

Letters To The Editor

Dear Editor:

"The Physics of Tremolo" by Dennis Hedberg in the Nov/Dec THEATRE ORGAN is a very outstanding article.

The insight into just some of the engineering that goes into the design of a fine theatre organ is something seldom offered readers and therefore inadequately appreciated.

High marks, indeed, go to Dennis Hedberg for shedding such clear light upon the applied science of organ design.

Yours truly,
Wallace F. Powers
Waterford, Connecticut

Dear Editor,

Regarding the excellent article by Dennis Hedberg, "The Physics of Tremolo," (Nov/Dec 1987 THEATRE ORGAN) a few comments are in order.

Using the given (and verified) equations in the article the correct absolute pressures for 6" and 14" pressures work out to 1.028×10^5 Pa and 1.048×10^5 Pa respectively. The erroneous exponent of 3 could cause confusion. Also, when calculating sound pressure levels (SPL) and acoustic intensities, the reference levels corresponding to OdB must be specified or the figures are meaningless. After some backtracking, I was able to deduce reference levels of 2.89×10^{-5} Pa (for SPL) and 10^{-12} W/m² (for intensity). Using these references the actual levels, assuming sinewaves, correspond to 150.8 dB (either SPL or acoustic intensity) which is equivalent to 1,200 W/m² (not 10,000). It is important to be accurate in such calculations as each 10dB corresponds to ten times more intensity or 3.16 times more peak pressure.

The acoustic intensity levels reported might confuse persons unfamiliar with such calculations. These pressures and intensities are present only in the essentially closed wind system of the organ (chest, regulators, etc.) and translate to far less on the outside of the wind system (listeners and building). If the doors, floors, windows and especially the theatre balcony flex when the tremos are on, I'm getting out of that theatre! There is no way that this level of power could be exerted by the organ on the building unless gigantic blowers were used.

As a final comment the "self stimulation" discussed in the final paragraphs is very interesting. This is due to the high efficiency (high "Q") system operating at resonance "Q" is proportional to the ratio of energy stored per cycle to energy lost per cycle in an oscillating system (such as an organ with tremos on). A high "Q" system "rings" (damped oscillation) when ever it is perturbed, say for instance,

when the tremos are shut off. A cure for this is to "de-Q" the system with the acoustical equivalent of resistance without changing the resonant frequency. Bleeding wind (energy) off is, as Mr. Hedberg states, one way to do this. Possible ways to do this without bleeding wind would be to introduce controlled damping by attaching a dashpot-like affair to the regulator or stretching cloth or wire mesh over some or all windlines. This last technique is sometimes used in microphone or earphone design. If some sort of dashpot were used it could be switched in (tremos off) and out (tremos on) as required, giving steady wind with tremos off and efficient musical tremolo when desired.

In general, the article is very enlightening and thought provoking — more of this type of article is needed in future. Mr. Hedberg is to be commended for his efforts and sharing his results with fellow organ enthusiasts.

Regards,
John D. Foell,
Auburn, Indiana

Dear Editor,

Thank you for giving me the opportunity to respond to some of the critics of my recent article, "The Physics of Tremolo." It is gratifying to know my work was generally well received. However, it seems some rebuttal is in order.

Mr. Foell is correct in pointing out the absolute pressure equivalents (in Pascals) of 6" and 14" water gauge pressure are 1.028×10^5 Pa and 1.048×10^5 Pa respectively for a differential of 2×10^3 Pa and not 1.02×10^3 Pa and 1.05×10^3 Pa as was published. The material should have been double checked again as it was correct in an earlier draft of the article. My apologies. Incidentally, Eq. 10 erroneously defines the velocity of sound in Ms (Meter seconds.) It should be M/s (Meters per second.)

Mr. Foell also takes me to task for bantering about decibel figures without stating a OdB reference level. Well, maybe. The discussion was about the high end of the scale, the 120db threshold of pain. Nevertheless, since Mr. Foell wants to be fussy I did use the accepted standard reference level of OdB = 2×10^{-5} Pa. Using this reference and my differential pressure above of 2×10^3 Pa we do see a sound pressure level of 160 db.

$$160\text{db} = 20 \log \frac{2 \times 10^3 \text{ Pa}}{2 \times 10^{-5} \text{ Pa}}$$

I don't know where Mr. Foell came up with his reference level of 2.89×10^{-5} Pa. 160db is equivalent to a power intensity

of 10^4 W/M² when using 10^{-12} W/M² as a reference.

$$160\text{db} = 10 \log \frac{10^4 \text{ W/M}^2}{10^{-12} \text{ W/M}^2}$$

I stand by my calculations. These are very large power levels and I wouldn't want to be in any theatre balcony or anywhere else where such levels are present. But these pressures and intensities are only present within the confines of the closed system of regulators, chests, tremulants and wind lines. Certainly not in a theatre auditorium or even in an organ chamber. Several occasions within my article I qualified statements as being "Within this closed system." Even so, there apparently was some confusion.

Another gentleman wrote concerned about how the "fhut-fhut-fhut" noise from a tremulant could possibly be responsible for balcony wrenching 160db sonic disturbances. It is not. It is the regulator top board oscillating up and down which is responsible for the large amounts of air in motion. If only the sub-woofers in my residence sound system could excite such masses of air!

This same gentleman expressed a problem in identifying with my F6-9 test chord. If this gentleman were a technician familiar with the layout of a Wurlitzer Tibia chest he would recognize the key and note numbers as being evenly distributed across the entire chest beginning with the lowest manual chest note of either a 10" or 15" Tibia resulting in the very heavy test load for the system.

The potential pitfall to my model is self-stimulation. Mr. Foell discusses the concept of Q in a resonant system. His comments are correct. In my experiments, flow restriction devices were placed in the wind line feeding the adjustable volume cavity. See photo 6 of the article. It was felt the restriction devices hampered tremolo performance more than they helped curb self-stimulation.

One reliable way to "have our cake and eat it too" would be to install a ventil in the wind line feeding the adjustable volume cavity. The ventil would simply disconnect the adjustable volume cavity whenever the tremulant was switched off lowering Q sufficiently where self-stimulation could not occur.

For those more curious, I will have a working, hands on demonstration at the 1988 ATOS National Convention.

Yours truly,
Dennis Hedberg

continued

Letters To The Editor

continued.

Dear Editor,

Please be advised that the showing of *Wings* with Gaylord Carter at Vancouver's Orpheum Theatre, April 9, has been changed to May 7.

It is planned for this occasion to have on display in the lobby of the Orpheum a WWI, Royal Airforce Sopwith Camel fighter aircraft on loan from the Community Museum of Flight.

A series of guided tours, open to the public, which will include a short demonstration of the organ are scheduled to start in March.

I have the privilege of playing the Orpheum's 3/13 Wurlitzer for approximately 20 minutes while patrons are being seated prior to the screening of World Adventure Tours.

This organ has had more public exposure during the past year than in the previous 40 years.

Sincerely,
Wm. G. (Bill) Hale
Burnaby, British Columbia
Canada

Gaylord Carter Will Judge Young Organist Competition



One of our most honored and loved theatre organists, Gaylord Carter, has graciously consented to adjudicate the Young Organist Competition this year. Gaylord is renowned as a silent film accompanist and recitalist and is highly respected throughout the theatre organ world.

Our young organists are fortunate to have an artist of Gaylord's experience and ability who is willing to participate in their futures. The other four judges will be announced at the convention banquet, but ATOS wishes to thank all of them in advance for their contributions to the advancement of theatre organ. *Lois Segur*

Opinions expressed in this column are those of the correspondents, and do not necessarily reflect the opinions of the editors or the policies of ATOS or THEATRE ORGAN. Letters concerning all aspects of the theatre organ hobby are welcome. Unless clearly marked "not for publication" letters may be published in whole or in part.

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From The Chapter Relations Committee

This committee was formed to secure, organize and disseminate useful information to the chapters of ATOS, information about forming local chapters, incorporating, obtaining tax-exempt status, ways to raise funds for installing a pipe organ, etc. A letter was sent last fall to all chapter presidents requesting input on what they would like to have the committee cover.

While the response has been somewhat disappointing, we have heard from Potomac Valley, Chicago Area, Mid-Florida, Jesse Crawford and Nor-Cal chapters. We would like to thank these people for their participation.

We plan to produce a booklet in the near future which will contain sample forms, documents and suggested procedures to benefit all chapters. In essence, our committee will serve as a clearing house for information which will help the chapters deal with some common problems.

At the present time we have requests for information which some of you may be able to supply. Do you have: 1) a "model" chapter organization showing titles and brief summaries of duties; 2) ways to attract new members; 3) ideas on how to get a theatre organ radio program started; 4) criteria to best obtain corporate fund-raising; and 5) criteria/procedures for chapter incorporation?

With your help, the Chapter Relations Committee will be able to supply assistance in a much needed area.

Thank you,
Bob Markworth, Chairman

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