Optimization of Transmission Loss on a Series-Coupled Muffler by Taguchi Method

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Abstract : In this study, an approach has been developed for the noise reduction of a muffler. The transmission loss (TL) in the muffler is maximized by the use of a double-chamber muffler, and a baffle with a hole is inserted between chambers. Taguchi method is used to optimize the design for the acoustical performance of the muffler. The TL performance is evaluated by COMSOL software. The excellent parameter combination for the maximum TL is attained as high as 35.30 dB in a wide frequency range from 10 Hz to 1400 Hz. The influence sequence of four parameters on TL is determined by the range analysis. The effects of length and expansion ratio of the first chamber on TL performance for the excellent program were discussed. Comparisons of the TL results from different designs are made.