Cutting tests using manila rope and hardwood with current sharpening protocol

My testing has evolved over time and I thought it would be a good idea to update what I am doing now (2018). The articles on sharpening and testing on the Seamount web site are out dated but I have left them since there is still good information there. This article will also serve as a guideline for someone who wants to replicate what I do and compare results themselves. We can then talk on the same sheet of music. I am striving to optimize for long wear edge holding for sporting outdoor knives, utility hunters, fillet, bait and lighter use bird and trout knives.

What I am describing here is not based on the scientific method.. It is based on experience on how a given design knife should behave in actual use and an effort to correlate actual field use to some testing in order to predict what to expect. I have been hunting and fishing all my life and knife making grew out of a need to have a tool that would make the use in the field a pleasure and minimize fiddling around with re sharpening and honing while trying to get the job done. I test every knife I make with this procedure and over time have come to know what to expect from each design and steel grade.

Manila rope is an ideal media to test with since it is abrasive and will wear down an edge in more or less linear way. It also approximates animal hair, fish scales and hide that would be encountered in the field.
There is some confusion on what "Manila" is. It is the leaf and stem fiber from the abaca plant related to the banana plant that is found in the Philippines; hence the name correlation to Manila the capital of the Philippines. It is not the same as hemp, sisal or jute which are all different plants. 80% or so of Manila rope comes from the Philippines and is a major export item. I had been buying my test rope from Lowe's but they were out the other day with none on order so I had to find a more reliable source. I found "Rope and Knot Supply" and ended up with an 200 foot order of ¾ inch diameter. This is Manila rope but seems a bit more abrasive than what I

had been getting from Loews so had to go back and do some calibration to my standard cutting blade. It is important to always go back to the standard blade and sharpening for comparison since the abrasive effect on the rope can change with humidity and other factors.

Years ago I started out testing with ½ inch diameter rope but with the very high wear blade steel grades now available I have evolved to ¾ inch. The larger diameter provides more rapid wear and less length rope is required to get results.

The original process came from Wayne Goddard and was refined by my friend Maynard Meadows. We used to cut against a sensitive scale and count the number of single slice cuts to build up to 25 lbs of downforce. I now just use the scale as an additional reference but use a sawing/slicing back and forth cut. With ¾ inch manila it takes about 7 strokes back and forth with a constant down force to cut through. The rope is backed up by a alder wood block. Due to multiple slicing cuts on the rope and the small amount of down force on the board abrasive wear due to the wood is washed out and has minimum effect on dulling. The rope is not pinched in the cut since I am cutting on an open end. Yes, it does take some practice but after a while it is easy to get into a cutting rhythm. One, two, three, four, five, six, seven and gently cut the last few fibers into the board.

There are many factors that influence the cutting. Blade thickness, sharpening, hardness, blade finish, edge geometry, handle shape and the character and personality of the rope.

After a while you can judge the initial sharpness of the blade right at the first cut. I might as well say right now that 80% of this is by feel. If the first cut makes a kind of "scrunchy" sound and leaves a shiny surface on the cut then I can judge the blade as standard sharp and ready for the test. If not back to the stone to get the sound and feel I want.. If you try this then it will surprise you how quick you can gain a "sense" of the cutting ability of the blade with just one cut.

The standard sharpening stone I now use is Silicon Carbide "fine" as

manufactured by Norton. I use spray window cleaner on the stone and am meticulous about ensuring the stone is completely flat. I take the burr off with a slightly steeper angle and very, very light touch. No more force than just the weight of the blade onto the stone. For hunting and fishing knives I like a very aggressive edge and the fine Norton has been determined to work for that. It is important to be consistent with the sharpening for each knife design and application so that comparisons can be made over time to check heat treat and quality control. Checking sharpness is again done with a lot of feel. After so many years have to say I have an educated thumb. The starting sharpness evaluation is done by the sound and look of the cut as already described plus holding the blade edge up and feeling with the thumb. I very carefully put the cushion of the thumb on the edge and slide down the blade. I want a pulling grab type feel on the blade. If it easily slides or feels smooth then it is not ready to test. Back to the sharpening until I get the grabby catchy feel to the thumb. To check for the burr slide the same thumb up the blade at right angles to the edge and you can feel the skin catch on the burr. This usually will be only on one side. Back to the stone very lightly as previously described until you can't feel the catch on the skin. The burr or sometimes called the wire edge can cause a lot of frustration. If it is not removed then it can bend back and forth during sharpening. If not completely removed it will at first give a very aggressive false edge. It will break off at the first few cuts with an instant blunting. The burr has to be cut off with the stone at a slightly steeper angle. Again feel the edge as described above and cut if off with very light strokes on the stone. For a more refined edge after the burr is cut off a few very light back strokes on a loaded strop will give an edge that will scare you.

I cut and check the blade edge with the thumb test until I can feel it start to change. I am cutting with the “belly” of the blade only, about 2.5 inches long. Again I feel the edge with the same educated thumb. As the blade edge wears you can start to feel it it smooth out, loose the catch on the skin and start to slide. At the point where it just starts to slide I call incipient wear. It has lost its aggressive bite at this point. However it will still cut printer paper and slice cardboard and is still a very useful edge. This stopping point is a good consistent reference point to evaluate and compare wear with different steels and heat treat. If after only 4 or 5 cuts the feel suddenly changes the

edge rolled or broke off. It is then necessary to resharpen at a different angle or modify the heat treat for more ductility. I do this rope testing before the handle is attached so that the blade can go back into the tempering furnace if needed.

It is pretty obvious that the thinner the edge and the lower the angle is the easier it will cut. This can be taken all the way down to something approaching a razor blade a few microns thick. The goal is to find the geometry that will allow easy low force cutting and still be strong enough to prevent rolling or chipping. This balance also depends on the intended use. A hunting knife for example is going to see more stress than a very thin chef's knife or a bird and trout. I flat grind my blades from the edge all the way to the top of the spine. In cross section this is a wedge, one of the classic simple tools. The thinner the wedge the easier it is to force through the cutting medium. Being a maker I can measure the thickness of the edge before the sharpening . This is done with a digital caliper and avoids trying to guess where the edge bevel shoulder is.

The second part of the testing is done by whittling on seasoned fir. I have some 2x4's that are fully seasoned and so hard it is difficult to drive a nail through them. Aggressive whittling on this wood will give a quick check on rolling or chipping. By aggressive I am talking about twisting the blade out of the cut so that it makes the edge chatter and vibrate. If the blade will stand up to this abuse with a given edge thickness and sharpening with out rolling or chipping then it will do the job in the field. The third test is the same whittling described above but with bocote wood. Bocote is a very dense hard tropical hardwood and is extremely hard on a edge. It approximates cutting into bone. With Bocote I expect to see some damage, mostly rolls and very small chips. I am talking here about very aggressive cutting but not chopping. Chopping introduces dynamic forces and the thin edge hard knives I make are not intended to endure this kind of use. I will leave the choppers to others who will fabricate them with steel grades, heat treat and edge geometry designed to handle those load types.

Just another note on sharpening: Can a blade be too sharp? As mentioned before I am looking for an aggressive blade for all around hunting and fishing

use or every day carry. This means it will physically kind of grab the material being cut. I call it a working edge. This is the opposite of a surgical type edge that is fine enough to whittle hairs or actually shave like a straight razor. A surgical edge is very highly polished and honed down to a extremely fine apex. This usually takes some time and high precision with a finish on say a very hard water stone. Because this edge is very fine it is very fragile. There is not much material to back it up and the first time force is applied it is easily bent over. Continued force causes more strain and the edge bends back and forth until it will finally breaks off. It can continue to cut but at higher force and is now sliding and wedging through rather than biting into the medium. A working edge will last longer since it is much stronger to begin with. It has a better feel in the hand since it is grabbing the medium being cut rather than sliding over it. The small micro “teeth” are acting somewhat like a serrated edge and as they wear new material is being exposed so this is somewhat like a self sharpening effect. This is even magnified more with the high carbide steel grades since the steel matrix between the carbides wears faster and exposes the very hard carbides that act to resist wear. The working edge cuts and wears best at somewhere in the range of 320 to 600 grit. This finish is obtained with the medium and fine silicon carbide stones mentioned above. Diamond plates in the same grit range will also work. I like the Lansky fine and medium plates. The best way to see what I am trying to describe here is to get some manila rope and do some sharpening and cutting and actually find the sharpening method and cutting feel that you like best.

Others will get different results due to rope personality and edge geometry and sharpening but here are some rough ideas of the number of cuts based on the steel grade and sharpening that I am looking for with my knives

Any blade and steel grade that can make 40 cuts with the method above to the incipient dulling point is right in the ball park for excellent performance in the field.

Category 1
CPM 154, CPM S30V, are favorite fillet knife, kitchen and bird and trout stainless steels and they will meet this category with 40+ cuts.

Category 2
PM stainless steels with 10% primary vanadium carbides
CPM S90V, CPM S110V, category 2 are good to 80 cuts

Category 3, ASTM, A11 tool steels or similair with 10% primary vanadium carbides
CPM 10V, K294, K390 with good geometry will do 100 to 150 cuts

Good luck and let me know how this all works out for you.

Phil

www.sharpeningsupplies.com Silicon carbide--- Norton crystalon stones

www.lansky.com Diamond sharpening plates