



PROPER MUSICAL INSTRUMENT CARE AND EMERGENCY REPAIR TIPS FOR BAND DIRECTORS

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Taking Good Care of Your Musical Instruments



Taking good care of your instrument will not only save you money on repairs, but it will extend the life and playing potential of your instrument. These are a few of the steps you should take on a regular basis to keep your instrument in shape. They might seem obvious, but I see instruments come in with repair issues that could have been prevented with just routine maintenance and careful handling.

General Care of Your Instrument:

- Be careful when opening the case. This may seem obvious however, instruments are often damaged because the case was opened upside-down or in a rushed haphazard manner. Students should place their case on the ground in front of them with enough room to open it. This is usually on the floor in front of their feet. Students should be careful in the assembly of the instrument not to bend keys or force anything. (see the section on instrument assembly).
- Take care of your case. To provide proper protection you must take care of your case. If the hinges or latches are broken, the instrument can fall out of the case while you are carrying. If you don't keep your case in good condition it may cause completely preventable damage to your instrument. Some handles, latches and hinges are replaceable by your local repair shop or a luggage shop that does repairs. If you cannot fix the problem, consider replacing the case. Keep in mind that hard cases are the best option to protect your instrument.



- Keep everything in its place. Most cases have compartments for loose items such as reeds, swabs, valve oil etc. Loose items can become lodged in the instrument rendering it unplayable. If there is no compartment, consider using a small zippered eyeglasses case or draw string pouch to store loose items. Mouthpieces should be placed in the designated area of the case. They should never be allowed to be loose in the case to prevent unnecessary dents. Method books and music folders should never be shoved in the case with the instrument. The case is made to hold the instrument in one way and one way only.
- Never put your horn down on a chair, the floor. Eventually someone will step on it or sit on it. If you do not have a proper stand, take a minute and put it back in the case. This is especially important if you plan to walk away even for a moment. Do not assume it won't happen to you. Even leaving it momentarily on a piano during a break can be dangerous. Be responsible for where your instrument is at all times. Do not hold it with one hand or swing it while walking. Have a solid grip on the instrument with both hands if possible. Keep in mind that some parts of the instrument detach from the instrument. Saxophone players should never assume that the neck strap will hold while carrying the instrument.
- Never eat just before playing your instrument. No one should eat, drink or chew gum before or while playing their instrument. If you have to eat lunch before band, rinse your mouth before playing your instrument. Residual food particles will accumulate inside the instrument.
- If there is a repair issue seek professional help. Do not attempt to repair musical instruments by yourself. Parents and students and sometimes instructors who attempt to DIY repair to save a

few dollars, often cause more damage ultimately raising their repair bill. Professionals have the tools and experience to take care of your instrument. Let them do it!

- Always wipe off any perspiration or fingerprints with a soft untreated cloth after playing your instrument. The oils and perspiration can eat away at the finish over a period of time. Make sure the cloth is untreated and use no abrasives on the instrument. Just wipe it clean. Flannel from a fabric store is cheap and readily available.

Proper assembly of your instrument:

- Woodwind Instruments should be handled very carefully during the assembly process so keys do not get bent in the process. Every effort should be made to avoid touching the keys while assembling. The keys bend easily They should only be touched when the instrument is actually being played if possible.
- When fitting the joints together, use a slight twisting motion while pushing the joints straight together. Never use a side-to-side rocking motion - this may or bend the tenon on a flute or saxophone. It can also crack the tenon on a clarinet. This type of damage will cause the joints to wobble back and forth and leak even while the instrument is assembled.
- When the upper and lower joints of a clarinet are fit together properly, they align to activate the bridge key which is an alternate fingering for Bb/Eb. Make sure to lift the bridge key when assembling this center joint to make sure they do not bend during the process.
- If the joints are hard to put together, use a little cork crease to make it easier.
- Brass instrument mouthpieces should be inserted into the lead pipe and given a slight quarter turn to keep it in place. These mouthpieces and lead pipes are built to a specific taper. Never pop or force mouthpieces into place. This is usually the root cause of stuck mouthpieces.
- When fitting slides back into the instrument make sure they are parallel and inserted at the same time.

Maintenance Practices for Brass Instruments

Daily:

- Oil the valves at least once daily when you sit down to practice. This will keep them in good working order and will help improve fingering technique. Remember you can only play as fast as your valves will allow you to. Use regular valve oil for this.
French horn players, do not use "key" or "rotor" oil. This type of oil is much too heavy for rotary valves. Use rotor oil for oiling the mechanical linkage only. Your initial impression may be that daily oiling is excessive, however the oil is light and evaporates the best oils are not residual. After removing the valve caps and applying oil to the top bearings, don't forget to oil the back rotors.

Weekly:

- Grease your slides at least once every week or so to insure they move freely. Remove the slides and wipe off any old grease and re-apply a thin coating of grease with the tip of your finger on each slide. Replace the slides into the tubing and be sure to remove any excess grease.
- Using a mouthpiece brush and snake, clean out the lead pipe and mouthpiece. This is important as debris will build up in these areas.

- If you have a piston style water key don't forget to oil it too.
- If you have mechanical linkages this is a good time to oil them. Use the heavier key or rotor oil. This will not only keep them working properly, it will help to reduce some of the noise associated with mechanical linkages.

Quarterly to Yearly:

- Each year your instrument should get a thorough internal cleaning at the repair shop. Removal of the corrosive build up is essential to keep your instrument in good shape and free blowing. This is also a good time to get any miscellaneous dents or repairs you need to be professionally addressed.
- In between the yearly professional cleaning, it is advisable to give your horn a bath. Remove all slides and valves from the horn. Keep the parts in order where they cannot be disturbed until you are ready to reassemble. Some manufacturers do not mark the parts. Soak it in warm soapy water. Make sure it is not hot water. Carefully brush out any loose debris with a snake, rinse clean, reassemble and apply slide grease and oil.

Maintenance Practices for Woodwind Instruments

Daily:

- At least once daily when you sit down to practice, check to see if you need to apply a cork grease. If necessary, apply by rubbing a small dab of grease into the cork. This will help to seal the joint and keep the cork supple and less likely to crack or break. Do not over grease.
- After playing, be sure to remove moisture from the instrument by using a swab. I do not recommend "shove it" for this purpose.

Quarterly to Yearly:

- Apply Key Oil to rod hinges. Be sparing with the amount you use. Too much oil may attract dirt and slow down your mechanism
- If you play a wooden instrument, bore oil should be applied. Use a designated secondary swab to coat the inside of your instrument with bore oil. This should never be the one you use for removing moisture after you play.
- Periodically you should take the time to check your pads for rips or tears. Damaged pads should be replaced.

Common Emergency Repairs for Woodwind Instruments

LOOSE PADS: In an emergency situation when a pad comes loose the best option is to use rubber cement. Be sure to place the pad in its original position in order to maintain the "seat" on the pad. Place a little glue between the pad and key cup. Press and hold in place a minute or two until set. Remember this is not a permanent repair. It is only meant to get you through a performance. The use of rubber

cement is ideal for this purpose because it is easy to use, easy to remove and does not require a heat source.

WORN PAD LEAKS: If a small pad like clarinet or flute becomes frayed, obviously, it must be replaced. However, in an emergency situation, simply cut a scotch tape and place it over the entire pad area. This will allow the pad to seal and get the player through a concert.

STICKY PADS: Pads may become sticky for various reasons. The best approach is to use rice paper like cigarette paper (remove the glue side of the paper), Place the paper under the pad, depress the pad with a moderate amount of tension, and slowly draw the paper out from under the depressed pad. Repeat this process several times. Be careful not to use too much tension with delicate pads, such as those on the flute, clarinet or oboe. Although some old books recommend the use of dollar bills for this purpose, DO NOT! The paper and ink used for money is not the same as it was. If you try with new money, you will be making the problem worse by leaving residual deposits on the pad.

LOOSE ADJUSTMENT SCREWS: Adjustment screws affect how the keys are closing. If a pad is not fully closing, check for an adjustment screw. If fine adjustment screws continuously become loose, put a very small drop of clear fingernail polish on the screw heads to keep them from unscrewing due to instrument vibrations.

LOOSE CORK JOINTS: Clarinet cork joints may come loose. In an emergency a missing cork joint can be created by winding waxed dental floss until the desired thickness is reached.

DISCONNECTED SPRINGS: If you have a spring hook it is easy to reposition the spring. If you do not have a spring hook, the next best thing is a small crochet hook. These are easily found in craft sections of stores including Walmart and Michaels. If you are patient and careful, a small screw driver can also be used in a pinch.

BROKEN SPRINGS: If a needle-type spring breaks, it should be replaced by a professional. In an emergency situation, a rubber band may be used by attaching it in the best manner possible to create enough tension to hold the key open or closed until a proper repair can be made.

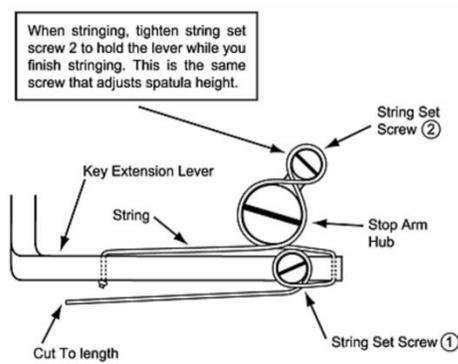
BROKEN LIGATURE: If a ligature is broken and unusable to hold the reed on the mouthpiece securely the simple fix is to use rubber bands. Velcro tape may also be used to create a ligature. To make an emergency ligature out of Velcro, cut two lengths of Velcro tape approximately 2"-3" long, depending on the size of the mouthpiece. Attach the two pieces of Velcro together with an overlap of about one inch. Place the overlapped portion on the table of the mouthpiece, where the reed will go. Then, snugly wrap the Velcro around the mouthpiece, fastening the other ends together on top of the mouthpiece. Next, slip the ligature up to allow the heel of the reed to be slipped into place. Finally, when the reed is in position, snug the ligature down over the heel of the reed into place. The added thickness of the reed will create enough tension on the Velcro to hold the reed securely in position.

NOISY KEYS: A major performance distraction is key noise. Surprisingly, simple key noise, including roller key noise, can be virtually eliminated with the use of oil. Key oil is fine; however, the use of heavier weight oil, such as 3 in 1 brand oil or Marvel Mystery Oil, is recommended (for larger instruments, such as the saxophone) in that it evaporates more slowly. Use only the slightest drop on each moving part, wiping away any excess with a tissue.

Common Emergency Repairs for Brass Instruments

LOOSE OR BROKEN FRENCH HORN STRING: Think of the pattern as a figure 8. To begin, loosen the string screw and rotor stop screws about $1\frac{1}{4}$ turn. Thread the string through the hole closest to the bend in the lever arm. Run the string between the lever arm and the rotor stop arm- shaft. "Start the figure 8 between arm and rotor stop" Bring the string around the rotor stop arm between the string screw and stop arm shaft. Bring the string around the string screw forming the top of the "eight". Thread the string under itself. This forms a loop that will pull taught to the screw. Set the string securely under the string screw. Gently tighten the screw to hold the string in place. Finish the figure eight by bringing the string around the opposite side of the stop arm post bringing it under itself once again. Pull the string slightly to take up any slack and loop the end of the string around the lever-arm string screw.

French Horn Rotor Stringing Diagram



Gently pull taught (not tight) and tighten the lever-arm string screw to hold firmly in place. Do not pull too tight, as that will cause binding and slow valve movement. Continue to the end of the lever arm. Thread it through the hole in the lever arm. Finally, adjust the spatula height to the other levers. If the lever is higher than the other levers, press it down with your left hand. While holding it down, loosen the rotor-stop string screw slightly. As you loosen the screw, it will allow the string to slip around the screw, lowering the position of the lever. Tighten the screw. Release the lever. Check the alignment with the other levers. If it is still slightly too high, repeat the process until even.

If the lever is too low, place your left hand finger on the lever holding it in position. Slightly loosen the rotor-stop string screw. Gradually lift your finger allowing the lever to move to a higher position. When it seems to be in alignment with the other levers, tighten the screw.

Some people like to use a stringing jig for re-stringing valves. This is not necessary. Do not worry if re-stringing your valves feels awkward at first. After stringing a few valves, the process becomes easier and takes only a couple of minutes per valve to complete.

One important reminder Monofilament the most common fishing line is not in any way suitable for stringing French horn valves. It is hard to work with. It slips out from under the string screws when tightening. It gives the levers a slow, sloppy movement and a very spongy feel due to stretching. Never use this string unless nothing else is available in an emergency. If you have this type of string on your levers replace it immediately.

When restringing a horn with a hinged lever arm, it is best to run the string under itself as you finish the bottom of the figure eight.

LOOSE WATER KEY CORKS: Loose water key corks can be temporarily held in place with rubber cement. DO NOT USE Superglue. It doesn't hold well and takes a lot of effort to remove and clean up before a new cork can be installed. This may end up costing more money in the long run

BROKEN BRACES: Loose braces can be held together using zip ties. It is important to secure the broken brace as soon as possible to prevent other braces from shifting and breaking as well. It is not as

unsightly as tape. This will keep the damage to a minimum until it can be properly secured and repaired by a professional. Again, DO NOT attempt to glue the brace with superglue. It will not hold the brace in place. The glue will ruin your lacquer and the extra cleanup efforts before the brace can be properly soldered will add to your repair bill.

TUBING LEAKS: If you suspect there is a leak or loose joint, you can temporarily seal it with electrical tape in most cases. You will need a piece long enough to circle the area 3 times. The first time pull the tape tight against the instrument to seal the leak. The second and third wrap, use gradually less pressure. This will prevent the tape from coming loose until it can be taken to the shop to be repaired. Electrical tape works much better than duct tape for this situation.

STUCK SLIDES: The safest method to pull a slide uses a rag or small piece of rope threaded through the slide crook. This gives a more efficient way to exert a stronger pulling force to the slide. One difficulty

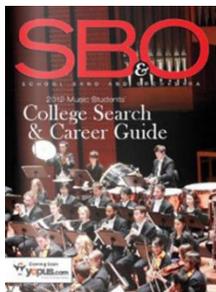


of this method is applying the pulling force in a straight line with the slide tubes. On the French horn, the bell is usually too close to some of the slides. If pulled at an angle, you could break braces or bend tubing. If you want to try this, do it only with slides that are clear and have no obstructions. Thread the cloth through the slide crook. Hold the instrument with one hand. Grab the end rag four to six inches from the slide crook. Pull the rag taut, and check the clearance from other parts of the instrument in the direction of the pull. Gripping the cloth firmly, move your hand towards the slide and then quickly

away in a straight popping motion. The fast and sudden popping motion of the cloth exerts more force than pulling by hand and is more likely to be successful. Repeat the process two or three times. If the slide has not come out stop and examine the slide. If one side is loose and the other is still stuck, do not continue with this method. It can result in bending the slide tubing. Take it to the shop.

MISSING FRENCH HORN ROTOR STOP BUMPER: A small piece of pencil eraser will substitute nicely for a missing cork or rubber rotor stop bumper until a new one can be installed.

BROKEN WATER KEY SPRING: If the spring is weak or broken on a traditional style water key can be held closed with the use of rubber bands. Remember to remove the rubber band at the end of the performance as the components of rubber band can tarnish silver and have a reaction with some lacquers.



Below I have included reprints of articles originally written for School Band and Orchestra Magazine to cover some overlooked maintenance practices that will help to improve the playability of instruments and improve the overall intonation of a group. Along with an article on storing instruments over the summer.

Band Instrument Intonation Maintenance and Summer Storage

(A series of three articles originally written and published in School Band and Orchestra Magazine)

By Glen Perry

Part 1 - Brass Instrument Intonation Maintenance

So, your classes are underway. The music is on the stands. And though it seems that some of your students have forgotten which end of the horn to blow into during the summer months, you carefully and patiently remind them of the important fundamentals of playing a wind instrument. (Technique, breathing, posture, embouchure, just to name a few.)

There are however, a few important details that often go unnoticed by directors. (These are assuming that the student in control is proficient in the necessary skills to play in tune and maintain a steady pitch.)

- The ability of the instrument to play in tune.
- The ability of the instrument to go from one note to another smoothly and quickly.

These two factors can greatly affect the overall tuning of the band as well as the ability of the student to develop proper technique on the instrument. Although students don't always realize there is a problem with the instrument, especially the beginners, it is important that the teacher does. Often there are students who just need a little extra help. But there are also those students that are doing everything right, but the instruments will not allow them to progress. This will ultimately inhibit the progress of the entire group.

Tuning a brass instrument is much more involved than pulling or pushing a few slides. Assuming the player is doing his or her part to play in tune, he or she will improve only to the limits of the instrument. We all know some instruments that are of a better quality than others, but there are factors that affect all instruments regardless of brand or level. Dents in the tubing will make an instrument sharp. Also, the placement of the dent will affect one note differently than others, especially if the dents are in the lead pipe. When the budget allows, these dents should be removed.

Dirt and corrosion in the lead pipe can build up slowly and often goes unnoticed by the player. This is a problem common to students and professional player alike. One horn that came into my shop recently suffered from this. The owner of the horn complained of restricted feeling and was having trouble with intonation on certain notes. When the lead pipe was cleaned with a brush, a pile of "green goo" $\frac{3}{4}$ " tall and about $1\frac{1}{2}$ " around came out. That much mass in a French horn lead pipe made the instrument play with very thin tone and no resonance. Tuning that instrument was nearly impossible. When the instruments first come out of the case the inside of the bore is dry. The buildup of dirt and corrosion is, in effect, dehydrated. As the moisture from the player's breath makes its way through the instrument, it re-hydrates this buildup. Sometimes a swelling occurs making the bore even smaller as time goes on. The solution to this problem is easy and cheap!

The difference between a medium bore and a large bore instrument can be as little as .003". Many instruments have over twice this thickness in debris and contaminants coating the interior surfaces. In addition to making the instrument feel tight, this material can interfere with the valve and slide action.



First, give the instrument an internal cleaning, or a "bath".

- Fill the instrument with warm water mixed with a few drops of degreasing dishwashing detergent like Dawn.
- Let it stand for a while. This will let the dirt and corrosion soften.
- Carefully remove the valves. Be sure to lay them out in order where they will not be disturbed. The valves are not interchangeable and are not always marked by the manufacturer. It is important that they be replaced in the same order.
- Brush out the bore with a brass bore cleaner (snake.) Don't be surprised what comes out if this instrument has not been cleaned in a few years or is shared by multiple students. Don't forget to snake the tubing as it comes from the valves and out through the bell.
- After cleaning, the instrument should be well oiled and greased.

An instrument that is played 30 minutes a day, six days a week should be bathed or cleaned out every 6-8 weeks.

This process will remove large amounts of the internal dirt and corrosion, but not necessarily all of it!

From time to time, the instruments also need to be cleaned with a mild acid solution. Some band directors and older repair manuals have advocated the use of muriatic acid. **It is not recommended that you try using this yourself for the following reasons:**

- As a cleaner it is less than adequate.
- It will attack the solder joints in the instrument.
- It will attack the zinc in the brass, leading to copper spotting.
- It will etch the inner surface of the instrument, leading to faster build-up of dirt and corrosion in the future.
- The fumes are nasty and very hazardous to your health.
- It will cause iron and steel springs and screws, such as French horn lever rods and springs, to rust and break.
- On less inexpensive instruments where the manufacturer has used chrome instead of nickel plating on the valves and inner slides, muriatic acid will remove or strip this plating from the instrument.

For this type of heavy cleaning, your local repair technician has the proper equipment and many other choices of cleaners available to them.

At the repair shop, chemical cleaning removes these heavier deposits of old oil, grease and corrosion and plaque deposits from your instrument. During a chem.-clean, the instrument is disassembled, degreased, and soaked in mild acids to dissolve any deposits and brighten the metal. The instrument is thoroughly rinsed, neutralized. Neutralization is a very important part of working with any kind of acid and brass instruments. All tubes are snaked or brushed by hand to remove any stubborn deposits. The instrument is reassembled with fresh lubricants.

Most professional musicians that play their instrument a lot have a chem-clean performed at least once a year. For school situations it is recommended that instruments be professionally cleaned at least every other year as budget allow on a rotating schedule.

Valve port alignment is often overlooked by musicians as a source of intonation difficulties. There is more to working valves than just the up and down motion of the piston or the side to side motion of the rotor. Since the valve cannot be seen, the port alignment is often taken for granted. Mis-aligned valves can make some notes sound sharp or thin and non-resonant. Recently, a college student brought her French horn into the shop complaining that the notes from E on the staff to low G were not playable. She had very little control in this range. The problem was port alignment of her valves. With a simple adjustment, the horn became free-blowing and equally resonant throughout its entire range. The student is not always able to tell if there is a problem, so it is a good idea if the director gives the instruments a quick check. Here are a few telltale signs of miss-alignment:

Piston Valve Instruments

- Finger buttons are mismatched.
- Finger buttons or levers are not level when the valves are at rest.
- Valve caps are mismatched.
- Valves make a clicking or clanking noise when they go up or down.
- The intonation varies drastically from one octave to the next.
- The instrument is under heavy use by multiple students during the school year.

If any of these statements are true, chances are your valves need adjustment. The easiest way to check valve port alignment in a piston valve instrument is to use a valve mirror. (If you do not have a valve mirror, you can easily make one by going to a craft store and purchasing a small decorative mirror with a diameter smaller than a half-inch. These small pieces of plastic mirror are usually used in the decoration of T-shirts. Glue the mirror piece to the end of a stiff piece of wire about six inches in length. The stiffness should be similar of that used in a wire coat-hanger. Once it is dry, bend the wire so that the mirror is at a 45-degree angle. Use this tool to check the port alignment of your piston instruments.

- First, remove the second valve.
- Then remove the bottom cap from the casing.
- Insert your mirror through the bottom of the valve casing, while looking through the top of the valve casing.
- Face the mirror towards the first valve.

- Look for the port between the first and second valve. The valve should be aligned perfectly with the port so that there are no overlapping edges showing.

If there is a misalignment, you must adjust the amount of felt and cork between the top of the valve and the underside of the top valve cap. The amount of the misalignment is the amount of felt or cork that should be added or subtracted to align the valve.

Now, depress the valve and check the alignment again. This time additions or subtractions should be made either to the top of the valve cap or under the finger button, depending on the design and brand of the particular instrument.

To check alignment of the valve guides, while the mirror is still in the casing, gently move the valve from side to side. If it moves more than a little bit, you may need to replace the valve guides. The director can easily replace the floating type of valve guides. The repair technician should replace fixed or permanent-type valve guides.

Check each valve with the steps as outlined above.

Rotary Valve Instruments

Although they are technically easier to adjust than piston valves, rotary valves are often neglected or misunderstood by students and directors. Rotary valves are neither mysterious nor complex. You don't have to be afraid to work with them. To check the port alignment of rotary valves, follow these steps:

First, remove the top valve cap. If the caps are not numbered, it is probably best to do this one valve at a time, as these caps often do not interchange.

Examine the alignment marks. (Rotary valve port alignment relies on the marks placed on the valve, bearing, and casing by the manufacturer.)

When the valve lever is in the up or at rest position, the mark etched in the center of the valve should line up exactly with a mark etched on the casing. (The word "exactly" is important in this valve alignment. The slightest error with the alignment marks will cause the valve to leak air and the valve itself to block the smooth flow of air through the tubing.)

If adjustment is necessary, the cork in the rotor stops on the back of the valve should be replaced with an increased or decreased piece as needed. These can be easily cut from a piece of cork with a single edge razor blade or small knife. Rubber can also be used, although it is sometimes more difficult to finely adjust. One size does not fit all! There can be variations even between valves on the same horn. Also keep in mind, some rubber substances are affected by valve oil, and will need to be replaced more often.

When the valve lever is depressed, the valve turns. The second mark in the center of the valve should now line up exactly with the mark etched in the casing.

Repeat these steps for all valves. A few minutes of careful fitting will allow the horn to play measurably better and improve intonation. Water key corks should be checked periodically. These can be a major source of air leakage in most brass instruments. As obvious as this seems, students often come to the shop complaining about the sudden change of sound of the instrument. Often, simply replacing the

water key cork easily solves this. Small missing pieces, cracks, and shrinkage due to old age often go unnoticed.

Checking valves for leakage is simple. If an instrument has been in use for several years or being played by several students a day the valves need to be checked for leakage.

- Press the valve or lever down.
- Pull the tuning slides half way out.
- Release the valve. Now push the slides back in.
- With your ear close to the receiver, listen for a light hissing sound.
- Press the valves one at a time.

You should hear a light popping sound. If you hear no hissing or popping, the instrument probably has valve leakage. This will make the instrument much harder to play or tune. It should be taken to your local technician for further examination and correction. Usually, it will cost much less to rebuild the valves in a good instrument than to replace the instrument. This is especially true with French horns and tubas

Part 2 – Woodwind Instrument Intonation Maintenance

It is especially important in the development of proficient young woodwind players to be sure that the instruments they are using can, in fact, play in tune and that the mechanism of the instrument can go from one note to another smoothly.

These two factors, more than any other, can affect the overall tuning of the band as well as the ability of the students to develop proper technique. Because students often don't realize there is a problem, especially the first- and second-year players, it is extremely important for the director to find out! More often, we have found students are doing everything in their power correctly, but the instruments they are playing will not allow them to progress. This will ultimately inhibit the progress of the entire group unnecessarily.

Warning Signals

Tuning a woodwind instrument is much more involved than just pushing in or out on joints. Assuming the player is doing his part to play in tune, he will improve only to the limits of the instrument. We know there are some instruments that are of a finer quality than others, but there are factors that will affect all woodwind instruments, regardless of brand or level. The delicate mechanism of woodwind instruments can be a blessing. When something is out of alignment on one of these instruments, the problem is more obvious. The instrument will usually stop playing near the note where the adjustment is necessary. This makes the problem easier to identify and fix.

Here are some of the easiest signals to spot:

- The "death grip" is the most common symptom of the leaky woodwind instrument. Students often grip the instrument like there is no tomorrow just to close the pads. The grip should be light, smooth, and even with no pressure. Remember your grip is probably stronger than the average 6th grader. So use your lightest touch when checking out these instruments for the kids.

- "Honking" or "huffing" the notes is a sure sign of a problem. This often indicates a minor leak in the instrument. The student can only get the tone production when a large force of air is used. This is especially true on saxophones.
- "Squeaking" at lower dynamic levels indicates leakage. On instruments such as the clarinet, this can and often be due to the holes not being covered completely by the student's fingers. However, if you are sure that the student is using good technique, then look for a small leak in one of the pad seals.
- "Clicking" sounds when the keys are pressed or released indicate the loss of regulation felts or corks.
- "Loose" or "wobbly" cork joints can cause air leakage from the joint. It can also cause the instrument to shift around while the student is playing. This will make it nearly impossible for the mechanism to function properly - especially clarinet bridge keys.

Key Height

Are the keys holding the pads too close to the tone hole, or do the keys have to move a large distance to seal the tone hole? When the keys are too close to the tone holes, the sound of the instruments will be stuffy and the pitch will be flat. When the keys are too high, the overall pitch of the instrument is usually sharp and the tone of the instrument will be very bright, making it hard to blend with the rest of the group. When one key is noticeably higher or lower, it can affect that particular note as well as the adjacent notes, making the tuning of the instrument hard to control.

Mechanical Regulation

Regulation of woodwind instruments can sometimes seem overwhelming, but it is something every director can do with attention to details. Start by moving the keys slowly. Take note of which keys move other keys in combination. This synchronization is important! The adjustment of these keys is accomplished in one of two ways, the use of small pieces of cork glued to the keys or the use of adjustment screws. Both methods have strong and weak points.

Cork regulation relies on using various thickness of cork to synchronize the closing of the keys. Sometimes this can be a time consuming and frustrating process involving:



Testing the key closures with a feeler gauge. First you must look carefully at the section of keys you want to start regulating and decide which key is the dominant key of the section. One key will be the primary key responsible for moving other keys or combinations. Depress this key. While gently holding it closed against the tone hole, see which of the slave keys are not closing and sealing the tone hole. If major regulation is necessary, the gap will be easily seen with nothing more than your eye. If the keys look as though they are all closing evenly, you

will still need to use a test feeler to be sure. [This is usually made from key (cigarette) paper. Cut the cigarette paper lengthwise into small strips about an eighth of an inch wide. For small pads you can narrow the tip of this paper to about a sixteenth of an inch.] Open the keys and insert the feeler between the pad and tone hole that you want to check. Gently depress the dominant key. Slowly withdraw the feeler. If you feel no tension on the paper, then this pad is leaking air. If you do feel tension, then repeat the procedure on the same pad from four different directions. (12:00, 3:00, 6:00

and 9:00) If it seals at one or two points but not the others you must determine why before going further. Possibilities for this besides regulation could be that the key is bent out of alignment or because of water damage to the pad. If neither of these are the problem, you can proceed on to the regulation.

Estimate the thickness of cork necessary. Sheet cork comes in many sizes, ranging from 1/64 to 1/4 inch. You must determine which is the proper size for the key section you are working on. This can be done by first looking at the backside of the key. While gently holding the dominant key closed again, gently apply pressure to the slave key. You should see a small gap between where the two keys should be touching. That is the point where the regulation key needs to be applied. The thickness of the gap will be the thickness of the cork necessary to apply. Place a small piece of cork in this gap and repeat the procedure with the test feeler. When an even tension is felt on both keys all around, then the thickness of the cork is correct and is ready for permanent attachment to the key.

Attach or glue the cork to the key. Most manufacturers leave a suitable flat spot for the attachment of regulation corks. The easiest method of attachment is to take about a one inch length of the cork thickness desired and cut it to the width of the area you are going to attach it to. Carefully apply a small amount of contact cement to one side of the cork. Usually, this will be about a inch from the end. Using the cork as an applicator, apply contact cement to the key area. DO NOT let contact cement get on any other area of the keys. While keeping the glued key area from touching anything, move the cork away from the key until both pieces are dry. When both pieces are dry, replace the cork to the key area. As the name suggests, they will bond on contact so be careful how they are aligned.

Carefully trim the excess cork from the key. And you are ready to move on to the next key section.

Screw Regulation is a simplification of the regulation process by manufacturer design. It uses screws to raise and lower key heights and to eliminate the lost motion between dominant and slave keys. The advantage of screw regulation is that a slight turn of a screwdriver will take care of the job in only a few seconds. The disadvantage is that it takes a very gentle touch when testing the key and using the feeler strip. It is very easy to over adjust causing slave keys to close sooner than the dominant keys. Remember the keys must close at exactly the same movement. Another common problem with screw adjustment comes when the student sees a loose pivot screw and decides to tighten it, at the same time tighten all the loose screws. This is your biggest nightmare! On instruments with many years of wear, screws will become loose and will turn by themselves. Once you have adjusted one of these instruments and are sure that it is in regulation, apply a small bit of clear nail polish to the screw head. This will act to lock the threads so that they will not turn by themselves and only by design if someone uses a screwdriver on them.

Pads

Pad condition is an underestimated source of playing difficulty. Outside of the obviously damaged pad, there are a few things to look for. On older instruments, especially those with leather pads such as saxophone and bassoon, age will cause the leather to harden up and cause minor leakage. The instrument will still play so the problem goes unnoticed. The student is working harder and harder to achieve the same results over a period of time. Check your leather pads. If they aren't soft and supple, replacement is called for! Repeated exposure of all woodwind pads to the moisture from rain during the marching season causes the felt inside the pad to harden resulting in the same difficulty of playing. During the marching season, clear skin pads will draw tight as they dry. This will pull the seat out and

cause leakage. Re-seat them often during the season, then replace them after the season is over. It is unfair to expect concert players to perform to the best of their ability on damaged instruments! If the instruments aren't holding them back, the potential for greatness in your concert band is much better!

Flute Tuning

Tuning your flutes is something you need to discuss with the students. They need to be reminded that the instrument is designed by reputable manufacturers with millions of dollars in engineering at stake. The head joint should not be pulled out more than about an eighth to quarter of an inch for proper tuning. They are not made to be hanging out by a thread. If it is necessary to pull out more than that, then a serious technique problem must be addressed. Have the student practice rolling the head joint forward and back while using a tuner. It is usually the player not the flute. Have them find the correct pitch and then practice starting there. The octave tuning adjustment of the flute is done with the head cork. Adjusting the head cork is easy. There are only a couple of things to remember. First, don't ever pull the cork from the flute. Push it out toward the body end of the flute after removing the head crown. Pulling it out the crown end will permanently ruin the instrument! It is smaller at that end and should not be stretched. Once the cork is removed, measure the diameter of the head cork onto a rod or stick. This is the exact distance you will need to adjust the cork. Re insert the head cork into the joint, and slowly push with the rod until the mark you made shows up in the embouchure hole of the instrument. When it is exactly in the middle of the embouchure hole, stop. Replace the head crown and the instrument is tuned. If there is still an octave problem it is with the student.

Periodically take a few minutes and look your instruments over. It will save you a great deal of frustration during important rehearsal time.

Part 3 - Preparing for Summer Storage

After spending 40 years in the business of instrument repair and restoration, I have seen some pretty incredible and sometimes funny things. These have included horns dropped off the top of bleachers at a football stadium, woodwind instruments caught in the rain at a parade, and the instruments that "everyone" was sure that the "other guy" put into the car, that are usually run over. While almost anything is repairable and accidents do happen, the sad truth is that the average repair job that finds its way into a shop could and should have been prevented. Proper instrument care and maintenance can save your program hundreds of dollars each year as well as unnecessary down time at the repair shop.

With the end of the school year approaching, now is a very good time to evaluate the condition of your instruments for next year. Let's start with a general inspection.

Brass Instruments Dents

The most obvious problems with brass instruments are dents. Cosmetically, if the instrument looks good, the average student will take better care of it. However, there are bigger issues at stake with dents that many people are not aware of. Remember, the smaller the tube, the more critical the effect on the intonation of the instrument. Let's look at the lead pipes and smaller crooks and branches of your instruments. If the inside diameter is obstructed more than 25 percent, it will be necessary to have these dents removed. Besides restricting the playing of the instrument, it can cause profound intonation problems for the player. Also be aware that the placement of the dent can affect some notes more adversely than others. Although the concert B flat may be in tune, there will be other notes that the

student cannot be expected to control, which ultimately will impact the overall intonation of the entire band. Dents on the bell flairs of instruments, besides looking bad, have an impact on the overall sound quality of the instrument. Dents make the bell more ridged and less able to vibrate with full resonance. (It has been estimated that as much as 75 percent of a French horn's resonance comes from the bell.) It stands to reason that any reduction in the tone or resonance of the instruments will adversely affect the overall sound of the group unnecessarily.

Slides

Examine the slides of all brass instruments. They should move freely. If they don't, here are several things to look for. Dents in the slide tubing, even seemingly insignificant, can make slides difficult to move. The primary cause for most stuck or frozen slides is simply corrosion. On an average slide tubing there is a clearance of .001 inch between the inner and outer tubing. This allows the tubes to move freely but not to leak air when playing. If the slides are not cleaned and greased on a regular basis, corrosion can quickly fill this space, making the slide difficult to move. The problem is usually hidden from quick visual inspection by the occasional application of slide grease, oil, or just the natural moisture from playing. If you were to leave the slide out of the instrument and allow it to dry, a chalky green film would begin to appear. If the instrument is packed away for a period of time without proper cleaning and grease, this same process will take place in the case. That is why so many instruments in the fall are frozen and stuck when they seemed fine at the end of the previous year. Often, they will require repair service to un-freeze them. This can be avoided by first removing as much of the white substance with 000 steel wool and then either applying a heavy grease or anhydrous lanolin for summer storage. These items can be purchased at your local pharmacy very inexpensively and will keep the slides from freezing in. At the beginning of the year, wipe the heavy coating off and replace it with normal slide grease.

Rotary Valves

This same corrosion can cause additional problems with rotary valve instruments like French horns and tubas when they are not played for a long period of time. Unlike piston valves, these valves are usually not plated and are made of the same raw brass material as the slide tubing. To prevent the chalky build-up from freezing the valve in position, a heavy oil such as "3 in 1" (available at most hardware stores and is not inexpensive) can be used during summer storage. Apply the heavy oil through the slide tubing and work the valve back and forth. This will thoroughly coat the valve casing and the valve itself. It will make the valve move very slow, but don't worry. When you are ready to use the instrument in the fall, the protective oil is easily flushed out using the same procedure with regular valve oil, or odorless mineral spirits (also available at your local hardware store). DO NOT USE KEROSENE.

Braces

Brass instrument braces should be checked, and if any are loose or broken, they should be fixed right away. When one brace is loose or broken, it will weaken the entire structure of the instrument, usually causing more damage to the instrument as others come loose. In addition, these loose braces can cause an annoying and distracting vibration for anyone playing the instrument.

Cleaning

All brass instruments should have their insides cleaned periodically. This is essential to remove the build-up that naturally happens when they are played. This build-up is compounded when the instrument is

shared by more than one student per day or the student has lunch before practice. Pay particular attention to the lead pipe of brass instruments. A snake should be run through this area on a regular basis. The build-up in this area of the instrument is unbelievable and often goes unnoticed by the player until there is a problem. If you can't have the horn professionally cleaned on the inside, please attempt to bathe and snake the instrument with warm soapy water. This will remove a majority of the loose chalky material inside the horn. Be sure to remove both the top and bottom caps from the instrument. Often the bottom caps are overlooked. This allows the residue to collect and eventually cause sticking valves.

Woodwind Instruments Pads

Inspect the pads on your woodwind instruments on a regular basis. For leather pads, like those found on saxophones and bassoons, look for dark or discolored areas. This will usually indicate water damage to the pad causing it to become stiff and brittle. In this condition, the pad will not properly seal air at the tone hole. The leather should be soft to the touch and clean. For all other types of pads, look for frayed or worn edges, or rips and tears to the skin. Also look to see if there are any sections that may have been cut by tone holes. Even though the outer edges look fine, they will leak air and cause difficulty in playing the instrument. These will need to be replaced. Pads should be dry and clean with no worn edges. If possible, on the last day of playing, swab the instrument and clean the pads with either pad paper or un-gummed cigarette paper. **DO NOT USE A DOLLAR BILL OR OTHER TYPES OF PAPER**, it will not work! Money has changed over the years. It is not the same paper the "old-timers" talk about. Notice that money sticks to itself now!

Regulation

Check all woodwind instruments for regulation. If the key heights seem to be excessively open, closed or are varied, the instrument will need regulation. If you are unable to do this yourself, have your local technician take care of it. Check to see if the pads will seal with a light touch. Often beginners have a very hard time mastering the instrument basics because they are spending all of their energy just trying to squeeze the keys. You should **NEVER** have to squeeze the keys shut on an instrument. It encourages bad technique from the beginning and will cause difficulty later when trying to perform faster passages in music.

Screws and Rods

Woodwind keys should have minimal movement between posts. This will affect the alignment of the pad seat and tone hole, often making the instrument erratic. Sometimes it plays and sometimes it doesn't. Keys should move smoothly and freely. A light application of key oil on all moving sections of the keys and screws will keep them from freezing with non-use. Two places often overlooked on instruments are the regulation screws on flutes and the roller rods on all woodwinds.

Dents

During the summer months is a good time to have the dents removed from saxophones and flutes. These dents, although often overlooked, will have the same adverse effect on woodwinds as they do on brass instruments.

Joints

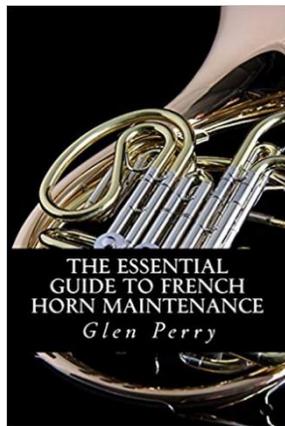
Make sure that all tenon joints are snug fitting and seal air. If they are loose metal joints like saxophone necks and flute foot joints, have your local technician expand them. If they are cork, make sure that they are tight with no tears or large chips that will come loose. Never store cork instrument joints together. It will cause the cork to compress and leak air.

Woodwind Storage

When storing woodwind instruments for extended periods of time, the keys that are normally open should be gently held in contact with the tone hole using cork wedges under the key feet. This will maintain a good seat on the pad through storage. When the wedges are removed in the fall, the instrument should be ready to play with no leaks. When instruments are checked and properly stored for the summer, the beginning of the next school year should be problem-free. If, however, instruments must be taken to the shop for professional help, please make clear arrangements with the technician in advance for delivery. Often, we are overwhelmed by directors or students who wait until the last minute before they need an instrument "fixed right away." This usually happens at the beginning of the school year, before holiday and spring concerts and during festival or competition time. It is unreasonable to expect that your group is the only one in the area participating in these events. To avoid misunderstandings and to maintain the highest quality of work, please make adequate arrangements in advance so our work can be finished properly.

I hope you find this information helpful. If you have any additional questions please feel free to give me a call. 305-903-2554

Another reference you may be interested in:



The essential guide to French horn maintenance is a complete reference manual specifically on the care, maintenance and basic repair of the French horn. Valuable information you will use repeatedly is presented in a clear easy to understand format. Careful step-by-step photo illustrated instructions guide you through the evaluation of your instrument, general care and maintenance, common repairs, basic repair tools and supplies and more. Use the evaluation checklist on the next used horn you consider for purchase. Keep the horns you own in good condition and save money by avoiding unnecessary trips to the repair shop. Being instrument specific, this book details information unique to the French horn not found easily in other repair manuals or resources. More than 170 pages of careful step-by-step instructions and photo illustrations guide you through: Evaluation of your instrument, Care and Maintenance of the French horn, Common maintenance related repairs, Tools, supplies and more. Learn to safely pull stuck slides, replace springs, strings and corks, make stuck valves work again, Check for leaks and More! More than thirty years of repair and playing experience combine to make this book the perfect addition to your reference and textbooks on the French horn.

