Small Shop - Big Results
Take Great Shop Photos – Part 4 (The Cross Section)
By Chuck Behm
Central Iowa Chapter

When a present-day doctor gets serious about finding out what's going on inside a patient's body, he has the luxury of being able to order a CAT Scan – one of the miracles of modern medicine. The CAT Scan machine produces images of thin slices of the patient's body which helps the doctor to both diagnose the problem and explain the situation to the patient with greater clarity. While there is, of course, no way to utilize a CAT Scan machine in taking shop photos, there is a particular type of photograph that a technician can utilize to achieve greater clarity – that of the <u>cross section</u>.
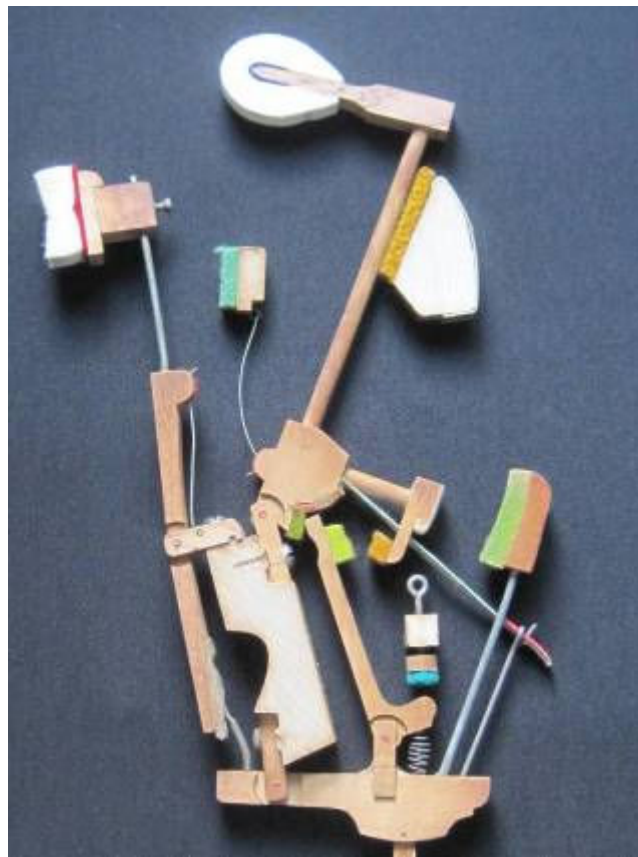

Photo 1: Upright action cross section.

The above cross section of a vertical action assembly (Photo 1) illustrates just how useful this type of photograph can be. Although I took this shot for inclusion in an article on vertical regulation, I've found that the image by itself is valuable. I have an 8 ½ X 11" print of the picture in a folder in my toolkit, and pull it out from time to time to explain a particular problem to a customer – I used it just this week in fact to explain to a customer why he had notes that were clicking upon release. Explaining the purpose of such parts as hammer butt felts is much easier with a photo that shows the relationship of the various parts of the action.

A cross section photograph is a specialty shot that can range from simple to complex in terms of production but which can be very powerful in its impact regardless of its complexity – done right, an effective cross section will reveal things about a subject matter that might otherwise go unnoticed. To illustrate this, consider first the two simple cross section photos I used for the article series on refinishing sharp keys which ran from June to September, 2010. The first photo clearly showed the differences in the woods used for producing sharps.
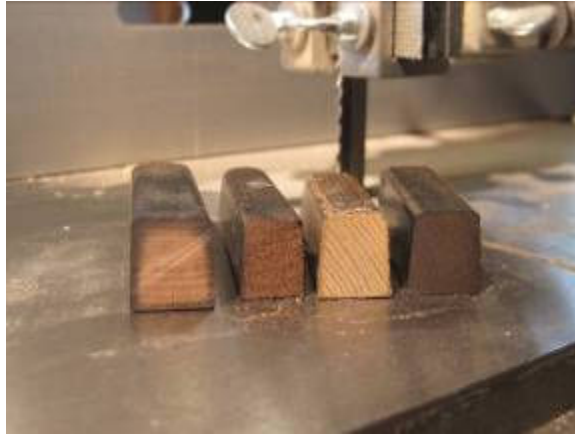

Photo 2: Revealing the truth of the matter.

This shot (Photo 2) was super easy to produce – I merely had to find examples of various types of sharp keys to cut in half for display. I didn't bother looking for a fancy backdrop for this photo, feeling that the saw bed with the blade slightly out of focus in the background worked perfectly well. Despite the simplicity of the photograph it is very effective in showing the wide range of differences in materials used. What startled me was the fact that sharps that I assumed were ebony were in fact a lighter wood (I'm guessing pearwood or hornbeam) which were disguised as ebony by being dyed black, such as the sharp on the left in the photo. I had never bothered to saw them in half before, and I was clearly seeing the difference for the first time!

Photo 3: Shades of . . . black, brown and white.

A second photo that I included of the raw wood samples also was an eye-opener (at least for me), although it was again simple to shoot. I hadn't realized up to this point

how truly black genuine ebony was, at least the Gaboon ebony shown on the bottom in the photo. Also, I was startled by the beauty of the Macassar ebony, with its rich folds of black and brown.

Photo 4: The function of keypins revealed.

Cross sections which are somewhat more complicated to produce can be well worth the extra effort involved. An article concerning keypin replacement called for a shot showing the function of the keypins as the piano is played. To get the photo I had in mind I first cut the sample keys at a point where the both the keypins and the interior of the mortise they fit into would be visible. I then rebushed the keys, since cutting the keysticks on the table saw had resulted in ragged edges of cloth. I chose to use 3 keys for the photo to show a key in the up position, the mid-way position, and the down position.

The photo clearly illustrates the necessity of both polished keypins to decrease friction and a snug fit of the key bushings to eliminate wobble. A surprise for me was how far up into mortise that the keypin extended when the key was in the down position. A good cross section photograph brings to light that which would otherwise unseen.
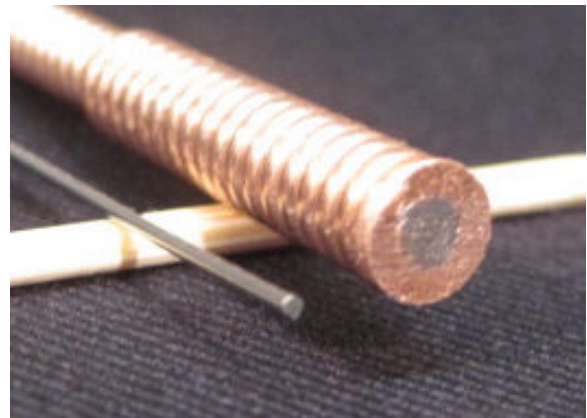

Photo 5: Large plate screw

Photo 6: Bass string vs. treble string

Photos 5 and 6 further illustrate this point. Most piano technicians have at some point held a plate screw in his hand, but to understand the tremendous holding power of such a screw it helps to see the cutaway view shown in Photo 5 with the threads visible as sharp teeth. It's only by sawing the screw in half and photographing it that this powerful impression comes to light.

Photo 6 contrasts the cross section of the lowest bass wire of a piano to the lightest treble wire of the same instrument showing the huge difference between the size of the steel core of the bass wire with that of the treble wire. Just by glancing at the far left hand string and the far right hand string of a piano it obvious that there's a difference in size between the lowest and highest strings, but seeing the two wires side by side like this makes it clear how much of a difference there really is.

While photos 4, 5 and 6 were each a bit of a challenge to set up and shoot, they pale in comparison with the amount of effort which was expended to produce Photo 7.

Photo 7: Two days of work for one photo.

The idea for this particular photo sprang from the need to explain the relationship of tuning pins and the pinblock to piano owners who knew next to nothing about the insides of their instrument. Thinking that a good picture would save a lot of words, I set out to build a model that I could shoot a picture of.

This was, as they say, easier said than done. I had plenty of pinblock material to choose from, and I cut a nice square piece of thick stock to use for my model (the photo showing a rectangular model is actually of the second one that I built). The problem was the plate. How would I duplicate that?

My first thought was to remove an actual plate from a junk piano I had been meaning to get rid of it anyway, but the thought of having to remove all the pins and strings just to get at the cast iron plate got me thinking of alternatives. I did have a large sheet of slate from an old school house which seemed to have potential – it was the right thickness and a similar look to it. Being alone in the shop I manhandled the chalkboard over to my table saw and got it up on the platform.

I could drone on and on about this and explain about what happened next and how I nearly burned down the shop – I won't, but will tell you enough (in just one sentence, I

promise) to give you the general drift of how the morning went. Ahem (I'm taking a deep breath). . . Sufficeth to say that you do not want (ever!) to try to cut a rectangle of slate from an old school house chalkboard (for a mock section of cast iron plate) with a concrete saw blade mounted on your table saw especially when said table saw still is stuffed with sawdust and celluloid keytop shavings because your vac system has broken down, but if you do you particularly want to have a fire extinguisher handy and sitting close by on top of the table saw and not somewhere in the shop which is really irritating because after filling up the shop with dense smoke and burning out the motor of the table saw you find (frustratingly) that you can't drill pinholes in said chalkboard slab without chips popping out so you turn to using MDF board for your mock cast iron plate which cuts amazingly easy (on your son-in-law's table saw ½ mile away) and sprays up convincing like cast iron plate with the right paint and drills like a dream! There – one sentence! Needless to say, it was a nightmare of a day!

So, after finishing the model (by the afternoon of the second day) I started taking photos. Having put that much work into the #^@!#%^^&% thing, I wanted just the right background. Here's a photographic summary of that process:
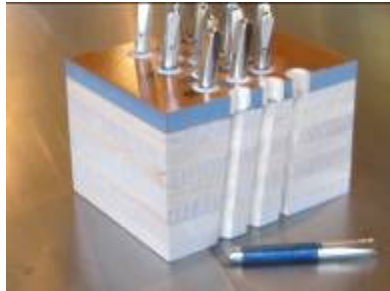

Photo 8: Duck   *Photo 9: Duck*   *Photo 10: Duck*

Photo 11: Duck   *Photo 12: Goose!*

To summarize, I took 116 photos, using 2 models (I decided the first one was too small) and 5 backdrops (the winner being the surface of an ordinary paper cutter) before I got it the way I really liked it.

The whole point of relating this convoluted story is to show that sometimes, if you've made a decision to do something worthwhile, you need to just carry through until it's done, no matter the effort that it takes. With cross section photos, I've learned, they can be at times easy to produce (as in the case of the sharp keys seen in Photo 2) or extraordinarily complicated, as in the case of the above mentioned pinblock model.

After getting the photo I wanted (finally) I set it into the article being written and added labels as shown here:
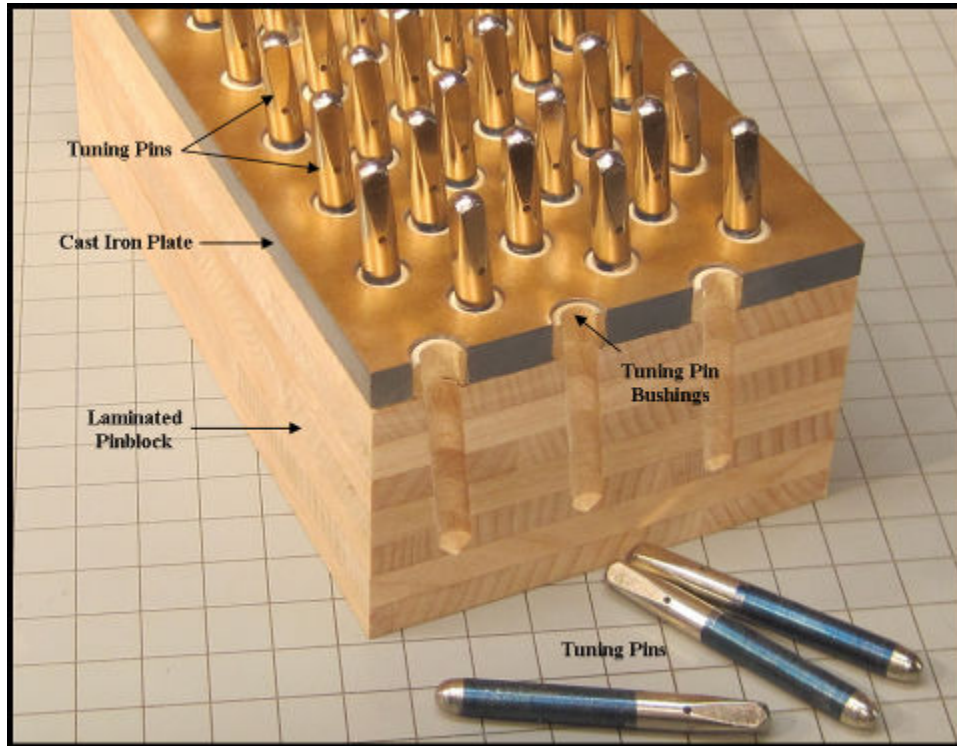
Photo 13: Success!

It did (as hoped) save a great deal of writing but more importantly added much needed clarity to the article. Granted, I could have explained everything in words, but for the average piano owner, all that verbiage would have caused his eyes to glaze over. The photo would give the owner something interesting to look at which combined with a short written description would be more likely to result in a real understanding of the relationship of tuning pins and pinblocks, and the problems caused by a loose fit.

One measure of the success of the photo is the fact that since its publication, I've been contacted by 6 different technicians wondering if I would be willing to sell the image to them for use on their own websites. My answer was no, it wasn't for sale, but I would be happy to simply give it to them. (If any of you would like the file, simply drop me an email and I'll shoot it to you in a reply – just let me know if you want it labeled or unlabeled).

Next month's installment, "Double Takes" will focus on the technique (and value) of taking before and after shots of the projects you bring home to work on.

Stop by for a visit and time. The coffee pot's on!

Chuck Behm is the owner of River City Piano Restorations in Boone, Iowa. He can be contacted at behmpiano@gmail.com.