Bay Area Engine Modelers Club
www.baemclub.com

The Crank Calls

May 2023

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NEXT MEETING

Saturday, May 20, 2023, at the Golden Gate Live Steamers clubhouse site in Tilden Park, Orinda, CA

Gate opens at 9:00 am

Meeting starts at 10:00 am

Upcoming Events

- May 20: BAEM meeting at GGLS
- Jun 10-11: GGLS Spring Meet
- Jun 17: BAEM meeting at GGLS
- Jul 15: BAEM meeting at GGLS

See below for more details regarding events. Watch Crank Calls, BAEM emails and BAEM web page for updates. BAEM meetings are usually 3rd Saturday of the month except December.

MEETING NOTES

Bay Area Engine Modelers met at Golden Gate Live Steamers on April 15, 2003.

Twenty-three members and two guests were present. President Paul Denham welcomed attendees.

NEW MEMBERS/VISITORS

BAEM members are reminded that visitors are welcome at our club meetings, and we're always looking for new members.

TREASURER'S REPORT

President Paul Denham reported club finances are "OK", 2023 dues of $25 dollars are due, and checks can be mailed to Deirdre Denham at 1937 Merchant St, Crockett, CA 94525. Make checks payable to "BAEM".

CLUB BADGES

If you are a member in need of a badge, contact Mike Rehmus (mrehmus@byvideo.com) who has offered to produce them.

BAEM's YouTube Channel: https://www.youtube.com/channel/UCZ7VbDw_y0GtNm1n6KWiQkg

UPCOMING SHOWS AND EVENTS

EDGE&TA

Ray Fontaine (rayfontaine2@att.net (925) 784-5411) has coordinated our club's participation in EDGE&TA events. He is recovering from hip surgery, and his participation is limited. The Branch 13 website is here: https://branch13edgeta.com/. Check it out for their full calendar. Upcoming shows of interest are:

--May 19-20, 2023 **Rio Linda farm & Tractor Days**
Deacon VanDerostyne 209-810-5913
richardvanderostyne@gmail.com

--July 27-30, 2023 **Amador County Fairgrounds**
Robert Facino (916) 417-8732
rtsco@netzero.com

BAEM members interested in participating in these events should contact the person listed, and let Ray know as well.

Diablo Valley Community College

At last month's meeting, Jeffrey Smith from Diablo Valley Community College gave an overview of the Industrial Design program at the Pleasant Hill Campus. Of possible interest to BAEM members was the open house and Car Show scheduled for May 6 10:00 AM to 1:00 PM. BAEM members were invited to show and run engines. The DVC Industrial Design program seems to be evolving. It has long covered manual and CNC machining, the program has expanded to cover robotics, CAD, 3-D printing and other design topics such as textiles and furniture.

Jun 10-11: GGLS Spring Meet

GGLS is having its Spring Meet this June 10 & 11, and BAEM has been encouraged to show our model engines. We'll have tables and sun shades. Saturday is for GGLS members, and Sunday is open to the public. This event is good exposure for our club, with an appreciative audience. Plus, free food for BAEM members!!! Dogs will be available but not burgers. Also expect salads, cookies or cakes or other dessert items, and beverages.

Paul is recommending we move the June meeting to June 10 and join GGLS for their pot luck lunch. Details will be provided at the May meeting.

FIRST POPS

At the March meeting, George Spain reported that his vertical twin design had run for the first time, but only for a duration of 10 seconds. Subsequently, the engine would not start. After checking carburation and ignition timing, he discovered the crank shaft had twisted, which adversely affected ignition timing. He speculated that the one way bearing and electric drill he was using for starting locked up during a start attempt.

George Spain describes crank shaft problems

George shared his woes in making crank shafts: one was bent by a tool/journal collision, one blank work hardened while facing to size, and the third one twisted as described above. We understand, for we all know from experience that the road to a fully running engine is filled with potholes, closures and unexpected diversions. We wish George luck in overcoming these setbacks.

Larry Zurbrick has almost arrived at first pops. He reported his GEM1 was nearly ready to start, but has been held up for a lost piece of 1/8" tubing needed to

mount the reed switch. Larry's engine is very close to the MEB published plans and is throttle governed.

BITS AND PIECES

Peter Lawrence is building a pair of vertical engines reversed engineered from Hanson's design seen on YouTube. One engine will be diesel, the other a pathfinder running on spark ignition.

Parts for Peter's engines

Peter shared details regarding a number of machining challenges he encountered:

He tried an alumina ceramic material as a spark plug insulator and found it to be unmachinable. He then discovered, on E-Bay, some affordable ¼" plates of Macor, a machinable glass ceramic material. He found the material to be very suitable for machining spark plug insulators. He cut off ¼" square rods with a hack saw and turned them to size using a square collet for work holding.

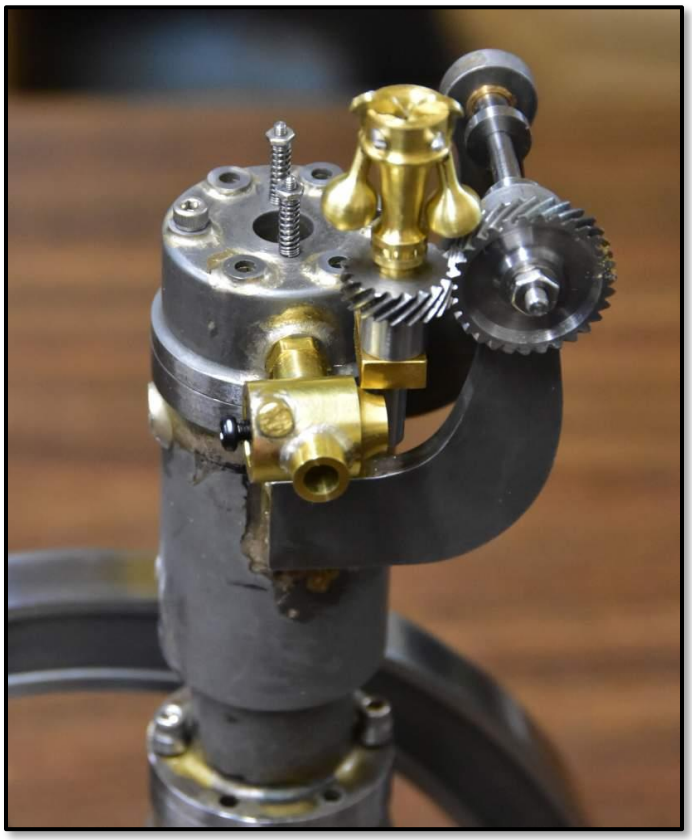
The spark engine flywheel suffered thermal cracks in the spoke to rim joint. Resolution involved considerable consumption of solder and gas. The ultimate solution was to align the flywheel on a fire brick and slowly heat the rim while keeping the spoke cool, so that uneven cooling would not stress the joint in tension.

The screw holes on the base needed to be drilled into curved surfaces. He needed to mill a flat surface area into which the hole could be drilled, but it was unreachable. Peter's solution was to fabricate a piloted D-bit from a piece of drill rod, to provide the cutter length needed.

The spark ignition engine is using a reworked glow engine carburetor. Peter fabricated a brass housing for the internal components.

The brass gas tanks needed formed end plates. Peter showed the dies he designed to form the plates.

The vertical engine had a flyball governor. Peter described the delicate machining needed to fabricate the parts.



Flyball governor

Building these engines has presented Peter with a wide variety of machining challenges. Once again, Peter has proven himself highly capable. There is much we can learn from his problem-solving process.

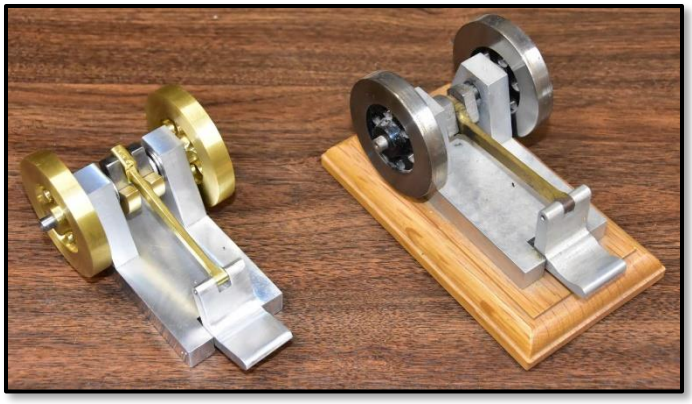
Paul Denham is another capable machinist in our group. He is machining a model of a Bolton and Wall steam engine, originally manufactured around 1802. Paul is using castings from an English supplier, which were acquired as part "payment" for machining the Stuart Twin Victoria.

Paul Denham describing bell crank fabrication.

Paul has mostly completed the brass flywheel work with and the eccentric channel. He cut the bell cranks from steel plate using his CNC mill with .125" end mills and .025" depth of cut. He shared some of the challenges arising from the low technical sophistication of the original design as well as the small sizes of the scaled down parts like bell crank connectors and using BA screws smaller than 2-56. He plans on using square nuts, to be cut from 5/32" square rod.

Of related interest, Anthony Rhodes found a series of Bolton Wall engine build articles in the GGLS archives. "Engines in Miniature" articles ran in 1993 and 1994.

Dwight Giles shared some of his personal history. He recalled that his first machine purchase was a Craftsman 12" lathe he got on sale for $550 (marked down from $625). One of his first projects was a toy "finger engine" which spins a fly wheel with finger power.



Dwight's finger-powered cranks

He showed 2 versions: one in aluminum and one in brass. The brass version with crank bearings and counterweights ran more smoothly (and perhaps reflected Dwight's learning curve).

Larry Zurbrick has been a long time Lick Observatory volunteer. As you might imagine, the observatory has a number of telescopes, including several of noteworthy historical significance. Foremost of these is the Great Lick Refractor, built during the years 1880 through 1888.

The Great Lick Refractor is a 36-inch refractor telescope with a 67-foot tube. It has a 4.5-inch diameter eye piece adapter. The adapter has a thread that locks to the telescope with a one eighth rotation. The adapter had become worn and needed to be replaced. Larry volunteered to machine a new adapter.

Larry reported it took him 4 trips to the observatory to fine tune the fit and find the start geometry to successfully mount the adapter. Another machining challenge was successfully overcome by a capable BAEM member.

Jeremy Coombes works for General Dynamics and has been allowed to pass along some lightly used end mills that GD uses for stator boring. Free end mills for BAEM members sounds great, but it is helpful to understand what these were used for, and the limitations of their usefulness to hobbyist machinists.

Jeremy explained how these end mills were used to mill motor stators. The electric motor stators are made of bonded Lamstack layers (kind of like a pad of paper). The 25 thin plates are easily torn or damaged during machining. The single use end mills minimize delamination forces on the stator during machining. The end mills are both "right hand" cutting, but one is a two

flute "left hand" helix, which applies downward tool pressure keeping the laminations together. This cutter is NOT something to use when blind plunge cutting. The other was a "right hand" high helix three flute end mill that provides high tool contact. The "left hand" helix tool is employed first, which "pushes" down against the part while cutting a circle larger than the tool diameter larger than the tool) to approximately half depth. The cutter is then exchanged for the "right hand" helix tool which when engaged to complete the bottom half of the bore, applies upward pressure against the part while interpolating. By using this method, the laminations are always being compressed during machining instead of "lifting" and tearing out.

Jeremy passed out a bag of cutter pairs which were eagerly scarfed up by BAEM members obviously contemplating delicate stator boring jobs. Most of us may not have realized the 2-flute left hand helix cutter requires a CNC tool path.

Ken with gauges

Ken Brunskill wanted to measure compression and vacuum in his Atkins Differential engine model. He acquired two gauges and then realized that the volume of the gauges and plumbing was large compared to the cylinder volume and pressure he would be measuring. He embarked on a Solidworks design effort to reduce gauge volume and was pursuing very small reed valve applications. He had noted that most McMaster Carr offerings in their catalog also include solid models and he searched for some examples. He then discovered that McMaster Carr offered a gauge that would measure both compression and vacuum with small volume. This "over the counter" solution cost around $16 to meet his needs. (https://www.mcmaster.com/products/pressure-gauges/pressure-and-vacuum-gauges-6/) Lesson learned: Don't waste your valuable time re-inventing the wheel.

Pat O'Connor brought in what appeared to be a cam grinder on a wooden base and a small geared down electric motor. Grinder was a dumpster find. There was some speculation that the application was optics rather than engine cams. Larry Zurbrick ended up with it, perhaps planning to grind new lenses for Lick Observatory.

Pat's mystery grinder

Peter Lawrence offered a tech topic on compression ratio versus pressure ratio that shared some of the design insights he originally acquired while designing model turbo jet engines. He is applying those insights to the vertical diesel design. Club notetaker tried to capture the essence of Peter's talk in a writeup that will be distributed separately.

Peter talks tech

RAMBLINGS

Working on an interesting project? Got a great BAEM story? Share it with us here. Send us pics and project details, and your hard work will be shared with the entire club.

FOR SALE

An opportunity has arisen: a Black Widow V-8 model engine that is 90% completed is now available for purchase by a BAEM member. If interested, read on.

Black Widow V8

First, some history. Dwight Giles, Ken Hurst and John Vlavianos had a dream of an improved Challenger V8. Dwight and Ken were machinists, while John was a pattern maker and foundry enthusiast. The 3 worked together and made the Black Widow patterns and castings.

Dwight and Ken took the undertook the machining of the first engines. Dwight and Ken completed their engines #1 and #2. Engine #3 was 90+% completed, and boxed up and sent to John Vlavianos, who was intending to finish it. Engine #4 was ~80% completed, and passed to Paul Denham, who completed the remaining 80% (Paul's estimate) and got it running.

So where is engine #3? John passed away before completing it, and the #3 engine went dormant.

Recently, Dwight heard from John's widow. She realizes her family members are highly unlikely to finish the machining of the engine. She's willing to sell it "as is", for a fair price.

Dwight is assisting the widow in this transaction. He recommended selling the engine. Dwight's asking price is $5000 to $7000. At this time, this opportunity is for BAEM members only.

For BAEM members, this is a great chance to own a Black Widow V8 . Given the amount of work completed, the asking price is fair. Check out Martin Model's casting kit (from John's patterns) and the Stuart price differences between raw castings and fully machined parts.

If interested, contact Paul or Dwight to get connected to the Vlavianos family.

Got something you'd like to sell? Your ad is free and will be seen by likely customers.

NEWSLETTER CONTRIBUTIONS

Your contributions to this newsletter are appreciated: workshop reports, tech articles, reviews, historical pieces, whatever. You contribute, we'll figure out how to post it. Send your contributions to either or both of us. Thanks!

-Mike Byrne at mgbyrne3@comcast.net
-Wes Wagnon at weswag@ix.netcom.cm