

<http://www.portlandmodelengineers.org>

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FOR THE BEGINNER # 29 by Wes Ramsey

CUTTING TOOL MATERIALS

High carbon steels are used for hand tools such as files and chisels, and only to a limited extent for drilling and turning tools. They are oil or water hardened plain carbon steels with .9 to 1.4 percent carbon content. These tools maintain a keen edge and can be used for metals that produce low tool-chip interface temperatures; for example, aluminum, magnesium, copper, and brass. These tools, however, tend to soften at machining speeds above 50 feet per minute in steels.

High speed steels may be used at higher speeds in mild steels without losing their hardness. The relationship of cutting speeds to the approximate temperature of tool-chip interface is as follows.

100 FPM---	1000 DEGREES F
200 FPM---	1200 DEGREES F
300 FPM---	1300 DEGREES F
400 FPM---	1400 DEGREES F

High speed steel is sometimes used for lathe tools when special tool shapes are needed, especially for boring tools. However, high speed is extensively used for milling cutters for vertical and horizontal milling machines. Since milling cutters are usually used at cutting speeds of 100 SFPM in steels with cutting fluid, they never reach 1000 degrees F and so have a relative long working life.

Cast alloys are referred to as such because they are nonferrous alloys. These materials are somewhat softer than HSS at room temperature, but retain their hardness to higher temperatures. This property in tools is known as red hardness. The cast alloys can be used at speeds of nearly 200 FPM or up to 1200 degrees in steels. The approximate composition of cast alloy materials is 12 to 17 percent tungsten or tantalum, 30 to 35 percent chromium, 45 to 55 percent cobalt, and 2 to 3 percent carbon. Cast alloy tools are not used for ordinary machining operations. They are used mostly for high-temperature operations such as friction cutting.

May Meeting at Shindaiwa, Inc.

The meeting last month was hosted by Jim Pfaltzgraff. He gave a tour of the facilities and explained some of the finer points of the engines that go into a Shindaiwa product. A high point of the visit was watching the 3D "printer" hard at work. It is used to quickly test out design ideas for the plastic parts. Check the following pages for pictures. A big thanks to Shindaiwa for the use of their building.

Next month we will be back at Grant Carson's shop. The meeting is scheduled for Saturday, June 10th, at 1:00pm. Directions and a map are provided on the next page. Bring your latest project to show -- complete or not.

Tailgate Swap Meet Announcement

The June meeting will also feature a chance to bring in any items that you would like to sell or trade with other members.

Joint Model Engineering Picnic

The second annual joint picnic is being hosted this year by the Mid-Valley Model Engineers. Join us in Corvallis June 11th from 12-4pm in the SE corner of Avery Park. Look for the steam engine and covered 100' table.

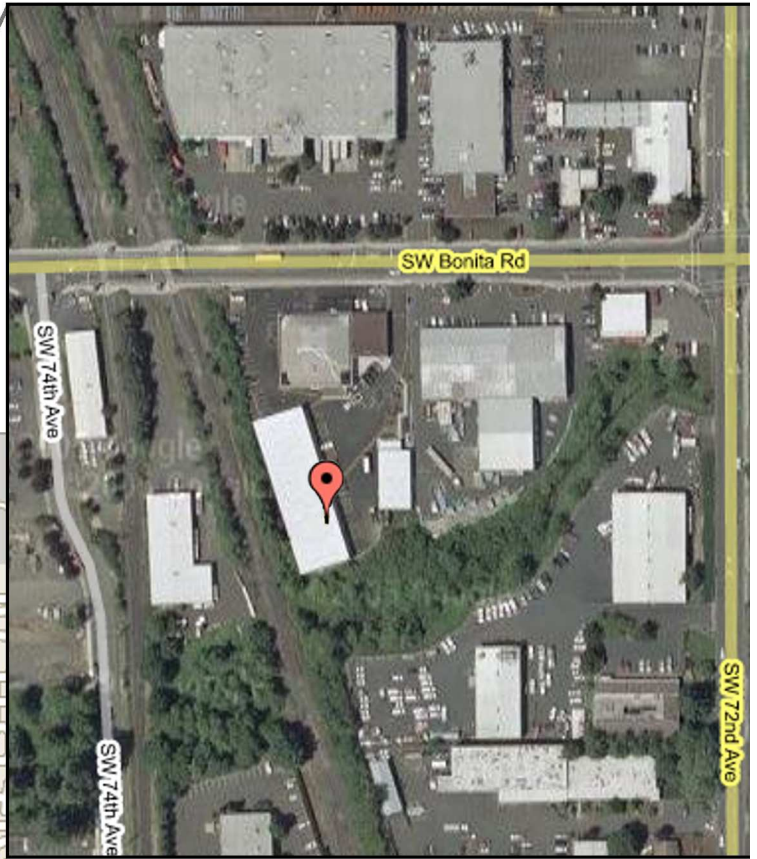
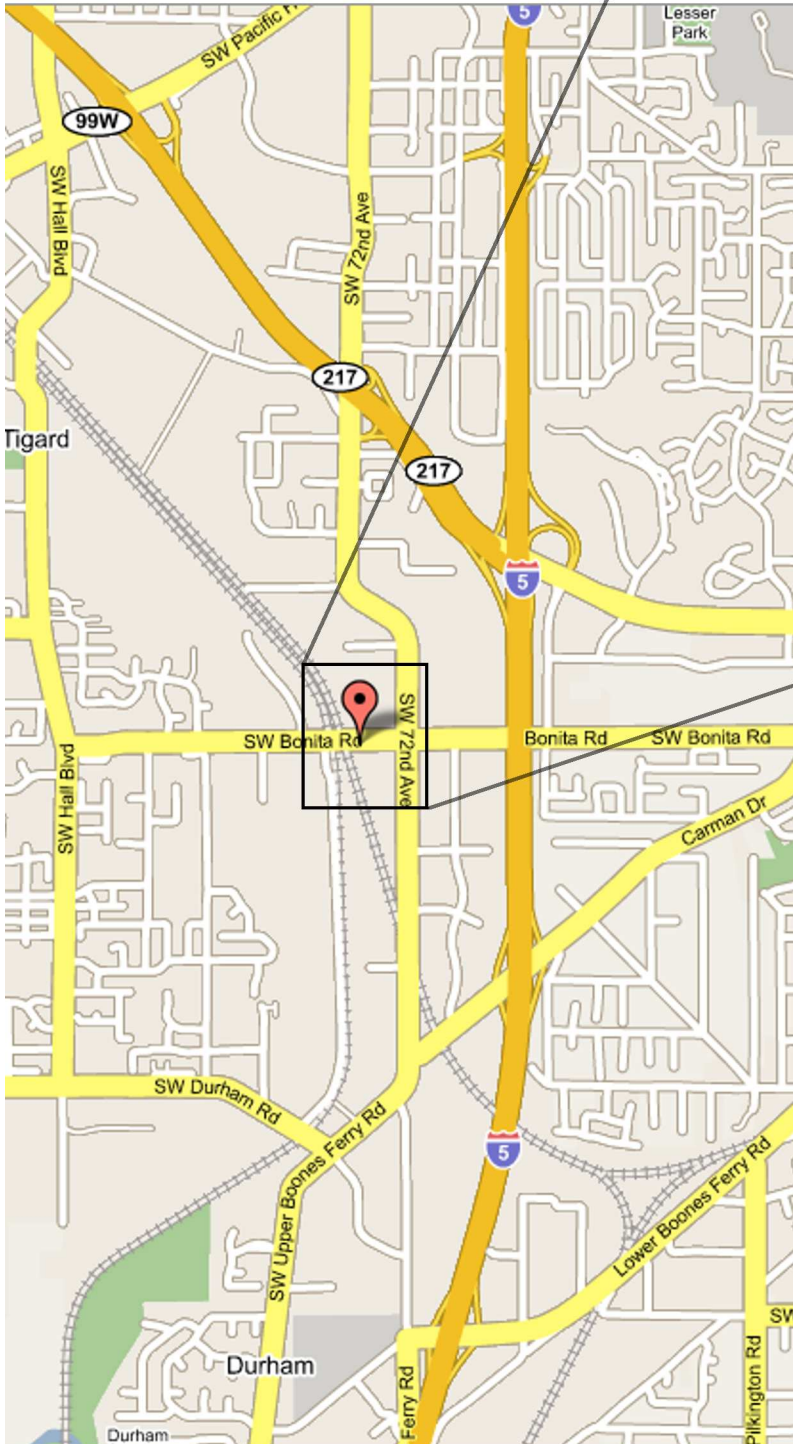
Lunch is scheduled to start at 1pm. Meat, beans, lemonade and serviceware are provided. Please bring a salad or dessert plate to share. Families are welcome to join.

An air supply will also be available for those who wish to show off an engine or two. Bring your air fittings.

A & G PRODUCTS

Saturday, June 10th, 2006
Meeting, 1:00pm

A & G Products
7360 SW Bonita Road, Unit C
Tigard, OR 97224



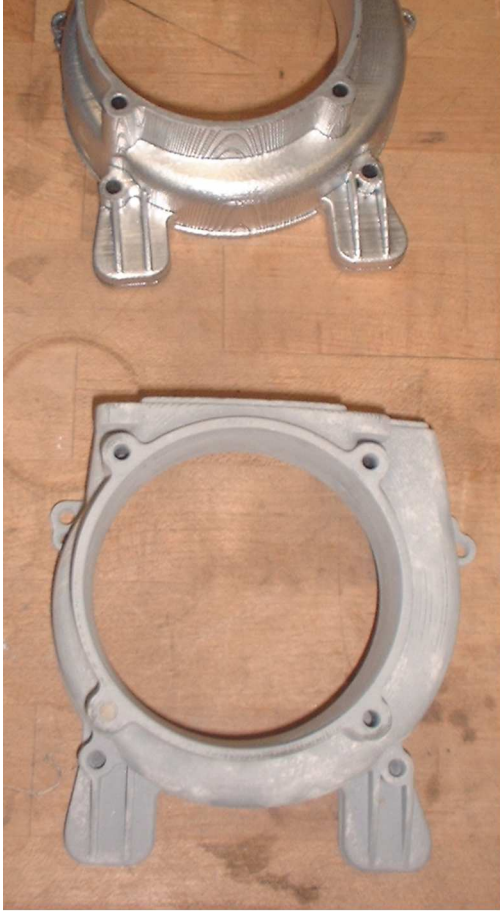
Directions to Grant's

From I-5:

Use exit 292 to Hwy 217, go north about 1/4 mile toward Beaverton to SW 72nd exit. Turn left onto SW 72nd Ave, go about 3/4 mile to Bonita Road, turn right. A & G will be on your left.

From Hwy 99 (Pacific Ave):

Turn south onto SW 72nd Ave, proceed about 1-1/2 miles to Bonita Road, turn right. A & G will be on your left.



On the left side are adapter plates "printed" by the 3D system Jim Pfaltzgraff demonstrated. The wavy lines on the upper one show the contours of the item left by the print head.

On the right is another example, this time of a cover. Notice the arrow detail in the lower right corner.

Below that is a water pump design that is being tested. The adapter plate fits between the motor and the pump.

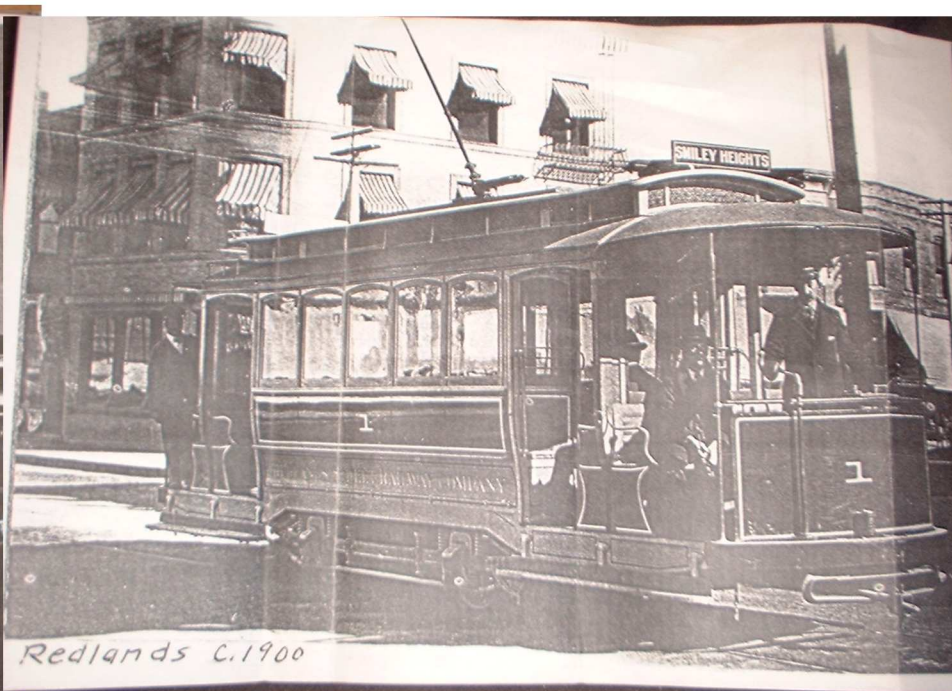


Dave Carr brought in a bicycle conversion kit which he estimates achieves 120 MPG and a top speed of 20 MPH. It uses a direct friction drive to the rubber tire. He also showed a Shindaiwa motor converted for use in a model airplane.





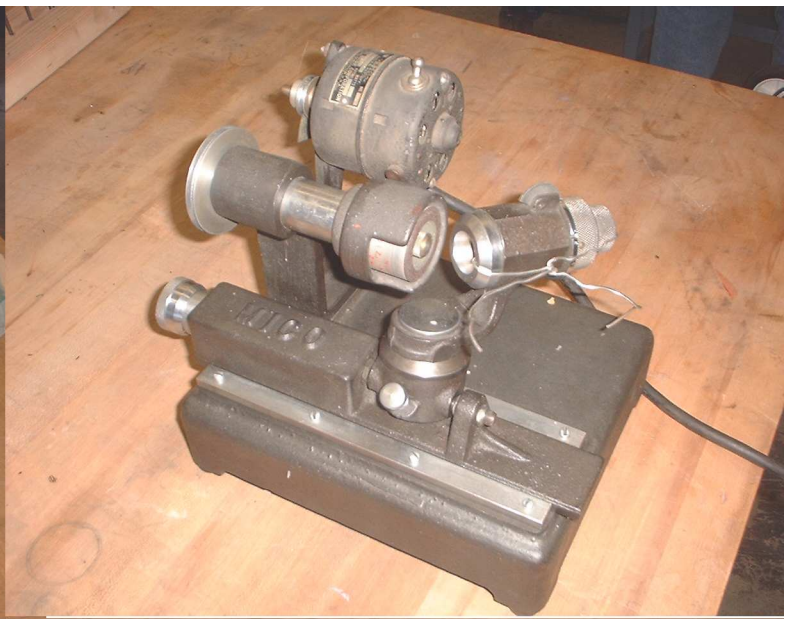
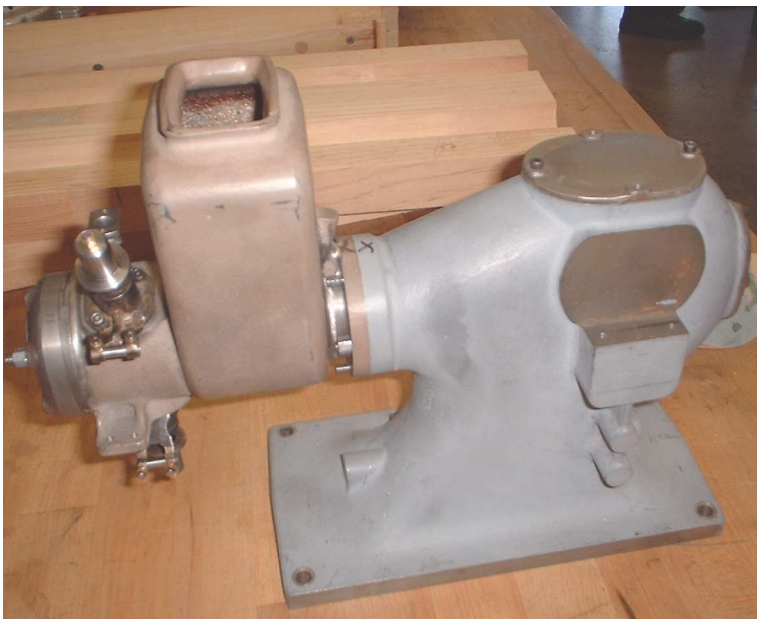
"THE 1910 PHOTO above brings back memories of when my mother would get me all dressed up so we could take the trolley into town and shop at the dime store." —George Baynard, Redford, Michigan. "I still recall the changing of the trolley when a car wouldn't get off the rails." —Nadine Walters, Irwin, Missouri.



The b/w photos above show trolley cars. Bud Statton is reproducing the "people catcher" part (below right). Two of these are connected to a board that when pushed lowers a basket to pick up the person on the tracks before they get run over. The red board is the follow block which helps the foundry quickly ram up the mould for the complex parting line.

He is also reproducing the item on the lower left which is one of the seat brackets used on the trolley.





Going clockwise from top left: Chuck Stark gave an update on his Mogul engine. A small tool grinder is seen next. Al Polhpeter brought in a pattern for a clockworks nameplate.



The lower right picture is the out-of-balance setup used at Shindaiwa to evaluate parts. A known out-of-round part is attached to make sure that it can detect the error. Then the real part is measured.

Jim also described his progress on the manual shaper project that he and Tom Hammond have been perfecting.

