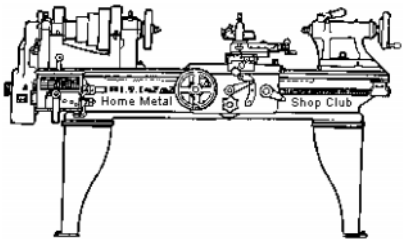
Home Metal Shop Club

June 2009 Newsletter

Volume 14 Number 6



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*

Election off club officers 2009-2010

Left to right: *Emmett Carstens - Rich Pichler - Vance Burns - John Hoff - Dick Kostelnicek – Dennis Cranston - Dan Harper*. Not shown: *Jan Rowland - Tom Moore*.

July 11 Meeting

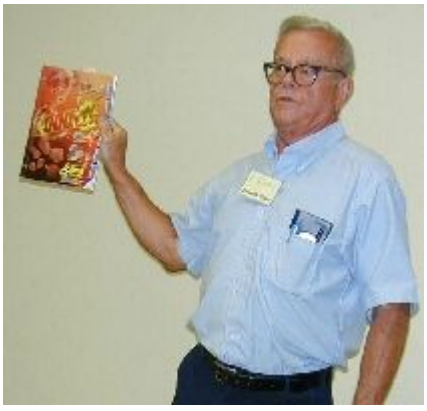
The July meeting will be held at an alternate location, the Freed-Montrose Library. Visit http://www.homemetalshopclub.org/events.html for details about upcoming meetings.

Recap of the June 13 Meeting

The regular meeting was held at the Looscan library in Houston, TX at 1:00 p.m. President Cliff Johnston called for the election of club officers. The newly elected officials are shown on the previous page. Thirty members attended the meeting along with two guests: Scott Jensen and Ed Lewis. Ed is a previous club member and we welcome him back. The newly elected president, Vance Burns, conducted the remainder of the meeting.

Discussion by Members

Tom Moore gave an overview of his recently published book A Composite List of Screw Thread Dimensions, which was distributed to club members at the May meeting. When asked '*What is the difference between a screw and a bolt?'* he quipped… '*A bolt has a nut!'* The book is free to new club members. It covers most English, metric, American, and tapered pipe thread forms. Tom has included information on the exact, nearest, next smaller, and next larger tap drill sizes.



Joe Scott showed how easily his name was written on a HS steel tool bit with a Harbor Freight diamond electric engraver. He also explained how he holds screws with the aid of a copper tube-flaring clamp in order to machine their heads in a vertical mill. Joe makes bolts that hold the license plates on refurbished London Double Decker Busses.

Joe Williams brought two elevating and work supporting wedges that he finished in a surface grinder. He discussed the challenges of supporting a wedge at an angle on the grinder's magnetic chuck and answered questions concerning heat warping of thin work while grinding.

Joe also mentioned that he will have an article published about a Contact Probe Tool in the Digital Machinist magazine this summer.

John Hoff brought his pneumatically operated sand-line shut-off valve. He explained that sand continued to fill the supply line of his blaster via gravity after closing the hand held nozzle feed valve. Upon subsequent blaster discharge, a stream of bulk sand spit out till the proper air-sand mixture cleared the line. The valve mounts between the sand tank's bottom outlet and the Venturi mixer. It closes off the sand supply hose by squeezing it between two rounded bar pincers. The pincers are normally held closed by a spring till a pneumatic piston forces them apart under pressure delivered from the hand held button valve. John's full description about his sand valve appears in Articles section of this newsletter.

Cliff Johnston showed a 12 volt power supply, purchased on Ebay, that he will use to electrically de-rust salvaged parts in a washing soda solution. A group of club members helped Cliff determine the proper wiring for 120V operation.

Joe Scott wrote an article about Electrolytic Rust Removal in a prior newsletter.
http://www.homemetalshopclub.org/news/sep02/sep02.html - rust

Gary Toll asked for suggestions about taking apart a staked (peaned over) universal joint cross assembly from an English Triumph auto. He also wanted to know how to machine slots for internal snap rings to confine the needle bearing cases upon reassembly.

Dick Kostelnicek described a problem with switching on fluorescent lights in his shop during hot, humid weather. The lamp fixtures are located above an acoustical drop down grid ceiling. The shop is air-conditioned. However, the lamps are exposed to outside weather conditions via the attic space. The lamp switch has to be flipped on and off in rapid succession till all lamps illuminate. This is not a problem during the winter's cool dry months. He received corrective suggestions such cleaning the dirty lamp socket connectors. Dick says he has tried every thing possible including tube changes, adding an aluminum foil electrical static contact strip between the tube body and fixture ground, etc. Often just touching the glass tube will cause the lamps to illuminate. Others members commented on having similar fluorescent lamp problems. Any suggestions are welcome.

Rich Pichler, the Novice SIG coordinator, asked for suggestions on how to wind springs on the 10" lathe that he uses for instructional purposes. All comments centered around buying ready made springs since no one winds them at home any more. You would need to stock a range of piano wire sizes, and besides, it is a dangerous process. You could pop your eye out!

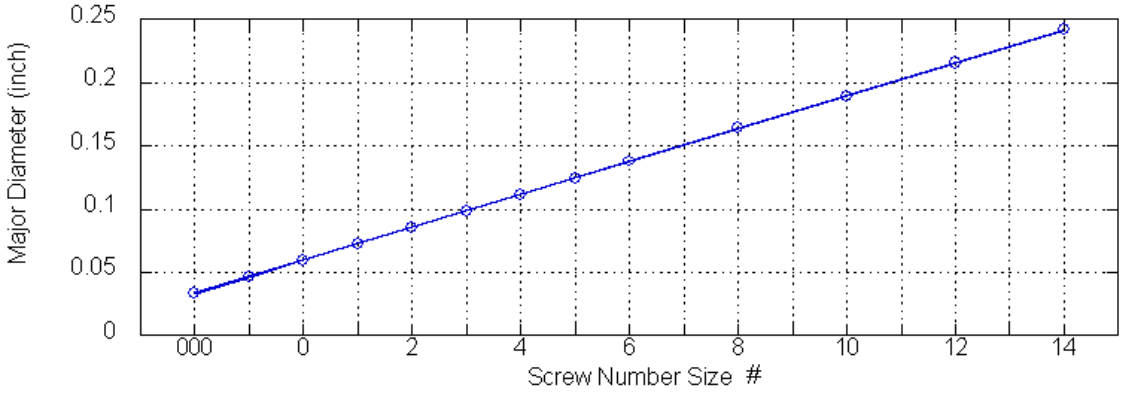
Lee Morin, Nasa Astronaut, talked about project Orion, the new space vehicle that will replace the current shuttle. He answered question about the recent Hubble telescope upgrade and how they chose the astronaut who removed all those tiny screws wearing large space suit gloves.

Articles

Formula for Major Diameter of Numbered Screws

By *Dick Kostelnicek*

I've always been aware of a monotone-increasing relationship between a screw's number size and its major diameter. For example, a #4 screw has diameter 0.112 inch, #5 has 0.125, #6 has 0.138, etc.



The above graph shows that there is, in fact, a linear (straight line) correspondence between the screw's number size **N** and its major diameter **D.** This relationship can be expressed as a formula:

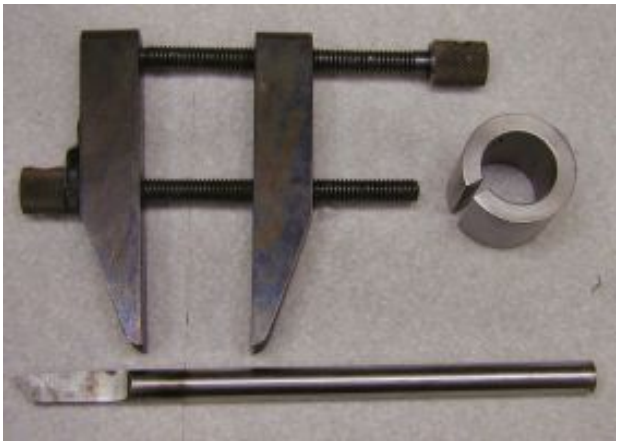
$$D = 0.060 + 0.013 \times N$$

It's easy to see that a #0 screw has diameter 0.060 and #10 has 0.190 inches. The formula works even for #00 (0.047 in.) and #000 (0.034 in.) screws when you use N = -1 for the #00 and N = -2 for the #000 screw. Someone knew their math when they specified numbered screws!

Keyway Cutting by Hand

By *Dick Kostelnicek*

While installing a power feed to replace the knee lift crank on my vertical mill, I found that I needed a keyway cut into the lift shaft. A key engages a shaft-mounted miter gear that is driven by the power feed mechanism. Removing the lift shaft to cut the keyway would have been a formidable task. They do make motorized keyway cutters that mount directly on the shaft, but alas, I had no access to such. So I chose to cut the keyway in-place, the old fashioned way, with a chisel and hammer.



The upper photo shows the cutting process using a split guide bushing held in place by a clamp. The chisel was made from a hand forged piece of drill rod. It was heat treated with an oxy-acetylene torch and water quenched. Grinding to shape was done off-hand on a pedestal grinder.

Make sure the lift shaft is pulled out from the mill and held tight against the front bearing by the split guide bushing. Otherwise, as you chisel, impacts on the shaft will be transferred to the bevel gears inside the mill's knee, possibly causing damage.

Pneumatically Operated Sand Shut-Off Valve

By *John Hoff*

Figure 1. The control air cylinder is at the left, the jaw bars surrounding the vinyl sand hose in the center, and the main air supply valve on the right.

I recently improved my sand blaster by providing for automatic shut-off of the sand supply. It has a pressurized tank holding about 160 pounds of sand abrasive. A ¾-inch ball valve is connected directly to the tank bottom and regulates the rate of sand flow to the top of a ¾-inch pipe mixing T. Compressed air is supplied to one side of the T while the other side delivers a sand-air mixture to the blasting nozzle via a long discharge hose. The stock blaster was turned on and off by another ball valve mounted between the nozzle and the discharge end of the hose. This was the original setup for my pressurized tank sand blaster.

When idle, gravity continued to supply sand from the tank, completely filling the discharge hose. When blasting resumed, the nozzle had to first spit out all of the raw sand filling the hose before the proper sand–air mixture could be released through the nozzle. Furthermore, the ball valves were designed for liquids, and are totally inadequate for passing abrasives. After a short time, the valve seals degraded, allowing substantial air to leak from the nozzle while in the off position.

Here are my blaster modifications. The ball valve just below the tank was swapped for one having an O-ringed sealed shaft and a loose fitting rotating cross-hole to modulate the flow of sand. The tank and the downstream mixing T are always at the same pressure, hence only the shaft needs sealing. I admit that the original ball valve could have been left in place, since once set for proper sand flow, it is rarely adjusted again.

The sand-modulating valve is connected to the top of the mixing T with a one-inch reinforced clear vinyl hose. The hose is pinched shut by two 1-in. diameter round bar jaws. A spring keeps the jaws normally closed with the sand flow pinched off. The jaws are forced apart by an air cylinder, thereby allowing sand to gravity feed from the tank. This same air cylinder also controls the blasting air going into the mixing T via a mechanical link to the main air supply valve.

In operation, whenever the jaws are shut, no sand flows nor is air supplied to the mixing T. Two small 5/32-inch air control lines are taped along the entire length of the discharge hose and are connected to an air push button valve mounted behind the discharge nozzle. When the button is pressed, the piston activates, allowing both sand and air to be supplied to the mixing T.

Before the blaster modification, I was contemplating buying a larger air compressor mainly due to air leaks and wasting stored air while purging raw sand at the start of each blasting cycle. I have a 5-hp compressor, which now provides plenty of air for my blasting needs. Also, I was constantly changing out the ball valve behind the nozzle because it would soon leak from seal damage. All those problems are now in the past.