



MECHANICAL ENGINEERING STUDENT SEMINAR

Thursday, August 11 2022 at 13:00

Online: <https://technion.zoom.us/j/94496824355>

Energy absorption in additive manufactured structures: The role of geometry and materials

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In today's modern transportation and aerospace industries, there is a growing demand for low-mass high-efficiency energy absorbing structures. One of the most researched structures is thin-walled tubes for their low-mass and high axial stiffness. Our novel design based on thin-walled tubes takes inspiration from origami art and add an additional degree of freedom to the design of thin-walled tubular structures. Our research focuses on polygonal cross-section design with a rotational degree of freedom, which means that during the collapse process our absorber rotates around the impact axis. Several crashworthiness criteria were used to compare our rotating models and the traditional non-rotating design. We used numerical simulation to study the impact of different materials (Ti-6Al-4V & Scalmalloy) and geometrical parameters on our models in terms of energy absorption and efficiency. Our main goal was to find basic parameters for engineers to use in their quest for an optimized absorber to meet their specific demands. Finally, we conducted a series of experiments to verify our numerical findings and offer a way to mitigate the friction-limited rotational degree of freedom during the impact.

Note: the seminar will be given in Hebrew