

13. Method of Determining Optimal Arrangement of Active Noise Control Equipment for Predefined Spaces

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Reducing noise from machines, particularly low frequency noise which is regarded as a major source of discomfort to workers, is required to improve factory working environments. While enclosing the noise source is effective, this approach is unsuitable when visual machine control is necessary. Active noise control (“ANC” hereinafter) is a useful option in such cases and the author has developed ANC measures for practical use. However, due to workplace-specific constraints, ANC speakers cannot always be deployed at optimal locations. In response, the author proposes a method of determining the optimal arrangement of ANC equipment by specifying the space in which noise reduction is needed and predicting noise reduction effects.

To determine the most effective arrangement of ANC equipment, this method evaluates ANC effects at several evaluation points within a predefined space by calculating the effect index based on superposition of wavefronts and converts evaluation results into a newly introduced index. This method was applied to an actual factory space to determine the optimal arrangement of ANC equipment. As anticipated, the ANC equipment thus deployed reduced average sound pressure levels within the space by 4–6 dB at frequencies between 100–300 Hz.

Key words: Active noise control, factory, working environment