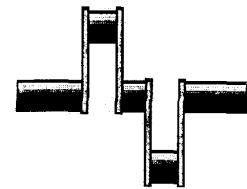


The Crank Calls



May 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

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



NEXT MEETING
May 17, 2003, 10 AM AT
Robert Schutz's Shop
366 40th St. Oakland, CA

April 19, 2003 Meeting BAEM Bob Kradjian, secretary

President Ken Hurst called the meeting to order at 10:02. Our visitor was Mike Keeney from Reno, Nevada. Friends Marc and Bobbin Cave introduced him. Mike operates a CNC shop and teaches TurboCAD/CAM. In addition, he is president of The International TurboCAD User Group. Maybe Mike will be the one to bring out a practical kit for an in-line four to replace the venerable Wall Four.

First Pops:

George Gravatt brought a nifty hit and miss "Aermotor." This engine is unique as an eight-cycle, not a four-cycle engine. A 4:1 gearing, not the usual 2:1 ratio, drives the cam.



President Ken Hurst brought his latest overhead valve Challenger with a Roots-type blower. He ran it briefly, but shut it down with a problem in

the middle main bearing. The old Challenger block is being pushed to the limit with the added pressure from overhead valves and a blower. Ken also has a nice video of his engine running. It's nicely turned out with bright red powder coating on the block. The blower housing is highly polished aluminum.



Dwight Giles has also finished his OHV V-8 and says it really snorts. I am sure that the BAEM members have the best V-8's in the country.

Treasurer's report:

Law Throop says we have \$1300 after paying our EDGE & TA dues and insurance. As reported last month, we actually received a rebate on the insurance.

Coming Events:

Hillsborough and The Dream Machine shows

have come, and gone. The weather was gorgeous at Half Moon Bay, and it was a thrill to see a B-25 and three P-51's do a fly-by. Your spy caught Pat O'Connor and Scott Overstreet enjoying themselves.

Next up is the Palo Alto Concours on June 22. This is held on the El Camino Polo Field at Stanford University. Details will be forthcoming.

Later in the year the "last" PRIME, is scheduled for late September in Eugene, Oregon. The huge GoodGuys show comes up in late August, and the all new "Men, Metal, and Machines"



show in Visalia on October 25 and 26.

Smaller Open Houses and possibly Mare Island may also materialize. It's a target-rich environment.

Bits and Pieces:

Dwight Giles

brought an Economy and an Upshur, both nicely done as usual.



Ken's neighbor, Lenard showed a German pulsejet engine from the 60's. He fires it up on occasion using a Model T spark coil and white gas. The noise is



"terrific."

Pat O'Connor had his nice OHV, highly modified, Wall Four.

The turbo is mounted, but not operational. He is experiencing oil by-pass and fouled plugs. Whatever the cause, it isn't low compression. Pat says the highest reading is 130 pounds!



Dick Pretel updated us on his very ambitious---even by Pretel standards---Four cam, 32 valve, V-8. He has the buckets finished and hardened, and also the oil-lite bushings for the cams.



The faceplate is under way and the pulleys are ordered.

His flat head Challenger was also displayed. This beauty runs well, has three Walbro-type carbs (only one is operational), uses an electric fuel pump, and the pressurized oil system has an effective filter in line. The Stainless steel, tapered exhaust headers



started life as turkey basters.

Al Vassalo decided to build a radial engine after he retired. We were privileged to see it start easily and to hear it run with a lusty exhaust note followed by a loud reaction from Robert Schutz's three smoke detectors. The radial is Al's own design. He admits to a lot of "trial and error" activity in bringing it along. At one point he had it mounted in an eight-foot span radio controlled Stearman Biplane. He, wisely, decided not to risk the engine to flight.

Host Robert Schutz's Upshur had a place of honor on the display table.

Scott Overstreet showed us an LED lamped flashlight. He believes the LEDs will be the future of portable lamp technology. The semiconductor industry is investing large amounts

of money to replace filament bulbs with these devices.

At the upcoming May meeting, Dick Pretel plans to bring some of Ed DeGear's hardware for sale.

A reminder, when placing articles on display, PLEASE label them clearly. They must be for sale with a price, or—if free—so labeled. Robert Schutz has offered help with labeling material, if needed.

The tech topic will follow, but I would like to comment on John Palmer's achievements. The term "world class" is often loosely applied, but John's Wright engines are truly world class. I doubt that there are better examples on the planet.

Photos by Bill Nickels
and Jim Piazza

Lenard Higgins' old mill gear is damaged. If you can help build a new one let Lenard know. You can reach him at 707-252-9110 or lhiggins@neteze.com

For Sale

Carolina Tool & Eq. HD-10
horizontal/vertical bandsaw,
3/4" blade. \$250
Pat O'Connor 408-733-3710

For Sale

Craftsman 6 x 18 lathe.
3 jaw, 1/3 H.P. reversing motor
Table/wheels \$375

Rototiller 5 HP Good condition
\$150

Call Jim Piazza 408-446-4825



TECH TOPICS

BY PAT O'CONNOR

This month the Tech Topic subject will be balancing of parts. You may have noticed the better balanced engines don't walk around on the table while running. To correctly balance a part both the static and dynamic components need to be addressed. The talk will include a demonstration of the balancing process.

TECH TOPICS

BY CARL WILSON

The John Palmer Replica Engine Show came to BAEM Saturday, and what a show it was. Our own John Palmer has built 3 full-size replicas of the Model B engine used by the Wright brothers in their 1908 Flyer. Yes, that Wright brothers who's centenary of the first flight will be celebrated this year. John brought one of the engines and slides showing how he built it. They are 4 stroke, 4 cylinder engines: 4 3/8" bore by 4" stroke, 240 cubic inch displacement, and weigh 165 lbs. John built them with a 16" lathe, Bridgeport mill and 16" shaper. The plans were drawn from copies of a partial set of the original drawings held by the Franklin Institute supplemented by measurements taken from engine #41 in the Hiller Aircraft Museum. The engines are will be installed in airframes and flown.

Let's take a brief tour around the engine:

The timing side of the engine is shown in the photo. The crankcase is visible only at the bottom. It is a thin-walled aluminum casting. It had to be poured from two ladles to ensure complete filling of the mold. All of the castings were poured in the patternmaker's backyard.

The cylinders were turned from solid continuous-cast iron billets 6 1/2" diameter and weighing 99 lbs. The finished weight was 9 lbs –

90% of the billet lay in the chip pan when John was finished, and he has made 64 cylinders! You do the math. John recommends cast iron chips for healthy roses, camellias, and citrus fruits. Twelve cylinders were used in the rep-



lica engines; the remainder were for other engines and for spares. The cylinders have integral heads, i.e., the bore is blind at the top of the cylinder. The valve guides are threaded into the solid top of the cylinder and the ports are bored into the side of the head below the valve springs. The intake manifold and the exhaust ports are on the other side of the engine. Additional exhaust ports are bored into the cylinder wall at the bottom of the piston travel.

This makes the engine a semi-uniflow 4 stroke! The original design had problems with breaking the fabricated exhaust valves. The solution was to reduce the lift of the exhaust valve cam lobe and dump some of the exhaust through the ports at the bottom of the cylinder. Both ports exhaust directly the atmosphere – no manifolds, no silencer. These engines are noisy! Note that there are only 4 push rods: the intake valves are operated “automatically” as the piston descends during the intake stroke.

Cast aluminum water jackets are shrunk onto the cylinders, they form the visible exterior of the cylinders, and the jackets are in turn secured by a shrink fit steel ring. The entire assembly is bolted to the deck of the crankcase. To do a valve job, you would have to unbolt the cylinders! The pistons, piston pins, rings, valves, and springs are regular automotive items. The coolant manifolds are cast aluminum and bolted to the cylinders. The coolant manifold is the horizontal piece with the numbers 1342 on it. There is a similar manifold on the other side. The intake manifold is fabricated from .040” steel tube, riveted and silver soldered.

The con-rods are clearly visible. They were machined from 6061 T6 aluminum billets, leaving lots of chips. John showed a picture of his Bridgeport mill: the base was completely covered by a pile of chips! I guess the roses don’t need aluminum, maybe John was able to sell the chips for scrap. Two of his engines used these rods. One of the engines used replicas of the original rods which had hollow tubular steel

shanks with cast bronze eyes threaded into the shanks. This is a very difficult construction and more information is available in the club newsletter dated June 2002.

The crankshafts were another exercise in chip making. They each started out as 212 pounds of 4140 steel flat stock drilled and sawed down to about 40 pounds. Two were turned in the lathe, and one was “turned” in the mill: that is the main and rod journals were end milled as the crank was rotated between centers. The original design used 1 ¼” journals and was a bit flexible. Two of John’s engines were built with 1 ½” diameter journals and to save weight the journals were drilled and reamed 7/8” and plugged. One engine was built to the original specifications and used the original design connecting rods mentioned above.

Not visible in the photo, but quite essential is the fuel system. A small gear pump sprays fuel into the intake manifold through a spray bar made from ¼” tube with 8 ea. #60 holes. There is no throttle! Speed control is by advancing or retarding the spark by rotating the magneto. The German built Mea magneto is visible at the lower left corner of the photo. A common problem with the original fuel system was wear in the side plates of the gear pump that would allow fuel to leak from the discharge side back to the inlet and reducing the pressure. There were two cures: rebuild the pump by disassembling it and lapping the wear marks out of the plates or by getting rid of the pump and moving the fuel tank to above the engine and using

This is the engine from the 1903 Flyer, one of three horizontal engines built by the Wrights. It is currently in the collection of the National Air and Space Museum.



1910 Wright Vertical Four Engine

KEN HURST AND DWIGHT GILES' V-8s

Photos by Ken Hurst

