

The NEMES

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

Gazette

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February Meeting

The February Meeting will be held at 7 PM in the conference room of the Charles River Museum, on Thursday evening, February 7, 2019

There will be a brief poster session, where members can discuss current projects, share experiences, and perhaps enlist the advice of NEMES members. Members are encouraged to bring current projects to discuss.

Following that, Bruce Strong will discuss catapults that he has built, and the differences between catapults and trebuchets.

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Club Business

Rich Baker

Dues. We are now collecting 2019 dues. Please bring your \$25 check to the February meeting, or you can try out our credit card system. Or mail me a check to Rich Baker, NEMES, 288 Middle Street, West Newbury, MA 01985.

See Rich Baker for the NEMES merchandise.



President's Corner Dan Eyring

[Editor's note: As Dan is taking over responsibility for programs, he will not be writing a monthly column. I am keeping this space open, in case he wants to do a column in the future.]

.Machinery for Sale / Wanted

As a service to members, we continue to put listings of machinery for sale or wanted by members in this space from time to time. The notices of machinery for sale are not restricted to NEMES members, as members will benefit from the widest possible exposure to information on used machinery. Requests for machinery wanted are restricted to members. Send any information to me at RWTimmerman@gmail.com

No new listings at this time



From the
Editor's Desk

Bob
Timmerman

There is not much of a Gazette this month. Most people seem to be doing other things during the holiday season. We have few notices of meetings to publish, nobody has contributed articles, and NEMES is, as usual, in search of program topics. If members want more out of NEMES, they have to put more into it.

Several months ago, I ran an article about doing something that is supposed to be impossible. I want to make this a regular feature. Additional contributions are welcome.

Our list of future events seems to be petering out. Get your listings of future events to our Webmaster, James Scheffler III.

Articles for the Gazette are always welcome. Even if you just have an outline of an article, e-mail me, and I will help you put it together.

The big item for this month is the NEMES Model Engineering Show, Saturday, February 16, from 10 AM until 4 PM. Setup is from 8 AM until 10 AM. The show will be in the Charles River Museum of Industry and Innovation, 154 Moody Street, Waltham, MA 02453

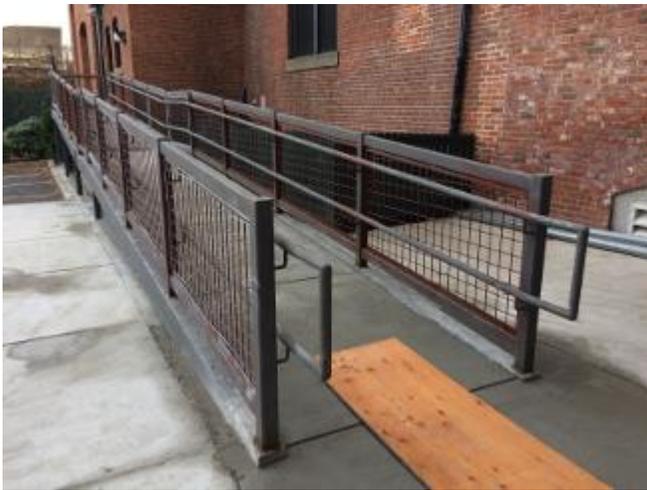
Summary of January Meeting

This was a Poster Session, where members discussed their current projects, and, in the case of Dick Boucher, brought in an example of what he was working on. This has been sufficiently popular that the Program Committee Chairman has decided to have a brief poster session at each meeting.

NEMES 23rd Annual Model Engineering Show

The 23rd annual NEMES Model Engineering Show will take place February 16, from 10AM until 4PM, at the Museum of Industry and Innovation, 154 Moody Street, Waltham, MA 02453. Normal museum admission of \$10.00 applies to visitors.

Non-Member exhibitors are encouraged to attend. Setup time is from 8AM until 10AM. Setup will be easier this year, as the Museum has installed a handicap ramp to the Jackson Room.



(Photo by James Scheffler III)

Future NEMES Meetings

At the December meeting, Dan Eyring took over responsibility for programs, and begun the effort to recruit a program committee, so that no one person would have to do all the work of programs. Anybody who wants to serve on the program committee, or has ideas for programs, please talk to Dan

Shop Hints and Kinks

Drilling Hot Rolled (A36) steel

I will be describing my experiences drilling 84 3/8" holes for light pipe supports for the Museum, and what I learned from this. The supports were made from hot rolled A-36 steel, which does not machine as easily as AISI 1018. My apologies to any people reading this with a lot of experience drilling A36-- some of my findings were new to me.

Hot rolled steel is frequently sold under the ASTM specification A-36. Chemically A-36 and AISI 1018 are similar, but A-36 is usually hot rolled, and AISI 1018 is frequently cold rolled. The difference in processing affects their properties.

Chemically, A36 and 1018 are very similar.

	A36	1018
Iron	99%	98.81%-99.26%
Carbon	0.26%	0.18%
Manganese	0.7%	0.6%-0.9%
Phosphorus	.04%	.04%
Sulfur	.05%	.05%

Note that A36 has considerably more carbon.

Mechanical Properties (psi)

Tensile	58,000	63,000
Yield	36,300	53,700

(Data from Capital Steel and Wire website)

The cold rolling increases the yield and tensile strengths of 1018 over A-36, even though A36 has more carbon. Put another way, cold rolling allows 1018 to achieve higher tensile and yield strengths with lower carbon than A36. The yield strength of A36 is an important property, as the AISI code for Structural Steel for Buildings determines the allowable stress for steel beams as a function of the yield stress.

Surface finish on 1018 steel is scale free, while A36 comes with mill scale from hot rolling.

AISI 1018 steel is intended for machined parts; ASTM A36 is not generally used for machined parts,

machining being limited to drilling for bolt holes, and sawing to cope out sections for joints. It, has a reputation for being difficult to machine. I found this to be the case.

Parts were cut to length with either the Museum's power hacksaw or a portable bandsaw. This gave no trouble.

Of the holes I had to drill, 60 were 5 holes in each of 12 identical supports brackets, and another 12 were in the safety clips added midway through installing the support bracket. I set up jigs to locate the pieces for drilling in the drill press, and did no layout work. I decided to drill through the mill scale using a 3/8" cobalt drill with a 135 degree point.

Initially I ran the drill press at a speed corresponding to about 100 feet per minute, with a relatively light feed, and ran into bad chatter. Experimenting, I found that slowing down the drill press to about 50 feet per minute, and using a very heavy feed (estimated drill point pressure of 400 to 600 pounds) produced a spiral chip with no chatter. According to the data in my 20th edition of *Machinery's Handbook*, the drill point pressure for drilling 1018 steel with a 3/8" drill is about 430 pounds at a feed rate of 0.006" per revolution, and 550 pounds at a feed rate of 0.008" per revolution. The recommended feed rates are between 0.004 and 0.007 inches per revolution, so that the estimated feed rates I used are at the high end of the range.

I also had to drill 12 holes in the toe plate of the balcony to install the safety clips. These had to be done with a hand-held drill. In order to reduce the drill pressure, I drilled the holes in several steps. 6 of the holes had to be drilled from a ladder, so I started with a 3/16" drill, followed with a 5/16" drill, and finally a 3/8" drill. This worked as well as can be expected, but I was able to brace myself against the already-installed support brackets, and apply extra pressure on the drill.

The remaining 6 holes could be drilled from the balcony, which was safer than working off the ladder. I drilled the 3/16" pilot holes from the ladder, and enlarged them to 3/8" from a low stool on the balcony. In order to put myself in a better position to apply pressure to the drill, I obtained a [imported] 12" long drill bit. I found that it was difficult to apply sufficient force for the bit to cut, and after two holes, it was too dull to cut well. I had to switch to a [US

made] standard length bit with a 135 degree point. Despite the lack of satisfactory pressure, exacerbated by the short length of the drill, this finished the remaining 4 holes. I am not sure if it was the different point angle made the difference, or differences between domestic and imported high speed steel.

Lessons learned:

A36 drills better with high feed rates and lower speeds than used for 1018.

In drilling with hand pressure only, drill a pilot hole, and preferably drill the hole in three or more stages.

Future Events

[Editor's note: Our new webmaster has done a great job of formatting this section for the NEMES website. This section of the Gazette is a copy of that section of the website, and will keep the website format]

Our list of future events is running short. Please keep our Webmaster informed of any future events.

February, 2019

- **February 16 2019 NEMES Model Engineering show**
Waltham, MA Charles River Museum of Industry and Innovation, 154 Moody Street, Waltham, MA 02453. Non-members of NEMES are encouraged to exhibit.
- Admission free to exhibitors, normal museum of \$10.00 applies to visitors.