ABSTRACT

Noise control is important and essential in a manufacturing factory, where the noise level is restricted by the Occupational Safety and Health Act. Several researches on new techniques of single noise control have been well addressed and developed; however, the study of noise depression on the whole plant noise by using optimum allocation planning is hardly found. An improper machine allocation will not only result in the tremendous cost on noise control task, but also cause the harmful environment for the neighborhood; therefore, the approach of optimum and economic allocation of noise sources within a constrained plant area becomes crucial and obligatory.

In this paper, a novel technique of simulated annealing (SA) is applied in the numerical optimization, and the multi-noise plant with various sound monitoring systems is also introduced. Before optimization, the single noise is tested and compared with the simulated data from SoundPlan, a commercial sound simulation package, for the accuracy check of the mathematical model. The result reveals to be within good agreements. The proposed SA optimization on the allocation of multi-noise plant surely provides an economic and effective methodology in reducing the sound accumulation around the plant boundary.

Keywords: sound transmission loss, space constraints, simulated annealing.