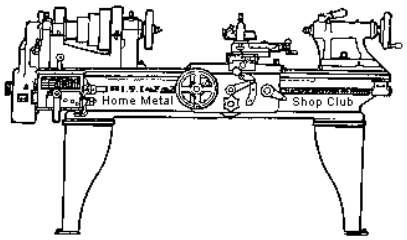
Home Metal Shop Club

May 2012
Newsletter

Volume 17- Number 5



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 a presentation with Q&A, followed by ***show and tell*** where the members can share their work and experiences.

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

About the Upcoming June 9 Meeting

General meetings are 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. The meeting location and time for June 9th has been confirmed.

Visit our website for up-to-the-minute details and for meeting topic.

Recap of the May 12 General Meeting

By Martin Kennedy, with photos by Jan Rowland

Twenty-six members and one guest, Tony Ciavattoni, attended the 12:00 noon meeting at the Parker Williams County Library. President *Vance Burns* presided.

If you would like to contribute a newsletter article, or discuss a topic, contact the Webmaster Dick Kostelnicek.

If you have an idea for a meeting topic, or if you know someone who could make a presentation, contact the Vice President John Hoff.

A tailgate sale was discussed, and is planned for this summer.

Two new agenda items were introduced at the meeting: a brief “Safety Moment” covering safe work in the shop, and “Ask the Blacksmith”, where questions are encouraged.

Presentation

Gene Rowan

Gene Rowan began his career in sheet metal at Parker Manufacturing Co in Santa Monica, California. For the past 40 years, Gene has owned his own company, Rollformers of Texas, in San Leon, TX. Parker was responsible for many innovations in the sheet metal industry, and Gene has carried on that spirit of invention in his own shop, as he makes and sells machines to work sheet metal. Gene also makes custom products, like roof hardware and door frames.

Gene spoke on basic sheet metal work, and plans to speak on advanced sheet metal work at a future meeting. He began the presentation with a discussion on the basic tools and machines needed for sheet metal work.

A small shop needs a metal shear, a bending brake (finger and standard), and hand tools such as tin snips and a hand seamer.

In the past, a Beverly Shear, or open throat shear, was used extensively in a sheet metal shop to cut straight lines, circles, and complicated shapes. Most commercial shops now use plasma cutters. However, a Beverly-type shear is still a good piece of equipment for use in a home or small shop (left photo).

For a small shop, if you only buy one brake, a good choice is a finger break. With this tool, you can make boxes and pans. Larger shops also have press brakes.

Air operated cut-off shear

Another inexpensive tool useful in any shop is a hand seamer (left photo). This tool can make a variety of bends.

Many other types of equipment are found in larger shops. These include:

- circle shears to make discs
- rollers to make tubes and pipes
- beading machines to make flanges or rolled tops, such as on buckets
- crimper beaders for joints
- slitting wheels

Powered Slip Roll

When you bend sheet metal, it becomes elongated. Generally, the metal lengthens by a factor of about 2 times the thickness of material with a 90-degree bend. This is a rule of thumb. To determine the actual amount of elongation, make a test bend on a scrap piece of metal. Annealing is generally not required after bending.

Account for the metal springing back after the bend. Generally, overbend by about 3 degrees for regular steel or as much as 7 degrees for high tensile material. It is easier to take out too much bend than to add more to it.

Metal shears need a gap between the blades of 2 to 3% of the thickness of the metal. Not having a gap makes cutting quite difficult.

Gene recently began doing electropolishing on stainless steel with equipment that he originally used for chrome plating. Electropolishing is similar to anodizing, but with much higher currents.

Safety Moment

For our first Safety Moment, *Vance Burns* recounted an incident where the disk of a high speed grinder of foreign manufacture came apart, and killed the operator when a piece of the disk went through his chest.

Martin Kennedy

Martin Kennedy recounted a personal experience early in his career, where he was being shown how to operate a 24-inch metal lathe. The instructor was telling him how important it was to periodically break the chips, since they were spinning, hot and razor sharp. Later in the demonstration, he forgot his own advice and pushed the chips with his hand. He yelled, pulled his hand away, and sprayed blood on the walls and ceiling before running off to the infirmary. Martin had to figure out how to stop the lathe, since it was still running. The instructor was lucky, but still nearly cut off two fingers. Martin says that was best safety lesson he ever received, and that he still thinks about it when he's using his own lathe!

Show and Tell

Martin Kennedy made a presentation about his trip to Sloss Furnaces in Birmingham, Alabama. This National Historic Landmark was in operation making cast iron from 1882 until 1971. It offers self-guided tours, and has active metal arts programs. People that have an interest in historical metal working facilities should visit the Society For Industrial Archeology.

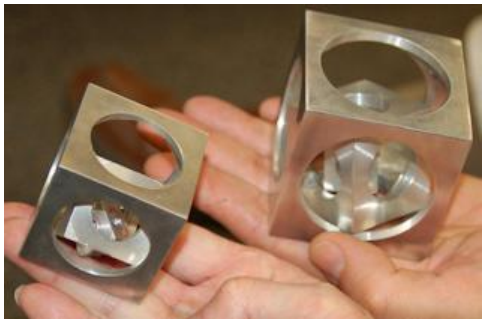
Joe *Williams* showed an unusual hand operated punch of unknown use (right photo). It is similar to a leather punch, except that it has a tapered pin and adjustable circular arc holes platen. He asked if anyone knew what it was, but no one did. He also passed around a fixture that he made for a job to turn 12 pieces of aluminum where the client didn't want a center hole. The piece fit over the end of the stock and on the other side had an indention that mated up with a lathe's live center.

Doug Blodgett

Doug Blodgett talked about how he is using a 20-gauge sheet metal cover for his locomotive boiler. The part was produced formed as a tapered cone. To start, he made a pattern from construction paper. Then, he transferred the pattern to poster board. He put the poster board on the sheet metal and sprayed the edge with bluing. After

the bluing dried, he scribed the edge with an awl. He then used a sheet metal swivel head shear that he bought from Harbor Freight. He was very happy with the performance of the tool and demonstrated its use. The type he used only cuts straight lines. There is another scissors type that will cut curves. Another way to cut sheet metal is to use a metal cutting jigsaw blade, and back up the sheet metal with plywood.

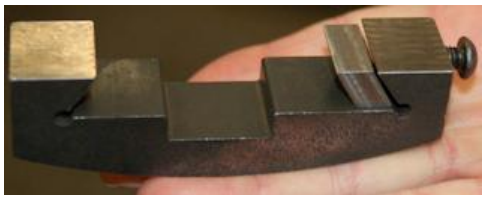
To finish the part, he rolled it with a slip roll. He made frequent aligning adjustment to produce his tapered sheet metal engine cover.



Randy Jacobs showed two well made aluminum *Turner's Cubes* that he produced on his non-CNC mill (right photo). Each cube has two more nested cubes inside of it.

Norm Berls was milling a flat steel bar to a specific thickness. The steel he used was cold rolled, and the metal removal process released residual surface stresses that resulted in bowed metal. He passed around the part, and said the he planned to make another one, but that he wanted to anneal it before milling. Some of the members suggested that he should machine off both sides in stages, or alternatively, use precision ground, stress relieved, bar stock.

Shannon DeWolfe said that he talked to the inventor of a new type of variable speed motor, and would be getting a sample to show at a future meeting.



Dan Harper built mini mill X-Y table stops, similar to the stops currently used on the Z-axis. To make them, he ordered a replacement Z-axis stop from Little Machine Shop and added a gib to account for the narrower dovetails on the table (left photo).

Problems and Solutions

Burnell Curtis

Burnell Curtis described his diagnosis of a chatter problem on his Sheldon 10x36 lathe. He described several measurements and tests that he performed. The biggest problem seemed to be that his carriage dovetails were no longer parallel, and the gib was worn out. He measured the dovetails using ball bearings and a micrometer. He found that they were 0.009" out of alignment. He could tighten the gib until the carriage wouldn't move, and the chatter went away. Of course, then he couldn't move the carriage. He wanted to know how he could fix the dovetails.

Members suggested that he machine a small brass block with a 60-degree angle. He could use the block with emery cloth or lapping compound, work slowly, and get the dovetails straight. Brass should be used with lapping compound because the grinding grit will embed itself in the soft brass and scrape away the harder steel from the dovetail.

Other members noted aditional fixes for chatter. It was suggested that he might try tool steel instead of carbide bits. Carbide bits take more force, and are more likely to cause chatter. Tool steel cuts with lower force because of the shearing action resulting from the back rake on the bit's top surface. Therefore, it is less likely to cause chatter. Also, using a larger radius on the end of the tool bit and lowering the speed if the chips were blue might help.

David Belinger showed a digital micrometer he received as a gift, and needed help with its operation. One of the members showed him how to use the various features.

Shannon DeWolfe discussed the crack he found in his cast iron turbocharger manifold at a threaded hole. He wanted to know if it would be better to try to fix it or to just replace it. After a discussion encompassing injecting materials into the crack and repair by brazing, the conclusion was that he'd be better off replacing the manifold due to the high temperature it would encounter during operation. The temperatures would be high enough to melt the brazing.

Stan Reves described how a bearing race can be removed from a blind hole by welding a bead on the inner surface of the race. After cooling, the weld bead will shrink, allowing the race to fall out of the hole.

Articles

Too Many Pliers

By Dick Kostelnicek

Being around a while allows you accumulate lots of hand tools. Also, though age may bestow wisdom, it often results in a shortened attention span. A corollary is the old adage "Out of Sight – Out of Mind".

Now, I have the right pliers and nippers to do almost any job, but I don't always reach for the best one when I need it. When I open a workbench drawer to get a pair, I usually go for one that's atop the pile (see above photo). And yes, like pants, pliers come as a pair. Reaching for the right one, often located at the bottom of the pile, can cause grave injury to fingers while lurking among all those sharp edges and points.

Here's my solution to the pile of pliers – a wood 2 x 4 with lots of holes (lower photo). My mantra now is "In Sight - It must be Rite". If you've lived in the Midwest and visited a Steak 'n Shake drive-in, you'll know what I'm talking about. They ground the beef and made their burgers right in front of you, not in some secluded back room or remote packaging plant.

Skiving a Skarf

By Shannon DeWolfe

A recent post on the Yahoo! Group devoted to Dave Gingery's shop built machines was titled with the exclamation, "Finally making swarf!" I know ninety-nine percent of those reading know what swarf means. But how many know why metal shavings are called swarf? Well I didn't. So I decided to investigate. It only takes seconds to find the etymology of most words with Google. I suspected a Viking connection to the word. Why? Read on.

At the November 2011 HMSC meeting there were two topics mentioned that at the time I did not realize were related.

The first topic came up during Rich Pichler's presentation. He described his method of skiving leather belt ends to form a scarf joint. Later, during problems and solutions, I think it was Joe Williams, asked about how to salvage NOS sanding belts. Even though the belts look brand new, they come apart at the joint as soon as the sander is turned on. The common thread? Both sanding belts and leather belts must have a scarf joint to be glued up as an endless belt. Certainly, leather belts can be laced or clipped together. But that is another story.

I knew the finished joint is called a scarf. I had a vague understanding of skiving. I wanted to know how these words came to be applied to the process and the result. Further, as belting has been *the* mode of power transmission for well over 100 years, I knew there must be a load of information available. Google, once again, became my research tool.

Skiving is defined as the cutting of leather, as in splitting into layers or slices. It also means "to shave hides." A third definition of which I was totally ignorant is, "to finish the turning of (a metal object) by feeding a tool against it tangentially." The common thread to all three meanings being the resulting thin cut. A best guess is skiving came into English usage through the influence of the 350 year long Viking occupation of Britain [1]. The closest word to be found prior to English usage was the Old Norse "skifa," meaning simply "to slice." Skiving can be used to describe the action of any slicing cut. As in, "Skive me a piece of cheese, please." But, skive and skiving have fallen from the common vernacular, with one notable exception. In modern British slang, to skive also means to shirk or evade, as in, "He is skiving off the job again."

Gem cutters use an iron lap called a skive for the final polishing of gem stone facets. It is unclear why an iron lap came to be known as a skive. One source claimed the origin as Greek. I spent considerable time trying to verify that claim with no success. However, neither could I find proof of any other origin. Until I learn otherwise, I will attribute the gem cutter's skive to the Viking source.

Skiving is now and has been for centuries used to describe thinning cuts on leather. The term is shared by saddlers, curriers, cobblers, hatters, tanners, in fact every form of leather manufacture. How did a Norse word that described any slicing cut come to be applied universally to leather? It seems there is a melding of meanings between two Norse words. The very similar English word shive is also of Viking origin. The Old Norse meaning, "to scrape skins", is very similar to the second English meaning of skive, "to shave hides". Just as skive describes any slicing cut, shive eventually came to describe any scraping action. Shive is also the root of shiver, as in splintered ("Shiver me timbers"). Though once the two words had distinct and separate meanings, shive is interchangeable with skive in recent English usage. But when it comes to leather, shiving still means to scrape and skiving still results in thin cuts.

Through the years the process of skiving to make leather drive belts has come to be applied to the resulting joint formed when the ends of the belt are joined, a "skived joint". This seems to be a relatively

recent development. I found no usage of "skived joint" prior to 1900. The leather was always skived to create a scarf joint.

How did the lap joint come to be called a scarf? Again, we can thank the Vikings. The Old Norse, "skarfr" roughly translates to "slant". It was used to describe the end of a board cut on a bias. Woodworkers form scarf joints and so do leathermen. From where did the Norse word come? I don't have a clue. Maybe they created the word. At least one school of thought attributes all words that start with "sk" or "sh" AND have an "i" or "y" that refer to any slicing action as coming from a very old Indo-European root language, now lost. That would mean that the Norsemen borrowed it from some Germanic tribe. Regardless, most of our English language is borrowed from another language and the "sk" family of words proves it out.

The Norse scarf is not to be confused with the more commonly used word of Latin origin with the same spelling and pronunciation. That scarf is a noun describing a clothing wrap. All I have to say about that scarf is, don't wear one in the shop.

While I was searching for the origin of skive and scarf, I ran into two other Old Norse words that came into English usage that are interesting. The aforementioned English word swarf was, in Old Norse, svarf. It means literally "metal dust". And finally, here is the etymology of the English word lathe:

> **"Machine for turning," early 14c., of uncertain origin, probably from a Scandinavian source (cf. Dan. drejelad "turning-lathe," O.N. hlaða "pile of shavings under a lathe," related to hlaða "to load, lade").** [2]

With my curiosity for the source of words satiated, I turned my attention to the problem of salvaging sanding belts that were beyond their shelf life.

I thought the sanding belts might be beyond salvage because of the paper backing breaking down due to chemical action of the glue at the joint. That is not the case. The problem is that the adhesive itself has a shelf life. These adhesives are not available to the public. They are only sold to sanding belt manufacturers and require machine application. To top it off, the adhesive developed for belting must be stored in liquid nitrogen for transport, held in a freezer until ready for use, and then applied under heat and pressure. Wow! You would think that an adhesive that requires that kind of handling would stand up longer than 2 years (the shelf life of sanding belts). Guess not...

The change in attitude toward what a man can or cannot do in his home shop is amazing. In 1944, Popular Mechanics showed a method to make your own belts from rolls. [3]

Less than fifty years later, an expert advised against attempting to do so. He outlined the reasons why, including the need for extremely cold storage for the adhesives. [4]

Adhesive technology has not stagnated in the intervening years. Are we to believe that no improvement over casein glue (made of milk curd [5]) has been found? Not likely. A commercial use for casein glue at the time of the Popular Mechanics article was to make plywood. Casein glue was abandoned by plywood manufacturers in the early 1950's because better (synthetic and cheaper) glues were found. If casein glue held well enough to make plywood and sanding belts in 1944, surely the "better" glues used by the plywood and engineered wood industry today would serve as well, right? Yes, but the glues used for engineered wood products are Phenol Resorcinol adhesives. These are hot glues that require a chemical hardener. They have a relatively short pot life and require more heat and pressure than a home shop is going to be able to cheaply achieve. And, I could not find a supplier in all my searches that sell to the general public. Hot glue was suggested as an alternative in the Popular Mechanics article. There are dozens of hot glues. Which one for this application?

Glue for a sanding belt needs to have a relatively high melting point. I don't know how much heat is generated on the belt surface. Obviously the heat generated depends on the work and speed. A reasonable guess is the belt will sometimes exceed 150ºF. Glue for this application must melt and flow at a temperature low enough to use in the home shop but, remain solid up to our arbitrary maximum working temperature.

This link is to a discussion concerning repairing belts exactly as the original question posed. The discussion never came to a close. One suggestion was to use iron-on patches:

http://familywoodworking.org/forums/showthread.php?16453-Re-gluing-sanding-belts

Here is a similar discussion that recommends using carpet tape:

http://lumberjocks.com/topics/3319

As brought out in that forum, tape of any sort will cause a bump because of the additional thickness of the tape. Ultimately the attempts to repair the belts with splicing a backing and using epoxy based glues failed. [5] However, some people reported success using a cyanoacrylate both with and without backing fabric. [6]

Finally, there is this method from "A Woodworker's Notebook":

http://www.amgron.clara.net/joiningsandingbelts.html

After several hours of searching for a method to repair sanding belts that have exceeded shelf life I ultimately failed to find "the" solution. Some repairs that seemed logical, failed immediately. Other repairs that seemed doomed from the start worked at least a little while. In summary:

- Butted and straight lapped ends should be avoided. The ends should be skived and scarfed.
- Backing, if used at all, should be of the thinnest material possible.
- Epoxy of any description fails. Hot glue of animal origin is probably the best, followed by cyanoacrylates.
- Repaired belts should be used as soon as possible. The adhesive will "go away" with time.
- Mount the belt so the top lap "follows". That is, the edge is never presented to the work.
- In use, be mindful of heat buildup. Avoid heavy work with a repaired belt.

REFERENCES:

[1] http://www.bbc.co.uk/history/trail/conquest/viking/loot_01.shtml

[2] http://www.etymonline.com/index.php?term=lathe

[3] http://books.google.com/books?id=gN8DAAAAMBAJ&lpg=PA127&pg=PA127 - v=onepage&q&f=false

[4] http://books.google.com/booksid=ifsDAAAAMBAJ&lpg=PA6&pg=PA6 - v=onepage&q&f=false

[5] http://books.google.com/books?id=Wqct82LvVB0C&lpg=PA359&dq=Casein%20glue&pg=PA360 - v=onepage&q=Casein%20glue&f=false

[5] http://lumberjocks.com/Karson/blog/17233

[6] http://www.woodweb.com/knowledge_base/Making_Sanding_Belts.html