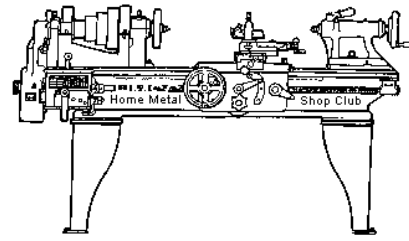




September 2012 Newsletter

Volume 17 - Number 9



<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 <i>Vance Burns</i>	Vice President <i>John Hoff</i>	Secretary <i>Martin Kennedy</i>	Treasurer <i>Emmett Carstens</i>	Librarian <i>Dan Harper</i>
Webmaster/Editor <i>Dick Kostelnicek</i>	Photographer <i>Jan Rowland</i>	CNC SIG <i>Dennis Cranston</i>	Casting SIG <i>Tom Moore</i>	Novice SIG <i>Rich Pichler</i>

This newsletter is available as an electronic subscription from the front page of our [website](#). We currently have 240 subscribers located all over the world.

About the Upcoming October 13 Meeting

General meetings are usually held on the second Saturday of each month at 12:00 noon in the meeting rooms of the Parker Williams County Library, 10851 Scarsdale Boulevard, Houston, TX 77089. Visit our [website](#) for up-to-the-minute details and for the main presentation topic.

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 and curated 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 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 who could make a presentation, please contact [John Hoff](#).

Recap of the September 8 General Meeting

By Martin Kennedy, with photos by Jan Rowland and Martin Kennedy



Twenty-six members attended the 12:00 noon meeting at the Parker Williams County Library. President *Vance Burns* led the meeting.

[Club treasurer, Emmett Carstens](#), collected Annual membership dues. We currently have 27 paid members. If you have not yet paid your dues for the upcoming year, please contact Emmett.

The HMSC tailgate sale was

held on September 3. About 20 members were in attendance to buy and sell machine tools and equipment. Many thanks to *Randy Jacobs* for hosting the event!

Rich Pilcher brought lots of garage-sale-priced and free tools to the monthly meeting.

Vance Burns and Martin Kennedy will be looking for a new, centralized location for meetings and will report back with a recommendation. If you know of a central location that could provide free facilities for our monthly meetings, please contact [Vance](#) or [Martin](#).



Safety Moment

Norm Burls found that he liked ½-inch" roughing mills with fine teeth for initial milling work. One bad thing about these mills is that they make very fine, sharp swarf. The small splinters stick to shoes, and are easy to track into the house. Norm stepped on one barefoot in his house. He could not get it out with tweezers, and in a few days he went to the emergency room.

There, he got a tetanus shot, but the staff could not get the splinter out either. He went home and used some coarse sandpaper on his heel until he was able to get to it with tweezers. To keep this from happening again, he bought a magnetic broom from a catalog. Members noted that these are also available from roofing supply houses. It was suggested to wrap the magnetic broom with saran wrap before use to allow easy cleaning. He found a smaller hand magnetic wand at Home Depot that works well on the lathe. For small swarf, he bought a telescoping magnet tool.

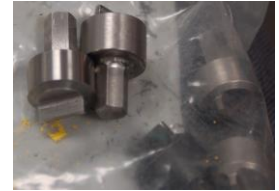
PS, the bill from the emergency room was \$1,400!

Presentation



Dan Harper, HMSC club librarian, gave a presentation on **Designing Things**. Although his presentation focused on mechanical devices, the techniques apply to many problems such as recordkeeping, manufacturing procedures and even recipes.

Dan's presentation conveyed how he learned, thought and worked. He said that everyone is creative. It's a skill that can be developed with practice. Most inventions are not created from scratch. Engineering is the art of improving what already exists. For example, Henry Ford's first car was not the Mustang Cobra. Honda Motors began by producing motorized bicycles that ran on readily available (at the time) turpentine. To illustrate the iterative nature of making something, Dan passed out many versions of screwdriver tips that he's developing for his Winchester rifles (right photo).



Things to remember during the design process:

- Begin with the end in mind (Stephen Covey – The 7 Habits of Highly Effective People).
- Who defines success? It may be you, the client, the public or others. Note that any of these may not be good at expressing exactly what they want.
- Define mandatory, desirable and undesirable characteristics? For example, it's mandatory that a boat must float, and desirable that it looks good. Rank non-mandatory items.
- Understand real and false constraints A real constraint is the physical properties of steel. A false constraint could be that steel is needed. Getting fixated on an item or misunderstood rules could lead to thinking a false constraint is a real constraint.
- Consider many possible solutions instead of just one “perfect” solution. Sketch out ideas, sketches, alternates, materials. Don't reject things at this point. You may need to put the project away and come back later when you're fresh. Some ideas may lead to other possibilities.
- Make quick drawings and mock-ups. Prototypes don't necessarily have to be the same as the final drawings. For example, make quick sketches and maybe a cardboard model of steel parts to work out the final design more easily. Dan generally starts a design with pencil and paper (and an eraser!). He then moves the design to CAD before committing the design to metal. Some people skip the first steps, and go directly to metal. Others don't like pencil and paper because they have trouble visualizing three-dimensional objects. The important thing is to use the technique that works for you.
- Guess about things that you're not sure about or that can't be established in advance. Henry Ford's first vehicle was the two cylinder [Quadricycle](#). Many things, like gear ratios, were guessed. Some of the guesses were wrong, but provided good information for building the next version.

Where do ideas come from? One source is to thoroughly look at existing things. This lesson came from Dan's college art instructor, who said that he wasn't Really Looking at something when he made a painting. Things can be used in other ways, modified and combined with other things. An example is that Dan uses a [lamp hickey](#) to hold parts for his lathe.

Take broken things apart, and find out how they work, what materials and techniques the designers used, and think about why they did it that way. A side benefit to this disassembly is having a store of many parts for future use.

Tomas Edison said that genius (or inventing) is one percent inspiration, ninety-nine percent perspiration. Just start small and simple, and you will succeed!

Dan showed some examples of his inventions:

- A milling vice stop. He found that the first version he built was hard to use and got in the way. He made modifications and improvements to produce version two.
- A travel stop for his lathe compound and cross slide. He has ideas to improve the first version, like design modifications to prevent bolt holes from filling up with swarf.
- A cut-off blade sharpener. Again, he has ideas on how to improve.



Vice Stop



Travel Stop



Cut-off Sharpener

Show and Tell

Dick Kostelnicek had a machining problem where he wanted to make small 1/8" rectangular cavities. He was using tiny 3/64-inch end mills running in his full size vertical mill at the maximum speed of 3600 RPM. He kept breaking them. He wanted to cut at a much higher speed, greater than 10,000 rpm. He bought a [1/8" Micro Air Die Grinder](#) from Harbor Freight. It fits in a 5/8" 5C collet. He made a new hollow draw bar. The bar seals against the top of the grinder, so he can provide air to the grinder from the top of the draw bar. The grinder exhausts through the slots in the collet. He can also use it as a tool post grinder in his lathe, with a 3/4" x 5/8" sleeve. He still breaks end mills, though! (see article below)

Lee Morin brought in a [Tormach Ring Light](#) with 14 LEDs and magnets that hold it on the mill. He said that it's very bright and works well. It cost \$33.



Joe Williams bought a round carbide insert at the recent tailgate sale. He made a tool holder with keystock. He said that it made a nice fillet in aluminum.

Rich Pichler demonstrated how to splice a plastic hose together using a putty knife he heated with a propane torch. This is similar to the method of connecting commercial buried yellow colored gas line pipe.



Martin Kennedy showed several cutters he made to hold different inserts that he had. One was made from a triangular insert, and could be used to cut dovetails. Two others used custom single-thread inserts. Another used a lathe single-thread insert. He also made a spring loaded tap follower for use in a drill press or vertical mill.

Problems and Solutions / Ask the Blacksmith

A member asked if there was such a thing as diamond sandpaper? Yes, from MSC, you can get diamond paste, powder, paper or embedded in plastic.

Novice SIG Activities

Rich Pichler and the Novice group discussed and demonstrated the use of a lathe tool post grinder.

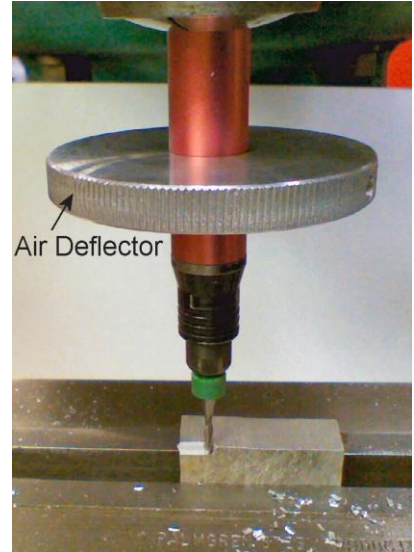
Micro End Mill Attachment

By Dick Kostelnicek

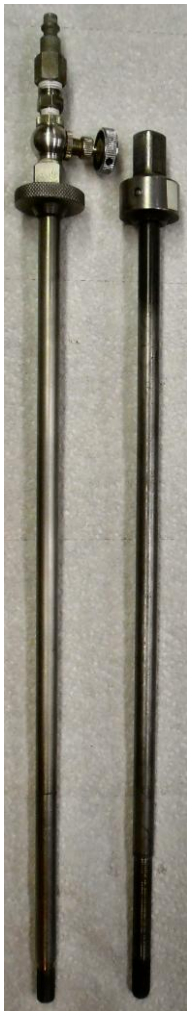


Using end mill cutters smaller than 1/8-inch in diameter on a full sized vertical mill presents a challenge. My mill is a MILLRITE, with a R8 spindle and a 1-1/2 HP motor. At its fastest spindle speed of 3400 RPM, the peripheral cutting speed on a 1/8-inch end mill is only 35 ft/min. For mild steel an ideal

speed is 100 ft/min. At max rotational speed, my mill heats the spindle bearings to the point where the grease liquefies and is thrown out of the bearing containment. The result: a grease streak about mid chest height on my shirt.

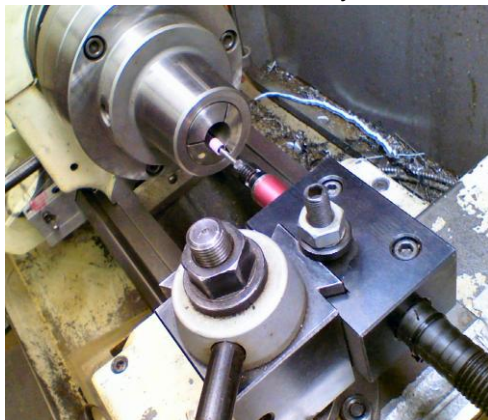


Rather than use the mill's motor for rotation, I employ a Micro Air Die Grinder (above left photo). It has a 1/8-inch straight collet and turns at up to 20K-RPM. Its body is 5/8-inch in diameter and fits into a 5/8-inch R8 collet (above right and lower right photos).



A homemade hollow draw bar is shown next to the conventional solid one (left photo). It has an airline quick connector and a valve to regulate the pressure to the Micro Air Die Grinder's internal turbine motor. The Die Grinder is secured in a 5/8-inch R8 collet. The air inlet to the Grinder is pressed against the bottom of the hollow draw bar and sealed with an O-Ring (right photo). Tightening the draw bar prevents the Die Grinder from slipping down and out from the collet. Exhaust air, exiting the back of the Grinder, is diverted downward through the three side slits in the R8 collet and released into the surrounding air at the collet's mouth. A clamp-on circular air deflector prevents the spent turbine air for propelling the swarf as the mill cuts metal (top right photo).

The Micro Die Grinder can also be used in a lathe as a tool post grinder. I use a 5/8 to 3/4-inch circular split sleeve to secure the Die Grinder in an Aloris-style 3/4-inch boring bar holder.



The Micro Die Grinder is shown at the left converting an inexpensive import imperial 5C collet to metric dimension by grinding its opening to a slightly larger size. You can also use it to correct run-out in collets.

