The NEMES Gazette

Vol 2 No 3
July, 1997

The Newsletter of the New England Model Engineering Society,
Stephen C. Lovely, Editor, POBox 277 Milford, Ma 01757-0277, 508-473-8621
Ron Ginger, Founder, 17 Potter Road, Framingham, Ma 01701, ginger@ma.ultranet.com

Our Next Meeting is at 7:00 PM on July 3rd, 1997 at the Museum, 154 Moody Street, Waltham Ma.

THE CAST IRON - 12L14 BUY,

All you heavy metal fans out there, I will need to know if you *definitely-will-be* attending the July 3rd meeting. Rick Tomer is very kindly cutting the stock up at his place in Ipswich, but *will not* be coming down on the 3rd. Therefore, I will drive up there to pick up what I think I can safely carry to the meeting with me - and no more. It won't be 1/2 a ton, more like a few hundred pounds. So, if you're in the "buy" and will ABSOLUTELY be attending the July 3rd meeting, give me a call at (617) 233-3671 (leave a message) and let me know. I will do what I can to bring as much as I can, but I don't want to haul it down from Ipswich to Waltham, and then have to haul it back up to Saugus. I have nowhere to store it, so it's a one-way trip, or nothing. Try to give me an idea of how urgent your needs are, too, in case more of you will be coming than I can accomodate on the 3rd. Thanks, Ed Kingsley

From the Editor's Desk:

This has been a busy month for me. I had planned on going, but things got busy and I missed Paul and Howard's swap meet, and I'm about to go out of town, so this issue may be a look a little bit rushed. Normally I print it out an give it the evil eye to cut down on stupid mistakes, but I don't have time so will apologize now for any stupid mistakes I don't catch before this gets printed.

See you all the 3rd.. -- scl

The Founders Corner
by Ron Ginger

MEETINGS.

I think the lounge area we used last meeting was much better on acoustics. We could very nicely hear the speaker. Unfortunately, the lighting in that area is designed for a lounge, and the lights make some kind of buzzing noise. I talked to Karen about it and she said they have tried to fix the light buzzing, without success. She also noted they have done some upgrading to the sound system, and suggested we try the new mike and work on getting the sound system adjusted correctly. We will keep working on this, until we get it right.

Our next meeting will be July 3, and I'm sure that wil mean a few fellows are likely to be headed off for the long weekend. We will hold our meeting anyway, so those of us not headed out of town on the 3rd can enjoy a meeting.

The July meeting will be the first attempt at a POSTER SESSION. The idea is rather like a Science Fair - everyone brings in something to show, we all can walk around and see what the rest of the group is doing. We did not pick a specific theme for this meeting - just whatever interests you. Maybe a part of some current project, or some favorite tool or fixture. How about the drawings for your 'blue sky' project you are going to start 'someday'? Whatever interests you.

Lets all bring along an item, and see how this meeting format works.

COPIER

Dick Cushing has obtained a copier for us, and Karen has offered an area just inside the storage area for it. We will also be placing a storage cab there to hold our supplies, overhead project, and our club library. We will get this all set up in the next month or so, by Septemebr our library should be available at any meeting, and members can make copies of specific pages as they need them. Once this is in place we wil look for members to donate books, magazines,plans, catalogs, etc to the library. It should become a very important part of the club.

CHARTER

Thanks to Mike Boucher for the work on the club charter. I noticed we had a few copies of his draft charter left after the meting. I thought EVERYONE would be eager to read that. It is important, and we will get a new draft with whatever coments we get on this one. I want to hold a vote on approving the final draft at the September meeting. This is important, and we will need to push ahead on it.

-- Ron Ginger

June -1997 Treasurers Report

Previous balance -------- $ 919.36
Ron Ginger - Banner ------ -106.71
Service charge ---------- - 3.23
Bank error (in our favor) ------1.00
Newsletter postage ------- - 58.81
Ron Ginger - Projector---- - 15.00
Dues ---------- 960.00
Dues ---------- 80.00
New balance ---------- $1776.61
Respectfully Kay R. Fisher

Calendar of Events

Saturday and Sunday, 28 and 29 June 1997. Orange Engine Show and fly in at the Orange Airport, Orange MA.

Thursday July 3, 1997 -- NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

26th and 27th July 1997 The 6th annual RC Subregetta at the US Sub Base New London CT.

Thursday August 7, 1997 -- NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Thursday September 4, 1997 -- NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

13 September, 1997, Original Yankee Steamup at the New England Wireless and Steam Museum. 9:00 AM to 4:00 PM Admission $5, No charge for exhibitors.

Saturday, October 4, 1997 -- STEAM EXPO at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Saturday Feb 21, 1998 -- Second Annual NEW ENGLAND MODEL ENGINEERING SHOW at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

The Meeting, June 5, 1997

The Meeting, June 5

This meeting started off right on time with Joe Picone, a Product Engineer from Norton Company who works with Ceramic Market Development for Superabrasives. He passed out a very nice catalog that covers the Norton line of Abrasive products, but only had seven copies with him. If you want a copy and didn't get one give him a call at 508-795-2333 and tell him you'd like a copy.

Norton is the largest abrasive manufacturer in the world., and the largest superabrasive manufacturer as well. Norton tries to match it's product ID system to the ANSI spec for abrasive ID, and it works out pretty well since the ANSI spec is also somewhat based on the Norton system. In grinding wheels they have three classes of wheel, based on the abrasive used. Diamond, Non-Diamond, and CBN (Cubic Boron Nitride.) The first section of a wheel ID designates the abrasive. Diamond grades all have a "D" except for "MSL". CBN wheels are either "CB" or "Aztec". Anything else is a Non-Diamond wheel.

The second group in a wheel designation is the Grit Size. 10 is coarse, 600 is fine, and there are a bunch in the middle. Next comes the Grade, from A- Z, although Norton doesn't make all the grades as standard product. A to H is soft, I to P is medium, and H to Z is hard. If it's a Vitrious Bond (like glass holding the wheel together) the next letter is "V", "B" indicates resin because "R" is used for rubber, and shellac is "E". Next come two optional values, a letter code indicating a variation in the bond of the wheel from standard, and a "P" if the wheel is designated as having a Porous bond

Diamond wheels come in grit sizes from 16 to 400. Resinoid, Metal, and Vitrified bonds are available and the grade is indicated by a letter. Next in the diamond ID comes the Concentration, which indicates the amount of diamond in the diamond layer. 25 is low, 100 is high. Next comes the bond type. "B99" is Resinoid, "M99" is Metal, and "V99" is vitrified. Last comes the depth of the diamond layer on the substrate, 1/16, 1/8, or 1/4. The "MSL" wheel is the Norton equivalent of a plated wheel. The diamond is brazed on so the diamond is bonded from the bottom rather than held down by a surrounding layer of plating, which gives an extra 15 % of life and a freer cutting action to the brazed wheels than the traditional plated wheel.

CBN wheels come in Grits from 60 to 400. Grades are "Q" for mild, "T" for intermediate, "W" for durable, and "Z" for most durable. "B99" is a Resinoid bond, and "M99" indicates a metal bond. The final item in the ID of a CBN wheel is the CBN depth. 1/16. 1/8. or 1/4.

Wheels are made up of three components, grit, bond, and air. Together they add up to 100 % of the wheel's volume.

Diamond is the hardest material known to man, but diamond doesn't work well with steel, use CBN for steel. For stainless you can use diamond, because it has a lot of things in it besides iron. Today, with synthetic diamonds readily available, CBN abrasives are about twice the cost of diamond abrasives, so people use diamond where they can and save the CBN for where it is needed.

Tough abrasives are durable and strong, giving better wheel life. Mild, friable abrasives fracture readily so the wheel stays sharp and there is reduced chance of damage to the material being ground. When choosing a grit size, use the coarsest grit that the product can tolerate. Finer grits will give a finer finish, and take longer to grind.

Vitrified conventional wheels are not safe at over 6500 Surface Feet pr Minute. They hold their form well - which means they are brittle. They are fragile and are fired at 2300 degrees F. Organic binders are good to 9500 SFPM and give a better finish than vitrified wheels.

Truing a wheel should be done at the first sign the wheel needs it. If you are running an ammeter on your grinder motor the current will go up as the wheel begins to glaze over and need dressing. When the wheel is really glazed you can see shiny spots on it, but if you wait that long to dress the wheel you will be wasting wheel life as the amount you will need to take off will be lots more than if you did it first needed it. Don't wait till you can see the wheel needs to be dressed. Truing the wheel leaves it with a smooth surface that will not cut. After truing the wheel needs to be dressed to where the binder back below the surface of the abrasive grains so they can cut the work. Use a dressing stick one size finer than the wheel you are dressing so the dressing abrasive can reach between the grains on the wheel and clean out the binder for free cutting.

You can do more with a vitrified wheel than with any other type. More of the vitrified binder makes a harder wheel. For cast iron Joe recommends a 37C 80 K 5 EBE wheel. for a point tool that will have a small ID he says to go to the "P" version for a more porous wheel. For a fine finish go to a 39C abrasive (green wheel.) For tool steel he suggests going to the 32A abrasive for it's high level of consistancy from wheel to wheel so that it is easier to establish standard procedures that will work from wheel to wheel. 57A is also good for tool steel.

Coolant is desirable in grinding and can add 1/3 to wheel life. A vitrified wheel will not be affected by water

as long as it isn't allowed to pool in the wheel and put it out of balance. Don't spin up a wheel that is out of balance because coolant has collected in the low side and thrown the balance off.

In any grinding cycle nothing is really stiff. Every time that the wheel comes up against anything things flex until something gives. It's usually the poor part. There are machine tool factors, work material factors, operational factors, and wheel selection. All four need to be right to get a good result, so no matter how good the wheel is or isn't, it may not be the reason that things are coming out bad.

At all times during grinding there are four things that are all in the picture and affecting the final result. 1:Abrasive/Work interface. 2:Chip/Bond interface. 3:Chip/Work interface. 4:Bond/Work interface. In addition there is the coolant effect. Coolant lowers the temperature of the interfaces as well as washing out the chips, which in turn effects the interfaces as less chips means less interaction of the chips with the wheel and the work both. A ground surface is a great many little arc shaped chips on top of each other.

What makes you choose a ceramic material? (Joe is from the Ceramic Market Development group - it's his job to get us to use ceramic parts.) For one thing they are even more resistant than carbide. Silicon Nitride Valves are now in use in Caterpillar and Detroit brand diesel engines where the heat is. Silcon Nitride is sensitive to the direction it is ground. If you grind the wrong way on the part with too large a grit it'll cause a crack that will lead to premature failure. More research has revealed what is happening. There are two ways to remove material, brittle fracture and plastic deformation. Brittle fracture is very damaging to ceramics. Brittle fracture causes subsurface cracks in the ceramic that later propagate to the surface, cause stress risers, and lead to failure. He prefers to grind the parts to finish, then to do minimal polishing. Lapping trades geometric accuracy for surface finish.

When mounting a wheel, try to get it as true as possible before tightening down on it so that it will run as true as possible. This will give less tendency to go out of balance when you true the wheel. The conventional way to true a wheel is to use a diamond. This will leave the wheel with the binder out to the surface. After using a diamond or a superabrasive to true it, use a stick to dress back the binder so the wheel will cut. Coming to the finish with a newly dressed wheel is the way to go. With the correct wheel selection you should not need to be constantly dressing, you should be able to do a lot of grinding before you need to dress. However, be sure to dress as soon as the wheel needs it - dress a coupld of tenths as soon as the wheel shows any signs of wear. An ammeter on the spindle motor will tell you when you need to dress long before you can see anything with the naked eye. Always use a blotter to take up the shocks, and make sure the flanges match and are in good condition. If the wheel is out of balance it'll vibrate, so balance the wheel on the spindle as well as truing it.

Coolant not only cools, it washes the chips, cleans the wheel face, and prevents chips from welding back onto the workpiecs. However, coolant splashing all over everything doesn't do any good. The only coolant that is benefitting the job is the coolant in the zone between the wheel and the work. Use an air scraper to separate the air trapped against the moving surface of the wheel so there is room for the coolant, and put the coolant into the zone so that the coolant velocity matches the wheels velocity. Don't use so much coolant that it's splashing all over things, remember that the only coolant that counts is between the wheel and the work. Don't use a mist on a grinder either though, you won't get enough coolant to keep things cool, and if steam is formed in the zone it can keep the fresh coolant from getting into the zone and make things worse than if you had no coolant. Remember, put the coolant in parallel to the grind.

Keep your coolant clean. A lump of crud in the coolant can mess things up, causing heat and friction spikes that are bad for the work and the wheel both. Get steel out with a centrifuge, settle ouf ceramic then follow with a 2 micron filter. Keep the coolant going by aerating it to keep anaerobic bacteria down, use a skimmer to get rid of tramp oil, monitor the pH, keep it clean, and watch it last a lot longer.

Forced compressed air is a good coolant for grinding, but be sure to use a dust collector. Use a vortex tube (Hilsch tube) for cooling the air.

ID grinding is the worst of all worlds. The stone tends to act as a dynamic bearing. Use a soft, free cutting wheel so you don't have to push hard, which would flex things and flex the mandrel, making things worse.

Joe was asked about inexpensive foreign wheels and grinders. Other countries have different regulations than the US. Here, three wheels from a batch need to be tested at 1.5 times the rated speed. Norton tests to 1.76 times the rated speed, then puts the 3 wheels into an archive and aren't sold. Joe saw a German machine where a wheel blew up after being dinged by a fork truck driver on the off shift who figured it was just a little ding in the wheel. The 1/2" Boiler plate wheel guard didn't keep the debris in, because there was a little tiny bolt to hold it closed that had failed. The US standards for safety are much more stringent than many foreign standards.

Joe has been at Norton for 25 years. They were sold to a French company a few years ago. At first he was concerned, but now he finds things better than they were.

A concentration of 100 in a diamond abrasive means that there are 72 carats of diamond per cubic inch, so 50% of the wheel's volume is diamond and the rest is binder and air.

Norton deals only through distributors. MSC is a distributor.

After the break Mike Boucher talked some about the organization. He had put together a draft of a proposed charter for NEMES to become a tax exempt non profit corporation. He suggested full and junior members, with junior members being from 12 to 17 years old. The only difference is that junior members can't vote. Mike had a handout and will be getting comments. We'll discuss it more at the July and August meetings and plan to vote on it in September.

Paul Gauffin is having a swap meet at his house June 14th, once again assisted by Howard Evers. Bring a basket of goodies to trade and plan on having a good time. Paul's selling his Jhead Bridgeport and his Horizontal Mill because he's moving in a couple months and doesn't want to have to plan to move them.

June 8 is going to be an open house at the Charlton Rail Road at the Charlton Masonic Home. 1 1/2" scale 7 1/4" gauge trains will be running. Officially open 10-4. Last year they gave 14,000 rides in one day.

John Wasser was inspired to get his 9" SB set up and running after coming to meetings, and brought in some parts to show that he'd finally gotten around to actually making some parts.

Don Strang had been looking to find tables for cutting external and internal threads to the US standards, but using a sharp 60 degree tool rather than a truncated tool as is typical in home practice. The result of doing this is that the roots of the threads are not truncated per the standard, but the crests will be. Since he couldn't find the tables anywhere for the depths of threads to cut with a pointed 60 degree tool he decided to calculate them. He had a table for external threads and another for internal threads, along with the supporting calculations showing how he arrived at the numbers in the tables. I'll get them into the Gazette, but am pressed for time this month so they'll have to wait for now.

Max ben-Aaron brought in a tapping jig. He has ME for 1974 in a bound volume, and saw the drill in one of Lautard's Readers and was inspired. It's made of pipe fittings from the builders supply. To hold the taps he uses a chuck similar to the nose on a drill brace for auger bits. He intends to make it into a staking tool.

Erroll Groff went on a field trip to the Precision Museum in Windsor Vermont. They are going to have an exhibit on the history of the bicycle this summer. The Simon Peirce Glass Works is also in Windsor and you can watch the glass blowers at work. The giftshop is very nice, but Erroll recommends you consider the seconds section. He had a couple of handouts. One on how to make all the pulley combinations you need for speed changes to come out the same length, the other on some good stores to visit in Maine. I've managed to get the one on the stores into this issue but didn't have time to get the other stuff organised and in. Hopefully next month. Email him if you would like a copy of the spread sheet he set up to calculate the belt lengths using Lotus.

Mike Boucher brought in a cylinder casting that he had needed to bore, and the boring bar he had made to bore it. He made a bracket to hold the casting where the compound usually goes on his father's 9" Logan and was pleased with the way it came out.

Hal Robinson brought in a couple of tiny (1/2" and down) hole saws he made, along with a right angle gearbox he uses on a drill to use them to get into tight spots. He uses them to light up model boat and airplane structures after they are together. He asked for suggestions for smalled right angle gearboxes and Henry Szostek suggested throwaway dental handpieces like they use to clean peoples teeth. Hal made the saws by hand filing the slots in the tubes.

Hal introduced Bob Cummings. Bob runs New England Brass and Tool, a small business that's putting out a new catalog soon. He's the largest seller of the Bison 5-C Collet Chuck in the country and carries a full line of Bison Chucks and Lyndex collets. He brought a few things in to show as samples and was pleased when he sold the collet chuck he'd brought. Not only did he make the sale, he didn't have to carry it back to the car either.

Tips And Techniques
by Ed Kingsley

A few items I've run across in the June sales fliers:

1) Kant-Twist Clamps (Klamps?) MSC and Westhoff both have them on sale for about 20% off. Westhoff is a few cents more, but offers a free plastic handle with the purchase of a regular size clamp, 1" to 6". (very nice, I got them for my clamps last month) MSC also has the handles on sale, so it's your choice. Great clamps, good prices. Get the handles. Westhoff - (800) 364-0280

2) If your milling machine will turn in both directions, Marshall's has a nice selection of Left Hand, Shell Mills, regular and Aluminum cutting, on closeout. They're good brands, I bought a couple and one was made in Germany, and one was a Hanitta. The 1 3/4" diameter is $7.50, up to a 6" for $85. A limited number of Arbors are on sale, too. If you can use em', check em' out. Marshall's - (800) 421-6467.

DRILLING PERPENDICULAR HOLES After finding more than a few holes drilled "off-axis" on my drill press, (they didn't come 'out' where I expected them to) I dug out my Starrett 6" Machinist's level and carefully leveled the table in both directions. Now, when I place a workpiece in the vice, I place the level on it and make sure that it's really parallel to the table, before I drill. Seems obvious, but the results have been very good. It doesn't take much of an angular error to put a hole out of perpendicular, sometimes by a whole lot. This works extremely well on the milling machine, too. NEVER assume that your vice is accurate or that it will hold a workpiece square or parallel. It rarely happens that way.

HANDY CLAMPS

Speaking of clamps, I picked up a pair of "Quick Grip", Mini Clamps recently, and like them a lot. They are miniature versions of the, now ubiquitous, grip tightening bar clamps sold everywhere. What makes these special is 1) their small size - 4" opening, and 2) their reversibility - the 'front' jaw is removable and can be attached to other end of the bar, facing out, giving the clamp the ability to work as a "spreader" as well. I find them very useful for grabbing things that I'm trying to put together with another, stronger clamp, quickly and easily. Sears sells the same things, under the Craftsman name, at $9.95 a piece. I've seen them discounted several places for a little as $7.50 (if you buy 4 or more). Look around, they're nice - made in Germany.

INDEX TO METAL SHOP ARTICLES IN OLD MAGAZINES

If you're Online, or have access to the Internet, check out Chuck Fellows Web Page. He has an Index to "Popular Science, Popular Mechanics, Home Shop Machinist and Projects In Metal", among others, going back quite a few years. It's listed alphabetically, by topic, and you use the "Find" or "Search" function on your Web Browser to find what you're looking for. Nicely done and useful, too. If you don't have the magazines yourself, your local Library might, or they can borrow them for you. My browser's "Find" doesn't seem to work right, however, so I downloaded the Index and use it Off-line. http://www.inficad.com/~chuckf/

THINGS THAT GO BOOM

Have a safe and enjoyable 4th, Say, anyone planning on "shooting an anvil", or two? Ahh, probably not a good idea in Massachusetts, these days, anyway. Fun though! Back in the "old days", both to celebrate important events and to make the 'enemy' (be they indigenous folk or Tories) think that they possessed cannon(s), people would gather two large anvils together with some gunpowder and a suitable fuse. One anvil (the larger) would be placed face down on the ground. The slight hollow in the base of the casting would then be filled with powder and the fuse positioned. The second anvil would be placed, face up, on top of the first, the fuse would be lit, and everyone around would run like hell! When the powder ignited, it is said, a mighty roar would ensue, "fit to scare the Devil Hisself", and the upper anvil would arise and very nearly assume low earth orbit.

Very loud, and *very* impressive, I'm sure. Any blacksmiths amongst us? Reloading must have been a bitch. Check out the 90's version - "Bowling Ball Mortar", at Dejanews.com, under last months rec.crafts.metalworking. Even more fun than lighting the BBQ with liquid Oxygen. Look for that in there, too. No, I am not making this stuff up .....

THE TOOL SHED (Please Note) The Tool Shed will NOT be open late on the 3rd of July. Andy expects that few of us will attend the meeting, that night, and has plans for the weekend which he wants to get started on early. He will be open late for us again in August. I might mention that, thanks to Andy, I now have virtually every size of US tap in existence, up to 1" x 8, and each one I bought at the TS, cost me only $.50. That's a hard price to beat, and all are sharp and most were, as far as I could tell, unused. Don't know if I can make it through a month without my 'fix'. Then again, maybe if I left for Ipswich early enough .....

-- Ed Kingsley

Resources

Need to get a flat belt laced up with all those little metal hooks? Give Harold Holland a call, he's got the equipment to do it as well as a supply of the hooks. He's at 401-828-4762 down in Cranston RI.

Classified

Roland Evans has a friend who is selling some equipment. There's a 10 inch Atlas Lathe, and a 6 inch Atlas lathe with a milling attachment.

Howard Evers has two things he's looking for:

1. Does anyone know or have any recommendations for a modestly priced computer drawing program, say around $100, suitable for HSM's? Please mention or discuss at the next meeting.

2. Does anyone have available a 1x10 tap and/or die? See Howard or call me at 508 987-0654. Thanks.

Letters

I will have family obligations over the 4th of July weekend so I will not be able to make the next NEMES meeting. Please post a notice in the news letter that I plan to be there the next month and in the mean time if anyone wants to pay their dues they can mail a check to me at home.

Kay R. Fisher 80 Fryeville Rd. Orange, MA 01364

Please make checks payable to NEMES.

After the June meeting I was chatting with the two wives that sit in the back of the meeting hall and mentioned the book Watch it Made in the USA. I said I would post the information on the book so that they could order a copy, so here is the info.

"Watch it Made in the USA"

Bruce Brumberh and Karen Axelrod

John Muir Publications

Santa Fe, New Mexico

ISBN 1 56261 157 7

The book can probably be ordered from any book store and is well worth the price ($16.95 or so).

Errol Groff

Steve:

Some grist for your mill:

1. Paul & Howard's most excellent swap meet, flea market, clam chowder and marching band society get together was just that-MOST EXCELLENT!! Almost everybody came with some trash and some cash and went home with somebody else's cash and trash. Actually, there was more swapping than selling and everybody seemed to enjoy themselves. We'd like to do it again in the fall, and hope we have more members attending.

2. Paul G. has been able to set up a special "buying tour" of the defunct Union Twist Drill Co. of Athol, MA. This company closed down about 12 years ago and the detritus of this large machine shop is slowly being sold off. There are cutters, mills, drills,tools, steel, cast iron, shim stock, lead screws, mootors, and lots of other stuff available. The suprintendant will let us in for two hours on a Sat. morning in August. After 2 hours you carry your plunder to the door, the super quotes a price (usually less than 5 or 10 cents on the dollar, and off you go. Please let Paul know if you are interested.

Thanks.

Howard Evers

The NEMES Gazette

c/o Stephen C. Lovely

Post Office Box 277

Milford, Ma. 01757-0277

newsletter of The New England Model Engineering Society