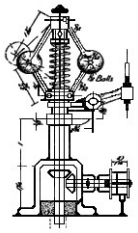

The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 246 November 2016

Membership Info. New members welcome! Annual dues are $25 (mail applications and/or dues checks, made payable to "NEMES", to our Treasurer Richard Baker) Annual dues are for the calendar year and are due by December 31st of the prior year (or with application).

Dues. It's that time of year again. We will start collecting the 2017 dues at the November meeting. Please bring your $25 check or you can try out our credit card system.

NEMES Apparel. We have NEMES denim button down shirts, t-shirts, sweatshirts, and aprons for sale. They make great Christmas gifts. The aprons are $20, the denim shirts $35, sweatshirts $25, and the t-shirts $15. Contact Rich Baker at 978-257-4101 if you would like to one.

NEMES Show. We traditionally have the NEMES show on the third Saturday of February, which is February 18, 2017, and we have reserved the Charles River Museum of Industry for that day. The date is approaching fast, and we need to start planning at the November meeting.

Cabin Fever. The Cabin Fever Show in January is also fast approaching. If we want to send a bus this year, the club needs to organize the trip and start collecting funds for the bus. If you are interested, come to the November meeting and help organize the trip.

Next Meeting

Thursday, November 3, 2016 7 PM

Charles River Museum of Industry & Innovation
154 Moody Street
Waltham, Massachusetts
Directions are Here.

Speaker for November:

Bob Timmerman, NEMES member and CRMII volunteer will give a presentation about upcoming exhibits at the Museum.

Deadline for submitting articles is two weeks prior to the next meeting.

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In Memory of Fred Jaggi:

Fred Jaggi, longtime president of the New England Wireless and Steam Museum in East Greenwich, Rhode Island, passed away on September 24th at age 81.

Fred was born on July 2nd, 1935 in Providence, to Frederick E. and Clarice (Melvin) Jaggi. He was the husband of the late C. Valerie (Jacques) Jaggi, married for 52 years. One son Christopher preceded him in death and he is survived by two sons, Frederick P. Jaggi and his wife Tammy of Plano TX, Nicholas Jaggi and his wife Carla of Warwick, RI, and six grandchildren, Brice, Corey, Zachary, Nicholas, Ryan and Kaitlin.

Fred studied chemistry at Brown University and graduated from the Massachusetts Institute of Technology with a Bachelor of Science degree in chemical engineering. Fred had a long and illustrious career in the petrochemical and energy industries. He completed projects all over the world. Fred and Val lived in England, France, Holland, and the US. They enjoyed travelling, spending time with their extended family, their dogs and spoiling their grandchildren.

Fred actively participated in many different organizations including the MIT alumni association, New England Model Engineering Society, Waushakum Live Steamers, and the North American Sundial Society. Fred also gave generously of his time and energy to St David's on the Hill Church, mobile loaves and fishes, Harrington House, Rhode Island Community Food Bank and the Hope Alzheimers Center. Fred was in good standing for over 50 years with the American Institute of Chemical Engineering. Fred served as the president of the New EnglandWireless and Steam Museum, and took great joy in hand crafting complex scientific equipment including miniature steam engines, sundials and orreries. Fred was greatly loved and will be sorely missed

Errol's Back!!

The annual open house at Rolly Gaucher's shop, always a good time, was made a great event by the attendance of Terri and Errol Groff. Everyone enjoyed catching up with the pair and Terri took lots of pictures, including the group photo below. The rest can be found on the NEMES web page – which Errol has put a lot of work into over the last month or so.

And did I mention the fabulous food at the event? Peter Sevier brought his "Kilowatt Wok" and made a terrific stiir fry. And Steve Cushman brought homemade cranberry bread that was so good there were several requests for the recipe. So here it is.

Quick Cranberry Bread

Preheat oven to 325°. Grease and flour a 9"x5" pan.

Prepare ingredients:

- grind 2 tsp orange rind
- squeeze 2 cup orange juice
- chop 2 cup walnuts
- melt 2 tbsp unsalted butter
- beat 1 jumbo egg
- 2 cups cranberries
- 2 tbsp hot water

Sift together into a large bowl:

- 2 cups flour
- 2 tsp salt
- 2 tsp baking soda
- 1 2 tsp baking powder
- 1 cup sugar

Blend the prepared ingredients into the sifted flour mix in the large bowl. When completely blended, transfer the mix to the pan. Grind an additional 3 tsp orange rind to top the mixture in the pan. Bake for 1 hour, 10 minutes.

From the Gazette Archives

From the June 2000 Gazette

The main speaker for the night was Dick Wagner of Mogo Rehab Inc., 193 West Avon Rd,Avon, Conn 06001, telephone/fax 860-673-5324.

Dick represents Devitt Machinery Company, the exclusive United States agent for Moglice, which is the trademarked name of a filled epoxy product made in Germany by Diamant Metallplastic GmbH. So, to be correct and to keep the name from becoming a generic term like aspirin did,remember that Moglice is a brand of filled epoxy and not a general term for filled epoxy.

Moglice is something that Ron first came across on the Internet, where you can come across a lot of things that seem too good to be true. Moglice is one of those things, except that the more Ron checked it out the more it seemed that it wasn't - it's real. I think the story that grabbed my attention about Moglice was the fish ladder. One of the large dams somewhere out west used big acme screws to move the fish ladder up and down to match the level of the water behind the dam as it went up and down depending on how much they were using to spin the generators. They were big screws with big bronze nuts on them, and because of the weight of the ladders that were being moved the nuts had a short life, wearing out in only a couple of months. Moglice was cast in place into the bored out nuts in an attempt to find an easier and cheaper way to keep the ladders functioning so the fish could get up and down the river. Moglice eliminated the problems of nut wear on the fish ladder and they had been in use for a couple of years by the time we heard about it.

Moglice got its start in 1964 when a customer who wanted a moldable low friction surface approached the owner of Diamant. Diamant came up with an epoxy filled with molybdenum disulfide. They made it into a curable putty. Shim the carriage of a machine tool into alignment with a nice true bed, put mold release on the bed, mold it to fit so the Moglice stays attached to the carriage, and you have a perfectly aligned carriage without having to scrape anything to fit.

You can do it with a new machine, or you can do it with a machine that needs to be rebuilt. Dick Wagner goes to customer sites and trains them to do future Moglice applications while doing a needed repair or rebuilding job on their machine.

An example is the nut he had with him at the meeting for a sample from a P&W Jig Bore. The bronze nut was worn, but the leadscrew was okay. He bored the nut out about .120over the major diameter of the screw, coated the screw with mold release, used alignment rings to hold the screw in alignment, and injected Moglice into the nut through a hole drilled in the side of it. Then he waited 24 hours to get a good cure. At that point if the screw turns too tight in the nut you can lap it in with a non embedding lapping compound, such as Timesaver brand.

You have about a one-hour pot life when using Moglice, followed by a 24-hour cure to bring it up to full cure and strength. Dick does not put Moglice into places where it is the sole support of something heavy, such as an unbalanced vertical slide. It's not that it isn't strong enough, it’s just that you can't be sure someone hasn't smashed it up against the stops and damaged it so that it's just barely holding on. That doesn't mean that it's not strong, just that you don't want to take chances.

As an example the P&W leadscrew nut just mentioned is on it's second set of Moglice threads. Dick pushed the first set out in a press to see how much it would take to break them. It took 14 tons, and the failure was in the bond between the Moglice and the bronze body of the nut, not in the Moglice.

If you have a ball nut that had died and you need to get back in business and can't wait two weeks for a new one to arrive, dump the balls and fill up the gap with Moglice. Then you can afford to wait ten years for the new ball nut to be delivered because the Moglice temporary repair will last that long.

The mold release for Moglice comes in a spray can and smells like furniture polish. Moglice is good for up to 400 degrees F, but you have to allow for the fact that at higher temperatures it's not as strong. You can use it in a bearing, but you have to remember that it has limited temperature capability and doesn't conduct heat away from the journal as well as a metal babbit will, so be careful.

How much does Moglice cost per pound? Dick wasn't sure right off hand, but pointed out that it's sold by the gram, which is a clue that it's not cheap. If you put it on about a sixteenth of an inch thick, which is about how thick you usually want it to be, it will cost about $80 a square foot. That's about the same cost as PTFE (such as Teflon from Dupont), which is its major competitor.

You can use if for half nuts. It's hard to fixture it to cast the half nuts, but you can cast it as a whole nut and then cut it apart after it's cured up. It cuts nicely but is tough on cutters and will take the edge right off of a carbide tool.

Moglice comes in three viscosities. A liquid for easy injection for nuts, quills, etc., a semi-liquid for carriages and such, and a putty that won't flow much at all. The bigger the machine is, the more economical it is to repair with Moglice. Dick did a 100-ton table on a machine in New Jersey.

Is it brittle? If you whack it with a hammer you can take

a chip out of it, but it'll support about 24,000 psi when it's cured.

How thin can you use it? Ten thou will do the job. If you go thinner you get problems because there isn't enough there to function properly. Sixty thou is about the optimum thickness. You can use a scraper and adjust things if you get it on too thick. If you position things with jack screws and set them right where you want them to be before you put in the Moglice you can get it to come out just were you want it so there isno need to do any adjusting later.

Dick met one guy at a show who wanted to know if he could use it instead of line boring for the camshaft journals in a VW engine. Dick saw him two years later and he told him the engine was still running fine. Don't use it on the cylinders though as they run a lot hotter.

It comes in 100, 250, and 500-gram kits, and they don't recommend splitting kits. Mix a whole kit at once and you know it will cure up correctly. If you split a kit it might not cure right if you don't get the ratios perfect. They recommend that you use your Moglice within a year. The putty is about 41 grams per cubic inch and the thermal expansion of cured Moglice is about the same as that of aluminum.

A three-eighths hole and a quarter twenty screw could make a good lead screw combination. It could work well in a place where there isn't room for a ball screw, such as the vertical slide on the Grizzly mini mill Ron is converting to CNC.

How do you lap it if you need to free up the nut some after you've cast it? Use a non charging compound, and when your done wash it out with kerosene. Howard Gorin suggested Bon-Ami cleanser from the super market as a good choice for a non-charging compound.

If the lead screw is worn and you are molding a nut to use on it, mold it at the end where it is worn the least. You'll end up with backlash in the middle of the screw, but the nut will fit. If you cast it on the worn part of the screw it will be tight on the unworn areas of the screw and if it's worn enough it might not fit over them at all.

As with all molding operations, if you want a good result you have to have a good part to mold against. If you mess up and haven't put enough in, Moglice will stick to itself so you can add more later if you need to.

Diamant make a product called DWH,which doesn't have the MdS in it and is for static applications since it is not low friction. It's used by a German company to align the columns on their machines when they manufacture them. They line up the column and inject the DWH. Counter intuitive that this would be better than scraping the column in to the base, but with the DWH you get 100 per cent contact between the two parts, while with scraping you get at most about 15 per cent contact. So they feel they make a better machine by using the DWH. DWH is about half the price of Moglice, and if you can get it into the gap between the two parts it's thick enough to do the job.

Sand blasting is a good way to produce an optimum surface for Moglice to bond to.

Making an Optical Punch

John Moran / Gadjet Builder

An optical punch is helpful in placing a punch mark accurately on a scribed point. A center punch can then be used to enlarge the mark. My unit is based on one shown on Harlan's Site(Disappeared 3/13).

Building an optical punch is a little harder than it looks, but not a lot. The main difficulty is making the optic; some trial and error established a technique which works pretty well for machining and polishing the optic. Some parts of this technique still aren't perfect so there is room for improvement - if you find a better way, please let me know.

My approach to making an optical punch is to make the base first and ream the holes so they are smooth and identical in size. Then, the optic is made and the diameter carefully reduced to fit the base. The punch is then made and adjusted to fit the base. Any looseness in the fit will affect the accuracy of the unit in use so it is worthwhile to get a reasonably precise fit - but not so tight that the unit moves as you swap the optic and punch. It is also possible to make the optic first and fit the base holes to the optic but it is generally more difficult to get the right size reamer than to turn the OD to fit a reamed hole; only minor adjustment of the optic OD is possible using fine sandpaper.

The Optical Punch Base

The base holds the optic and punch for storage plus it is used to position the unit in use. I used plastic for the base but brass or aluminum would work well also. Plastic is difficult to ream to a specific size in one pass

so it takes some extra fiddling to get the optic to fit the base properly.

My base has 3 holes but two holes would be a better choice. I made 3 holes with the idea that I'd line up the optic, move it to the spare hole, move the punch to the active hole, and tap the punch. I found that this makes it more difficult to keep the base from moving slightly so I routinely pull the punch out and lay it next to the base, line the optic up on the mark, pull the optic and put it next to the base, insert the punch and make the mark. A single hole base is possible but lacks a way to keep all the parts together for storage. A two hole base is, as Goldilocks opined, "Just Right" :-)

The optic and punch are made from 1/2" diameter material so the base should be about 1.125" diameter or more to accommodate them. The height should be 1" to 1.2" or so. The holes should be far enough apart to allow the punch and optic to be inserted without interfering with each other.

The holes can be made on the drill press or on the lathe in the 4 jaw. They should be drilled slightly undersize, reamed to 3/8" diameter and chamfered; the reamer provides a smooth bore so the optic and punch slide in and out smoothly.

Making Optics from Lucite

Lucite has a low melting point and this dominates its machining. It turns best with a sharp tool at fairly low speed (under 220 rpm); cutting oil or WD-40 helps to keep the temperature down and reduces the chance of melting. Attempting to cut at high speed may cause a very rough surface due to local melting. Parting Lucite is possible but I generally avoid it by cutting to approximate length in the bandsaw and then facing the cut ends - the low melting point requires very low speed for parting else the end is very rough. Lucite is softer than glass so it scratches easily. Fortunately, minor scratches have little effect on operation of the lens; if scratching is severe, the lens is easily re-polished using the methods below while spinning in the chuck (a collet-like holder isn't needed for re-polishing).

The ball/sphere attachment is, of course, constrained by these restrictions on speed with Lucite. Low speed, lubricant, and a steady hand on the handle are needed to produce a smooth spherical surface. Roughing to shape can be done with heavier cuts because a rough surface from heating will be removed by the finishing cuts. The finishing cuts should be done from outside toward the center, where I move the cutter away for the return to the outside since sometimes it makes contact and leaves circular "zones" on the surface. If there is a tit in the center, use a paper shim under the toolholder to get it precisely on center -- it is difficult to remove this bump during polishing with fine sandpaper (but sometimes it can be done).

Similar temperature cautions apply to polishing: 500rpm or less with WD-40 on 1500 grit paper converts the turned finish to a coarsely polished optic in a minute or two. Wipe the carbide paper to remove the plastic dust/WD-40 and add more WD-40 occasionally. Meguiar's polish for clear plastic on a linen cloth completes polishing in another minute or two. Always ensure there is some liquid (WD-40 for sandpaper, Meguiars or equivalent with cloth) to avoid melting the surface accidentally. It isn't always easy to obtain an optical polish so some trial and error may be needed; sometimes I end up re-doing the lens with the ball attachment if I get over-enthused polishing and cause surface distortion from heat. The lens may end up a little shorter than expected if this happens a couple of times but it doesn't seem to matter with most of the simple optics made using this technique.

Harlan used a file to produce the optic for his punch. My experience is that a fairly accurate spherical surface is needed or the view through the optic will be distorted. The optic for the punch is usable even with distortion because the distortion is symmetrical about the center but I find it disconcerting because the magnification of the circular target changes if your eye moves off the lens axis. I have tried to correct zones on an optic with a file and been unsuccessful: the resulting surface was rough and difficult to polish and/or the view through the resulting lens was distorted.

Optic for the Punch

A 2" length of 1/2" diameter Lucite rod is the raw material; it was available in 6 foot lengths at Modern Plastics in Bridgeport. The ball attachment is the simplest way to make a spherical optic with minimal distortion. A collet-like fixture is needed to hold the Lucite (so the ball attachment clears the chuck) while making the lens as seen here. Static electricity causes the plastic swarf to stick everywhere so a vacuum cleaner is needed for cleanup.

Mount the collet-like holder in the chuck, install the Lucite blank with enough sticking out to allow turning the 3/8 section. Adjust the collet to run true using the DTI. I barely tighten the chuck and tap the collet lightly to get the blank running true, then tighten the chuck.

Face the flat end (bottom) of the optic first, polish it as described above, then turn the 3/8" section of the optic to fit the base using low RPM and lubricant. Most any tool can be used to rough the 3/8 section but the cutoff tool works well to finish it because it has little rake; take

light cuts and use generous lube. Trial fit the base onto the optic (leaving it in the collet) and adjust the diameter as necessary for a good fit. I polish the 3/8 section to help it slide smoothly into the base.

To ensure concentricity, add the target on the flat end before removing the optic from the collet. To locate the target, clean off all lubricant and touch a blue Sharpie to the spinning flat end, producing a small dot about the size of the desired target - refine the size with a fingernail. My technique is to then place the cutoff tool adjacent to the flat end to act as a tool rest, advance it so the tool (the point on a set of dividers) can be steadied against the QCTP and rested on the blade of the cutoff tool. The point is then touched to the flat end of the optic to gouge a small circle; the center of this circle is untouched. The sharpie is immediately used to add color to the rough surface of the gouged circle. The ink dries quickly, then the flat end is polished again with Meguiars to remove extra ink; ink remains in the circle because of the rough surface but is removed from the polished area. The center of the circle improves slowly during polishing so take extra time to get this area polished as well as possible since this is where you'll be looking when using the completed device.

Reverse the optic in the collet and use the ball/sphere attachment to make the spherical magnifying lens. A radius of about 9/16" works well for an optic of 1.5" to 2" length; the focus should be about 1/16" beyond the flat end. I tried a smaller radius to get more magnification but it didn't work because the focus was inside the lens. As noted earlier, I cut from the outside edge of the lens toward the center and move the cutter away from the lens when returning it to the outside edge. Polishing is as described above.

The optic provides some small magnification and items should be clearly visible with the end of the lens touching the surface or 1/16" above the surface. Your eye must be near the axis of the optic but need not be close to the lens -- the view is much the same for a considerable distance. The lens gathers light from the surroundings and seems to light up the target area but only if you keep your head far enough away so light can get to the lens. To check the optic, move the holder so the target circle is accurately centered over a small dot, then twirl the optic in its hole while watching the dot; if the dot changes position relative to the target circle then either the circle isn't concentric with the OD or the optic is a loose fit in the holder.

Adjust the height of the base so the flat surface of the fully inserted optic is close enough for a clear view of the surface it is on while keeping the end of the optic clear of the surface so it doesn't get scratched. Glue a piece of super-fine sandpaper to the bottom of the base and use an X-Acto knife to trim excess sandpaper away. The sandpaper keeps the unit from sliding on smooth surfaces as you swap the optic out and the punch in. An alternative is to make a groove in the bottom of the base and fit an O-ring to provide traction without scratching.

The Punch

The punch is made from 1/2" drill rod, oil or water hardening. The height of the holder has been adjusted to match the length of the optic so the diameter and length of the small section on the punch body must be adjusted to match - relatively easy because steel is more predictable than plastic.

Make the punch using techniques similar to those used to fit the optic into the holder. To ensure concentricity, complete all turning without removing from the chuck. The point is a shallow cone which need not extend to the outside diameter. The length of the 3/8 diameter section should be such that the cone extends slightly from the base when it is fully inserted; trial fit and adjust diameter and length as needed. When this is complete, mark the overall length to approximately match the optic using the parting tool. Knurl the upper part for ease of handling, chamfer the sharp corners with a file, then part it off and face the top so it looks nice. Harden as usual for drill rod; I used oil hardening drill rod and did not temper afterwards because I've had good luck without tempering - YMMV.

In use, I tap the punch lightly, just enough to leave a mark, then put the optic back in and verify the mark is where I wanted it. If needed, I move the unit slightly and tap again (seldom necessary). Then, I feel for the mark with the automatic center punch and enlarge it that way.

Coming Events

Errol Groff

I have no information about any events in Novenber Please contact me if you have information about an event you wouldl like to share with the NEME-S membership.

Machines for Sale

Breakheart Tool Company
515 West Main Street

Tilton, New Hampshire 03276
603-286-8762 • Fax 603-286-8274

SURPLUS MACHINERY
November 2016

Call Dave Barbuto 603-387-6551

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5. Hardinge Lathe $ 1000
6. Covel Tool & Cutter Grinder w/ 6"x18" Magnetic Chuck $ 995/BO
7. 10" Craftsman Radial Arm Saw Needs Assembly $ 100
8. 7" Holz FR250 Cold Saw $ 250/BO