

타이어의 2차원 유한 요소 모델

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2-D Finite Element Model of Tires

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Key Words : tire, strip finite element, dispersion relation, waveguide

Abstract : It has been shown that the vibrational response of a tire can be represented by a set of decaying waves, each associated with a particular cross-sectional shapes, in the region near the contact patch. Thus, it can be concluded that tires can be effectively modeled as lossy waveguides. It has also been shown that the sound radiation from tires is mainly from the region close to contact patch. In consequence, it may be computationally efficient to analyze tire vibration and sound radiation in the region close to contact patch by using a "strip" finite element model in which the cross-section of a tire is approximated by 2-D finite elements while an analytical wave solution is assumed in the circumferential direction of the tire. In this article, a strip finite element was formulated based on a circular conical shell. The element includes provision for initial stresses that can represent the inflation pressure of tires. The dispersion relations for tires obtained by using the strip finite element model were then compared with those obtained by using a full, three-dimensional finite element model. It has been shown that the FE analysis made using the strip finite elements yields reasonable results at reduced computational expense.

버스차체 동특성 파악을 위한 실험 모드해석

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Experimental Modal Analysis for Understanding Dynamic Characteristics of Bus Full BIW Assembly

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Kyoung-Won Kim, Kyoung-Ho Song, Youn-Sik Park**Key Words** : Experimental modal analysis, Natural frequency, Mode shape, Bus BIW

Abstract : It is necessary first to understand dynamic characteristics of a bus full BIW assembly for fatigue endurance analysis. FE model has been used usually for analyzing the dynamic behavior of structures. A lot of experience and effort, however, is necessary to make a credible FE model. Experimental modal analysis of structures has been performed to verify the credibility of initial FE model and to update the model. In this work, experimental modal analysis was performed to understand dynamic characteristics of the bus full BIW assembly in free-free boundary condition and the result was used to verify the initial FE model. In addition, some practical techniques, which were used in this experiment, were mentioned.