SCHSM

Southern California Home Shop Machinists November 3, 2018

OFFICERS

President	Charlie Angelis
Vice President	Michael Vulpillat
Secretary	Fred Bertsche
Treasurer	Jim Endsley

COMING EVENTS

November Meeting
Sat,November 3, 2018, 2:00 p.m.
El Camino College

December Meeting
Sat, Dec 1, 2018, 2:00 p.m.
El Camino College

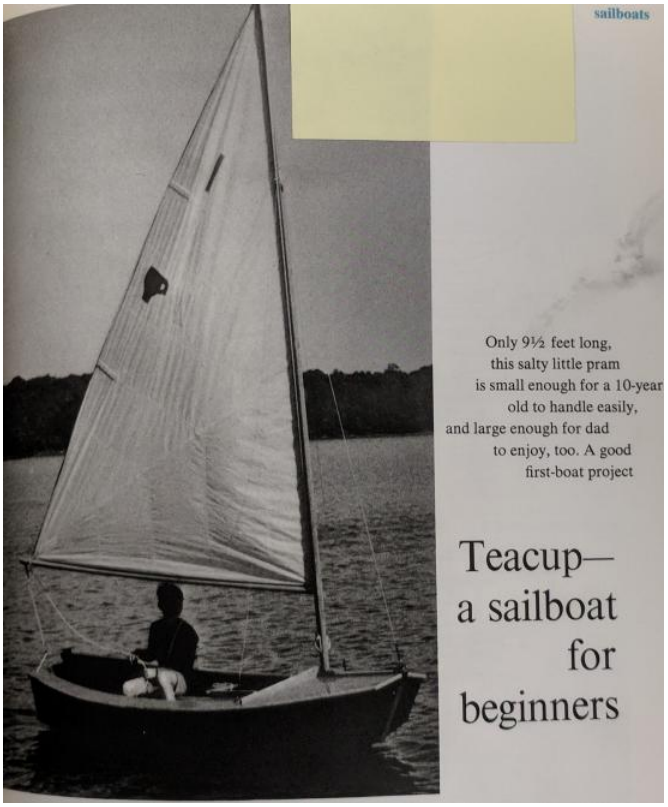
PREFACE -
The November meeting of the Southern California Home Shop Machinists was called to order at 2:00 p.m. on Saturday, November 3, 2018. We met in classroom AJ115 on the first floor of the Industry and Technology Building at El Camino College in Torrance, California. There were 31 members in attendance. We had three visitors. The first was Rosario Lopez, an El Camino Machine Technology student. The second visitor was actually a repeat visitor by the name of Mike Turner. The third visitor was Andrew Lentvorski who is the VP of Engineering at a Biomedical company in Irvine. He belongs to a Maker Space called Urban Workshop.

CLUB BUSINESS –
Willie Jordan – Willie provided a brief report on last Saturdays Little Machine Shop event. The event went from 11am to 3pm and was attended by 10-15 SCHSM members. Chris Wood, the Little Machine Shop owner, was appreciative of the SCHSM attendance at his open house since it helps draw customers. It was noted by Willie as well as several members that the general attendance level was down from previous years. None the less, it was good event and was enjoyed by all in attendance.

PRESENTATIONS – Lewis Sullivan
Fiber Reinforced Epoxy Resin (fiber glass) Construction Techniques and Materials

Projects over a 50+ year span

Lewis has a long (long) history of working with Epoxy Resins for a variety of construction projects dating back to his high school days in the late 60's. He was excited to attend a seminar put on by a local Fiber Glass expert but found to his surprise that only he and one other prospective student showed up for the class. He then proceeded to get an excellent education with one-on-one attention from the instructor. He built numerous boats that were detailed in Popular Mechanics magazine at the time. The first one, a 9 ½ foot sailboat called the Teacup, was built



when he was in 11th grade. It was built with Spruce and Marine Plywood and then was completed coated and sealed in fiber glass to give it added strength and to seal out all water.

In 1976, in an industrial application, he built 12' long solar reflectors by laying fiber glass into parabolic molds and then coated the inside surface with a reflective acrylic mylar film. It was capable of boiling a significant amount of water in approximately 3 hours.


12' Solar Reflectors

In the early 80's he built another Popular Mechanics boat. This time it was a 14' hydroplane that was capable of 50mph speeds with the 75hp outboard engine he mounted on it.


Hydroplane In Action

A second boat in the 80's was a 14' speedboat that he used for water skiing. It was built from plans obtained from Glen-L Marine and was a Stitch-N-Glue design. It was built by cutting out flat patterns in plywood and then stitching the various pieces together with copper wire. This formed the basic


Speedboat During Build

Speed Boat in Action

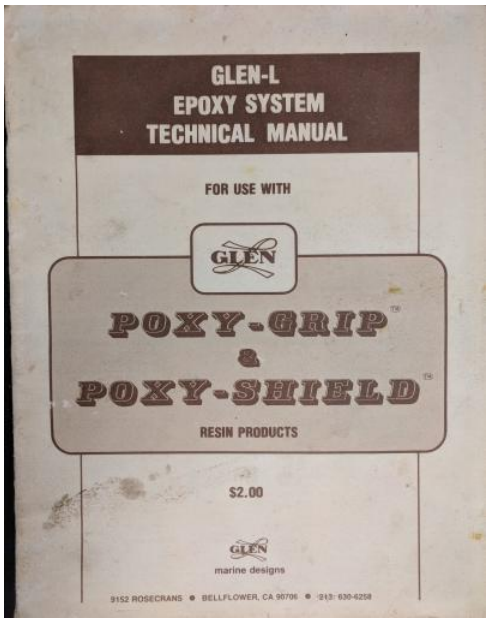
shape. Fiber glass was then applied over the entire structure resulting in an extremely strong yet light weight structure. This was powered by a 30hp outboard engine.

Though Popular Science was a great source of construction plans he also received a lot of ideas as

well as full plans from a book supplied by GLEN-L Marine Designs called "BOOK OF BOAT DESIGNS". They also supplied info on the stitch and glue technique with their STITCH 'N GLUE Manual.

Materials and Techniques (Resins & Fillers)

The basis for all these materials and construction techniques is the Epoxy resin and hardener. The magic ratio is 5:1 resin to hardener by weight. The



hardener can be of different varieties for getting a range of cure rates which can be very quick to very long. Once the epoxy resin/hardener is mixed, it can be supplemented with a variety of fillers to improve its consistency or reduce its weight per volume. The three common fillers are Microspheres, Silica and wood flour. Microspheres add volume to the mix and reduce weight. Silica and wood flour fillers improve the viscosity which makes it less likely to flow away from desired areas.

The epoxy is spread over the desired surface and then reinforced with a variety of woven fiber glass materials that add a tremendous amount of strength once the combination cures. The various

Variety of Fiber Glass Materials

glass fiber materials are woven cloth (of various weights), matting (random pattern of various thicknesses) and roving (thick woven pattern of various thicknesses). Fiber glass tapes and biaxial woven cloth offer other more application specific characteristics.

Fillers are generally mixed by volume unlike the resins and hardeners which are mixed by weight. Balance scales are a great tool for weight mixes and various plastic cups can be used for volume mixing of fillers.

One thing that was stressed by Lewis was the need to keep any air voids out of the finished epoxy/fiber finish. Trapped air can lead to weak points and issues related to trapped moisture. A special roller tool is used to press the fibers into the epoxy which then forces air out.

Special Roller for Eliminating Air Pockets

Other tools are used to shape the resin/filler mix such as rounded edge plastic scrapers for forming smooth wide fillets in inside corners. This is critical because the glass fibers cannot be bent at sharp angles.

Scraper and Mixing Tool

A clever hint was passed on by Lewis for mixing containers. He takes empty (or near empty) 1 gallon paint cans of the newer plastic variety and strips out all the old paint, outside labels and metal trim at the top and he is left with a nice 1 gallon ABS plastic container. Once dry, the old paint in a container can be released from the sides with a shot of compressed air. The metal trim at the top of the can is removed by careful use of a table saw.

1 Gallon Paint Can Repurposed as a Mixing

Some other items of interest were coloring agents that can be mixed in with the raw resins and a product known as Spot Putty that is used for filling small voids and holes. It is quick drying and can be sanded and formed once set.

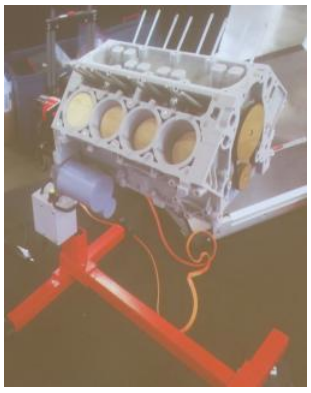
Coloring Agent

Spot Putty

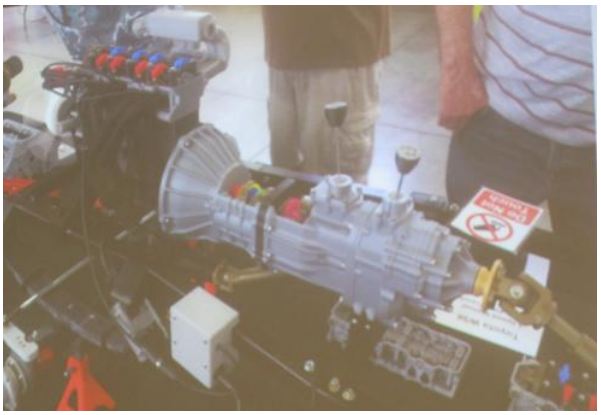
SHOW and TELL –
Frank Schettini – Frank gave a report, with numerous pictures, of the Goodguys West Coast Nationals (August 24-26) where he and other SCHSM members joined the WEME group to display model engines and other hobby machinist projects. It was a well organized event. There was space made outside of the exhibit hall to run IC engines since running them indoors is no longer permitted.

Frank Gives His Presentation

Runnig V8 Engine Model



3D Printed Plastic V8 Engine



3D Printed Transmission

There was a lot to see including many steam, gas and sterling engines. Two notable items were the model V8 engines and the 3D printed car.

Norm Wells – Norm showed the group a general purpose thread repair tool that could be adjusted to repair a wide variety of 60 degree external threads. Though not stated it appeared that the tool was limited to screws of ¼" major diameter or larger.

External Thread Repair Tool

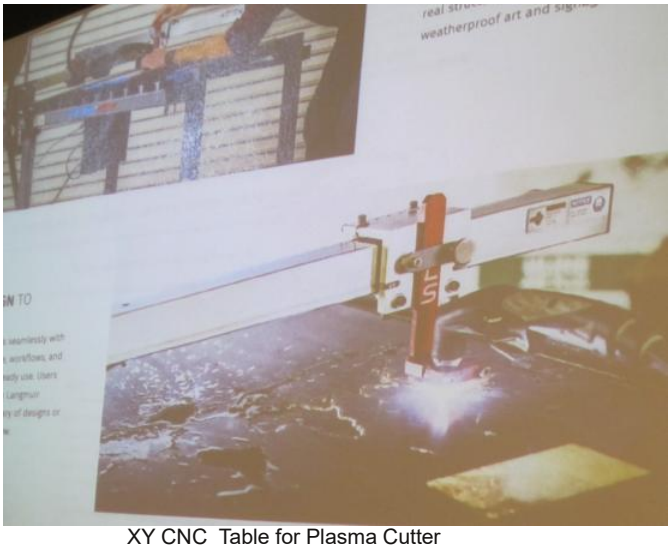
Also shown was a tap holder with a built in, spring loaded center guide post that was intended to be held in a collet or chuck during a tapping operation.

Tap Holder w/ Alignment Pin

Thirdly, Norm passed around some special lock washers that are used on threaded fasteners that need to remain tight under any and all conditions. They have small cam or ramp surfaces around their perimeter such that pressure on the nut and screw will actually increase when turned in the normal direction for removal. It actually requires more torque to unfasten than to fasten.

Anti Release Lock Washer Set

Millar Farewell – Millar presented an interesting item which was a cost effective CNC XY Plasma Cutting machine from a company named Langmuir Systems located in San Diego. A 25" X 26" table goes for $1295 if you supply your own plasma cutting equipment. He has ordered one but apparently, they are so popular that they are on back order. We look forward to hearing more about this when he gets his machine and starts using it.



XY CNC Table for Plasma Cutter

Doug Walker – Doug discussed the Antique Tool Swap Meet at the Rockler down in the San Diego area (8199 Clairemont Mesa Blvd in San Diego, CA 92111). It will be held the following morning, Sunday Nov 4th, 6am until noon.

Don Huseman – Don asked for suggestions on how to make or modify a 1" diameter hole saw so it could make a hole around an existing rod that is is considerably longer than the standard hole saw length which is about 2". Some suggestions were to cut the hole saw cross ways and welding it onto a longer piece of thin wall pipe. Others suggested just making a crude hole saw by cutting teeth into a section of thin wall pipe. This might be sufficient since this will be a single use tool.

Bob DeVoe – Bob did a little follow up and Q&A related to his presentation last month on Thread Cutting. Some points noted by Bob:

- Taps should be re-sharpened after approx. 500 uses
- Taps for machining hard materials like titanium come in sets of three. The first tap cuts just a small portion of the thread depth. The two follow up taps cut progressively deeper threads.

Three Progresive Tap Set for Hard Materials

- There are several common available tools for measuring outside thread size:
  - Three wire technique; cheap but a pain to use
  - Thread triangles; Inexpensive and easier to use than thread wires
  - A thread micrometer; more expensive but easy to use

Thread Micrometer

Thread Measuring Wires

Bob also talked about a Swiss made single point thread cutting tool with an adjustable lead angle,


Thread Cutting Tool w/ Adjustable Lead Angle

Continueing on with other unusual tools Bob showed a fish tail that was attached to a round rod with a V cut along its length to allow easy alignment with the target rod that is to be single point threaded.

Fish Tail w/ Integral V-Cut Alignment Rod

Next up was a nice little center punch tool that was designed to allow a visual alignment with 90 degree cross hair markings on a part. After alignment of the edges with the lines the built in punch can be struck with a hammer delivering a potentially very precise punch mark.


Center Punch Tool w/ Alignment Edges

****

SCHSM welcomes presentations by members or guest speakers on any subject related to metal working activities. If you have some knowledge or experience you feel may be of interest to our members, or if you know someone that may have something interesting to relate, please consider making a presentation at a meeting. Presentations may be a little longer and more detailed than a show and tell, and may be accompanied by slides, video, or physical displays. Probably every member has some experience they can share, and this is the purpose of SCHSM. Please contact President Charlie Angelis to make arrangements to give a presentation.

SCHSM meets in Classroom AJ115 on the first floor of the Industry and Technology building of El Camino College, 16007 Crenshaw Blvd. Torrance, California, at 2:00 p.m. on the first Saturday of every month. The building is near Parking Lot B. Enter the campus from Manhattan Beach Blvd.

If you would like to contribute an article to this newsletter, or make a comment, contact the editor, Fred Bertsche. He can be reached via the SCHSM Yahoo Group, or at fbschsm@yahoo.com.

Find us on the web at www.schsm.org.