Thesis Project Portfolio

Rock-Slide: Developing an Indoor Climbing Volume with a Linearly Actuating Hold

(Technical Report)

Bidding for Better: Changing University Policy Regarding Hazing and Substance Abuse

(STS Research Paper)

An Undergraduate Thesis

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Bachelor of Science, School of Engineering

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Executive Summary

Introduction

Although it may not be immediately apparent, the two projects that I have undertaken share a common purpose of enhancing the college experience. While my STS paper delved into the university policies on binge drinking and hazing in Greek life organizations, my technical project involved the creation of a rock climbing hold that could move back-and-forth on a wall. Admittedly, these two subjects appear to have nothing in common. However, both projects aim to improve the college experience, which is a critical time for many young Americans. Greek life organizations and club sports such as rock climbing are two major influences on this experience. Therefore, the two projects in my thesis portfolio share a common goal of enhancing the overall experience for all.

Capstone Project Summary

My technical project involved the construction of a rock climbing volume with a linearly moving hold. The volume is made of welded aluminum, and the hold moves along a 22-inch lead screw. Even while using a relatively cheap DC brush motor and a standard DeWalt drill battery, the prototype volume was able to move from side-to-side even while a person put their full body weight on the hold. This project serves as a proof of concept for a larger scale wall where each hold is equipped with similar motion capabilities.

The purpose of this project is to increase college student's interest level in indoor rock climbing and to allow college rock climbing gyms to maximize their space efficiency. A wall full of holds like this would be able to dynamically adjust its difficulty level for the skill of the climber approaching it. This would allow a single wall to provide climbers of all experience

levels with a challenging and stimulating climb. Additionally, the holds were able to move while a climber was on them which could be used to provide interesting new challenges to a classic rock climbing wall. Holds could be programmed to gradually pull a climber to the top of the wall or rapidly descend if held for too long, creating a new, "gamified" version of indoor climbing. Overall, the project was an enormous success and the prototype was finished with excellent results.

STS Research Paper Summary

Fraternities and sororities, collectively known as Greek life organizations, have been a prominent feature of university campuses in the United States for over a century. While these organizations are often associated with community service and social opportunities, they have also been plagued by serious problems such as hazing and substance abuse. In recent years, there has been a growing concern about the negative effects of Greek life on college campuses, and calls for reform have become increasingly urgent. This research paper aims to explore the problems related to Greek life organizations, with a focus on hazing and substance abuse, and to suggest ways in which students and university administration can address these issues.

This research paper will contribute to the understanding of the complex social and technological systems that shape Greek life organizations on university campuses. Insights into the challenges faced by these organizations will be provided, and ways in which they can be reformed to better serve the needs of students while promoting a safer and more inclusive campus community will be suggested. Ultimately, this research aims to contribute to the ongoing discussions about the role of Greek life organizations in higher education and the ways in which they can be made more responsible and accountable to their members and the wider campus

community. This will be accomplished by recommending that universities shift their guidelines and rules from prohibition to harm-reduction.

Concluding Reflection

The two projects in my thesis portfolio may share a common goal, but they differ greatly in their execution. The technical project was a team effort that involved an iterative design process, where we sketched, rendered, built, and tested physical prototypes. Conversely, the STS research paper was an individual project that consisted mainly of reviewing existing literature, analyzing the relationships between organizational entities, and providing policy recommendations.

Working on these two vastly different projects simultaneously has significantly contributed to my development as an engineer. These projects have allowed me to enhance my individual and collaborative engineering skills. The individual approach required for the STS paper has helped me better understand how to handle assigned tasks within a team. Moreover, the collaborative nature of the technical project has enabled me to communicate effectively and work with peer editors to perfect my STS paper. Additionally, these projects have improved my design skills, both abstract and physical. The physical design work done in the technical project has taught me to ensure that proposed solutions for my STS topic will work in real-life scenarios. Similarly, the abstraction of the research paper has enhanced my brainstorming skills for the technical element. By working on these two projects, I am now better prepared for the real world, where problems are not solved in isolation.

In summary, these two projects have allowed me to become a well-rounded engineering student, which is a crucial attribute for success in the engineering industry. As an engineer, it is

essential to have both individual and collaborative skills, as well as abstract and physical design

skills, to tackle real-world problems effectively.