상시진동실험을 이용한 남해대교의 동특성 평가

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Estimation of Dynamic Characteristics of Namhae Suspension Bridge Using Ambient Vibration Test

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Key Words : Ambient Vibration Test, Dynamic Characteristics, Natural Frequency, Mode Shape, Traffic-induced Vibration, Namhae Suspension Bridge

Abstract : The AVT under traffic-induced vibrations was carried out on Namhae suspension bridge in Korea. Mode shapes as well as natural frequencies up to the 15th mode were acquired exactly, and the effect of traffic mass and temperature on measured natural frequencies was investigated. The results from the AVT are compared with those from forced vibration test(FVT) and FE analysis. In the case of long span suspension bridges such as Namhae bridge which has relatively large mass, the results shows that the measured natural frequencies are not affected by vehicle mass. From the results of long-term variation of natural frequencies due to temperature change, it can be said that temperature effect may be predominant to structural demage effect. Therefore, if damage detection methods based on dynamic characteristics of bridges are to be used, the variation should be taken into consideration.

펜들럼 자동 평형 장치의 동특성 해석

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Dynamic Analysis of a Pendulum Automatic Dynamic Balancer

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Key Words : Pendulum Automatic Dynamic Balancer (펜들럼 자동 평형 장치), Perturbation Method (섭동법), Stability Analysis (안정성 해석), Time Response (시간 해석)

Abstract : Dynamic stability and behavior are analyzed for Pendulum Automatic Dynamic Balancer which is a device to reduce an unbalanced mass of rotors. The nonlinear equations of motion for a system including a Pendulum Balancer are derived with respect to polar coordinate by Lagrange's equations. The perturbation method is applied to find the equilibrium positions and to obtain the linear variation equations. Based on linearized equations, the dynamic stability of the system around the equilibrium positions is investigated by the eigenvalue problem. Furthermore, in order to conform the stability, the time responses for the system are computed from the nonlinear equations of motion.