

New Piano Preparation

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This article is based extensively on “Hands-on Grand Regulating,” a class that Joe Swenson will be teaching at the Annual Technical Institute in Kansas City later this month.

An Adaptable Framework for Piano Service Procedures

A few years ago my employer, Geneva International, asked me to develop a program of piano technical instruction geared toward dealer-related service. The format was to be a week-long seminar offered to technicians affiliated with our dealers. The idea was that, as a piano distributor, we have a vested interest in doing what we can to ensure that the pianos we distribute are properly serviced by our dealers – on salesroom floors and in end-users’ homes (or schools, churches, etc.). Naturally, my first thought was to begin listing, step by step, all of the information that I could muster regarding what I consider to be the three essential skills a technician has at his/her disposal: tuning, regulation, and voicing. Next, I would arrange the material so carefully, that merely by having a technician follow the instructions from A to Z, no known service problem could possibly survive the onslaught. The end result was to be a flawless, all-encompassing exposé – the quintessential checklist – that, if rigorously adhered to, would all but eliminate piano service problems for our participating dealers. Amen.

After several sessions of staring at a blank computer screen, I realized that I might have taken the wrong tack when embarking on my journey. The reason was simple: this has already been done (minus the hyperbole), and done well – more than once.

How to Proceed?

I began, instead, to consider my own experience as a piano technician. It occurred to me that nearly all of that experience has been connected, in one way or another, with the subject that I had been asked to address: dealer-related piano service. Whether as a private technician, service employee, salesman/technician, technician/salesman, or now in my capacity as Technician Services Manager at Geneva, I have never been far from the service concerns of a piano retailer.

So, I simply began to collate my thoughts as to how my approach to piano service has evolved over the past 25 years. A few themes began to take shape – these topics encompass the views that I’ll try to present in this article:

- To a dealer (or end user), piano service is an expense, and dealers (and end users) have a natural (and understandable) tendency to minimize their expenses.
- Time is money – in our working lives, at least.
- In light of the above, there is almost constant pressure to minimize the time spent on servicing pianos.

The challenge then becomes: how can I strive to enhance the quality of my service within the framework of ever-present time restraints, thereby increasing my value to the customer – not to mention justifying higher rates? In a word, how can I increase my *efficiency*?

In order to investigate increasing efficiency in piano service (a very broad topic), I’d like to begin by breaking the discussion down into its component parts, examining each one individually, comparing them to one another, and reassembling them in a way that I hope will seem new and helpful.

For the most part, I’m going to leave the tuning aspect alone, except to use it as a reference to compare other skills. An overview of regulation will be included in this article, with a subsequent article dealing more specifically with regulation procedures and voicing.

To begin with, I find it helpful to keep in mind what it is, exactly, that I’m trying to achieve as a technician. The goal of piano service is, in general, *to increase the musical potential of the piano* – to maximize the piano’s ability to respond to the pianist’s artistic and technical requirements. Leaving aside rebuilding and repair skills, the three groups of skills that a technician has at his/her disposal for accom-

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plishing this goal are tuning, regulation, and voicing.

Three Fundamental Skills

Of these three skills tuning, in some respects, is the least problematic. Although the skill of piano tuning is highly complex, in both theory and practice, it possesses one simplifying feature that the other two disciplines lack: an entirely objective reference – one that exists outside the piano itself. This reference usually is A4=440Hz. All decisions made by the tuner, at any point in the tuning process, can be judged by their relationship to this universally agreed-upon point of departure.

At the other end of the spectrum is voicing. The voicer has no such standard of orientation; all judgments are purely subjective. The overriding authority is one's own assessment of what constitutes good piano tone. The ability to make these judgments can only be developed with experience. Studying the physical properties of both hammer and strings, listening astutely to piano performances, and observing other voicers' techniques are all recommended as methods of developing this skill.

In terms of objective orientation, regulation lies somewhere between tuning and voicing. There are objective references, e.g., key height = 64mm, but they exist only in the engineer's drawings. By the time the piano is assembled, none of these references can be trusted with absolute assurance. Once again, skill and experience

are needed to accurately define certain parameters that allow a particular piano to perform at its best. These parameters take the form of mechanical relationships rather than precise numerical values.

Ideally, a piano technician is equally proficient in all three of these skills.

Chart 1 shows a chart (with some additions in red) used by physicist Donald Hall in his lecture "The Hammer and the String."¹ I have added the red brackets to indicate those segments of the playing process over which the technician has some control. The piano builder or rebuilder can extend this bracket to include soundboard motion.

Referring to this chart, the effect of the technician's work begins the instant the key is set in motion (*lever action*), and ends when the string vibration is transferred to the bridge (*force on bridge*). Regulation directly affects *hammer motion*. Tuning affects *string motion*. Voicing determines the physical condition of both hammers and strings when the two meet during the *striking process*. In the progression illustrated in Chart 1, voicing literally connects regulation and tuning. A thorough understanding of all three skills, *and how they relate to one another*, will enhance the technician's ability to make judgments involving each one individually and enable the technician to make the most of his/her time (and the customer's money).

Regulation

Taken as a whole, the object of the regulation process is easy to describe. The short paragraph below neatly brings together all facets of regulation and can serve as a definition of the entire procedure:

When a piano is played, mechanical energy is imparted by the pianist into the front of the key. This energy is used to propel the hammer, via a system of levers, into the string, initiating the piano's tone. The purpose of regulation is to minimize the loss of energy to this system, giving the player as much control as possible over the velocity of the hammer.

The concept of the entire process then, is simple. The number of steps, and therefore the number of separate skills needed to complete the regulation process, and the interactive nature of these steps are what make the task seem daunting. Taken individually, none of these skills is particularly difficult to master. How all of these steps relate to one another, and to the system's overall efficiency, is a more complex issue. Although there is a certain logical progression to the steps involved in regulation, any attempt to compile a comprehensive, ordered list of these procedures that will yield consistently high-quality results if followed precisely is bound to be both extremely lengthy

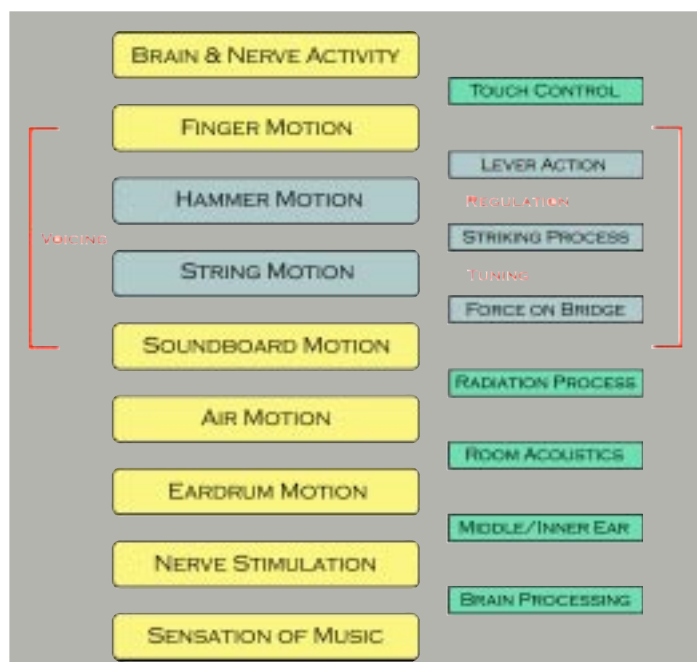


Chart 1 — Steps in the process of playing the piano. The steps influenced by the piano technician are bracketed in red. This chart is adapted from one by Dr. Donald Hall (see endnote (1)). Used by permission.

and inefficient in practice. Every service situation is unique. Ever-present time restraints force technicians to make judgments on which procedures to focus, and what degree of perfection can be attained in the time allowed.

It may be useful here to draw an analogy with the tuning process. When learning to tune (aurally), we generally follow someone else's written list of steps – a “bearing plan” – when setting a temperament. Along with these plans, there are usually a greater or lesser number of notes regarding checks and explanations for these steps. At first, we continually refer to this plan and compare our progress to it by using the accompanying notes. As time

goes on, we wean ourselves from having to refer to others' instructions and learn to make our own judgments “on the fly.” When we reach a certain level of maturity as a tuner, we realize that no two tuning situations are identical, and we are unconsciously altering our learned procedures in order to manage the situation at hand. If an experienced tuner were to write down his/her entire thought process on any given tuning, it would encompass volumes, and it would differ significantly from the same type of description the tuner might give for another of his/her own tunings.

The point is that, without even being consciously aware of it, we are constantly recreating our own “bearing

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Table 1

REGULATION PROCEDURES	
STEP 1 - PREPARATION	
TIGHTEN ACTION SCREWS	
TIGHTEN ACTION CAVITY & CABINET SCREWS	
TIGHTEN PLATE BOLTS	
CLEAN & LUBRICATE ACTION CAVITY	
BED BALANCE RAIL	
BED FRONT RAIL	
SAMPLE REGULATION	
STEP 2 - LUBRICATION/FRICTION	
ACTION CENTERS	
KEYPINS	
KNUCKLES	
KEY BUSHINGS, BALANCE & FRONT RAILS	
BALANCE RAIL HOLES	
STEP 3 - ALIGNMENT	
SQUARE KEYS	
SPACE KEYS	
ALIGN SHANKS	
TRAVEL SHANKS	
VERTICLE HAMMER ALIGNMENT	
ALIGN WIPPENS	
REPETITION LEVER HEIGHT	
JACK POSITION	
BACK CHECKS (ANGLE)	
BACK CHECKS (SQUARED TO TAIL)	
DAMPER WIRE ALIGNMENT	
DAMPER-UP STOP	
ADJUST PEDALS	
DAMPER LIFT	
KEY LEVELS	
KEY TRAVEL (UNIFORM)	
HAMMER/ STRING ALIGNMENT	
STEP 4 - REGULATION	
HAMMER TRAVEL (HAMMER LINE)	
SPRING TENSION	
LET OFF	
DROP	
BACK CHECKS (CHECKING DISTANCE)	
KEY TRAVEL (AFTER TOUCH)	

The logic behind the order of these four categories can be summed up as follows:

- 1) *Action Preparation* – Action components are cleaned, secured or firmly mated (as with the key-bed to key-frame arrangement).
- 2) *Friction* – Areas of excess friction are discovered and corrected. Excessive friction is that which causes an action part to impair the mechanical efficiency of a key, damper, etc. to a musically significant extent.
- 3) *Alignment* – These procedures involve the arrangement of action components in such a way that the transfer of energy from part to part is most efficient. The nature of these procedures differs from the nature of the regulation procedures in that their placement is either *right*, or it's *wrong* – at least within the framework of a particular action. As examples, a hammer shank is either moving straight up and down, or it's not; the key-set is either perfectly level, or it's not; etc...
- 4) *Regulation* - By contrast, *regulation* procedures can take on a range of values, and what is “correct” can often be dictated by circumstance, or simply be a matter of taste. The ranges of acceptable values for these procedures fall within narrow, well-defined limits. Even these small variables, though, when manipulated, can effect profound changes to the response of the piano.

This brief outline should be viewed as a “bearing plan” for regulation – a tool to use for the development of a foundation of efficient and confident regulation.

Table 1 also illustrates a design for an order of steps that can be used in situations where a “complete” prep is required – and adequate time is allotted. As an illustration of how these ideas can be applied to this specific case, the procedures in each of the four categories are split into two groups. Those that are *not* highlighted in yellow can all be completed at the beginning, *with the action removed from the piano*. They can be thought of as representing a first pass through the “four steps.” The procedures that *are* highlighted in yellow must be performed with the action *in the piano*, and represent the second pass through the “four steps.”

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plans,” and referring to our own “notes” that have accumulated over years of experience and study. All of this happens more or less instantaneously. When an experienced tuner examines a piano to be tuned, he/she can make what amounts to an extremely complex diagnosis within a matter of seconds. All matters of pitch adjustment, pin tightness, and character of sound are quickly analyzed, and, by the time we sit down to actually do the work, we know exactly what to do and are able to adjust our procedures to meet whatever time restriction exists for that particular job. No longer having to refer to anyone’s notes or checklists, we can stay several steps ahead of ourselves. There’s nothing extraordinary about this; as piano tuners, that’s our job.

I believe that the ability to make quick, complex judgments as to the proper course of action is generally more apparent within the subject of tuning than it is with regulation. Part of the reason for this is that most technicians have performed far fewer complete regulations than they have tunings. This lack of experience can lead to an incomplete awareness of the *musical* value of proper regulation. The fact is that, within a given time frame, time spent regulating a piano can often effect a greater musical improvement to the piano than, say, voicing can. (As we’ll see later, the quality of voicing is actually dependent, to a significant degree, on the quality of regulation.) Sometimes the opposite is true, but the ability to quickly assess a situation and make decisions as to how to invest your time is a crucial skill for an efficient, and therefore valuable, technician.

The “Four Steps” of Regulation

The ability to perform efficient regulation is predicated on the development of two separate disciplines: the mastery of each individual skill and a thorough understanding of how these skills combine to produce a desired overall effect. With practice, and some instruction, mastering individual regulation skills will take care of itself. Developing an understanding of the interrelation of these steps and learning to apply this information to improve efficiency are matters that are, by nature, considerably less clear-cut. For this reason I have simplified the entire process by placing all of the individual procedures into four distinct categories (see Table 1):

- Action preparation
- Friction
- Alignment
- Regulation

Taking a list of procedures normally associated with

regulation, each separate procedure can be distributed into one of these four categories. In a general way, these four categories follow one another in sequence – the completion of each category laying a foundation for the next. Now we can begin to think of “regulation” adjustments as simply different facets of just four steps. One advantage of this arrangement can be illustrated by using it to help analyze an action intended for regulation: using the list below, a thorough analysis can be made by drawing on just four well-ordered observations. The analysis is a vital component of regulation, and will be examined, along with other regulation procedures, in the next article.

A Final Thought

Every time I’ve presented this material, whether at the seminar held in our offices in Wheeling, Illinois, or at various Guild conventions, at least a few participants have argued that certain procedures should be placed in different categories, or that the distinction made between alignment and regulation procedures is too rigid ... and there are others. This is exactly the kind of response that I look for! It helps me underscore the crux of the matter. None of this material is designed to be rigid – quite the opposite. It is intended as a device to help the technician gather his or her own knowledge and experience, sort it out as they see fit, and focus it on the task at hand – all taking into account their own tastes and abilities. It’s a little like the opening in a game of chess. Opening sequences (and their variations) are studied and memorized through a string of 15 moves – or more. Rarely, however, is your opponent polite enough to follow along with your plan for more than a few moves. When the inevitable wrench is thrown into your planned opening, you don’t discard the plan, you simply alter it in order to adapt to the situation at hand. This analogy serves a purpose, but it breaks down rather quickly. I don’t, for example, like to think of the piano as my “opponent.” On second thought, there are times ... but that’s an entirely different subject.

Notes

¹“The Hammer and the String,” by Donald E. Hall. *Five Lectures on the Acoustics of the Piano*, edited by Anders Askenfelt. Royal Swedish Academy of Music No. 64, Stockholm, 1990. In the context of his lecture, Dr. Hall uses this chart (p. 59) to illustrate concepts viewed from the perspective of a physicist. I use it here because I find it a very useful tool in putting our work as technicians into perspective. ☒