The Bay Area Engine Modelers Club, Branch 57 of EDGE&TA

The Crank Calls

June 2003

President…....Ken Hurst…..……..(707) 257-2481....icengine@napanet.net
Secretary…….Bob Kradjian……...(650) 343-7585…....bkradjian@aol.com
Treasurer…....Lewis Throop……...(650) 941-8223…….....lthroop@aol.com
Editor……..…Bill Nickels…..…..…….(408) 739-2407…….whnickels@aol.com
Tech Topics….Pat O'Connor……..……...(408) 733-3710…...pat1650@yahoo.com

NEXT MEETING
June 21, 2003, 10 AM AT
Robert Schutz's Shop
366 40th St. Oakland, CA

The BAEM web site now has the current and archive issues of this news letter.
www.baemclub.com

Jim Piazza, web master

May 17, 2003 Meeting
BAEM
Bob Kradjian, secretary

President Ken Hurst was attending the Infeon drags and asked your secretary to chair the meeting. Actually, he asked Dick Pretel to do the honors; but Dick got the wobblies and made a neat lateral with the ball.

Thus, the notes will be a bit sparse as I was not able to chew gum and take notes at the same time.

A visitor was Don Catalano, a friend of Ken Hurst. Mike Sharp, Jeff Rosen, Don Cram, and Herb Pond also visited. Welcome to all.

Our club, for the first time, cancelled an engine show. The Hillsborough people were slow in getting our passes, some of our exhibitors then made other plans, it threatened rain---and we regretfully backed out.

However! Do not fail to plan attendance at the Palo Alto Concours. We will be there in force. It is held at the Polo Grounds on the Stanford Campus right on El Camino between Embarcadero (on the North) and Park Blvd. (on the South). All of this is in full view of the huge Stanford Stadium just West of El Camino.

For an extremely well done presentation of our club---with excellent photographs, PLEASE go to paconcours.com and look up "Miniature Engines."
Your breast will swell with pride, guaranteed! There you will also find a map to the Palo Alto event under "Map of Area."

The Concours will be held on June 22, just the day after our meeting. It should be a fine day, a beautiful site, and an overall good time as in past years. Recall that the management of this concours had faith in us, which resulted in our first (1997) auto show.

Member Bob Haagensen (in Southern Cal) is building two ambitious engines. A Corvair six, and a modified Colonna Offy with two valves per cylinder instead of the four shown on the plans.

Bits and Pieces:

Dick Pretel brought his beautiful Wall Four. It ran well, turns up to 10,000 rpm, and will be a

featured engine at the Palo Alto show. The engine's smoothness may be partially due to professional dynamic balancing. This tied in nicely with our tech topic later presented by Dwight Giles. Dick's oil pump for the Wall put out so much pressure that he used a by-pass to keep things at 60 psi.

Al Vassallo again showed his versatility with a collection of intricate gears of various sorts that

he was able to cut with shop-made hobs. Some of the gears were quite complex. Al seems to be able to meet any machining challenge.

I showed my first attempt at a four-cycle engine.

A single cylinder 0.65 cubic inch, air-cooled engine based loosely on the Saito .65. I used the approach of making one component at a time, then assembling all and test-running it. The completed engine runs quite well on a glow plug.

Dwight Giles brought us up to date on the V-8's that he and Ken are developing. They had a connecting rod failure when a 5/40 screw came loose. This was followed by a lively discussion on securing important fasteners. There is no room for lock wires or turn-up tabs. The best solution still seems to be in the thread locker department, but not sleeve retainers.

Steve Jasik roams the aisles at Cosco and found a twenty-dollar level that includes a neat laser.

Steve also passed around his quick release threaded bar for a mill or lathe.

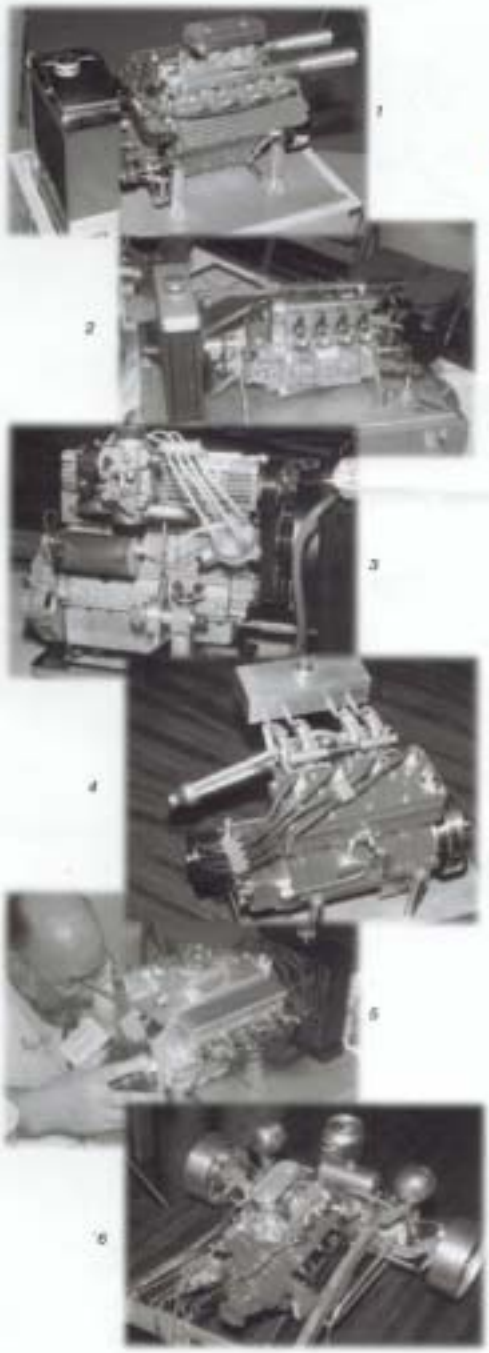
Just to show that our members are not only gifted machinists, but also sterling gentlemen---Frank Kurz announced that he found a twenty-dollar bill on the floor. It was reunited with its former owner.

We will continue to have items for sale, but all items must be clearly labeled as "Free," or if for sale, with the price. It would also be nice to have the member's name on the item so that we can easily complete the purchase.

Thanks to all for help in the setting up and taking down of the tables and chairs as well as taking out the trash, washing the coffee urns. We all appreciate the splendid meeting place that Robert Schutz provides and the effort that he makes to prepare the facility for us each month.

See you at the meeting and the Concours.

Photos by Bill Nickels



Miniature Internal Combustion Engines on Display at Palo Alto

In 1997 the directors of the Palo Alto Concours had the foresight to sponsor the first-ever West coast display of miniature internal combustion engines at a major automotive event.

This year, the Bay Area Engine Modelers are pleased to make our fifth appearance at the Palo Alto Concours.

A variety of miniature, functioning, engines will be on display. We will be pleased to run some of these engines for interested viewers.

Each engine represents hundreds of hours of handwork in our home machine shops. Because of the small scale, a greater degree of precision is required for these tiny machines when compared to a full sized automobile engine.

For the young auto enthusiast there will be three animated cut-a-way engine models that clearly demonstrate the principles of an internal combustion engine.

For the performance-minded enthusiast, an overhead valve V-8 engine with a Roots-type supercharger will be demonstrated.

For the nostalgia buff, we will exhibit a number of early "hit-and-miss" engines from the early days of the last century. These engines use an atmospheric, or automatic, intake valve as well as a governor that causes the "hitting and missing". Also featured will be a 1/5th scale Model "A" Ford engine, as well as number of original, scratch-built, engines.

The nearly 100 members of the Bay Area Engine Modelers compeise the largest such group of builders in the country. We meet monthly and are a non-commercial group. Visitors are welcome.

Bob Kradjian, *Secretary,* **Bay Area Engine Modelers**

1. Challenger V-8 by Paul Knapp
2. Twin cam in-line four. Has throttle-body electronic fuel injection. Built by Lee Root
3. 1/4 scale Offenhauser 270 cu in. Built by Bob Haagensen
4. Wall Four. Built by Dick Prete.
5. Overhead Valve V-8. Built by Roger Bolsen.
6. Quarter Scale 1932 Ford Roadster. Built by Red Garlough.

TECH TOPICS

BY PAT O'CONNOR and SCOTT OVERSTREET

Well, folks, we aren't going to have Tech Topics this month. That's the bad news. Now for the good news: this is a Let's Run Our Engines Meeting. Bring anything that runs; let's crank 'em up, and check Robert's smoke detectors.

Woops, there is more news. Pat O'Connor, our Tech Topics Chairman, has had eye surgery. At this time he is recovering and expects to have full use of his eyes. And, Carmin Adams had gall bladder surgery, is recovered, and says that he is feeling better than ever. Best wishes for full recovery, both of you.

TECH TOPICS

BY CARL WILSON

Once again, ladies and gentlemen, Bay Area Engine Modelers had a Twofer Tech Topic and Dwight Giles was the man of the hour. Some of us are wondering if there is anything that Dwight can't do, and do well. Fortunately, he cheerfully shares his knowledge and experience, this time on balancing rotating parts and making rings for gas engines. Let's start with his balancing stand, but first a couple of words about his experience. Dwight told us about balancing nuclear submarine propellers that were about 18 feet in diameter, and balancing 3 blade propellers for general aviation aircraft. The balance on these was so close that a small piece of masking tape placed on the tip of one blade would cause the propeller to rotate until that blade was on the bottom! And that is only part of his experience. Guess he knows what he is talking about.

The photo shows his small balancing stand viewed from the "back." It looks like a watchmaker lathe with a round bed and we will use the names of the lathe parts to describe it. The vertical aluminum block on the right is the headstock and the one to the left is the tailstock. The tailstock can be moved along the bed to accommodate different length rotors. Both 'stocks have two knife-edge rings mounted on small ball bearings to support the part being balanced. The dark object in "front" of the stand is a sewing machine motor that drives the part. A variable resistance foot pedal controls the speed of the motor.

A very important detail cannot be seen in this photo. The tailstock is in two pieces connected by a piece of clock spring. The bottom part slides on the round bed and can be clamped to it. The top part carries the two ball bearing knife-edges. The spring between them allows the top part to move horizontally (more on this later.) There is a small clamp piece that can be bolted between the top and bottom parts.

Now, the neat part – how it works. (For the first demonstration the clamp between the tailstock parts was in place.) Dwight first put on the balancer a rotor from the Roots supercharger that he is working on. It immediately rotated until the heavy side was down. He spun the rotor with his finger and when it stopped, the same side was down. Clearly the rotor had a heavy and light side. Weights could have been placed on it until it would stop in any random orientation. This is static or single plane balancing and it is usually sufficient for rotors that are very short (axially) compared to their diameter such as flywheels.

But the Roots blower rotor is long compared to its diameter and it must be balanced dynamically, i.e. two plane balancing. To demonstrate the difference Dwight now removed the clamp piece and spun the rotor. The top piece of the tailstock wiggled back and forth horizontally. This showed that there was an unbalanced weight at this end of the rotor. He picked up the rotor and reversed it on the stand, and showed that the other end was also unbalanced.

Each end has to be balanced separately. The spring in the tailstock allows that end of the rotor to move and indicate the location of the unbalance. The rigid headstock prevents the unbalance of its end from influencing the tailstock end. This is called "plane separation," and now the meaning of the phrase "two plane balancing" is clearer: the rotor is balanced at two locations – each end. Dwight's balance stand is a bit "by guess and by gosh" because it does not have mechanical or electronic means of locating the point of unbalance. Trial and error will have to suffice. One last detail, a rotor that is balanced dynamically will also be statically balanced.

What does the electric motor have to do with all this? Dwight did not demonstrate its use, but told us that a pulley can be attached to the rotor and connected to the motor pulley by a small round belt. Now we can drive the rotor at various speeds. A quick look at the equation for the force imposed by an unbalanced weight shows that the force increases with the square of the rotational speed. Aha! Smaller unbalances can be found by increasing the Rpm's.

Look back at the photo and note the tin cookie box beneath the balancing stand. Now Dwight is well known at BAEM for making very fine finger-jointed boxes, but his next bag of tricks came out of that tin box. First out was a piston ring compressor: a tube with the same bore as the cylinder and a 10-15 degree taper turned into one end. The piston is inserted into this end and the taper slowly compresses the ring into its groove. As the piston starts to exit the straight end it can be inserted into the engine cylinder, and voila, the piston, ring and all will slide right in.

Dwight makes his rings .001" larger in diameter than his cylinders. Rather than breaking them after heat-treatment, he cuts them open with a .006" slitting saw. The ring gap is adjusted to .0025- .003" per inch of cylinder diameter with a ring gap tool. The cutter is two pieces of 320 wet/dry paper glued back to back, trimmed to about 3" diameter and a ¼" hole punched in the center. It is mounted in a mandrel with a screw and washers, and the mandrel chucked in the lathe. A special table is mounted horizontally at center height on the lathe compound. The abrasive disc fits into a slot in the table.

The ring is placed on the table and squeezed against the disc to lap the ends to the proper fit. The table supports the ring and holds it square to the disc.

The third goodie was a ring lap (holder) and here Dwight explained the procedure for fitting a ring to its groove. The rings are made about .001" wider than the piston ring groove. The ring is then lapped to fit. The ring lap (holder) is simply a tube or cylinder bored to the cylinder diameter and a little less in depth than the width of the ring. The ring is fitted into its holder and its sides lapped with a figure eight motion on wet/dry paper or on a brass lap impregnated with diamond. The correct fit is "just goes in with no force."

Dwight then talked about making oil control rings. The face groove in the ring is turned before heat-treating and slitting. The oil drains can be machined after heat-treat. The drain grooves are milled into the face groove with an armature undercutting saw. These are small diameter saws available from Ideal Industries, and from Martindale Electric. Try your local motor repair shop. A ¾" diameter ring will have 6 drain grooves and a 1" ring 8 grooves. A small hole is drilled through the wall of the piston at the bottom of each drain. More of Dwight's method of making rings is available in Tech Topics for September 2001.

Thanks, Dwight.

TECH HINTS

From Bob Kradjian: For balancing small items and for a idea for low friction bearings, go to your local hobby shop and look at the Top-Flite propeller balancer.

From Dick Pretel: Clear nail polish makes a good, low tech thread retaining compound. Coat the screws with the nail polish and allow to dry before assembly. The lacquer will secure the screws and will not run where it is not wanted.

Bob Kradjian's 4 cylinder

Dick Remington built this nice tail stock lathe chuck.

This Compressed Air V–4 engine was designed and built by BAEM member Rudy Kouhoupt. Specifications are a 90 degree V configuration with an angular separation of 180 degrees between the two crankpins, cylinder bore and stroke is .875 inches, admission and exhaust events are regulated by an inside admission piston valve for each cylinder, single eccentric on each block end.