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R. E. A. Arndt, C. R. Ellis, and S. Paul, "Preliminary Investigation of the Use of Air Injection to Mitigate Cavitation Erosion,"
In the above paper, part of the Conclusions section was omitted from the published version. The complete section is printed below.

Conclusions

This study and previous work by others indicate that water tunnel tests are an effective method for isolating the essential flow physics that contribute to cavitation erosion in hydroturbines. The hydrodynamic conditions for the water tunnel tests were carefully chosen "bubble-cloud" cavitation (van der Meulen, 1983).

Although the precise mechanism for cavitation damage is unclear (e.g., van Wijngaarden, 1993), it was determined that the damage initiates in the form of individual pits as observed on the soft aluminum inserts used in this study.

Pitting rate was not directly measured, but three different diagnostic techniques infer that air injection can be very effective in minimizing erosion. Reductions as high as 14 db in the modulation acceleration level were found in these tests.

For the conditions in this study, the modulation analysis technique is the most sensitive to changes in air injection implying a similar sensitivity to erosion rate that needs further verification. A simple analysis indicates that mean square acceleration and mean square pressure are related by the fourth power of pit diameter. If pit diameter scales directly with bubble size, there should be no difference in the velocity scaling for mean square pressure and acceleration. However, there are observed differences in the velocity scaling of the two quantities, implying a velocity scaling for pit diameter which appears to be consistent with previous results.

The piezoelectric film used in these studies shows promise for further research. However, the very short duration of the pressure pulses, much shorter than the Rayleigh bubble collapse time, probably preclude accurate measurement of pulse height spectra. Total impulse can be accurately measured, lending validity to using mean square measurements as a gage of cavitation erosion. Although trends with velocity and σ were noted in the noise signal, the effect of cavitation on the acoustic path makes the monitoring of cavitation noise less effective than the other techniques used.

The results reported herein must be viewed as preliminary until a direct correlation between pitting rate and acoustic emission monitoring is achieved.