구조물의 결함 규명을 위한 위상최적설계 기법의 적용

이중석†(서울대) · 김재은*(LG전자) · 김윤영**(서울대)

Structural Damage Identification Using the Topology Design Method

Joong Seok Lee, Jae Eun Kim and Yoon Young Kim

Key Words: Damage Identification(결함 규명), Topology Design Method(위상최적설계 기법), Design Domain Reduction(설계영역 축소)

Abstract : The topology design method has been introduced for structural damage identification. The resonances and antiresonances of the finite element models corresponding to damaged and undamaged structures are used as the predominant parameters in the developed topology optimization based damage identification method. The keys to the success of the topology optimization in damage identification are 1) the use of both resonances and antiresonances and 2) the non-conventional topology optimization formulation newly developed for damage identification applications. To pinpoint minor damage locations, a multi-stage candidate damage location identification scheme, which is called the progressive design variable reduction scheme, is also developed. Several numerical tests were performed to show the effectiveness and accuracy of the proposed method.

돌기승월에 의한 타이어 벨트의 동적 변형 해석에 관한 이론적 고찰

김범석†(한국타이어) · 김석남*(한국타이어)

A theoretical Study of Dynamic Behavior Analysis of Tire belt over an Obstacle

Beomseok Kim, Seoknam Kim

Key Words: Enveloping(돌기승월), Tire belt

Abstract : In general, the pattern of external force which is given tire belt for enveloping is found by experiment. However we need analytic approach to establish mechanical relationship in the enveloping problem. In this study, the tire belt is considered cantilever beam which has vertical stiffness and bending stiffness in tensile force. Then we focus on the deformation of the belt by moving load. Deformation in dynamic state analysis is larger than that in static state. Also, deformation of the belt is considerably large at extremely high speed, 120km/h. It probably results from impact characteristic in very short time. Even though geometrical displacement of the cleat height, contact problem between tread rubber and cleat are not considered in this study, we should consider these factors for further study.