

What You Should Know About Tuning Your Piano



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Piano Tuning & Repair

5 What Makes a Piano Go Out of Tune?

22 How Often Should I Tune My Piano?

27 How Can I Keep My Piano in Tune Longer?

Chapter One

Why Do Pianos Go Out Of Tune?

There are several reasons why pianos go out of tune. Some are well known and some are somewhat of a mystery.

Gaining an understanding of the various reasons your piano goes out of tune can help you know how often and the best time to call the piano tuner. This knowledge should assist you as you work with your piano tuner to keep your piano in tune for the longest amount of time so that you can enjoy it more.

The five main reasons a piano goes out of tune are as follows:

- Loose tuning pins
- Changes in humidity
- New strings stretching
- Playing the piano hard and often
- Moving the piano

Before we discuss these, I think it would be helpful to look at the piano itself and the parts that relate to the tuning of a piano.

The Strings

If you have ever plucked a stretched out rubber band, you know that the more you stretch it, the faster it vibrates. As you pull on the ends of the rubber band, you put more tension on it and when you pluck it, you hear a sound that is "higher" in pitch. If you lessen the tension on the rubber band and pluck it, it sounds "lower".

The piano as well as any other stringed instrument, utilizes this same principle. If a piano string is stretched, there is more tension on the string and it will sound "higher" when you play the key that plays that note. If there is less stretch, or lower tension, it will sound "lower".

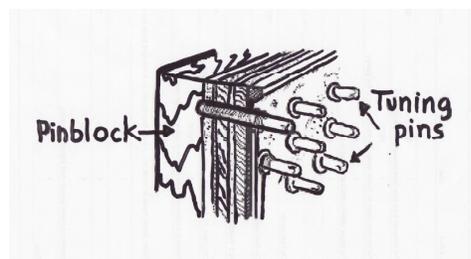
So when a piano goes out of tune, it simply means that strings have lost or

gained more tension than they had when the piano was in a properly tuned state.

In other words, when the piano tuner comes, he or she is simply adjusting each string to have the correct amount of tension that will produce the correct pitches.

Tuning Pins & Pinblock

Each string on the piano is wrapped around a pin called a “Tuning pin”. When you turn this pin clockwise, the tension of the string increases. When you turn the pin counterclockwise, the tension of the string decreases. This turning of the pin affects the pitch, or how high or how low the note sounds. This is similar to turning the tuning pegs on a guitar or violin.



As you can see in the illustration above, the tuning pins are held in place

by the pin block. The laminated pin block is usually made from either “northern rock maple” or beech and has holes drilled into it. The pins are pounded into each hole. The strings are each wound around these tuning pins.

The tight grip that the pinblock has on the pins keeps the strings from loosening up. This tight grip keeps the pins from turning which would cause the strings to lose tension which would cause the pitch to go flat.

Tuning Hammer

In order to turn these pins, the piano tuner uses a special tool called a “tuning hammer”, which is really a fancy wrench.



In order to adjust the pitch of a string, i.e. how low or how high the string sounds when played, the piano tuner slips the tuning hammer onto the tuning pin of the string he wants to adjust, and

then turns the pin one way or the other in order to adjust the pitch. This causes the tension of the string to change. When the string produces the desired pitch the string is at the correct tension.

When all the strings have been adjusted properly, the piano is said to be “in tune”.

Now what you must understand at this point is that even if a piano has been tuned by a professional tuner and is perfectly in tune, that piano may immediately start going out of tune as soon as he or she leaves. Why is this?

Well, there are five main reasons pianos go out of tune as we will discuss below.

Reason #1: Loose Tuning Pins

One reason a piano may go out of tune is that it has loose tuning pins. As a piano ages, tuning pins may start losing their grip. The pins may not be as tight as they used to be which makes the piano go out of tune quicker.

This grip needs to be quite tight because each string has a pull of between 150 and 200 pounds on each tuning pin.

The reasons for loose pins could be:

- A shrinking pinblock that has dried out over the years
- A cracked pinblock, usually caused by the block drying out over a period of several decades
- Poor pinblock material or workmanship
- Incorrect tuning technique over a period of time
- Many, many tunings over a period of many years.
- Oil or another substance getting onto the pins and seeping into the pinblock.

Your technician can tell you if loose tuning pins are affecting your piano's ability to maintain its pitch.

If you have loose tuning pins, what can you do?

Well first of all, if you have a very valuable piano and can afford it, you can have your pinblock replaced. This is a major undertaking and should only be done if your piano is worth it. Replacing the pinblock, if done properly, will assure you that your pins will be tight for a good long time, probably decades, and thus hold its tune like it should.

Another mid-priced option is to have oversized pins put in place of the old pins. Larger pins would obviously be tighter in their holes and thus greatly increase tuning stability.

One last and popular option is to have your technician apply CA Glue to the pinblock. This procedure does not take long, is very effective, and is not that expensive.

Reason #2: Changes in Humidity (The most common reason)

It is possible for a piano, newer or older, that has super tight tuning pins, to be thrown out of tune in a very short period of time. Why is this?

It has to do with two things:

1. The effect of humidity on the piano's soundboard.
2. The effect the piano's soundboard has on the tension of the strings.

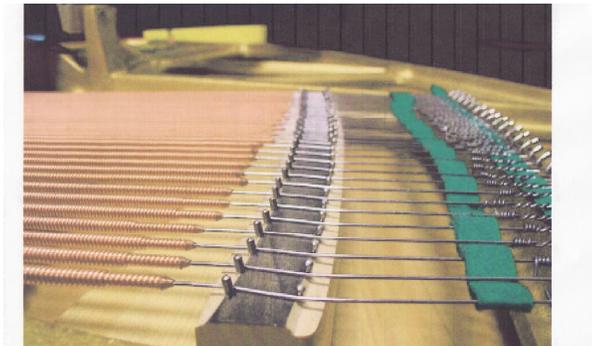
To help in our understanding of this, let's go back to our rubber band illustration and see exactly how the soundboard affects the tension of every string in a piano.

Imagine our rubber band is stretched across two fingers and your friend puts his finger in the middle of your rubber band and gently pushes. He plucks one side of the rubber band. You both hear the pitch. Then he pushes harder and he plucks again. The pitch is "higher". He pushes less and plucks. The pitch is "lower".

Like our friend in the illustration above, the soundboard is pushing on the strings of a piano. It is pushing all the time. When it pushes harder, the pitch of

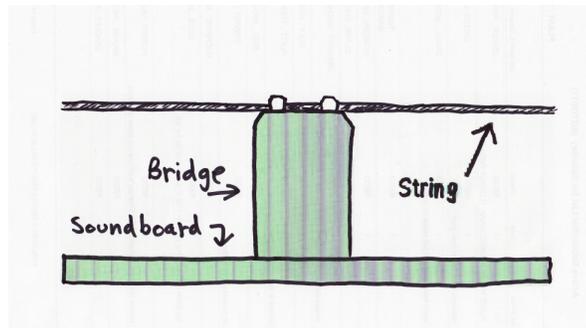
the strings goes “higher”. When it pushes less, the pitch is “lower”.

Below is a photo of piano strings going across what is called a bridge. The bridge is glued to the soundboard.

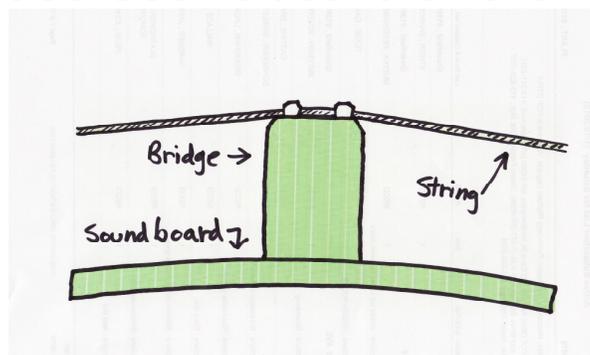


The strings are pushing down on the bridge and soundboard and which are pushing back. Sometimes the bridge and soundboard press upward more. Sometimes they press less. This is because sometimes the soundboard expands and sometimes it contracts as is illustrated below.

Normal soundboard and bridge



Expanded soundboard and bridge



As the soundboard becomes bigger (expands), it moves upward and presses more on the strings. As the soundboard gets smaller (contracts), it moves downward and presses less on the strings.

So what causes the soundboard to expand at times and at other times to contract?

The answer which is the most significant factor in most pianos going out of tune is changes in relative humidity. This expansion and contraction happens when the soundboard is exposed to changes in relative humidity. In other words, the soundboard expands when the surrounding air is more humid, and conversely contracts when the surrounding air is less humid.

When the soundboard expands, the strings have more tension and the pitch goes higher or sharper. When it contracts, the strings have less tension and the pitch goes lower or flatter.

Guitars and violins also are affected in like manner by their “soundboard”.

So why does the soundboard expand and contract in direct relation to humidity?

Well, the soundboard is made out of wood, and therefore when exposed to increased moisture in the form of humidity, it expands. When exposed to less moisture, or dryer air, it contracts.

You may have experienced this with the wooden doors you may have in your home. If the humidity increases in the summer, your doors may not close as well due to the expansion of the wood in the door.

In similar fashion, as the air around the soundboard becomes more humid,

the soundboard absorbs some of that moisture, thus causing it to expand.

Conversely, when the air around the soundboard becomes drier, the soundboard releases some of its stored up moisture, thus causing it to contract. This means less pressure on the strings, which causes the piano to go flat.

Dry winter air and the use of home heating systems during the winter translate into shrinking soundboards. This causes less string tension which means the piano goes flat.

Humid air in the summer translates to expanding soundboards. This causes more string tension which means the piano goes sharp.

This is why your piano technician recommends you tune your piano at least twice a year. Humidity is certainly the largest factor in a piano going out of tune.

Reason #3: New Strings Stretching

Piano wire is flexible. It needs to be so in order to wind around the tuning pins, etc. and to be able to tune it. Therefore it is subject to stretching, especially when it is a new string.

Imagine tying a new piano string to the ceiling and attaching a 200 lb. weight to the other end of the string. If you could accurately measure the length of the string every day, you will find that it will be a little bit longer each day. The piano wire is slowly stretching.

This stretching will cause the string to vibrate slower and thus go flat.

If your piano is new, the strings will continue to stretch for the first few years. That is why manufacturers recommend having a new piano tuned 3-4 times during its first year.

Reason #4: Playing Often and Hard

One better known reason that can contribute to a piano going out of tune is

playing it a lot; especially playing it hard. The more a string is played and the harder it is played the more the pin may turn in its hole.

This is why professionals and very dedicated students have their pianos tuned more often than the average piano owner.

For most people this is not as significant a factor as others that we have discussed, but it certainly can affect the piano's tuning.

Reason #5: Moving the Piano

Most people are also aware that moving a piano can cause a piano to go out of tune especially if it is being transported by a motor vehicle.

The reason moving may affect the tuning is that the resting position of the soundboard may be disturbed as it is moved. This would change the amount pressure being exerted by the soundboard to the strings, thus changing the pitch of those strings. Also the more

the piano is bounced around, the more the tuning pins may turn.

Another indirect result of moving a piano is that if the piano is being moved to a place with a different humidity level, that different level will also cause it to go out of tune, for reasons mentioned earlier.

You should know that moving a piano is not as big of a factor as the 3 factors that we discussed earlier.

Chapter Two

How Often Should My Piano Be Tuned?

Piano owners know they need to keep their piano tuned on a regular basis. This is important not only for the good of the piano, but for the benefit of the ones playing it.

If there is a piano student in your home it is very important to keep your piano tuned as suggested in this article. As the student plays the piano, his or her ear is being trained. If the pitch of the piano is off-pitch, that is how the student's ear will develop. Therefore it is essential that the piano student play on an in-tune piano.

So, how often should a piano be tuned?

According to the major piano manufacturers, twice a year is a good rule of thumb.

Yamaha Pianos

"...a piano should be tuned at least twice a year."

Baldwin Piano Company

" After the first year a piano should be tuned at least twice each year."

But there are factors that can make this rule too frequent or too infrequent.

The Piano's Condition

An older piano may have a pinblock that no longer has the strong grip it once had on the tuning pins, causing the pins to slip. Until the pinblock problem is dealt with, this piano will need 3, 4 or more tunings per year, depending on the severity of the problem. Your piano technician can tell you if you have such problems and how they can be corrected.

Pianos of lesser quality tend to need more frequent tunings, especially if it is a small piano.

A new piano will need to be tuned 3-4 times in the first year or two because the strings are still stretching.

The Piano's Environment

Because most of the piano is made out of wood, changes in temperature and humidity affect the piano greatly. The more your piano is subjected to these changes the more it will need tuning.

If you keep the room where the piano is at a constant humidity level of around 42% or have a moisture control system installed in your piano, tuning stability will be increased.

The Demand Put on the Piano

Pianos that get a good daily workout by a professional or serious student will need more frequent tunings, say 4 times a year or more. Pianos that sit idle most of the time should be tuned at least once a year.

Important: If left untuned for years, the piano may need several tunings to bring it up to pitch and remain stable. You also risk having strings break when

the tuner comes to bring the piano back up to proper pitch.

Two other problems may result from leaving the piano untuned for such a long time.

False beats may develop which can make notes sound permanently out of tune.

And the soundboard and bridge may become damaged. This is due to the pitch dropping which causes not enough downward pressure on the soundboard.

Because of these potential issues, it is important to have your piano tuned at least once a year.

Chapter Three

Things You Can Do to Keep Your Piano in Tune Longer

As a piano owner, you want your piano to stay in tune. When your piano is in tune,

- playing it is more enjoyable,
- you are hearing the right pitches, which for a music student, is important for developing a good musical ear,
- you don't need to call the piano tuner.

But the reality is that no piano stays in tune.

Good recording studios tune their pianos 3 or 4 times a week. And even a Steinway concert grand will start to go out of tune shortly after it has been tuned.

The good news is that there are things you can do to slow down the rate that your piano drifts out of tune.

Now if you do have a Steinway or a high quality piano, the tuning should already be more stable than other pianos because these pianos have cured hardwoods, sturdy construction, quality parts & stringing design, which better resists the adversities of humidity.

And remember too, that if you have a new piano, it may not hold its tuning as well during the first year. This is because the strings continue to stretch throughout the first year. That is why manufacturers recommend 4 tunings in the first year.

But regardless of the quality and age of your piano, the following guidelines will help your piano's pitch be more stable.

(I am assuming that your piano has no pin block or other structural issues which can play havoc on tuning stability. Your piano technician can tell you if you have such problems and how they can be corrected.)

The Piano Room

The biggest factor that affects the piano's pitch is humidity. Temperature affects it some, but humidity is really the thing to control.

If you don't have one, you should get a digital hygrometer to monitor the relative humidity in the room. These are fairly inexpensive and you can get them at your local hardware store. Keeping the room where your piano is between 40-50% relative humidity should be your goal. The less it changes, the better.

WINTER- To help your room get up to 40% R.H., you may need to put a small humidifier in the room. Don't put it near the piano though. Plants can help too.

Keep the piano away from heating ducts and radiators. These dry out the air around them. Keeping the piano out of direct sunlight is important too. And if your windows are drafty and the house isn't well insulated, keep your piano on an inside wall, not an outside one.

SUMMER- Central air conditioning helps control humidity. If you do not have central air, a dehumidifier can be used. Again don't put it near the piano.

Other factors to keep in mind that can affect relative humidity levels are open windows and rainy weather.

What about keeping a piano in the basement? Again you need to consider how damp it is down there. It used to be very bad for a piano to be in the basement. But with modern heating and insulation, you don't have a lot of airflow so the humidity tends not to change so much down there. Humidity can be controlled better today. So actually it may be a good place for a piano. Just be sure to follow the guidelines in this chapter.

The Piano Itself

Because controlling the relative humidity in the room where your piano is can be difficult, people have tried to control the humidity inside the piano itself. There are two methods of doing this.

You may have heard that keeping a jar of water inside of an upright piano will help during the dry season. The idea is that the water will evaporate and help alleviate the dryness. Two observations about this method:

First, hardly anyone who tries this does it faithfully. I have seen many empty and dusty jars in bottoms of pianos over the years. People simply forget it is there.

Secondly, there is no evidence that suggests that it works. It sounds like a good idea, but when the piano really needs the moisture, the water from a jar simply cannot evaporate quickly enough or disperse properly to meet the needs of the entire piano.

Therefore I do not recommend putting a jar of water inside the piano.

The other method of controlling the humidity inside the piano itself is to install a moisture control system. These systems work great. This system once installed, constantly monitors the relative humidity of the soundboard, and then

automatically regulates it. It is designed to keep the relative humidity of the piano at 42%.

In addition to helping keep your piano's tuning more stable, this system also protects the wooden parts of your piano, thus helping to prevent sticky keys and a cracked soundboard.

If you really want to keep your piano in tune longer, I highly recommend installing one of these systems. They are very easy to maintain and will easily pay for themselves over time with the savings in piano tuning costs.

Your piano technician can give you further details and a free informative brochure.

What Time of Year is Best to Tune a Piano?

I get asked this from time to time. My feeling is to tune it when you want it to sound its best.

If you plan to play it a lot during the summer, you may want to have it tuned as the summer begins.

On the other hand if you will be away for the summer, it doesn't make sense to tune it if it won't be played.

If you take piano lessons, you may want it tuned right before you begin lessons in the fall. Then you may want to have it tuned once winter has settled in and most pianos have gone flat.

Churches and schools will want to plan tunings around their special events during the year that make special use of the piano.

Your piano technician can also help you decide when the best time is to tune

your piano, as he or she will take into consideration the climate of your area.

For all your piano tuning
& repair needs, contact:

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