Understanding After-Touch

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After-touch gives a safety zone for the pianist's fingers so they are not hurt. It is the little bump felt as the key is pushed down. Looking at the 37 steps of regulation, actually many of the steps are about repairs. If an action center is too loose or too tight, it needs to be fixed. Mechanical changes must be done for the hammers to hit the strings properly and for the action to work. All this has to be done, but repairs are not a core part of the regulation. They are low-tech, low-understanding jobs.

Dealing with a well-made piano from Asia might work very well according to the specs. However, is it working very well? If one were to pick some section end notes and regulate them until they work well, the specs might not matter anymore. Measuring to achieve specs does not really matter as much as the way the piano actually works. When you see a certain movement, you should know where to go and what to do.

There are two positions that we deal with. Either the key is at rest or depressed. Currently the action model is regulated to a very conservative spec. The jack position is in the middle of a close and a sloppy regulation – at the zero point. We are going to start moving the jack from one extreme to the other to explore what happens.

Push down the key and look where the jack is. How much space is there between the jack and the knuckle? With the key down, take the hammer and pull it up until it touches the string. Now what is the distance? It is farther away. Now place the 5/8"-wide piece of plexi-glass between the hammer and the string. Now where is the jack? It should be touching or almost touching the knuckle. Using only three variables -- the front rail punchings, the balance rail punchings, and the capstan -- alter this fairly regulated action to find out what changes.

Key Travel and After-Touch

For these exercises we say the action "works" when

a) Let-off is between 1/8" and 1/16"
b) Checking is 5/8"
c) When the key is fully depressed the jack tip clears the knuckle and is not pressed into the felt cushion in the repetition lever window
d) Drop is 1/16" and the relation of the jack to the knuckle core and repetition lever is correct when the action is at rest.

During these exercises (and only during these exercises) we accept whatever key height, key dip and blow distance is needed to make the action "work," and we ignore the damper.

Work with a partner, and say what you propose to do before you do it.

First Exercise

1) Check to see that the action "works" and adjust as needed.
2) Put a blue punching under the balance rail punching.
3) Test the action. If it still "works" add another punching and test again.
4) Propose a way to make it work without removing the blue punching.
5) Make it work.

Second Exercise

1) Put another blue punching under the cloth balance rail punching
2) Test the action
3) Propose a different way to make it work.
4) Make it work.

Third Exercise

Add punchings and "fix" the regulation until you reach the limit of the action model.

Fourth Exercise

1) Go back to the "Start" position and make the action work.
2) Add a thin cardboard punching under the front cloth punching.
3) Proceed as in the above exercises, finding at least 2 ways to make the action work when you change the front punchings.

Fifth Exercise

1) Go back to the "Start" position and make the action work.
2) Increase the blow distance and make the action work.

Sixth Exercise

1) Go back to the "Start" position and make the action work.
2) Decrease the blow distance and make the action work.

Look at the action model for an energy model. The front of the key is the energy in. The hammer is the final energy out. If you are used to feeling what after-touch is, you can tell if there is more or less than what you think feels right. Some players want more after-touch than others. This is where we have to know what variables should be changed to accommodate a particular player.

If you have surplus energy, it must be used up. When the energy goes in, there is a demand for the energy at the other end. If there is not enough energy, the whippen will not rise enough or the jack will not trip. If you have to raise the capstan, the system will raise at a higher point. If there is too much energy, then the jack will be stressed between the let-off button and the front window, so the blow distance must be decreased or it must be reduced elsewhere.

Questions and Demonstrations of Grand Regulation
Do these today if you have time, or take them home for later.

Discuss the following regulation points with your colleagues.
Each regulation point has a reason for being adjusted a certain way.
Each regulation point can be off by "too much" or "too little."
Begin with the action model properly regulated.
Imagine what will happen if you de-regulate just one of the parts. Talk about it, then try it and see what happens.
Return the part to proper regulation and continue through the list.
There may be more than one problem to a particular deregulation point. Try subtle and extreme deregulations.
During this exercise we are not changing the let-off, the drop or the back-checks.

1) Jack to knuckle alignment
2) Drop screw
3) Repetition lever to jack tip
4) Position of jack tip when key is at bottom of stroke
5) Position of hammer in check
6) Repetition spring strength
7) Damper up-stop rail
8) Damper timing

Our experiments:

- Key height
    - We raised the key height so high that the front of the key was off the front rail pin. The jack is being stressed on the front side of the window.
    - We removed balance rail punchings and lowered the key height, which reduced escapement, lost power, checking changed.
- Dip
    - We raised the front rail so high that the hammer baubled and the jack did not escape.
    - Too much dip. We removed all the front rail punchings. The hammer blocked on the string, the jack was much too far back from the knuckle.
- Blow
    - We raised the capstan so high that the jack was stressed against the front cushion, there was too much after-touch, and the hammer baubled.
    - We lowered the capstan so much that the let-off was nearly blocking, the hammer was resting on the rest rail creating lost motion, the jack would barely release, and there was no after-touch.