ER인서트를 이용한 Hull Mount에서의 진동저감에 관한 연구

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Vibration reduction in a Hull mount using the ER inserts

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Key Words : ER(Electrorheological) Fluids, Vibration reduction, ER insert

Abstract : This paper deals with the vibration reduction of the hull mount system of ship structures brought by ER smart structures. The hull mount is used to isolate the vibration form the immersed structures. Utilizing the tunable characteristics of ER fluids, ER insert are made in the hull mountint structure. Different types of ER inserts are proposed and the vibration characteristics are investigated. A hull mount structure was made and the influence of ER inserts are experimentally studied. An extensive modal test is empirically conducted to identify natural frequencies and mode shapes according to the applied electric field and the types of ER insert. The frequency tunable characteristics of ER insert can be applied to many mounting structures for vibration reduction.

ER마운트 제어에 의한 원통셸의 진동소음 해석

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Noise and Vibration Analysis of a cylindrical shell by controlling ER mount

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Key Words : ER mount(electro-rheological mount), radiated noise(방사소음), sound field(음장)
transmitted force(전달력), LQ control(LQ 제어), cylindrical shell(원통쉘)

Abstract : ER mount is often used instead of rubber mount in cylindrical shell to improve the vibration and noise performanec. The noise radiated by cylindrical shell will be reduced by reducing the force transmitted to the cylindrical shell through ER mount. In this paper ,LQ control theory is used to reduce the transmitted force to the cylindrical shell. The finite element method of cylindrical shell is formulated by NASTRAN and its vibrating shape is calculated in frequency domain. The noise radiated from the cylindrical shell is calculated by the use of SYSNOISE, the boundary element CAE tool. The vibration of the cylindrical shell and radiated acoustic pressure is compared in case of both controlled and uncontrolled ER mount.