

5160 CLUB NEWS LETTER

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The Direction of The 5160 Club
July 2009, by Wayne

The 5160 Club is now six-months old and the direction has somewhat changed. There were twenty-two present at the last meeting and a show of hands indicated that at least half of those present were more interested in knifemaking than in passing the yet to be established performance requirements.

The official rules for the 5160 Club have not been established so the name could be changed, the direction changed, you name it.

This author has been acting as Grand Poobah simply because no one else wanted to do it at the start of our meetings. I said from that the start that I didn't want to be in charge and I meant it. Jeff has kindly offered to be Grand Poobah and I thank him from the bottom of my rebuilt heart.

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We are now into the summer months thinking about the upcoming Bohemia Mining Days down here in Cottage Grove. The 5160 club will have a table during the festival. On July 16th we will be given a table. At this time we will begin to set up the area for our group being ready by 4pm. Dave, Walter and Jeff will have the first day running the booth/table. The assignments thus far are the following:

Thursday 16 July...Dave, Walter and Jeff...at 2pm-10pm

Friday 17 July...Wayne, Dave, Joel...at 9am-10pm

Saturday 18 July...Dave, Lynn M., Jeff, Christian...at 9am-10pm

Sunday 19 July...Walter, Lynn G...at 9am-2pm

The table will be open for people to place their blades for sale on...Please mark them with a price tag so as to not leave others watching the table to guess as to what it is...Jeff Crowner will have his shop open to leave things over night such as tools, knives for sale, anvils...etc...to make things easy for everyone and their travels...If you do not know how to get to my place then ask someone that has been to my hammer-ins...1565 Samuel Drive Cottage Grove, 97424 Oregon...My phone number is 541 201-3182...please call and make arrangements for things to be stored at my shop for the Bohemia mining Days event....

Jeff Crowner will not be at the meeting July 2nd, being on vacation in Texas...Wayne has appointed Jeff Crowner to run things at the meeting starting in August...Please mail me with articles, pictures, research, new tools, new blades...etc to the following mail...If you have any good ideas on the club, please feel free to send advice or comments...

Jcrown1@netzero.net

I will start posting members articles and such with the newsletters...August we are going to appoint and really organize this club...we are looking for serious volunteers for assignments and duties in order to keep this club running smooth...

For example...we need some of the following:

Scribe-to write down meeting things and info for the benefit of the members; David Ryder

Mass email person- Chuck Sholes, mail the newsletter out each month.

Editor and writer-Wayne and Jeff

Meeting Leader-Jeff as appointed by Wayne

Assistant Leader-?????

Research and Development guru-????

Training coordinator-?????

...One thing I want to do is get some of you makers to do short tutorials during the meeting like Wayne has been doing...Last, please check your mails and respond to them while keeping the flow of communication and information going...Please be patient, I will try to learn every ones names during the meeting...

God Bless and be safe....

Jeff

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5160 Club Test Knife Tutorial

By Wayne Goddard

June 2009

First let us consider all the ways there are to selective harden/temper a blade. And, do understand that these methods apply to carbon and carbon alloy steel types. Also remember that I'm thinking of 5160. Stainless steels and high alloy steels are not suitable for the methods presented here.

#1. Edge Hardening.

An oxygen/acetylene torch is used to heat just the edge portion, then either an edge quench or full quench. Temper the whole blade three times.

#2. Edge Quenching.

The whole blade is heated to the hardening temperature either with a forge or torch and then only the edge portion is quenched. Temper the whole blade three times or use a soft back draw.

#3. Fully Hardened

The whole blade is hardened and then the back is then given three soft back draws with the tempering of the edge as a function of the soft back draws. Tricky to learn but can be efficient.

Be cautioned that these methods require both a certain amount of good metallurgy theory and some art to be successful. They take practice to learn. Keep records, a sample "Heat Treating Record Sheet" will be found at the end of this article. I'll be happy to do hardness tests of test pieces of failed blades. Set it up by e-mail, wgoddard44@comcast.net, or call 541-689-8098. The diamond penetrator in a Rockwell test penetrates into the surface of a blade and can be considered a stress riser. I don't recommend it prior to a flex test. A file test can be very efficient and I'll write about that in an upcoming newsletter.

Few students of mine can go to work with their heat treat stuff and get good results the first time. Time, temperature, speed of the quenchant, accuracy of the tempering method, it all has to be consistent time after time and followed up with test results. The edge quench can be practiced on rectangles of steel the thickness of the test blade, either beveled or not, my test pieces are four inches long. It might be good to require members of the 5160 club to keep a log book of the blades they heat treat with all pertinent data recorded along with the test results. It wouldn't take long and should add to their confidence in their blades.

I teach what I call finding balance in the heat treatment of a blade. A general rule for a starting point is one third hard edge, one third springy, the third at the back is soft or springy. The thickness of the blade has to be considered. By hard edge, I mean a temper that is good for normal use. Determine this by some simple tests, the rod test for one, chopping knots out of a 2x4 is another. A blade with too much soft/springy part may pass the flex test but also might bend in rough use. The object is getting the right amount of soft, springy and hard and it will do the 90-degree and return to the slight bow with a uniform arc.

Testing has found that some of the modern 5160 hardenes all the way through to the back when edge quenched. The edge quench that I used with good results for many years doesn't work on the batch of 5160 for my test knives and several members have material out of the same batch. I hope to get my test blade finished soon and when it comes time to harden it I will use method #1 in the list above. Torch hardening is tricky on long blades but

very efficient at hardening only the edge when done right. Ed Fowler uses torch hardened blades for his exceptional high performance blades made of 52100.

I may as well answer the question here as to why I don't use 52100 for large knives. It's an edge holding steel, complicated to get just right and overkill for a camp knife, bowie or tactical knife. In my opinion, 5160 is more than adequate, readily available and somewhat forgiving in the heat treating process.

Preparation of the blade for hardening is critical. Stress risers must be totally eliminated. There should be no coarse grinding marks running at 90-degrees to the sides of the knife, the same goes for all of the edges with no square corners anywhere on the portion of the blade being hardened. I use a 300 grit finish or better. I recommend narrow tangs for test knives and be sure to have a nice radius where the tang meets the blade. Leave 20% of the steel to grind off after it is hardened and tempered. If you make the edge too thin and it may crack or warp badly in the quench.

The part of the soft back draw that is most important is to not get the back too hot, especially with saw steel, it will air harden if it gets any where near red. Anything past silver is too hot. You should use the smallest oxy/acetylene tip you have running hot, get in and get the blue started and then move it along. It takes practice to get it right.

Another thing to experiment with hardening with the oxy/acetylene torch which will bring only the edge up to the quench temp. This is the way I did all my early knives, including my JS test blade, it was a year or two later that I got into edge quenching. The way the new 5160 responds to the edge quench it may be necessary to go back to hardening only the edge.

I have always taught and put it in print that each new source of steel should get a quench test. A strip is prepared, hardened, tempered and tested before making a finished knife from it. That's the only way to be sure you've got something worth working with.

Not only is it a waste of time but there is no need to rivet a finished handle on a test blade. That is, unless you are going to make only one test knife in your life. Make up a pattern for a nice strong narrow tang and make yourself an interchangeable handle of Micarta that goes on with a couple of bolts. That will save you lots of time down the road.

That's it for this issue. I'm sure I missed something so feel free to ask questions or straighten me out.



The picture at the left shows Lynn Moore with his successful ABS Journeyman test blade. The successful test was the result of a great deal of hard work which includes several broken blades. Perhaps we can get him to share his formula for the successful blade in a future newsletter.

Note the new paint job on the big Wilton, I had stripped several coats of after-market paint off of it and then got interrupted by more important things. Needless to say it turned into a mass of rust. (My smithy is open on three sides.) I couldn't bear it being seen in public in such a mess so it got the new paint job especially for Lynn's test.

Scroll down to the last page for the heat treating record keeping sheet.

**5160 Club
Heat Treat Record**

Date of test	
Name of applicant	
Item (sample piece, test blade, etc.)	
Ambient Temperature	
Steel type	
Steel source	
Blade width, length and thickness	
Forged or Stock Removal	
Normalizing	
Annealing	
Heat source for hardening	
Heat source for tempering	
Method of judging critical temperature	
Type of quenchant	
Temperature of quenchant	
Depth of edge quench	
As quenched hardness Rc test or estimated	
Time/temperature and number of temper cycles, include oxide colors at each temper	1.
	2.
	3.
Hardness at edge after tempering	
Soft back draw ?	
Hardness at mid blade	
Hardness at back	
Results of rod test	
Results of a 90-degree flex	
Comments	