

About 'Research on Decking' Project

What:

Investigated the impact of graphene on the strength and maximum deflection of wood-free composite decking.

Why:

To validate the possibility of reduced wastage when making such decking. This would happen if the strength increased to meet industry standards even with less material used, promoting sustainability.

How:

I did an internship at a CleanTech research startup, Vector Homes, where I investigated various different factors that may affect the strength and maximum deflection of wood-free composite decking (including dimensions and material properties like Young's Modulus), I wrote a research report on graphene's impact as an additive on the strength of the decking. I did this by adding different percentages of graphene (by mass) to samples of polyurethane foam, and testing how much they deform using state-of-the-art machinery found at Vector Homes. I then compared the results from the lab through simulations made on Fusion 360 and calculations

What skills I learnt/developed:

Research- Finding credible websites to learn about the effect of graphene on other materials, researching the composition of the decking I was experimenting with, or looking for potential alternatives to graphene, all tested and developed my research abilities throughout this project.

Communication- When writing a report about the entire process of research, the conclusions, and all the skills I developed from it; the report won the Gold CREST Award.

Problem solving- When tackling any problems I faced throughout the experimental process. For example, to shape the polyurethane foam into the intended cuboid with similar dimensions for each test sample, I used a silicon mould clamped using steel blocks, plates, and G-clamps.

Time-management- When making a detailed action plan for the whole process, considering commitments I have made outside of this project, and trying to stick to the timeline throughout the project.

Interdisciplinary nature of my field- When writing a report, when analyzing the effect of different forces, or when trying to understand the properties of graphene, all highlighted the interdisciplinary nature of my field of passion.

Knowledge about areas of my interest- Knowledge about graphene, its effect on the hardener, and the area moment of inertia; about experimental methods, techniques, and equipment; and about skills like 3D modelling and conducting 3D simulations, all of which would be useful for me for university and for my career as an engineer!

What I plan to do next-

Further investigate other factors that may affect the strength of decking, like material properties, dimensions, etc. when I get the resources to do so.

Share my results with firms that produce wood-free composite decking.