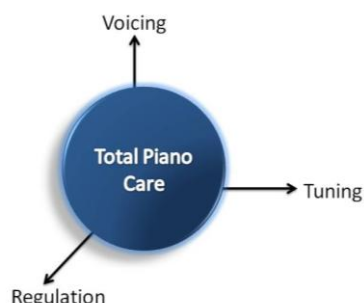


## Regulation - The Sum of Small Sums

by Rob Mitchell

Following close after keeping your piano in tune, Regulation is perhaps the most important service in maintaining your piano at optimum performance (and frequently the most overlooked).



For any given piano, there can be between 10 and 20 adjustments *per key*. Regulation is the piano technician's term for correctly making all these adjustments for maximum dynamic range (soft and loud playing) and fastest repetition in your piano.

All piano manufacturers have recommended regulation specifications which are most applicable for new pianos. Piano technicians will usually attempt to apply them quite literally on new pianos and take more latitude to adjust the specifications on older pianos. As parts wear down and hammers are filed on aging pianos, determining the best settings becomes much more "exploratory".

Now, I would have to imagine that the topic of Regulation would be a pretty dry one for most non-technician piano owners. So I'm going to approach this from the pianist's perspective and discuss the types of problems that occur if a piano is out of Regulation. I'll break this down by major areas, going through the Keys, Action, Dampers and Pedals. (Notes: 1) For the purposes of this discussion, I'll assume that nothing is physically broken, in need of repair. 2) In some cases, I will use technical piano terms without explaining them. Contact me if you want to learn more.)

I like to think of a well regulated piano as being the "accumulated sum of small sums". There are many, many little things that contribute to fine regulation. But all done well will deliver a piano that is remarkable to play.

**Keys.** The keys on a piano are surprisingly complex for what's really little more than a stick of wood. But

since the keys are the primary way a pianist interacts with a piano (along with the pedals), lots of attention gets paid to them.

Getting down on your knees and looking at the keys, all the naturals (white keys) should be the same height (level with each other), squared up and equally spaced. Similarly, the sharps (black keys) should also be level with each other, squared up and equally spaced in the gap between the naturals.

Every key is a lever that translates the downward motion of a pianist's finger into an upward motion into the action. A key should freely move up and down with very little friction, though there are multiple places where problems can occur. Obviously, a key should never rub against its neighbor or the key slip (the strip of wood across the front of the piano immediately in front and below the keys). For every key, there are two pins that come up out of the keybed which hold the key in alignment: the Front and Balance Rail Pins. For each pin, there is a small channel in the key with felt on each side called Key Bushings. Sluggish key action can occur if the felt is too tight against the pin, or if the hole the Balance Rail Pin passed through is too tight. The goal is a key that freely moves up and down, with no side-to-side or front-to-back motion.

A key should travel down with no sense of drag and should release without any hint of sluggishness or lag. Any key to the contrary will result in a piano that feels "heavy" to play or lacks repetition speed. A sluggish key can also cause the scenario where the first play of a note is fine, but the second is either with reduced power or fails to play at all. (I'll finish the article with a discussion on aftertouch).

**Action.** The piano action is the internal mechanism that translates the motion of playing a note into driving the hammer towards the string, releasing it at the last possible instance and catching it so that it won't strike again.

There's a useful analogy between how a piano works and throwing a rubber ball against a wall. If you want to hit the wall as hard as possible, then you would start with your arm outstretched, throwing the ball with all your might and releasing it right before the ball strikes the wall. On the other hand, if you

wanted to quickly bounce the ball off the wall again and again, then you would want to work from a much shorter distance. The motion of a hammer inside the piano is quite similar and hopefully you can see that there is tradeoff between power and repetition.

With the example as a basis, I'll discuss some of the more frequent action regulation problems and the most common causes.

"Piano lacks power or speed". Power or speed problems usually indicate that the hammer starting position (blow distance) or release point (letoff) are wrong relative to the strings. Speed problems can result from stiff action centers (basically, hinges) or problems with the repetition lever in grands. (Power can also be affected by hammer voicing, but that's a separate discussion). Also from the earlier discussion on keys, speed or power problems can be due to sluggish keys or the failure of the jack to completely return under the hammer butt. Any of these problems should be readily solvable by adjusting the regulation, but from the rubber ball analogy remember that this is a process of making tradeoffs.

"Note won't play". There are actually two variations of this problem: 1) the hammer never strikes the string, or 2) the hammer hits the string but stays pressed against it so the string cannot ring (hammer blocking). The first usually indicates a failure of the jack to successfully reset underneath the hammer when the key is released (lost motion adjustment). The second can either be a hammer checking (with the backcheck pushing the hammer into the string) or letoff problem.

"I don't feel like I'm in control of the piano". Surprisingly, a good pianist needs to feel that the keys have some weight to them and a sense of overcoming momentum during play. In fact, this touch is so desirable that the higher quality electronic keyboards will claim to have a "grand piano touch". Problems here can usually be traced to worn out action centers or key bushings contributing to a sloppy feel.

"Hammers aren't checking". This is also a control issue. The action should "grab" the hammer after any play louder than *mp* and hold it in position (though this is easier to achieve on some pianos than others). This places the hammer closer to its original starting position for best power and repetition.

"Some notes seem to echo or double strike". Technicians call this "bobbling hammers". Assuming hammer checking is okay, it usually indicates that a

piano has been adjusted too far beyond the manufacturer's original operating assumptions.

**Dampers.** Hardly anyone worries about the dampers until they don't work. There is one per key for every note except in the high treble. Operation is simple enough: the individual damper should lift when a key is depressed and should fall back to the string when the key released, stopping all sound from the respective strings. All the dampers also respond to the sustain (right) pedal by rising and falling in perfect synchrony.

Even the slightest deviation from these behaviors is considered a regulation issue. Furthermore, as with the keys, the dampers should all be neatly aligned and level. Otherwise, the most common problems are dampers stuck in the up or down position, or an uneven response to the sustain pedal. Note that getting the dampers "just right" can be a surprisingly challenging adjustment (especially in uprights)

**Pedals.** Pedal adjustment is fairly straightforward, assuming everything else is working and well regulated. The key is to assure that the expected activity (sustain, una-corda, sostenuto, etc.) engages after only a slight depress of the pedal and that there is adequate spring tension. Complaints of pedal problems are more often than not a problem elsewhere with the action mechanism.

**Back to the Keys.** I'll finish this article where I started: with the keys and aftertouch. Towards the bottom of the keystroke, the pianist will feel a very subtle click or bump in the key (try playing a key *very slowly* to feel this). This click is the point where all of the activities in the piano action are completed - - aftertouch is the slight distance the key continues to travel until it bottoms out on the keybed. Both the sensation of the click (clean, not mushy) and the aftertouch distance are extremely important to the pianist. A well regulated piano culminates in a very good aftertouch feel. Poor aftertouch will leave a pianist either feeling that they are driving their fingers into the keybed or are working harder than they normally expect.

A well regulated piano is one that delivers all the power needed, can play softly and subtly, and can repeat notes rapidly. I've only tried to cover the basics of regulation -- be assured that there are many more layers of refinement to achieving a concert ready instrument.

For more information or to request an appointment, visit [www.mitchellpianoservice.com](http://www.mitchellpianoservice.com).