

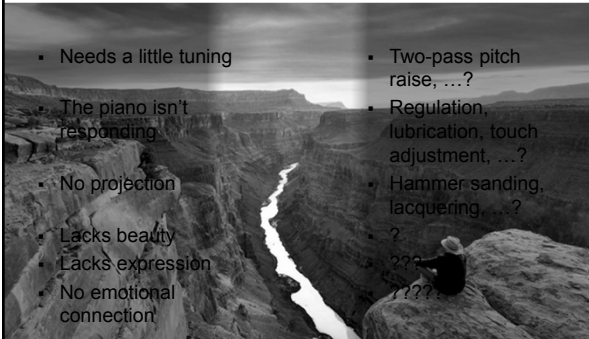
How Our Work  
Affects the Pianist

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Two Worlds




- Needs a little tuning
- The piano isn't responding
- No projection
- Lacks beauty
- Lacks expression
- No emotional connection
- Two-pass pitch raise, ...?
- Regulation, lubrication, touch adjustment, ...?
- Hammer sanding, lacquering, ...?
- ?
- ???
- ????

Two Worlds

- What is your goal?
  - Tune to pitch within +/- 1 cent?
  - Make the mechanism work flawlessly?
  - Voice the piano for evenness and balance?
  - Achieve technical perfection?
- OR:
  - Improve customer's experience with the piano?
  - Remove obstacles to immersion in music?
  - Enhance emotional connection with the piano?
  - Stoke passion for music?

Two Worlds

- Why does your customer own a piano?
  - Play, practice, teach, accompany, record
  - Decoration
  - Status symbol
  - Bridge to old ideals, beauty
  - Bridge to the Zone
  - Sentimental reasons
  - Link to youth, familiar values, family, simpler times
  - Self worth
  - ...?



Two Worlds

What is the value  
you provide?

Consultant  
Motivator  
Therapist  
Optimist  
Friend  
...?

Two Worlds

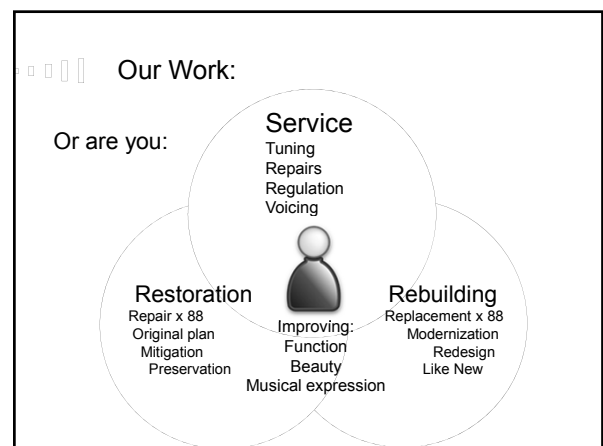
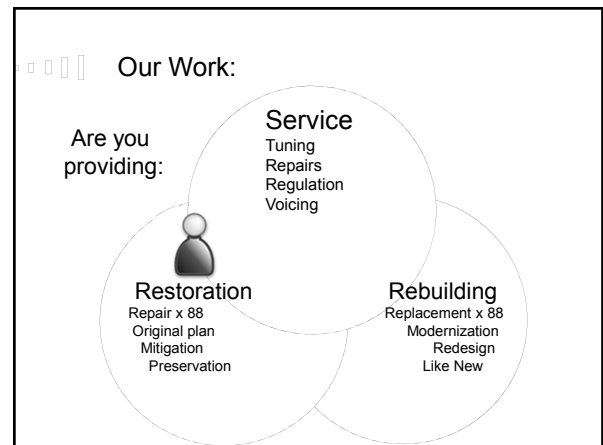
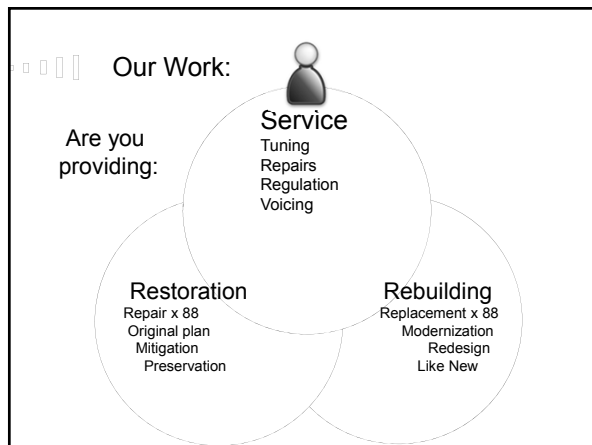
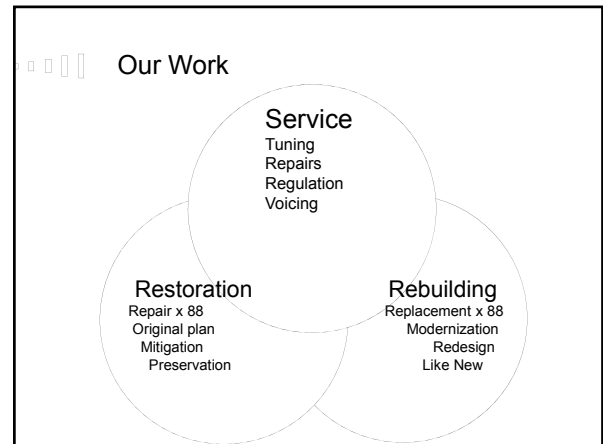
What is the value  
you provide?

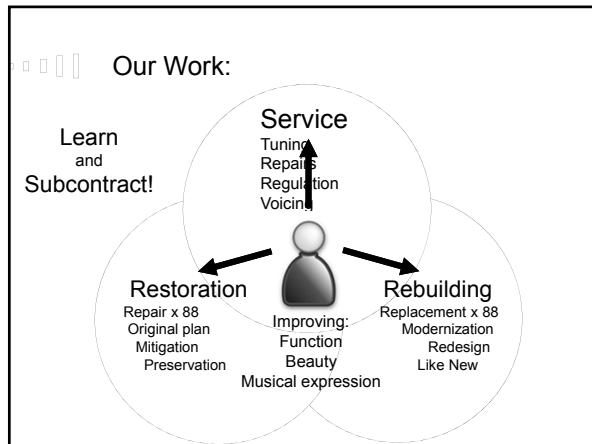
Relating to customer

Two Worlds

What is the value  
you provide?

Are you a one-stop solution  
for piano needs?





Our Work

- Upsell
  - Adds value to owner/user
  - Restores "magic," improves response and tonal palette
  - Improves musical experience
  - Encourages continued use (and servicing)
- Not upselling necessary services is a disservice to the customer

How Our Work Affects the Pianist

- Sound
- Tuning
- Action
- Keyboard
- Touch
- Dampers
- Pedals

Sound

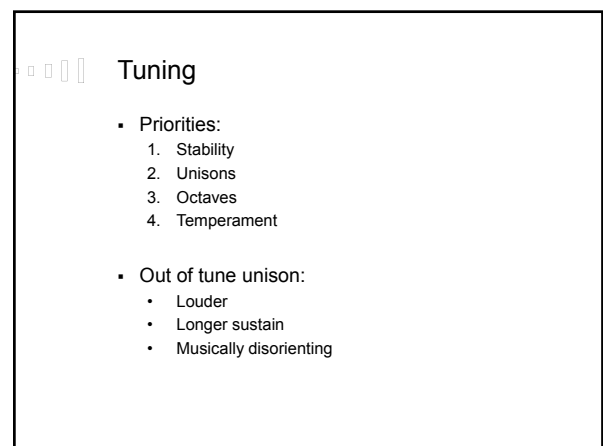
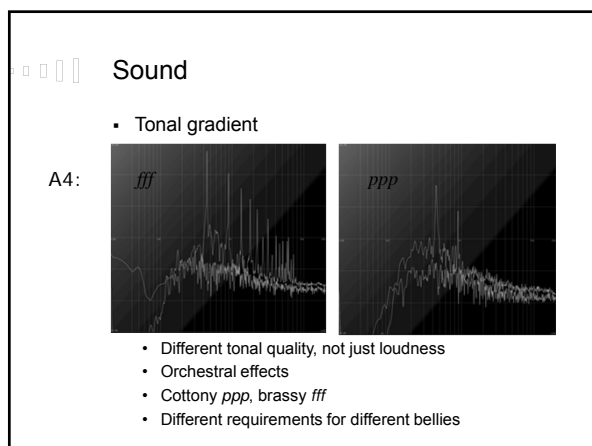
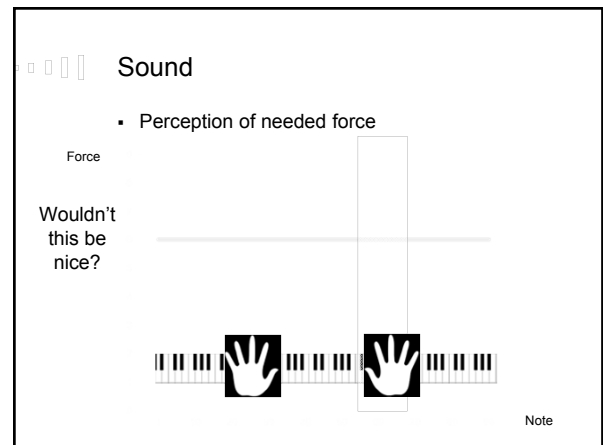
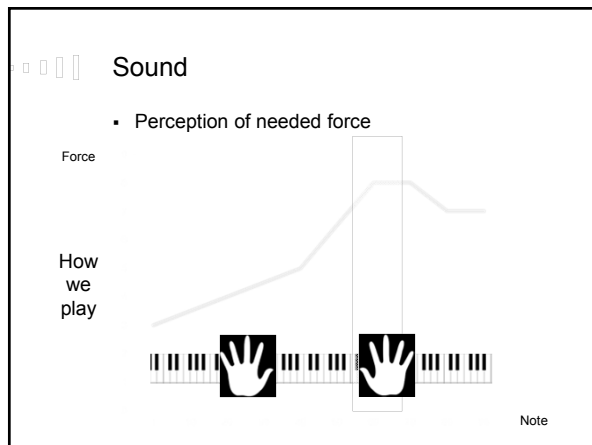
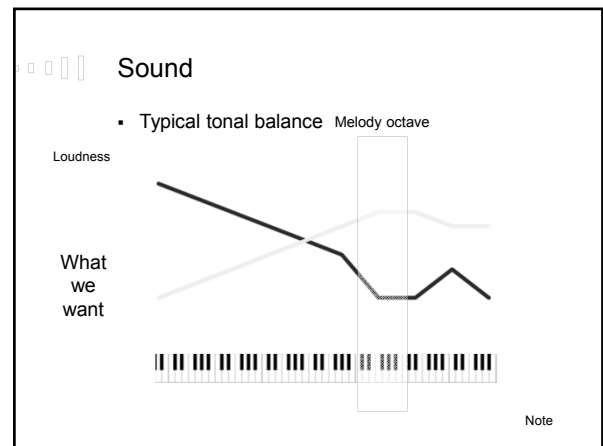
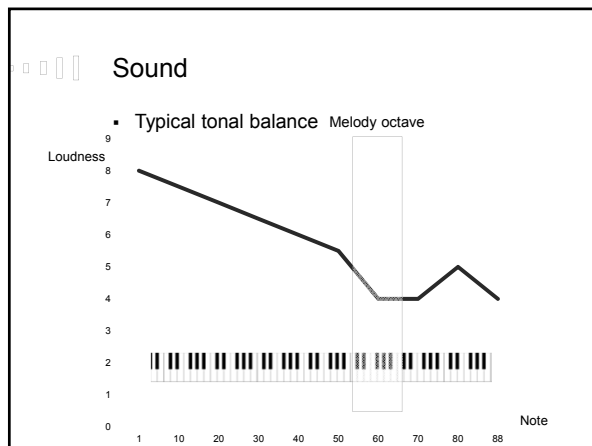
- Approaches to tone building
  - Soft hammers, lacquer:
    - Characteristic "American" sound
    - Punchy with surface noise
    - Warm?
    - Not much tonal gradient
    - Easy to work with
    - Unpredictable: can brighten or get duller as lacquer shatters

Sound

- Approaches to tone building
  - Soft hammers, acrylic:
    - More focus, projection
    - Not enough brightness?
    - Surface zings if on crown
    - More tonal gradient
    - Harder to work with
    - Brighten steadily

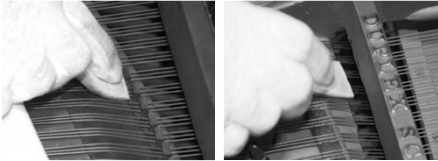
Sound

- Approaches to tone building
  - Dense hammers, resilient felt, needled for tonal gradient:
    - Clean, focused, projected
    - Thin, no warmth?
    - Most tonal gradient
    - Hardest to work with
    - Brighten slowly




□ □ □ Tuning

- Stability:
  - Equalize tensions in string segments
    - Hard blows
    - Lubricate string bearings with Protek Prolube



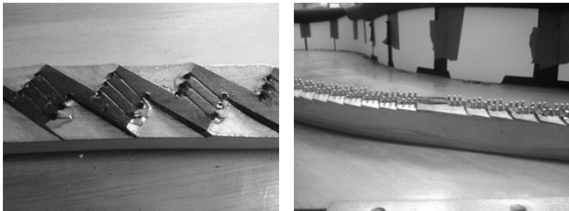
□ □ □ Tuning

- Humidity control
  - Room/house humidifier?




□ □ □ Tuning

- False beats
  - Bridge pins must be firm
    - CA
    - Epoxy, redrill holes




□ □ □ Tuning

- False beats
  - Massage strings




□ □ □ Action

- Let off
  - Critical for *ppp* control
  - Soft openings: high anxiety
  - > 1.5 mm: less control
  - < 1.5 mm: ugly, distorted sound
  - Bass: increase to 3 mm
- TIPS:
  - String shadows
  - Magnetic strip, adjust by touch
  - Playing off the jack
  - Check if too high in bass (play loudly, relift and stop key at let off—can you feel vibrations?)



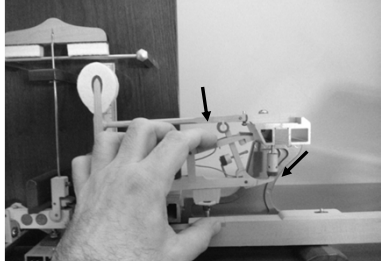
□ □ □ Action

- Drop
  - Important for repetition
  - Allows rep lever to bounce hammer back up just under strings
  - 1.5 mm under letoff
  - > 1.5 mm: heavy touch, spongy, poor repetition
  - < 1.5 mm: bobbling
- TIPS:
  - Compare to neighboring note's letoff



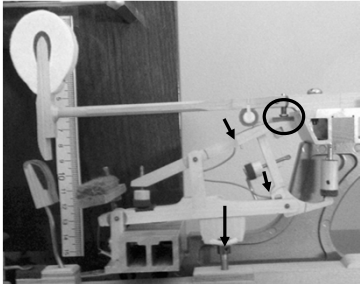
□ □ □ □ Action

- How “heavy” is drop? Try:
  - Down weight with and without pressing the rep lever
  - Jack tender with and without pressing the rep lever



□ □ □ □ Action

- How “heavy” is drop?



□ □ □ □ Action

- Backchecking
  - Critical for repetition and tight action feel
  - Not more than 15 mm from strings
  - < 15 mm: faster, quieter repetition
  - > 15 mm: slower, louder repetition
  - > 20 mm: missing notes, stress on rep spring, extra knuckle wear

TIPS:

- Raise backchecks if needed
- Cut hammer felt outer tip if needed
- No tail/backcheck rubbing on seesaw test!
- Replace with thicker wires

□ □ □ □ Action

- Rep spring strength
  - Critical for repetition
  - Decisive rise without hammer fluttering
  - Rep lever center pin friction
    - Low: unreliable repetition, missing notes, knuckle sits on jack
    - High: spring may not be strong enough

TIPS:

- Don't change overall shape of spring
- Small reduction: massage top segment up

□ □ □ □ Action

- Rep spring strength
  - Spring slot, spring end: clean and lubricate



□ □ □ □ Action

- Aftertouch
  - Critical for repetition, orientation, control
  - Key travel after letoff:
    - Grands: 1.0 – 1.4 mm
    - Verticals: 1.2 – 2.0 mm
  - Controlled by strike distance and key dip
  - Should be tight, but allow full escapement plus small “second rise”
  - Depends on size of knuckle, angles, shank and wippen ratios

TIPS:

- Compromise strike distance or key dip?
- Firm front punchings

□ □ □ **Action**

- **Aftertouch**
  - TIP: Lubricate knuckles with micropowder Teflon




□ □ □ **Keyboard**



- Main interface with piano
- Orientation, tactile response
- Tactile feedback:
  - Backchecking: timing and firmness
  - Hammer/jack bounce
  - Dampers: timing, resistance, firmness, friction
- Noises: percussive element

□ □ □ **Keyboard**

- **Saturation:**
  - Robs energy, lowers dynamic ceiling
  - Key frame (balance rail) bedding
  - Key stick stiffness
  - Balance punching firmness
    - Ironing, hardening, Crescendo punchings
- **Sharps:**
  - Space F# - G# - A# evenly


□ □ □ **Keyboard**

- **Friction:**
  - Spongy, sluggish, slow
  - Ease and lubricate
  - No debris in mortises!
  - Ream/lubricate balance holes
  - Reduce mortise bottoms

□ □ □ **Keyboard**

- **Key dip**
  - Shallow = high leverage ratio: limits expression, power
  - Deep = low leverage ratio: nuanced expression, requires strength
  - Inconsistent: like walking on cobblestones




□ □ □ **Keyboard**

- **Sharps: level from dip up?**

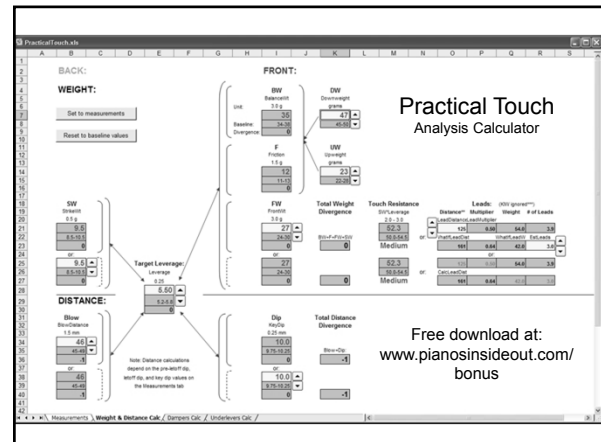
What should be more consistent?

- Sharps height (height of hurdles)
- or:
- Sharps dip (level of ground on landing)



## Touch

- Friction slows
- Downweight (DW) resists
- Upweight (UW) repels
- Inertia fatigues
- Leverage ratio:
  - High: catapults, reduces dynamic control
  - Low: enhances control but requires greater key dip, good for powerful pianist

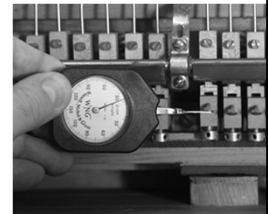


## Touch

- Inertia: friend or foe?
  - Evens out touch and variations in technique
  - Reduces need for finger control
  - Can make playing more comfortable
  - Balanced tactile and tonal feedbacks
  - Impediment for fast repetition
- Addressing high inertia (heavy hammers)
  - Reduce hammer weight: file, taper, shape, cove
  - Reduce action leverage ratio, increase key dip
  - Reduce strike distance

## Dampers

- Timing to key:
  - EARLY: juicy, heavy
  - LATE: dry, light
- Weight affects touch:
  - Up to 35 grams in bass
- Damper friction affects touch
  - Underlevers are decoupled from keys



## Dampers

- Noises
  - On return: pianist not aware, affects timing
  - Bleedthrough: distracting in *forte staccato*
  - Duplex hum: distracting after big chords
  - Damper whoosh
    - Mostly issue in recording studios
    - Reduce with thread in trichord wedges
- Stop rail
  - TOO HIGH: delayed kick on key
  - TOO LOW: spongy escapement, bottom of key travel

## Pedals

- Heavy, high friction
  - Distracting
  - Replace or remove damper tray spring
  - Use lighter spring in trapwork
  - Lubricate trapwork, pitman, tray spring
  - Soft pedal: lubricate key bed, key frame, return spring
- Too low
  - Shin cramping
  - High-pile carpet: use caster cups
  - Reduce thickness of pedal rest felt
- Too high
  - Remove tall caster cups
  - Add to pedal rest felt





## Pedals

- Pedal squeaks
  - How annoying!
- Lubricate/renew:
  - Pedal cup, leather, boot
  - Pedal pin and bushings
  - Pedal rod guide rail bushings
  - Trapwork leathers, felts
  - Pitman linkage
  - Underlever tray spring interface
- Modernize pitman



## What Else?

- Piano bench
  - Pianist often not aware
  - Makes a huge difference
  - Most overlooked service item

### TIPS:

- Routinely inspect and tighten legs
- Tighten scissor mechanism
- Promote petit artist or artist bench for students (they really need it)
- Pneumatic/hydraulic?



## Pianist's Top 10

10. Nice temperament, nice stretch (not too much)
9. Quiet dampers
8. Good bench
7. Smooth, quiet soft pedal (small amount of shift)
6. Reliable half-pedal
5. Even, balanced voicing
4. Even touch
3. Clean, stable unisons
2. Low, consistent friction ties with
1. Nice regulation

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"The solutions are all simple—  
after you have arrived at them."

—Robert M. Pirsig

Thank you!

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