

Second Laureate Innovation Research

Scientific Committee: Mechanics

Research Work Title

Design and Construction of Sound Pressure Loading Test Facility



Executive Organization

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Abstract

The sound pressure loading test is one of the most important environmental tests by which the behaviour of the structure or the performance of the specimens under acoustic energy is examined. This test platform includes different parts: sound sources, an acoustic reverberant chamber, horns, a fluid flow supply system, data acquisition, and control systems. In order to increase the sound pressure level and to transfer it to a stable phase in a fluid flow, the exponential horns are placed immediately after the modulators. Due to the exponential function and the high ratio of the output cross-section to the input cross-section, these horns guarantee both desired demands. The test specimen is placed in an acoustic reverberant environment for the testing. Although the chamber's ability to reflect the sound leads to the synergy of the sound energy, the main point of the design and construction of the acoustic reverberant chamber is to create a uniform sound environment. Due to nonlinear behaviours in complex and composite structures, researchers should use modern techniques of sound and vibration analysis. In the laboratory, the Enhanced Frequency Domain Decomposition method is used to monitor the natural frequency of the sample before, during, and after the test.

