

**Thesis Project Portfolio**

**Little Ivy Creek Bridge Replacement using Accelerated Bridge Construction  
Methods**

(Technical Report)

**3D Printing a Possible Solution to Brazil's Housing**

(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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## **Sociotechnical Synthesis**

For the last 8 months, I've been working on two different projects. Both of my projects deal with new construction methods being introduced to the industry and the impact they could have. In both situations, the technology is being used either to fix existing social problems or to avoid causing social discomfort to citizens in the nearby areas. Both ideas are far from our traditional construction methods, but the construction industry is evolving at the same pace as other industries.

My Technical Report is based on using prefabricated parts to shorten the construction process in bridges. This process is mainly used on roads and highways to avoid the extended closure of certain routes. Our project was focused on studying the viability of using the Accelerated Bridge Construction Method and looking for possible design for an existing bridge in Charlottesville, Virginia. We had to study the differences between our proposed construction process and the traditional construction process to see if there was evidence of the expected benefits seen when using the accelerated method. Additionally, we analyzed possible location for materials and equipment, in site, to avoid social discontent as if we were the company tasked with executing the project.

My STS research paper, talks about the implementation of a new technology in a new place to deal with certain existing social problems. This technology is 3D printing and how it could help to fight the existing housing problems being faced in Brazil. The implementation of this technology gives Brazil's government more budget flexibility and could help them complete their existing and upcoming projects faster and in a timely manner. This would positively impact Brazil's social infrastructure, because if there were to be such a big change in the low-income housing industry the over-population in cities could be alleviated helping reduce crime, social conflict between classes, and improve quality of life of the entire society, not only those benefited directly by the housing program.

Both of the projects I worked on during the last year focus on the next method and technologies that are going to be coming to the construction industry. As an upcoming engineer, it is imperative for me to understand these processes and their applications so I can use them throughout my professional career. Additionally, as a student from a third world country, these new technologies have never been used in Panama and after studying them for a year I can now study their viability and possible impact on the country I call home.