Thesis Project Portfolio

Ivy Corridor Phase II Redesign

(Technical Report)

An Analysis of the Sampoong Department Store Collapse through the Lens of Virtue Ethics

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

My technical design and STS research are related in that they both center around the built environment and the ways in which it is designed with stakeholders and the general public in mind. The built environment is a broad term that refers to human-made structures, such as buildings, transportation mechanisms, and utility systems, that contribute to the formation of physical spaces for societal activity. My technical design aims to better serve a college community through the creation of a site with multi-use spaces and functional infrastructure. My STS research narrows down the concept of the built environment through the analysis of the failure of a single building — a shopping center intended for consumers. Therefore, both projects are connected through the topic of the built environment and its relationship with relevant parties.

My Capstone team's technical project is a redesign of Phase II of the Ivy Corridor project at the University of Virginia (UVA) in Charlottesville, Virginia. This is a roughly five-acre site that serves as a vibrant and welcoming hub for the UVA community and its visitors. The final site layout centers around an open green space that consists of an interactive bioretention basin. Around its perimeter are three buildings intended for mixed-use residential, dining, and academic spaces, as well as an amphitheater that may be used as an outdoor classroom. Additional design considerations include multi-modal transportation and access, utility mapping, stormwater management modeling, regrading of the topography, sustainability initiatives, erosion and sediment control, and cost estimation. Due to the large scope of the design, coordination between the aforementioned items was a very important factor throughout the span of the project. All design decisions were made in conjunction with the goals set forth by the University, the demands of students and faculty, and the expectations brought by visitors of UVA.

My STS research investigates the ethicality of the actions and choices made by the engineers on the Sampoong Department Store project in Seoul, South Korea, which collapsed in 1995 and resulted in the loss of more than 500 lives. Virtue ethics is utilized to support my claim that they did not act morally in their decision-making due to their lack of two key virtues: competence and commitment to quality. The engineer in charge of inspections failed to exhibit competence when he did not call for an immediate evacuation of the building despite the clear warning signs of an imminent structural failure. The group of structural engineers responsible during the construction phase of the project also did not showcase a commitment to quality when they failed to perform accurate calculations or conduct adequate quality control walks. Consumers, who were one of the most important stakeholders in this project, were neglected when intentional decisions were made that deprioritized their safety at a deadly cost.

Additional value was added to both projects by working on them simultaneously. The Capstone project revealed the complexities involved in infrastructure design in order to make it foundationally functional, giving me better insight on the technical intricacies of the building project discussed in my research paper. Likewise, the STS research project underlined the importance of an engineer's moral responsibilities to prevent catastrophic failure from taking place. This made me realize that broader societal consequences, such as safety and sustainability, should be continuously deliberated throughout the design process of my Capstone project. In conclusion, my technical and STS research projects relate through the topic of the built environment, and the concurrence of these two works allowed them to benefit from one another.