

Using CA adhesive as a finish

Walter Hall looks at using CA adhesive as a finish on pens

REFERENCES

1. Concise International Chemical Assessment Document No.36
Online: www.who.int/ipcs/publications/cicad/cicad36_rev_1.pdf
2. Health and Safety Executive:
ISBN 978-0-7176-6454-2
Online: www.hse.gov.uk/pubns/priced/hsg53.pdf

In the search for a long lasting, robust and high gloss finish for pens and other small turnings, many turners and pen makers have found that using cyanoacrylate adhesive – often referred to as CA – is an effective way of doing the job. This article explains the nature of cyanoacrylate, the health and safety risks associated with its use, suitable personal protection and also its applications as a finish and some of the methods used to apply and polish it.

WALTER HALL



Walter Hall is a woodturner who has specialised in making pens and pencils for more than 20 years. Based on the beautiful Northumberland coast in the UK, Walter sells his bespoke pens and pencils through local craft centres and via his website.

walter@walterspens.co.uk
www.walterspens.co.uk

PHOTOGRAPHS BY WALTER HALL

What is CA?

Cyanoacrylate adhesive is an acrylic resin. In chemical terms it is a monomer, which cures by polymerisation. In simple English this means that it consists of single molecules that are capable of reacting with other molecules to form chains known as polymers. The trigger for this chemical reaction is water and the normal levels of water vapour in the air are

sufficient to enable cyanoacrylate to polymerise – cure or harden. Certain other chemicals such as cellulose will also trigger polymerisation.



ABOVE: Cyanoacrylate is available in thin, medium and thick formulations

LEFT: Using an accelerator will speed up drying

Health and safety

As cyanoacrylate polymerises it gives off fumes, which are acrid and unpleasant. These fumes are not toxic and contrary to myth they do not contain cyanide, but they can cause irritation to the eyes, nose and throat. In approximately 5% of people they can cause an allergic reaction with flu-like symptoms and there is evidence that they may exacerbate asthma in some individuals. Contact with the skin, while it may result in the inconvenience of gluing your fingers together, is unlikely to cause significant harm, although there is some evidence that repeated exposure can cause skin irritation in some people. Those interested in a full assessment of the health risks may wish to read the World Health Organisation publication Concise International Chemical Assessment Document No.36, which is available online – www.who.int/ipcs/publications/cicad/cicad36_rev_1.pdf.

Although the risk of harm is small it makes sense to avoid inhaling the fumes and this can be achieved either by good ventilation – for example, drawing the fumes away using a workshop vacuum or dust extractor, or by wearing a suitably rated face mask. Woodworking dust masks are not suitable as they will not protect against chemical fumes, a mask or respirator rated for gas and vapour is required.

Do not be tempted to wear a powered woodworking respirator as this will draw



A suitably rated respirator will protect against both dust and fumes

the fumes in towards your face rather than protecting you. Powered respirators for use with CA should be fitted with gas and vapour rated filters. A useful guide to respiratory protective equipment is available from the Health and Safety Executive.

You can protect your hands with polyethylene gloves which the CA will not stick to. Nitrile and latex gloves will also provide protection, but will stick to the CA. Avoid using cotton cloths with CA as the cellulose in the material can accelerate the polymerisation causing overheating and giving off unpleasant fumes.

Manufacturers of CA are obliged by law to make available Safety Data Sheets for their products. It is good practice to obtain a copy and ensure that the advice they contain is followed.

CA USES

- CA is mainly used as a finish for pens, although there is no reason why it may not be used for other small spindle turned items. Achieving an even coverage on larger turnings such as bowls and vases would be difficult and I cannot recommend it
- CA is an effective finish on wood and some other substrates, such as polymer clay. Acrylics and polyester resins do not require an applied finish, but CA can be useful to repair and hide chips, cracks or uneven surfaces in these materials
- CA can also be used to 'stabilise' difficult or spalted woods and to fill voids in burrs and other highly figured timbers



An extractor inlet placed near the work will draw fumes away from the user

Finishing methods

There are probably as many ways of applying and polishing CA as there are turners applying it, but in the following paragraphs I have set out the principal methods.

The first choice to make is between the different consistencies of adhesive. CA is generally available in thin, medium and thick formulations. Most turners prefer medium CA as a finish, although this is by no means universal and many swear by the thin formulation. I do not know of anyone who uses the thick CA for finishing, but I have no doubt it could be and has been used. Thin CA is more generally the consistency of choice for stabilising wooden blanks and filling voids.

A decision is also needed with regard to the use of an accelerator. I rarely use accelerator, but some turners do so for all their work. Excessive use of accelerator is one cause of unsightly blooming or whitening of the finish. It is definitely best avoided when filling cracks and voids as it can cause the adhesive to whiten as it polymerises leaving an unsightly blemish rather than a neat repair.

Some turners use boiled linseed oil – BLO – in conjunction with CA and while I do not see the need for this myself and find that it increases the emission of fumes, many people obtain excellent results with this combination of materials. BLO can also be used to enhance



Too much accelerator can cause the CA to go white

the appearance of the untreated wood surface before the application of CA.

One of the problems many turners experience when finishing with CA is that the CA will stick to the bushings. A thin coating will break away cleanly when the blanks are removed, but a thick layer can cause unsightly chipping at the ends of the blank. Numerous weird and wonderful methods have been devised to overcome this problem, ranging from smearing the bushings with wax to using the point of a skew chisel to cut the blank cleanly from the bushings. In my experience none of these methods are wholly effective and it is much better to remove the blank from the bushings and finish it between centres or between cone bushings, so that there is nothing in contact with the ends of the blank for the CA to adhere to.

My personal finishing method of choice



Paper towels or non-woven safety cloths are best for applying and polishing CA

is to apply a thin line of medium CA to a folded paper towel or safety cloth and wipe it quickly from side to side, while turning the blank slowly by hand or with the lathe set at its slowest speed. I then leave this to harden, sand away any ridges with fine abrasive – 1,500 to 2,000 grit Micromesh – and repeat.

I find three or four coats sufficient. Some turners purport to apply up to 20 coats, but as far as I can tell this is mostly being sanded off again between coats; however, the choice is yours, apply as many coats as you need to produce the result you want to achieve.

Once I have achieved an even coating of finish, I then turn up the lathe speed to about 3,000rpm and continue to work through the grades of Micromesh abrasive to 12,000 grit or use a suitable burnishing cream or paste abrasive to bring the surface to a high gloss.

Some turners follow a similar process to my own, but with the lathe running at high



A line of CA applied to a paper towel is wiped quickly over the blank

Other uses

Punky, dry or spalted blanks that may be difficult to turn cleanly may be made much more stable by applying thin CA so that it wicks in to the timber. Care is needed as the thin CA will flow everywhere if it is not carefully controlled. Once set, the stabilised blank can be turned and finished by any of the normal methods using CA or any other finish.

Voids in burrs or chips in acrylic can be filled with CA. Whether to use thin or medium CA depends on the size of the void, but whichever is used it must be built up in thin coats. Thick layers of CA will not polymerise properly, a thin layer or skin of polymerised adhesive will form on the surface preventing the liquid CA beneath from setting. This may not become obvious until the lathe is turned on when it will become only too apparent as a fine spray of glue engulfs the turner and his tools. The use of accelerator when filling voids is not recommended as it can result in the hardened CA turning white inside the voids from where it can be difficult to remove.



Thin CA can be used to repair voids in burrs or chips in acrylics

speed, using the heat from the friction to assist the polymerisation process. When I have tried this I usually end up with the paper towel stuck to the blank and/or my fingers, but some people manage to produce a top quality finish with this method so don't let my lack of success with it put you off trying it.

A third method, usually done using thin CA, is to apply the adhesive directly to the blank from the tube or bottle, while simultaneously wiping the blank with a paper towel to spread it evenly over the surface. This method can be very effective, but is best



A drop of BLO may be applied to the towel before a few drops of CA



Micromesh abrasive is available in sheets, rolls or foam-backed pads



Fine paste abrasives provide a high gloss finish

Polishing

After application CA must be burnished or polished to achieve a high gloss, using fine abrasives. The choice is between Micromesh abrasives and burnishing or polishing creams. In practice these choices are equally effective so long as you always work from the coarser grades of abrasive to the finer, ending up with 12,000 grit Micromesh or a fine

done with the lathe set at a low speed to avoid splashes of CA being distributed around the workshop by centrifugal force.

The CA/BLO method preferred by many pen makers uses a small quantity of boiled linseed oil applied to a paper towel or safety cloth onto which a few drops of CA are then placed and applied to the revolving blank, moving the cloth from side to side until the CA polymerises. This process is repeated as many times as necessary to achieve the desired finish. Removal of ridges and polishing is done in the same way as in my preferred method.



Keep the applicator moving to avoid sticking

burnishing cream.

My preferred method is to work through from 1,500 grit to 2,000 grit Micromesh and then polish with a burnishing cream or fine abrasive compound, such as the Farécla 500 compound. A moderately high lathe speed – 1,500-2,000rpm – is required to achieve a good gloss, but excessive speed or pressure can cause overheating. Foam backed Micromesh abrasives will help to reduce the risk of overheating.

Problems and solutions

1. Blooming is a whitening of the surface during or after finishing, caused by using too much accelerator, applying the CA too thickly or by high humidity. The only solution is to sand away the defective finish and reapply.

2. Cracking or crazing can be caused by using old adhesive or by applying it too thickly. It may also be brought about by overheating during the polishing process. The cure is removal and reapplication, as above.

3. Paper towel glued to the blank. Caused by holding the paper towel for too long against the work. Pull away as much as you can and remove the rest with abrasive. If necessary, apply further coats of CA before polishing.

4. Fingers glued to the paper towel or the blank can be released by using proprietary debonder or acetone.

5. White spots in the wood grain, caused by applying a second coat of CA before the first has fully hardened, or by the pores of open grained timber not being properly filled with CA and filling up with polishing compound. Strip back to the bare wood, fill the pores with thin CA and refinish. ●