

A REAL LIFE KNIFE TEST (January 3, 2009)

I recently had the opportunity to test some of my knives in a real world-hunting situation. Cutting rope and cardboard is a good way to predict how a blade might act in the field but the only way to really test it is to actually use it for the intended job. The animal in this case was a Cow Bison approx 3 years old and estimated weight on the hoof at 800 lbs. The task was skinning, field dressing and quartering. Later on at home, I used three fillet knives for de-boning and cutting up the meat for freezer size packages. All of this work gave me the opportunity to compare the performance in the field against the testing at home in the shop.

Based on previous rope cutting some of the steels I use rack up for edge holding as follows.

Category 1

CPM S125V (RC 65, 66), CPM 10V (RC 64)

Category 2

CPM S90V (RC 60, 61) CPM S30V (RC 60, 61)-CPM 154 (RC 61, 62)

My best ever performing knife based on cutting manila rope is a CPM S125V Silver Peak (5-inch drop point). Hardness is RC 65/66. This knife is ground to a .010 thickness behind the edge. CPM S125V however is a rare commodity and is a challenge to work (see more on CPM 125V at the end of the article). Therefore, I wanted also to check out a hunting knife with CPM 154 steel. This steel has proven itself in the fillet knife application (field-testing on halibut and salmon), but I have not had the opportunity to try it out on big game. It is available, nice to work with and can be fabricated and furnished at a reasonable price for a custom knife. I chose a CPM 154 Coyote Meadow (trailing pt, 4.3 inches). Rockwell hardness is 61.5/62. It has the same 0.010 thickness behind the edge as the Silver Peak. Both knives were sharpened at about 15-degree angle on a DMT (green) diamond stone and the burr removed with a loaded strop. Both knives would easily shave the fine hair on my arm when run against the skin.

My point of reference for CPM 10V was a 5 inch Coyote Meadow used on a Bull Elk on a previous hunt. In this case, all the field dressing, skinning and quartering was done with one knife. It was still cutting well at the end of the job so this is a point on the curve that correlates with the above rack up. I have used both CPM S90V and CPMS30V on smaller game like mule deer and both steels have also been well proven in the fillet knife application. The above rack up reflects how these knives (and steels) do cutting rope. The question is will they follow the same general performance in actual field use?

This bison hunt was at a large ranch in Montana where the animals roam over about 4000 acres. There are several herds scattered over the rolling prairie terrain. They allow hunting for about 75 animals each year out of an approximate total herd size of 500. This hunt was an interesting experience but is the subject for another story. In short the host for the hunt was well prepared to help us get the animal back to the ranch house area and provide assistance in the skinning and dressing work. Skinning an animal, this size is a lot different from a mule deer for example. I admit I was overwhelmed with the task so was happy to provide the knives, stand back, and watch two experienced guides do the work. One used the CPM S125V knife and the other the CPM 154. With two men working on opposite sides of the hanging animal, it took about an hour to complete the job. The sternum was cut with a sawzall but the hind and fore legs were ringed with the knives. I checked sharpness at 15 min intervals during the process. The checking was done with my educated thumb. Based on many hours cutting rope at home I can tell when the blade is starting to smooth out. I could detect the difference in sharpness between the curved belly of the blade and the unused area in front of the finger guard. Both knives did very well and neither needed re-sharpening during the process. The CPM 125V blade was still biting well at the end. The CPM 154 blade felt smoother but it was still cutting easily. Initially both users complained that the blades were "too sharp" they were nicking the meat under the hide. At the end of the process as the

sharpness moderated, and as they got used to the knives, they liked the feel better. Both said they could have easily done the whole animal with their respective knives.

I had done some testing on rope with these actual knives at home before the hunt. The CPM S125V blade did 230 slices on 5/8 rope against an alder backing board before it reached 25 lbs on the scale. The CPM 154 with the same rope test did 180 slices. Both knives were then re-sharpened before the trip. When I got back home, after the Bison work, both blades cut the rope with less than 20 lbs pressure. In addition, after the rope cutting, both blades were easily restored to original sharpness with a few strokes on a loaded leather strop. (See description of the loaded leather strop below). I wanted to test a CPM S30V and CPM S90V knife but only had one animal to work with and neither knife that was in use dulled up enough to swap it out for a different sharp knife. The CPM S125 blade performed the best as expected but the CPM 154 was not far behind. Before we left the ranch, the carcasses were split with a sawzall and then cut into three separate pieces per side. The hind quarters, the front quarters and the rib section in the middle. I arrived home with these six sections and faced the challenge of turning this large amount of meat and bones into freezer size parcels. This took two days of work for my wife and me and fortunately, the temperature was cool enough that we could leave the meat over night without concern for spoilage. For this work, we used three fillet knives. A 5 inch, and 6.5 inch CPM S30V (RC 61) and a 9 inch CPM 154 (RC 62). We also made use of a CPM S125V, 3.5 inch Bow River (RC 65).

The fillet knives were used for the whole two days. None of the three needed to go to the stone for sharpening. As they lost the bite, they were restored by stopping on loaded leather. Much of the cutting was against bones to remove muscles from the large front and hindquarters. They were also called upon to separate joints and a significant amount of cutting into the plywood table was necessary. These knives are thin and flexible and tend to continue to cut even when the original sharpness is gone. Therefore, it is more difficult to correlate their performance on this job with the rope cutting testing. I was more interested in how they would hold up working against and around bones. My wife did more than half of this work. She is a chef so is experienced with knives and was careful with the amount of force and twisting. Even so there was a lot of scraping and scrunching sounds but I held my counsel so as to not to influence how they were used.

At the end of the process, none of the three had any evidence of chipping. The two S30v blades are RC 61 and the CPM 154 is RC 62. They are all about .008 behind the sharpened edge. The work with these knives also gives me confidence that my heat-treating process with CPM S30V is right on. The conclusion is that even with this high hardness and very thin flexible blades bending toughness was still adequate to resist chipping against hard bone given reasonable care.

As stated earlier I was looking for a correlation between rope cutting and field performance. Here is the conclusion:

Given my shop cutting test method (see description of the method at the end of the article) any of my knives that will make about 150 cuts on 5/8 rope with less than 25 lbs force on the scale will be adequate to field dress, skin and quarter any large game animal with out any re-sharpening. It is fair to say then that CPM S90V, S30V and 10V (already field tested) would do the job. Bison are the ultimate test since they are such a large animal. Wild pigs would fall within this envelope since even though they are smaller the hide is often embedded with dirt and the abrasive bristles go all the way through the hide. Elk and Moose are roughly the size of this Bison. Could these knives have done another Buffalo? Yes, I believe so but this is a personal evaluation that depends on how fussy you are about sharp. In my case, I carry a small loaded leather strop in my hunting fanny pack. As mentioned before both knives were restored to hair shaving sharp with the leather at home. If another animal were available then it would have taken only a few seconds to restore the edge in the field and continue. Others may have just gone ahead and proceeded with the knife as it was. It would have done the job but would not have had that nice crisp feel that we all love in a very sharp knife. All the knives used during this task were made by me. I like to use the high alloy steels at the highest practical hardness. I flat grind to a very thin edge, most times less than 0.010, so the point is that these are optimized for slicing type work. These steels do very well

under bending loads but will not tolerate impact loads such as chopping. They are skinning and slicing knives only.

The testing of course is very subjective and this report is antidotal. The same steels in different knives with different heat-treating used by different people may not have similar results. I have seen reports of knives that have lasted a whole season with out sharpening on multiple deer for example. Again, it depends on how different individuals feel about sharp. Ideally, the best knife for this kind of work can be made very sharp in the first place and can easily be restored to "scary sharp" with just a few strokes on a strop or small field stone. I think that this example of a couple of very hard, very thin knives used on a large animal may put it all in perspective.

Rope cutting test method

I cut manila rope using Wayne Goddard's method. Maynard Meadows came up with this method for testing knives and he and Wayne perfected the process. They have been doing this for probably 30 years and have developed this test method to the point where they have a lot of confidence in it. I like the idea of cutting rope since it closely replicates the abrasive characteristics of deer/elk hair and wild pig bristles.

The rope diameter can vary but I cut with either 1/2 inch or 5/8 inch diameter and it sometimes has a plastic tracer strip running through it. I use a slicing cut with downward pressure against a clean Alder wood board. The board is on a high-grade postal scale to indicate how much pressure is applied. Cutting against a scale is not a precise operation. It takes some experience to get the right combination of slice and push while reading the scale. Different batches of rope, humidity, temperature and sharpening all add variables to the equation. During any one-test session, the variance on the number of cuts is about plus or minus 20. The point is that tests done on different days with a different batch of rope may not be exactly comparable. A well-sharpened "thin grind" blade will make the first cut on 5/8 rope with about 15 pounds force on the scale. After several hundred slices, the force gradually increases to around 25 pounds. This kind of force is much more than is needed to skin an animal. It would be hard to imagine even 5 pounds force needed for that task. The fact is that rope is used as a cutting media to simulate wear. It is obvious that big game animal hide, skin, bristles ect. Are much more abrasive than manila rope. In rough terms then-- one hour cutting on a Bison with 5 pounds force or less equals 150 or so slices on 5/8 rope.

The loaded strop

This is simply a leather strip glued to a back up piece of wood. The one I take in my backpack is 2 inches by 8 inches. I make them about 12 inches long for shop use. I have tried several different polishing compounds to "load" the leather. Most all will polish an edge but are not very effective in cutting off a burr. For cutting, I use the slurry from a Silicon Carbide bench stone. Spray Windex on the stone and use it as normal for sharpening a blade. Rub the leather strop over the stone to soak up the abrasive slurry left on the stone. The result is that fine silicon carbide particles work into the pores and surface of the leather. These particles are hard and sharp enough to remove the burr on even steels like CPM 125V. A few strokes stropping away from the edge will do the job. It takes some practice and feel since it is easy to go too far and dull the edge.

CPM 125V is the best edge holding steel I have used to date. I have a small supply, maybe enough to make about 20 blades. Crucible made one heat with this steel as sort of a test run and I was able to get some of it to experiment with. The workability is very low in fact; I have had trouble with a few blades cracking with the result of lost time and wasted abrasive. It has such a high percentage of alloy that at optimum hardness (65/66) even with a very thin edge it is difficult to sharpen. Given all of this, I have decided to drop it from my offerings of blade steel. I am hoping to obtain some of the new CPM S110V to try out. It may take six months or more to obtain the steel, get the heat treat right and do some field-testing. When I have confidence in my method, I may be able to offer CPM S110V as a replacement for CPM S125V and as my higher end stainless blade steel.

Update on CPM S110V (March 5th, 2009)

I did get a sample piece of CPM S110V to try out. Heat treat is about the same as CPM 10V, CPM S90V and CPM 125V. I got an as finished hardness of 63/64 with the first attempt. The test blade is a 4.5 inch drop point made in the Bow River design. Initial cutting tests show that this one is in the same category as CPM 125V and CPM 10V. This is very encouraging since there was no evidence of edge chipping with light to medium slicing work on rope and whittling pine. I am hoping to obtain more steel to work with in the near future.

Update on CPM S110V (July 2009)

I was able to obtain about 30 pounds of the steel. This is some of the last available from the initial heat. The steel had been precision ground due to some problems with the roll finish. As a result, the cost was very high. I have enough to make 40 blades in the Bow River partial tang design or with the hidden tang design if I limit the blade length to 4 inches or less. I have done extensive testing comparing this steel to CPM 10V and find that at similar hardness they are in the same category. It has more than replaced CPM S125 since it is easier to work with and has comparable performance.

Phil