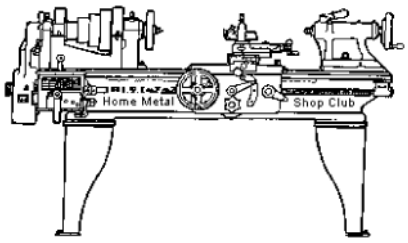
Home Metal Shop Club

October 2009

Newsletter

Volume 14 - Number 10



http://www.homemetalshopclub.org/

Since its founding by John Korman in 1996, The Home Metal Shop Club has brought together metal workers from all over the Southeast Texas area.

Our members' interests include Model Engineering, Casting, Blacksmithing, Gunsmithing, Sheet Metal Fabrication, Robotics, CNC, Welding, Metal Art, and others. Members always like to talk 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	Treasurer	Secretary	Librarian
Vance Burns	*John Hoff*	*Emmett Carstens*	*Dick Kostelnicek*	*Dan Harper*
Webmaster	**Photographer**	**CNC SIG**	**Casting SIG**	**Novice SIG**
Dick Kostelnicek	*Jan Rowland*	*Dennis Cranston*	*Tom Moore*	*Rich Pichler*

About the Upcoming November 14 Meetings

We're meeting at the Freed-Montrose library in Houston at 1:00 p.m. A business meeting will convene at the snack shop next to the Freed-Montrose Library entrance at 11:30 p.m. Jan Rowland will talk on *Ball and ACME screws in CNC and Machines that I Cobbled Together*. Visit http://www.homemetalshopclub.org/events.html for details about upcoming events.

Recap of the October 10 Regular Meeting

Twenty-two members attended the 1:00 p.m. meeting at the Looscan library. President Vance Burns presided. Guests included Dave Rutledge, Pete Bull, Nick Reyner, and Bill Peck (a blacksmith). A request was made for members to submit their metal working capabilities and willingness to help others (fee or gratis) to be put on a new club web page, All interested members should contact the webmaster.

Presentation

Bill Swann and Adam Hampton talked about the economic feasibility of running Bill's electric car from a primary source of a tracking photo-voltaic array in Houston TX.

Their analysis included all investment costs through the savings by not using gasoline. They determined that a 30-mile per day range could be supported by charging batteries at night from the power grid and reverse powering the grid from their photo-voltaic array during the day.

Adam Hampton demonstrated his open-loop tracking motor and electronics driving the array.

Show & Tell

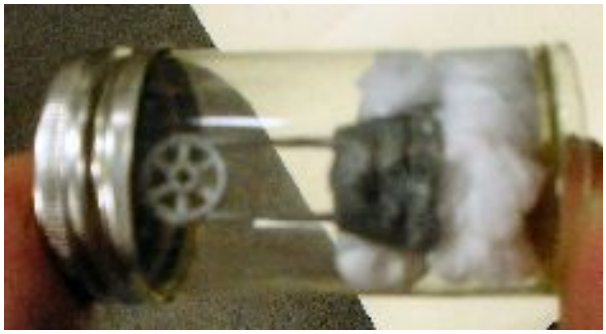
Joe Williams described a Glass Blowing Lathe (see article below) and showed his watch closing jig consisting of two hollowed-out aluminum cups that are used with a C-clamp to press shut a watch case.

Dick Kostelnicek demonstrated how to cut 1/8-inch diameter copper tubing by scoring it with a pocketknife and breaking it with the help a short length of overriding stiff tubing (right).

Dan Harper showed his extractor for broken taps (below).

Mike Winkler brought his homemade lathe center rest that uses ball bearing work supports (right).

Ed Gladkowski showed some very small injection molded model parts that he cast (below). He used molten ZA12 metal forced into a steel mold with the aid of steam generated from a “wet blanket” cover plate placed over the molten metal revervoir.



Articles

Making a Slugger

By *Vance Burns*

Louisville Kentucky is the home of the Hillerich & Bradsby Company, better known as the manufacturers of the “Louisville Slugger”. This is slugger city; as you walk down the streets there are cast bronze baseball bats set into the sidewalk, tipped against a nearby building, each one a scale model of a unique bat design with a bronze home plate describing the bat’s history. Quite charming.

Upon reaching the plant, the first thing you notice is a seven-story bat, tipped against the building. The scaled replica is something in it’s own right; constructed of A36 steel, it stands 120 feet high, 9 feet wide at the base and weighs 68,000 pounds. If it were full of Louisville pride, it would hold 30,000 gallons.

I’m not much of a ball fan, but I can attest there is enough baseball memorabilia displayed to warm the heart of any sand lot aficionado. My interests lie in the manufacturing process.

The outer sanctum of the plant held all the baseball mementos, and just at the plant tour entrance is a static replica of how the shop used to operate. The future bat billets were delivered as logs, which were cut to length and riven, split in eighths, resulting in the long triangular shaped pieces you see at left. The lathes were really interesting; they were called back-knife lathes, but these didn’t have a “back-knife” nor were they technically a lathe as we think of one, rather they had what I would call a “Profile

Cutter". As you can see, a large fixture supports hundreds of cutting blades, aligned to cut a full-length bat with one pass at the billet. These individual blades were identical to the blades on cabinetmakers' hand-plane; small, flat, rectangles. The fixture provided mounting points and the blades were bolted to the apparatus, which provided approximate positioning. Retargeting and realignment must have been a nightmare. Now imagine placing the triangular log segment between the spindles, turning it at a high speed, and easing it into the counter-rotating fixture... Danger Will Robinson!

Once in the plant proper, you are then taken into the woodturning lathe area, where manual turning is demonstrated. They then take you to the automated turning area, and explain how the Hemple Lathes were brought into the business, eliminating the 30 minute manual process, producing a profiled bat every thirty seconds. The cutter/vac assembly slides out of the way, back over the spindle, a billet is automatically centered, and then the cutter slides across the billet, cutting the bat in one pass as it follows a plate steel template. Professional bats are turned in the same fashion, however they are produced singly on a CNC system. Amazingly, little sawdust hits the floor, as the shop is surprisingly clean, with all of the collected waste going to Maine turkey farmers for bedding. The roughed bat is sent to the automated sanding systems, and then given the company brand. Ash bats are branded; Maple bats are labeled, being too structurally brittle to allow a brand. Aluminum Bats are manufactured in California.

Glass Blowing Lathe

By *J. R. Williams*

I finished making a dual headstock glass blowing lathe. Two slow speed stepper motors are fed by a common signal source so the two timing belt driven headstocks are in synch. Headstocks, chucks, and lathe bed were all made by Taig Corp. Both headstocks are mounted on beveled mounting plates attached to the large base block and the cross slide. There is a rear mounted carbon gage block that is pressed against the softened glass with a profile specific to the part being formed. The gage block is pivoted and swings out of the way while heating the glass. The machine is intended for making decorative oil lamp globes about 1-1/2 inch diameter and six inches long.

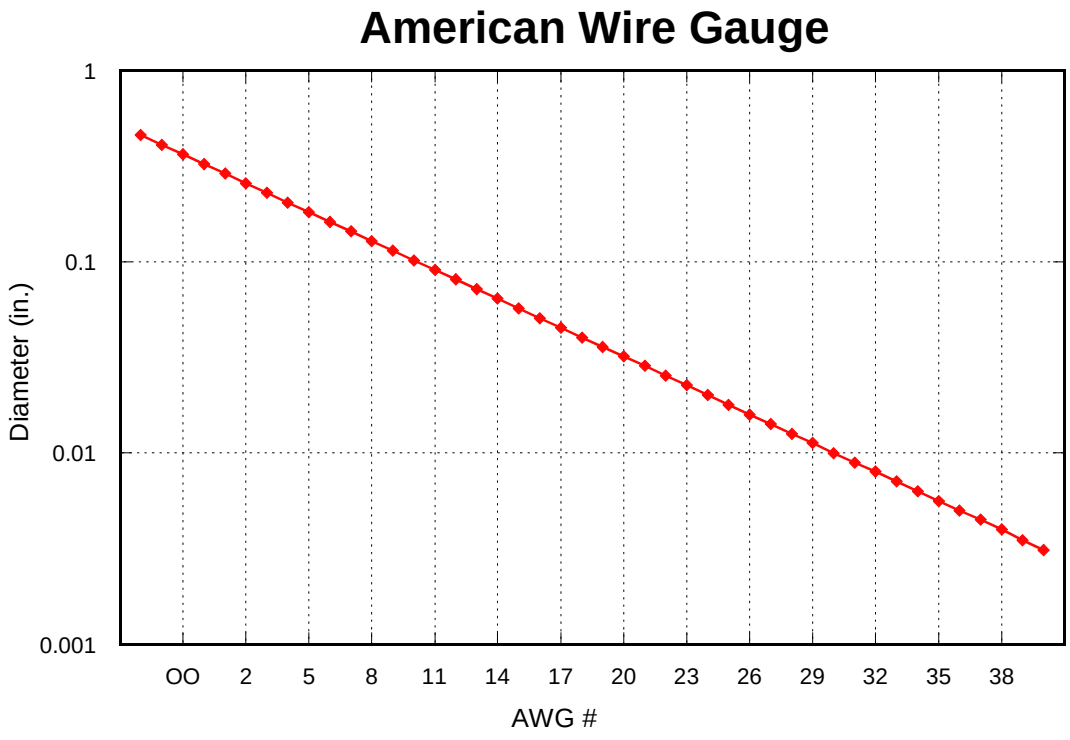
AWG vs. dB

By *Dick Kostelnicek*

Most mechanics know that decreasing the American Wire Gauge number (AWG) by 6 units doubles wire diameter. For example, #8 wire (0.1285 inch) is twice the diameter of #14 (0.0641 inch). Decrease it by 3 units and cross sectional area doubles. Now, change hats! In an electrical circuit of constant resistance, an increase of 6 dB (decibels) means that both voltage and current double. A 3 dB increase doubles the consumed power. All those 3s and 6s for doubling… what's the connection between AWG # size and the dB scale? The mechanic and electrician in us need reconciliation.

Traditionally, we've thinned wire by drawing it through a succession of smaller and smaller dies. The AWG's # size represents how many times the wire has been drawn. It starts with #0, a metal bar about 5/16-inch D. After two draws, it becomes #2 wire, 1/4-inch D. When we compare the wire diameters of any two adjacent gauge sizes, say a #5 and #6, we find that the ratio of diameters is 0.891. Each draw of the wire reduces the diameter by about 11%. The reduction in cross sectional area is 0.793 (the square of the diameter ratio) or 21%. You can verify this from a Circular Mill table (1 CM = area of a circular wire of 0.001-inch diameter.). The drawing process conserves metal volume. Hence, each draw elongates a wire by the factor 1.261 (the reciprocal of the area reduction) or by 26%.

Plot wire diameter vs. gauge size on a semi-log chart and you get a straight line. That means that the AWG system is logarithmic or *naturally scaled*. Said another way, a wire's percentage growth or shrinkage depends only on the change of gauge # and not on its original diameter. An elephant and a mouse both eat one gauge # (5%) of their body weight each day. The pounds they put on, however, are grossly different.



Have we skipped over the dB stuff? Hardly! Recall that Alexander Graham Bell's daughter had a hearing problem. He showed great interest in the connection between perceived sound level changes and the acoustic pressure acting on the eardrum. The gauge unit for a 10-fold increase in sound power was named in his honor, the *Bell*. Now, one *Bell* is a big change. A more familiar gauge is 10 times smaller, the decibel or dB (derived from the grammatically mangled deci-Bell). One dB is close to a *just perceptible change* in sound level.

The dB scale is just another gauge. Its dB value represents the amount of electricity relative to a base value, just as the AWG # expresses a wire's size relative to a #0 wire. Both gauges report the logarithm of the ratio of the base component to the item of concern. The base (starting value) for the AWG is the #0 wire with diameter 0.3249 inches and area 105,531 CM. The base for the electrical scale is 0 dB, represented by 1-milliwatt dissipated in a 600-ohm circuit having a voltage of 775-millivolts.

Wire cross sectional area and electrical power play similar roles in their respective gauges. Changes in wire diameter behave like variations in voltage or current.

Here's one last observation. AWG #'s increase as wire diameter decreases. The dB scale is the opposite, voltage, current, and Db values all change in the same direction. But, that's just a matter of taking the logarithm of a ratio or its reciprocal.

Anyone still awake!