June 2015
Newsletter

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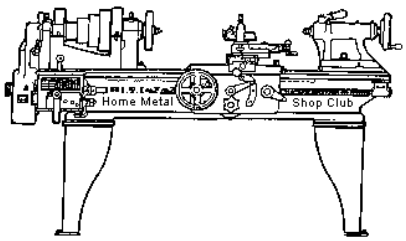


http://www.homemetalshopclub.org/

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 togetherand 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	*Norm Berls*	*Joe Sybille*	*Emmett Carstens*	*Ray Thompson*
Webmaster/Editor	Photographer	CNC SIG	Casting SIG	Novice SIG
Dick Kostelnicek	*Jan Rowland*	*Martin Kennedy*	*Tom Moore*	*Unfilled*

This newsletter is available as an electronic subscription from the front page of our website. We currently have over 834 subscribers located all over the world.

About the Upcoming 11 July 2015 Meeting

The next general meeting will be held on 11 July at 12:00 noon at the Parker-Williams Library that is located at 10851 Scarsdale Blvd. - Houston, TX 77089. Dan Harper will give a presentation on Indexing – part 1 of 2.

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. The library is maintained by the Club's Librarian *Ray Thompson*. These books can be quite expensive 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.

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 'ugh ohs' along the way? If so, others would like to read about it. In the September 2012 HMSC board meeting, the board elected to waive membership fees during the next membership renewal cycle for those providing newsletter articles.

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 *Norm Berls*.

Recap of the 13 June 2015 General Meeting

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

18 members attended the noon meeting at the Barbara Bush Library, 6817 Cypresswood Drive, Spring, TX 77379. Two visitors attended today, Kyle Owens and his young son Brandon. There are 59 members in good standing. President *Vance Burns* led the meeting.

Presentation

The scheduled speaker, Chris Marvel, was unavailable to give the presentation on Non-Ferrous Heat Treating. To the rescue came club member George Carlson. He gave two impromptu presentations, one on a Maker Space in the Woodlands, the Woodlands Innovation Zone (WIZ), and the other on cutting acrylic and thin wood with a laser cutter.

WIZ formed in August 2014 with the goal of establishing a kid-friendly maker space. The space is an old horse barn located on property owned by Extraordinary Education, a co-op based school for home schooled children. As plans developed for the space, leaders decided the space could serve a dual purpose: first, provide a learning laboratory for the children during the day, and second, provide a workshop for adults during the evening and on the weekend.

Much work remains to be done on the space. The barn's electrical service requires updating. The upper loft area requires expansion and build-out into air conditioned spaces suitable for classroom and laboratory activities. Upon completion of the build-out, the maker space will have almost 4000 square feet of work space.

Extraordinary Education is a 501C3 non-profit organization. Volunteers and benefactors are needed. Members of WIZ meet at 7:00 p.m. on the 2nd and 4th Thursday of the month at 9522 Carraway Lane, Magnolia, TX 77354. For more information, visit woodlands innovation zone, contactwiz@googlegroups.com or phone Jeanie James directly at 281.850.2158 or email mjeanieljames@gmail.com.

Next, George talked about cutting acrylic and thin wood with his laser cutter. He has a 60 watt laser manufactured by Red Sail. It is of the flying optics configuration which features a stationary table supporting the work and a cutting head that moves over the work piece in both horizontal dimensions.

Flying optics machines use mirrors to account for the changing laser beam length. Major parts of the cutter are laser tube, three mirrors, cutter head, and a source of compressed air, all enclosed in a box. One mirror is fixed. Another mirror rides on a gantry, and the third mirror rides on the cutting head. In operation, the output of the laser beam is focused on the material to be cut by the position of the mirrors which direct the laser light beam to a lens. In turn, the lens, fixed to the cutter head, focuses the laser beam at the area of the work piece to be cut. The focused beam vaporizes the material according to the set of instructions controlling the movement of the cutter head. Compressed air is fed to the cutting head to cool the lens, prevent the accumulation of smoke on the lens, and clear the smoke from the work piece.

Before use, the laser beam must be focused. An improperly focused laser beam is prone to causing fires. Consequently, one must avoid leaving unattended a laser cutter in operation.

George showed a short video of his laser cutter making a logo out of acrylic.

As a final note, George cautioned the members that PVC should not be used in a laser cutter. The PVC contains chlorine and, when heated at high temperatures, creates hydrogen chloride (HCl), a corrosive and dangerous gas. For this laser, metals, even thin ones, cannot be cut or engraved, because the metal will reflect the low laser energy of the machine.

George's presentation slides can be viewed at these two web links:
Woodlands Innovation Zone - Maker Barn

Safety Moment

Vance Burns showed several slides on safety signage. While well intentioned, many of the signs conveyed messages other than safety. Signs should state succinctly and clearly the imminent hazard. A safety sign is no place for humor, sarcasm, or proselytizing.

Dick Kostelnicek cautioned the members to avoid the use of silicone putty for ear plugs. He used pliable silicone putty to plug his ears while swimming. On one occasion, after removing the ear plug material, he left a small piece of silicone in his ear. Upon using a Que Tip to remove the moisture in his ear he pushed the silicon piece deep into the ear canal. An Ear, Nose, and Throat physician removed the lodged piece via a suction tube. Dick learned an expensive lesson.

Show and Tell

Norm Berls showed a holder that he made for a dial indicator. He had a significant problem after drilling the hole for the indicator and cutting the slit. The metal would not give sufficiently to allow compression of the plunger housing. Norm had to heat the holder to stress relieve it. This allowed compression of the opening formed by the slit. (Photo left.)

Dick Kostelnicek explained and showed the results of how he replaced on a task lamp the bell shaped shade with incandescent bulb with a LED light fixture. He added a step down transformer to power the 12 volt LED light fixture. The advantage of the modified task lamp is a bright light without the heat of the incandescent bulb. Dick showed another LED light fixture that he mounted on his mill. (Photo right.)

A member showed photos of a large hydraulically operated mill used to make parts for robots. Also, he showed a picture of a hoist that he made from 1 ½-inch roll cage tubing. (Photo left.)

Warren Goss told the group about the success he had using cobalt bits and Tap Magic to remove stainless steel bolts on the deck of his boat. The bolts secure the wood decking to the steel deck, and Warren is replacing the decking.

John Hoff showed a video clip of a chip collection system that he designed and built for his mill. Flexible sheeting covers the ways of his mill and works well as a collection medium.

Dan Harper demonstrated how he uses shrink wrap to facilitate turning of the hand crank on his lathe. Simply put, he slips a piece of shrink wrap over the handle one uses to turn the crank. Doing so makes turning the crank much easier. Also, Dan showed examples of plugs

for the ends of motorcycle handle bars. He makes the plugs from Acetal Co-Polymer, a durable material easily cut and shaped on the lathe.

Brian Alley showed examples of anodized accessory parts used on motorcycles. Typical parts include axle end covers, handle bar end covers, and foot rests. (Photos below.)

Problems and Solutions - *Ask the Blacksmith*

A member wanted to know what horsepower motor would work best for a power hacksaw designed to use a 12 inch saw blade. A ¾ horsepower motor is a good choice for the application. Also, this member has a reamer with a long shaft that he wants to shorten, but he is uncertain about the use of the tool afterwards. With the shortened shaft, the reamer will work just fine. Lastly, other members recommended that this member use a two flute tap when making threads in tool steel.

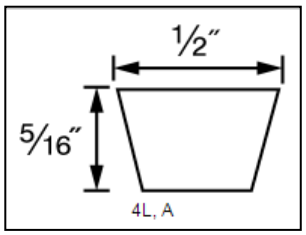
The member using the Smithy lathe saddle (See last month's newsletter.) that has sides that are not perpendicular reported that he received an estimate of $5000 to true the surfaces. Members suggested the purchase of a new machine would be the best option.

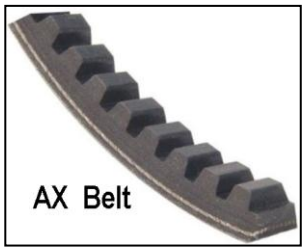
Articles

The A and 4L Belt Mystery

By *Dick Kostelnicek*

Two of the most common designations for ½-inch V belts are the "A" and "4L". Both have the same basic cross section as seen in the upper right drawing. When used on motor drives in the home shop, they are virtually interchangeable. Different manufactures will expound the virtues of one type over the other. However, for light duty indoor use, they are identical in performance. A slight variation is the ribbed version of an "A" belt called the "AX" that can easily bend around very small diameter pulleys and still grip tightly (see right photo).





The mystery about "A" and "4L" belts comes from the difference in the number that follows the "A" or "4L" prefix. This number refers to the belt's circumferential length. For example: a 4L580 belt has an outside measured length of 58 inches, while the A56 belt also has an outside circumference of 58 inches. For a 4L### belt, the outside circumference is given by the ### divided by 10 in inches. For A## belts, the outside circumference is given by ## + 2 inches. How strange and why do the numbers differ? Well, the number following the "A" is really the **inside** circumference and not the **outside** length. Since both "A" and "4L" belts are 5/16 inches thick, the circular outside and inside diameters differ by 5/8 inch; i.e., twice the belt thickness. Now, for any circle, if you increase the diameter by 5/8 inch you increase the circumference by 3.14 x 5/8 = 1.96 or approximately 2 inches. And that's why the number in the "A" belt designation is always 2 less than that for the "4L' belt of equivalent length.

"A" belts are numbered by the inside circumference and "4L" belts are designated by their outside circumference. Mystery solved!

Centering a Probe (or Another Tool) on a Mill

By *Martin Kennedy*

I have a Renishaw TP1s probe on my CNC mill. The probe tip shaft is fairly soft, and can be easily bent if the probe is dropped or vigorously bumped into the stock. The bend shows itself as a slight wobble when the probe is spun (after having been unplugged!). I have three replacement probes, but all of them exhibit some bending.

There are some screws on the top of the probe, and I thought it might be possible to re-center the probe using these screws. I didn't want to mess with them unless I was sure. I wrote to Renishaw and asked them about centering the probe. Their reply was that no, there was no way to center the probe, and you just use the software of your CNC machine to make the adjustment.
I'm using Mach3, and it has no built-in way to make this adjustment. I modified code that I had written to use the probe for edge and center finding to make the adjustment in software and wrote a new calibration routine. In use, I found that my probes needed X and Y adjustments from 0.010 to 0.030 to make them accurate. Additionally, the probe had to be used in exactly the same rotational orientation to both calibrate it and to use it. My mill does not have a quill lock, so I was getting it close visually. I wanted a better way.

I kept thinking about how I could modify the probe holder to incorporate adjustment screws. I came up with the following design, which was similar to another design I made years ago for a quill camera.

The piece on the left (above photo) is a Royal quick-connect adapter that I use in my mill. This is immaterial to the design and could be replaced with any connector or arbor needed. I drilled four threaded holes equally spaced around the circumference. These are for the adjustment screws. It is possible to use only three, but it's a lot easier to adjust with four screws. The piece on the right side of the above photo is a plate that fits up in to the bottom of the quick connect. It has three important features:

- There is a set screw to hold the shaft of the Renishaw probe.
- There is a large flat plate on the bottom that fits up against the bottom of the quick connect. This prevents any tilting from occurring during use and limits any adjustment so that it is constrained to the horizontal plane.
- There is a beveled groove where the adjustment pins press on the piece.

The adjustment pins consist of two pieces – a set screw and a brass pin. The brass pin is beveled on the inner edge. There is a hole cut into the bottom of the quick-connect that is somewhat larger and deeper than the part with the beveled groove to allow for some adjustment. In my case, I made the diameter 0.050" greater and the depth 0.025" greater.

In use, the set screws and pins result in two forces. One force moves the bottom adjustment piece around in a horizontal plane. The other force is created by the beveled groove and pins. This force tends to pull the bottom piece up into the top piece. The flange on the bottom piece limits this movement and assures alignment. The completed assembly is shown below.