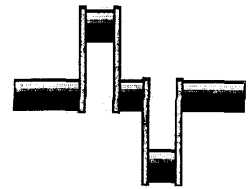


The Crank Calls

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

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May 2001

www.baemclub.com

NEXT MEETING

May 19, 2001

AT 10 AM

AT

Robert Schutz's SHOP

366 40th St.

Oakland, CA



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for more pictures.**

BAEM Meeting Notes, April 19, 2001

Bob Kradjian, Secretary

The meeting was called to order by President, Peter Brooks at 10:02 a.m., on a Saturday! This was our first scheduled Saturday meeting and was again held at Robert Schutz's fine Oakland facility. The membership offers our collective thanks to Robert for his continued hospitality. It was decided to meet there again in May. We will announce the meeting time as the third Saturday of the month. This falls on the 19th of May. Unfortunately, this conflicts with the Woodland MECA collecto and I will be asking someone to handle the secretarial chores. Be on the lookout!

One new visitor was Glen Wall, a retired Mare Island machinist and neighbor of Ken Hurst. He wanted to see the rest of the crazies that spend their nights making tiny engines. Wall is the distinguished name of the American pioneer of the sport. Our other visitor and guest was Charles Taylor, more about him below.

Our esteemed treasurer, Lew Throop, reports that we have paid our yearly EDGE & TA dues and insurance. Lew and I have teamed up to arrange for the insurance coverage at three shows and a home showing in July if we choose to have one.

I reported on the Hillsborough Concours, May 6th. We will have our same excellent spot under the overhang at the end of the entrance drive.

All members willing to spend some time at our exhibit were urged to contact me. A report on the showing will be found in the next newsletter.

Tech Question: I asked about the sticky problem of making distributor caps for our little engines. As usual, the membership had plenty of good answers. The materials mentioned were, Lucite, Delrin, and Micarta. For old time engines, the Micarta seems a bit more authentic. As reported at our last Bennett Automotive meetings, RTV casting procedures can also be used.

We touched briefly on the meeting place situation. Member Bob Allen had prepared a map of the Bay Area with a red dot over each member's house and a green dot over the three areas we are exploring. It is abundantly clear that the Hiller site is closest to the center of our club population. The next closest is the South San Francisco site and the Oakland site is the most removed.

We were pleased to have Charles (Chuck) Taylor as our guest. Chuck is the owner and CEO of Syneon in South San Francisco. This company develops and manufactures advanced medical devices. Chuck, who is an avid RC flyer, has a marvelous facility complete with two milling machines (his Bridgeport is his small mill), two lathes, etc. Look out Chuck, we'll try to lure you into the building of tiny engines. The visit allowed Chuck to meet with us and see a bit more of what we are about.

Scott Overstreet introduced the next portion of our meeting. This was Chris Leggo's superb treatment of the problem of balance in internal combustion engines. Scott will deal with this in detail, but I must say that Chris has outdone even himself with a fabulous working model that clearly demonstrated the elusive concepts of balance. No wonder the English modelers think he is a "senior chap."

Bits and Pieces:

Joe Tochtrop brought in a prototype of an Elmer Wall (there's that name again) engine. This one is the "Mighty Atom" which was featured in a 1930s magazine article. This rare Wall engine is not usually listed in histories of Wall's work. Joe has developed patterns, plans, and castings for this nifty single cylinder, four-cycle engine. It looks great, and I am sure that people will be building the engine for decades to come. Joe also can provide plans and castings for the Economy Engine and the Atkinson Cycle Engine as well as a small pump and dyno kit. We have a wealth of talent in the Bay Area.

Lew Throop described a CNC program that he is investigating. Check with Lew for details, the web site is LinuxCNC.org. I saw a bit of their presentation at NAMES 2000. Keep in mind that host Robert Schutz is literally our home-based CNC expert.

Dick Pretel has completed his F-Head Wall four. It has the usual fine Pretel finish and attention to detail. The last problems to be solved were those of oil seals, by-pass relief valves, and excessive oil pressure. He has given up on his nifty digital tachometer, finding that when he shields the high-tension side sufficient to avoid interference, the engine won't run! However, it ran well at the meeting, pleasing the members and setting off all the smoke alarms.

Visitor Chuck Taylor brought some lovely antique measuring instruments from his personal collection. The ingenuity and skill of our predecessors was amazing.

Ken Hurst and Dwight Giles teamed up to exhibit a cylinder for the 30 cc Wall single. Ken built the cylinder and liner and Dwight lapped it to a marvelous finish. This technique will need to be shared with the group at a later time.

I presented several engines. First, a Conley V-4, this used engine was bought with a destroyed camshaft. It was possible to reshape the deeply grooved lobes with hand tools and refinish the shaft. A call to Gary Conley in Illinois resulted in the information that the engine has plenty of valve lift and the ten thousandths lost from the lobe nose will not prevent the engine from running well. The V-4 was essentially half of the Conley V-8. Gary said he planned to make 100 of them, but quit at 60.

The next engine was an unusual one, a British "Sea Otter" designed by a Mr. Heacock. It is in the process of setting up and needs a new distributor cap. Maybe we'll have it as a runner in months to come.

The Edgar Westbury "Sea Gull" is an old design built currently by the Ukrainians who have provided us with the Profi line. It is a vertical twin, flat-head.

Finally, as a spoof, I mounted the 1/12 scale Mini-Cirrus in a die-cast cartoon-like '69 Camaro. The picture will document this nonsense. Sometimes a little levity is a good thing.

BAEM made its second appearance at the Hillsborough Concours d'Elegance and what a success it was!

We displayed over 35 engines. The sounds of V-8 Challengers, Walls, Seals, Economy, Atkinson, a Harley-Davidson and even a Holt pierced the air all through a perfect, sunny day.

We were never without a sizeable crowd of car aficionados who were appreciative and respectful.

Thanks to Ken Hurst and Boyd, Al Ingersoll, Rudy Pretti, William Nickels, Pat O'Connor, Joe Tochtrop, Eugene Corl, Rudy Pretti, George Gravatt, and Jim Piazza. All pitched in and worked perfectly as a team.

We had six tables filled to overflowing, and will ask for eight next year. And yes, we were officially asked to come back by the happy organizers. The organizers were very helpful with parking, unloading, and location for the exhibit. They even provided a great lunch.

Of course, the setting and the automobiles were spectacular. Don't miss it next year.

TECH TOPICS

BY
SCOTT OVERSTREET



First, and I'm sure I am speaking for all of us, another very appreciative thanks to Chris Leggo for another superb presentation, this time on engine balancing. Not only was this presentation captivatingly informative, thanks to his knowledge, organized style of presentation and wit but also because of his use, at each increment in his presentation, of a unique "degree of balance" demonstrator which he designed and built just for his session in front of us. In relatively short order, we learned that the primary balance (about the plane described by the crankpin motion) of a single cylinder engine cannot be completely perfected by crankshaft weights alone; but, in the case of a 2 cylinder 90 degree V arrangement, it can be. Then we learned that whereas the primary balance of a single cylinder engine cannot be perfectly achieved, there are multicylinder inline arrangements where overall primary balance of the whole engine is achievable

and in some cases without any balance weights at all. In the case of a balanced 2 cylinder 90 degree V, we next learned that any number of these modules can be lined up without impacting perfect balance, and also that there are arrangements where overall balance is again achievable without any counterbalance weights. Chris then touched upon secondary balance considerations, which he defined as the end to end rocking vibration of multicylinder arrangements. Due to lack of time, and I'm sure Chris' concern for not hitting us with too much too quickly, Chris' coverage of the multicylinder extensions of the basic single and 2 cylinder 90 degree V was brief. Maybe we can get Chris to talk more about multicylinder arrangements and the advantages of other V angles some time in the future. After I got home, I read Chris' handout (I tried to read it during his presentation, but found that I couldn't focus on both Chris and it at the same time.) and found that an easy to accomplish procedure for balancing the two basic configurations is there. Terrific presentation Chris - again many thanks from all of us.

Our "Tech Topic" subject for our May meeting will be the finishing of precision bored holes, both "blind" and "through," as in engine cylinders and the like. This is a task that some of us have under control but probably more of us don't. Anyway - two distinctly different finishing processes are commonly used to achieve the same desired end result after machining; these are lapping and honing. Dwight Giles will lead a discussion on the lapping approach and Roger Slocum will do the same for the honing approach. Both will bring samples of their tooling and will show how you can make your own and how they are used and what can be expected. Bring your knowledge, questions, sample work, problems, tooling, precision hole measurement devices, etc. - the more to talk about the better. The plan is that, by the end of the session, it will be clear to each of us just where, how and when the honing and lapping processes can each be most advantageously used to produce a round, taper free hole to size with high precision and desired finish.



Scott

From the Ed.

This is an E-mail and photos from our member across the pond Clennell Tomlinson.

Clen is taking on a very ambitious project. We will be looking forward for more progress reports and photos.

Hi Jim,

I have just received the latest crank calls, very good as usual. It did prompt me to send greetings from this side of the pond and to give a progress report on my efforts, some of your colleagues may remember I am building a 1/8th scale 18 cylinder opposed piston 2 stroke engine based on the Napier Deltic. I have just completed the assembly of the 3 "V12" crankshafts and thought you may be interested. I'm sorry it's a little late for your recent meeting topic.

My approach has had to be a little different. The scale is so small that I could not fit in split big ends. so I have to have a built up crank. I designed a system and an assembly fixture, built a complete dummy/test crankshaft to check out the assembly fixture and to test the crank design. The main feature of the assembly is that it is bonded together using loctite 680 high strength adhesive supplemented with multiple locking screws. I had calculated that if I was very lucky My 160 cc engine would turn out about 5 lbs/ft of torque per crank and if it really went about 10 lbs/ft. I tested the crankshaft assembly as bonded without locking screws. It was placed in the assembly fixture with No 1 big end journal jammed and a 12" lever attached to the rear of the shaft then hanging on lumps of cast iron! It took some 18 lbs weight to sheer the No 6 crank web to rear main shaft. By this time there was a 13 degree torsional twist to the shaft allowed by the failure of one side of Nos 4,5 and 6 big end joints there was no permanent deformation.

This seemed good enough to me. I now have 3 completed assemblies; 2 clockwise and 1 anti-clock, they all run very freely and smoothly in the assembly fixture, conformation of the accuracy.

each individual assembly is comprised of 130 individual components made up as follows:

1 rear main bearing shaft and extension.

1 front main bearing shaft and extension.

12 identical crankshaft webs .

5 middle main bearing spindles. (8 mm dia. X 19 mm long)

6 big end spindles. (5 mm. dia X 21 mm. long)

18 inlet conrods. (48 mm. centres, 5 mm dia small ends, 13 mm dia big ends X 6 mm. wide, machined from titanium)

18 exhaust conrods (As above but forked to 2 X 3 mm. sides 6mm apart at the big end to fit over the inlet rod)

22 big end ball races, 2 in each conrod. (13 mm O/D X 5 mm. I/D X 3 mm. wide)

7 main bearing races. (16 mm. O/D X 8 mm. I/D X 5 mm. wide)

2 outrigger main races. (14 mm. O/D X 6 mm. I/D X 6 mm. wide)

24 big end locking screws. (M2 X 6 mm)

36 main bearing locking screws. (M2.5 X 6 mm)

Each of these items is assembled into the fixture with very positive location and bonded to the previous.

Once cured the locking screw holes are drilled and tapped and the screws threaded and bonded into place.

the fixture is relatively simple but very accurate. It comprises a strong base to which is fitted 7 split main bearing housings. There is a separate plate at either end to locate the outrigger bearings. There is an indexing plate with 6 equi-spaced holes marked with the firing order 1,5,3,6,2,4. The holes are marked the same both sides of the plate but 1 side is labeled "clockwise" and the other anticlock. This plate has a screw clamp to the rear of the crankshaft. Finally there is a thin location plate which fit onto the main bearing housing screws and between any of the housings to position a big end .

I have attached a few pictures to show some of the items and the finished assemblies.

Two top crank covers.

An exhaust and inlet conrod assembled together

The 18 inlet and 18 exhaust conrods.

Fixture showing the anti-clock crank in the assembly fixture.

Crank2 is the two clockwise cranks

Web is one of the crankshaft webs with a dime to indicate the size.

Two of the three cranks with conrods.

If I have not made this clear please ask anyone to mail questions. In the meantime please remember me to your members who may remember me from PRIME last year.



Deltic Cutaway

Keep up the good work, with very best regards,
Clen
Ed- Clens's email address: clen@charmans.com
More Deltic info: <http://www.ptfnasty.com/ptfDeltic3.html>



Con Rods



Two cranks



Crank Fixture with anti-clock crank



Covers



Assembled pair of conrods



Crank web



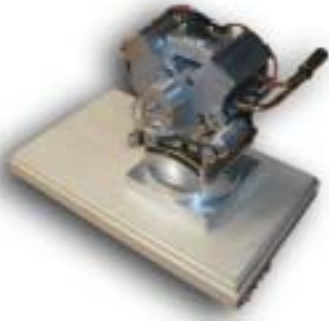
Dick's F Head Wall 4



Dick Pretel filling up his F head with Go



Chuck's Calipers



Bob's Conley V-4



Bob's Wall 10 cc



Bob's Wall 10 cc



**Bob's 1/12 scale mini Cirrus in
Cartoon Camaro**



Bob's Westbury Sea Gull



Joe's Wall Mighty Atom

Bob's Sea Otter



**Photos by Mike Rehms, Ken Hurst and
Clen Tomlinson.**