



# Hamilton Model Engineering Club

## The Armchair

Season 30 Meeting 5

January 20, 2015



### Coming Up...

The next club meeting will be held on Tuesday February 17, 2015, 7.30 'til 10 pm. At February's meeting Dave Oulton will bring in his Sherline milling machine to show us how he has added Digital Read-outs to all 3 axes. Also there will be a brief presentation by Yours Truly about a small start-up company that I visited recently, where they are doing metal treatment using a high-powered laser. As always, please feel free to bring in your models, tools, and work-in-progress for the front table. We would especially like to see those items that we didn't get to see last month due to time pressure.

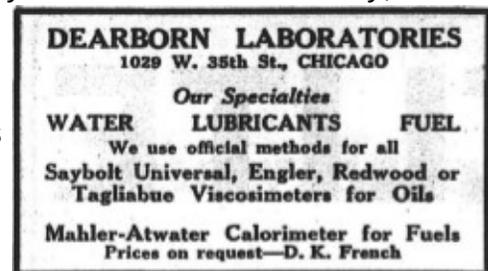
### At The Meeting

Thirty-eight members and 1 visitor braved the cold weather for our fifth meeting of the season. President Jim Seager began with a reminder of the [NAMES](#) show at the Yack Arena in Wyandotte, Michigan, on April 18 and 19 of this year.

The care and feeding of model boilers was Wolfgang Habicher's subject matter this time around. He began by talking about water, and how it's qualities affect both steaming and boiler life. He rated water as follows: Best is distilled water, especially for the last run of the day; next would be air conditioning condensate, and third, rain water. Water can be tested with pH strips, caustic (pH between 9 and 10) is better for steel boilers. Beware water that is too pure, such as from reverse osmosis filters. Water treatment is worth investigating, Wolfgang has had excellent results with "Dearborn 3088".

After water, coal was discussed. Before firing draft is needed, usually supplied by electric blower. At this point a deep voice from the audience informed us that the best blower he has ever seen was made from an old aluminum vacuum cleaner. Then one adds fire-starting material such as kerosene-soaked wood, although Wolfgang suggests alcohol-soaked charcoal is a better alternative, as it leaves less residue. Finally, once the fire is self-sustaining, begin adding coal. Wolfgang summed up this part of his talk by pointing out that water and fire must still be kept track of while driving.

Boiler stresses formed the final part of Wolfgang's talk. He mentioned the importance of hydrostatic testing, the safety factor to be used for copper and steel, and how often to do it. Glen McKee offered his information on testing of full-size loco's at the Waterloo Central Railway: done every 2 years. After noting the seriousness of the responsibility for boiler safety, especially for those members who are Professional Engineers, Wolfgang quickly covered some aspects of boiler design: choice of material, copper or steel; wall thickness; seamed or seamless, and joint design; temperature effects and choice of factor of safety; axial, hoop, and other types of stresses. He summed up by saying that designing and building a boiler of any size is a serious undertaking, and there is a lot to consider. The K.N. Harris book "Model Boilers and Boilermaking" (reviewed last meeting by our Librarian) was recommended, and that deep voice



from the audience mentioned the [Kozo Hiraoka](#) books as good boiler design references as well.

After all that talk about coal, Mike Gibbon began by telling us how he has become a coal merchant. He will be journeying to England to arrange for the Easter delivery of at least 3 tons of Welsh steam coal in 20kg bags, as a group purchase by interested live steamers around Ontario. Then he moved on to his topic of discussion: an experimental boiler project.

Mike believes that we can do better than the performance typified by traditional Model Engineer practice, as detailed in K.N. Harris' book, getting more steam and more forgiving behavior from our boilers. He gave a short history of traditional boiler design, and the characteristics that affect performance, before talking about the ideas of [Chapelon](#), [Fry](#) and [Porta](#) for improving boilers. His conclusion is that the tubes in model boilers are too few and over-scale, adversely affecting the tube/flue area. His plan is to test the boiler that he has had made to these ideas, a Don Young design for a British Rail Standard Class 2 loco in 5 inch gauge, measuring the firing rate, smokebox vacuum, and flue gas temperature. He has a program of modifications in mind: adding a firebox arch, extending the length of the boiler, and maybe adding "turbulators" in the tubes. Mike had some of the test hardware on hand for us to see, including his boiler, electrically driven water pump, and draft impeller in aluminum.



*Examples of pipe spiral turbulators.*

Mike's presentation covered a lot of ground on a very technical subject, about which he has done a great deal of in-depth research and thinking. His presentation stimulated lots of questions and comments, especially among the steam men, and we will all look forward to hearing about future test results.

After a much-deserved break, we enjoyed seeing some projects on the front table. First up was Bert de Kat with a stand-up shoe-horn he has made as a volunteer project for use by the disabled. His prototype is left-handed, but he is working on an ambidextrous design.

Ted McJannett showed us some assemblies for a 1.5" scale 0-6-0 British Rail tank engine he is building for a client. A front buffer beam and safety valve/water delivery assembly prompted some discussion on high-quality castings available in this scale.

Norm Mulloy brought in the spindle from his Bridgeport right-angle attachment for a follow-up on his successful repair. He had EDM'd out the stuck key in the spindle, then realized he'd been a little oversize and couldn't re-use the 1/4-28 threaded hole. A welded in straight pin saved the day.

A shop-built fixed steady made by Julius Gombos was on display, made for his Myford S7 lathe. Made in aluminum, it has a 5" capacity and features roller bearings on the fingers.

Harry Savile, as well as donating copies of Home Shop Machinist and Live Steam for the club library, showed us a selection of his tiny engines including a tilting piston engine and an old oscillator he built "two lathes ago". The re-purposed fire extinguisher that Harry was using as an air-supply tank to run the engines attracted a lot of interest. He explained that once out-dated, it was cheaper to buy a new extinguisher than it was to have the old one reconditioned, but it could still make a great air tank.

Last up for the evening was Dave Sage with a tale about adding a water pump to his big 1902 gas engine. It has a water jacket and can be water cooled, but Dave wanted to hide the pump and radiator in the base of the engine for an esthetically pleasing installation. He was able to buy a small radiator (used for computer cooling) on [Ebay](#), but the pump would have to be designed and built. Using his 3D CAD and CNC machining facilities, Dave went through several iterations of the design-build-test process to try different pump types until he came up with one he liked. With 3D drawings and photos of the parts, Dave took us down the path he followed,

explaining as he went the lessons learned. He tried a screw pump, a centrifugal pump, a gear pump, and finally a piston pump. Development of a drive system and a proposed electric fan for cooling were also covered. It sure looked like Dave had covered every possible pump configuration, but our favorite deep-voiced member was able to suggest one other – a peristaltic pump. However, the consensus was that the required slow-speed drive might be tricky.

And so we came to the end of the evening at 10:25pm, leaving some items for next month. I am prompted to point out that we have an obligation to finish at 10:00pm, many members face a long drive home and some have to rise early for work. Balanced against this one must point out how fortunate we are to have so much to present, look at and talk about that the evening runs over-time. All I can say, speaking for the executive and officers of your club, is that we will continue to do our best to strike the right balance, and we do appreciate your comments on how we are doing.

### **Club Business**

No club business this time.

### **Agony**

*"Knowledge is of no value until shared with others"* - Vane A. Jones, "Traction & Models" magazine

Hoping to see you all on the third Tuesday! Your Secretary,



Doug Crawford