

# The NEMES Gazette

NEW ENGLAND MODEL ENGINEERING SOCIETY INC.

No. 116

December 2005

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## Editor's Desk

Victor Kozakevich

I was looking at a local newspaper over lunch, and spotted an article about a local artist who among other things, created a giant metal fish ("The Great Cod") that hangs over the Legal Seafoods headquarters on the South Boston waterfront. The fish's 45 foot long steel body includes disk shaped scales that turn in the wind, serving as wind speed indicators and are each hooked to generators that power the LEDs in the fish's eyes, glowing amber, violet or green depending on wind speed. He needs to climb it at least once a year to grease the bearings.

The artist, David Tonnensen, started out as a jewelry maker and did reasonably well, but got bored. An eccentric Hopkinton homeowner hired him to build a sculptural railing for a moat. David had never built anything bigger than a necklace, but as any entrepreneur will tell you, it's important to get the job, then figure out how to do it. He completed the project and went on to be a full time metal sculptor.

According to his website, his medium ranges from stainless steel to rust. Everything's art, I guess.

More at: <http://www.dtonnesen.com/>

## Next Meeting

Thursday, Dec. 1, 2005

7:00 PM. Meetings held at:  
Charles River Museum of Industry  
154 Moody Street  
Waltham, Massachusetts

## Membership Info

Annual dues of \$25 (via checks made payable to "NEMES" and mailed to our membership secretary) for the calendar year are due by December 31<sup>st</sup> of the prior year.

Missing a Gazette? Send mail or email to our publisher.

Addresses are in the left column.

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## *President's Corner*

Norm Jones

### **The Meeting**

Our speaker for the December meeting is Ed Seldin. Ed, an oral and maxillofacial surgeon at Mass General Hospital and a Senior Lecturer in Mechanical Engineering at MIT has had a 40+ year fanatical interest in building mechanical devices and geometrical structures exclusively out of wire. His favorite type of wire is coat hanger wire because he feels that he is recycling by using it. Ed will display and talk about two classes of the things he builds: mechanical devices, including several unique solutions to the problem of transmitting rotational movement between shafts oriented at right angles and also a construction system based upon the use of helical sub-units of specific dimensions in the building of platonic solids, crystal-like lattices and other objects of interest. (Ed also builds unusual steam and Stirling cycle engines, but that's another story.)

### **American Precision Museum Model Show**

The 6<sup>th</sup> annual APM Model Show was once again a very enjoyable event. Our organization was very well represented at this year's show. The spectators that I spoke with seemed particularly interested in learning about the various items that we had on display. I always try to encourage fellow model engineers to join in on the fun by participating in future events. Please excuse me if I have missed any of our members who were exhibitors at the show. The following pictures highlight some of the fine work that fellow NEMES members brought to this year's show.



Harvey and Carol Noel with a display of steam and gasoline engines



Bill and Cindy Schoppe with a display of steam engines



Richard and Lori Sabol with a display of Richard's unique steam engines and Lori's beautifully handcrafted glass beadwork





Dave Stickler with a display of steam engines



Rich Hubbard with a display featuring: a locomotive, steam, gasoline, and hot air engines



Russ Steeves with the steam engine that powers his steam launch, "Redbud"



Dave Bono and his wife with a display of steam locomotives



Todd Cahill with a display of steam engines



Ernest Smith with a display highlighting his wood and metalworking skills





Rich Puleo with a display of hot air engines



Todd Cahill with his steam engine on the adjacent steam table #1718

As you can see, NEMES has a number of very talented craftsmen.

### George King Invitational Meet

Sunday October 30 was the finest example of a perfect New England fall. George King's annual event had been rescheduled to October 30 due to bad weather the previous weekend. Dave Dearborn (who I talked with at the APM show the day before) suggested going to George King's show and supplied directions. Russ Steeves and I drove to North Franklin Conn, arriving at 9:30 AM. By then, things were well under way with a cordwood saw powered by an antique gasoline engine supplying lots of fuel to feed the large vertical steam boiler. We met many fellow NEMES members, some of whom had been in Windsor Vt. the previous day. Here are a few photos taken at the show.



Dave Bono with his steam traction engine also on the steam table #1721



The first picture was taken at just the right time as a very large whistle was blowing. It was mounted close to the steam boiler for obvious reasons.



Cal Pixley's Packard V12 PT boat engine (around 2900 pounds!) #1724

George's show was indeed the perfect event to finish off the show season. Thanks George!

## Cabin Fever Expo Bus Trip, York, Pa.

This is just a reminder for those of you who have not yet signed up for the trip. We will be leaving the Riverside T station in Newton Ma. (off route 128) on Friday January 29 at 9:00 AM and return there on Sunday January 22 at around 8:00 PM. Call me at: (978) 256 9268 or send a check made out to "NEMES" for \$110 to: Richard Koolish 212 Park Ave, Arlington Ma. 02476-5941. Actual cost will be less than \$110 if more than 26 people go on the trip. Please make your own room reservations at the Holiday Inn on Arsenal Rd. York Pa. by calling (717) 845-5671. You must mention that you want the New England Model Engineering Society Cabin Fever Expo rate of \$60+ tax per night. Sharing a room is encouraged to make the trip more affordable. The same rate is available if you wish to travel independently. Rooms are held in reserve for our use for this event up until the end of December so please sign up as early as possible. Everyone who signs up will receive a letter with last minute details prior to the trip.

See you at the meeting on December 1<sup>st</sup>!  
*Norm*



## *The Meeting*

Max ben-Aaron

The November meeting of NEMES, the New England Model Engineering Society, was called to order at the usual time in the Jackson Room of the Charles River Museum of Industry by Venerable President Norm Jones.

In anticipation of manufacturing whistles to hand out at Cabin fever, Errol Groff bought the material while he was in this neighborhood. A

motion to reimburse him was moved and carried unanimously.

John Bottoms announced that an effort will be mounted by CRIM to replicate the Lowell loom which was the mainstay of the original mill in 1813 and to bring a loom back to Waltham where it all began. No original looms have survived, so historical research will precede construction. To this end, negotiations have commenced with Solidworks to train volunteers in the use of Solidworks CAD software to do the drawings. Would-be volunteers are urged to get in touch with John.

Earle Rich reported that, for the club, he salvaged approximately 10 boxes worth of modelmaker's magazines and books from the estate of a compulsive collector in New Hampshire.

Ed Borgeson reminded members that membership dues (\$25) are due now for the next year. Checks made out to 'NEMES' are preferable to cash because they are easier to keep track of.

## Show & Tell

Bob Neidorff recently attended a tool show in Manchester, NH and was impressed by two different machines. "One was a wire EDM. I got a sample of the wire EDM's work, a 1" stainless steel v-block (see photo following). This machine is a CNC machine and can make any shape. The v-block was made in two passes. The first pass cut a 13mil kerf with 11 mil wire. They used the second pass for very fine surface finish, 0.7 micron, almost comparable to grinding and much finer than an endmill. The machine has the ability to cut at angles by pivoting the work. The machine can also cut inside shapes if you start from a drilled hole and let the machine feed the wire into the hole. Cutting rate in 1" stainless was no faster than ¼" per minute for the coarse cut, so even a small part like this takes a long time to make. The machine holds enough wire to run for 40 hours non-stop, so unstaffed operation around the clock is practical. The main use for this machine is medical instruments. The cost? A mere \$125K."

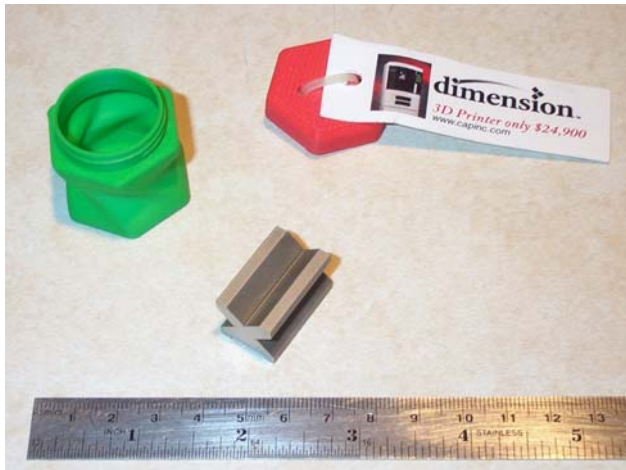
More at on the Fanuc wire EDM is at:

<http://www.fanuc.co.jp/en/product/robocut/index.html>

and

<http://www.manufacturingtalk.com/news/siz/siz114.html>





Sample 3D Printed Box with Screw-on Lid and Wire EDM V-block

“The second machine was a 3D printer. They gave me a sample "printout", a twisted box with a screw-on lid (see photo above). The box was printed with hot ABS, one layer at a time, each layer 10mils thick. They even printed screw threads, one plane at a time. They can make very strong prototypes with this machine. To make the prototype lighter yet equally strong, they can print a honeycomb pattern rather than a solid. They have five colors of ABS available. You can get this printer for under \$25K and run it from any standard 3d CAD program output. “

More information on this 3D printer is at:  
<http://www.dimensionprinting.com/3Dprinting.html>

Al Goldberg had been previously scheduled to report on the status of the Low Service building at the Chestnut Hill Waterworks, but had to postpone his talk because the meeting that night would have been over-long, so he shared the podium time with Jim Phillips of the Smithsonian Astrophysical Observatory.

### **What's Happening at the Chestnut Hill Waterworks - Fall 2004 - Al Goldberg**

Much of this report was shamelessly pilfered from the website: [www.chwaterpumps.com](http://www.chwaterpumps.com). All the pictures mentioned in the text are viewable there.

The Low Service Building:  
 This elegant building was completed 1899, shut down in mid-1970, and is now being renovated by a commercial developer. At this time, the

Massachusetts Division of Capital Asset Management (DCAM) is transferring ownership of the Waterworks to Diamond-Sinacori, a private developer, who will convert the buildings into a first class commercial property.

The building shell has historic protection, but none of the internal structure or machinery was included in that protection. As of September 2005, the shell still stands surrounding a roofless hole in the ground, to be filled with some 40 condominium units.

Until recently it contained three identical large reciprocating steam engines built by the Holly Manufacturing Co. and erected in 1899. These triple-compound engines, with cylinders 17", 31¼" and 48", and a stroke of 60", running at 29 rpm, used to drive pumps capable of 35 million gallons of water per day at a head of 45 feet. Since the engines have been dismantled and scrapped, any photograph of them may be a unique image as there is little documentation available about this building.

Each engine had a two-piece crankshaft, each holding one flywheel and hub. Due to its weight, which was beyond the capability of the gantry in the building, the flywheels were removed separately in two pieces, with the spokes cut off using an oxygen lance. Without the hub, a 17-foot wheel weighed 12.5 tons, and likely the crankshaft section was in the vicinity of 6 tons. There is a picture showing one of the outer cranks, that is, either for a first stage or for a third stage cylinder. The far end of this shaft had a crank that was connected by a large pin to a similar crank on the second crankshaft. The connecting rod from the intermediate cylinder drove the pin.

Al reported that "I didn't measure the crankshaft diameter, but by eyeballing the crank in that picture I'd guess the crankshaft was 12 inches in diameter."

There were also two Solar gas turbines with centrifugal pumps, each rated at the same capacity

Al showed a picture of the front right corner of the building, and one of window grills 20 ft above grade on the side of the building. As security wasn't a problem, the grills were simply done by people who cared about esthetics. He also showed a picture of one of the elegant staircases that each Holly engine had (seen in the background is part of the decorative main entry).

A water pump was located directly under each steam cylinder in the basement, with a huge water vessel on each side. The vessels acting as plenums for water entry and discharge of the pump contain water valves. The reciprocating of the steam engines caused pulsations as the pumps were filled and discharged, and much of the mass of cast iron in the pumps is there to contain the pulsations, even though there was also an air chamber at the top and an air chamber at each end of the pipe running through the inlet water vessels, to damp the surging water flow. Surging pulsations were a major design problem for large reciprocating pumps, and the advent of rotary centrifugal pumps with continuous flow sometime in the 1920s, obviated the need for valves or the large water vessels, and was a significant advance in pumping technology.

Once demolition started, entry to the building became difficult. There is an image showing what was left of an engine before the flywheels and crankshaft were taken out. Before demolition there was a question about how the flywheel halves were fastened. The wedge shown, one on each side of a joint, is not a method commonly used on similar wheels in this country. On the website there are pictures of a smashed wheel on the junk pile, explaining the wedge concept. Joining with wedges was common in Europe and seems crude but doesn't require the precise machining needed for the US style dogbone system.

Occasionally, something interesting appeared on the junk pile. For example, a third stage cylinder head turned up showing a Corliss entry valve and a pair of poppet exit valves. Hollis used Corliss valves for all but the final exhaust. The hole in the center (see picture) seems too small for the piston rod; possibly it's a simple piston guide at the top.

While the engines in the Low Service Building are lost to posterity, the engines in the High Service Building will be preserved in a condition suitable for public display in perpetuity. The question at the moment is what "preserved" means.

One alternative is that after a cleanup, some display material will be set up among the

engines, the area opened for visitors, and the building's receptionist will accommodate visitors to the engine area in addition to his or her normal duties handling visitors to the commercial areas. This concept of preservation is basically that of a static lobby - a low bar that satisfies the minimum requirements of both DCAM and the developer.

We believe this historic collection deserves a more imaginative alternative. We would like to see a truly viable museum that is based on the technology within the Waterworks while also touching on the impact of this site to Boston. This implies that a small staff be supported along with occasional changes to the displays, and that the museum be capable of raising its own funds. There is also the possibility of getting one of the early engines to operate, in some fashion, to interest visitors.

However, before either alternative can be implemented, DCAM requires that the engines be made presentable. The developer, under time pressure, wants this accomplished by the time the whole site is finished. This means that the engines, now covered by peeling paint and rust after some thirty years of disuse and neglect, must be cleaned within the next couple of years.

There are two ways that cleanup can be accomplished. Lacking money for a specialized commercial group, if one could be found, the developer is prepared to spend some of his reserve funds to hire low-cost, unskilled help to do the job. This may produce a superficial result with a good possibility that the machinery is damaged, with little hope that things would ever be made better.

The other way is to organize a group of knowledgeable volunteers who are willing to devote time to doing a more careful job. Conversation with the developers suggests they will be willing to give cleanup by volunteers a try, and if it is demonstrated that such a group is effective, then there is a good possibility that a truly viable museum could be created. In essence, this means that creating a true museum will have to be done by a group of citizens, working in conjunction with the developers, but not a part of them. It also suggests that the reserve fund set aside for preparing the engine space could be used more effectively. If such a group can't be formed, then the static lobby alternative will prevail, and the opportunity to create a setting appropriate to this unique collection will be lost.

We, a small group of people who want to see the engines properly cared for, and a true museum created around them, are searching for volunteers. Anyone interested in historic machinery and willing to devote time to cleanup please contact us by clicking on the contact link. We also need advice from people having experience cleaning and preserving large machinery, and although the museum lies in the future, we would like to have contact with those having relevant experience. Finally, please send us your comments - we may not always reply but we are interested in what you have to tell us. We believe this project is something well worth doing and will have its own rewards in the sense of creating something of lasting consequence. For more information, see <http://chwaterpumps.com/> or contact: [al.goldberg@alum.mit.edu](mailto:al.goldberg@alum.mit.edu) or 617-566-9869.

The second speaker of the evening was Jim Phillips of SAO who is in the midst of project POEM, an experiment to validate or disprove the Weak Equivalence Principle (WEP). The WEP states that the motion of a body solely under the influence of gravity is independent of the composition and internal structure of the body. This is the principle that, in popular lore, Galileo tested by dropping two balls, of different weights, from the Leaning Tower of Pisa.

The WEP is the foundation stone of Einstein's General Relativity and is critical to the understanding of:

- black holes
- quasars
- gravitational radiation and binary pulsars
- the unfolding of the early universe.

It has been conjectured (Schiff) that, for any complete, self-consistent theory of gravity, WEP implies Einstein's Equivalence Principle (EEP), so the WEP may be more fundamental.

For more on Jim's research and apparatus for measuring relative gravitation, see: <http://cfa-www.harvard.edu/poem/>  
Photos from Jim's talk are at: <http://www.cfa.harvard.edu/poem/docs/Literature/SAOTalks/NEMES.pdf>

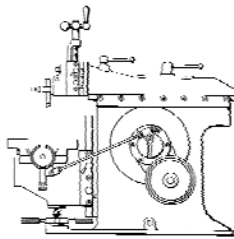
Max



## ***Treasurer's Report***

Richard Koolish

Balance on October 17, 2005	6481.48
Membership income	+450.00
Gazette printing	-172.98
Speakers fee	<u>-50.00</u>
Balance on November 14, 2005	6708.50



## ***Shaper Column***

Kay Fisher

### **Ludwig Gack Shaper Part 2**

This month we will continue our story of Ludwig Siegfried Schmidt's Gack Shaper.

#### **Rework**

"No, I have no tool museum and therefore, I lack the enthusiasm for a real authentic restoration. My goal was not to restore the machine to a like new condition, like it left the tool factory in 1952. My aim was a touch up of the old paint, cleaning and inspection of all moving parts and surfaces, and as far as possible, the restoration or rework of the sliding surfaces.

Since it's not only a very big paperweight, the machine was intended to do some work from time to time; so I had to restore the electrical installation also.

In these pictures, the painted surfaces look flat and shining, the old scratches and dings in the paint are not hidden under body putty. This can be fixed some time later. I think it will not bother me later since it does not bother me now.





**Military Gack**

**Photo source unknown**

Quite early, the question of the original color arose. The faded green is, as far as I can see, not the original color. Further, it's worn away, and not a good base for a new paint job.

The luscious green on the inside seems to be original; there are no signs of touch up work there. Inside the worktable, I found gray colors, which are mentioned as the original outside color by some online sources.

Pictured above is a military machine, the inside of which is also shiny green.

This gave rise to a green paint job. If the machine was gray before, then shame on me but I like the green much more.

The tool head and the rotating worktable gave the fewest problems at all. Everything was shiny, the table's surface was straight and the rest only needed a few drops of fresh paint.



**Ram**

**Photo by Siegfried Schmidt**

The machine's main body bore the year of manufacture. Some of the machine's parts were stamped "6" with a punch. Below the

grime, good surfaces showed up. On some parts, the scraping marks were still present.



**Serial Number**

**Photo by Siegfried Schmidt**

The heart of the machine, the die block of the rocker arm, was preserved in remarkably good condition, without signs of wear. Beyond cleaning, nothing was left to do here. The setting of the machine's stroke is done through the hollow shaft of the crank drive via a joint to the spindle in the picture below.



**Crank Pin Assembly**

**Photo by Siegfried Schmidt**

The crank gear is made of fabric-reinforced phenolic resin and will perform its duty.

In the photo below, the shaft is going out of the machine on the left hand side onto a hand crank where there is no rest or bearing. The black ring to the left is next to the housing, but not touching it. To the right of the gear is a shiny nut for setting bearing clearance. It is attached to the gear with two pins that fit between two voids in the gear. In the housing to the right sits another reduction gear.



**Drive Shaft** Photo by Siegfried Schmidt

The first reduction gear housing is attached to the inside of the big side cover. The cover is screwed and pinned to the machine's body.



**Motor on Cover** Photo by Siegfried Schmidt

Because of the hollow drive shaft for the crank, a separate gear is necessary for the table feed. In the photo below, the square to the right is for setting of the machine's stroke. The moveable screw sets the table feed. Here, the pushed on gears again act as a counterpart for the setting of the bearing clearance. The rings have corresponding noses that fit in the voids of the gears.



**Side Cover** Photo by Siegfried Schmidt

The drive is attached to the cover. The inner bearing of the motor is cast in place. The motor is screwed to the cover. The air from forced motor cooling escapes through the side vents.

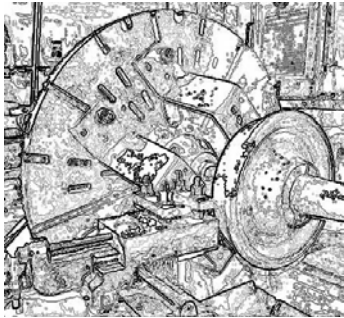


**Table Feed Gears** Photo by Siegfried Schmidt

The old hole is bored to the size of the new mains switch.



**Shop Hints**



**Hole for Switch** Photo by Siegfried Schmidt

The mounting of the lower rocker arm is a pressed in pin that I didn't take out. Some paint was enough to install the full glory of this part. The writing on the part is not really known (my guess: H185 is the machine type)."



**Rocker Arm** Photo by Siegfried Schmidt

Next month we will continue with the assembly of Siegfried Schmidt's Ludwig Gack Shaper.

Keep sending me email with questions and interesting shaper stories. My email address is:

[KayPatFisher@yahoo.com](mailto:KayPatFisher@yahoo.com)

Kay

**Do you keep losing that spray-head tube? Here's one way to remedy the problem**

I don't know about you, but I'm forever losing that pesky little red tube that sticks out the front of spray cans...you know, the one intended to let you put the spray just where you want it. Not any more!

I found a simple answer. See the four steps below. I first drilled clear through the spray head, using a bit that was sized to match the existing hole, in this case a #45 was a snug push fit.



Here, drilled through using a # 45 bit. Yours may be different.



Pressed through far enough to allow the end to be heated & pressed closed.



In this case a #23 drill bored through the spray tube (just through one side!)



The end simply heated shut with a soldering iron.

The photo below shows the nozzle, ready to use. This is a refillable pressure can from Harbor Freight, and it works great. I use the WD-40 for coolant/cutting lube sometimes. Just wipe it up. Don't let it puddle anywhere, as it dries to a brown, scummy, sticky, mechanism-stopping goo.



The label is a home-brew decal...it tells it as I see it, not as WD-40 advertises. Look up the MSDS sheets: The composition of WD-40 is:

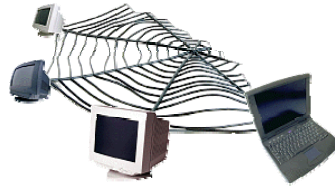
- 45-50% Stoddard Solvent
- 30-35% Petroleum Base Oil
- 12-18% HVP Hydrocarbon fluid
- 10% Non-Hazardous Ingredients

—Bob Beecroft



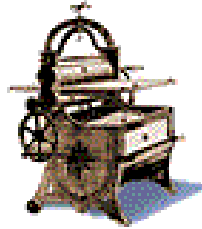
### *In the News*

Andy at *The Tool Shed* in Waltham has indicated that he no longer plans to stay open past 5:30PM on meeting nights. Get your shopping done early!



### *Web Sites of Interest*

Sign up for the NEMES mailing list at:  
<http://groups.yahoo.com/group/nemes>



### *NEMES Gazette Editorial Schedule 2005-2006*

Here are the closing dates for Gazette written contributions in the coming months:

<u>Issue</u>	<u>closing date for contributions</u>
January	12/23/2005
February	1/20/2006
March	2/17/2006
April	3/24/2006
May	4/21/2006
June	5/19/2006



### *For Sale*

#### *Lathe For Sale*

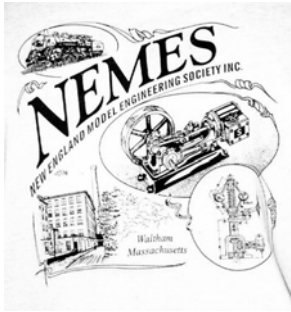
Atlas 10" lathe, 40" bed, 28" centers, on cast iron base, 1/2 hp 115-230v motor, includes 5" 3 jaw chuck, 6" face plate, steady rest, change gears, drill chuck, and misc. other items. \$400. Call Jeff at River Boat Works in Gloucester, 978-281-1303.



## Shaper Work CD

Put out in 1944 by the New York State education Department this 326 page manual is chock full of valuable tips and information on using the King of Machine tools....The Shaper. Covered is everything you need to know about the care and feeding of the shaper, use of the shaper, even how to sharpen tools for the shaper. Scanned and saved in Adobe Acrobat format. The CD now has a lot more info on it, and the price has increased accordingly. \$10.00, shipping included.

Errol Groff  
180 Middle Road  
Preston, CT 06365 8206  
[errol.groff@snet.net](mailto:errol.groff@snet.net)



## NEMES clothing

### NEMES Shop Apron

Look your best in the shop! The NEMES shop apron keeps clothes clean while holding essential measuring tools in the front pockets. The custom strap design keeps weight off your neck and easily ties at the side. The apron is washable blue denim with an embroidered NEMES logo on top pocket.

Contact Rollie Gaucher 508-885-2277



President Norm Jones in his shop, proudly sporting his NEMES apron

### NEMES Tee Shirts

NEMES tee shirts and sweat shirts are available in sizes from S to XXXL. The tee shirts are gray, short sleeve shirt, Hanes 50-50. You won't shrink this shirt! The sweat shirts are the same color, but long sleeve and a crew neck. Also 50-50, but these are by Lee. The sweat shirts are very comfortable!

Artwork by Richard Sabol, printed on front and back:



Rear



Front

Prices:

	Tee Shirts	Sweat Shirts
S - L	\$12.00	\$22.00
XXL	\$14.00	\$24.00
XXXL	\$15.00	\$25.00

Add \$5 shipping and handling for the first tee shirt, \$1 for each additional shirt shipped to the same address. Sweat shirts are \$7 for shipping the first, and \$1.50 for each additional sweat shirt.

Profits go to the club treasury.

Mike Boucher  
10 May's Field Rd  
Lunenburg, MA 01462-1263  
[mdbouch@hotmail.com](mailto:mdbouch@hotmail.com)



**MARK  
THIS  
DATE**

### *Upcoming Events*

Bill Brackett

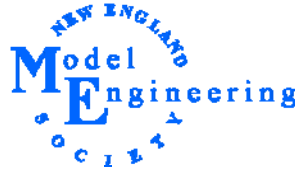
To add an event, please send a brief description, time, place and a contact person to call for further information to Bill Brackett at [wbracket@rcn.com](mailto:wbracket@rcn.com) or (508) 393-6290.

*Bill*

Dec 1 Thursday 7PM  
NEMES Monthly club meeting  
Charles River Museum of Industry  
Waltham, MA 781-893-5410

Jan 21-22, 2006 Cabin Fever Expo  
York, PA Gary Schoenly 800-789-5068

Feb 18, 2006 NEMES Model Show  
Charles River Museum of Industry  
Waltham, MA 781-893-5410



## **Membership Renewal Form**

**Renew your NEMES membership  
for calendar year 2006  
Enclose check for \$25 payable to:  
NEMES**

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ ZIP \_\_\_\_\_

Home Phone \_\_\_\_\_

Work Phone \_\_\_\_\_

Email \_\_\_\_\_

**Please bring this form to the next  
meeting or mail to:**

**Ed Borgeson, Membership Coordinator  
11 Peck Avenue  
Wayland, MA 01778**

*(If bringing cash, place in envelope with your  
name and address on outside)*