World Academy of Science, Engineering and Technology
International Journal of Mechanical and Industrial Engineering
Vol:17, No:08, 2023

# Realization of Hybrid Beams Inertial Amplifier

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**Abstract :** Inertial amplifier has recently gained increasing attention as a new mechanism for vibration control of structures. Currently, theoretical investigations are undertaken by researchers to reveal its fundamentals and to understand its underline principles in altering the structural response of structures against dynamic loadings. This paper investigates experimental and analytical studies on the dynamic characteristics of hybrid beam inertial amplifier (HBIA). The analytical formulation of the HBIA has been derived by implementing the spectral element method and rigid body dynamics. This formulation gives the relation between dynamic force and the response of the structure in the frequency domain. Further, for validation of the proposed HBIA, the experiments have been performed. The experimental setup consists of a 3D printed HBIA of polylactic acid (PLA) material screwed at the base plate of the shaker system. Two numbers of accelerometers are used to study the response, one at the base plate of the shaker second one placed at the top of the inertial amplifier. A force transducer is also placed in between the base plate and the inertial amplifier to calculate the total amount of load transferred from the base plate to the inertial amplifier. The obtained time domain response from the accelerometers have been converted into the frequency domain using the Fast Fourier Transform (FFT) algorithm. The experimental transmittance values are successfully validated with the analytical results, providing us essential confidence in our proposed methodology.

**Keywords :** inertial amplifier, fast fourier transform, natural frequencies, polylactic acid, transmittance, vibration absorbers
**Conference Title :** ICVCMS 2023 : International Conference on Vibration Control Methods and Systems
**Conference Location :** Tokyo, Japan
**Conference Dates :** August 17-18, 2023