

Thesis Project Portfolio

Liquor-Based Canned Cocktail Production:

Fizzy with the Rizzy

(Technical Report)

**An analysis of the February 3rd , 2023 Train derailment in East Palestine, Ohio and its
ethical ramifications**

(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

Department of Chemical Engineering

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Sociotechnical Synthesis

While seemingly not related, the Ohio train derailment and canned cocktail production relate on the front of chemical engineering safety. Both my research and technical paper explored their specific subjects while stressing the importance of high safety standards. Chemical engineering safety is one of the most important aspects of engineering, as it pertains to physical, mechanical, and chemical safety. Where these two papers differ is in the scale of the outcome of an accident. The research paper on the Ohio train derailment explored an accident with outcomes that affected hundreds of thousands of people, while an accident that relates to the technical paper would only affect a handful of people. Despite their different effect scales, both the derailment research and cocktail technical project provide useful lenses for chemical engineering safety.

My technical report encompassed the construction of a canned cocktail production plant while also maintaining safety within the facility. The capstone team analyzed current market shares of alcoholic beverages and generated a market goal. From this goal, we were able to calculate parameters and specifications for the entire process, including the safety factors involved. Each piece of equipment was specified while keeping safety in mind, as if the business was pursued high safety standards would need to be kept. The chemicals to be used were also analyzed for their chemical properties and the dangers they could pose to the workers and local community. Overall, this project produced a profitable and safe business plan to open and operate a canned cocktail production business.

The STS paper I wrote investigated the morality of the Ohio train derailment, which was affected by a lack of chemical engineering safety. An important aspect of this is that the accident had already occurred, and I examined where responsible chemical engineering safety was not followed. Due to the facts involved in the accident, as well as the behavior of the offending company after the derailment, I argued that the company was morally liable for the chemical spill that occurred. Their violation of safe chemical engineering safety standards was explored in the paper and provides a relevant case that can be applied to chemical engineering safety overall.

My simultaneous work on both the research paper and technical project allowed me to greatly expand my knowledge of chemical engineering safety. The STS research gave me a perspective on chemical engineering safety when applied to large scale accidents and processes that can result in large health effects. My technical project allowed me to implement the chemical engineering safety principles I had learned to an actual project plan. Together, these projects will allow me to carry this new knowledge forward into my career, so that I may apply it in a way to better my community and industry.