time when club members were making dead-blow lead hammers. The hammer manufacturing process proceeded as follows. Members melted bulk lead in a crucible and then poured the molten lead into a mold around which the end of a galvanized pipe had been placed as a handle. After several minutes of cooling, members removed the pipe with the formed lead hammer and submerged it in water to bring it down to handling temperature. If the hammer looked acceptable, a piece of rubber hose was slid over the pipe and served to facilitate gripping the hammer handle. In one case there was insufficient led available and a cavity in the hammer formed. The hammer was unacceptable. A member returned the hammer to the crucible for another melt attempt at but the entrained water in the cavity immediately flashed to steam spewing molten lead all around. Fortunately, all involved were wearing protective clothing and face shields and no one was injured.

Another participant witnessed a forklift operator lose three fingers from one hand. It happened when the operator forgot where he had placed his hand while pivoting the forklift forks toward the roll-cage. With one hand operating the control levers and the other resting on the framing of the roll-cage, the forks pivoted faster than the operator anticipated. In doing so, the forks smashed the framing and the hand resting on it. Lack of attention caused this preventable accident.

Show and Tell

John Cooper showed a few tooling extras he found in a storage cabinet acquired at a recent auction. Among the finds included were ER20 collet holders, assorted tool bits, thread taps, hex wrenches of different sizes, and an edge finder. See photos below.

Richard Douglas displayed two benchtop machines manufactured during the 1930's and sold by Sears under the Craftsman label. One machine is a table saw where the table tilts and can also be raised and lowered. Usually, the arbor will tilt along with raising and lowering. It has an eight inch saw blade. The other machine is a 4 inch jointer. It is missing a safety guard, something Douglas will likely make before using the machine. Unique about the pair of tools is that they rest on a common base. See photo at right.



Dick Kostelnicek exhibited a fixture used with a surface grinder for sharpening chisels and other items requiring a sharp edge. See photo at left.

Joe Sybille showed pictures of the making of a globe valve being made by club member Phil Lipoma. Lipoma made a radius turner to make the body of the globe valve. While the globe valve is not yet complete, evident in the pictures is the skill and craftsmanship of Lipoma and his attention to detail. See photos below.







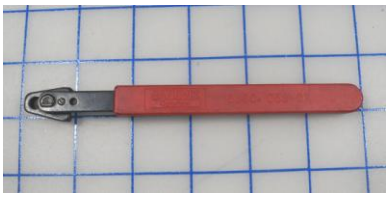
Joe Sybille also showed a ninety second video depicting the air powered model of a beam engine crafted by member Phil Lipoma.

Problems and Solutions

A participant shared a solution to a problem that involved a rock cutting saw blade that no longer had a round arbor opening. An associate gave the participant a 14" saw blade with a usable arbor opening. The task at hand became one of reducing the diameter from 14" to approximately 6". Now the problem became one of finding the center of the arbor opening. The participant put the saw blade on a mandrel and used a plasma torch circle cutting jig to reduce the saw blade diameter. This reduced diameter blade served as a doubler when welded to a blade with an out of round arbor opening. The end result is to extend the usable life of the rock cutting saw blade with an out of round arbor opening. Time will tell if the welded doubler will work.

A participant discussed his ideas for a knife sharpening jig and requested suggestions for improvement of the design. Several suggestions were offered.

A participant requested help identifying an item included with other items purchased at an auction. Below are front and back views of the item. If you can identify the item and its purpose, send a note to the webmaster.

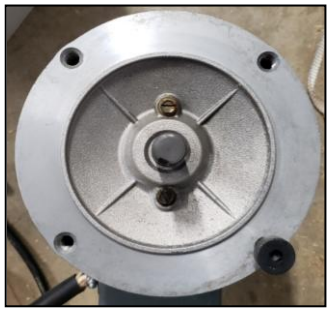


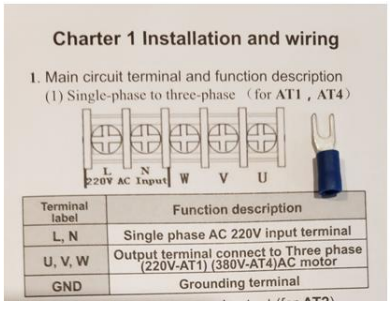
Articles

Trials of a Drill Mill Part 2

by Richard Douglas

In the last installment, I talked about acquiring a drill mill and failure of both the motor and controller driver. This time I will talk about how I solved the failure, my motor selection, and what I have learned about VFD'S.





Let us talk about the motor first. It will be three phase, size 56 frame, and will need to run on 220 volts. Yes, it is most common, but you need to know that. For my application, I wanted a C-face mounting. The motor has a flat face on the shaft end instead of a bell end. Therefore, I wanted to use the face to mount the motor, as I planned to mount the motor atop the drill mill headstock via an adapter plate. Also, the motor will be rated for approximately 3400 rpm to closely match the speed of the DC motor I replaced. To keep chips out of the motor, the selected motor will have enclosure type TEFC, totally enclosed fan cooled.

The last parameter I considered was the duty factor. One does not need to consider duty factor if the motor selected is designed to work with a VFD. The duty factor may be stated as “cont” which is continuous or as a number. A duty factor of 1.0 is the same as continuous. A number greater than 1.0, such as 1.15, means the motor has a 15% overload factor. A motor has a rated load or amount of work it was designed to do. The percentage overload factor means the motor can be run a certain percentage over the designed rated load without damage to the motor. I was told by a control engineer friend that the higher the duty factor the better the motor works with a VFD.

VFD’s, I am no expert, but I will share what I have learned over the years. It has been two years since the motor failure on my drill mill. The first VFD I had experience with was in the mid 90’s, while replacing a Reeves type drive that was beyond repair. Three phase in and three phase out, 5 hp, 480v, and it cost about $1500. Thirty years later came my next use of a VFD. I went on eBay and looked for VFD’s. I found one that looked good, fit my budget, and was made in America. It was a Lenze MC1000 series industrial unit. I found an on-line manual and bought the VFD. The listing said it was used, but it was not. The enclosure was NEMA 4x, wash down, stainless steel with a touch pad on the front. The touch pad made it difficult to change the speed of the motor. The resolution on the frequency was to 1/10 Hz, so changing it was slow. The manual showed how to control the frequency with an external potentiometer, but I could never get that to work. The one nice feature on it is that the input voltage can be either 120v or 220v. So, after a couple of years, I decided to look for a more convenient solution and put the Lenze on my cutter grinder. As of this writing, the Lenze MC 1000 is obsolete by the manufacturer.

The solution to my VFD dilemma was the AT Simple Mini AC motor driver. Yes, they are made in China, but I have 4 or 5 of them and have not had an issue with any of them to run all my three phase tools. They come in various sizes up to 5 hp. The VFD’s are available from various on-line suppliers. Pick your favorite. They range in price from $50.00 to $90.00 and claim to have a unit that will speed control a single-phase motor, but I have never seen one for sale. The manual for the AT Simple Mini AC motor driver is a double sided 11x17 sheet of paper. The Lenze manual was 88 pages. Right out of the box one can control a motor, though it is not optimal. The units come set up for 50 Hz not our 60 Hz. So it is doing all its internal calculations with 50 Hz. The frequency displayed is 6/5 of actual frequency being delivered to the motor. So if you set the input frequency at 60 Hz, you are really getting 72 Hz. This frequency differential will continue until one manually programs the VFD to indicate the actual input frequency of 60 Hz, rather than the default 50 Hz. There are two connections for incoming power and three for the power out to the motor with a common ground. Do not forget to connect the ground to the motor frame. Some users complain that the terminals are small and connectors do not fit. This is the time to employ inexpensive crimp-on connectors. They fit the terminal bus perfectly.

The frequency control potentiometer is built into a removable control module that can be placed away from the main VFD with an optional extension cord. This option allows placement of the VFD close to the motor and the controls for it in a convenient place for the operator. The unit is also low noise on my mill. I get no VFD whine when using the VFD to control the motor.

The motor I chose was a 3 phase, ½ hp TEFC with a 1.15 duty factor and rated at 3450 rpm. Ideally, one would want the motor to run between 25 Hz and 60 times the duty factor, in my case 69 Hz. With the 4 step pulley system I have, I get all the speed range I need. Operation of my motor below 25 Hz causes it to overheat. Overall, I am pleased with the performance of the motor controlled by the AT Simple VFD.

I have offered the reader the criteria I used to select the motor and the VFD for my mill. Next month I shall discuss programming the VFD.