Graduation Project Proposal

Project Title	Attenuation of acceleration amplitude values of an aluminum honeycomb sandwich panel by geometry optimization
Classification	Research project
Supervisor	Akın OKTAV
Abstract	The aim of the project is the optimization of the dynamic behavior of aluminum honeycomb sandwich panels while preserving their strength properties. Whether the strength properties are preserved or not will be checked through the maximum shear strength value. A finite element model will be constructed for computational analysis. The accuracy of the finite element model will be determined by experimental modal analysis. The finite element model will be updated using the experimental modal analysis results. For the strength test, a three-point bending test will be performed in accordance with ASTM C393 standard. Within the scope of the project, it is planned to optimize the dynamic response of aluminum honeycomb sandwich panels under random loading. In order to determine the dynamic behavior, random loading is planned to be applied to the structure through the finite element model. As a result of random loading, the point where the acceleration amplitude value is the highest will be determined and the acceleration amplitude value at this point will be minimized by geometry optimization. The variables for geometry optimization are the thickness of the top and bottom plates and the height of the core structure. The total weight and the maximum shear strength are the design constraints. When setting up the geometry optimization, these constraints will be adjusted to compromise at most 10%.

The graduation project is the subject of the MEC 401 Mechanical Engineering Design and MEC 402 Graduation Project courses offered in the 7th and 8th semesters, respectively.

Course Name	MEC 401 Mechanical Engineering Design
Prerequisites	MEC 308 / Theory of Machines II
Corequisites	None
Requirements	Basic knowledge of a finite element analysis package
Workflow	• Literature survey • Construction of the finite element model • Computational analysis • Midterm presentation • Three-point bending test • Comparison of the experimental and computational results • Project report • Final presentation

Course Name	MEC 402 Graduation Project
Prerequisites	MEC 401 Mechanical Engineering Design

Corequisites	SEC 402.4 Mechanical Vibrations
Requirements	None
Workflow	• Experimental modal analysis • Comments on the results • Midterm presentation • Project report • Final presentation

Term	Fall'23		
Date			
Project Title	Attenuation of acceleration amplitude values of an aluminum honeycomb sandwich panel by geometry optimization		
Supervisor Name and Signature	Akın OKTAV		
Students			
First Name	Last Name	Student Number	Signature