Effect of Exciting position on Sound Field in Cylindrical Enclosure
with End Plates

by

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Abstract

This paper describes the coupled vibration of circular end plates and the sound field in a cylindrical enclosure by exciting on one side of the plates. Coupled vibration analysis is carried out for shifts of the exciting position. The dominant acoustic mode and the relationship between plate motion and sound field are investigated based on the analytical results which are expressed as distributions of the sound pressure level within the cylindrical cavity. It is shown that the exciting plate motion is prevented by closeness between its mode and the exciting position, and then the coupled vibration with the sound field is weakened. Furthermore, the weakness of the exciting plate motion causes the other resonance mode in the cavity or the coupled vibration with three components including the other side plate.

Keywords: Coupled vibration, Circular end plates, Cylindrical cavity, Sound field, Exciting position

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Study of Erosive Burning Correlation of Composite Solid Propellants
Based on the Experiments with Sub-Scale Motors

by

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Abstract

Although a number of erosive burning correlations of solid propellants have been proposed, there is no decisive one. Therefore, a simple correlation such as Dickinson's one is preferred from practical point of view.

In this study, another simple correlation expressed in terms of the ratio of mass flow rate to mass burning rate is examined based on the experiments using sub-scale double slab motors. As a result, the present correlation is shown to have the advantage that the threshold value beyond which erosive burning occurs can be treated as a constant value.

Keywords: Solid propellants, Erosive burning, Rocket motor

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