


How It Should Work



Maintaining and Diagnosing Your Piano

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Download at:
<https://pianosinsideout.com/Classes.html#HowItShouldWork>

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Maintenance

- Tuning 1-4 times a year
- Thorough service (1 or 2 days) every 2-3 years
 - Cleaning (grit = noise = premature wear)
 - Lubrication
 - Rejuvenating felts and cloths (e.g. key bushings)
 - Action regulation
 - Reshaping hammers
 - Voicing

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Maintenance

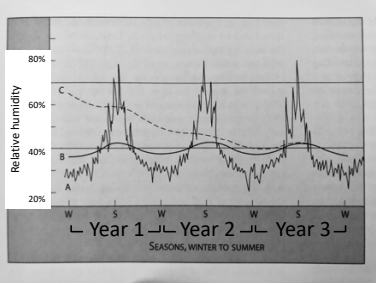
- Control humidity!
 - Ideal: 40-50% RH
 - Tolerable: 30-60% RH



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Humidity

- Seasonal changes

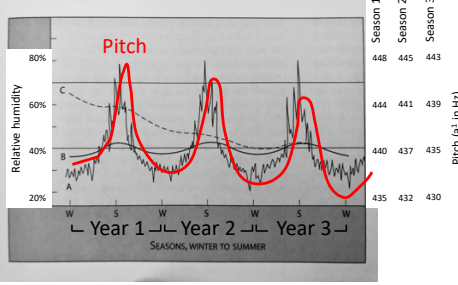


Bruce Hoadley, *Understanding Wood*, p. 135

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Humidity

- Seasonal changes
- Pitch follows humidity

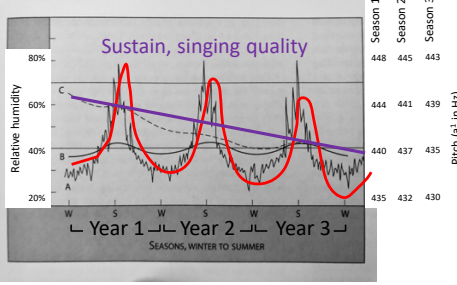


Bruce Hoadley, *Understanding Wood*, p. 135

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Humidity

- Seasonal changes
- Pitch follows humidity
- Sustain gets shorter with time
- The tone dies!

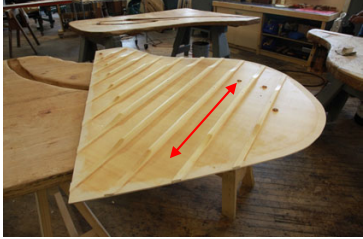


Bruce Hoadley, *Understanding Wood*, p. 135

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Humidity


- Expansion, contraction (in piano soundboard: across the grain)



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Humidity


- Expansion, contraction (in piano soundboard: across the grain)
- But wood is constrained:
 - Ribs



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Humidity

- Expansion, contraction (in piano soundboard: across the grain)
- But wood is constrained:
 - Ribs
 - Glued to rim



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Humidity

- Compression set



Bruce Hoadley, Understanding Wood, p. 129

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Humidity

- Soundboard has nowhere to go



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Humidity

- Soundboard has nowhere to go ... but up and down, affecting pitch



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Humidity

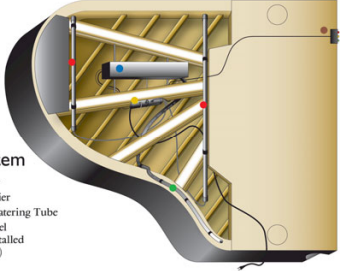
- Wood eventually cracks

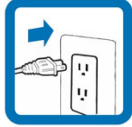


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Controlling humidity

- Damp Chaser's Piano Life Saver System
 - Adds and removes humidity as needed






The System

- Humidifier
- Dehumidifier
- Easy-Fill Watering Tube
- 3-Light Panel (Can be installed out of view)
- Humidistat

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Controlling humidity

- Removing humidity: Dehumidifier



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Controlling humidity

Adding humidity:

Humidifier
Whole-house evaporative type with automatic control

- <https://www.amazon.com/HD1409-Whole-House-Console-Style-Evaporative-Humidifier/dp/B00KVN8CLA/>
- **Additive:**
<https://www.amazon.com/Chemical-Humidifier-PRODUCT-CANNOT-SHIPED/dp/B01LX7ECBZ/>



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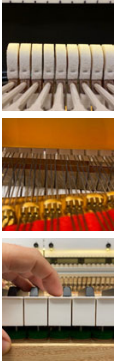
Tuning

- Pitch a440?
- Pitch correction
- Unisons: pure
- Temperament
 - Octaves: pure
 - Fifths and fourths: slow beat
- False beats
- New strings

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Action


- Hammers at rest
44-48 mm from strings



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Action

- Damper lift
at half of total hammer travel



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Action

- Escapement bump
(resistance)

Keep the pedal depressed




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Action

- Letoff
(highest point in hammer travel)
1 - 2.5 mm from strings

Keep the pedal depressed



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Action

- Drop
1 - 2.5 mm from letoff

Keep the pedal depressed



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Action

- Aftertouch
key travel from hammer letoff
to bottom of key stroke
0.6 - 1.2 mm from letoff

Keep the pedal depressed

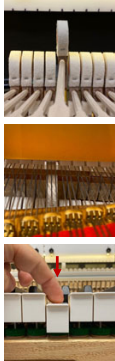


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Action

- Back-checking
hammer at 12-18 mm ($1/2'' - 3/4''$)
from strings when played *forte*

Keep the pedal depressed




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Action

- Repetition spring
(hammer rise from backchecked)
quick but not jerky


Keep the pedal depressed



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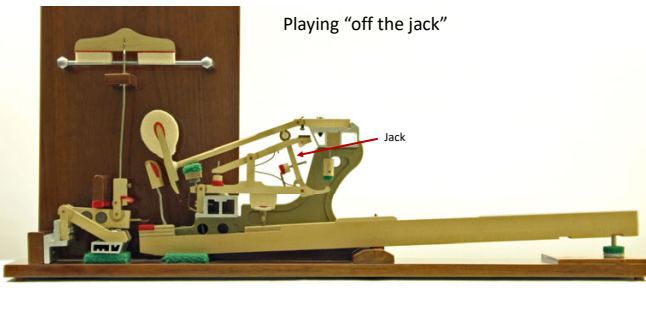
Action

- Playing "off the jack"
 - Keep pedal depressed
 - Press key to escapement bump
 - Push key down



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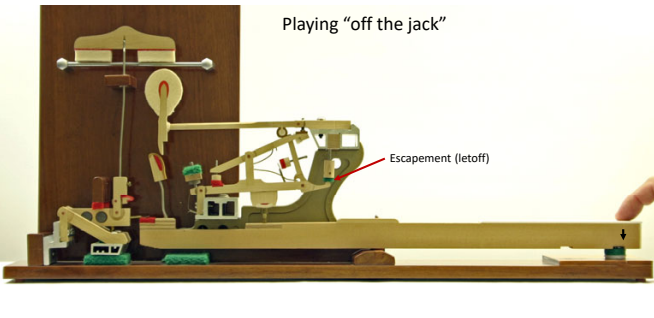
Playing "off the jack"



Jack

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Playing "off the jack"



Escapement (letoff)


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Touch

- Downweight
10 nickels
(44-52 g)

Keep the pedal depressed

Help the key go down
first 2-3 mm




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Touch

- Upweight
5 nickels
(20-28 g)

Keep the pedal depressed

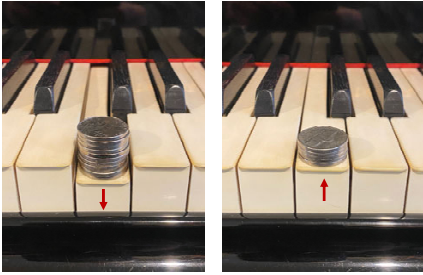
The key doesn't have to
go all the way up



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Touch

- Why discrepancy?
- Friction!



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Touch

- Too much friction (high downweight, low upweight):
 - Added resistance
 - Sluggishness (slow key return, poor repetition)
- Not enough friction (low downweight, high upweight):
 - Feels flyaway
 - No control
 - Feels like electronic keyboards

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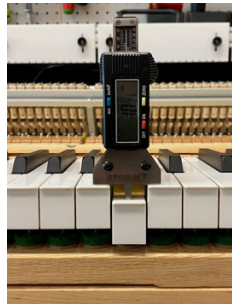
Touch

- Static balancing (affects *pp*)
 - Resistance to force
- Inertia (affects *ff*, repetition)
 - Resistance to acceleration
 - Heavy hammers: greater inertia

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Touch

- Key dip (9.8 – 10.4 mm)
- Sharps height (12.2 – 12.7 mm)
- Sharps dip (1 – 3 mm above naturals)



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Touch

- Excessive key dip
 - Fingers go farther up and down
 - Extra vertical motion is doubled: 0.1 mm extra dip = 0.1 mm taller sharps
 - Fatigue—feels like heavier action



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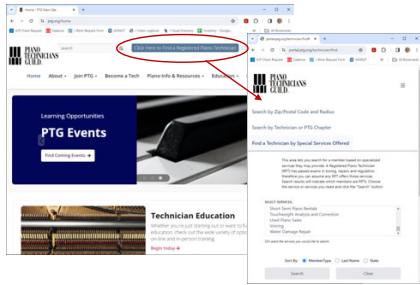
Tone

- Volume, brightness, power, projection
- Sustain, bloom: singing quality
 - Pluck vs. hammer
- Room acoustics
- Old piano sound
- Voicing
- Reshaping hammers & voicing
- Replacing hammers

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Finding a technician

- Recommendation
- College techs
- Rebuilding shops
- Piano dealers
- Ptg.org: Registered Piano Technician



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Q&A

Thank you!

Download handout at:
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