

Stability in Single and Double Reeds

Construction methods and coatings for partly and completely natural reeds

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Dry-blown Double Reeds

Dry-blown instruments are bagpipes such as the Irish uilleann (or "union") pipes, Scottish smallpipes, Northumbrian pipes, and a number of European bagpipes whose air is supplied not by mouth but rather from a bellows which is pumped by the player. Therefore the relative humidity of the air can range from 100% down as low as 10% or less in desert climates or elsewhere indoors in heated winter air. The stiffness of the blades can change dramatically over such a range. Even the dimensions of the reed can change, causing intonation problems for all pipes and serious tuning problems in pipes such as the uilleann pipe which jump into the 2nd octave.

Construction Methods

The most common advice for improving reed stability is to make the reed slowly over a period of days or longer. Most methods of reedmaking create considerable stress in the blades when they are tied onto the staple. The cane will "creep" or permanently deform over a period of time until most of the stress is relieved. The amount that the cane will deform depends on the individual piece of cane (especially its hardness or stiffness) and on the humidity of the air in which the reed is stored and played.

The reed may be finished to a preliminary playing condition very soon. However it should be left in a somewhat strong condition, not fully scraped or sanded, for some time while stresses are settling out. Pipers and reedmakers expect all double reeds to collapse slightly during the break-in period, and so they learn to finish their reeds to be a bit strong and slightly out-of-tune in appropriate ways which will be largely corrected by the natural breaking-in process.

If the reed is to be played in a variable climates, it should be played in different temperatures and humidity ranges before final scraping or sanding. Most pipers these days feel that the relative humidity is the most important factor, which causes dry-blown reeds to change. No reed can play its best through an extreme range of humidity but every reed will need to work in a modest range which changes 30% to 40%. Increased humidity causes the reed to behave as though it were scraped thinner. Therefore the reed must not be eased and thinned any more than is desired for the highest humidity expected for it.

One safety precaution is advisable when exposing new-ish reeds to changing humidity. Any wires or bridles used to regulate the blades' elevation (the amount they are open at the lips) should probably be eased just a little bit as a routine step when putting the reed or pipe away. The blades will be tending to resist the bridle but as humidity changes, so does the stiffness of the cane, and it may permanently deform into a geometry which is either too closed. If so, when the bridle is later opened, the sides of the reed may leak, indicating that the reed is ruined or needs serious attention. As a reed ages and has been exposed to a range of humidity, it becomes increasingly stable, and the changing of bridle or wire tension can be minimized or eliminated. The old pipers' lore is that nothing should be changed once the reed is put into service, but of course old-time pipers lived with little central heating and in a moderate oceanic climate.

Some pipers believe that a reed can take up to a year to become fully stable. Most of the initial stabilization is probably due to deformation and stress relieving. However during a year of playing and handling it is also very likely that the pores of the cane are gradually becoming partly blocked with dust, tobacco smoke and oils from the fingers. This brings us to the topic of deliberately coating or treating the cane to achieve greater stability from the outset.

Cane Treatments

Over the centuries a variety of substances have been applied to cane to make it more stable, although this is not necessarily widely practiced among pipers. I have been told of such varied substances as candle wax, cane-bark wax, shellac, skin oil, cooking oil (even deep-fat frying finished reeds!), tung oil and various furniture or wood oils and sealers. Still, none of my printed references for Irish uilleann pipes mentions any form of cane treatment, and few pipers have admitted to me that they use any.

Safety Caution!

Many oils and sealers are toxic or poisonous! Obviously nothing toxic should be applied to a reed which is played or tested in the mouth. Some substances have toxic fumes and these should be allowed to dissipate before testing by inhalation as is often done with dry-blown reeds. A bassoonist has informed me that there are oils and sealers intended for use on babies' furniture or wooden kitchen utensils, which along with some food oils might be wise choices for treating reeds which are likely to come in contact with the mouth. Read labels and be careful!

My Experience

I first treated a reed not to stabilize it but rather to restore its flexibility when the weather turned extremely dry in winter. I had seen one reedmaker apply natural sheep lanolin to his reed in winter air, believing it to restore some of the flexibility it had in more humid air. Extremely frustrated, I immersed the blades completely into almond oil which is used by many pipe and other woodwind players to protect the wood. Many pipers believe the oil restores flexibility, which is especially important when returning neglected or antique instruments to playing condition.

To my astonishment, after I blew excess oil out of the reed and wiped the exterior clean, there was virtually *no difference* in the sound, and to my dismay, very little improvement in the cane's flexibility. I was soon able to notice a distinct reduction in the reed's response to humidity changes and so my experimentation was launched.

I next experimented with furniture "lemon" oil and then wood sealer, and have settled on wood sealer for now. I use my local hardware store's equivalent of Thompson's Water Seal, a very thin petroleum oil which is intended for waterproofing wood for boat docks and other outdoor construction. Lemon oil is said (according to manufacturer's instructions) to require periodic recoating when used on furniture, and I felt that the oil's effect was gradually disappearing from my reeds, which is why I switched to the more permanent outdoor wood sealer.

I have also tried other substances such as varnish, nail polish and super-glue, all of which caused noticeable changes in the stiffness and behavior of the cane. These made both slips and finished reeds more difficult for me to understand so I did not pursue their use. I also note that some artificial Highland bagpipe single reeds (for drones) are made with varnished tongues which are prone to catastrophic failure if moisture from the breath eventually penetrates the outer barrier and softens the cane.

Application Methods

There are 3 obvious methods of applying sealers to the cane.

1. Light application onto the surfaces
2. Immersion of finished blades or fully assembled reed
3. Thorough soaking of cane prior to manufacture

Surface application can help considerably but almost certainly needs to be done to the interior as well as the exterior. Obviously this must be done before the reed is assembled or else it must be taken apart for sealing and rebound after sealing. This is a conservative approach which can be tried on a well finished and broken-in reed (with care if the interior is to be treated, and of course provided it is *not* your only good reed!) since many treatments in such light application seem to

have little effect on the playing properties of the reed. Of course with light treatment the improvement may be quite modest, and several successive light treatments may be advisable.

Immersion of the entire head will coat both interior and exterior surfaces thoroughly. This could be dangerous for shellac or other substances too thick to drain away sufficiently or which could act to glue the blade edges together. The outdoor wood sealer and lemon oil seem to have no such properties. It is probably wise to loosen any bridle or wire blade binding very slightly in case the treatment softens the cane, which would otherwise allow it to collapse. A thorough but very brief immersion will probably limit penetration to the surface of the cane, which may effectively seal it without affecting the bulk of the cane. Wood sealer instructions advise that porous surfaces (which clearly includes cane) may be sealed 2 or even 3 times provided 48 hours or more are allowed for drying between coats.

Some makers of reeds for some European bagpipes are reported to pre-soak slips for up to 2 weeks in neatsfoot oil before making reeds from them. It would seem advisable to allow a protracted interval for evaporation before proceeding to make reeds from thoroughly soaked cane, so that the substance becomes stable before being subjected to the stresses of binding and scraping.

My Preferred Double-Reed Method

- Finish reed 99%, break-in traditionally for days or weeks through varying climate.
- Immerse entire double reed head into outdoor wood sealer, up to binding, for a few seconds.
- Withdraw reed, let drain for a minute onto absorbent paper or cloth.
- Blow double reed through staple to move excess sealer out through lips.
- Wipe exterior dry.
- Reed may be used immediately but will be more stable after 24-48 hours.
- Acclimate reed 1+ days to highest expected humidity at next opportunity.
- Scrape as much as humidity will allow, to make reed freer in drier conditions.
- Wipe scraped or sanded areas with sealer.

Single (Drone) Reeds, Dry or Wet Blown - Treatments

The all-natural cane reeds can be sealed by immersing them briefly and draining after manufacture. If using glue-like treatments, prop tongue a bit higher than usual and clean base of tongue area with very fine absorbent paper & leave tongue up until substance dries enough to eliminate danger of gluing. Reeds can be played immediately but will be more stable after treatment dries. A natural single reed can also be immersed for prolonged periods (depending on the treatment) before the tongue is split. Again it seems prudent to allow a prolonged drying period before proceeding.

Artificial single reeds (either natural tongues fastened to metal or plastic bodies, or artificial tongues fastened to wood or cane bodies) can also be sealed by immersion after manufacture. Again, sealers which can act as glues are dangerous and should be managed as shown above for cane reeds.

Since artificial reeds are assembled from separate parts, it is easiest to treat porous natural components before final assembly. This is especially true for the undersides of natural tongues which are hard to reach after the reed is assembled. The top surface of a natural tongue usually needs some scraping during break-in & fine tuning. If the tongue was not thoroughly pre-soaked before assembly, any scraped areas can be easily treated with a light wipe.

As with double reeds, treated single reeds may accept more scraping or other adjustments that are ordinarily suitable for high humidity, with less danger of misbehaving when conditions dry out.

Wet Blown Double Reeds - Treatments

At present, wet-blown reeds are often sold by vendors and are normally supplied in a preliminary state of finish. Highland bagpipe chanter reeds for example usually require an extended period of blowing-in. The reed is regularly exposed to moisture in the instrument, and often requires pinching to prevent the lips from opening excessively, perhaps as often as every few minutes.

For these reasons I have not yet attempted to seal wet-blown double reeds. My prediction, based on experience, is that these reeds would best be broken-in normally before sealing. Furthermore I would expect that the piper could, in fact should, further adjust the reed only when it is relatively dry. Usually such reeds when broken-in tend to be sharper and stiffer when first played than after a long warmup. A sealed reed will likely respond less to warming up and so may need to be finished more thoroughly. The results I expect are that the reed will tolerate a very great range in atmospheric humidity & temperature, will normally be ready to play after a very short warm-up, and will remain playable for much longer intervals than before.

If the cane is presoaked in sealer thoroughly before manufacture, I would expect that it could be gauged thinner initially and finished to an easier initial strength since it will be less subject to swelling and settling-in than a reed made of raw cane.

Results

Wood sealer is not an impenetrable barrier to moisture flow, merely a significant retardant. Reeds still behave as natural reeds always have. There may be changes in tone & tuning but they are much less than experienced by switching to artificial cane substitutes. Reeds will still stiffen and shrink upon prolonged exposure to low humidity and will still soften and expand upon exposure to high humidity. For this reason I do not believe that wood sealer is an answer to annual climate change. However, treated reeds appear to react much more slowly to humidity changes. Reports from pipers seem to be confirming my experience that a set of treated reeds may be able to perform successfully where untreated reeds would fail, in air that is much drier or more humid than they are meant for.

I leave this matter to more expert players and experimenters to help decide whether sealers, oils or surface varnishes are best for different types of bagpipe reeds--or if this practice is detrimental to the fine tone desired by expert players, or if I am imagining the benefits entirely!

Source: <http://www-bprc.mps.ohio-state.edu/~bdaye/reedstab.html>

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