



# SCHSM

Southern California Home Shop Machinists

January 5, 2019

## OFFICERS

President	Charlie Angelis
Vice President	Michael Vupillat
Secretary	Fred Bertsche
Treasurer	Jim Endsley

## COMING EVENTS

February Meeting  
Sat, February 2, 2019, 2:00 p.m.  
El Camino College

March Meeting  
Sat, March 2, 2019, 2:00 p.m.  
El Camino College

## PREFACE -

The January meeting of the Southern California Home Shop Machinists was called to order at 2:00 p.m. on Saturday, January 5, 2019. We met in classroom AJ115 on the first floor of the Industry and Technology Building at El Camino College in Torrance, California. There were 31 members in attendance. We had two visitors. The first was Molly Kawasaki who has an interest in machining but has no machine tools yet. She is looking for insights and suggestions on how to proceed. The second visitor was Jim Coronado from Hacienda Heights. He has interests and some experience in machining, welding and plasma cutting.

## CLUB BUSINESS –

Jim Endsley – Jim suggested members consider registering now for this year's Westec show which will be held at the Long Beach Convention Center from September 24th to the 26th. Jim also discussed the park reservation he made for the club picnic. The date reserved is June 8th, which is the second Saturday of June. Former President and current VP Michael Vupillat confirmed this was a good schedule making the picnic the week after the monthly Saturday meeting since it allowed for last minute planning and will make the event fresh (or at least fresher) in members' minds. We all need help sometimes in remembering what is on our schedules.

Officer Elections – Elections (or more aptly, a group coercion) were held for this year's officers.

Charlie Angelis - graciously agreed to one more year as president.

Michael Vupillat - will repeat as Vice President

Jim Endsley - will once again take on the Treasurer assignment

Ron Gerlach - will continue as Secretary and committed to sporadically publish the monthly newsletter.

Charlie Angelis, as continuing President, asked for feedback on things members would like to change in the manner in which the meetings are run and what, if any, changes were needed in direction the club was heading. A comment was made about limiting the time spent by individuals doing presentations and show-and-tell discussions. This quickly morphed into a rather heated discussion of the merits of such a move. It is safe to say that there were diverse opinions from various members. It would be rather tedious to try and capture all of the views but a general consensus was reached that presentation, those that are scheduled in advance and that are generally presented after club business and before the mid meeting break, should be limited to

something in the 30 to 45 minute range. This would obviously be extended if there is a healthy mix of questions and commentary from the other members. It was up to the presiding officer to moderate this timing. Show and Tell presentations would be shorter in nature and should be targeted as 5 minute presentations. A general rule cited by Charlie was that anyone with an extensive show and tell presentation should contact him in advance of the meeting so such presentation could be scheduled into the meeting agenda.

#### PRESENTATIONS –

Ron Gerlach Van Norman Piston Grinder Restoration

Ron presented a PPT slide show of the restoration of a 1940s vintage Van Norman model 76, taking it from a rusted and dirt encrusted pile of parts to a functioning and new looking tool. The machine belongs to Ray Salmon, a fellow club member (occasional attendance) and was restored in exchange for a Sunnen hone. Ray got the better end of the deal since it required consider more work than was anticipated. Below are before and after pictures showing the transformation.



Piston Grinder-Before



Piston Grinder - After

Photos were shown of all the subassemblies as they were removed from the machine, broken down into parts and inspected for any unusual wear or damage. Once it was determined that the inner guts of the two main spindles, consisting mainly of precision open race ball bearings, were intact and free of rust, it was all system go for the restoration.



Wheel Drive Spindle Bearings

The entire job would have been canceled if there was any significant water damage to the spindles since replacement would have been prohibitive.



Dismatted Parts Ready for Derusting

Various means of degreasing and rust removal were utilized. Degreasing was minimal since it had sat idle for so long. Simple Green and Lacquer thinner did most of the oil and grease removal. Once free of oils and grease the various parts were de-rusted using one or more of the following processes or products: Evapo-Rust, Naval Jelly, Metal Prep (phosphoric acid), electrolysis, sand blasting and wire wheel. Evapo-Rust was reserved for small delicate parts, naval jelly was used on most machined surfaces since it can be applied in a controlled manner. Parts that could easily be soaked were de-rusted using



diluted phosphoric acid. This was especially handy on things like nuts, bolts and small shafts. Most of the smaller cast iron parts were cleaned up using electrolysis since the parts can be suspended in the tank and forgotten about for hours or days as necessary. The large items that were 20lbs or more were sent to a sand blasting shop to be cleaned up. A wire wheel was used on most parts after all the other techniques except the sand blasting. The wire wheel removed all residual films and residue after these



processes. After de-rusting, all machined and/or moving parts were coated with Boeshield to inhibit rust. All other surfaces were primed and painted. Rustoleum Sunrise Red was used to best match the original Van Norman colors.

Besides the obvious derusting and painting there were a variety of machining operations required to fix broken parts and to build new parts that could not be salvaged. One cracked cast iron bracket was milled out to remove the cracked section and a new chunk of cast iron was brazed into place. A new adjustable table stop was built to match the other existing one.

SHOW and TELL –

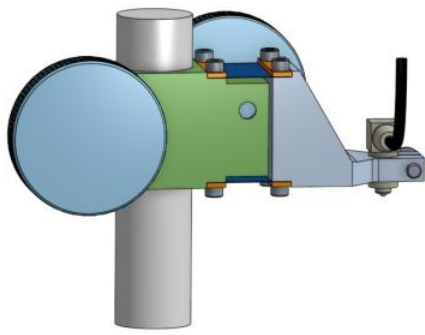
Dan Snyder – Dan presented his latest project in which he reverse engineered and built a precision vertical gage stand for a Blanchette Tool & Gage Mfg Co. comparator gage system. He started with an analog meter manufactured by Blanchette which could display differences down to 0.000005" when coupled to the appropriate



Blanchette Analog Comparator

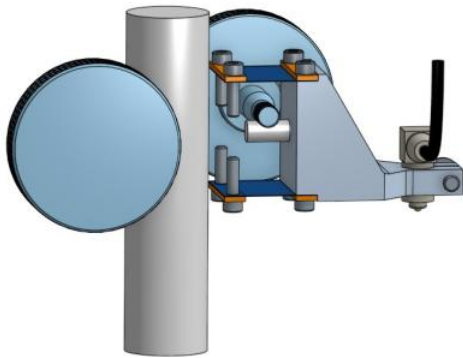
Linear Differential Transformer sensor. He found one of these transformers on Ebay but it was not designed specifically for his meter. He dissected the analog circuitry of the meter and determined the appropriate gain changes required to match up with the transformer he had obtained. Once the transformer and meter were integrated together, he was left with having to build a precision stand that would allow very minute adjustments that were within the differential measuring range of his meter and transformer sensor.

He zeroed in on a design by Mitutoyo, which consisted of two blocks coupled together by two spring steel plates. One block is fixed to a vertical base and can be moved for coarse adjustments and the other a suspended block which is supported by the two spring steel elements. Together these elements form a parallelogram of sorts and allow a very small yet precise amount of vertical movement. After immersing himself in the details of the design approach he reduced his studies into a set of mechanical drawings using Onshape.



3D Model

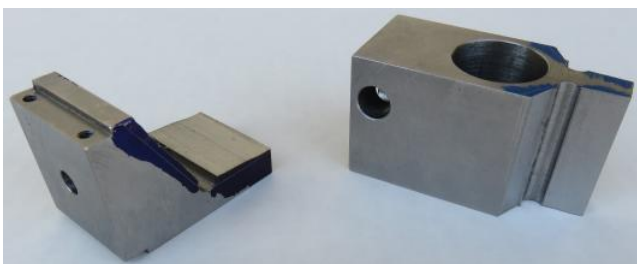
The 3D model above shows the completed stand with the Linear Transformer mounted on the moveable section. Hiding the fixed part, in the image below, exposes the internal guts and shows how the assembly works.



3D Model With View of Internal Parts

Note the tapered screw driven by the knob and mounted in the, now hidden, fixed section. The tapered section of the screw contacts a steel rod protruding from the rear of the moveable section. Turning the tapered screw by means of the knob, translates to vertical movement of the rod and the moveable section.

With the modeling done, he created the 2D parts drawings and then machined the various pieces. The fixed and moveable sections were machined out of mild steel and are shown below in process.



Fixed and Moveable Sections

Below is an in-process view of one of these pieces being formed on the mill.



Milling the Moving Section

He found some spring steel material and punched four mounting holes in each piece. Each thin spring

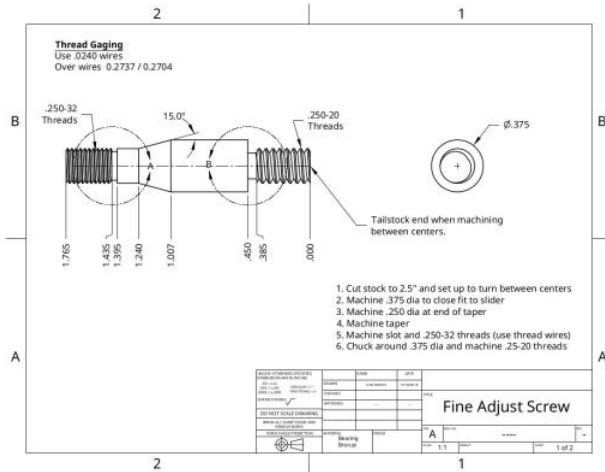


Punching Holes in Spring With Aluminum Guide

steel plate was sandwiched with an aluminum guide plate to aid in accurately locating the holes during the punching process. These will form the top and bottom section of the parallelogram and will also allow a small amount of movement of the suspended piece by virtue of their springy nature.

Next up was the tapered bronze screw that mounts in the fixed section. This was part of the Onshape model. The 2D drawing for this part is shown below on the next page.





2D Drawing for Tapered Screw

The next image is the bronze screw in process, with the tapered and threaded section completed.



Tapered Bronze Screw for Height Adj

The picture below shows the new mount in place on the vertical base and with a standard dial indicator for display purposes.



Finished Indicator Stand With Standard Dial Indicator

Larry McDavid – Larry presented the modifications he made to his precision Acra (Hardinge clone) lathe. He added a DRO to the tailstock, modified the tailstock (TS) to incorporate a lower weight handle and changed his lamp from a very hot Halogen lamp to a much cooler LED lamp.



DRO Installed on TS

He frequently finds himself having to drill deep holes using the TS dials but was tired of having to keep track of the number of revolutions. The natural solution was to add a DRO so he obtained a standalone scale made by Digikit.com which resembles a digital caliper with the jaws removed. These items are made specifically for these types of application. One end of the scale attached to TS ram in the form of a custom made clamp that fits to the very end of the ram without interfering with the Morris taper socket or the automatic tool rejection of the ram when backed fully into the TS body.



The other part of the scale had to mount to the body of the TS but he was reluctant to drill any holes in the casting. His solution was to build a two part adjustable metal bracket system, with one piece attached to the TS body using a 3M adhesive VHB 4541 with an 0.043\"/>



DRO Mounting Brackets

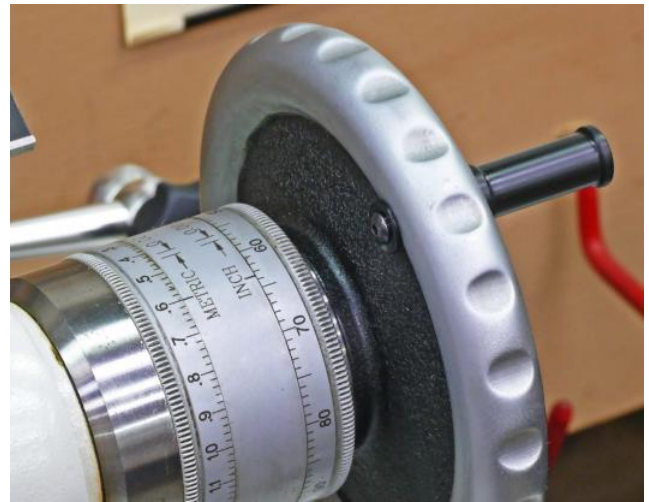
Once both the bracket and TS body were thoroughly cleaned the adhesive was applied to the bracket and then the bracket was located in place by eyesight. His two part bracket system incorporated a range of adjustment to compensate for any freehand errors made in sticking the bracket to the TS body because once the parts are placed together they can no longer be moved. Strong as it is at first contact it continues to increase in strength over a several day period. The bracket attached to the TS body contained two PEM stud inserts which were then used to secure the other half of the bracket with nuts.

The original handle on the TS wheel was a very



Original Handle (Top) New Handle (Center)

well made yet heavy device made, no doubt, from either steel or cast iron. The significant weight of the handle, which was obviously only located at one point on the wheel, made the wheel & crank assembly very unbalanced. So much so that he frequently experienced problems where the hand wheel would keep on turning, either forward or reverse if left in the upper portion of its motion. The TS, though very precise with no significant backlash, had so little drag that there was no resistance to this unbalanced weight and would turn freely until the heavy handle found a stable location at the bottom of its travel. His solution was to press out the



New Handle Mounted to TS Hand Wheel

heavy handle and replace it with a small and light weight handle made from Delrin. The weight differential between the original and new parts was significant so the hand wheel no longer wanted to turn on its own and stayed where it was left. The original and new handle are shown to the left.

The above image shows the finished TS knob with the new handle attached. One last image shows the entire lathe setup with the mods in place including the new LED lamp attached to the magnetic base; an impressive setup.



Complete Lathe With Modifications



John Denney – John built a small 3/8" bore steam engine with his Sherline lathe and mill. It is a McCabe's Runner, the plans for which were found at <http://nrmccabe.tripod.com/mccaberunner.htm>.



Most of the parts including the piston, connecting rod, cylinder, flywheel etc. are aluminum but the valve is steel. The images below show the cylinder, piston and connecting rod.



Cylinder



Connecting Rod and Piston

The valve was turned on the lathe and then heated to a cherry red and bent over to form a right angle part.



Steel Air Valve Prior to Forming



Steel Air Valve After Bending 90 Degrees

The flywheels were made from flat plate which were cut into octagonal shapes and turned down to the final round size.



Rough Cut Flywheel



Finished Flywheel and Drill Guide

Note the drill fixture used to precisely locate the holes in both flywheels and provide a means of mounting in the lathe chuck. The following shot is one of the two flywheels being turned to size in the lathe.



Flywheel Turned In Lathe

Once completed he could not get it to run with his small compressor so he took it to a gas station and used their air supply to run it... it ran great and he showed a video to prove it.

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SCHSM welcomes presentations by members or guest speakers on any subject related to metal working activities. If you have some knowledge or experience you feel may be of interest to our members, or if you know someone that may have something interesting to relate, please consider making a presentation at a meeting. Presentations may be a little longer and more detailed than a show and tell, and may be accompanied by slides, video, or physical displays. Probably every member has some experience they can share, and this is the purpose of SCHSM. Please contact President Charlie Angelis to make arrangements to give a presentation.

SCHSM meets in Classroom AJ115 on the first floor of the Industry and Technology building of El Camino College, 16007 Crenshaw Blvd. Torrance, California, at 2:00 p.m. on the first Saturday of every month. The building is near Parking Lot B. Enter the campus from Manhattan Beach Blvd.

If you would like to contribute an article to this newsletter, or make a comment, contact the editor, Fred Bertsche. He can be reached via the SCHSM Yahoo Group, or at [fbschsm@yahoo.com](mailto:fbschsm@yahoo.com).

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