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In this issue:

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Front cover: Terenzio Zandri ... the silk men

Photo on page 2: Charles Jardine tries a Marco Giardina bamboo rod
Photo on page 62: Walter Rumi, decan of italian rodmakers

EDITORIAL

I went to read the editorial of the BJ #25 from last May again. The predictions made at the time about this summer's climate trend have sadly almost all come true. According to the World Meteorological Organization, in the next 5 years, every year we will almost certainly experience a new warmest year ever. I cannot help but think that the negative trend regarding the reduction of many fish species in our fresh waters, but above all the evident decrease in surface activity of our favourite adversaries, trout and grayling, are largely connected to climate change. While many Italian waters still today experience a sort of suspended judgment regarding the fate of the "less native" trout, the state of health of the grayling populations in the rivers that were very rich in them only a few decades ago does not seem to be improving. Despite some very weak encouraging signs reported to me about the Sesia, the news I receive from many other rivers in Northern Italy is not at all encouraging. I would very much like to be proven wrong by the facts!

Despite this disheartening premise (since obviously the prospects of fly fishing should be very dear to all of us, rodmakers, fly fishermen, and not only) I believe that this BJ #26 which is an issue very rich in technical content, will captivate you.

Davide Fiorani opens the dances with an in-depth summary of his 6-year experience with conical bamboo ferrules. Beyond the specific theory on the "taper" of the ferrule and the documented results of the load tests that he carried out, you will also find interesting considerations on the wrappings of the ferrules, on the silk and on their impregnation.

Directly from the IBRA demonstrations on finishing, the social event held last May in Boario with a great success of participation, three contributions arise. Daniele Giannoni and Massimo Paccotti illustrate in detail the their very different varnishing methods that they presented to us. A third article instead talks about the demos in general for those who were unable to participate, but above all attempts a comparative synthesis between all the methods that were tested, discussed and evaluated in practice by the participants in the two days of the gathering.

The finishing/varnishing of the rod is a mixed blessing for every rodmaker and regardless of the importance that everyone attributes to it within a complex manufacturing process, I believe that it still deserves great attention and some critical in-depth analysis. A very similar consideration can be made about planes and their blades, the rodmakers fundamental work tools, often wrongly considered a sort of necessary "black box", but difficult to fully dissect.

So here you will find Marzio Giglio's article which sheds new light (in the literal sense) on a complementary method for sharpening blades, not new in itself, indeed very ancient, but certainly not common in the world of rodmaking, and with the potential to open up new perspectives to make the planing of the strips more effective and efficient.

This issue ends with an article by Moreno Borriero (& Co.) which illustrates in detail a very effective practical method for creating hexagonal winding checks.

I would also wish to remind you of the IBRA Bamboo Rod Show, which will be held in the Torre Velasca hall of the Melià Hotel in Milan on Saturday 25th and Sunday 26th November (you will find the poster and more details in the BJ). A truly exceptional opportunity to have a glance at the production of 40 rodmakers, IBRA members but not only, Italian and foreign, not to mention the section dedicated to historical rods. But there is more: for example, the charity raffle that will give away six prestigious bamboo rods and other wonderful prizes.

I hope to see many of you there!


IBRA
ITALIAN BAMBOO RODMAKERS ASSOCIATION GABRIELE GORI
IBRA BAMBOO ROD SHOW
EXPO OF HANDCRAFTED BAMBOO RODS HISTORIC AND MODERN
SATURDAY 25
SUNDAY 26
NOVEMBER 2023
Hotel Meliá Milano
via Masaccio 19
simultaneously with 25th Show
Corporazione Italiana Coltellinai
opening time
saturday 9:30 / 17:30
sunday 9:30 / 16:00
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IBRA BAMBOO ROD SHOW

Edward Barder
rodmaker
from England

Development of the TBF conical bamboo ferrule: analysis after a few years

by Davide Fiorani

Six years ago, I made the first rod with an integrated bamboo conical joint, a 7'0'' #3-4 in two pieces. I called the conical joint the T**apered Bamboo Ferrule (TBF)**, see article **BJ no.19.**

I continued to make hexagonal two pieces rods with this type of joint and fishing with them. I have also given some as a gift to friends who use them regularly, so to have further elements to find out what to improve.

I also made different two piece rods with hexagonal, pentagonal and square sections, and a 8'0'' #10 hexagonal rod. I finally made a few three-piece rods with hexagonal section for #3-4 lines. I wanted to diversify the geometries and also include a powerful rod to try to collect more data and identify critical issues.

I also reviewed the choices of threads, glues and varnishes.

I have done tests on rods and ferrule samples which I report in detail later.

I would like to share knowledge and developments that I have reached so far as I believe they can be useful to all rodmakers who make bamboo ferrules in general.

I have to thank the experimental physicist and **IBRA** member, **Marzio Giglio**, because he stimulated me and helped me to think about on some aspects that perhaps I had taken for granted and on others that I had not fully understood.

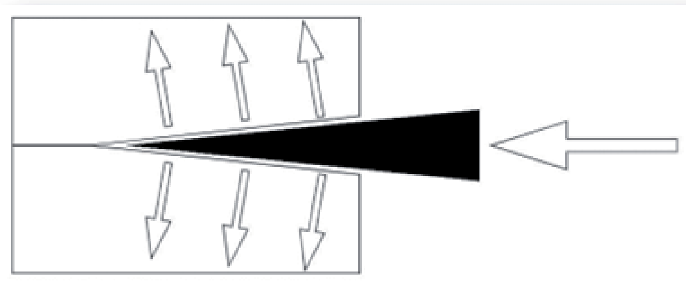
TBF quad ferrule 7'0'' #3 - 2pcs

This report is divided into four different paragraphs.

1. Gripping

The gripping of the conical TBF uses the Physics of the wedge.

The wedge is used to lock two sections together. The smaller is the angle of the wedge, the less force is needed to insert it. See the following drawing below.



Example of the dilation produced by inserting a wedge

The force applied to the wedge produces radial pressure against the walls of the female spreading them apart. It is the elasticity of the wrapping which fights against these spreading out forces.

As showed at the end, the gripping occurs in the last portion of the male slide travel. This is exactly what happens with graphite rods that have the cap ferrule (or over-sleeve ferrule): the **TBF** ferrule utilizes the same concept.

I checked some graphite rods I have and their ferrules have angles just under 1°. In practice, I was using this principle, and later, I understood it during one of the chats I had with **Marzio**.

As shown later, the **TBF** joint offers some advantages with respect to the other bamboo ferrules. Among them, the most noticeable is that it prevents the two sections from getting stuck together.

Mating sequence of a **TBF** *ferrule on a hex rod 7'0'' #3 - 2pcs*

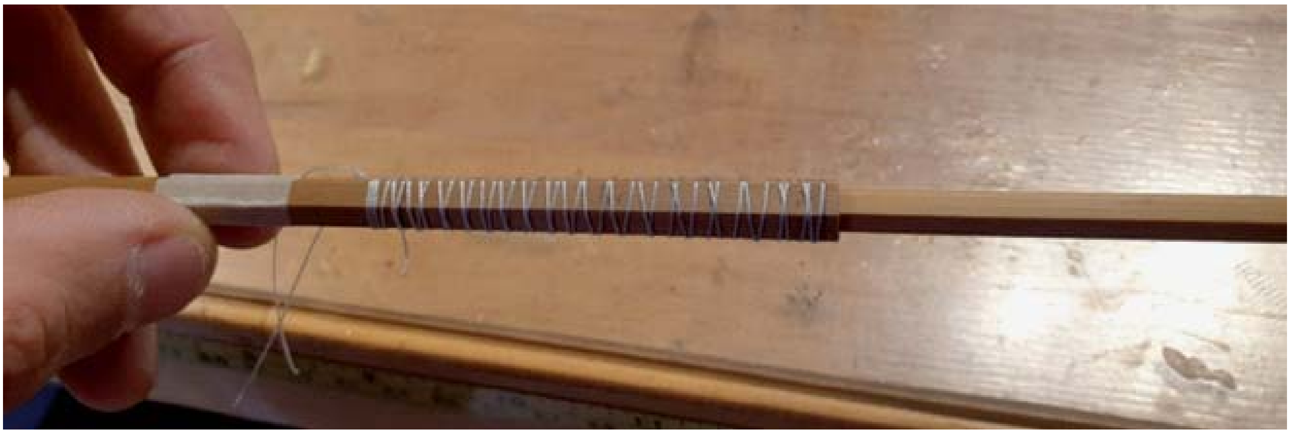
I made the female a little bit longer than the male slide. In this way, the tightening between the butt and the tip is better guaranteed and better adapts to any small imperfections of the male slide. Mating accuracy is needed for the joint to be effective. It turns out that the male slide travel to obtain gripping is typically a few millimetres.

2. Gluing up the male and the female.

I describe the precautions I use during the gluing process of the butt and tip strips, necessary to obtain a good fitting.

Gluing the butt (the male): once the strips have been tied, I carefully clean the male slide from excess glue using thinner. Once glue has dried, I remove the wrapping thread. Traces of cured glue are taken away from the male part using a flat rigid pad, with fine grain sand paper. I then check the dimensions "face to face" at various points to make sure they comply with the project. I keep the male a few millimetres longer and then adjust it once the female is finished. Then I round the edges at the top of the male part and apply a drop of cyanoacrylate glue or a thin layer of epoxy to its top to waterproof it.

Gluing the tip (the female): the bamboo strips of the tip section are planed flat on the inside so to create the volume to receive the male slide. To be sure of getting the best mating, the female tabs will be glued and tied with the male slide in place. After having distributed the glue on the strips, I carefully clean the internal surfaces of the female ferrule with gauze soaked in thinner. It is important that these faces are clean an as free of glue as possible. Using a dynamometer, I adjust the tension of the binder thread by hand and start tying the tip, being careful not to overtighten the wrapping to prevent any skewness in the cross-section. Then I insert the male butt into the female to hold it in place during the first few turns of wrapping. I start just above the end of the ferrule, go down to its edge, then go back to the beginning and tie the whole tip as shown in the figure below. The idea is to make the final adjustments by mating the inner female faces onto the male.



Wrapping/whipping a hex TBF ferrule during gluing of the tip

Once the tying is completed, I pass a thinner soaked swab into the female to remove any glue that may have leaked from corners. I insert it into the female several times, always cleaning it with a little thinner to make sure it runs smoothly, without sticking. During the curing of the glue, I repeat this insertion and cleaning manoeuvre. This sequence of operations is essential to guarantee proper alignment of the ferrule. The final adjustment of the length of the male is made after the tip blank has been cleaned and the female tied with silk and impregnated with epoxy.

3. Threads for wrapping of the female and their impregnation.

Personally I prefer transparent ferrule wrappings. Aesthetically it looks clean and it underlines the visual continuity of the rod. Almost as trying to minimize the junction point between the two sections... or at least I like to think of it this way.

TBF *hex ferrule wrapped with neutral silk*

Neutral or straw yellow silks are the most suitable for this purpose. The silk should not be overtightened, so as to absorb the epoxy properly. This is to obtain uniform transparency continuity throughout the winding. I use **#50** silk for medium-light line rods and **"Cordonetto"** type (Editor's note Seta Cordonetto per occhielli) for rods designed for heavier lines. The "Cordonetto", given its size, has difficulty in absorption and in order to obtain a good result it is advisable to spread a thin layer of epoxy on the surface of the female before wrapping. Once the wrapping is complete, more epoxy is applied to the outside and in this way the wrapping is completely soaked.

I've chosen epoxy to impregnate the wrappings because varnishes are not adequate. The epoxy resins formulated for finishing the wrapping of the guides used by graphite rod manufacturers are very suitable: they guarantee greater mechanical strength and are not excessively rigid when cured, maintaining the right elasticity.

Finished **TBF** *hex, quad and Penta ferrules*

It is important that the wrapping on the edges of the female ferrule is well soaked. The edges are delicate points of the wrapping. If overstressed, the first failure of the wrapping is commonly observed at the lower edge of the ferrule. Visually, the epoxy will appear foggy. **Marzio** informs me that this fogginess is due to the formations of microvoids caused by localized stresses and loss of optical contact between epoxy and wrapping fibers.

Epoxies specially formulated for wrappings are also available in different viscosities. They have good adhesion, are self-levelling, and can be applied in multiple layers. It is advisable to choose products with long curing times in order to allow good penetration into the thread: this also improves the final transparency of the wrapping. If too much resin has been applied, once cured, the excessive curvatures can be levelled with fine-grained abrasive paper. Afterwards, simply brush a thin layer of epoxy over the entire wrapping to restore its uniformly shiny appearance.

4. "Dressing" the ferrule.

Putting together the two sections should never be done dry to avoid the two pieces getting stuck together. This is especially true for quasi parallel type bamboo ferrules, which rely mainly on friction to guarantee the seal.

I have tried various products such as paraffin, natural waxes, etc. The best are those that do not harden at low temperatures, have good adhesion and maintain a certain plasticity: they should be thick and not lubricating. There are products for surfboards and skis that are suitable because they remain soft and do not affect grip. They also have the advantage of helping to protect the inside of the ferrule from water penetration when fishing.

TBF *of 7'0" #3 - 3pcs hex rod*

Tests

I report below the load test and spreading apart test.

Load tests

I want to document the first load test I made on a **TBF** ferrule sample for a 7'0" #4 rod. The female O.D. "face-to-face" at the opening is **6.80mm (267mils)**, which is reduced at **5.80mm (228 mils)** at the end. Length is close to **50mm (more than 2inches)**, the conicity is in the order of **1.2°** and the tab thickness is **1.0mm (39mils)**. The ferrule wrapping is one of the first I made using #50 silk and then impregnated with an epoxy commonly used for guide wrapping in graphite fiber rods.

To apply the load I secure one end in a vice and leveraging the other, applying the force of **1kg (2.2lb)** that I measured with a dynamometer.

See next image…

Load test up to 1kg (2.2lb) on **TBF** *sample*

…getting to **1kg (2.2lb)** and …

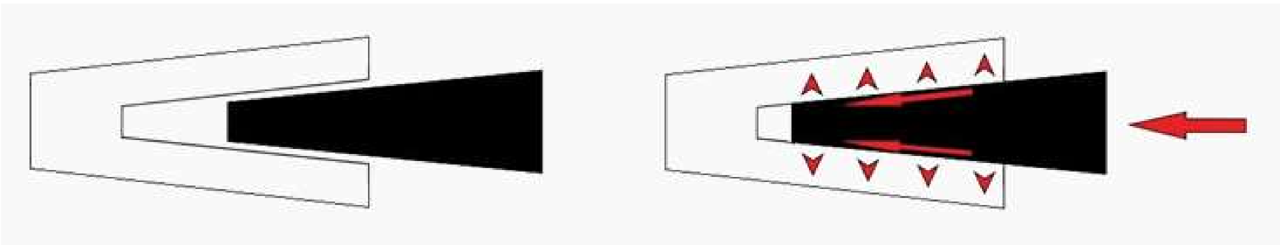
Close-up of the reading on the dynamometer

...the ferrule did not fail.

TBF exa ferrule of 7'0'' #3 - 2pcs rod

Spread-Apart Test

The following drawings represent the sequence of insertion of a wedge (an angle larger than real has been drawn for clarity).

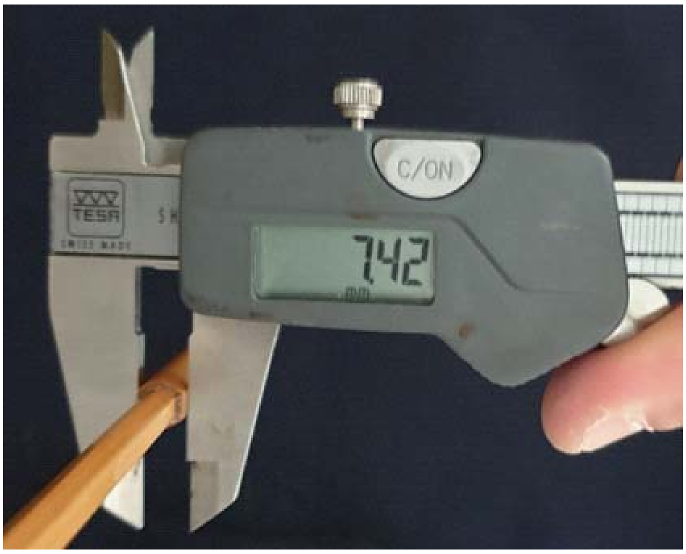


I then measured the O.D. of the female "face to face" at the opening of the ferrule sample, the same one used to perform the previous load test, as shown in the next image...

O.D. of the female measured "face to face" taken at the opening

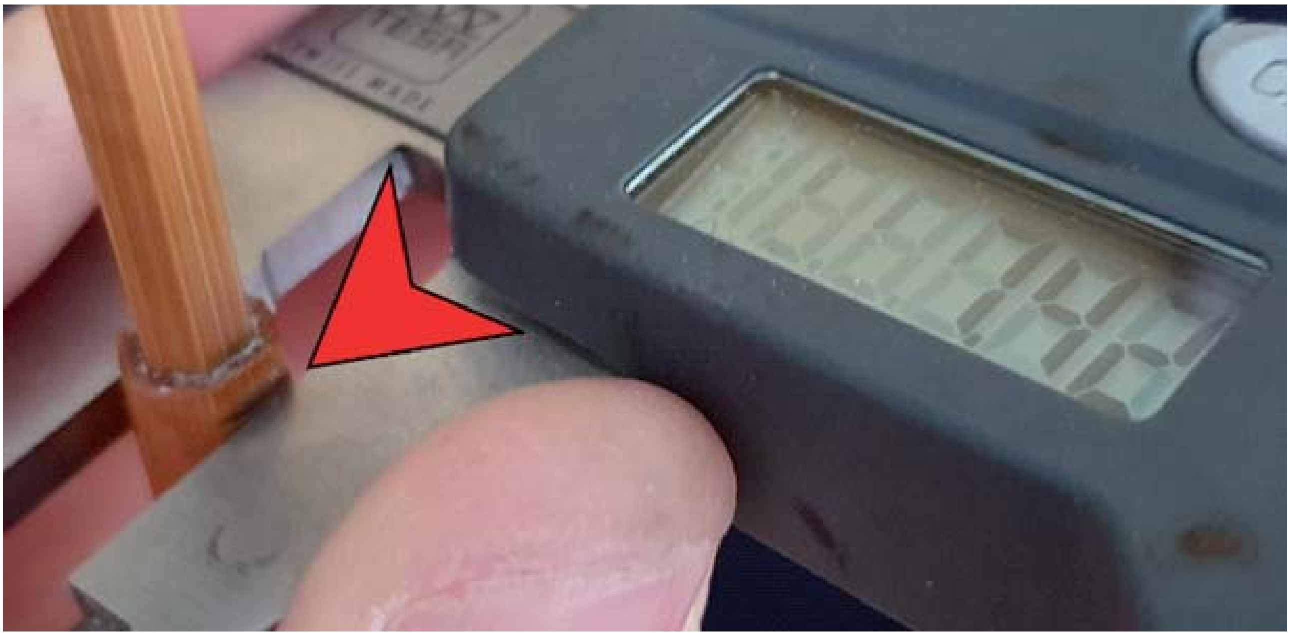
…and then, in the next image,

I repeated the measurement upon insertion and final tightening of the male.



O.D. of the female measured "face to face" with the inserted male taken at the opening

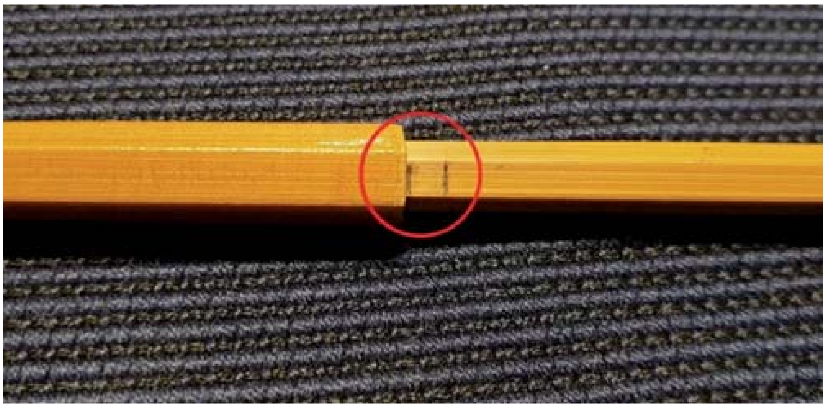
I repeated these measurements several times at the same point to be sure. In the next image you can see the exact position under the black line drawn near the edge of the female ferrule.



Position at the opening of the female where measurements were taken

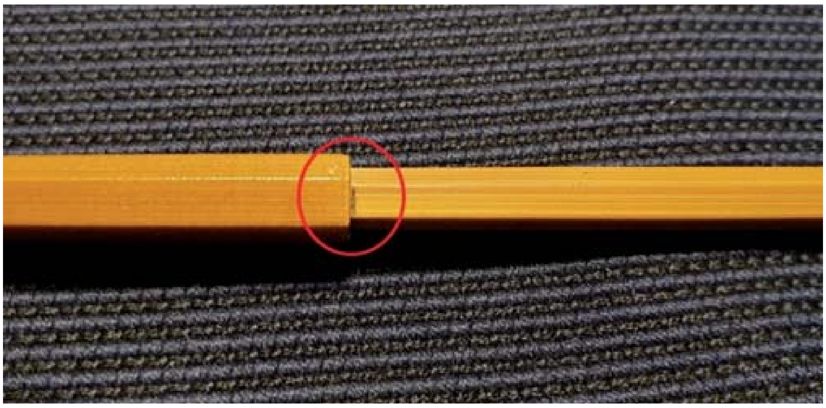
The spreading apart is in the order of **0.05mm (2mils)**. I also then checked that the O.D. of the female, once the male was removed, returned to its initial size.

I also measured the length the male slide travel, as shown below...



Position of the beginning of the slide

...and then I inserted it until it was completely tightened and marked the end point as shown in the following image.



Position of the end of the slide

The length I measured, shown in the next image, was in the order of **2.6mm (102mils).**

Measurement of male slide

So, in summary, for a ferrule of the dimensions described, which has a taper in the order of **1.2°**, I find that the female near the edge expands by **0.05mm (2mils)** when the male is fully inserted for **2.6mm (102 mils).**

Marzio then suggested to check the relation between the change of the O.D. diameter of the female upon insertion of the male. He gave me the following simple equation:

$$a = b \times \tan\alpha$$

where:

• **a** is the change of the O.D. diameter of the female. a= 0.05mm (2mils)

• **b** is the male slide travel from first engagement to final gripping. **b**= 2.6mm (102mils)

• **tanα** is the t**angent of the taper angle α. α** = 1.2 degrees, = 0.021rad

By choosing to measure angles in radians, it is known that for very small angles, tanα is numerically equal to α. Therefore, the calculated spread-apart is:

$$a = 2.6 \times 0.021 \simeq 0.05 \text{ mm (2mils)}$$

That agrees with the reported measured value.

At this point we were more and more curious. I then checked other rods and I found that all of them exhibit the same behaviour. Of course the effect is small (few mils), but well above the caliper resolution.

TBF *of #10 hex rod and #3 quad rod*

Conclusions

Classical bamboo fly rod image has always been associated with nickel-silver ferrules. As everybody is aware of, nickel-silver ferrule making requires machining to tighter tolerances than the bamboo blanks. The boundary in between is a stiff boundary, and it has been repeatedly disputed if a "true" rodmaker should be able to turn his own nickel-silver ferrules. The measurements reported here above show that bamboo ferrules are kind of softer in terms of accuracy requirements. So they can be done with a planing/scraping procedures. They can be checked with a good thumb roller caliper accurate to better than one mil. The same required for the blank.

Finally, choices of materials and procedures have been indicated for the all important ferrule wrapping. It is hoped this will reduce the reliability gap with respect to the nickel-silver ferrules.

I would probably never have succeeded in developing a ferrule with these characteristics if not starting from the works previously carried out on bamboo ferrules by **Marcelo Calviello** and **Bjarne Fries**, but above all from those carried out more recently by the current **IBRA** President, **Alberto Poratelli** together with **Gabriele Gori**, in the design of the integrated parallel ferrule in bamboo.

Thanks again to **Marzio** for the help with the text.

Here are some videos relating to the ferruling and tightening of the link

https://studio.youtube.com/playlist/PLyzTG9OI7T6Ccw4TOZqhHd0dd6fPQqLMY/videos

TBF *of a quad 7'0'' #3 - 2pcs rod*

IBRA BAMBOO ROD SHOW

Michele Gallo
rodmaker
from Italy

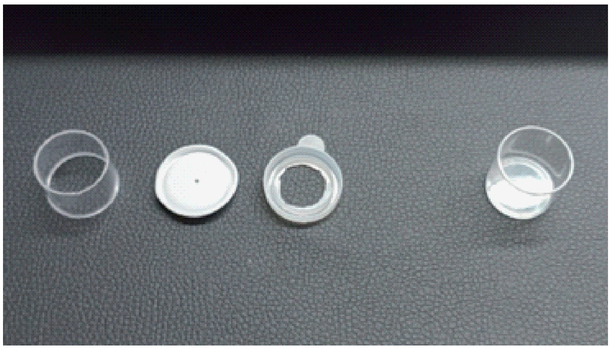
Downhill varnishing

by Massimo Paccotti

The varnishing of the rod covers an important step, at least in my opinion, regarding its presentation.

When you look at a rod on exhibition the first thing you notice is certainly the finish, not that it is the most important part but certainly the first that catches the eye.

I started varnishing by dip tube with good results, then having moved the workshop to the basement of the house which has a height of about 250 cm, I had to abandon this varnishing system.



I could have taken inspiration from Alberto Poratelli's article " System for immersion varnishing in low-height rooms " but I admit that I didn't have the courage to propose it to my wife.

I then moved on to varnishing with the syringe but the results I obtained were not as good as the dip tube, I probably wasn't able to exactly adjust the correct inclination of the rod, dilution and rotation speed or who knows what else, the fact is that by dip tube was my favourite.

Then the turning point, the article by Davide Fiorani in BJ n. 21 “Varnishing the rough, varnish-saving method”, it seemed like a brilliant idea to me, on hind sight an obvious idea.

I did some tests but I found it difficult to be able to manually descend very slowly and with constant speed over the entire blank.

I put the tests aside until I discovered that during the 2023 meeting there was to be demo on varnishing, I decide to make some changes to Davide's system to obtain good repeatable results.

I tried to use the vinyl glove as a membrane but I find that it is complicated to be able to pierce it with the needle without it splitting during the descent, especially on the tips with bamboo ferrules, the difference in taper between the tip and the ferrule is really high.

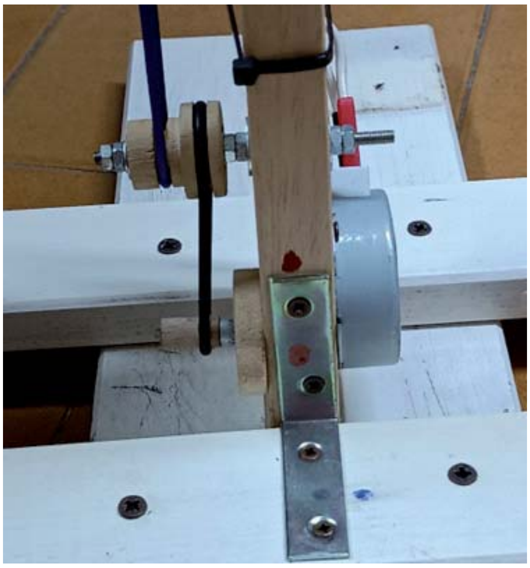
I then tried using children's balloons, which are thicker than the glove, and I also experimented with 2 mm thick EVA foam disks. I prepared enough varnish for all of us!

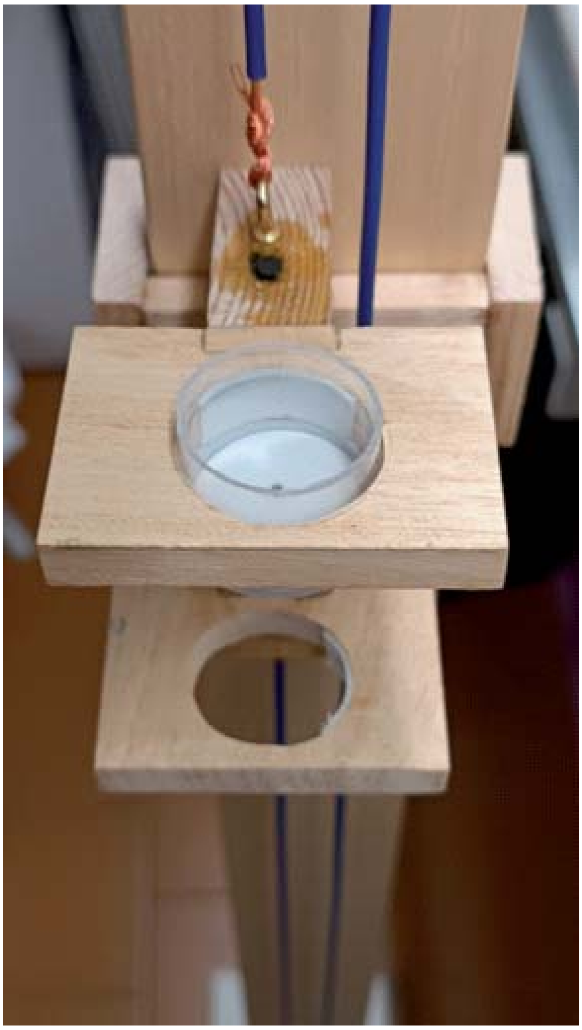
Both held up without breaking but, I couldn't understand why, using the balloon as a membrane deposits a greater quantity of varnish than the EVA foam, I decide for the latter and started thinking about how to motorise everything.

I mounted an asynchronous motor with four revs per minute and calculated the diameters of the pulleys, which I made of wood otherwise the belt would slip, in such a way as to have a descending velocity of five cm per minute.

The first attempt to transfer the rotation into vertical movement I used an O ring cord. but being elastic it made my glass jump with the varnish due to the friction between the rod and the foam, I managed to solve the problem using an electric wire: the external coating guarantees grip with the pulleys and the internal metal core is not elastic.

I prepared a jig with a slot for two ten cc glasses to be connected to the cable that gives me the movement, the first one, above, will be the one with the membrane that will contain the varnish, the second one below will be inserted when varnishing is almost completed to collect the remainder of varnish present in the glass above.

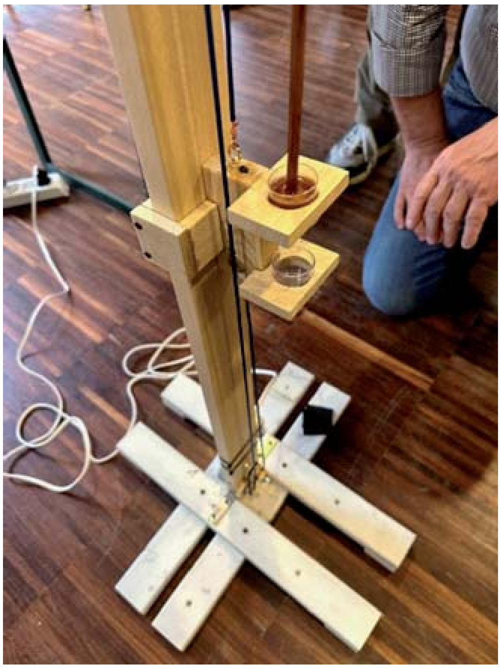




The varnish I used was Cecchi Spinnaker diluted with two parts varnish and one part thinner. Keep in mind that the slower the descent, the less varnish will remain deposited on the rod, this is because it will have time to drip back into the glass, the faster the descent the more varnish will remain on the rod with the risk of dripping. Also, to be taken into consideration is the fact that the foam membrane tends to form a slight upward cone due to the friction with the rod, so it is better to add a few more ccs of varnish in the glass to avoid the risk of running out.

Later I saw that on well-known Chinese sites they sell toothed belts with their dedicated pulleys at very low costs which, combined with a variable speed motor, make everything a lot easier.

To conclude, I would say that the method gives good results, avoiding having a tube full of varnish which tends to deteriorate and accumulate impurities over time. With this system we always use fresh varnish, given the minimum quantity necessary we can afford to throw away what is left over, but on the other hand by varnishing the blank we will have to make all the bindings with the rod already varnished and this requires us to pay greater attention to the varnishing of the bindings themselves.



One final clarification, I realized after struggling to invent a structure that would guarantee me regular movement and with the right (in my opinion) speed, that in BJ n.1 of October 2008 there is an article by Paul Agostini and Christian Deacon entitled "The Elevator" in which they also explained a very similar procedure. What I propose here is probably simpler to implement in practice and allows me to quickly move the glass, if necessary, simply by releasing the belt from the pulleys.

Furthermore, I would like to draw attention to the fact that the choice of material used for the membrane is, in my experience, very important for the success of the varnishing.

IBRA BAMBOO ROD SHOW

Reinhard Lang
rodmaker
from Osterreich

Airbrish Varnishing

by Daniele Giannoni

I started thinking about airbrush varnishing after a gathering, I don't remember it being Glenn Bracket or Per Brandin who talked about it. What struck me, in addition to the result (far from obvious) was the news that a single coat was sufficient to obtain optimal varnishing. Later I also saw some rods spray varnished by Luciano Oltolini (a professional!), beautiful, inviting.

Previously I used, like most of us, the tube immersion (Dip tube) system. They weren't bad, but I found a lot of problems: storing the varnish (in the tube/in a container); filter it adequately, staying in the tube for a long time brings inconveniences, avoid dust, each hand an additional risk...

Preparation of the rod

It is necessary to pay a lot of attention and carry out careful preparation of the rod and the working environment to create the best conditions for an excellent result.

All parts that do not need to be varnished must be perfectly shielded although, since the rod is not submerged, watertight shielding is not necessary.

Silicone is enemy No. 1, it causes varnishing and gluing problems, so it must be fought with suitable means...

Cleaning with anti-silicone liquid and microfibre cloth:

1- Wet a small portion of cloth and pass over the rod. Then wipe with a dry cloth;

2- Change the cloth often enough, otherwise you risk spreading silicone;

3- From this moment on, do not touch the parts to be varnished anymore. Cleaning with anti-silicone liquid and microfibre cloth:

Preparation of the work environment

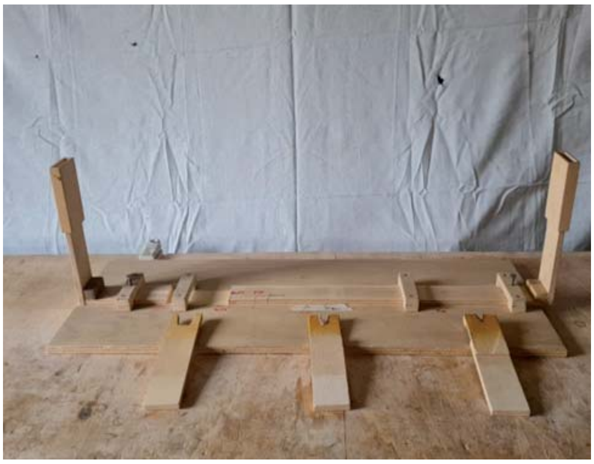
• Remove dust with a vacuum cleaner and a brush with a damp cloth.

• Spray a couple of small glasses of water with a «rich» jet into the room, with compressor and spray pistol, especially upwards, towards the varnishing area and on the support.

• Cover the wall and the support surface with antistatic nylon

• Cover all the furniture in the room with old sheets of nylon varnish

Here is the set up ready for varnishing a tip:



I created a system of interchangeable supports to be adapted to the different parts of the rod. The length can be adjusted quickly and precisely. You can go from tip length to mid or butt length in an instant.

You can quickly change the type of support you need: cork, ferrule, tiptop.

The compressor

The compressor is the heart of the system together with the spray pistol/airbrush and must have certain minimum characteristics, as well as being of good quality.

• A certain power and a certain autonomy of air in the tank are needed

• The varnish must not be very diluted. Following instructions from Cecchi and a bodybuilder friend:

- pressure 3.5 atmospheres,

- 100 dilution of varnish, 30 of white spirit

• Mini graphics compressors are not suitable

The spray pistol (airbrush)

The spray pistol must obviously be of good quality and the use of a 0.70mm nozzle is recommended. The varnish cup and air hose must be securely attached to the spray pistol.

The most suitable air pressure may vary depending on the type, viscosity and other conditions of the varnish (e.g., temperature).

The optimal distance for varnishing is approximately 10-15 cm; smaller or larger distances, as well as moving the jet circularly affect the quality of the final result.

At the end of the work, thoroughly rinse the entire body of the spray pistol with new, clean solvent.

The air cap and nozzle must be disassembled, immersed in solvent and cleaned with the help of a toothbrush.

Be very careful not to damage the holes in the air cap and the centre hole in the nozzle.

To clean the varnish passage, spray a little pure solvent as for varnishing.

Secure the needle seal screw by pulling the trigger and adjusting screw so that it is not too tight.

In addition to the compressor and the spray pistol, you will need a few other things: new and reusable white spirit, disposable varnish filters, containers for mixing and washing.

For safety, it is important to use a valid protective mask.

The varnishing… finally

Mix the varnish thoroughly. No problem if air bubbles are created.

Spray very little white spirit (really a few drops) before putting the varnish in the spray pistol, previously we shot water (to break down the dust).

Adjust the spray for both size and amount of varnish/air.

Make a few passes per face, fairly fast, continuously, without stopping and move on to the next face. Get acquainted with the spray pistol, a single pass may be enough.

Before doing other steps, wait a few seconds (a little more than the time needed for the complete rotation of the faces of the rod is enough). At first it will seem that the varnish is not enough, wait for the varnish to spread and form a film, if it is not satisfactory do other step(s).

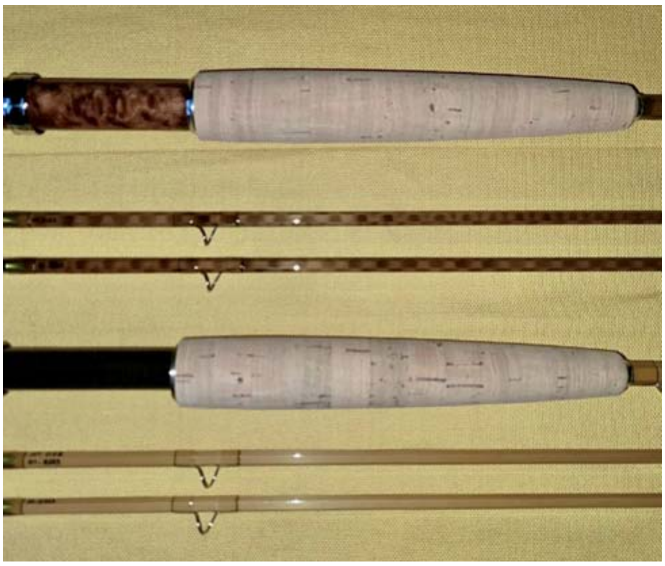
It is best to varnish the tip first, as a more precise adjustment of the ferrule-tiptop distance is needed, then move on to mid and/or butt.

As soon as the piece is varnished it is placed "in the dryer".

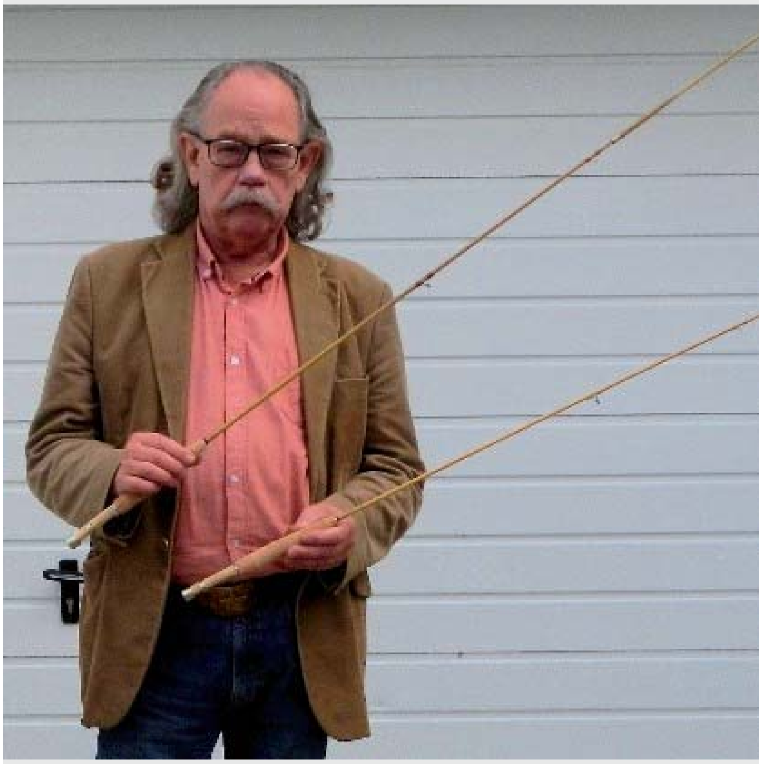
These are the spray pistol manufacturer's recommendations in case the varnishing shows typical problems:

State of Trouble	Cause	Counter-measure
Paint breaking	1. Air gets mixed with paint in the Paint passage attributable to needle Packing being worn out. 2. Loosen or scar(s) on matching portion in between Fluid Nozzle and taper seat face 3. Air mixing attributable to loosening of blind nut of Paint Cup.	1. Replace O-Ring with new one or tighten the Packing Screw furtherer. 2. Complete the fastening Or replace replace the faulty part . 3. Tighten it perfectly.
One-sided pattern	1. A portion of square bore of Air Cap is clogged. 2. Adhesion of solid dirt at the top of Fluid Nozzle.	1. Dirt inside square bore must be Eliminated (Needle or wire must not-be used.)
Cresent pattern	1. A portion of square bore of Air Cap is Clogged.	1. Eliminate the dirt from the square bore.
Narrow pattern	1. Air pressure from the square bore of Air Cap is critically high. 2. Paint viscosity is too thin.	1. Reduce the air pressure. 2. Adjust paint viscosity.
Thick pattern	1. Clearance between Fluid Nozzle outside diameter and the center bore of air Cap gets worn wider. 2. Air pressure from the square bore of Air Cap gets excessively low. 3. Paint viscosity is excessively high	1. Replace the part with new one. 2. Rate up spraying pressure. 3. Adjust paint viscosity.

…. at the end (the whole varnishing process takes 2 minutes, maybe even less)
Open the windows as soon as all the parts are free from dust
Recover unused varnish
Give all the components of the spray pistol a quick clean
Soak in white spirit or nitro thinner (better)
Return to the room when the air is clear and finish cleaning.
Last notes
Just one coat of varnish is enough!
A drizzly day, with low atmospheric pressure, high humidity, solves a lot of problems...



IBRA BAMBOO ROD SHOW



Ulf Lofdal
rodmaker
from Sweden

The Shining of Stropping

by Marzio Giglio

Introduction

Learning how to use a plane is essential if you end up choosing the Planing Form as your bamboo fly rodmaking method. Clever choice, possibly the most widely used method, at a fair price.
But then you will be left with the task of learning how to sharpen and hone a blade, which is often hard and more time consuming.

While sharpening and honing is a topic dealt with great care in the woodworking circles, the newcomers to the bamboo fly rod fraternity are so much worried by the great diversity of things to learn that honing becomes an annoying ancillary procedure to go through as quickly as possible.

To be honest, even the appearance of the Carmichael/Garrison "Bible" did not really help. We had to wait another book or two to learn about Japanese whetstones, accurate honing guides, and the much-needed Hock O1 blades.

Smooth sailing started from there!!

Woodworkers use methods to sharpen and hone that I found to be mostly unknown to bamboo rodmakers, like the old practice of stropping.

Stropping is a simple procedure that produces consistent and predictable results. It basically consists in dragging a blade on a leather belt, with the cutting edge trailing behind.

This short article will describe how to put together and use a leather bench stropping plate, and stropping pastes. The amazing thing is that stropping is very easy to use, gets the job real fast. How it comes? Can one visualize what is happening to the stropped surfaces?
I am a Physicist by trade and spent my life in Laser Optics Labs. At the end of the article you will find a crude optical setup that uses a cheap laser pointer. The setup will show that stropping will form a micro camber right at the very edge. The edge included angle will be seen to increase with stroke number: ten strokes and you will see it to appear, thirty strokes will be enough to increase the angle by ten/fifteen degrees.
I want to emphasize that I do consider myself a newcomer to stropping, but I am so amazed by the level you can achieve by using stropping and stropping pastes, that I felt I should divulge

Incidentally, I never felt any danger handling plane blades, but I must say that after starting to use stropping I sometime find myself bleeding by moving my hands carelessly close to the blades.

A caution remark: Will you always need supersharp blades? Not really. But as all of us will or are already caught by the one mil accuracy obsession, once you are down to final passes, any defect in blade honing might cause you lose control. For those difficult strokes, you will need a perfectly honed blade. This points out the irony of the situation. The rodmakers fight for the highest planing accuracy and yet they are not too interested in learning more about honing a blade. Tell an experienced woodworker that you plane to one thousandth of an inch accuracy. He will smile at you, but deep down he will think you are a liar or a madman.

1. A closer look to a sharp edge.

Could one use an optical microscope? It turns out that optics does not have adequate resolution. So what is needed is an electron microscope, something very few people have access to.
To be able to see in detail the areas of operation it is however an invaluable help. It will provide estimates of the "length scales".
Scanning electron microscopes are ideal to generate three dimensional images. It appears that among the large group of people interested in steel blades, the users of straight razors are the lucky ones that have access to scanning electron microscopes.

An example is shown below, taken from the site of " The Science of Sharp", a very professional list of articles and comments generously provided by its Editor. I became aware of it when preparing this short article. Let us discuss the electron microscopy image.

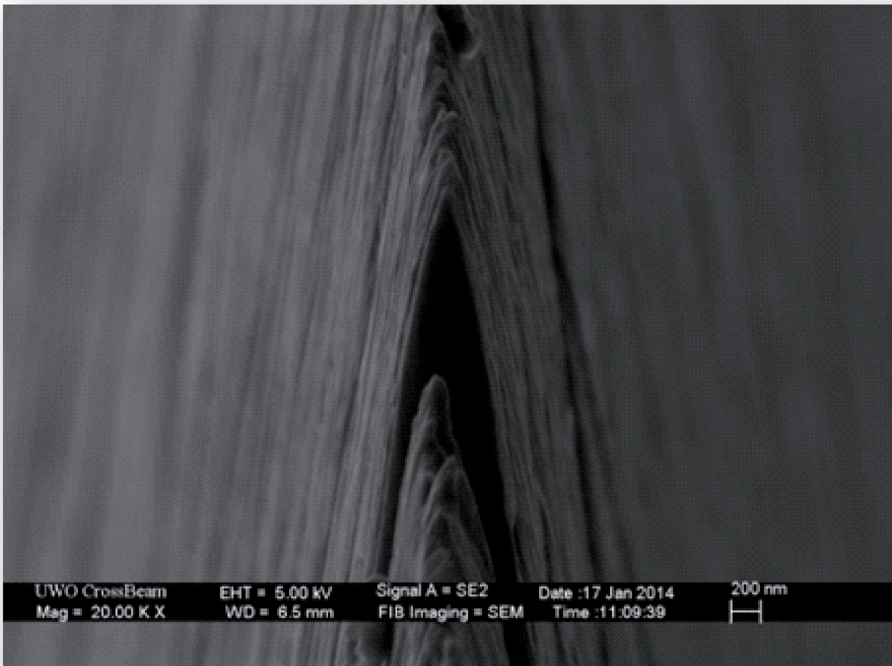


Fig.1. Scanning e.m. Image of a straight razor cutting edge.

The black shadow on center is a thin portion sliced away with an ion beam to reveal blade silhouette. The image shows that the cutting width is smaller than 100 nm. See ticks for 200 nm below, right.
From the Image you easily understand why to get really sharp you need to use superfine abrasive. This is why you need to go above 10000-16000 grit.
Alternatively, you can instead buy some stropping pastes, that will bring you to the same level of finesse. Stropping pastes will be discussed next paragraph.
I understand that there is no agreed method to measure blade sharpness, so I know I am on a slippery terrain. So let me explain in practice how I define a super sharp blade edge.

(My definition...)

It is a blade capable to slice effortlessly a very thin piece of paper, without ANY SLIDING motion parallel to the cutting edge. You can use sliding just to initiate the cut, but then you must be able to push the blade thru with very minimal force. And barely audible ripping noise, possibly no noise at all.

To complete the requirements, the thin test paper I selected is the two mils chemical paper used for receipt printers. Keep future receipts, or just buy few rolls. They will last forever. The photo below shows some tests.

Fig.2. Test cuts on printer chemical paper.

2. The Abrasive Pastes.

You can strop just using the leather. But dispensing abrasive pastes will add efficiency in taking metal away.

I buy abrasive pastes from a goldsmith supply shop. A warning: there is a bit of anarchy among abrasive paste producers. Pastes are in the form of prismatic blocks, or fat round crayons. They are made in different colors, but there is no agreed relation as to the average grain size. Indeed one color for one producer could be the finest grain size, while it could be the coarsest for another

With few exceptions: for example green is a pigment itself, chromium oxide, a strong coloring green. So at least green is fixed, typically slightly smaller than one micron, but again, hard to know for sure!
Another much used abrasive is Aluminum Oxide, the one used for the gray sandpaper. Both Chromium Oxide and Aluminum Oxide are hard, and well suited for honing blades, both class 9 of the Mhos scale. Remember that there is just one class to go in the Mhos scale, and it is 10, diamond.
In the photo below I show the three pastes I use the most.

Fig.3. The green strop is 0.7 micron, Chrome oxide, the white is 0.3 microns and the yellow is 0.1 microns, both Aluminum oxide.

Is there a criterion to follow as you strop, and want to evaluate if you are doing right and when to stop?

Once reading a discussion between blade honing aficionados, I found that one had figured a simple way to estimate if things improved. His recipe was extremely simple:

"Make it shine the best you can!". Never saw that comment anywhere else, but he was absolutely right. Either he was a Physicist under cover, or a genius! Indeed there is a basic Equation that comes from the Theory of Scattering that relates partial reflectivity to the root mean square of surface roughness. In numbers!

The Figure below might help to understand.

Incident light may be a low power laser pointer. Here indicated with a black line. It is directed against a flat, finely ground surface, our blade bevel.
All the light that bounces upward is divided into two well defined components: a) a specular reflection (light gray ray) that goes in one direction only, the angle of reflection being the same of the incident beam. b) the scattered light (red rays) sent into any direction other than the specularly reflected light.

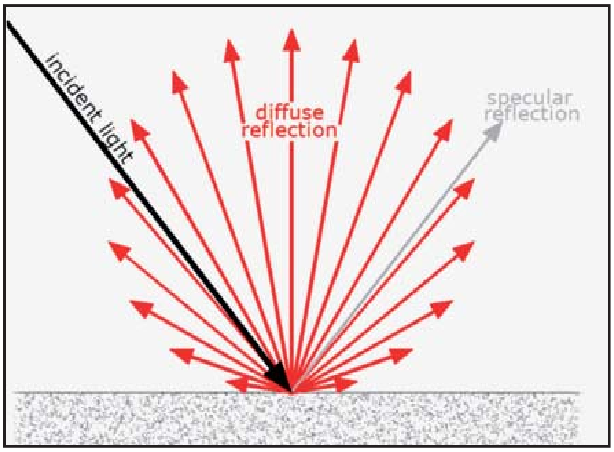


Fig. 4. A collimated beam (like the laser pointer beam) hits a finely ground surface. The light that bounces back is divided into diffused light and usually weak specular reflection, here in light gray.

As you go to finer grits, the spot of specular reflected light will get more intense, and the intensity of the scattered light will get weaker and weaker.
I show below a shiny brass knuckle, being polished some, but you will clearly see the overlap of an image with stray scattering.

Fig. 5. Hazy image due to poor polishing. The haze is generated by the scattering due to residual surface roughness.

A good example of a well-polished small blade of a round lutery finger plane is shown below

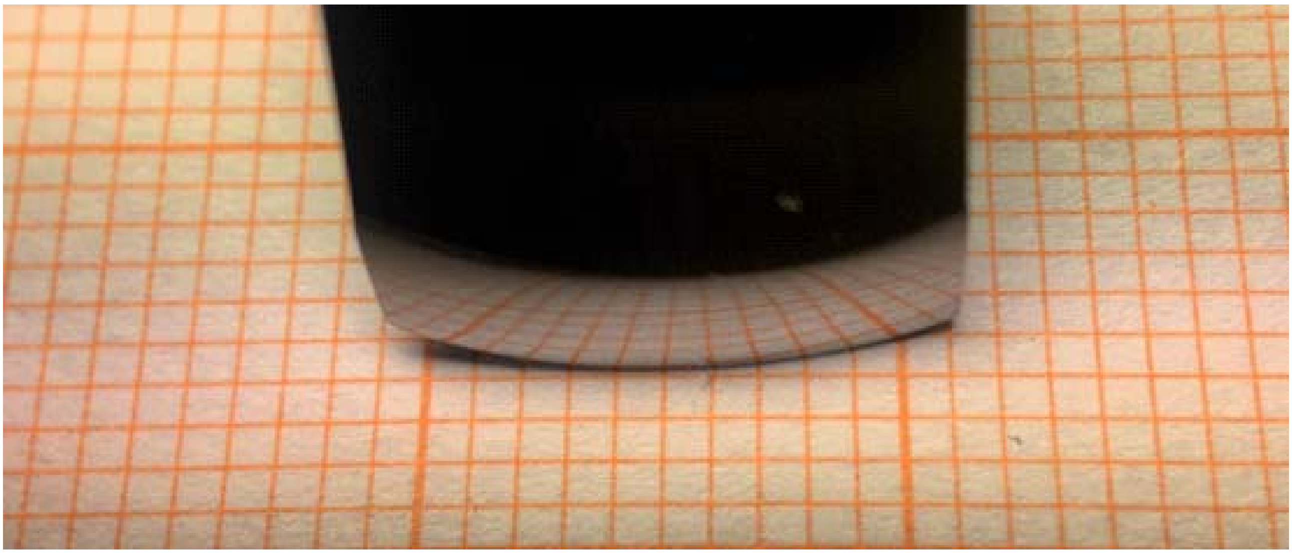


Fig. 6. A fine stropped small lutery blade. 01 steel, will cut a hair without touching the skin! See comments next paragraph.

3. Making the stropping plates.

A. The instant made, wood Stropping Plate.

Just use a block plane to plane a few flat pieces of of soft wood. Fir, soft yellow pine, spruce all of them will work fine. Say 2"x 6" will be enough. The surface must be roughened with 240 grit sandpaper, so to gain a bite to receive the abrasive paste uniformly. Nothing could be easier.

Try it. Paste some green stuff, use an O1 blade, the easiest to strop, trail the bevel pushing some against the pasted surface. You will notice that the color of the pasted surface will take a black shade. The shade indicates that metal is taken away from the blade. Just few strokes, and immediately feel the blade getting sharper.

I confess I lied to you before by saying that I am a newcomer to stropping! I used that method for years to sharpen my small curve edge blade of a lutery finger plane shown above.
Great success! It was the first time I could slice a hair with the blade edge not touching my skin! It was a great step forward for my rendition of the Former Beam method. Used to cut the tapered curved grooves along the Former. Irrespective of former fiber orientation. Crisp curved grooves matching the bamboo enamel.

In conclusion, try this instant made approach to stropping. It really works fine!

When you reach the point that you feel that the paste has been exhausted, Scrape the surface with a card scraper, or moving sidewise the edge of a chisel. Reload and continue as necessary.
The test with wood plate will teach you a lot and give you confidence to start to build a leather strop.

B. The leather strop,

I believe that any kind of leather will be fine but very soft could be a problem, as described below.
I suggest to buy hard cowhide, the type to make the heels of costly shoes. I suggest to get the hardest one, so hard it will resist bending. There is a reason for this. As explained later, you will strop holding the blade by hand, pretty much like you do when sharpening free hand the blade with whetstones. And you will have to try to keep the bevel flat to the leather surface, and this is easier if the leather is hard.

The leather has two sides, a fine finished one, the Flor side, and a rough one, the one inside the animal. Either one can be used, but for finer results, I suggest to use as a stropping side the Flor one. The other side is used to glue the leather onto a wood strip that you will have planed flat. To even up the glue thickness, I suggest that you let the glue set while clamping the wood panel and the leather in a bench vise. Once the glue has set, you can cut or plane away the overhanging parts of the leather, just for the pleasure of a nicely done piece of equipment.

Prepare a few of these plates with leather, and keep each one for a given paste. As suggested by many, keep one of them to be used without stropping paste. Keep it for the last strokes. Still, some black will start to show on the leather. Quite less than on the pasted strops. Shown below you will some leather bench strop plates.

Fig. 7. Some leather strops, two pieces of hard cowhide, and the bar C-clamp to fasten

If starting with a small number of plates does discourage you, just cut a piece of leather belt, and a piece of planed wood, and start with something you will not be afraid to see it go wrong. Do not worry about imperfections, just move fast, and try to get an idea in practice.

4. How to strop.

Stropping is a simple, easy method. I will describe the procedure I use.
I first use the cheap combo 1000 - 6000 whetstone and a honing guide to form a bevel with the desired included angle. So I have a fixed geometry to which return to when needed. The guide will guarantee that the bevel face is flat.
Start stropping. The blade is kept with both hands, the tip of the fingers applying even force along the edge. I suggest you stand, use a rather low bench, and keep the elbows against your body, and move the whole body back and forth. The bevel must be almost flat to the leather. Consequently the blade will be canted at an angle with respect to the stropping surface. The angle is the same of the bevel. If you now press the blade against the leather, you will hardly see any deformation on the leather. But if you slightly increase the blade angle, the contact area diminishes drastically, and leather deformation will localize near the cutting edge. This way the steel removal becomes very efficient right there. On a stropping stroke I strongly suggest you to start with the bevel registering flat to the leather, and gradually increase the contact angle. Few dozen strokes, ending with a few degrees angle increase will produce the following results:
1) The bevel will remain mostly flat, except for a narrow rounded region close to the cutting edge.
2) Thanks to the tight wrapping of the leather, each stroke will efficiently contribute to the honing of the cutting edge.

Of course the amount of metal removed by one stroke is really very small. Is it detectable? How many strokes are necessary to appreciate that edge sharpness increases?

Let me answer to the last question, the most interesting question. Not too many. Few dozen strokes are enough!

Can we understand what is going on? In the next paragraph I will show a simple setup that will show what is happening on a very fine scale.

Why stropping is so effective? To the risk of annoying, let me say that stropping is a "differential" method. It takes reference on the flat bevel plane, and chews metal away at a slightly larger angle, right at the very cutting edge, with a persistent wrapping touch!

Awesome!

Notice (for your general interest) that differential schemes are often used when precision is vital. The electric signal from an electrode pasted on your chest when your heart is checked is a very noisy signal. But taking the difference between two electrodes gives a nice signal as the noise is zeroed.

In general stropping will make stronger cutting edges. But let me add that there is a great difference between bevel up (BU) and bevel down (BD) planes.

Stropping will increase the cutting angle of BU blades, while it will decrease the clearance angle of BD blades.

Most of the rodmakers use BU block planes. Stropping is perfectly suitable. But let me add a fine point. A general source of concern is that often people use bevel angle above 40 degrees, while even the last very nice side clamping guide by Veritas stops at 40. I have not tried myself, but I think that the extra angle above 40 degrees could be advantageously gained by stropping.

BD planes are seldom used for rodmaking, although I remember seeing articles on rodmaking in central Europe (before the Garrison-Carmichael Bible appeared) showing the classical Bailey no.4 being in use.

I have tried to plane bamboo with an old Bailey no.4. O1 blade. Bedding (and cutting) angle at 45 degrees, 30 degree bevel angle.
I then stropped blade so that the (liminal) clearance angle was very small, as the cutting angle at the very cutting tip was close to 45 degrees.
Planing was very easy, very little power needed to push. Perfectly smooth surfaces on the nodes. Incidentally, this is the blade that was used to test the optics setup, see next paragraph.

Finally, let me stress that stropping sessions can be repeated once the blade has lost its superfine edge. So you do not need to go back to whetstones and honing guide, just strop again. A few dozen of strokes, really fast! Start planing again. Until the blade is not as sharp. Then strop again….
But how many stropping sessions before you must go back to using whetstones and guide to reshape the bevel?
Tentatively I would say five times, but possibly ten or so if you learn how to avoid rounding the edge, and make the edge dull.

But the outermost advantage is to get super sharp edges that would require very costly hard whetstones 16000 grit or above.

5. The laser pointer setup

Let me first explain how it works.

As we know for sure a honed bevel is a reflecting surface, we will shine the laser beam onto the bevel, and check the reflected beam. The idea is simple: a perfectly flat mirror surface will reflect the round shaped laser beam into an identical round beam.
But an even slightly cylindrical mirror will spread out the beam onto a fan of directions. The actual range of angles of the fan gives the variation of slopes of the mirror. So the plan is that we will start with ground and honed bevel, check that it is really flat, then strop, and watch how the bevel surface changes as we strop.

Let me come to the description of the setup. For a partial view see Fig 8 below.

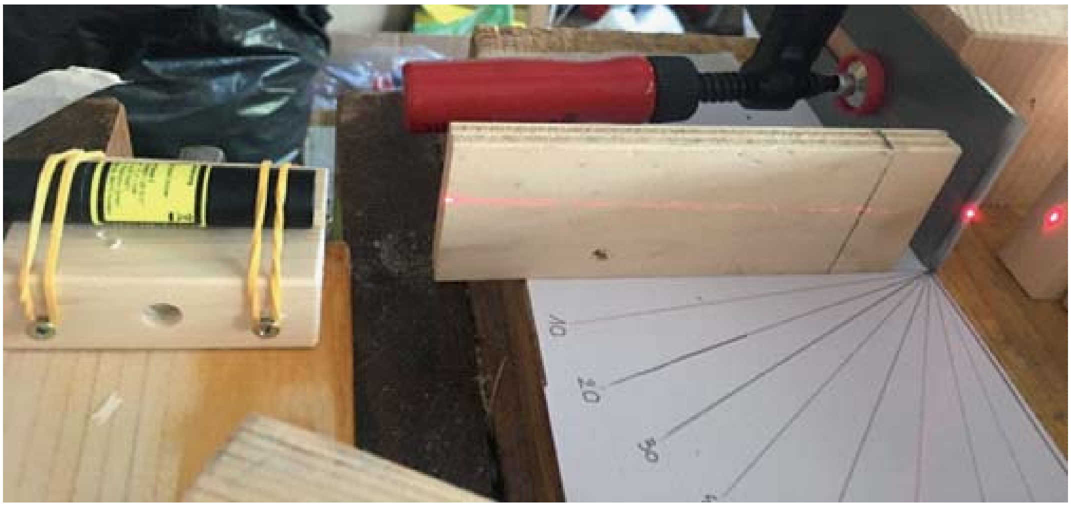


Fig.8. Side view. At left the laser pointer and its mounting block. The beam goes from left to right, and to try to make evident the beam, a plywood panel is placed parallel to the beam so that it grazes the panel (see the weak red line at mid height). The beam hits the blade partially. Notice the spot onto the beam stop further away from the blade. Finally, a crude protractor measures the reflected angle direction (see next image).

The cylindrical small laser pointer sits on a v groove block, clamped to the bench. You must have a stable mount.

The blade rest on its side on the bench. It is clamped to a square section block, so the cutting edge is vertical. The bevel surface faces toward the laser. Also, the block can be rotated to change the angle of incidence of the beam onto the bevel blade. I recall here that the angle of incidence is the angle between the incoming beam and the normal to the plane. The easiest arrangement is to hold the block at 90 degrees from the beam (so the back of the blade is at 90 degrees). This way the angle of incidence is the same of the bevel angle.

The blade can slide on the bench so to position the beam as desired. Two positions will be chosen:

Pos.1. The beam falls inside the bevel. If accidentally the honed width is smaller than the beam diameter, a fraction of the beam will pass clear and hit the beam stop.

Pos.2. Only a minute fraction of the beam falls on the bevel (roughly 10%), most of the beam passing free of the blade and blocked by a beam stopper.

A view of the protractor and of the reflected beam is shown below. It shows a BD blade honed at 30 degrees. It sits on Pos. 1, most of the beam being reflected by the shining portion of the bevel.

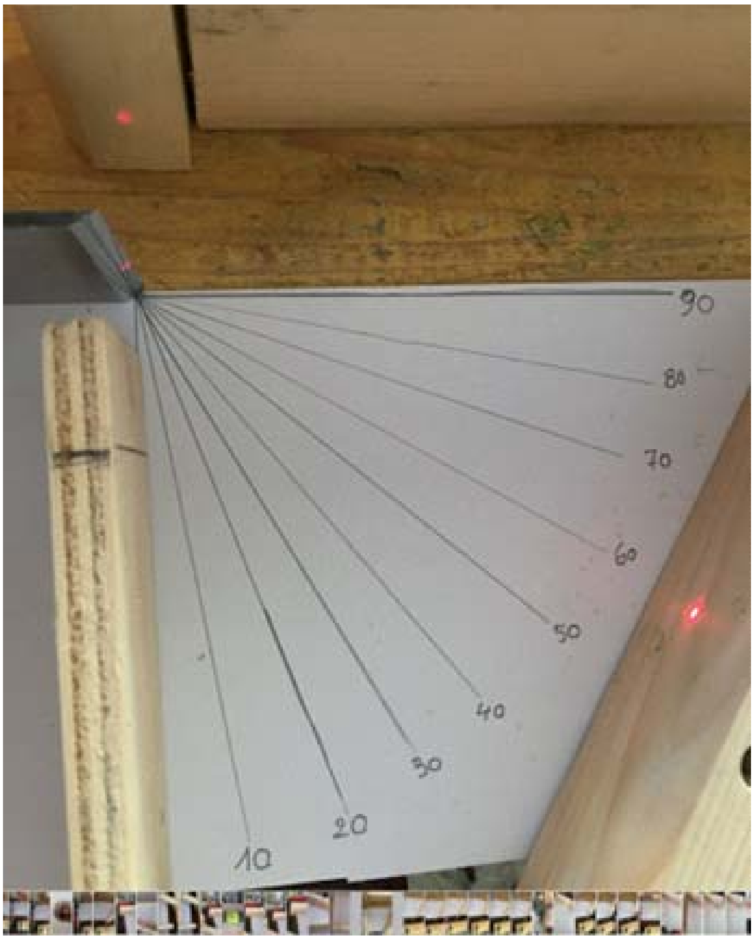


Fig. 9. Notice on the right, below, the beam reflected at 60 degrees, as expected.
The image has been taken from a different viewpoint with respect the Figure above. Notice how intense is the reflected beam in comparison with the transmitted beam, leaked on the right of the blade edge, top left.

One very technical point on the last image. If you look at the reflected beam, you will notice that on center, where peak power is attained, there is a central white core. Really round spot. How it comes? The laser is red! This is due to saturation. As the intensity exceeds a maximum value, no changes in intensity can be further measured. So the cellular software will tell the screen to reproduce in flat white the area where that maximum value has been exceeded.
So we are in the position to conclude that the transmitted beam has circular symmetry, and therefore the bevel surface of the bevel is extremely flat. A round beam has been reflected into an equally round reflected beam!

Pause and rejoice!

At this stage you can be sure of the extreme sensitivity of the method. Be ready to watch what happens if you strop.

As changes are expected in the vicinity of the edge, to amplify the sensitivity of the method, the Pos.2 for the blade edge was chosen. Numbers now become a bit daring, but I estimate that close to 90 % of the beam power passes clear of the cutting edge, and the maximum width of the of the strip of illuminated bevel is somewhere between 0.1-0.2 mm wide.

I stropped the blade, taking note of the number of stropping strokes, and making intermediate observations.
For brevity, I will show in the next Figure an image of the reflected beam after three dozen of strops. But even after a dozen strops the changes where visible.
Here the result:

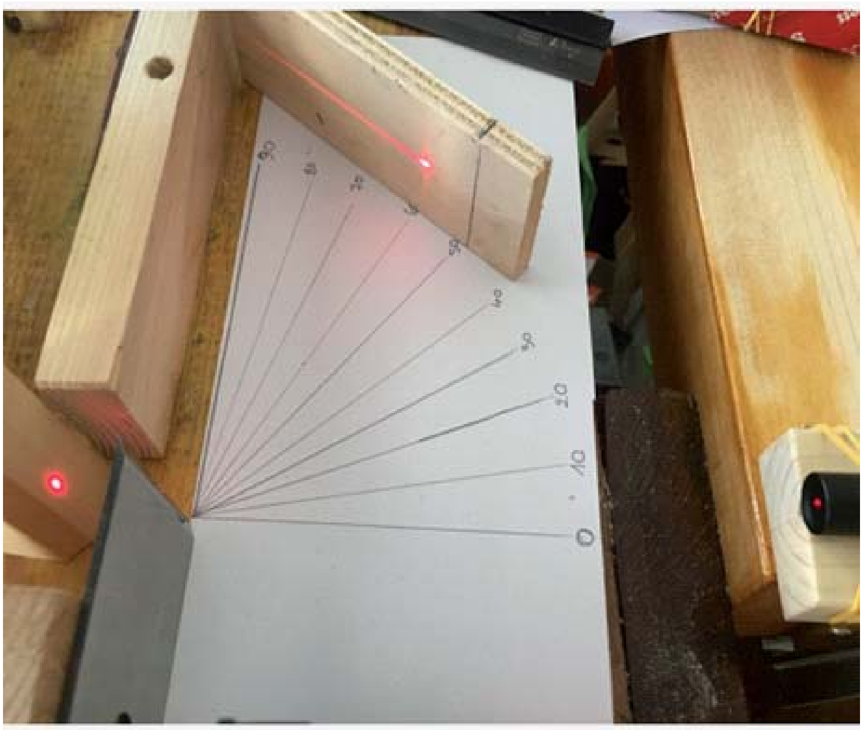


Fig.10. Same viewpoint as in Fig.9. Laser beam reflected from the stropped blade. From a reduced thin area, parallel and close to the cutting edge.

Note two contributions, an asymmetric peak at 60 degrees, and a weak, continuous streak like contribution all the way from 60 degrees to about 90 degrees. See text for comments.

There are many observations that can be made.
The strong 60 degree contribution.
In spite that the illuminated region of the bevel was just close to the edge, there is still an intense component at sixty degrees. This shows that a large fraction of that liminal part of the blade still consist largely by a quasi-flat region. But if you look closer to the shape of the border of the white lighted region, the saturation zone, you can notice that is pear liked in the direction of increased angles. Remember. That border in general is the only place you van make an absolutely strong statement! That is the line over which the intensity has the same numerical value! So it is not a flat region! Is it cylindrical? Here we are getting fancier!!
No! It cannot be a cylindrical in shape, as in that case you would expect a higher symmetry elliptical shape! But it is pear shaped! So the tentative explanation is that the radius of curvature is changing rapidly
The streak region.
It is elongated in the direction of the pear shaped 60 degree spot. So it germinates from there, but it extends for roughly 30 degrees, from 60 degrees reflection angle and ending at 90 degrees. This means that the bevel blade angle will change from 30 degree to 45 degrees. Please notice that the profile across the streak should be identical to that of the main, intense peak at 60 degrees. It looks thinner, because is much less intense, but it is the same reflected beam that keeps changing direction!
Can one evaluate the width of the bevel region over which this change has been produced? Not really from this qualitative observation. The discussion becomes too thick to be treated here.
As a crude estimate, it could be anywhere between 10 and 50 microns. Real thin. After all, how much metal can you hope to remove with three dozen stropping strokes pasted with sub-micron pastes?

6. Stropping different steel

I realized that a small fraction of bamboo rod makers is not aware of the existence of blades of various steels other than the blade their block plane came equipped with.
If it was a Stanley 9 1/2 as prescribed by the “Bible”, the block plane they bought is a poor copy of those made before WW2, and the same applies to the blade, for sure a high carbon steel. Not as hard as the first below.
O1, High carbon
First high quality plane blade was again high carbon steel, but with a pinch of Manganese, oil tempered, hard to 61 Rockwell. Produced by Ron Hock, they quickly became the standard blade for bamboo rod makers. They have a very fine grain, and are easy to hone! Easy going blade.
STROPPING: they do strop extremely well! These blades can be stropped to the sharpest edge one can possibly achieve.

A2 Blades
Search for steel with higher edge retention brought to the A2 steel. It is achieved through adding moderate quantity of Chromium. It quickly became the standard, higher price blade. Admittedly, they are harder to hone. You will spend considerably longer time on the whetstones. Because Chromium carbide are generated, their grain size often exceeds the cutting width you are trying to obtain. So extra effort goes in shaping them, or even dislodge them from the edge (if they are just too big). For sure, the edge retention is improved. A2 are offered by a number of blade producers.
STROPPING: Not as efficient. It works best if the blade is first honed on whetstones WITH A GUIDE! Then the improvement in sharpness becomes more clear.

The situation changed after introduction of the more costly particle metallurgy blades . Not being offered as widely as the O1 and A2

VERITAS Particle Metallurgy (P.M.) V11
They have been the first to appear on the market. The only available for many years. They have great edge retention, and great toughness, and they can be honed to a very fine edge, almost as fine as the O1. They are finished with very fine surface roughness. The back can be easily brought to a mirror surface near the edge. Blades are often offered at various bevel angles. More costly.
STROPPING: very good due to the very fine structure.

LAKE EERIE TOOLWORKS . Crucible Particle Metallurgy, Magnacut alloy
They were introduced a year or so. They have a high Chrome content, higher than A2 blades. Yet, due to a complex procedure that includes crucible passages, no Chrome carbide is generated. The only carbides are Niobium and Vanadium carbide, both of small dimension.
A recent comparative report has shown that these blades have an edge retention higher than any other alloy. This is very interesting for the finishing passages on the bamboo strips, where one mil accuracy will be at stake, and it is wise to use the same blade, on the same plane, with the same blade exposure. Even more costly.
STROPPING: they will strop very nicely due to the very fine microscopic structure.

In conclusion, it appears that stropping is in general quite effective for a large number of alloys, the new P.M. or C.P.M. blades included.

Marzio Giglio

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immagine tratta dal sito
https://www.wallybois.com/

IBRA BAMBOO ROD SHOW

Edoardo Scapin
rodmaker
from Italy

THE "FINISHING" OF THE ROD
IBRA STAGE MAY 2023

by Maurizio Cardamone

This year's IBRA gathering had as its central event a series of demonstrations dedicated to rod finishing. I expressly use the term "finishing" and not varnishing because we know that there are methods, currently used by some rodmakers, that do not use varnish at all. However, in every respect they constitute possible methods of finishes for a bamboo rod.
Not only were the numerous participants able to debate the pros and cons of different methods for a day and a half, but some willing members agreed to demonstrate them in practice. We have therefore seen and touched them "in person":

Spray bottle	Danilo Marnati
Pouring with Syringe	Alberto Poratelli
Tru-Oil	Mirco Forlani
Pouring with container	Moreno Borriero
Airbrush (*)	Daniele Giannoni
Polyurethane glue	Moreno Borriero
Membrane and up and down	Massimo Paccotti
Brush finish	Alberto Poratelli

This article briefly describes the various demonstrations, but I will also try to summarize the experience with some basic concepts. Obviously, it will not be a complete discussion of any of the methods on the list, but I would like to leave a reminder of the many small notions, details, ideas, tricks that were mentioned or discussed during the event. I will also try to group the finishing methods with some logic related to the main features. If I have misinterpreted something, forgive me and, as a very famous and loved Pope even said years ago: "If I'm wrong, you will correct me"!

Nor can we think that this could be a universal collection: surely some rodmaker in some corner of the world will be using an approach that is still different from all of these, due to the materials or the application method.

Even if it seems obvious, I would like to start by sharing the reasons for finishing, i.e., why do we want (or must) finish the rod? Given that all the wrappings (whipping), those of the guides, the ferrules, and even the simple aesthetic wrappings (whipping), must necessarily be protected from various external agents (water, UV, abrasion, etc.), even the "wood" certainly needs protection.

While mechanical protection from small mechanical injuries could also be considered superfluous, given the intrinsic hardness of the material, it is instead essential to protect bamboo from humidity. This would gradually be reabsorbed by the fibres, and would lead to an alteration of the elastic and mechanical characteristics of the material as well as an increase in weight.

Then there is an aesthetic fact: a perfect and shiny finish has long been considered a further element of artisanal excellence, and for many rodmakers and users of these rods it undoubtedly still is today. The wrappings (whippings) are usually impregnated with varnished or epoxy resin. If in the world of modern fibres or graphite rods we are used to seeing thick "rod" wrappings (whipping), usually obtained with two-component epoxy varnish which guarantee thickness and transparency which is unaltered over time even with just one coat of product, for the wrappings (whippings) on bamboo we usually try not to exceed the thickness of the varnish so as not to round off the edges of the hexagons. In addition to this, transparent wrappings (whippings) are often made on bamboo which require perfect impregnation of the thread - natural or synthetic silk which is used for the wrappings (whipping). There are therefore two normally divergent requirements for the product used: low viscosity to effectively impregnate the thread, higher viscosity to obtain an adequate varnish thickness with the minimum number of varnish coats. Let's remember that whatever varnish is used, the waiting time between one coat and the other will always be quite long, making the process quite tedious. Even in the varnishing of the wrappings (whipping), whether it is done before or after finishing the blanks, the enemies to be fought, dust, air bubbles, etc. they are always the same.

Nowadays many rodmakers varnish the wrappings (whippings) with epoxy resins more or less diluted with specific products, to reduce their viscosity. The resin has the advantage of becoming very hard and possibly workable, with steel wool or fine abrasive papers, after a much shorter time than any traditional urethane or polyurethane varnish.

If we ignore the obvious division between "with-varnish" finishing methods or "with-something else" methods, an important factor to consider concerns the treatment of the wrappings (whipping): in fact, we have finishing methods that must (or in any case can) be applied AFTER having completed the varnishing of the wrappings (whippings), and methods which instead necessarily require the wrappings (whippings) to be made and varnished after finishing the blanks.

The first type methods have two advantages:

1. the perfect continuity of the varnish layer on the frame and wrappings (whippings) is certainly a plus from an aesthetic point of view;

2. tying the guides on bamboo, which is perfectly smooth, is certainly simpler than doing it on a layer of varnish already present on the blank, which is partly engraved by the thread and limits the possibility of repositioning (synching) the wrappings, especially when using very fine silks.

We therefore have a class of methods based on the use of products that are completely different from the classic "varnish": these are drying oils, polyurethane glues or impregnating resins to be used under vacuum (paraloid and similar). Among these during the demos we experimented practically with Tru-oil (which is a very well-known mixture of drying oils used above all to treat wooden parts of guns) and the use of a polyurethane glue, such as Gorilla or Mastro D’Ascia.

(translator’s note – an Italian alternative).

With these methods the product is applied with the fingers using a lint-free cloth, quickly distributing the product and immediately removing the excess.

Both Tru-oil and polyurethane glue (the latter with Gorilla glue was by the way first introduced to us by Tim Anderson) require a large number of coats to achieve the optimal result (perhaps even more than 10) which however can be applied quite quickly as they do not require the long drying times, less than 2 hours between one coat and the next. These finishing methods, just as impregnation, which must rightly also be considered a blank finishing method, are carried out on the blanks before wrapping (whipping), which therefore must be varnished subsequently.

The main difference in the use of polyurethane glues compared to drying oil is that the latter are applied and immediately removed with very little force to allow a layer of infinitesimal thickness to dry. Polyurethane glue, which is extremely viscous and must also be removed almost completely with each pass, requires a certain amount of pressure and energy: therefore, great care is required when working backwards on the tips!

It should also be said that while 8-10 coats of polyurethane glue produce a fairly hard and permanent finish, although perhaps thinner than a classic varnishing, the oil finish will have to be repeated periodically with a maintenance coat, say every year, which also requires very little time and effort.

There was a unanimous positive opinion for the homogeneity and brilliance of the blank finish obtained by Moreno Borriero with polyurethane glue. Discussing it, it was noted that both the glue and the drying oil certainly benefit, in terms of aesthetic result, from a very careful preparation of the blank with abrasive papers or very fine steel wool. This is because both of these products form a film with a thickness much lower than the 50-150 microns of a classic varnishing, and therefore cannot fill any micro roughness still present on the surface of the wood.

An important secondary effect of this reduced film thickness is the perfect preservation of the edges!

Another important note about these finishing methods is their insensitivity to dust problems. The trade-off could instead be represented by an incompatibility with the epoxy used to varnish the wrappings (whippings).

Let's now move on to the methods that make use of the classic "varnish" (1). These can essentially be classified according to the method of application: brush, immersion, pouring, airbrush.

Even if we didn't do it in practice during the demos, it will always be necessary to refer to the main method for varnishing rods: dip tube, also described by Garrison and Carmichael in the "rodmakers bible" as an alternative to the brush.

The varnishes used essentially come from the world of woodworking and in particular from boating. Polyurethane, oleo phenolic, etc. wood varnishes are used, usually perfectly transparent and very shiny (even if they exist in satin or semi-satin versions). For use on rods, the varnish must form a relatively hard film, but at the same time remain flexible to accommodate the flexing of the rod, and must resist without flaking over time. They must obviously offer protection from water and UV rays.

We must therefore consider that nautical varnishes are not specifically formulated to be used on the very small surfaces of the faces of a bamboo rod, but are adapted to this use above all thanks to dilutions which are generally greater than those recommended by the manufacturers for use on large wooden artefacts for which they were designed (hulls, floors, masts, booms, etc.).

An important property of the "varnish" is thixotropy (2), i.e., the property of some fluids to modify their natural viscosity due to a force. Typically, the viscosity decreases as a result of the applied force and returns to the original one when it ceases. In general, thixotropy is a sought-after characteristic for varnishes because it simplifies brush application, but above all it allows the varnish to adhere better to the surface, reduces the risk of dripping and allows a more level and uniform coverage.

This is essential when varnishing large surfaces, especially not perfectly horizontal ones, but it is certainly less important when varnishing the rod. Varnishing the rod with a brush is never done with the energetic back and forth brushstrokes typical of varnishing large surfaces; on the contrary, it is necessary to use a very light hand on the rod.

The thixotropic effect would therefore seem irrelevant in rodmaking and it must be taken into account that the use of relatively high dilutions already significantly reduces the basic viscosity. The viscosity can also be reduced by using a higher temperature, which also has the advantage of speeding up the drying process.

Brush and varnish are the historically oldest finishing method. There are then different nuances and schools of thought depending on the type of brush used (harder or softer, flat or round, wide or narrow), the inclination and rotation of the piece during varnishing, but above all depending on the viscosity of the product used.

The common recommendation for all variants of the method is to take meticulous care in cleaning the brush, which must obviously be of good quality (it seems obvious, but it must absolutely not lose hair) and to give long, light and regular brush strokes on each face, from one coat to the next, without changing direction and leaving subsequent coats to pick up gaps or imperfections.

The viscosity of the varnish (therefore above all the percentage of dilution with solvent) plays a leading role. There are many factors that affect this: the risk of drop formation, thickening of the film, especially on the tip or in the centre of the faces rather than on the edges, accumulations at the wrappings (whippings) and guides.

It might seem that a low viscosity varnish (very diluted) largely avoids these problems, but this is not always true (let's also think about the issue of thixotropy) and above all a greater dilution leads to the need for a greater number of coats to obtain one adequate final thickness.

In reality, the relationship between the dilution of the varnish and the number of coats to give to the rod is a problem common to all varnishing methods. In fact, the varnish must dry completely between one coat and another, say 24 to 48 hours, even longer if it were necessary to treat any grains of dust deposited on the surface during drying with light abrasives.

Excessive dilution could even irreparably alter the characteristics of the varnish, in fact the technical sheets of some products on the market explicitly indicate a maximum dilution which must not be exceeded.

The dilutions we are talking about are generally greater than those recommended for the "conventional" use of these varnishes. We are talking about percentages ranging from a minimum of 10-20% up to 30-40%, but some also use dilutions of 50% and more.

Whatever the dilution used, it is absolutely necessary that the solvent is perfectly compatible and is mixed very carefully, for a long time and without shaking excessively vigorously to avoid the incorporation of micro-air bubbles.

A method seen at the stage, very valid especially for the small quantities of varnish necessary with all the pouring methods, and of rotating for a long time with a very small electric motor (4-6 rpm, the same one used to rotate the segments of the rod) a small container in which the varnish, the solvent, and some steel balls are placed. This method certainly has the advantage of not incorporating small air bubbles which are a typical risk when mixing with sticks or similar things.

Insufficient mixing can lead to imperfect final surfaces, probably due to the "rising" of the solvent itself during drying.

In any case, it is essential that after each coat the rod is hung to dry away from dust and at a temperature not lower than 18°C. A higher temperature reduces drying times, but obviously without exaggerating and risking "burning" the varnish.

For this reason, many people hang the freshly varnished piece in a closed cabinet, possibly also heated.

To obtain a uniform thickness of varnish, especially with the pouring or brushing methods, it may be useful to keep the varnished piece rotating, horizontally and for some time before hanging it to dry.

The very uniform thickness of the varnish is instead intrinsically guaranteed by the immersion (dip tube) method: in this case it is the radial forces that are generated at the free meniscus of the varnish that guarantee its perfect distribution. Another classic problem is the transition to the free surface of the varnish on the coils: here it is necessary to stop for a while the already very slow rise of the piece being varnished (minimum 20 minutes) to allow the varnish to flow and possibly to "break" the veil that was formed in the ring of the guide.

A real, big problem with dip tube varnishing is the large quantity of product needed to fill the tube (even if in reality a very limited quantity is then consumed for each rod). This large quantity must then be stored and preserved over time, perhaps for years. For this reason, there is a lot of room for imagination: there are those who remove the varnish from the tube, filter it and put it back in the can, but there are also those who leave it in the tube, closing it, and taking care to remove the superficial film, if necessary, that has thickened over time. A small refinement is to replace the (little) air at the top of the tube with an inert gas before capping it.

Another problem for many workshops equipped in cellars or garages is given by the small machine to slowly extract the piece to be varnished from the tube, which is not difficult to create, but which simply requires a rather high ceiling.

Maybe think about the possibility of drilling a small well into the floor: someone has done it!

I have grouped under the name "pouring" a whole family of methods which share the characteristic of requiring very limited quantities of varnish, pouring it directly onto the rod rotated with a certain slope (ref. Poratelli article). The varnish must have such a viscosity that it can flow in a "spiral" along the rod, covering it completely without leaving drops.

The parameters that control the perfect success of the method, and which must find a perfect compromise, are the rotation speed, the angle formed by the rod with the work surface, the viscosity of the varnish, the quantity and speed with which the flow of varnish is dripped onto the top of the piece. If things have been done to perfection, the excess that "drips" from the piece, possibly collected in a long tray, will be very minimal.

The most interesting aspect of this class of methods, in addition to the fact of having to prepare a very limited quantity of varnish (a few cc), is that they can be applied after making the wrappings (whipping).

Massimo Paccotti demonstrated an interesting combination of the immersion method and the pouring method: the "lift" which he has greatly improved since some historical attempts by P. Agostini and D. Fiorani. It could also be defined as a “controlled pouring” method. Even with this method the difference between an excellent result and a mess is in the details. I won't say much since you will find a dedicated article and explanatory photos in this same issue of the BJ. It is worth highlighting that the lift requires the creation of a device that is perhaps slightly more complicated than the one that extracts the rod from the dip tube. The advantage is that it does not require double the height and uses, like the pouring methods, a very limited quantity of varnish. It also exploits the phenomenon of the meniscus at the free surface which guarantees the homogeneity of the thickness of the varnish deposited. The trade-off, if we want, is that the method can only be applied to the blank, before wrapping the guides.

Due to the undoubted peculiarities of implementation, I saved for last the method that was illustrated by Daniele Giannoni with a good presentation: the airbrush (the fact of being hosted in an elegant meeting room of the hotel did not allow us to put it in practice).

The airbrush requires some basic equipment (compressor, airbrush, a certain "furnishing" of the room). The varnishing is carried out horizontally on the parts of the rod, with the guides tied and varnished. The piece is rotated by hand face by face, ideally with a single pass of the airbrush. Even though I don't know many who use it, the quality of the results is clearly visible in Daniele's impeccable rods. I believe that to obtain excellent and constant results with this method it is necessary to acquire a certain dexterity and coordination of movements, but this is certainly also true for the brush method and the pouring methods. Also, for this method you will find an article by the author in this same issue of the BJ, so I won't go into much detail here.

My personal reflection is therefore that the method that "following the instructions" guarantees a high-level finish and repeatable results is immersion in the tube.

METHOD	DILUTION	COATS (#)	ROTATION.	SLOPE (deg)	Solo BLANK / WRAPPED	QUANTITY PRODUCT
Tru-Oil	n/a	6-12	no	n/a	blank	1 cc
Polyurethane glue	n/a	6-12	no	n/a	blank	1 cc
Brush		2-6	no	variable	Wrapped	10 cc
Immersion/dipping	10-20%	2-6	no (1)	Vertical	Wrapped	1500 cc (3)
Pouring	20-40%	3-6	yes	10-30	Wrapped	10 cc
Lift		1-2	no (2)	Vertical	blank	20 cc
Airbrush	30%	1-2	no (4)	Horizontal	Wrapped	3 cc

(1) a device is needed that lifts the piece to be varnished vertically very slowly out of the varnish

(2) it is necessary to create a system that slowly slides the varnish container along the vertically suspended piece

(3) 1500 cc (indicative) is the quantity of diluted varnish that must fill the tube, obviously only a very small part is used for each rod

(4) The piece is simply rotated by hand to go from one face to the next

Appendix

Aging of varnish

A practical problem that rodmakers often face, due to the very small quantities of varnish that are actually needed for each rod, is the aging of the rod itself.

A long stay of the varnish in containers in the presence of air translates both into a progressive partial evaporation of the solvent, which could actually be restored in subsequent use after some time, but unfortunately the evaporation of the solvent is inexorably accompanied by the polymerization process of the binders, which absolutely cannot be compensated by the addition of further solvent.

To limit this phenomenon, it is necessary to eliminate or at least limit the oxidation that occurs on the free surface of the varnish. The method proposed some time ago by Alberto Poratelli in the BJ helps us in this direction and is valid for all methods that use a small quantity of product. This involves not opening the can of varnish at all, taking only the small quantities needed from the bottom of the can via a small tube permanently inserted into a small hole in the lid and sealed there. Another excellent method is to divide the contents of the can into many smaller containers filled to the brim.

Another palliative consists in replacing the air in the container, can or directly in the varnishing tube, with an inert gas, in order to block the oxidation of the binders.

Garrison dixit

In his “A Master's Guide to Building a Bamboo Fly Rod” (the famous “rodmakers bible”) Garrison recommends being very careful when using the brush as it tends to trap air between the fibres and transfer it into the varnish in the form of microscopic bubbles. The story of when Pinky Gillum shows Garrison how to varnish with a brush in her laboratory, made up of interminable waits, in silence, for the dust suspended in the air to settle, is very funny. Speaking instead of varnishing the wrappings (to be done as soon as they are completed to protect them from possible damage before completely varnishing the rod), Garrison suggests the use of a needle instead of a brush, which completely overcomes the problem of air bubbles.

In that comprehensive text we also talk about urethane and polyurethane varnishes, tung-oil based varnishes and also shellac based varnishes. Apart from obvious characteristics such as flexibility, and perfect transparency and shine without dominating colours, the different types of varnish can show different characteristics regarding unsuspected details, such as the formation of a more or less convex surface on the faces of the rod, rather than the tendency to accumulate in greater quantities on the edges.

Varnishing problems

The dreaded dust problem, which impacts across all methods that use varnish, must be addressed with specific methods for different types of dust. In fact, there is dust in the strict sense, that is, very small solid or liquid particles suspended in the air, which is further classified as "fine dust" when the particles have dimensions from 1 millionth to approximately 1 thousandth of a millimetre, or "dust" if these are solid particles with larger dimensions, but still such that they can remain suspended in the air. However, there is also a problem which concerns solid impurities of various nature which can end up suspended in the varnish. These include both the dust itself deposited by the air, but above all coarser impurities due to the same tools used to mix, to containers that are not perfectly clean, or even to microscopic granules of dried varnish released by the brushes.

This last category of impurities can be eliminated by frequent filtering of the varnish and by impeccable cleaning of the tools and containers used or by frequently replacing the brush and cleaning it very often and in a truly meticulous manner.

For the problem of dust sticking to the surface of the varnish during the first drying phase (hence the importance of the well-known "dust-free time") as well as reducing the risk by trying to work in a very "clean" environment or prepared for the purpose with some precautions (see also Daniele Giannoni's article on airbrush varnishing) it is very useful to let the pieces dry between one coat and the other in a closed cabinet.

However, any very small surface imperfections can also be removed, once the varnish is WELL DRY, with light passes of very fine abrasive and then repolished with bodywork pastes of suitable grain, woollen cloths, toothpaste or other similar products, always paying close attention to not cause the varnish to overheat. However, even a slight reduction in the original brilliance must be taken into account and the need to wait for the varnish to dry perfectly each time greatly extends the processing times.

There is another category of imperfections in the final result, caused by microscopic air bubbles that may have been incorporated into the varnish especially, but not only, during the mixing of the thinner (for example also when a piece is immersed too quickly in the varnish tube).

If poorly diluted varnishes are used, these bubbles cannot emerge on the surface and therefore cannot be eliminated except with radical varnish stripping.

Even applying the varnish at too low a temperature or in conditions of excessive air humidity can cause very serious problems that are not easily remedied.

There are also problems linked to the imperfect preparation of the surfaces: for example, residues of silicone substances, but also processing dust which remains adherent to the external surface of the blank and may not be completely removed by degreasing with acetone or alcohol. This dust is then mobilized by the applied varnish, especially when it is very diluted, and brought to the surface causing the appearance of diffused stippling effects.

“Varnish” (the Anglo-Saxon term varnish identifies a more specific class of products than the Italian term varnish)

Solvent based varnish, also known as traditional varnish, is composed of a binder, which can be a drying oil, a resin or shellac, and by a solvent, which makes the varnish liquid and easily applicable in practice. It is a self-levelling and transparent wood sealant, although the resins it contains, which mainly derive from natural oils, tend to give it a slightly yellowish colour.

After application, the solvent evaporates into the air, leaving the binder which settles on the surface to be varnished. The drying speed depends on several factors, including the chemical composition of the varnish, the ambient temperature, the relative humidity and the thickness of the applied varnish film.

The drying process occurs in several stages. Initially, the solvent quickly volatilizes, forming a film on the surface of the varnish film. Subsequently, evaporation continues more slowly and the varnish film begins to harden. During this stage, the chemical binders in the varnish film react with each other or with oxygen in the air through a process called polymerization. This chemical reaction is responsible for the final hardening of the varnish film.

Room temperature plays an important role in drying solvent-based varnishes. Higher temperatures accelerate the evaporation process of the solvent and therefore the drying of the varnish. However, it is important to note that drying too quickly can cause problems such as blistering or reduced varnish film quality.

Varnishes are commonly oil-based, but there are also water-based ones. These varnishes were originally designed to protect the masts of sailing boats from water, wind, exposure to the sun's heat and UV rays, but also to resist dimensional variations due to changes in humidity and temperature. Modern polyurethane varnishes, which also exist in two-component formulations, are more resistant to atmospheric agents, have greater surface hardness, and are able to guarantee better adhesion to the support.

Thixotropy

Thixotropy is the ability of a material to become less viscous and more fluid when subjected to a shear force. In other words, a thixotropic varnish becomes more fluid when it is shaken or applied with a tool that applies force to it, such as a brush.

This property is particularly useful because it facilitates the uniform application and spreading of the varnish. When varnish is shaken or stirred, its particles align and separate, reducing viscosity and making it easier to spread.

When the application of force ceases, the thixotropic varnish returns to its original, more viscous consistency (reverse thixotropy or restoration of the structure). This prevents sagging and ensures that the varnish film remains stable and homogeneous on the surface where it has been applied.

Thixotropy is mainly controlled by the chemical formulation of the varnish and above all by the addition of specific additives called thixotropic agents. These agents are added to the varnish to promote thixotropy and improve its rheological characteristics. Thixotropic agents work by changing the internal structure of the varnish, interfering with frictional forces between particles and facilitating flow when a shear force is applied.

There are also solvent-based varnishes that do not exhibit thixotropy and maintain a constant viscosity regardless of applied shear force or movement. These varnishes may be suitable for specific applications where a stable viscosity is desired, for example when very precise varnish film deposition is needed without subsequent changes in its consistency.

For further information - in the Bamboo Journal

System for immersion varnishing in low-height rooms, A. Poratelli, IBRA website, Articles section

The Elevator, P. Agostini BJ #1, October 2008

How do I finish the bamboo rod? (The poor man dip tube), M. Cardamone, BJ #13, July 2014

Save the varnish! A. Poratelli, BJ #16, April 2016

Varnishing the rough piece – a varnish saving method, D. Fiorani, BJ #21, October 2020

Urushi. M.O. G., BJ #25, Maggio 2023

IBRA BAMBOO ROD SHOW

Robert Stroh
rodmaker
from Germany

Making Hexagonal Winding Checks

possible method

by Moreno Borriero
with the collaboration of
Massimo Paccotti e Mirco Forlani

Hexagonal Winding Check

In 2022 the IBRA BOD decided that at the gathering we would have the Big Workshop and as usual we had to decide what demonstrations to have. So together with Massimo Paccotti and Mirco Forlani we decided to make hexagonal winding checks in nickel silver. Sounds easy when you know how but we were completely in the dark about the system. The only thing we knew, was that you needed a hexagonal and conical mandrel (punch). This was easy enough to come by and so we started studying the method.

The only other thing we were certain about, was that the nickel silver winding check needed to be annealed or the process would make it split. Reading around, we discovered that in order to anneal NS, you need to heat it up until bright red and then dunk it in cold water. This operation, contrarily to what happens with iron, makes the nickel silver soft and malleable. We thought we were on the ball now.

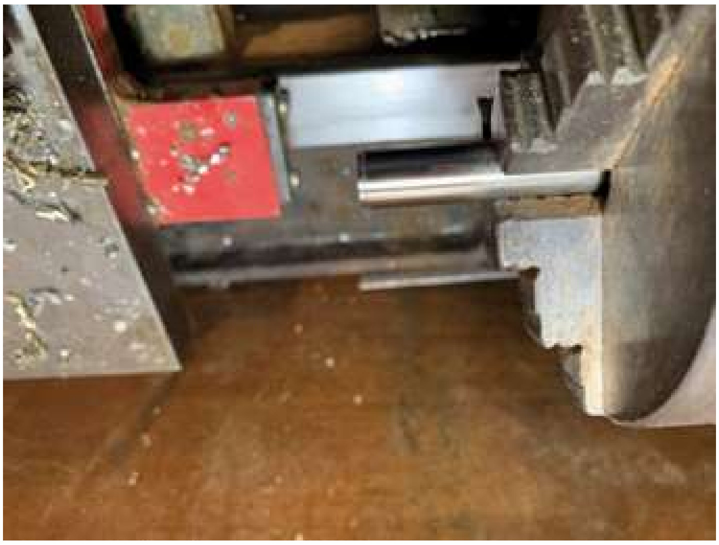
Let's start by describing what you need:

- The hexagonal mandrel (punch) – easy to find on the web
- A round Aluminium ram with a centre hole.
- Some 4 mm thick PE discs with a centre hole (various diameters)
- Drill bits – various sizes – you can get them all sizes but, in the beginning, choose the ones that you will most likely use on you rods. The sizes come in mm by mm.
- A little container with water
- A little metal hook
- A Dremel with felt disc and rouge
- A propane/butane gas pistol
- Round NS stock. The diameter will depend on the dimensions of the rod where the winding check need to fit i.e. just above the cork.

Round bar stock just before the centre hole

Dimensioning the winding check

You need to figure out the right dimensions of the blank winding check and here we need to thank to Mirco's experience as a fitter and turner. He prepared some round blanks in various diameters. This is not rocket science and you can decide the size (thickness) that suits you best. We preferred making a small shoulder at the front part and we did not knurl the ring for obvious reasons.



Shoulder

Winding Check blank

After various trials, Mirco found that the ideal dimensions, or rather the ideal diameter of the centre hole should be that of the face-to-face measurement and the external diameter should be at least 2 mm (0.079") larger than the flat-to-flat size. At first Massimo made a wooden ram which worked well without damaging the winding check during the widening process which involves hammering. This worked well with one or two then it would split or the winding check would become embedded in the wood. Therefore with Mirco it was back to the drawing board and they made an aluminium ram with a centre hole and to protect the winding check from getting "bruised" they thought of making the famous PE discs which we will see later.

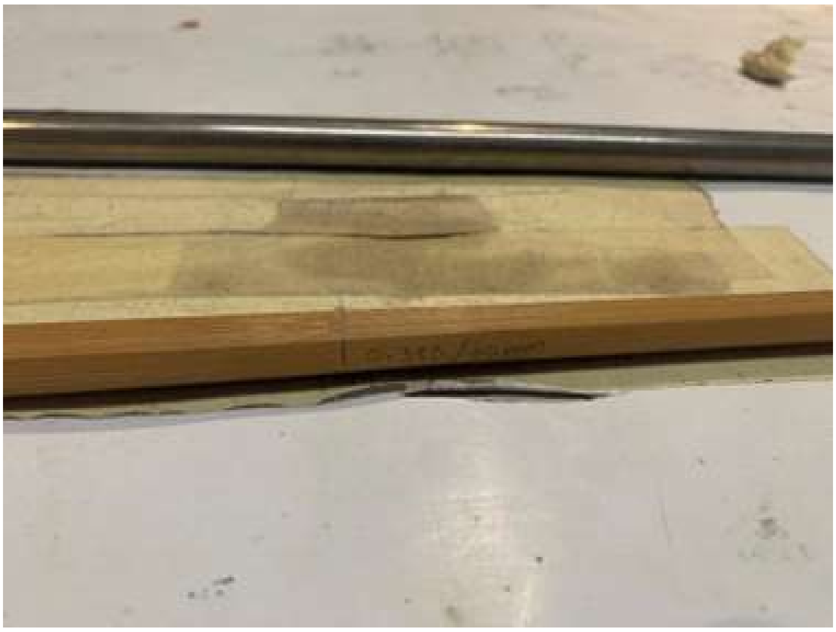
Let's examine the method in our example

My nickel silver round bar stock measures 12mm (0.472")

The dimesons of the rod in the point where the winding check is to be fitted is 10 mm (0.393"). Thus, a perfect match! But only by chance.

The hole must have a diameter of 10 mm or0.393" (flat to flat dimensions; the OD must be larger by 2 mm (0.079")

On the lathe you drill a perfect centre hole of 10mm (0.393") and you turn in the shoulder. In our example we turned a 1 mm long and 1 mm deep shoulder (0,0393"). With the parting tool I cut the rings about 2.5 mm thick (0.098")



Method

Light the propane/butane pistol and hold the winding check with the little hook. You can use small long nose pliers but with the hook it heats up more uniformly.

Heat up the ring until bright red and immediately dunk it in the cold water. You now have a malleable winding check.

Since our winding check must fit on a 10 mm flat to flat, we can measure 10 mm (0.393") and make a mark on the punch This is where we must reach with our ring.

See the 10mm mark near the thumb.

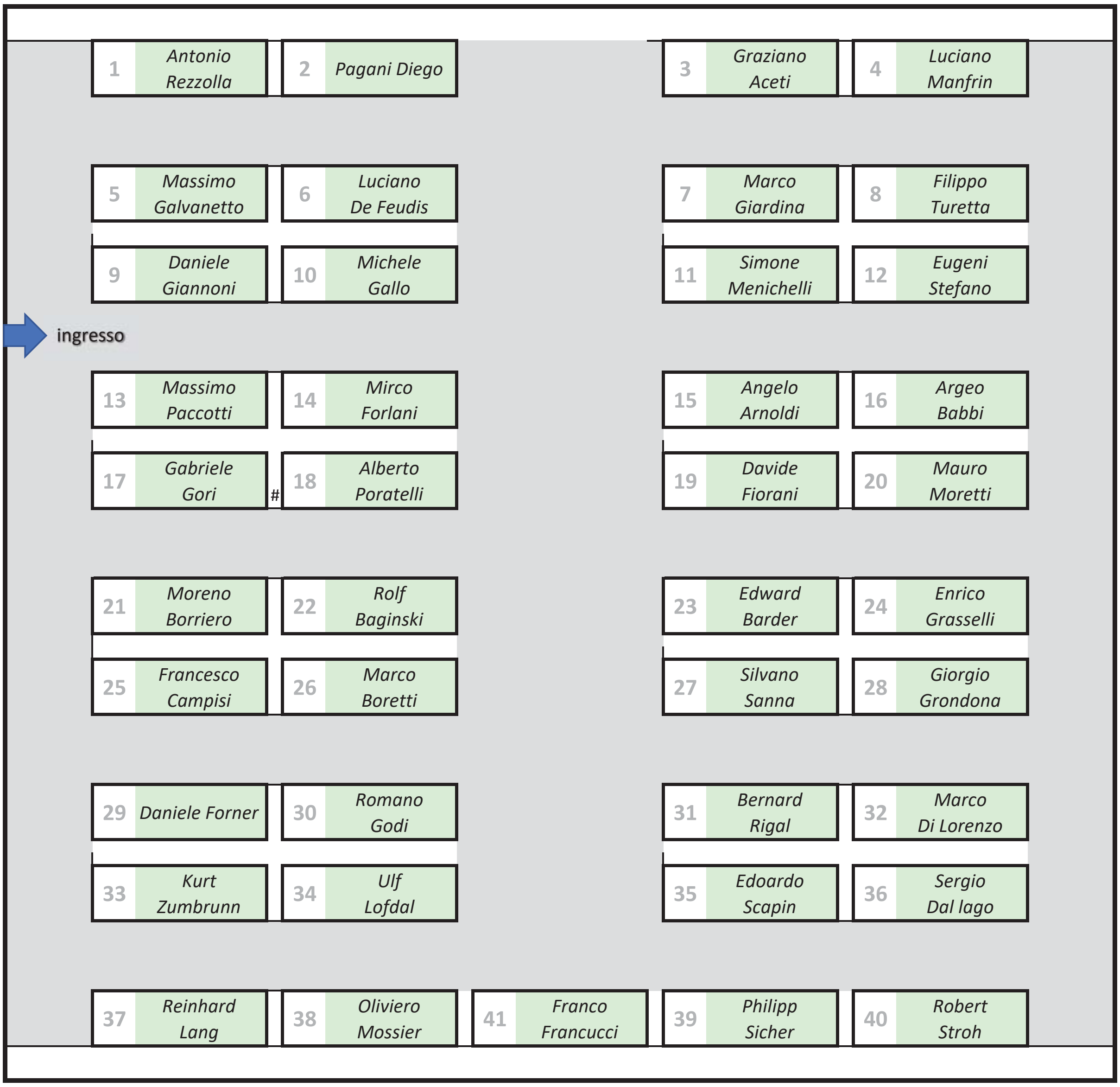
Insert the punch in a vice making sure the base touches the bottom of the vice. Insert the winding check on the punch followed by the PE disc. Place the ram over the punch and using a rubber mallet hit the ram until the winding check has reached the 10 mm mark. After having made a few, I noticed that the ram would get stuck on the punch so I made a bigger hole.

Result

As you can see the winding check is now hexagonal. We had mentioned to not knurl and it is quite logical. The deforming would deform the knurling too

At this point the winding check fits perfectly as can be seen but it is a little dark due to the heating process. If you need to use it dark plated it is perfect after a slight polishing. Instead, if you need it bright, you can polish it with the Dremel and some rouge.

The next step is to make the quadrate ones.



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