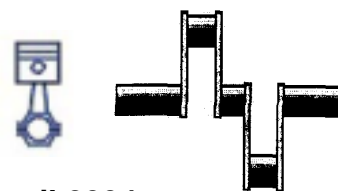


The Crank Calls



April 2004

President.....Ken Hurst.....(707) 257-2481.....icengine@mcispeed.net
Secretary.....Bob Kradjian.....(650) 343-7585.....bkradjian@aol.com
Treasurer.....Lewis Throop.....(650) 941-8223.....lthroop@aol.com
Events Coordinator...Dick Pretel.....(408) 732-6507...RPM10K@SONIC.NET
Editor.....Bill Nickels.....(408) 739-2407.....whnickels@aol.com
Tech Topics....Pat O'Connor.....(408) 733-3710.....pat1650@yahoo.com

Upcoming 2004 Club Events

The Hillsborough Concours d'Elegance, May 2
BAEM Swap meet and Running Engine, June 19
Palo Alto Concours, June 27
GoodGuy's West Coast Nationals, August 27-29
Blackhawk Automotive Museum, November 20--probable date.
Dick Pretel, Events Coordinator

TO JOIN THIS CLUB

Contact Lewis Throop at
27272 Byrne Park Ln.
Los Altos Hills 94022-4324
650-941-8223
lthroop@aol.com

MAKE \$25.00 CHECK
PAYABLE
TO LEWIS THROOP

NEXT MEETING

April 17 – 10AM
At Robert Schutz's Shop
366 40th St. Oakland, CA

Check out the BAEM Web Site at www.baemclub.com
Send your project photos to the Web Master Jim Piazza.
Phone: 408-446-4825
Email: jpiazza@ix.netcom.com

Meeting Notes

March 20, 2004

Bob Kradjian, Secretary

President Ken Hurst, looking fit after his successful surgery called the meeting to order at 10:04. It is great to have you back, Ken.

Visitor: Ron Meckley came as Jeff Miller's guest

New Members: Mark Geise, Lee Bishop, Bob Johnson, Grant Seviars, Paul Marshall, also Karl--but I couldn't catch the last name. Will fill it in later, sorry. Karel Vystrcil was listed last month as a visitor, but actually is a member.

Treasurer's Report: Lew Throop says that we are solvent, but we haven't yet paid the EDGE & TA dues.

Special Events: Coordinator Dick Pretel an-

nounced the Hillsborough Concours date as May 2. He took a number of names of those wishing to exhibit. Contact Dick if you have an engine, or engines, to show. He can accommodate 20 or fewer. It's a good show, with excellent protection from the elements and a friendly crowd.

The Palo Alto Concours (our first big show in 1997) will be June 27 at Stanford. Look up their fine web site at: paconcours.com. Our club is featured both under "links" and under "Concours 2003" as Miniature Engines. It's worth a look.

Members wishing an EDGE & TA badge, please see Lew Throop.

FIRST POPS!

This is a biggie. Eugene Corl called on April 5 to say that the one-third scale; cast-iron, small-block Chevrolet engine has just clocked an hour of running time! This project took up seven

years and three days of Eugene's life. It runs great! Takes the throttle well, has a good mid-range on its two Zumis and sounds a lot like a big version of Lee Root's quarter-scale Corvette engine. He consulted with Ken concerning ignition problems and switched to Mike Neal's system using a Hall-effect trigger from the crankshaft. He feels that he gets 60 degrees of dwell. At present, he is using an 1100 rpm drill motor to crank it via a Torrington clutch bearing. Perhaps a built-in starter will come later. At the first oil change, there was some nasty stuff in the oil. Eugene has magnets in the pan and also in the oil filter. There is a difference in a cast-iron engine compared to our aluminum, sleeved engines. The radiator is from the Concord supplier that Dwight uses; Eugene is also using a 12 volt booster fuel pump. The bore of this historic engine is 1.25 inches and the stroke is 1.16.

This engine will make its national debut at NAMES (next week-end) where we can confidently predict it will be the hit of the show. (The engine project was first displayed at the 1997 NAMES.)

It's amazing that this is Eugene's first engine. He thought he could complete the project in a year and says that he doesn't recommend this approach.

We are fortunate to have, in our club, more than a half dozen "world class" engines.

Bits and Pieces:

Alan Ingersoll brought a box full of engines, some dating back to the 1950s. The most remarkable of the group was an opposed twin, two-cycle, marine engine with a transmission that has a built-in clutch and planetary gears. It has a water pump, cooling jackets



around the cylinders, water-cooling for the headers and I have heard it run. It sets up a fine racket. The engine is a good runner with its dual mix carburetor. He also had an aero two-cycle opposed twin. This one had a supercharger housing on the backplate. The last engine was an unfinished seven cylinder radial, it also had a blower. All of these engines had



"Super Cyclone" cylinder castings. These were the result of Al's wartime work at the Lockheed plant in Burbank. The Super Cyclones were made at an adjacent facility and a friend supplied Al with castings that had small blemishes. All of

these engines had the ingenuity and complexity that we associate with Al's engines.

Al Vassalo also had a marine opposed twin two-cycle that he built over fifty years ago. It is of brass, heavy, nicely made, and entirely original.



I showed a Virgil Jeffries Harley Davidson. We met Virgil at PRIME, he came to Visalia and joined the club.

Ken and I both love his Harleys. They start with a brief touch of the starter. With a retarded spark, they just tick over. Nice job, Virgil.



Jim Piazza showed us the latest in his work on a single cylinder, OHV, engine--nice progress.



Hurst and Giles brought in two nifty engines. One, a Wall four with overhead valves and nice blue crankcase. The other engine is a flat-head Challenger finished as usual with a finely crafted walnut

base, enclosed electrics and starter. The usual nice radiator and welded up aluminum shell.

Who brought the beautiful John Deere Model "E"? I lost my page of notes. Will give credit and details next time.



President, Ken Hurst and George Gravatt were guests of Mazda, USA last week at the Mazda Automobile Research and Development Convention in Irvine. Their engines were well received by a very sophisticated audience. Several of the Auto magazines will be there and we should have some fine publicity in "Car and Driver", "Hotrod", and "Custom Hotrod". See the enclosed photos. The gentleman with Ken is Jim Sullivan, CEO of Mazda, and USA.

Frank Gudaitis, a free-lance writer, called me to say that his article on miniature engines can be seen in the May issue of "RC Driver".

Don McRae, long-term BAEM member, informs us that the "Gas Engine Magazine" now has a section devoted to miniature engines. The May issue has the first installment entitled "Reader's Scale Engines".

Do you remember the conversation about a big, BIG diesel engine during the last meeting? Here is some scoop from the March issue of "Four Wheeler". It's called the Wartsila-Sulzer RTA96-C. It is a turbocharged two-stroke, in-line, diesel engine built by Aioi Works of Japan's Diesel United, Ltd. Well, how big is it? How about a bore of 38 inches with a stroke of 98 inches? Each cylinder displaces 111,143 cubic inches. For the 14-cylinder jobbie, this comes out to 1,556,002 cubic inches (or 25,480 liters). It's 89 feet long and 44 feet high. I suppose you want to know about horsepower? OK, try 109,920 at a whopping 102 rpm. By the way, it uses 1,660 gallons of heavy fuel oil per hour. What's it for? It's built to power container ships.

Alan Ingersoll has decided to sell his "J-Head" Bridgeport, step-pulley mill. Serial number, J46607. The motor is a 1hp. US Electric, 220volt, with an extra back-gear belt. The price is a fair, \$4,000, firm. It comes with a Phase-A-Matic three phase converter, an Acu-Rite (Bausch & Lomb) digital read out, a set of collets, a 6" vise, 46 assorted cutters, 2 lights, an Albrecht-type chuck, a boring head, a fly cutter, a small Mitutoya digital read-out for the Z-axis, a non-tailstock index head, a Servo power feed on the x-axis (knee and cross-feed are manual).

The ways still show the original frosting and the mill is smooth running. It could use a good cleaning, but most of the paint is intact. I will bring a picture to the meeting. The buyer will have to provide drayage. Here is a chance to acquire a complete milling package for a reasonable price. See Dick Pretel or me for details.

President, Ken Hurst and George Gravatt were guests of Mazda, USA last week at the Mazda Automobile Research and Development Convention in Irvine.





Eugene Corl called on April 5 to say that the one-third scale; cast-iron, small-block Chevrolet engine has just clocked an hour of running time!



TECH TOPICS BY PAT O'CONNOR

TECH TOPIC AT THE APRIL MEET

The April Tech Talk will be given by Mr. Sam Bail of the Locktite Corporation. He will discuss the uses of their 600 series products, primer and threadlockers

Tech Topics: V-8 Engine Building Layout: Datums and Centerlines

March 20, 2004

By Carl Wilson



The crankcase casting of a V-8 engine is a bit intimidating. There is a lot to do and most of us do not like to make too many mistakes, so where does one start? How do you find the finished part buried in all of that metal? The best advice is, of course, to “begin at the beginning ...and go on till you come to the end: then stop.” (Lewis Carroll, *Through the Looking-Glass*) Somehow, as good as are those words, they seem a little in the air when you are trying to bolt a casting to the mill table. To help us out

Ken Hurst talked about the very first things to do: locate datums, layout the centerlines of the (finished) casting, and layout other features that are referenced to the datums and centerlines. Sounds easy, huh!

Some definitions will help us get started. Webster's Ninth New Collegiate Dictionary defines a datum as “something used as a basis for ... measuring.” A datum is the place where a measurement starts: it can be a surface of the casting (a “feature”) or a geometrical construction from a feature such as a centerline. The manual for design practice published by the American National Standards Institute titled Dimensioning and Tolerancing defines a feature: “The general term applied to a physical portion of a part, such as a surface, hole, or slot.” And datum: “A theoretically exact point, axis, or plane derived from the true geometric counterpart of a specified datum feature. *A datum is the origin from which the location or geometric characteristics of features of a part are established.*” (*Emphasis is mine*) Begin at the beginning. What do we have so far: features, datum features, and datums. Features are surfaces of the casting: bottom and sides of bearing webs, cored holes for the liners, the inverted vee inside the lifter gallery, etc. Datum features are those surfaces that are used to create datums, i.e., the surfaces that are used to generate the perfect points, lines, or planes from which a measurement can start.

This is all well and good, but I have yet to see a drawing used in the hobby that employed geometrical dimensioning and tolerancing. All of our drawings give the essential dimensions, but the datums are not specified. You have to work them out for yourself. Ken used a 2 cylinder and a 6 cylinder in-line engine, and the newly developed Black Widow V-8 engine to illustrate the process of deciding and locating datum features, developing datums, and making layouts from these. Here are some of the guidelines that he talked about:

The layout for the length of the block begins at the centerline of the center main bearing web. The datum features are the two faces of the bearing web; the datum that is derived from them is the transverse centerline of the web. A layout line is scribed here and then layout lines are scribed at the two ends of the block. These lines define the length of the block and the excess casting material at the ends is milled off to these lines. Both photos show this datum line, and to make sure that you see it, Ken is pointing right at it.

These engines are water cooled and have wet liners, that is the liners are surrounded by the coolant. The cored holes for the liners of the 6 cylinder engine can be seen in both photos. The layout of the center of these holes begins with the water space. Ken's rule is to center the liners in the water spaces as well as possible and at the same time be sure that the cylinder head will be centered on the block.



There is extra material on the bottom of the block that is removed to make the bolting surface for the main bearing caps. This finished surface is at the centerline of the crankshaft and that centerline is located at the intersection of the centers of the bores on each side of the block. So a major factor in laying out the centerline of the crankshaft starts with the location of the walls of the water space around the cylinder liners.

Another datum feature is used in laying out and machining the bottom of the block: the inside of the lifter gallery. The crankshaft should be parallel to the length of these surfaces. No measurements are

required here. Ken supports the block on parallels inside the lifter gallery while machining the bottom of the block.

The important datums so far (for the layout of the crankshaft) are surfaces that are not machined, that are located away from the crank, and that would appear at first thought to be unrelated to the crankshaft. These are not precision surfaces: they are as cast. There may be errors in them. You may have to move your layout lines around to satisfy as many of the requirements as possible. Working with castings requires a bit of thought.

The height of the deck (top of the block where the cylinder head bolts on) is measured from the centerline of the crankshaft. The best way to make this measurement is to put a precision pin in the main bearings and measure down from the deck.

Some of the layout lines will be removed during machining. A good example is shown in the photo of the bottom of the V8 block. The transverse centerline of the center main bearing will be machined away when the bolting surface of the bearing cap is machined. You can: extend the lines to locations that are not machined; place centerlines all the way around the block; make note to yourself about the layout dimensions; make secondary datums that will be used to replace the primary datums that have been machined away; make locating datum features that will locate the casting in its fixture.

The dimensions on the print may not be the dimensions that you need to layout and machine the casting. Make careful notes of your calculations: a month later you may not remember why you wanted to do things that way.

Looking Ahead: Future Tech Topics will take us all the way through the building of an internal combustion engine from castings. So stay tuned, there is a lot ahead of us. At the March meeting, Dwight Giles talked about fitting and lapping the cylinder liners. I'm going to hold this information until we get the engine built up to that point so that it will be in order. I didn't forget to include it in this month's report.

**Model Crankshafts
and Camshafts**

By Roger Slocum

Hardened and ground
alloy steel crankshafts

Hardened and ground
tool steel camshafts
Lobe profile and timing
to suit your needs

Web Site

www.cranksandcams.com

Email: roger@cranksandcams.com.

West Coast Engine Exhibitions For 2004

Gas Engine Antique Reproduction in Portland,
Oregon September 25 & 26, 2004

2nd Annual Men, Metal, & Machines! Visalia
Conventions Center Visalia, CA October 23 &
24, 2004 – probable date

Dick Pretel, Events Coordinator

FOR SALE

Grizzly G1005 Mill-Drill \$650
Contact Jim Piazza 408-446-4825
Email: jpiazza@ix.netcom.com

Surface Grinder: Free to Good Home

6 x 12 manual surface grinder needs good home
and lots of care. If sweat equity is your idea of
fun, this may be the project for you.

Carl Wilson 650-967-7715

Email: toolcarl@comcast.net

WANTED

Small milling machine in good condition.

Contact Roger Slocum

408-866-6243

Email: okiedebby@cs.com