Thesis Project Portfolio

Coilolo River Pedestrian Bridge

(Technical Report)

Seasonal Isolation: The Latest Call for Action Regarding Climate Change

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Spring, 2023

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Sociotechnical Synthesis

Introduction

For my capstone, my team and I worked with Engineers in Action to design and provide relevant construction documents for a pedestrian footbridge to be built over the Coilolo River in Bolivia. During the rainy season, the river floods and separates nearby communities from essential infrastructure for months at a time. The capstone project relates closely to my STS research, where I analyzed the global scale and impact of this seasonal isolation and identified what must be needed and steps to mitigate the problem.

Project Summaries

At the conclusion of our capstone project, we had produced a final design, bill of quantities, and construction schedule for our proposed bridge site. The design not only needed to pass a series of checks, but also needed to be made as efficient as possible to save on material and labor costs. This ensured that our bridge was the best solution for the community, which is ultimately every engineer's goal. The final design spanned 58.3 meters and included specifications for the abutments, anchors, decking, fencing, and handrails. The bill of quantities and construction schedule were also essential because they provide the blueprint for turning the design into an actual bridge, one that will hopefully make a tremendous impact on the lives of the people in the villages of Coilolo and Tipa Tipa.

In my STS research, I explored the reach of seasonal isolation across the world, and the impact that this flooding can have on communities. In total, over one billion individuals experience separation from schools, healthcare, and markets for months at a time during the rainy season. This leads to a number of significant drawbacks for these villages. For instance, several million children are not enrolled in school because areas encompassed in school

commutes are simply ill-equipped for flooding and other natural disasters. Additionally, some countries have had their crop supply devastated by flooding, leading to severe inflation. While solutions like EIA's footbridges can make a massive difference for a community, larger efforts are necessary to address the issue on a global scale. Governments and political leaders need to establish and meet goals to mitigate climate change, as the damage that humanity has done to the planet is on the verge of reaching an irreversible level.

Conclusion

Working on the capstone project with my team while performing my STS research gave me a more powerful perspective on our efforts. Throughout the capstone process, I was aware that the construction of our bridge would benefit the neighboring villages. However, my STS research gave me additional context, and allowed me to realize how much of a difference will be made by connecting these individuals to essential infrastructure. Through utilizing our engineering knowledge to design and provide construction documents for this bridge, I feel as though my capstone team is acting ethically and making a societal difference, which should be the goal of every engineer.

Lastly, I would like to acknowledge my STS professor, Richard Jacques, my capstone advisor, Jose Gomez, and my capstone team, Sarah Besecky, Glenn Broderick, Katherine Foley, Gabriella Ford, Cooper Hamby, Tim Maxwell, and Wyatt Yoder.