

Tucson Chapter (857) Minutes

May 1, 10 am to 11:35

Venue: The World Wide Web via Zoom

The meeting was recorded for later viewing. If you're interested, click on the link below.

Topic: Richard West's Zoom Meeting, PTG

Start Time: May 1, 2020 09:43 AM

Link to Meeting Recording:

https://us02web.zoom.us/rec/share/xNZE7_s9G9LAaP_7EjxUKcNOqv_T6a80Sgd_vUIzEelYiCq-YuK9JijCFf4WEj4

Access Password: 2x!@Rm!1

Tucson Chapter members in attendance were (I'm not sure I recorded all attendees. If your name isn't on the list and should be, let me know so I can have an accurate record. Thanks):

Bob Anderson
Steve Dexter
Steve Fogelman
Jack Phelps
Richard West

And there were four guests from the Phoenix chapter

Rick Florence
Nick Gravagne
Elliot Lee
Rick Springer

Tech Topic: Lubricants: Flanges to Pedals to.....

Bob Anderson, Presenter.

Bob Anderson presented a great technical on flanges, especially early 20th century Steinway flanges that eventually develop verdigris. During manufacturing the flange bushings were impregnated with a material that Steinway believed would provide a natural lubricant and protect flanges from changes in humidity. Unfortunately, that material welcomed contamination. Verdigris! It attacks those old flanges and eventually chokes them so that they will hardly move. The bushings develop a characteristic green color. Bob Anderson experimented with various methods to try to release verdigris' grip.

Bob first laid out some basic facts.

1. Verdigris cannot be cured and therefore the only way to eliminate its grip is to eliminate the part and install new. That's expensive.

2. There are things that can be done to old parts to help restore movement, but there's no guarantee that it will last; it probably won't. And there's no guarantee of consistent results from flange to flange.
3. Bob started with flanges that measured more than 15 grams torque (that was the maximum limit of his gram gauge). The second test started with flanges that all had 13 grams torque.

Here are a few experiments that Bob tried:

- A. Protek—it can work; it won't probably last.
- B. WD-40—He doesn't use this for anything in pianos because it tends to collect dirt and clog up moving parts. Not a product for pianos.
- C. Ballistol—Didn't work very well. Also, very thick making it difficult for the liquid to soak into the bushing
- D. LPS—Worked somewhat.
- E. PFPE lube—Worked the best among the various lubricants. It's a new product handled by Mark Purney in Phoenix (Supply 88 is the company name). It's expensive, but a minimal expense compared to parts replacement. There's more information at the end of the minutes.
- F. Heat—This method also worked well. Bob used a heat gun to heat the flange almost to the point that the wood starts to char. The bushing will start to ooze as the waxy material in the bushing melts out.

There were variables that were hard to take into account. Bob was experimenting on old Steinway hammer assemblies that had been removed and replaced with new. Bob didn't know how old the parts were, or whether anything had been done to the parts to perhaps free them up. The various lubricants were applied directly to the flange center with a hypo oiler type of bottle and fine tip. Some of the lubricants were too thick for the fine tip.

After Bob's presentation there was considerable discussion of the topic in general.

Repinning: Repinning old parts may do some good, but not much. There was some lengthy discussion of repinning new parts right out of the box. Having proper pinning and proper friction in flanges is critical in high end performance pianos. Proper touch, and repetition will be compromised without managing friction and maintaining fairly strict humidity control. Repinning has to be carefully done especially regarding hammer flanges and repetition lever flanges. Jack flanges must be very free. The Mannino broaches got very high marks as the tool of choice in repinning.

Current production methods. There was some concern with some flanges from a prominent manufacturer of action parts. It seems that under heavy use, flanges start to seize up. Repinning doesn't always fix the problem. Several years ago, that problem was a result of poorly designed center pins that were plated. The plating would flake off into the bushing and start restricting the motion of the flange. No one had an answer to the current problem of pianos with high use. Why would new pianos that are in college practice rooms and get played perhaps 8 hours a day, or more, start to seize up? If you have a possible solution, contact me at 440richard@gmail.com

Treated bushings. Today's manufacturers continue to impregnate felt bushings with various lubricants. Steinway uses Teflon, I believe. Alcohol was also mentioned. It's not a lubricant; it's a sizing agent. What happens with alcohol-based products is that the treatment immediately causes flanges to seize up. The reason is that alcohol always contains about 50%percent water. The alcohol acts as a carrier for the moisture and that's what makes the bushing swell and become very tight on the pin. As the alcohol and moisture evaporate, the flanges loosen.

This process relieves tight centerpin bushings (after the bushings have dried). Since this procedure is done without removing the action parts, it is not reasonable to expect a uniform final torque on each flange. The idea, of course, is to find a cost-effective solution to excessive action centerpin friction. Flanges can be selectively treated while attached to their actions rails by using the swing test. This can be roughly done in a vertical action in the piano by depressing the damper pedal and swinging the hammers by operating the left pedal (if it raises the hammers toward the strings). Optionally, hammers can be raised individually with the finger to test for tightness. In a grand action, a gang test can be applied by removing the stack and swinging the hammers to assess tightness.

Final comments: Everyone agreed that we had hardly scratched the surface of this broad topic.

FURTHER INFORMATION: Jack Phelps went online to find out more about PFPE lube. Here's what he discovered:

PFPE lubricant is a high temp, high pressure and high vacuum fluid designed and used in aircraft industries including NASA.

Very expensive about \$407 a gallon (\$3.20 p/oz when bought by the drum(55gal)).

Perfluoropolyether Fluids & Greases TYPICAL APPLICATIONS:

- *Aircraft instrument bearing grease.
- *Taper plug valve, gaskets, and joint bearings in aircraft fuel systems.
- *Valve and o-ring lubricant in oxygen service.
- *Impregnate for O-rings in pharmaceutical equipment.
- *Pump seal and bearing lubricant in chlorine or strong oxidizer service.
- *Rack and pinion disk drive lubricant.
- *Spindle and actuator bearings in disk drives.
- *Lubricate gears, bearings, and pulleys in Class 100 or cleaner manufacturing areas.
- *Mechanical components of cameras used in deep space.
- *Astronaut space suit bearing and breathing apparatus lubricant.
- *Oven conveyor chain and bearing lubricant.
- *Mold release agent for plastic injection molding.
- *Plasma etching equipment lubricant.
- *Robots in wafer handling, clean room, and commercial environments.
- *Air conditioning bearing and cabin pressurization valves on aircraft.
- *Vacuum grease in semiconductor processing.
- *Top coating lubricant on computer disc drives.
- *Fluid medium in ferrofluidic type seals

- *Moderate to high radiation resistant lubrication applications.
- *Anti-seize compounds.
- *Non-dynamic cryogenic lubricant applications
- *Gyroscope lubricant in aircraft, automotive, naval vessel, and space craft navigation systems.
- *Scanning Electron Microscope(SEM) elastomer and position table lubricant.
- *Automotive 'ABS' Braking Systems.