

# The NEMES Gazette

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*The Newsletter of the New England Model Engineering Society,  
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## From the Editor's Desk:

Another month has gone by already, and the show is nearly here! The last I heard from Max there were a lot of you who still hadn't signed up for a space. The latest Financial report from Joe Masciovecchio indicates that we've got 81 members now, so 3 out of 4 of us still haven't signed up for space at the Show. Don't be shy, dust off those projects and bring them on down. If they're too big to carry up the stairs, bring in some pictures or a video.

I've included a copy of Kay Fishers NEMES Profile form with this issue to be sure that everyone has one. If you have access to email, send him a message and he'll send you a copy of the form to fill out and email back to him. It'll save him a lot of work putting the Profile together.

See you all next Thursday night. -- scl

## The Founders Corner by Ron Ginger

### The Show

We are getting very close to the show now, so I hope everyone is sorting out their projects to bring.

We met with the Waltham Fire Department and have agreement on our fuel use for the show. Each exhibitor is allowed to bring in engines with a full fuel tank. If additional fuel is required during the day, we will refill from a single can held by the show safety committee. We need to be cautious when refueling an engine that no nearby engine has an open flame-like a Hot air engine.

A small propane tank is allowed, as well as Sterno or similar fuels. Just be sure to bring the absolute minimum amount that will let you run a few times during the day.

I think we will have coffee available during the show. I suggest you plan to bring a bag lunch, since there will not be food service in the museum, and I'm not sure of any nearby lunch places. Besides, you wouldn't want to have to leave the show for lunch.

I expect to have a detailed handout at the meeting with directions for the show, but in case you miss that, the most important item is about parking. As always there is NO parking in the area behind the museum. A Police Detail is usually there to insure this. You can drive to the back door, at the loading dock, and unload your models. We will have a few guys on hand to help move your models to a table, while you move your car to legal parking. Park in the Embassy lot, across the footbridge, as always.

I think we are going to have some air hose and a compressor for running steam engines. We should have more info at the show, but John Wasser has been working on a couple ideas.

I would like to have some videos running during the show. I know there are 3 or 4 tapes floating around, if you have bor-

rowed one please be sure to bring it back for the show. If you have a video of some of your work, maybe some of the items to big to bring into the show, please consider bringing them.

### Bus Trip to NAMES

Both good and bad news- good that I have found 2 companies that are even cheaper. We should be down to \$125 or so with just 30 riders. I will have details at the meeting. The bad news is a couple companies are already sold out for busses in April and May, so we have to get a contract made soon.

So, the deadline is Feb 15, at the show. If I have 30 checks for \$125 at that date I will sign a contract and we are on. If not, no bus.

### Meeting Room

We are in luck on the meeting room. The Bingo group has offered to move their game to another room, and Ed Mann has offered to move their equipment each meeting, so we can use the big meeting room, with the sound system. This should make meetings much better.

We will place a table along the side wall, and people can place the show and tell, or the swap items on the tables as they come in. This will let everyone look at them before the meeting and during the break. We can move the refreshments to the back of the room.

Does anyone have an overhead projector we could use for meetings? I think many of our talks would be better if we could draw a few sketches. The museum does not have one.

This is really great news for us. We are just too crowded in the place we have been meeting. But we must keep in mind that the tenants of the mill have first right to that room, it is only their generosity that lets us use it.

### Logo

We had the voting for a new logo at the meeting, and several nice designs were submitted. The winner was submitted by Ed Kingsley. Ed has promised to produce a larger version, and with luck it will get to Steve in time for this newsletter. There were suggestions we might make this into items like a button or Tee shirt. I want a nice big banner made up for the North American Show in April. Does anyone have contacts or experience in this area to help us get these items produced?

### Storage Room

At the last meeting a few of us got a peek into the museums storage area. I must remind everyone that the storage area is for museum staff only, and we are NOT invited in there. Karen has told me they are working on a big "garrage sale" of excess items, and she has promised our club will get the first peek at the sale when its ready. But until then, the storage room is for museum staff only.

### February Meeting

The museum has a special event on February 6, that may cause us to have to delay our start a while. We will be able to gather in the Appleton Room, which is just inside the museum gate. We should have a sign, or people around to direct you. As soon as the other event finishes up and clears out we can move to the main museum area.

The main event will be the long awaited speaker from Loctite. We will have a show and tell program as usual (I'd like to see a couple real nice projects that night so our guest speaker sees some of the work we do). We will be sure to leave plenty of time for questions.

Future meetings.

I need help on this. I think we need a featured speaker for each meeting. I'm running out of ideas. Come on guys, lets get some help on this. Any other companies you might like to hear from? Anyone have a good project or technique they want to hear about. I think maybe we've beaten drill sharpening to death, how about some other topics?

Organization

This is another hot item for me. I want a 'board of directors' of 5 people to help run this group. Dick Boucher has volunteered (I only had his arm slightly twisted when he said yes) and I'm going to get a couple more. Since this group is large, and everyone tells me they like it and want to see it continue, then we must get at least a bit of organization. Some night I won't be able to make it, and I would hate to see this thing fold just because no one else was helping. I also want some others to help decide things like how we spend our dues. So, please, will a couple of you let me know at the meeting that you are willing to be a director.

-- Ron Ginger

### Calendar of Events

Thursday February 6, 1997 -- NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Saturday, February 15, 1997 -- New England Model Engineering Show at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

Thursday March 6, 1997 -- NEMES MEETING at the Charles River Museum of Industry, 154 Moody Street, Waltham, Ma 02154, telephone 617-893-5410

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

### The Meeting, January 2, 1997

The meeting started out with a talk by Ron Ginger. He met with the fire marshal, and we have the okay to run engines during the show. The fire marshal was impressed with the video that Ron showed him and is planning to come to the show to see the model engines in person. The official hours of the show will be 10 AM to 4 PM on Saturday, February 15, with the doors open for setup at 8 AM.

Max had the leadloy from the group buy in his car, and a bunch of folks adjourned to the parking lot during the break to

pick up their purchases. Max is thinking maybe durabar cast iron for the next group buy.

We had the logo contest at the meeting, with quite a few logos to choose from. We chose one, and hopefully we'll have something ready using it by the show.

The business organization of the club still needs to be formalized. We need to get three or four people together to lay something out for the club. One of the things we need to do is to determine if we want to be independent of the museum or if we want to be officially affiliated with it (which would be the Museum's choice - we need to decide if we want to be connected, but if we do they have to decide to accept us for it to happen.) We also need to get a formal program committee in place to insure that we have a speaker for each meeting. Show and Tell goes well, with relatively quick talks. We need to have a featured speaker that is a little longer - half an hour to forty five minutes or so. The February meeting will have the long awaited speaker from Loctite. Some of the subjects suggested for future talks are carbide inserts, mirror grinding, how to set up a lathe, and sharpening.

Kay Fisher has volunteered to coordinate the club guide to members interests and expertise. The form is attached to this issue of the Gazette in case you didn't get one at the last meeting. Be sure not to put anything on the form that you don't want to be public. The only way to get a copy of the report is to submit the form with your info on it. If you have email, Kay would prefer that you send him your form by email so he won't have to type it in. His email address is FisherK@exchange.eng.pko.dec.com. If you want to know about your fellow NEMES members, tell them about yourself.

Norm Jones brought in his Miser project. It's a low temperature differential Sterling engine that he saw at the NAMES show. Jerry E Howell, 3980 Becket Drive, Colorado Springs, CO 80906 sells the plans for \$20 and a kit of the hard to find materials needed to build it for \$14. If you go to the NAMES show you might be able to get it for less because he will be there and he has specials. Norm bought an Enco Collet indexer, and when he got it the rings on the indexer to hold the collets in wouldn't screw onto the collets. He visited with John Rex, and while he was there they ran the threads on the rings a little bit deeper. Now they screw onto the collets just fine. He says that Enco equipment is okay if you look at it before you buy it. In general he finds the equipment from Taiwan okay, the stuff from India not so good.

The Thursday before the meeting Norm was at Admiral Metal for the Thursday afternoon sale and decided to go to see the Steam Engine at Horn Pond in Woburn that is used to pump water. It was made in the late 1800s and hasn't been in service for quite a while, but is still there and quite nice. He also mentioned that there is a 300HP steam engine that was used for generating electricity across the street from Bainbridge's Restaurant in N Chelmsford. He thinks it's for sale?

Paul Gauffin brought in some copies of a tap drill chart with the size drill to use for 90, 75, and 50 per cent depth threads (see page 5.) He also had some pictures of the new Erwin Model 5 Machine Tool from Russia. If you were at Paul and Howard's Big Event last spring you saw the earlier model Erwin Machine that he has now. He's looking to get some

other people interested in getting one, because if he orders 4 he can get a good deal on the shipping over from Russia.

He also needs to know how to get rust off of gauge blocks. He has a metric set, and when he opened them recently he was surprised to see a brown haze on some of them. Some of the suggestions were Noxon brand metal polish, Bon Ami brand cleanser, and Naval Jelly (which has phosphoric acid in it.) This is also a good time to remind everyone that if they don't use it now, they should get some vapor protection paper

Ed Mann brought in a really nice scraper to show. It was made from a piece of carbide brazed to the end of an old hacksaw blade.

Don Strang has completed the improved version of D.A.G. Browne's drill sharpener for small drills that has been running in ME recently and had it here to show us. The four facet drills that it produces come to a point, so they are self starting. He passed around four different size drills, along with a piece of steel that he had drilled matching holes in about one or two diameters deep so you could get a good look at the bottom of the holes. All of the holes were impressive, the bottoms were smooth and conical down to a sharp point matching the point on the drill. He made two separate guide blocks. One for the 10 degree facet and one for the 25 degree facet. The article in ME put the two guide slots in a single block, but Don figured it'd be simpler to make two separate blocks. He also decide to use a square holder for the wide range collets with a red and a black stripe on opposite sides that shows through a slot in the guide block so that you can see that the drill is properly aligned with the fixture before you start taking off metal. It doesn't matter if the alignment of the drill is not exactly perfect, what is most important is that the two sides are both the same. Grind the 10 degree facets first, using the depth control to insure that both sides are the same. Then grind the 25 degree facet to provide the secondary relief. Grind the 25 degree facet till it matches up with the center of the drill and forms a point, then stop.

If you want to put a good point on your drills, you have to have them symmetrical, which means that the axis of the collet in the square holder has to be exactly in the center. This is the part that Don said was the most trouble for him making the drill sharpening fixture. He used a square collet to hold the square stock he used for the collet holder. A four jaw chuck would have been a lot harder because the square material is a lot harder to true up that round material is. He now has a fixture that uses a cup wheel under a table with guides for the sliding block so that he can use a powered wheel rather than a slip stone to sharpen his drill but he will need to modify it because the motor he has now turns the wheel too slow so he has to sound out his drills rather than spark them out when he's grinding them. (See the sketches on page 6.)

Larry Twaits brought in his Associated Handyman Model. He made it after he saw Norm Jones' at the Rhode Island Wire-less and Steam Open house a couple of years ago. It's a hit and miss engine, the governor holds the exhaust valve open to keep it from firing as long as it's tuning fast enough. When it slows the valve closes and the engine fires again. The basic kit he got has a half dozen castings in it. It uses an ignitor. one point is silver, and the other one used to be a spark plug electrode. A pushrod pushes a hammer and when the hammer slides of the rod in opens the ignitor inside the cylinder

and it sparks. It was a very nice looking modek, and Larry says if you come to the show on February 15 you can see it run.

Ron had his mini traction engine in again to show us. He's been busy. The gear train is done, complete with a spur gear differential. Ron got the idea from a unit that Ken Fox had at Kinzer. Max ben-Aaron says that similar differentials were used in the mechanical computers used in WW II aircraft for navigation and bombing and such and were called pancake differentials. Two of the gears were cut from Durabar Cast Iron, the rest from leadloy steel. He used 20 dp gear cutters that were part of the haul he made at DB Cotton a few years back when he got a bunch of them at practically scrap prices.

Max ben-Aaron has an old Boston worm wheel and would like suggestions on how he can determine what the pressure angle of it is.

Kay Fisher got a Darex Drill Doctor for Christmas. He sharpened 98 drills the first night. He says it's a good unit and the wheel does put out smoother drills after the first 20 or so just like they say it will. He's still going to make the fixture that Don has been showing us though.

### News From the Show Registrar

High their:

Here is the current list of exhibitors as of Wednesday, January 22:

Boucher, R.L.; Budlong, Paul H.; Cahill, Todd; Chetwynd, J.H.; Corman, Art; Cotterly, Herbert; Evans, Roland; Evers, Howard; Gaucher, Roland; Gauffin, Paul; Ginger, Ron; Has-Brouck, Raymond F.; Jaggi, Fred; Jones, Norm; Lovely, Stephen; Martha, Gene; Purcell, Dan; Rogers, Ed; Sabol, Richard x 2; Stickler, David; Twaits, Larry

So far 22 spaces have been spoken for.

Mb-A

### Tips And Techniques

by Ed Kingsley

I'd like to start by extending my thanks to Max ben-Aaron and Art Corman, respectively, for organizing, buying and cutting up the "group buy" of 12L14, leaded steel rod. Many thanks to you both for your kind efforts. My lathe thanks you, too.

A few months ago, I described how I had reorganized my shop to make it both more efficient and more comfortable. A couple of things I forgot to mention were that I keep a chart of decimal equivalents and tap/drill information at each tool and a small, 'solar' calculator, permanently fastened, to the milling machine and the lathe. They are as close to eye level as I can get on both tools and provide answers to the many - how far to move - how much to remove - questions that come up regularly on both machines.

I have been focused, more than usual, on drills lately. I suppose it started with getting a Darex Drill Doctor and continued with the tutorials offered by Don Strang, over several meetings, on the theories of drill sharpening.

Drills are possibly the most used (and abused, next to screwdrivers) tool in our shop. For many people, there is only one kind of drill, the 'Standard' twist drill, sold ubiquitously as "the universal" drill. With a bit of research and/or experience, one

quickly learns that, as always, there is no such thing as a "universal" anything, especially drills.

The "Standard, universal twist drill" that we all grew up and learned to love or hate is designed to drill, more or less accurately, holes in what is referred to as, mild steel. The cutting edges are ground to a positive rake and it is NOT designed to drill aluminum, brass, wood or most plastics. It will drill aluminum, reasonably well, but does not do particularly well in wood, most plastics and it is especially unsuitable for brass and acrylic.

Wood should be cut with a brad point or Forstner type drill. The 'Standard' twist drill tears soft wood and tend to 'burn' a hard wood like Maple or Oak.

Aluminum, stringy stuff that it can be, is often better suited to a 'Rapid Spiral' drill that clears chips from the hole very quickly to avoid 'choking' the hole.

Brass and acrylic plastic are best drilled with a 'Slow Spiral' drill. This type of drill has a negative rake which does not 'grab' into these materials like the 'Standard twist drill', with its positive rake, can do. It's almost impossible to drill a satisfactory hole, greater than 3/16", in acrylic with a Standard drill, unless the acrylic is clamped tightly to another, equally hard, material and the drill is started with extreme care. The positive cutting edge tends to tear and 'chip' the plastic at the points of entry and exit, at best, and will often crack or split the work piece.

Brass can jam on a 'Standard' drill and be pulled out of a vice, or chuck, wreaking havoc on both tool and operator. Once a drill with positive rake has 'grabbed' into brass, it becomes a screw and tries to advance into the work at the pitch of the drill. With a 'Slow Spiral's negative rake, drilling is a scraping action, and both materials cut well as long as proper cutting speeds are observed.

Glass, ceramics and hard steels, up to Rockwell C 65, can be usually be successfully drilled with specially designed solid or carbide tipped, one and two fluted drills. Not cheap, but when the goin' gets tough ... they keep on goin'.

Rubber, fiber and similar materials may best be drilled with a "D", or Spade type drill, which can also be used for brass and copper.

Deep holes in steel are most efficiently drilled with 'Parabolic' drills. These drills are normally ground to 135 degrees, with a split point, and have a high helix angle and deep flutes, both of which expedite the extraction of chips from deep holes, making frequent withdrawal of the drill unnecessary.

In addition to Standard, Slow and Rapid Spiral, Parabolic, Spade and Carbide drills, we also need Center (or Centering) or Spotting drills to start our twist drills accurately on their way. Center drills are different from Spotting drills in several ways. Center drills have a short, two diameter point ending in a 60 degree angle, cone shaped flute, well suited to preparing a piece of stock for mounting between Centers on a lathe. It also works quite well to make a starting depression, to be followed by a larger drill, on a drill press or milling machine. In my experience, Center drills will almost always 'pick up' a Center punch mark and accurately expand it for a drill to follow. Center drills are usually pointed at both ends.

Some people are not aware that Center drills are made in 'long' sizes, up to 6" in length. These extended Centering drills are particularly useful when using a long drill bit in a machine with limited quill travel. They are also usually double ended.

The Spotting Drill is a very accurately ground, very short drill, with a single flute, that is used to start a cone shaped indentation, that a drill will follow. Spotting drills are so aggressive in their cutting action that, more often than not, they will start drilling at the exact point of contact, which may or may not be the Center of a punch mark. In my limited experience with them, I have found it to be quite difficult to guide them into punch marks and I would recommend using a Center drill for that purpose. Spotting drills seem more suited to precision mechanical location, such as CNC, or lathes, where punch marks are neither used nor needed. Spotting drills are usually single ended and expensive, compared to center drills.

Twist drills come in several sizes. Screw Machine length, Jobber's and Taper Lengths are the most common. Screw Machine length is short and useful for drill presses or milling machines with limited quill, or 'z' axis, travel. Jobber's length is the 'Standard' size we're all used to. Taper length is longer than Jobbers and used for deeper than 'normal' holes.

In general, Standard, Slow, Fast Spiral and Parabolic drills are all available in Screw Machine, Jobbers and Taper length sizes.

I will try to bring examples of each of these drills, with me, to the February meeting.

### Financial Report by Joe Masciovecchio

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Balance on 20 Sep, 96 (last report)	676.17
Operating Income	
New Member Dues since 20 Sept	540.00
total income	540.00
Operating Expenses	
Newsletter Expense (see note 1)	221.94
Checking account (see note 2)	12.50
Total Expenses	234.44
Balance as of 20 January, 1997	981.73

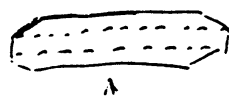
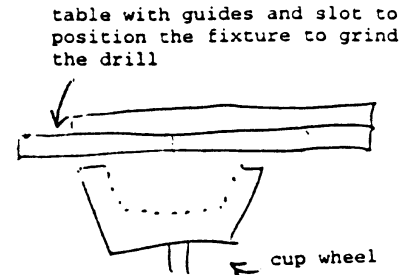
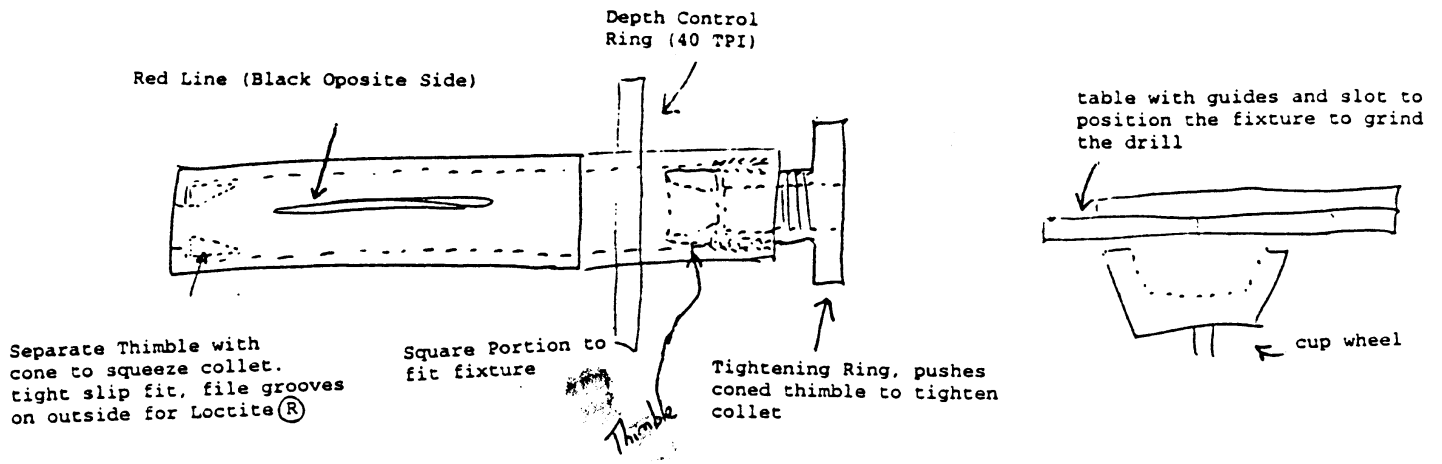
note 1: Newsletter copies/postage expenses covering Vol. 1, issues 6 through 9

note 2: Non-interest bearing (\$2.50 Monthly fee) account charges covering 9/19/96 tp 1/19/97

The 27 new members between September and January put paid NEMES membership at 81.

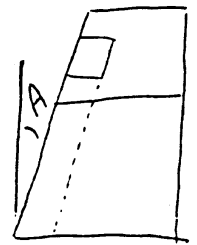
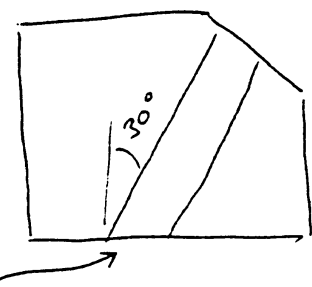
Nom. Size	Thrcs /inch	Clear. Drill	Major Diam.	Minor Diam.	90% Depth		75% Depth		50% Depth		
					Tap Drill	% of Thrds.	Tap Drill	% of Thrds.	Tap Drill	% of Thrds.	
#0	80	#51	0.0600	0.0438	xx	xx	3/64	82%	#55	49%	<b>90% Column</b>
#1	72	#47	0.0730	0.0550	#54	100%	#53	75%	1/16	58%	Good for: 1 Shallow work (less than d)
#1	64	#47	0.0730	0.0527	#54	89%	#53	67%	1/16	52%	
#2	64	#42	0.0860	0.0657	#50	80%	#49	65%	#48	50%	
#2	56	#42	0.0860	0.0628	#51	83%	#50	70%	#49	56%	2 Cast Iron
#3	56	#36	0.0990	0.0758	5/64	91%	#45	74%	#44	56%	3 Hand tapping
#3	48	#36	0.0990	0.0719	#48	85%	#47	78%	#44	50%	No good for power tapping.
#4	48	#31	0.1120	0.0849	#43	85%	#42	70%	#40	53%	<b>75% Column</b>
#4	40	#31	0.1120	0.0795	#44	81%	#43	72%	#41	50%	
#5	44	#29	0.1250	0.0955	#40	90%	#37	70%	#35	50%	
#5	40	#29	0.1250	0.0925	#41	90%	#38	75%	7/64	50%	Good for: 1 General work
#6	40	#25	0.1380	0.1055	7/64	91%	#33	78%	#31	59%	
#6	32	#25	0.1380	0.0974	#37	83%	#36	78%	#32	53%	
#8	36	#16	0.1640	0.1279	#30	100%	#29	78%	#27	56%	2 Most steels
#8	32	#16	0.1640	0.1234	1/8	90%	#29	68%	#27	49%	3 Fine thrd. Set
#10	32	13/64	0.1900	0.1494	#23	88%	#21	76%	#18	51%	4 When thread length is 1 to 3 diameters
#10	24	13/64	0.1900	0.1359	9/64	91%	#25	76%	#20	54%	
#12	28	7/32	0.2160	0.1696	#16	85%	#14	74%	#11	54%	<b>50% Column</b>
#12	24	7/32	0.2160	0.1619	#18	87%	#16	72%	#12	50%	
1/4"	28	17/64	0.2500	0.2036	#4	89%	7/32	67%	#1	48%	
1/4"	20	17/64	0.2500	0.1850	#10	88%	#6	71%	7/32	47%	Good for: 1 Power tapping
5/16"	24	21/64	0.3125	0.2584	17/64	87%	I	74%	9/32	57%	
5/16"	18	21/64	0.3125	0.2403	1/4	86%	F	76%	I	55%	2 Soft metals
3/8"	24	25/64	0.3750	0.3209	21/64	87%	Q	80%	S	50%	3 Coarse Thread
3/8"	16	25/64	0.3750	0.2938	N	90%	5/16	78%	Q	53%	
7/16"	20	29/64	0.4375	0.3726	3/8	95%	W	78%	Y	51%	4 Thread length of plus 2 diameters.
7/16"	14	29/64	0.4375	0.3447	T	85%	U	74%	25/64	50%	(Equals 80% of full thread strength)
1/2"	20	33/64	0.5000	0.4351	7/16	97%	29/64	72%	15/32	48%	
1/2"	13	33/64	0.5000	0.4001	Z	87%	27/64	79%	29/64	47%	

Tap Drill Sizes with Thread Depth Percentages



Collet, split to four fingers on each end, slots at 45 degrees to slots on other end

Aluminum Fixture Block  
Make 2, one with the Slot tilted back 10 degrees, one tilted back 25 degree



Make one with  $A = 10^\circ$   
one with  $A = 25^\circ$

The more concentric you make everything, the better the drills will come out. Don Recommends a square collet to bore the hole down the center of the collet holder.

Square Slot in fixture to fit collet holder. Make a cover so holder is a sliding fit (put a slot in the cover so you can see the red or black line on the holder)

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newsletter of The New England Model Engineering Society