

The Care and Maintenance of Your Piano

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The piano is a self-contained musical universe that is also a complexly structured machine. The main components are the cabinet, the cast-iron frame, or “plate” holding the strings; the tuning pins and wooden pinblock into which the tuning pins are set; the soundboard and ribs; and the keyboard and action. The following should shed some light on what is a mystery to the average piano owner. *This is **NOT** a crash-course in do-it-yourself piano repair!*

CABINET: obviously, this is the container of the other components, and is important structurally, beyond its qualities as furniture. The massive posts of the back help withstand the tension of the strings, in particular.

PLATE: This is a massive cast-iron structure of vaguely harp-like appearance that bears the brunt of the load on the 220-odd strings. The combined tension of the strings is usually over 20 tons (40-44,000 pounds). This stored energy, if released suddenly, is an earthquake-scale force, enough to yank the average house off its foundations. These plates are the epitome of metal-casting, and are the optimum balance of weight, rigidity, and economic construction.

STRINGS/ TUNING PINS/BLOCK: The **strings** of the piano form the “scale”. Before being strung on the piano, they are called wires. Designing a scale is a highly involved process, and is crucial to the tone of the piano. All pianos have a single string for the lowest (bass) notes, two for the not-so-low (baritone/tenor), and three for the higher (treble) notes. Each note is called a unison (one sound). The lowest notes have a heavy steel wire core wrapped with copper to add mass and weight, as a plain steel string behaves more like a bar than a string. This results in an unpleasant bell or chime-like tone. The treble notes have plain steel strings that get progressively thinner as the scale becomes higher in pitch. These strings are secured to the plate at the bottom, then pass over a bridge. From the upper or forward end of the bridge to the upper edge (or v-bar, due to its profile, or agraffe, in a grand) of the plate is the “speaking length” of the string. This portion generates the sound. Just above the v-bar is a pressure-bar, or, in a grand, a hump in the plate which is covered with very heavy felt. Next come the **tuning pins** which secure the strings and are the means by which the strings are tuned. All these points of contact mean the strings are divided into a number of segments. When the piano is tuned, it is important that the strings move easily over these contact points, else friction will cause the string to stretch more in one segment than another. It is important that tension in these segments is equalized. If they are not, then the piano will go out of tune. A large part of the mechanical art in tuning lies in skilfully moving the string so the result is stable. The **pin-block**, or **wrest-plank** is a laminated wood plank secured to the underside of the plate. It is drilled to hold the tuning pins. Its grip on the tuning pins must be neither too tight or too loose, else the piano will either tune jerkily, or the pins will not resist the pull of the strings and they will go out of tune.

The **soundboard**, **bridge** and **ribs** are the amplifier of the piano, much like the top and back of a guitar. It takes up most of the back of the piano. Since the volume of sound as we perceive it is dependant on how much air is set to vibrate, it can be seen that a string by itself will excite very little air. Hence, all things being equal, a large soundboard will

amplify the string vibrations more than a small one. The **ribs** help hold the soundboard together as a unit; the **bridge** is the interface between the strings and soundboard. The soundboard is constructed with a slight inward curve, called the **crow**. This curve is roughly the arc of a circle 60 feet, or 28 meters, in diameter. It helps the soundboard keep its shape against the roughly one ton/ 900 kg. pressure of the strings. Don't confuse this with the much larger strain on the plate. This pressure is to ensure solid contact of the strings onto the bridge.

The **keyboard** and **action** are what turn the piano from an unwieldy harp to a powerful percussion instrument. When a key is depressed with sufficient speed, a complex series of linkages made to watch-making tolerances causes the felt-covered hammers to be thrown at the string, setting them vibrating; the instant before, a spring-loaded felt pad called a **damper** is lifted off the strings, allowing them to vibrate freely. As the key is released, the spring-loaded damper falls back on to the string, silencing it. The damper must be precisely positioned to function properly, as it's surface area isn't much more than a fingertip, yet in the case of a concert-grand it must damp the energy of a bass-string more than seven feet long,! The (usually) three **pedals** are extensions of the action and have important uses. The **sustain** pedal under the right foot lifts all the dampers at once, allowing all the strings to vibrate. This is sometimes called the loud pedal. The middle pedal in an upright lifts only the bass dampers, or sometimes lowers a strip of soft material between the hammers and strings, producing a muffled tone. This is often known as a practice pedal, though this is somewhat of a misnomer, as the touch is affected in a way that is a hindrance to good technique. It *can* save the nerves of those who don't wish to hear a beginner practicing at full volume. On a grand piano and some uprights, this pedal has a different function, and is called a **sostenuto**. It will hold up the damper on any key depressed when the pedal is used. This is useful for sustaining single notes or chords. The left pedal on an upright is called a **half-blow**, and moves the hammers nearer the strings so they have less force. On a grand, this pedal is called a **una-corda** or **shift pedal** (the latter more accurately describes it). This shifts the whole action so the hammers strike only two of the three strings in the treble, and only one in the bass. There are many gradations of tone possible between the rest and fully depressed position.

Care and Maintenance of Your Piano

There are four main aspects to piano care: Tuning, Regulation, Voicing and Repair/Refurbishment.

TUNING

Strictly speaking, no piano stays in tune for more than a few days, unless it's in a room where the humidity never varies in the slightest. All manufacturers would say a piano should be tuned every change of season, which for us means four times a year. Realistically, few pianos besides those owned by music teachers, concert halls and recording studios are done this often. Once a year should be regarded as a minimum.

It is most ungratifying to shatter people's illusions, but serious piano owners should also be educated. So here are some common misconceptions about tuning and the piano:

Pianos should be tuned when they're moved. Quite true, but often implicit is that they don't need to be tuned EXCEPT after moving. That is quite incorrect.

Pianos don't need to be tuned if they're not played/ not played hard. Also incorrect.

A cracked soundboard means the piano is ruined. The soundboard can still vibrate as a unit, despite cracks. Loose ribs and cracks that buzz are another matter.

My piano has a lead/steel soundboard. That is actually the plate, which is cast-iron.
My piano sounds good because the plate is bell metal. This is false, old-time marketing ploy, despite it being stamped right onto the plate. No builder would use or want a bell-sound. Piano plates are meant to be as acoustically dead as possible.

A tuning should fix all the ills of the piano. Tuning harmonises the strings, but DOES NOT include work on the other mechanisms. These fall under regulation, voicing and repair/refurbishment. As a matter of course, if I find some pesky things that interfere with my convenience while tuning the piano, such as a few “sticking keys”, I’ll often fix them gratis, but I won’t perform thorough adjustments for free.

I haven’t had the piano tuned for 10 years, and it sounds fine. Perhaps it does to you, but only because you became used to the piano sounding that way over time. If someone in your household is clamouring that your piano sounds nothing like the teachers, pay attention and loosen your purse-strings.

Pianos are at the mercy of changes in humidity. The life cycle of a piano is all too commonly as follows:

The piano is built at the factory. It undergoes many rough tunings until the plate is stabilizes under the over-20-ton load, and the strings have largely stopped stretching and relaxing from the tension. A finished factory tuning may be at 90% of possible in-tune-ness. From this point, the piano is still adjusting to the load, and going out of tune. The piano is then sent to the dealer. It goes out of tune after leaving the humidity-controlled environs of the factory. Once at the dealers, it may be at 75% of in-tune-ness. It is usually tuned unless sold immediately. The dealer can’t charge extra because the piano was tuned many times, so they usually aren’t. The piano is purchased, with an in-home tuning included. When it arrives, it may be back to 75% tune. This IS NOT the dealer’s fault, but an innate quality of the piano. Remember the string tension? All the wood in the piano, including the soundboard, bridges and pin-block, as well as action, swell and shrink with every tiny change in humidity. This process carries on for the life of the piano; wood never really dies, in the sense it’s always subject to this swelling and shrinking, regardless of the finish. Now, the tuner comes after, say, 6 months. The piano is found to be perhaps 1/8 of a tone flat, compared to the tuner’s fork. He does his job to the best of his ability, and a slippery, difficult job it is (when I describe what’s involved in tuning a piano, most everyone’s eyes glaze over and they leave me to my work). The piano was out of tune enough that, when brought back to the correct pitch, the load from the added tension adds anywhere from 500 lbs/ 250 kg. to a ton/850 kg. to the piano. The piano starts to go out of tune, even while it’s being tuned! The wise tuner/technician knows there’s only so much to be done, but hopefully the piano will be tuned before it goes flat too much. Then, the furnace kicks in, the air dries out, and the piano’ pitch goes through the floor. It should be tuned in the spring, when the pitch goes up a bit with the humidity so the tuner doesn’t have to wrestle quite so much with it. **THE BEST WAY TO KEEP A PIANO IN TUNE IS TO ENSURE IT NEVER DRIFTS FAR BELOW PITCH FOR THE FIRST FEW YEARS OF ITS LIFE.** Remember what the builder’s booklet said, about tuning the piano every change of season? The piano will sound fine for a while, and indeed the out-of-tuneness happens gradually. But little by little, the pitch will go down unless the piano has regular tunings, at least for a while. Then, with luck, once a

year MAY be adequate to keep the piano to a reasonable musical standard. IF it's not getting hard use! Hours of practice and heavy playing will indeed cause the strings to become fatigued and out-of-tune, over and above the inevitable working of humidity.

Pianos shouldn't be on an outside wall.

This was certainly the case in old homes with no insulation in the walls, but in a modern house is not so much a factor as avoiding drafts, if practical (doors, windows, heating vents and cold-air returns).

If all is now clear as mud and you wish you had a kazoo instead, here comes the action.

The **action** consists of over 4,000 moving parts. When a key is depressed, there's a lot of swivelling going on. Felt is extensively used to cushion these parts and keep the racket to a minimum. Some of the felt produces the sound- as in the hammers. Some stops the sound- as in the dampers. Over time, the felt packs down and gets harder. This causes shrill tone in the hammers (imagine a marshmallow and a nail hitting a string-a piano hammer should be in between in hardness) and noisy dampers. **Regulating** the action means adjusting key height, hammer travel, escapement, after-touch, etc. so the touch is as responsive and uniform as possible. Counting tightening all the screws, there are up to 50 operations in a thorough regulation.

Voicing is the icing on the cake, and should usually be performed only after the piano is also tuned and regulated. Voicing optimizes the tone of the piano to the room it is in and the taste of the player. A piano should be able to go from a whisper to a blare, from mellow to trumpet-like. The hammers should be softest in the bass, getting harder up the scale until quite brilliant in the treble. This helps in giving the piano its "orchestral" qualities.

This, then, is your piano- or should be. The competent tuner-technician is able to "hear" how your piano could sound and play, versus how it does. This is the artistry and craft of piano care.

"Those who work with their hands are labourers;
Those who work with their hands and minds are craftsmen;
Those who work with their hands, minds and hearts are artists".