

Super Glue As A Finish For Wood Turning Projects

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Super Glue As A Finish For Wood Turning Projects

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ABSTRACT

Super Glue is a trademark name for cyanoacrylate and is marketed under various other trade names as well. Cyanoacrylate or CA is basically an acrylic resin with a fast cure rate that is activated by the introduction of moisture and/or pressure. CA is available in various levels of viscosity that is denoted by the term CPS. Selecting the viscosity of the CA that is right for finishing your turning project is an important factor for successful results. The manner in which the CA is applied to the project is equally important and relates to the material used to apply it as well as the speed in which it is applied. Safety precautions are also an important consideration when using CA as a finish and it is highly advisable to employ the use of protective eye wear and a respirator during the application and sanding processes. While CA is not the best selection for every project it can produce a finish that is beautiful and durable.

INTRODUCTION

During the course of the past year or so I have begun to experiment with the use of CA glue as a finish for some of my wood turning projects. I have had several comments and questions from some of the *Yellowstone Wood Turner's* club members who have seen some of my projects that were finished with CA glue. Since public speaking is not exactly my forte I will in this paper, attempt to answer their questions by relating my experiences using CA glue as a finish.



There has been a rather steep learning curve in this process with the results ranging from disastrous to spectacular. While I do not claim to be an authority on the properties of CA glue and this paper is by no means intended to be a definitive guide as to its properties or use as a finish, hopefully it will impart enough information via my personal experiences to help others achieve satisfying results while avoiding some of the pitfalls.

Selecting a Viscosity of CA Glue

It is important to select the the proper viscosity (thickness) of CA glue for finishing your project. The viscosity of CA glue directly relates to the cure rate. The viscosity of CA glue is expressed as the symbol *cps* which is an abbreviation for the term *Cenitpoise* and is the standard unit of viscous measurement for fluids of all types. A *centipoise* is 1/100th of a *poise*. Water is approximately 1 *poise* and all other liquids are calibrated to the viscosity of water. For example: if you are using a CA glue with a *cps* of 300 it is basically 3 times the viscosity (thickness) of water. See the chart below to get an understanding of how viscosity relates to cure time.



	<u>Grade</u>	<u>Viscosity</u>	<u>Curing Speed</u>
I-1605	Thin	5cps	3 seconds
I-1650	Thin	50cps	8 seconds
I-16100	Medium	100cps	15 seconds
I-16300	Medium	300cps	30 seconds
I-16700	Thick	700cps	45 seconds
I-161500	Thick	1500cps	90 seconds

My personal choice of CA glue brands is E-Z Bond as seen in the above chart. Like anything, it has its pro's and cons.

On the pro side: it is available in many levels of viscosity which generally can't be found at your local hardware store. The cost for a 16oz bottle is approx. \$18.00 (plus shipping) which is fairly inexpensive compared to the \$5.00 for a 2oz bottle you might pay at most local stores. (it is offered in smaller size bottles by E-Z bond).

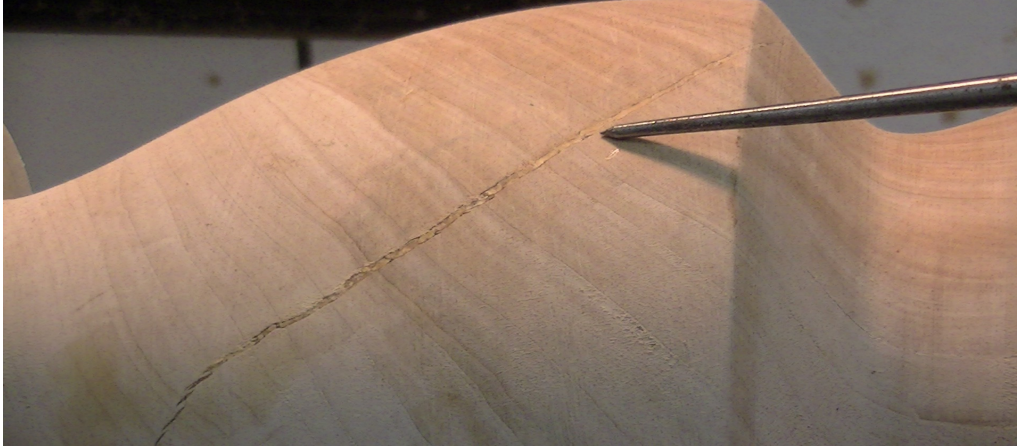
On the con side: You must order direct from E-Z Bond with a minimum order of \$150.00 (plus shipping). You will probably want to get some other club members or friends to go in with you on an order.

E-Z Bond also offers various other CA glue accessories such as containers, accelerators, and solvents. You can view their website at www.e-zbond.com

I have experimented with different viscosities of CA glue and my preference for all around use is the 300cps. The thin stuff cures too fast, the thick stuff cures too slow. The medium cure seems to be the one that works right for me. After some trial and error you might find that you prefer using one of the other viscosities available to you, depending upon your project and the type of material that you are applying it to.

Applying CA Glue To The Project

We will assume that you have turned your project to the desired form on your lathe and performed your primary sanding. At this point, if you are going to fill any cracks with CA glue, now is the time to do it. You can fill cracks with the CA glue as you apply successive coats. But remember that since you will be applying the coats thinly, filling any cracks will be a slow and progressive process.



If you try to apply too much CA glue to fill a crack, the CA glue will form a skin which cures on the surface while the CA glue beneath it remains in a liquid state that requires more time to cure. The results are likely to be that the liquid CA glue under the cured skin will spin out under the pressure of centrifugal force that is created when you restart the lathe. I have found that it is best to mix sawdust or other material(s) with the CA glue when using it to fill cracks.

If you are turning a very wet piece of wood the moisture content might help speed the cure time, but I wouldn't count on it. You might also try to use an accelerator to speed the process of curing the CA glue in a crack, but it doesn't always penetrate deep enough and I have found that it can cause the CA glue to become cloudy rather than remain clear. After you have filled any cracks with CA glue and sawdust, or whatever material you wish to employ as a filler (coffee grounds, turquoise, gold leaf, etc.) perform your final sanding. I generally sand to at least a 400 grit.

Once I am satisfied that I have achieved a smooth surface I use compressed air to blow the project clean of any residual debris and I also make certain that the lathe and surrounding work area is free from any dust or debris that might migrate to my project while I am applying the CA glue finish. Any foreign particles that find their way into your finish will remain there and the only remedy to remove them is to re-sand the project.



At this point I place a towel on the lathe bed directly under the project to protect the bed from any CA glue that might spin off of the project.



Next, I will set the lathe to slowest speed and put on my respirator and eye protection. The fumes generated when applying the CA glue to the project are truly obnoxious and unpleasant. A fan placed to blow the fumes away from you will help to minimize the fumes but can also blow fine particles of ever present sawdust into your finish. I recommend using a respirator, eye protection, and an exhaust vent strategically located behind the project.



Now its time to actually apply the CA glue. I use a folded paper towel as an applicator and keep another folded paper towel ready to use for smoothing the CA glue I have applied to the project. (I use a good grade of paper towel that will stand up to the application process without coming apart or tearing during the application of the CA glue).



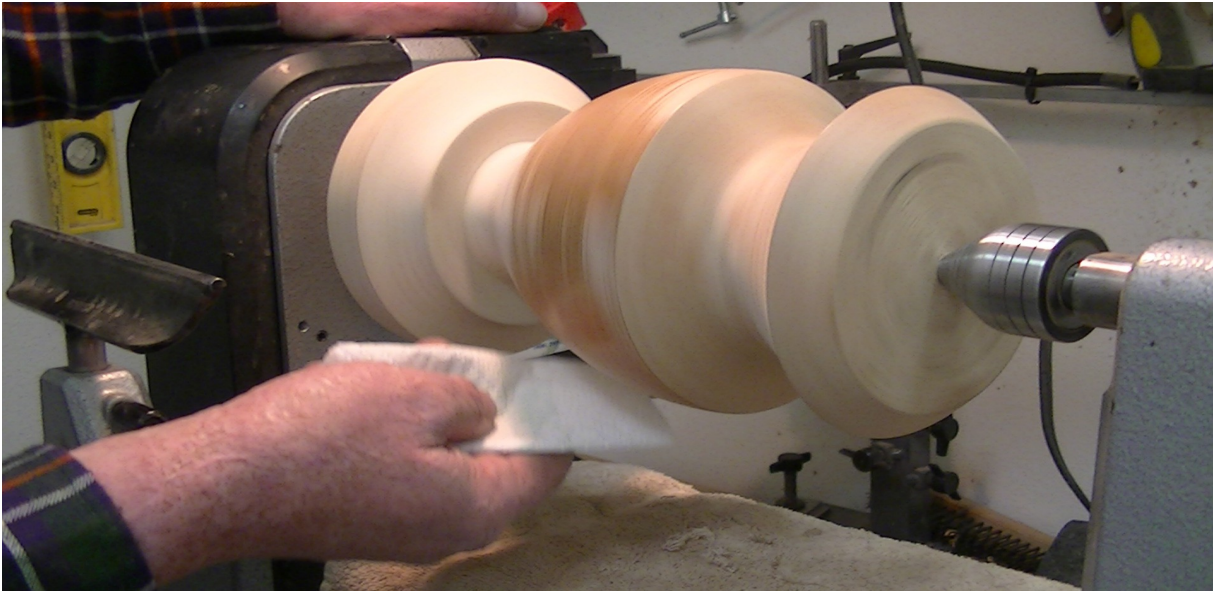
With the lathe spinning at its slowest speed I apply some CA glue to the paper towel. Remember, you are going to apply the CA glue thinly, so you don't need to put too much on the applicator.



Now I just hold the applicator to the spinning project and allow the CA glue to evenly coat the surface. If you are using a 300cps CA glue, as I do, you will have plenty of working time to smooth it out as you go.

When I say that you will have plenty of working time, **I don't mean that you can daydream.**

Once the CA glue has been applied I will quickly use a dry folded paper towel and smooth the thin coat that I have just applied. The object of the smoothing operation is to remove the lines and ridges that you created during the application process so that you will have less sanding to perform between coats.



Now that the CA glue has been applied and smoothed, I will allow the project continue spinning at low speed for a short time to prevent the finish from running toward the lower part of the surface. If you speed it up too much the CA glue will tend to not even out on the surface because of the centrifugal force created by the spinning. (This can result in more sanding between coats to achieve a smooth surface.)

After you have applied the CA glue to the project you will probably notice that the paper towels you used as an applicator and smoother are hot and possibly smoking a little. I have never had an applicator spontaneously burst into flames, but I am always fearful of it and I discard the used applicators as soon as possible into a covered metal can that I keep nearby.



If the project I am working on has an inverted tenon (socket) that I intend to use for reverse chucking I finish the the socket and bottom of the project with a few coats of CA glue first and allow it to dry. By doing this first, the socket finish will be nice and hard and resist marking from the reverse chucking. (This method also has the advantage of not requiring me to re-chuck the project again in order to finish the bottom)



Larger Projects

I feel that I should make a few comments regarding the application the process of applying the CA glue finish as it relates to the physical size of the project. If you are working on small projects like pens, vases, or small bowls, you should have ample time during the application and smoothing operations as described. However, when you are applying CA glue finish to larger projects, like a 12" bowl for example, you will need to use a proportionally larger amount of CA glue on your applicator and pay diligent attention to what you are doing if you are to apply an even coat on the entire surface of the larger project. This is especially important on the primary coat, as the fresh surface of the wood will absorb the CA glue at an alarming rate on a larger project. I suggest that you keep multiple applicators at the ready for larger projects.



Sanding Between Coats

Sanding between coats of CA glue is a straight forward process but I will describe it because in the case of finishing with CA glue I have found it necessary to sand between each successive coat. This is largely due to the fact that since CA glue cures so quickly that it does not always have the time to even out on the surface as some other finishes will.

My experience has been that if I sand between each coat, I can eradicate irregularities that I created on the surface during the application and smoothing operations. (Small surface irregularities may increase in size with successive coats if not sanded out.)

If I have done well the surface will be smooth and free of ridges. I will then work the surface over with a dry, folded paper towel at a higher lathe speed. This action serves two purposes. First, I can tell if the surface is cured by the amount of drag I feel on the paper towel. Second, the pressure I apply with the paper towel acts to further cure the finish. After the paper towel process is completed I will then sand the surface with a very fine grit sandpaper, or steel wool. A critical step in the sanding process is to thoroughly clean the sanded surface with compressed air to remove any fine particles, prior to applying additional coats of CA glue. Even though the CA glue finish will be ready to sand between coats in a relatively short time, take care that it is well cured before you sand or you will embed sanding debris into the finish that cannot be easily removed. This could require you to sand out the imperfections, which is in essence starting over from square one. Repeat the processes as described until you have applied the number of finish coats desired. I generally find that 3-5 coats of CA glue is adequate for most projects. But I might apply 5-6, or more. I generally find that 10-15 minutes between coats on small to medium size projects is adequate cure time. Larger projects require a longer cure time.

Polishing

Once I have applied the desired number coats of CA glue to the project, I give the surface a final sanding with a fine grit sandpaper or steel wool, work it over with a dry paper towel, and blow it off with compressed air.

Now the project is ready for the final polishing. I use the 3 stage Beall polishing system for the final polishing. The Beall system uses three separate polishing wheels. The polishing begins by using a polishing cutter called Tripoli, followed by White Diamond, and lastly with Carnuba Wax. I find that if I have been diligent with the previous steps of application and sanding that the final polishing does not require a great deal of time and brings out the luster and depth of the finish.



Conclusion

I have done my best to fully describe my limited experience of using CA glue as a finish for some of my wood turning projects. It is my hope that this paper will be of some small help to others who wish to try using CA glue as a finish for their own projects. My methods may not be the best way to use CA glue as a finish and are certainly not the only methods available. But at present they are the only methods I know. I would urge anyone who wants to try CA glue as a finish, to experiment with different methods on their own projects. Hopefully they will share what they learn with others as well.

Properties and Uses

CA glue (cyanoacrylate) is an acrylic resin that rapidly polymerizes in the presence of water forming long strong chains, joining the bonded surfaces together. Because the presence of moisture causes the glue to set, exposure to normal levels of humidity in the air causes a thin skin to start to form within seconds, which very greatly slows the reaction. Because of this, CA glue is applied thinly to ensure that the reaction proceeds rapidly and a strong bond is formed in a reasonable time. CA glue is used mainly as an adhesive and requires some care and knowledge for effective use. CA glue does not bond some materials. The shelf life at room temperature is about 12 months. Unlike epoxies CA glue does not fill spaces well and a very thin layer bonds more effectively than a thicker one that does not cure properly. CA glue bonds many substances, including human skin and tissues, almost instantly and can cause harm to people. CA glue has a low shearing strength, which has led to its use as temporary adhesive in cases where the piece needs to be sheared off later. A common example includes mounting a workpiece to a sacrificial glue block on a lathe. Thin CA glue has application in wood working. It can be used as fast-drying, glossy finish. The use of oil (such as boiled linseed oil) may be used to control the rate at which the CA glue cures. CA glue is also used with sawdust (from a saw or sanding) to fill voids and cracks.

Safety Issues

The fumes from CA glue are a vaporized form of the cyanoacrylate monomer that can irritate sensitive membranes in the eyes, nose and throat. The fumes are immediately polymerized by the moisture in the membranes and become inert. The risks can be minimized by using CA in well ventilated areas but the use of safety equipment such as eye and respiratory protection is also advisable. Applying CA to some materials made of cotton or wool (such as cotton swabs, cotton balls, and certain yarns or fabrics) results in a powerful, rapid exothermic reaction. The heat released can cause serious burns, ignite the cotton fabric, or release irritating smoke. Care must be exercised with selection of materials used to apply CA to a wood turning project. Certain paper towel products contain a significant percentage of cotton.

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