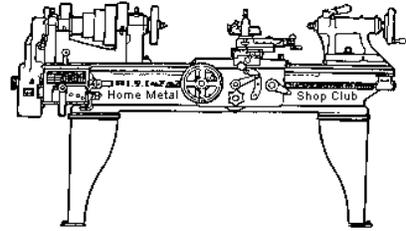




March 2023
Newsletter

Volume 28 - Number 03



<http://www.homemetalsclub.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 <i>Vance Burns</i>	Vice President <i>Ray Thompson</i>	Secretary <i>Joe Sybille</i>	Treasurer <i>Gary Toll</i>	Librarian <i>Ray Thompson</i>
Webmaster/Editor <i>Dick Kostelnicek</i>	Photographer <i>Vacant</i>	CNC SIG <i>Martin Kennedy</i>	Casting SIG <i>Vacant</i>	Novice SIG <i>John Cooper</i>

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 08 April 2023 Meeting

The next general meeting will be held 08 April 2023 on-line at Zoom.us. Log-in credentials are: One click Join Zoom Meeting

<https://us06web.zoom.us/j/82107481649?pwd=OVhzUU1tQ1I3UIZXekdwT25MektZdz09>

Meeting ID = 821 0748 1649 Passcode = 021628.

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!

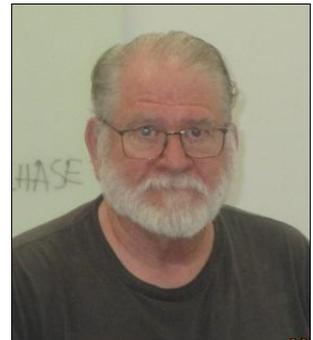
Ideas for programs at our monthly meeting are always welcomed. If you have an idea for a meeting topic, or if you know someone that could make a presentation, please contact [Vice-President Ray Thompson](#).

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.

The club is looking for a member to serve as webmaster. After over ten years of service, our current webmaster would like to pass the webmaster torch to a successor.

Recap of the 11 March 2023 General Meeting

By Joe Sybille



There were 7 in-person participants and 4 on-line participants attending the 1:00 P.M. meeting. Three visitors were present, Mark Heidorn, David Merritt, and Buster Wilson. President Vance Burns (right photo) led the meeting.

Show and Tell



John Cooper showed a picture of a Sci-Fi Transformer character made entirely from salvaged auto parts. The character appeared at the tool exhibition HOUSTEX. See photo at left.



Also, he showed a set of tweezers cut from steel using a submerged waterjet. Using the waterjet, below the surface of the water, results in no splatter. Next, Cooper showed a picture of a trailer anti-theft device weighing over 1000 pounds. See photos above right.



Joe Sybille showed pictures of the wrong way to drill a hole in a shelf support standard. Standards hold brackets on which a board is placed to hold books or other items. The wrong way pertained to holding the standard with one hand and lowering the drill quill with the other. The drill bit 'walked' while making the required hole. Placing the standard in the drill vise eliminated the 'walking' drill bit, but by then, the extra hole had already been made to form an unwanted 'keyhole'. See photos below.



Safety Moment

Several safety videos were shown today. The first one depicted a person walking on a narrow street and holding the end of a leash in one hand. On the other end of the leash is a small dog. A passing motorist on a scooter did not see the leash and consequently drove through it, sending the dog crashing into a parked car. Lesson: The dog walker should have been aware of potential hazards present by a dog on a long leash, a narrow street, and motorized traffic.

The next video depicted a person electrocuted after climbing a utility pole to capture a bird perched on a high voltage transmission wire support. After capturing the bird, the person lost his balanced and

became part of a lethal electrical circuit. Lesson: Failure of the person to recognize the danger of high voltage transmission lines.

The next video depicted two workers crushed by improperly stacked slabs of flat stone. The slabs were about shoulder high to the workers and about an inch thick. Like a deck of cards falling one after another, the stacked slabs began to fall and the workers could not get out of the way. It appears the workers survived the falling slabs. Lesson: Always be aware of potentially dangerous situations.

The last video depicted cement workers receiving and spreading concrete on a formed structure for the second floor of a building. Unfortunately for the workers, the supports for the second floor gave way under the weight of the cement. Fortunately for the workers, no one sustained a life threatening injury. Lesson: Ensure floor supports are adequate to hold the estimated weight of the concrete.

Problems and Solutions

A participant requested suggestions on precautions to take when sweating copper pipe close to a fiberglass tub. Work carefully and use a heat shield blanket to avoid melting the fiberglass were two suggestions offered.

Article

A Crypt-ic Machining Problem

by Martin Kennedy

I completed an interesting project that combined my interest in machining, lockpicking, and 3D printing. The problem was that a mausoleum in a local cemetery was no longer locked, and no key was available to lock the large bronze doors.



The lock was removed from the mausoleum and disassembled. It is a mortise lever lock, and likely dates from the 1920's. No manufacturer name is on the lock. The body and bolt are stamped with matching numbers. The manufacture of the lock mechanism is of high quality. All the parts fit together tightly. It is likely to have been hand made, and that's the reason for the numbers stamped into the parts.

Since I didn't have even an example key from a similar lock, I made measurements, the best I could, of the dimensions of the key based on measurements of the

receptacle in the lock. It's a long key, with a thin blade and a thicker part near the head so that some torque could be put on the key without bending the thin blade section. Based on the measurements, I designed a blank key. I then lined up the lock mechanism to get a first guess of what the key cuts would look like.

It was hard to make a lot of the measurements accurately. Here's where 3D printing is useful. I printed the key based on my drawing. The print only took about 15 minutes. This first print would not fit in the lock, because it was slightly too wide. I sanded down an edge so that I could get it in the lock. That let me check a lot of the other dimensions. It also let me identify that I had made the key cut depths exactly backwards from what I needed. Based on new measurements, I revised my model, and printed another key.



I ended up printing 6 keys. Starting with key 4, I could open the lock. From this point, I was able to make minor ($\sim 0.010''$) tweaks to the model to make the key fit better and reduce the play. The last key opened the lock smoothly. Time to make it in brass!

The first brass key worked, but not well. It had to be jiggled to open the lock. This is because the as-printed tolerances in the 3D printed version are not as tight as the machined version. For reference, modern locks have cuts that only vary $0.018''$ or so between key cut depths, and require machining tolerances of just a few thousandths of an inch.

The lock body has a convenient hole on the face where you can see just how the levers are aligned with the mortise. From this, I could see that one of the levers was slightly off. I revised the model and subtracted $0.020''$ from one of the cuts. Unfortunately, this required the key to have a shallower cut, so it had to be remade.



The second key fit the lock perfectly!

Now that I had a working key, I did some forensics. Keys are cut to depths for each pin, wafer or lever. Tables are available from the manufacturer that show the cut number (usually 0-9) and the corresponding cut depth. I noticed that the cuts I had made were more or less (within a few thousandths) on multiples of 0.035". So I made up a table based on this. A zero cut was 0.000", a 1 cut was 0.035", a 2 cut was 0.070" and so forth. This gave me a code for the key. On the face of the lock body where the deadbolt came out, there was a stamped code that differed from all the other numbers stamped into the lock. The code matched the one I had calculated! There were also individual numbers stamped into some of the levers that matched. I broke the crypt-ic code!