

## **Acoustical Design of Laboratories**

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Laboratory spaces often include noisy equipment (fume hoods, refrigeration) that can affect the ability of people to communicate. Most labs require hard, cleanable surfaces, which can result in high reverberation, also affecting speech intelligibility. When these two factors are combined, communicating in a laboratory environment can be challenging. In this paper, a recent study of laboratory acoustics completed at the University of Alberta (Edmonton) is described. Teaching labs are differentiated from Research labs. Published guidelines and end-user feedback are integrated to help determine appropriate criteria governing background sound levels and reverberation in laboratory spaces.

## **MODELING OF INTERIOR NOISE IN LARGE COMBUSTION TURBINE POWER STATIONS**

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The interior noise environment in large power generation stations is characterized by a complicated interaction between many uncorrelated noise sources, reverberant effects, and near-field sound levels close to large structures and enclosures. From an occupational exposure perspective, Canadian, US, and EU requirements are often met by restricting unprotected access to areas with excessive noise. Thus it is desirable to map the distribution of noise inside the turbine hall and other mechanical areas. While this is often accomplished after the fact by direct measurement of the noise contours, analytical methods can be used in the plant design process to minimize the high noise areas or shift them to little traveled areas of the plant.

Conventional exterior noise propagation software may be used, with some caution, to model the distribution of noise indoors, including the near-field. The ray tracing algorithms inherent in such software is well suited to the cramped and complicated interiors commonly found inside power stations. Once the initial model has been built, it may be used to conceptually arrange equipment and enclosures for reduced noise exposure. Potential sources of error, the initial validation process, and estimation of enclosure effectiveness are discussed. A comparison is made with the results of auditorium acoustic software, which while designed for interior problems may not be as suitable in predicting industrial noise.