Dos and Don’ts for Piano Servicing

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Objectives

- To offer guidelines for piano tuner-technicians on:
  - Enabling best value-add to our customers
  - Focusing on the important job requirements
- Provide guidance to the piano-owning public

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1) Tuning Pin Stability
2) Tuning Hammer Technique
3) Ambidextrous Tuning
4) Muting and Unisons
5) Aural versus Visual Tuning
6) Reject Non-Standard Tunings
7) Piano Technician Groups

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8) Get benchwork experience

9) Use of Hearing Aids

10) Loose Tuning Pins

11) Humidity Control

12) Soundboard Cracks

13) Pitch Raise

14) Use of lanolin for “zinging” strings

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15) Historic temperaments – myth versus reality

16) Steinway Teflon Action Centers

17) Tight action centers. Verdigris

18) Use of lubricants

19) Piano Rebuilding

General Comments

- Plan on lots of practice
- Practical experience is important
- Aptitude is very desirable
  - Mechanical
  - Aural
  - Problem solving
    - New issues are always arising

(1) Tuning Pin Stability

- Tuning objective: stable pitch, even with loud playing
- Learn via practice to achieve:
  - Neutral pin twist and bend
  - String neutrality at friction (bearing) points
- Upon raising pitch: go sharp, ease flat
  - Opposite for pitch decrease
  - Factor in non-speaking length of string to the tuning pin
    - The longer the non-speaking length, the more pin change typically needed
- Strong key blows are NOT NECESSARY
  - Loud noises can damage your hearing or cause tinnitus
  - Learn the proper touch. Practice it

(2) Tuning Hammer Technique

- Slow tuning hammer movement ONLY
  - Remember: pin blocks are made of wood. Wood fibers (like cotton string) are more resilient under slow stress than with a fast “snap” or impact.
  - NO IMPACT TUNING, aka “jerk tuning”
    - Possible exceptions only for particular pins or sections of pins with explicit problems
- Be prepared to decrease tension first
  - If there is a hidden rust bond, such as between the string and the bearing felt.
  - When you hear an initial “zing” when first decreasing string tension
- Again, learn to stabilize and settle the tuning pins without hard blows
- Remember, for a quality piano, 40 or 50 years is only the beginning of its lifetime

(3) Tune Ambidextrously

- Tune grands right-handed (except for the upper section)
  - Tune uprights left-handed
- Angle the tuning hammer such that you are never compressing the pin block while raising pitch
  - Regardless of whether the manufacturer uses bushing sleeves or not
  - Avoids shortening the life of the pin block
- The combination of tuning ambidextrously + avoiding impact tuning:
  - There should be no significant degradation of pin tightness in the pin block of a quality piano after, say, 40 years of tuning – assuming a reasonable humidity environment.
- The phrase that “time is money,” is NOT appropriate here
  - Slow + ambidextrous is worth money to your customer, not the speed of the tuning
- You too can learn to tune ambidextrously.
  - Even if you are right-handed (or left-handed) for everything else
  - Just decide that you will learn to do it

(4) Muting and Unisons

- First tune only one string per note
- Traditional strip muting works fine
  - For a grand piano
    - The temperament octave
  - For an upright
    - All multi-string notes except for just above the treble break
- For grands I tune note-to-note unisons as I progress beyond the temperament octave
  - Traditional “Triple-String Unison” approach works fine
    - 1) Tune one string;
    - 2) Tune second string to the first string;
    - 3) Tune third string to the second string
      - On uprights, tune the third string to the first and second strings together
  - Consider using a two-string unison approach for problem notes

(5a) Aural vs Visual Tuning

- Both approaches can achieve good accuracy
  - Yes, visual tuning (with an Electronic Tuning Device, or ETD) is easier to learn
- Consider using aural tuning
  - Tune with your ears
  - You will tune (or at least test) unisons aurally anyway
  - Keeps your ears trained
    - Including for tuning evaluation purposes as well as for tone regulation
- Aural tuning is “enjoyable and exciting”*
- See my separate presentation on Learning Aural Piano Tuning**

* Ben Gac. Steinway Technical Trainer
** On my Web site. https://potomacpiano.com/tuning-articles. “Learning Aural Piano Tuning”

(5b) Aural vs Visual Tuning

- Aural tuning works well based on the principles followed throughout the twentieth century
  - Such as the John Travis approach that I use and teach
  - NO need to stress out on:
    - Learning music theory or understanding music chords
  - Keep it simple and powerful
    - Industry-standard equal temperament with pure octaves
    - Implicitly utilize native piano-based inharmonicity that averages more than 10 cents per octave!
    - Lots of aural tuning approaches are available
      - Suggestion: try to keep it simple! No counting of beats!
      - Keep with the proven quality backed by tradition as enjoyed by Rachmaninoff, Hoffman, Rubinstein, Horowitz, Hess, etc

(6a) Reject Non-Industry-Standard Tunings

- Equal Temperament (ET) was established in 1917 for a reason
  - 12 – TET (Tone Equal Temperament) based on the octave
- Some piano tuners use other ET's, or non-ET's, or historic temperaments
  - Examples: perfect 4th and/or 5ths and/or 12ths (all of which yield non-perfect octaves)
    - Or adjust octave stretch, or use historic temperaments, or do other modifications.
  - Some tuners use an ET that is not the industry standard
    - Such as 7-TET based on the fifth OR 17-TET based on the twelfth
- If considering other than the industry standard piano tuning
  - First listen to an A-B comparisons, preferably blind comparisons
    - Are generally not available!
  - Ask for documentation for the non-standard temperament
    - Such as via use of Scala. Are generally not available!
  - Ask to try it beforehand
    - Using a MIDI keyboard with a MIDI controller such as Pianoteq

(6b) Reject Non-Industry-Standard Tunings

- For acoustic pianos, stick with the industry standard tuning
  - Allows modulation to any musical key
  - Matches (perfect) octave use in all classical music and by all string instruments
- If you are interested in piano playing using non-industry-standard tunings
  - Consider the purchase of an all-digital piano
    - Such as a hybrid, or a MIDI keyboard with a MIDI controller
    - Instantly tune-able on a per-musical-piece basis via an app
    - You can match a classical composer’s original historic temperament per-musical-piece

(7) Piano Technician Groups

- Consider association with groups of other tuners
- A couple good formal technician groups are:
  - Piano Technician Guild
  - Master Piano Technicians of America (MPT)
- Look for acceptance based on the quality of your work
  - Regardless of whether you tune aurally or visually
- Options include joining / following several excellent online Piano Tuner list servers
  - Best opportunity, besides with direct apprenticing, for learning benchwork
- Look for apprenticeship work in your community
- Be aware of the impact on the piano tuning profession of the recent significant decrease in acoustic piano sales

(8) Get Benchwork Experience

- Best approach: apprenticeship and/or a school
- Piano Technician Listservers. Examples:
  - Piano Technicians Guild
    - https://my.ptg.org/communities/community-home/digestviewer
  - Master Piano Technicians of America Facebook group
    - https://www.facebook.com/groups/masterpianotechs/
  - Facebook's Piano Tuner's group
    - https://www.facebook.com/groups/pianotunersgroup/
- Lots of good YouTube and other sources available online
  - Regulation example:
    - https://www.youtube.com/watch?v=pHKdPNCa4aA
  - Tone regulation example:
    - https://www.youtube.com/watch?v=NrORPqRzSN0

(9) Hearing Aids

- Not necessary to switch to visual tuning with hearing degradation
- Great progress in hearing aid technology in the past several years
  - Computer-based (in your ears) and wireless
    - Bluetooth for control and for optional audio to/from the hearing aids
  - A control app on your phone to adjust
    - Gain, frequency response, filtering, noise reduction, etc
- Potential for normal, or even better than normal, hearing*
  - Enhanced capabilities
  - Ability to real-time adapt to problem situations like
    - Background filtering for noisy environments
    - Temporary gain or frequency adjustment for unique piano issues

* Ensure that any noise suppression and frequency compression are appropriately remote controllable
* Ensure that safe limits for loudness are not exceeded in your control of the hearing aids

(10a) Loose Tuning Pins

- Move up one size ONLY
  - Achieves adequate tightness
  - Avoids a wedge effect on the pin block / wrest plank
    - Extends its life
    - Minimize impact on neighboring pins
- Screw the pins in/out
  - First remove and preserve the old becket / coil
  - Screw the new pin in. Estimate the height for when string is later added
    - Do not drive it in.
- New tuning pin
  - Use the best quality pins
    - With threads cut, including after any plating

(10b) Loose Tuning Pins

- Usually sufficient to only replace those tuning pins that are too loose
  - One loose pin.
    - If in the treble, I usually do both tuning pins that are on a single string
  - A section of loose pins
    - Address as torque fails.
    - Might occur multiple times over a period of multiple decades
    - Sections of 2, 4, 8, etc tuning pin replacement
  - When there is not systemic pin block failure, this approach can be very cost effective for your customer
    - I service Steinway grands where this approach has been extended over 30 to 40 years and still going strong
  - Avoids rebuilding of the piano

(11a) Humidity Control

- Humidity control is very important for musical instruments like pianos
- Humidity gauges are a desirable home device
  - Inexpensive and accurate digital versions (with memory) are readily available
- For adding moisture (in Winter), in order of preference:
  - (1) Whole home units are most preferred
    - Very common in colder areas like DC
    - Forced hot air humidifier systems use flowing water
  - (2) Room humidifiers are next best
    - Cost range $50 to $150
  - (3) Piano specific humidifier aftermarket systems are an undesirable last choice
    - Regular maintenance when piano is tuned
      - Check for corrosion, particularly with hard water
      - Be sure to first disconnect the electricity before any maintenance
    - Advise customers on regular use of anti-bacterial agents in the water
      - Advise on potential health issues from standing water or mold, such as Legionnaires Disease

(11b) Humidity Control

- Some topics from my paper*
  - Health issues with chemical additives
  - Whole house alternatives
  - Electrical safety
  - Cost & maintenance
  - Physical and operational complexity
  - Lack of pin block protection for grands
  - Operational Sequence

* On my Web site. https://potomacpiano.com/tuning-articles. “Considerations For Piano Humidifying Systems”

(11c) Humidity Control

- For removing moisture (in Summer), in order of preference:
  - (1) Whole home units are most preferred
    - Most home air conditioning systems include moisture removal
  - (2) Piano specific dehumidifier aftermarket systems
    - Work well
    - Minimum maintenance

(12a) Soundboard Cracks

- Important to control the range of humidity and temperature of a piano
- Soundboard cracks need to be repaired when soundboard bonding to the ribs is compromised / threatened
  - Glue joint to ribs broken near the crack
  - Protect the integrity of the downbearing at the bridges
    - Protect the crown of the soundboard
- Piano rebuilding is rarely needed
  - In my experience

(12b) Soundboard Cracks

- Simplest repair approach appears to be the most desirable & effective
  - Screws to re-bond the soundboard to ribs
    - Example: #5 x 1” or #5 x 1 1/4” round-head screws
  - Tools: drill, starter bits and pass bits
    - Long drill bits sometimes required
    - Apply screws from soundboard side
      - Or from rib side if soundboard side is not accessible
  - Optional: inclusion of glue
  - Lifetime of screw bond found to be extensive / long
    - At the least, more than 30 – 40 years
- Rapid, inexpensive, and important repair

(13a) Pitch Raise

- Very common situation
  - You are asked to tune a piano quite low in pitch
    - Been neglected over many years
- Various options for the tuner, including
  - Double tuning
  - Use an ETD set for a pitch raise
    - Set it to estimate the amount to over-tune
  - Or do the following:

(13b) Pitch Raise

- My preference: do a “normal” tuning to proper pitch
    - Exception for drop-action spinets
  - Advise the customer ahead of time on the impact
    - Quality of this first tuning will suffer
    - Will need tuning again within 2 to 6 months
    - Piano will need several weeks to adjust to the new tension
      - Continual decrease in pitch
    - Explain that other customers have been pleased with the result
      - And that the next tuning will be better quality and will hold better
  - Make the follow-up tuning appointment

(14) Use of Lanolin
for “zinging” / string binding on grands

- Problem: piano strings create a bond to the string bearing felt in front of agraffes
  - String can break when tension is increased.
  - Under-string corrosion (rust) at the string bearing felt
  - In particularly bad cases, must first release the tension when tuning
    - Wait for the loud “zing” before re-tightening
- Lanolin rubbed into the string bearing felt
  - A permanent fix. One application
    - Restore original friction pattern
  - 100% pure anhydrous lanolin. A natural product of wool
  - Rub it into the felt by hand
    - Give it a few weeks to continue to work its way into the bearing felt under the strings. Effect will not be immediate
    - No risk when applied to the bearing felt, unlike with a liquid, of the lubricant traveling to the tuning pin
  - Available at pharmacies
  - Yes, lanolin is very sticky/messy on your fingers!

(15) Historic Temperaments

Myth versus Reality

- Historic Temperaments – used by classical music masters before the 1900's
  - Octave-based Equal Temperament was established as the industry standard in 1917
    - Two different sounding keys – major and minor.
      - Two sets of twelve shades of grey
    - Enabled the growth of the acoustic piano industry
- Historic temperaments convey mood and color as a function of the key chosen
- Evolution of historic temperaments were very roughly:
  - Just Intonation followed by Meantone temperaments followed by Well Temperaments
- As mentioned earlier, not practical for acoustic pianos
- Good introduction to historic temperaments by Dr. Baldwin:
  - https://www.youtube.com/watch?v=y6iwiQwVUIc
  - https://www.youtube.com/watch?v=309gNT_72Nc&t=47s

(16) Steinway Teflon Action Centers

- A Steinway invention
  - Used in Steinway pianos 1962-1982
- Excellent engineering!
- Audible “clicks” began appearing (humidity effects)
  - Steinway went through iterations
  - Enough of the piano technician community was unable to learn to properly service the instruments, so use was discontinued
- What to do if your piano, or one you want to purchase, has teflon centers
  - Hire a piano technician with engineering skills to service them
  - Not a big deal for the appropriate technician!
  - Problems rarely occur, particularly in a reasonably-controlled humidity environment

(17) Tight Felt Action Centers

- Piano action gets sluggish and tight
- Often caused by a center pin corrosion called verdigris
  - But can have other causes
- Be cautious of liquid-based quick fixes
  - Most are only a temporary fix. A year or two
- Often the main culprit is the hammer flanges
- Consider manual bushing reaming and center pin replacement for all hammer flanges
  - Approximately 3 hours work
  - Should last well more than a decade

(18) Use of Lubricants

- No established standard set of lubricants
  - Best guidance: be conservative
- Action centers
  - Liquid lubricants have a history of short-term success, long-term failures
  - Liquid lubricants usually have proprietary contents
    - Depend on word of mouth for endorsements
- Some lubricants are dependable
  - Lanolin for string bearing felt friction / zinging
  - Talcum for tight or jumpy tuning pins
  - Teflon for wippen cushions and hammer knuckles

(19) Piano Rebuilding

- Variations in quality of rebuilds
  - This is factory-level work - often now done outside the factory
- Removal of plate (and soundboard repair/rebuild) is not unusual
  - Compression crowning of soundboard is commonly done
    - But approaches vary widely. None appear to be the original factory methods
  - Modern soundboard woods are not equivalent to original woods
- Some times the end result can be disappointing
- Likely that rebuilding contracts will not allow for a refund should the resulting tonal quality or timbre or power be unsatisfactory
- Pursue personal and professional recommendations before proceeding

Summary

- Presented a core set of principles for piano tuners-technicians
- Questions, suggestions, and discussions are welcome
- Happy to arrange a Zoom session

Dos and Don’ts for Piano Servicing

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