Fayoum University
Faculty of Engineering
Industrial Engineering Department

Investigation And Simulation Of The Mechanical Behavior Of Different Sandwich Beam Configurations

By
Mohamed Ahmed Mahmoud Shehata

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ABSTRACT

With the growing needs of the global industry for light-weight, stresses resistance, vibration damping, and reliable structures; investigate the sandwich beam structures has a great focus as a research field. In this work, researchers investigate the various types of stresses that occurred to the sandwich structures subjected to bending moment, axial load, and a combination of these both loadings. Also submitted to shear force, distributed load, concentrated load, three-point bending test, and finally under a dynamic state, for:

1- A solid steel beam versus sandwich beams with a different core material between polyamide, epoxy, and wood. Whereas, the other variables such as length and width were kept constant.

2- A different configuration than the classic sandwich beam one-cell as constant height sandwich beams with different cells number. While face sheets thickness and core thickness varied depending on the cells-number. And the other variables were kept constant.

The used investigation was varied between theoretical, simulation, and experimental type for validation purposes of the selected cases.

The results indicate that the different stress types can be significantly varied due to a change in the flexural rigidity D and the transformation factor n. This can be done through sandwich beam advantages over a solid beam with the same dimensions.

An interactive program designed by Visual-Basic software was introduced as a tool helping in accelerating the design stage of the sandwich beam to meet the desired requirements.