December 2013

Newsletter

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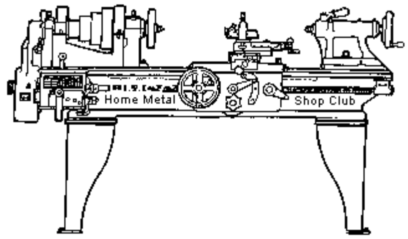


http://www.homemetalshopclub.org/

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 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 *Vance Burns*	Vice President *Norm Berls*	Secretary *Joe Sybille*	Treasurer *Emmett Carstens*	Librarian *Dan Harper*
Webmaster/Editor *Dick Kostelnicek*	Photographer *Jan Rowland*	CNC SIG *Dennis Cranston*	Casting SIG *Tom Moore*	Novice SIG *Rich Pichler*

This newsletter is available as an electronic subscription from the front page of our website. We currently have over 456 subscribers located all over the world.

About the Upcoming 11 January Meeting

The next general meeting will be held on 11 January at noon at the Jungman Library, located at 5830 Westheimer Road in Houston, Texas. This location is near the intersection of Westheimer Road and Augusta Drive (west of the Galleria). HMSC member, Mike Hancock will give a presentation on "From Idea to Part - Basic CAD/CAM."

Visit our website for up-to-the-minute details, date, location, 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 librarian, Dan Harper. 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.

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. 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 welcome. 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.

Norm Berls acknowledged the reference in a worldwide publication, *Home Shop Machinist,* of a technical article contribution by club member Dick Kostelnicek. Way to go, Dick!

Recap of the 14 December General Meeting

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

Twenty (20) members attended the noon meeting at the Collier Library. There was one guest: Darrell McCurly. President *Vance Burns* led the meeting.

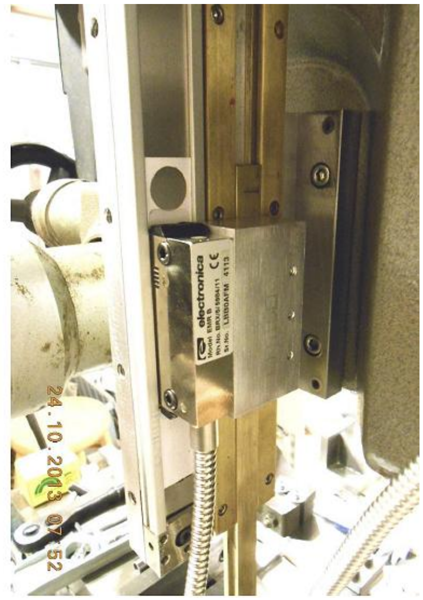
The club has funds to purchase new books for the library. If you have suggestions, contact the librarian, Dan Harper.

Presentation

Club member Norm Berls gave a presentation on "Adding a DRO (Digital Readout) to a Rong Fu Mill/Drill". After owning the mill/drill for thirty years, Norm decided to add a DRO to it. He had three requirements: 1. The DRO had to display 0.001 precision; 2. The addition had to cost less than a new mill with CNC (Computer numerical control), and 3. The addition had to be faster and easier to use than using a dial indicator with the mill.

As recommended by another club member, Norm purchased a DRO Pros model EL-400 (3-axis DRO). It had magnetic scales and read heads. Unfortunately, upon receipt of the DRO, Norm realized the DRO was designed to mount on a 'Bridgeport' style mill. This proved to be quite a challenge, as Norm had to both design and build new mounting brackets for the DRO.

Modifications to the DRO mounting brackets were made and attached to the mill. After installation of the scales and read heads, testing of the accuracy of the readouts began. In turn, using gage blocks for comparison against the control panel display, Norm tested each axis' readout.



Measurement discrepancies, either too long or too short, were apparent for each axis readout. The x-axis readouts had errors on the order of 0.001-inch or less; however, they were within acceptable limits. Errors measured on the y-axis and z-axis readouts averaged 0.009 and 0.0126-inches, respectively, and fell outside the range of acceptable limits.

Initial troubleshooting efforts revealed there is noticeable play in the quill movement resulting in extreme z-axis readout inaccuracies. Y-axis readout inaccuracies, while not as extreme as the z-axis, were significant. Additional trouble shooting efforts to resolve the inaccuracies are pending.

Here is the link to Norm's presentation slides.

Safety Moment

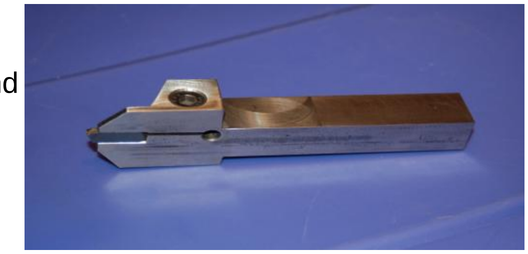
Vance Burns described how his wife, a personal exercise trainer, while trying to catch something she inadvertently dropped, made an unusual movement, fell, and fractured her wrist.

Joe Scott cautioned those present to get regular eye examinations. Symptoms of eye disease may go unnoticed for years, and when they do appear, it is usually too late to reverse the eye damage done.

Show and Tell

Dick Kostelnicek described how he silver soldered a bearing ball onto the ends of both a dead center and live center to use during offset turning on a lathe. See photo at right.

Joe Williams exhibited his collection of odd dies in decimal sizes (left photo) and a homemade carbide insert grooving tool (right photo).



Joe Scott displayed a metal butt plate he made for an antique M14/M1A rifle stock.

Problems and Solutions - *Ask the Blacksmith*

A member requested suggestions on the best way to cut about one quarter inch from the bottom of several metal pickets in a sliding gate. The gate is moved by a chain and sprocket arrangement to allow access to his driveway. Over the years, the ground has deformed to the point whereby the area under the middle of the gate has 'hogged' or become higher than the areas under both ends of the gate. Limited mobility of the member makes the task a difficult one. Suggestions included mounting a 'Dremel' type cut off saw on a narrow board to make the cuts while standing.

Another member remarked that belt sanders are good tools for sharpening carbide blades.

One member revealed that he has gotten satisfactory results using a saw blade for wood to cut aluminum stock.

Another member requested ideas on moving heavy equipment and suggested that subject would make an interesting presentation topic.

Novice SIG Activities

The novice group met to discuss and to learn the finer points of indexing.

Articles

About Helical Torsion Springs

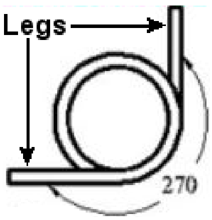
By *Dick Kostelnicek*

A helical torsion spring consists of a coil of stiff wire that is usually wound in a close wrap; i.e. adjacent loops touching. When twisting one end of a spring around its axis, a restoring torque is generated that tends to return the spring to its relaxed condition. Torsion springs are specified by the rate that the restoring torque increases with additional rotation. For example: suppose a spring is twisted by an additional ¼-turn (90-degrees) and produces an increase in restoring torque of 2.5-inch-pounds. The spring rate, sometimes called the spring constant is, therefore, 2.5 / 90 = 0.028 inch-pounds per degree.

The often used name of "torsion" spring is a bit of a misnomer. Actually, the way that the helical spring combats twisting is not its resistance to torsional stress. Rather, it lies in the wire's ability to resist simple bending. Look at a small arc segment of the spring's coiled wire. As the spring tightens, the radius of the arc decreases with each curved segment of the spring being bent a bit more. By contrast, a solid rod, when twisted, is actually placed in torsion. Torsion requires a completely filled cross sectional area, which is absent in the spring because the core is empty. A helical spring's wrap diameter decreases when it is twisted. By contrast, a solid rod placed in torsion will not have its diameter reduced. The reason: the rod's center is filled with incompressible metal.

Helical torsion springs perform best when they are supported by a mandrel, especially when they are long, such as those used with overhead garage doors (right photo). They are most often twisted in a direction so that their wrap diameter decreases. Hence, the overall length increases by exactly the spring wire's diameter for each full circle of rotation, irrespective of the spring's length. To monitor how many turns have been applied, paint a thin line along the length on a relaxed spring and then count the number of painted line twists after tightening.

The spring's resistance to twisting is inversely proportional to its length or number of turns. So, if you double the length, it produced only half the torque for a given angle of rotation. This makes the longer spring twice as weak but able to accommodate twice as many revolutions. Torsion springs are usually *called out* by their relaxed external diameter. The spring rate is directly proportional to the diameter. Since bending stiffness grows as the 4-th power of the wire diameter, the spring rate is heavily dependent on the wire size. Hence, increasing the wrap diameter by 20% increases the stiffness by only 20%. However, with a wire diameter that is 20% larger, the stiffness doubles (1.2^4 = 200%).

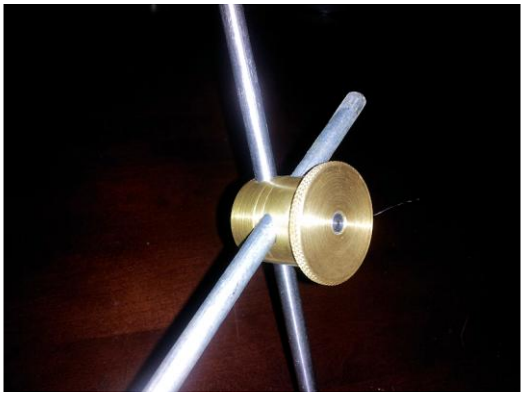


A torsion spring's ends can be terminated and attached to a supporting structure in two ways; "legs" or "threading". With legs, the relaxed spring ends exit the wrap in a tangential direction, usually at 90, 180, 270, or 360 degrees (left photo). With the threading method, the spring ends are screwed onto a threaded mandrel, a popular technique when used with overhead garage doors (right photo). With the threading method, a torsion spring should always be tightened so that the spring's helix tends to thread onto and constrict about the mandrel.

Finally, helical springs are specified as being either left or right handed. This is the same convention we use for screws and bolts. When looking along the spring's axis, a clockwise rotation would advance a right hand helical coil away from the observer. The legged spring in the above drawing is left handed.

Swivel Clamp

By *Martin Kennedy*



I'm building a misting system for my mill that will cool the tool bit. I needed a easy way to securely position the sprayer head. After looking at several designs, I made this swivel clamp. The knob allows you to quickly change how the two rods are clamped together. This was a relatively easy project, and it works quite well. Other uses for such a clamp would be as part of a holder for a dial or test indicator or as part of a vise stop.

I made most of the clamp out of brass, except for the screw which was made from carbon steel. Disassembled, the clamp looks like this:

Dimensions are as follows, left to right:
Screw – 1-1/8" long, 7/16" and ¼" diameter (head is ½"), ¼-24 threads.
Base – 1" diameter x 3/8" thick with 7/16" hole. Cross drilled ¼" hole.
Washer – 1" diameter x 1/8" thick with ¼" center hole.
End – 1" diameter x 3/8" thick with ¼" center hole. Cross drilled ¼"
Nut – 1 – ¼" diameter and 5/8" diameter, each 1/8" long (1/4" total length), knurled outer edge

Make each part in the lathe, less the two ¼" cross drilled holes. Assemble the part loosely. Clamp in a mill or drill vise such that the vise jaws press on the nut and head of the screw. Slip a 1/32" spacer washer that fits over the screw head between the base and vise jaw. You want the head of the screw to have a small gap (about 1/32") between it and the base. That way when you drill the cross hole, there will be a slight gap between the parts that will provide the clamping force when in use.

Drill the two ¼" cross holes. The one in the base is centered. The one on the washer end is offset about 0.265" from the center line. The hole is drilled such that it is mostly in the end piece, but intrudes slightly into the washer (about 1/16").

File down the face of the end piece about 0.010" to provide the clamping force between it and the washer.