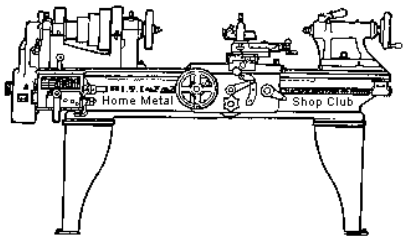
March 2017
Newsletter

Volume 22 - Number 03



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
Brian Alley	*Ray Thompson*	*Joe Sybille*	*Emmett Carstens*	*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 1073 subscribers located all over the world.

About the Upcoming 08 April 2017 Meeting

The next general meeting will be held on 08 April at 12:00 P.M. (Noon) at the South Houston Library, located at 607 Avenue A, South Houston, TX 77587. Bill Swann will give a presentation on the 'Current State of Solar Panel Installations'.

Visit our website for up-to-the-minute details, date, location maps, and presentation topic for the next 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.

Club member Rich Pichler announced a design contest among members. There will be two designs for consideration. One will be for a business card holder and the other for a business card. The winner of each category will win a full year's membership. Click here for details

Club member Phil Lipoma announced there is a tool sale in Dickinson, Texas at 9:00 A.M. on 25 March 2017 at 1100 Deats Road. The sale is offered by Todd S. Gupton. For additional details, see SWAP section on the club home page.

Recap of the 11 March 2017 General Meeting

By *Joe Sybille*, with photos by *Jan Rowland*

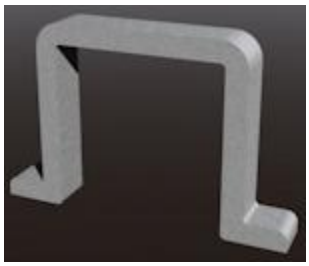
Twenty-four (24) members including one new member, Jim Dallas, attended the 12:00 P.M. (Noon) meeting at South Houston Library, located at 607 Avenue A, South Houston, TX 77587. There were no visitors present today. There are thirty (32) members in good standing with the club. Jim, welcome to the club.

President *Brian Alley* led the meeting (right photo).

Presentation 1

Club member Paul McKneely gave a talk on 'A CNC Project' in which he described how he made a plank fastener for a remotely controlled yard gate.

Paul's project began innocently enough with the goal of repairing fence pickets screwed into square 2x2 steel tubing constituting a framework for his moveable gate. The gate allows access to his driveway. Over time, the screws had worked themselves loose or had rusted and broken, thereby no longer fixing the pickets to the metal framework. Rather than replacing the screws Paul sought another solution. He designed a bracket to fit over the steel tubing and attach with screws to the fence picket. This way he could avoid fixing the picket directly to the steel tubing. To get a mental picture of the bracket, envision a square u-shape about ½" wide by ¼" thick of sufficient length to wrap around three sides of the 2x2 steel tubing (right drawing). On both sides of the open end of the u-shape are right angled tabs or bracket feet to facilitate fastening of the bracket to the wood picket.



Paul chose to make the bracket from plastic using an injection molder. First, he had to make a mold of the bracket, and here is where the CNC use of his mill contributes to the project. Paul discussed how he wrote a controller program for his mill and lathe to dictate the tool path for each machine. His program, written in C, runs on Microsoft Windows, drives two Arduino based microcontrollers, and generates G-Code for both the mill and the lathe. Using Paul's custom controller program, the mill is used to make the aluminum mold. With the aluminum mold finished, the injection molder is loaded with feed stock from recycled plastic milk cartons, and molten plastic is forced into the mold to form the bracket. Once cooled, the bracket is removed from the mold, and the sprue and ejection pin witness marks are removed. Next, the bracket is placed in a jig and the CNC controlled mill drills a hole into each of the bracket feet.

Paul then discussed future CNC controller projects whereby he would use a custom designed control board with support for onboard drivers configurable for several controllers and machines. The new board would support powered control and limit switches and have modular programs within arguments and variables. Support for eight axes per machine would be possible with the new control board.

Cilck here for Paul's presentation slides.

Presentation 2

Club member Richard Douglas discussed an 'Android DRO' that he made from a design by Yuriy Krushelnytskiy.

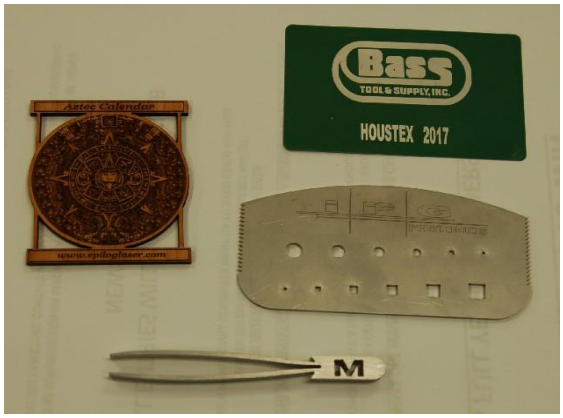
Richard wanted a single digital readout (DRO) that he could use on both his mill and lathe. The DRO project by Krushelnytskiy appeared to fulfill Richard's requirements. Since input to the Android display came via Bluetooth, he could relocate the display from one machine to the other with little effort and without any concern of loss of accuracy from the different scales on the machines. In addition to an Android tablet, parts for the project included the following items:

Texas Instruments MSP430 ValueLine Launchpad kit
Bluetooth transceiver module
USB phone charger
Terminal connectors
Battery holder
Project box
Diodes
Capacitors
Wire.

Richard explained how he assembled the project and overcame technical challenges of flashing the Texas Instruments microcontroller MSP430G2553, making the scale and sensor connections, calibrating the scales, and changes to the project he would recommend. A photo of his DRO project is shown at the right.

Here is the link to Richard's presentation slides.

Show and Tell



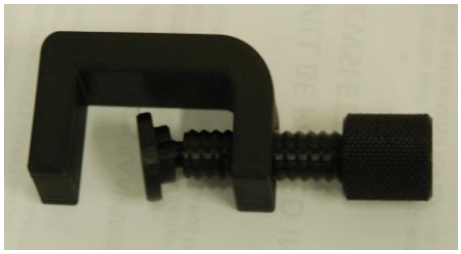
Martin Kennedy showed and described ten cutters and holders that he uses in his shop. See article on the cutters at the end of this newsletter. Also, he displayed three parts made by different laser cutters and tweezers made by a water jet cutter (Left photo) from the recent HousTex tool show.

John Cooper talked about and showed samples of merchandise from his visit to the same tool show (Right photo).

Emmett Carstens displayed a turbine blade that had been removed from service (Left photo).

Rich Pichler showed a tool that is used to debur or clean internal threads in an item (Right photo).

Brian Alley showed a 3D printed C-clamp and two gears that were made on a 3D printer. (See photos below.)



Articles

My Ten Favorite Turning Tools

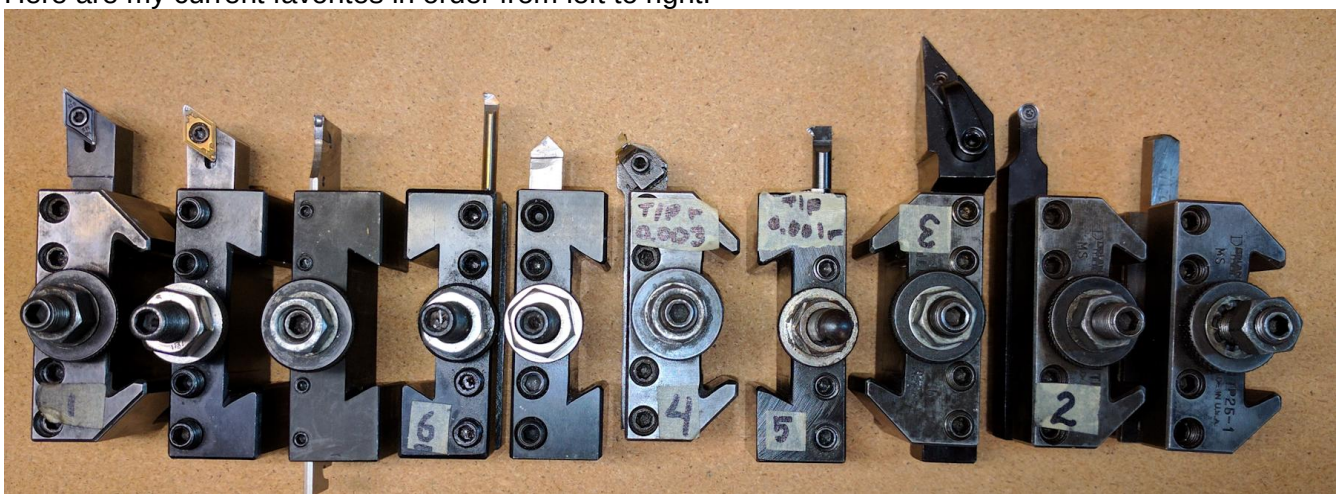
By *Martin Kennedy*

I thought that it might be useful to show my most used turning tools on my lathe. When I started machining, I had no idea what I might need, or even what was available. Perhaps this list may help you if you're in the acquisition phase of machining!

First, almost all of my tools have carbide inserts. I love carbide. I cut stainless steel and some fairly hard carbon steels like 4130 and 4140, and they do a great job. These steels almost seem to be harder than tool steel, and they will wear tool steel down before I can finish a job. These steels will also wear down a carbide insert, but only after 3-4 jobs. Books have been written about how to sharpen tool steel properly, and this is unnecessary with inserts. For these reasons, I highly recommend carbide inserts.

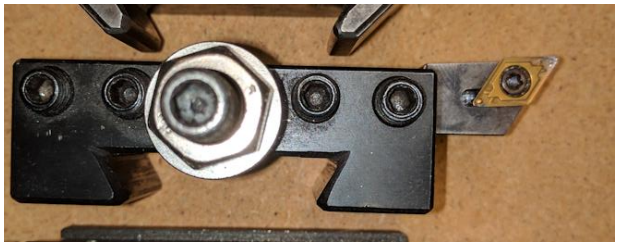
Second, all of my tools are permanently mounted in their own holders. I use an AXA Wedge Type Tool Post. I have a 13" lathe, and this size is plenty big. I recommend the wedge type over the piston type. A starter set is about $120, and extra tool holders are only $10, so there's no reason to not have plenty. As a side note, these inexpensive holders have soft set screws that tend to strip out, so plan on replacing them. I have about 30 holders. Most of my tools have 1/2" or 12mm shanks.

Here are my current favorites in order from left to right.



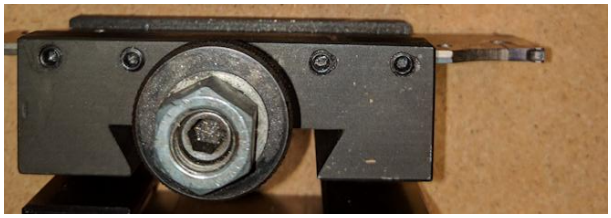
Let's talk about these in more detail, plus why I use these particular tools.

Number 1 – 55° Diamond
Insert: DCMT 32.51
Holder: TMX SDJCR 08-3A
This is my favorite tool. It makes great cuts, and it's pointy enough to get down into many narrow areas without dragging on the back side. It's good for both turning and facing. It has a very small radius on the end, which reduces the force required to cut hard metal. I began using this particular insert after I acquired a jar of them for a good price. Since inserts cost $10-$15 apiece, it's a good idea to use what you can find inexpensively. A good practice is to decide on inserts first, before you get a holder. I've done this the other way around, and it does not work well. Many older holders use hard-to-find or obsolete inserts. I've also used the TCMT inserts, which are more common. I still like this insert slightly better. I have a right hand and a neutral version of this same tool, but I don't use them that much.



Number 2 – 55° Diamond
Insert: DCMT 32.52
Holder: TMX SDJCR 08-A
This is identical to the tool above, but has a larger tip radius. A larger radius gives a slightly smoother cut, but leaves a larger radius where the stock changes size.

Number 3 – Cut-Off
Insert: N3C
Holder: Iscar TGFH 26-3
This is a great cut-off tool. I like the way it slightly curls and narrows the chip from side to side so it does not drag on the sides of the cut. I use a neutral (flat)



insert because I also use this tool to smooth rough cuts on small crankshafts, where a regular insert like the two above can't be used because it won't fit down in a narrow gap. The only downside to this tool is that it's slightly wide. For multiple cuts in small brass parts, it can result in some wasted stock. I have other tool steel cut-off tools that are thinner and more appropriate for this type of cut. I have one where the blade is only 1/16" thick, and it's my second most used cut-off blade.

Number 4 – Small boring bar
Insert: Iscar PiccoCut R 050 06-25
Holder: Homemade square adapter
I've found that for most small stuff and for shallow interior cuts, this tiny boring bar does a great job. I have them in various lengths, and with triangular, square, and round tips The only drawback is the cost. I got a bunch of them used, and I re-sharpen them on a diamond wheel when necessary. I have boring bars of various sizes up to 5/8" diameter. I've found that the carbide ones deflect much less than the tool steel ones, and make less of a taper as you cut. However, the cost of carbide boring bars is staggering!

Number 5 – 45°
Tool Steel
This is a simple tool that I use all the time to take the edge off of sharp corners.

Number 6 – Threading
Insert: NT2R
Holder: Kennametal NSR 82
This is a great all-around threading tool. I have a tool steel threader that I grind to 60°, but I find that I use this one the most. The disadvantage is that because of the slow speed used to thread and the depth of the cuts, it's easy to chip or break the carbide when threading.

Number 7 – Inside threading
Insert: Micro 100 IT-290750
Holder: None Required
Works great for threading inside diameters. But like tool No. 4, the drawback is the cost. Again, I got a bunch of them used.

Number 8 – 35° Diamond
Insert: VNMG 332/3-NF
Holder: (Chinese) MVJNR1616K16
I wanted a low angle tool to use for CNC cuts where my main tool (No. 1) dragged on the back side of cuts. Because it's very pointy, this tool has a little more clearance on the back side. It's a tool I acquired after I got a box of inserts. This tool is largest that you can fit into a Dorian AXA holder – 5/8" – and too large for the Chinese holders. I wanted a smaller holder, but this is the smallest one made.

Number 9 – Round
Insert: RCMT 0602M0
Holder: (Chinese) SRDCN1212H06
I got this tool for CNC cuts. I was looking for a small diameter tool to make complex shapes, like balls and rounded bumps. This cutter fits the bill. It can do turning and facing. It's of limited use for non-CNC, unless you're looking for a fairly large radius on diameter changes.

Number 10 – Vertical Shear Bit
Tool Steel
This is an unusual cutter. It cuts on the front of the cutter, and not the top like all the other tools here. The biggest advantage is that it can take very fine cuts –0.001 or less. It makes fine hair-like swarf. For tiny cuts, a carbide insert tends to ride on top of the metal and not make a cut at all. If the pressure on the insert is increased, it will suddenly "bite" into the metal and remove probably more than you wanted. This bit is great for final cuts when you need to take off just a little more. It also makes a nice finish. Here is a link to a video I made about the bit.