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Jim's Background

Jim has been to all the manufacturers training classes – Yamaha, Steinway, Renner. He tuned pianos on the side, taught for nine years, then got more in depth with pianos. Next he worked at a friend's efficiency company. There he learned how to cut time and be 20% more efficient, which increases profits. For example, when he gets into an elevator, he would ask "how long does it take for the elevator door to shut?" If you save 5 minutes a day, that's 30 hours a year saved. Save ten minutes a day, that's more than a work week saved per year. By being efficient, you can schedule either four two-hour piano appointments a day, or fewer appointments and do more work.

A Logical Order for Vertical Regulation

Repairs, alignment, cleaning, & tightening have been completed prior to regulation.

Step 1: Pre-Regulate

1. First determine what major tasks must be done, or that should be done if at all possible
    a. Balance rail hole repair
    b. New felt, punchings
    c. Soundboard repair
    d. Reshaping hammers (or replace with new)
    e. Trapwork, pedals,casters
    f. Touchweight
    g. Case refinishing, etc.
    h. Pinblock repair
    i. Bridge repair
    j. Key bushings
    k. Keytops
    l. Key pins
    m. Re-pinning
    n. Bridal tapes
    o. Dampers
    p. Strings
    q. All miscellaneous repairs

2. Second, check or ensure the following minor tasks are completed prior to regulating
    a. Clean and lubricate
    b. Ease keys
    c. Check dampers, adjust, and fix leaky
    d. Adjust pedals
    e. Action is properly located
    f. Tighten screws
    g. Travel, burn and align hammers to strings
    h. Square, space & (after 2D below) level keys

Step 2: Regulation Steps

Step 1. Set samples

- Set C4 and C#4 for proper aftertouch., indicated by 1/32" space between jack and hammer butt on a normal mf blow.
- Adjust lost motion and checking
- Manipulate dip, let-off and blow to achieve after-touch
- Re-adjust lost motion and checking

Step 2: Wholesale Changes
Samples have now revealed what the piano wants. Now make wholesdale changes as needed to get everything to "ballpark" specs.

1. Set blow distance to the sample that worked.
    a. Set stick gauge on hammer rail and wink the hammers
    b. Fine-adjust by inserting a rubber mute
    c. Adjust the gauge until the hammer winks
    d. Do the same exact thing with grand pianos
        i. Set the first and last one so they are perfect
        ii. Set the second and last one
2. Raise or lower let-off rail
    a. Don't sacrifice let-off
    b. With let-off closer you have more power and more control
3. Change dip, or key height
    a. Dip, blow, let-off
    b. 17-21 mm: slight rectangle on front of keys for key height
    c. Key height is primarily determined by the case , rather than the specs
4. Re-level keys if needed
    a. With stick or Yamaha key leveling stick and look down from both sides
    b. Tap to see which keys are too high & fix

c. Next see which are too low
d. Feel with fingertips

Step 3: <u>Fine Regulation</u>

- Lost motion
- Let-off (refine)
- Checking
- Dip (refine)
- Bridle straps

Tools:
Jim handed out some tools for us to use during regulation.

- Back-check gauge
  - Checking 1`5mm or 5/8”
  - Steinway has gone to ½”
  - Is the gauge touching the hammer?
- Stick
  - Adjust let-off
  - Square keys
  - Level keys
  - Drill hole through stick, insert screwdriver through hole as a fulcrum and adjust the let-off rail fork up or down.
  - Tap front rail bedding

Video: **“Splicing Hammer Shanks**

- Cut splice angles in jig
- Wood glue on one part, super glue on the other part
- Insert straw over first, insert second piece with superglue into clear straw
- After 15 seconds it should be set. Cut off straw
- Sand excess glue with sanding paddle
- If the break is uneven or if a new shank must be spliced onto an old one and you do not have a cutting jig, tape two shanks together and cut them both at once.

Tone Building

What makes the most difference?

From the list below, listed in alphabetical order, which makes the most difference in the actual sound of the piano?

1. Aligning hammers to strings
2. Blow distance (42m-45mm)
3. Center pin tightness (0-5 grams)
4. Drop (1/32" to ½")
5. Hammer alignment (burning shanks, slightly crooked vs. straight-on, perfectly mated)
6. Hammer shape (very important)
7. Loose pinning (will cause multiple strikes)
8. Jack to knuckle alignment
9. Let-off
10. Mating hammers to strings
11. One 3mm stitch in only one string out of a tri-chord at the crown
    a. one poke at the crown makes a huge difference in the tone
    b. Norm Neblitt and Wally Brooks make noticeable differences when voicing
12. Traveling hammers

A. Has the most influence on sound
B. Has noticeable influence by not as much as A
C. Seems to have little if any influence on tone by itself.

Where Do You Spend Most of Your Time?

Most time:

Least time:

How Good Are Your Skills at the Following? (1-10)

1. Hammer shaping
2. Mating hammers to strings
3. String prepping
4. Setting let-off

Reallocating Priorities: What Do I Really Need to Do Better?

Write down your skills and priorities and focus on where and how you can improve.

Hammer Shaping/Resurfacing in Ten Minutes

Introduction

It used to take me hours to reshape hammers. I carefully filed each hammer, frequently looking at both sides of the hammers to make sure they were balanced. I carefully tried to "bring up a bead of felt" up and over the other side of the hammer. Then I started seeing people doing a much better job, in a fraction of the time!

Learning the method below has saved me literally hundreds of hours over the years, and my service calls are much more enjoyable! There is a learning curve, but by following the instructions below that curve should be greatly minimized.

Why Use This Method?

1. To save time. Use the time you save to do more to the client's piano.
2. To keep all hammers relatively uniform. By gang-filing you are preserving the integrity of the hammer line, which makes it easier to do periodic resurfacing of the hammers. Individual hammer filing can leave each hammer slightly different than its neighbor, making gang filing impossible to do later. Except in the bass and some of the angled hammers in the lower tenor, hammers can be filed as if they are all "one big hammer."
3. To keep hammer crown parallel to the string plane. Using a wide sanding paddle or a wide strip causes less "rounding" of the hammer crowns, thus making it easier to mate hammers to strings.
4. Nice, straight hammer-lines look better. If you like the look of a new set of hammers, gang-filing can help maintain this look, and return uniformity to the hammer line.
5. Hammers that vary in size/weight can affect regulation and touch-weight. I have seen hammers reshaped by very good technicians that have varied by nearly 1/16", and hammer weight that varied by nearly 2 grams!

How Is It Done? (Restoring, or creating a "good shape")

1. Know the desired shape. The "ideal shape" is the most important thing to keep in mind. You must be able to visualize the end result of your efforts. Some companies (Steinway, for example) have published pictures of what hammers should look like in each of the different sections. I won't try to describe shapes here, but you should end up with something that is appropriate for each area of the scale. Bass hammers will usually look rounder, upper treble hammers will have their slender shape, etc. When you're finished filing, the whole set should be balanced (i.e. one side mirrors the other) and should look like they were "made that way." Take a look at brand new hammers and remember the shapes.

In general, I like to restore the original shape of the hammers to whatever they were, because this tends to follow the layers of felt better. That being said, technicians from Steinway, Kawai and some very successful independent techs have imposed the “diamond shape” to various hammers and have had great success in bringing out better tone from the hammers.

2. Aggressively “sculpt” the set of hammers (4 minutes). (At this point we’re not doing the bass hammers or any hammers that are angled more than about 4 degrees). Start with aggressively sanding, using a very coarse grit. I prefer 60 to 80 grit of very good grade sandpaper. This is a very fast and extreme removal of felt. Start filing as low as possible and remove felt up towards the crown. You must have the shape you want in mind. You are removing felt in the places that will give you the desired shape. At the crown, stop when you have taken off about 1/3 of the string cuts of the side you’re filing, then do the same to the other side. The goal is actually to “sculpt” the hammer into an acceptable shape, but to leave the middle 1/3 of the string cuts intact. Occasionally, stop and look at some hammers from both sides and try to make the sides perfectly “balanced.” Take off felt from a wider side until each side is the mirror of the other: achieve symmetry.

3. Now use more “finesse” (2 minutes). You’ve aggressively removed a lot of felt. Now, switch to a gentler touch when the hammer gets close to the desired shape. This gives you more careful control and lets you refine the shape. Continue to leave the middle 1/3 of the crown (string grooves) intact. You will deal with this later. Consider the set of hammers as “one big hammer” and make sure you are filing uniformly and not taking off too much felt in any area.

4. When the basic shape is formed, switch to a finer grit (2 minutes). To do the finish work I like 320-grit. Starting low on the hammer, use the finer grit to finish the hammer clear up to the crown. You will now go very gently over the crown and shape the remaining 1/3 of the string grooves that you previously left alone. As you do this, do not take all of the cuts out, but shape the hammer so that you have a good smooth shape over the crown, leaving just a hint of the cuts at the very apex of the crown still visible. Avoid taking this hint of the cuts out because this is the line you do not want to cross. The felt under the bottom of the string cuts is new felt and you do not want to remove any useful felt unnecessarily. Felt doesn’t’ grow back! Continue to work the hammers, making the whole set look brand new. You may continue to perfect the shape if you need to, but at this point, the shape should be completed. As you gain experience you will not need to do any remedial shaping in this step.

5. The finial finishing is done with very fine grit sandpaper (2 minutes). I use either a sanding paddle with 1000 grit, or a wide sanding strip with 1000 grit. This final "finishing" removes any unsightly marks and give the hammers a nice look. Some hammers require 400, then 600-grit, but a good grade 1000 grit paddle used firmly will usually do the job. Don Mannino teaches to "slap" the hammers as you use the 1000 grit paddle, as it helps pack the felt. I've done this for years, and it can make the hammers sound a bit brighter, so sometimes I finish with a 320 grit as taught by Rick Baldassin in the Renner Academy classes.
6. You are now basically finished re-shaping. Most of the time bass hammers are not too flat and do not need to be reshaped. A quick resurfacing with single hammer strips can make them look good, and this takes another 3 or 4 minutes if you want to take the time. If they do need to be reshaped, use the small sanding strip move aggressively, or switch to a small sanding paddle. Bass tri-chord felt is always more problematic, so take more time on 9' pianos with tri-chord felt, and make sure to mate the strings there.
7. What about the "hint of the string cuts" that we left? As I mate hammers to strings (I lift and level strings first) I like to have this "hint" of a string cut so that when I lightly file to mate hammers I can still see the cuts. If I need to take off a tiny bit of felt, I usually only need to remove the "hint" completely and the hammer is mated. By leaving this "hint" you are ensuring that you are not taking off too much felt unnecessarily.

Speed Voicing

- Put masking tape on the top of the key slip or the key bed in front of the keys.
- Go through every note and mark on the tape whether the note needs to be louder or softer. This procedure can be done without removing the action.
- To soften the loud hammers, use the long thin stick with one needle on the end and poke the tops of the hammers.
- To brighten the soft hammers, place your finger firmly on the strings you will be striking and play the note hard ten times. This packs the felt.
- Scott Jones will brush a tiny bit of lacquer onto one string cut.
- Rock a squeegee over the hammers in the opposite direction while pulling the sandpaper strip. This provides enough friction that the hammer looks brand new. Part number

Miscellaneous Issues

- Crooked or asymmetrically shaped hammer: file to be even on both sides.
- New type of felt. A lot of companies are going to this. Ray Negran uses it.
- Scott Jones string couplers. Do not dampen any of the duplexes in the upper section. There should be a sizzle in the upper section; this is necessary to project the sound. Instead of muting this off, add a drop of glue between the two strings on the player side of the agraffe, or use a string coupler. Even putting a coupler on one string will change the weight and singing of that string.

Video of String Prepping

Lock the strings on the hitch pin.

1. Pitch raise. Before prepping the strings with Roger's string twister, tune the piano high by 10 cents high in bass, 15 in low tenor, 20 in high tenor, 30 and 40 in treble. After twisting the tool to sharpen the bend of the string around the bridge pins, the tuning will drop down to zero. When a string is prepped, the sound will pop out of the piano.
2. Jim demonstrated how to prep the strings on a grand piano in 10 minutes using Roger's tool, starting with the non-speaking bridge pins.
3. Push the strings. After tightening the string bends with Roger's tool , then takes the other tool, goes underneath the strings and pushes horizontally to make the band. He taps the tool lightly with the palm of his hand, and you can actually see the string moving. If the pins are loose, instead of tapping the pins in, add one drop of super glue. Put the drop on the pin and let it sink in; don't get the glue under the pin or the pin will rise up. This technique increases tuning stability. It also increases volume.
4. Milk the stings. Use the string lifter to pull up each string on the speaking length side of each agraffe. The metal part on the handle can be used to push the string down instead.

Grand Regulation Quick Reference List

Before you start, ensure that you have:

- Hammers off the rest rail
    - Hammer shanks should be about one shank diameter above the rail.
    - Set samples on C4 and C5
- Repetition spring
    - There must be some rise. Check at decent height to see rise
    - Hammer might be too high
    - If pops too high, centers might be loose
        - Drop test: lift hammers and drop them
        - Hang action down & swing hammers
        - Stand action on end and tap the action to see if they move
        - Lift them all with the key slip and see if they drop down
        - Stand the hammers straight up and see if any don't balance
- Enough key travel
    - Set/examine samples and set dip now
    - 10mm+ of
- Enough drop (Enough but not excessive. May need to manipulate let-off, spring tension, rep height and/or jack position to get drop.)

The checks are for built-in redundancy, in a circle of refinement.

Rough Regulation

- Blow
    - 1 shank
- Jack position
    - Push down on the rep lever, and line eye up with the back of the jack
- Rep height
    - Line up eye directly over
- Let-Off
    - Mannino can do let-off in 9 minutes
    - A quick way is to set samples by eye of the first and second hammers on each end of the section. Set the stick on the first and last one and move the stick so that that the second samples wink. Now adjust all the middle hammers to wink the same.
- Key travel
    - Raise the keys off the rest rail and set a sample dip.
    - At C4 the hammer should go up to 1/16" of the string, then drop 1/16", and come back up 1/32" for after-touch.

- Drop
    - Set a bit low
    - Make sure there is some drop
- Back-check
    - ½”-5/8”
- Rep spring
    - Bass a bit slower than treble
- Repetition lever height
    - Press jack down with middle finger so it rubs against the knuckle
    - Set one jack too high so it’s rubbing and feels sticky
    - Set the other jack too low in the window so there is no friction
    - Set the middle jack so it is just right. Feel it with your finger so that it’s just right: not sticky and not friction-free. This is a touch done by feel, which is quick. We want the jack to go under every time.

Final Regulation

Fine-check all the adjustments:

- Jack position
- Rep Spring
- Rep lever height
- Let-off
- Blow
    - Set samples for best after-touch
    - Set hammer line by averaging after-touch
- Drop
    - Set to touch fly and rep lever at same time
    - Bounce the same
- Back-check
    - As close as possible
    - Rock check

Hammer Spacing

- Use carbon paper to make string marks on hammers
- Clamp Mylar over hammers with string marks. Adjust the flanges so the hammer lines move, comparing the hammer string marks to the marks on the Mylar.
- Tap the ends of the flanges with a screwdriver to space the hammers.
- Use an upright spacer on grand flanges.
- To align hammers for shift pedal, insert magnet strips
- Not all hammers are equal, so centering them does not always work. Instead, go off the left side of the hammer for consistency.

Tools and Techniques

Kits

It is important to have redundancy of tools. Jim carries a mini kit with the same tools as in his main kit. He purchases multiple kits because they wear out.

Some tools we need to own:

- Shoe reducer for sizing the center pin hole in the wood.
- Clippers for breaking old plastic elbows
- Flat spoon benders
- To set spoon damper lift, some people use a turnbuckle. A simpler quicker way is to use a piece of wire to lift the damper lift rod to the sample height. Stick it through the rod, pull it up so the dampers are engaging, move it down to match the samples, and adjust. The hammer and damper should move at the same time when lifting the whippen for evenly timed spoons.
- 3M Wet or Dry Rubber Squeeges, patent number 05517 for evenly rounding hammers with a sanding strip
- Block for grand damper adjustment. Set on top of keys and depress until clicks.
- Key leading kit includes sliding down-weight up-weight gauge, Chris Roberts lead remover tool “Dead Leader,” 3 sizes of punches , little anvil, several sizes of leads, all in one case. Use the 50-20 rule: 50 down-weight, 20 up-weight. Get rid of friction first; there is a formula for friction and a formula for balance weight. Before punching out weights, check if the problem is the hammer, not the key. Inertia makes up only a small percentage of key problems: 2%-5% difference.
- LeRoy Edward’s bag clip. Clip onto damper underlevers, unscrew and re-screw the damper wires, and the dampers will be exactly the same height.
- Weight with leads to push keys down for aligning hammers
- To spread tight front rail key mortices, use aluminum cauls, or make a jig with a custom-made mortice sizing tool ground down and set in a block of wood.
- File card or card file, which is a brush to clean files. After needling hammers, press and squeeze it into the hammers to improve voicing.
- Converted butter knife as a key after-touch gauge: .0030 - .0050.
- Needles in a shank for unicorda. Eric Shandel came up with this.
- Small mirror with folding stand to rest on strings to view dampers from behind.
- Squeeze voicing with modified pliers. Install stop screw on handle.
- C-Clamp with hole drilled into for pressing pedal pins
- Dr. Jack Hamilton invented the rapid voicer, which is a dental tool.
- Mason Hamlin BB hammers that had been cut on one side in order to clear the belly rail. Instead, sand down the belly rail and maintain original hammer shape.
- Small awl as a spike needler
- Bent wire for removing capstans with a drill

- Long center-pin reamer. It's not just a wire, but a long soft wire made with the same material as center pins
- To re-pin Schwander style whippens, you have to mobilize the spring, so he showed a special wire tool.
- For a concert instrument with a little bit of an edge, take a needle tube, and put a thin line of ProFelt along the string cuts of the hammers. This softens the tone from edgy to creamy for a couple months. It contains silicon and fabric softener.
- 56 gram weight should push down every key
    - Some might go down more slowly than others
    - With one weight we can determine if it is a friction problem or a down-weight problem
    - At 20 grams the key should come up
- Gauge for hanging hammers with magnet on end

Modifying Tools

- When using a tool pouch, have everything look different so the tools are easy to see & pull out
- Mark one side of turning or twisting tools so you know which way you're going
- Add grips or handles
- Bend 90 degrees on key spacer
- Sand parts of tool shanks so the tool fits better between parts
- Alter shape of center pin hole reamer
- Add slots to every screwdriver so springs can be reinserted
- Upright flange spacing tools, grind off tip
- Bend flat capstan wrench
- Grind a screwdriver shape to the end of the handle on a glide driver
- File a bevel off the becket breaker
- Tiny boxes for mini storage
- Make things out of bucket handles

Machines Every Technician Should Own

- Grinder (Sometimes instead of a bench grinder, use a file)
- Drill press
- Sander
- Band saw
- Chop saw
- Miter saw
- Table saw
- Wire brush
- Buffing wheel, wire brush, stone wheel

Safety First

- Use eye protection
- Hearing protection: muffs or plugs
- Learn how to use equipment properly
- “Finger removers”
    - Band saw, chop saw, table saw, routers.
    - Use a push stick. Don’t grab the cut pieces
- Shop monkeys.
    - *We go faster when we are focused and develop a ryhythm.*

Bending Steel Using Heat

Rules

- Safety first
- Know what metal you have
- Have fire extinguishers handy

Bending Metal

1. Heat until cherry red
2. Carefully bend
3. Quench

Tempering Metal

1. Heat again until desired
2. De

Grinding

- Once again, safety first: wear protection
- Hold firmly while grinding
- Quench as needed to guard the temper of the metal
- De-burr with wire wheel or sander
- For brass or aluminum
    - Do not use grinding wheel
    - Use a band saw, belt sander

Miscellaneous Comments

- Do you do extra work for free? It depends on the furniture. Any time you do something extra for free, let the customer know there is an extra value.
- Tell the normal price, do the work, then give a big discount and ask for referrals.
- Do something, even if that something is nothing.
- For small screw holes, insert toilet tissue into stripped hole, douse it with superglue, install screw in hole, remove screw, put in , and replace screw.
- *Slow is fast: practice slowly and you will get fast.*
- *Time yourself – time each job you do.*

Grand Dampers

1. Introduction
    a. The bottom line in damper work
        i. It must work correctly
        ii. Dampers are a skill we have to learn
        iii. It should look good
    b. Sage Advice
        i. "If it ain't broke, don't fix it."
        ii. Keep your nose in line with the damper
        iii. First, make it work.
    c. Different approaches, and why I do what I do.
        i. To lean or not to lean?
            1. Leaning dampers creates less movement
            2. Allows for larger guide rail hole, and the damper will never stick
            3. Size the hole with a #8 bridge pin
            4. Always start off centering the damper wires in the holes.
        ii. Fingers or tools?
            1. The Japanese Yamaha technique uses fingers. They finger-tighten the screws, but they have small hands, and some workers keep the little fingernail longer.
            2. Turning the wire with pliers will scar the wire, but it is faster.
        iii. Use a tray or a jig?
        iv. One at a time, or pitch raising?
            1. Carefully and perfectly adjust one at a time
            2. "Pitch-raising" is going through the entire set with one tool, then through with another tool
        v. Combining the best of all systems
    d. Technique

i. Name the bends
    1. Alignment
        a. Damper on the string
    2. Spacing
        a. Using a damper wire tool, bend the wire from on top.
        b. Spacing bends are done above the string
    3. Travel
        a. The damper wire must rise & fall straight in the hole
    4. Pressure
        a. The two pressure bends are done with the action out.
        b. The first bend is just above the block
        c. The second bend for travel is 1/3 below the guide rail.
        d. Use the wire bending pliers
        e. These bends are done 1/3 up the wire.
    5. Twist in damper block
        a. Twist the wire to position the damper on the strings
        b. Pry the wire out of the block by leveraging the pliers
        c. Most damper wires will break after nine bends
        d. Damper wires can also be pried out of the block with dull wire cutters.

ii. Sequence
    1. Work the bends from the bottom to the top
    2. Do what's needed: timing, zinging, etc.
    3. Travel: when the damper is out of the strings and it is moving to the side, bend above the strings.
    4. Adjust the front-to-back of the damper head with the fingers. Standard is to have the front hit slightly sooner, but Kent Webb says they should land equally.

iii. Oinks and problems
    1. Steinway felt is cut with the grain going sideways, left and right. Yamaha has the grain going vertically up and down. The Steinway felts are quiet and don't oink as much, but they are softer and easier to mess up and tear.
    2. Horizontal felt dampers will solve oinking on slow release.
    3. Needling can work.
    4. Sand off a tiny bit of the felt. Press on the pedal, sand with the paddle and remove a slight layer of felt.
    5. VS ProFelt doesn't work as well.
    6. Trim the felt so it's sitting more on top.
    7. Replace the felt if nothing else works.

Turbo-Charging Your Service Calls

We should charge for everything we do, but we should also do things for charity. Wow, look at all this bread. Yeah, you can have all the bread you want because we don't want to throw it away. My husband died in a wreck and this is how we get by. Jim tore up her check; he just couldn't charge her because she had no money.

Another lady was very concerned about how much it was going to cost, and he said his tuning price of $40. During the tuning, he noticed how much more work the piano needed. He asked her why, and she said the last tuner came in, did some bad work and charged her $500. Jim did lots of extra work, and would not take her money to show her that not all technicians were like the other guy. The next year when he went to tune her piano, she paid him $40 plus a $40 tip, plus from her he got 54 referrals.

We can all be charitable, but we can't give out a lot of free work because we have to make money. A little here and there is worth it in the long run.

What do you do in a 1-1/2-2 hour appointment?

- Tune
- Pitch-raise
- Lost motion

We need to earn 20% more money, have 20% more fun, and 20% more efficiency & time, but give more value to our clients.

Benefits (20% more): always give your clients more than they expect

- Time
- Money
- Less stress
- Accuracy
- Giving more value to your clients
- What we want is undying loyalty

What it doesn't mean by learning to tune faster

- A more hurried and harried lifestyle
- Shoddy work
- Make more money by "skimming the cream"
- Deception: what the client doesn't know
- "I don't fix them; I just tune them"

Efficiency Principles for Piano Technicians

1. Become acutely aware of your use of time
    a. Relax: your body knows what to do. Story: “hit the can”
    b. Time each job. 1 second = 90 seconds
    c. What time is it now? What distractions happened?
2. Eliminate (or minimize) time wasters
    a. Minimize time robbers
    b. Think for a minute. What are some of the things that waste your time, or take more of it than they should?
    c. Do you get distracted by the phone and media?
    d. Waste 5 minutes a day, that’s 40 hours a year, etc.
    e. Chatty clients
    f. Looking for things
3. Cut down on time with clients, yet make them feel like they are the most important customer you have
4. Decrease your tuning time
    a. Be stickler for unisons
    b. Pitch raise in 15 minutes
5. Decrease regulation time
6. Find your “rhythm” in your work
7. Dangers to avoid while trying to become more efficient
8. Tips for institutional work and shop work

Service Timing

1. Pitch raise: 12-15 minutes
2. Tune: 25-35 minutes
3. Change blow and regulate lost motion: 15-30 minutes
4. Adjust checking: 3-5 minutes
5. Align hammers to strings: 10-15 minutes
6. Burn shanks: 5 minutes
7. Square, space, and level keys: 5-15 minutes
8. Mate hammers to strings: 10-15 minutes
9. Tighten bench and adjust pedals: 3-5 minutes
10. Misc. repairs and/or clean varies: 10-20 minutes

Totals: low = 1.5 hours, high = 2 hours 20 minutes

Main Time Thieves and Slippery Slopes

1. Cell phone and other electronic devices
2. Looking for that tool
3. No-shows, forgetting appointments
4. Doing work beyond the scope of this visit
5. Finding a can of worms and more work than expected
6. Talking, eating
7. Traffic, efficient routing
8. Getting caught up on a minor detail

Cut down time with clients

Don't be in such a hurry! Don't make it look like they're in your way or a burden; just keep working without being rude or acting like you're in a hurry. At the moment, they are the most important thing in life, but stay focused on the job.

1. Be friendly, but get right to work
2. Until you reach turbocharged speed, don't chit-chat much. You can later on.
3. You can accomplish a lot while you're talking with the client.

Decrease your tuning time

- We want the string in motion. Hit the key about every second. The string will walk itself over the friction point when it is vibrating. Yamaha calls tuning a "pitch correction" or a "tension adjustment" in 20 minutes.
- Listen to each note for 7 seconds to listen to the quality of the unisons and voicing.
- Keep your hand on the ball of the tuning handle to reduce hand movements and to maintain control. Using a ball handle cuts time spent changing hand positions.
- The ball keeps your hand open more and is ergonomically healthier.

Tuning Tips

- The ball end tuning lever
- Learn to listen quickly
- Occasionally time yourself
- Watch someone who tunes fast, but solidly
- Muting systems
- Consider combining ETDs and aural tuning
- During the process of checking the intervals we listen to the same note several times: first when tuning the note, and again during each check.

- By tuning with all three strings vibrating, the tuning will render better without strip muting. Jim uses a single felt wedge.

Learn to Regulate Quickly

Some ideas to consider:

- Use tools that work for you
- Use a checklist until you have your routine down
- Develop speedy techniques
- Never “get lost,” and other newbie mistakes (which way did I turn it?)
- Avoid slippery slopes

Bedding the Key Frame

1. Set front and back glides
2. Set glides just up so they touch
3. Lower them, press on the pedal and tap
4. We want it to knock, keep knocking with the pedal down and adjust until the knocking stops

Find Your Rhythm

After a few minutes you will find a rhythm.

Once you get your rhythm going, don’t let yourself get interrupted

4 Dangers to Avoid

1. Substandard work
2. Unstable tunings
    a. How do we get our tunings stable? Repetition. After a long time, our bodies know what to do. It takes time to learn.
3. Putting off the client
4. Adding too much work to your schedule

Don’t watch the clock: you’ll be late anyway.

It’s not about pianos. It’s about music, people, and doing what you love.