MATC Internship

Midwest Roadside Safety Facility

Summer 2023

Zach McWilliams

Throughout the summer while working at the Midwest Roadside Safety Facility (MwRSF), I have developed an array of skills that will benefit me in future internships and my future career. Some skills were technical, such as developing drawings using AutoCAD® and creating roadside safety systems in SolidWorks®, while others were soft skills, such as how to interact with engineers in a project meeting and how to communicate with my colleagues and supervisors in a research setting. All of these skills were developed through the vast number of experiences and opportunities I was given at MwRSF. Although this was my first internship, it was an extremely valuable one because it allowed me to develop and enhance my abilities in a professional setting.

The first advanced skills I developed were through working in SolidWorks® and AutoCAD®. SolidWorks® is software in which 3D models are developed and transferred into a 2D format to be used to create test plans, models for simulation and models for 3D printing. I used SolidWorks® on many projects to make small edits and corrections, but I was primarily involved in developing two roadside safety system drawings, specifically a generic end terminal and a steel bridge rail with abutments. While working on the generic end terminal system, I learned how to easily substitute parts in and out of assemblies and use mates to define all parts of these drawings. I also learned that drawings were a lot less complicated to update than I thought with the help of the MwRSF personnel. These problems ranged from fixing properties within individual parts of a system to resolve problems in the Bill of Materials, to going into the system to mate parts to accurately represent the system we are trying to display. Since I was independently working on this system, I needed to ask questions, and these questions furthered my understanding of the software.

Another project I worked on was creating a 3D model and test plan for a steel bridge rail with abutments. Throughout this project, I was challenged with creating the concrete abutments which contained rebar reinforcement from a hand sketch as well as the steel bridge rail from a 2D plan from the sponsor. This project gave me the opportunity to solve problems with limited resources, such as learning how to design parts using the small number of dimensions available. I was able to learn from this project how to create new drawings using the formatting and dimensions I am given from hand drawings and AutoCAD® and create noncomplex drawings that still contain enough information to replicate the system on the job sight.

Lastly, during my time between SolidWorks® projects, I was assigned AutoCAD® drawings. AutoCAD® is another drafting software, like SolidWorks® but it is mainly in 2D and is primarily used to give a visual representation of the data we collected for reports, such as the placement of the cameras during a test or the deformation of the system after a test. Prior to my internship, I had never used AutoCAD®, so this allowed me to develop an understanding of the software and have a visual representation of the data we were hoping to collect from the test. This visual representation strengthened my understanding of the research being done at MwRSF. Overall, my time working with MwRSF developed my abilities in computer aided drafting, which will be highly valuable in my work as a future mechanical engineer.

Critically, I also developed soft skills during this internship. Some skills included formatting an email, professional terminology within the industry, and the correct way to bring up problems with others. These skills were attained and polished through everyday interactions with my coworkers, who led by example, as well as within

projects. During my time working on the bridge rail with abutments, I was invited to attend the project meeting where the engineer's discussed information provided by the project sponsor as well as potential problems and solutions. It was extremely enlightening to see first-hand the value of gathering a team of professionals to improve the quality of the project. This experience will help me with interactions in meetings in the future. I gained a better understanding of how to respectfully express my ideas and opinions in a professional setting and saw the value in being well prepared for discussions. Similarly, working with other interns doing SolidWorks® in the same shared cubical was extremely valuable. Since I worked full time and started slightly earlier than some of the other interns, I was able to help them when they had small issues with SolidWorks® and in turn, I had the opportunity to learn when they had issues that I did not know how to solve. This small community created opportunities to engage in group problem-solving as we identified problems in each other’s work and produced solutions as a team.

This internship has been an incredible experience for me. I have learned technical skills that will undoubtedly help me in my career. I have had the opportunity to learn from my coworkers and teach my fellow interns, as well as gain experience working as a team in a professional setting. I am extremely grateful for this opportunity.