

Victor E. Bulldog Stage

Mechanical Engineering

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FRESNO STATE

Lyles College of Engineering

Abstract

Victor E. Bulldog is an important public figure to the University of California, Fresno as well as a lovable, chunky bulldog that the local community can not get enough of. This stage can elevate Victor and provide a safe and aesthetic method of displaying Fresno State's live mascot. Other important considerations to incorporate into the stage design are sponsorship recognition, public safety, and design portability.

The Fresno State Alumni Association is responsible for providing care and financial support to the school's live mascot. Thus, sponsorship recognition was important to integrate into this project as a means to raise funds. The addition of a spacious backdrop to the stage provides plentiful sponsor space acting as a method of raising funds for the Fresno State Alumni Association. The public's safety as well as Victor's safety are paramount when considering design functions of the project which is why the stage has been carefully analyzed and has various safety features incorporated into the design.

Sitting at about 50 pounds, the solution to display Victor is a stage composed mainly of aluminum components. The design utilizes a platform elevated with 4 adjustable legs. The stage has an attached ramp for Victor to walk on stage. A foldable backdrop will be on the back of the stage to provide a convenient and effective method of sponsorship logo display. The protruding components such as the ramp, backdrop, and legs can fold either onto the top or bottom of the stage platform to provide easy transportation.

Concept Prototype



Other Concept Prototype View

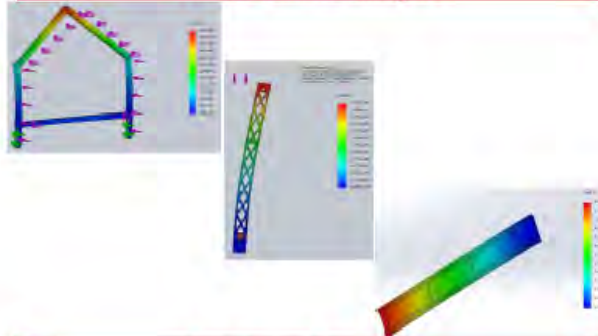


Design

Our design includes:

- Safe elevation for Victor E. Bulldog, the live mascot
- Capability to load and unload Victor E. Bulldog without requiring a human to lift him
- Portability so that the stage can be transported to many events
- Ability to be set-up and taken-down by one person in under two minutes
- Sufficient space for sponsor logo display as a means of raising funds
- Comfortability for humans to stand close to Victor E. Bulldog for photos
- Embody Fresno State values

Finite Element Analysis



Manufacturing Process

All of the sheet metal components were manufactured to a high accuracy using a CNC router programmed by converting the CAD file. The CNC was used to pocket the stage and save weight while at the same time keeping its integrity. Due to the precision of the CNC routing machine that was used many parts were able to be completed in virtually a single step after being prepped. This was critical for the main sheet of the platform which needed to be highly accurate for all the other components to fit well and be assembled correctly.

The tubing was mainly treated using the CNC router and for this process we used the CNC router to cut holes for the leg increments and other essential areas. The legs were also pocketed using the CNC to save weight.

Overall, all the parts matched what was modeled in CAD and fit as expected once purchased, manufactured, and assembled. There has been no need to remake parts thus far due to inaccuracies or inconsistencies in the manufacturing process. Using the CNC router played a great role in our prototype and we did come across having to postpone working on the stage due to the CNC being down for a few days. Fortunately the issue with the CNC router was resolved and the team was able to proceed with the manufacturing process.

Fabrication Process

The assembly process for the stage was simple and straightforward. All of the parts were designed to be riveted together, which is a simple and strong method for attaching two components. The stage was assembled into four sub-assemblies that could then be assembled into the final product. The four sub-assemblies being the backdrop, stage top, legs, and the ramp parts. Each of these sub-assemblies had all of the components riveted together and were prepped. The backdrop then was attached to the stage top with two pins and a gusset on each side.

The ramp consists of two parts which were connected together with a piano hinge that goes across the two faces. The legs each attached to the stage top with a pin and a link-mechanism for added stability and support. The stage can easily be assembled and disassembled into these major components in under two hours while only taking approximately two minutes to set up for presentation purposes.

Fabricated Prototype



Sponsors/Conclusion

FRESNO STATE
Alumni Association
Lyles College of
Engineering Chapter

Star Finishes

WCP WESTCOAST PRODUCTS
ADVANCED PERFORMANCE

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