Personal CAD Project Summary - Matthew Wehner

Penn State Streetcar

Figure 1: Final 3D rendering

Figure 2: Dimensioned multiview drawing
For my personal CAD project, I modeled a vintage electric streetcar in Solidworks (shown in 3D in Figure 1 and in dimensioned multiview in Figure 2). I have always been interested in anything related to railroads, but I became interested in streetcars in particular after discovering a collection of around 50 old streetcars in the woods near my hometown while browsing through Google Maps. After doing some research, I took a trip out to the site where I took some pictures. I later met the owner of the trains who said he was working on restoring the ones that were in better shape. Figures 3 and 4 are pictures I took during one of my trips to the site.

Figure 3: A view of the streetcars

Figure 4: Another view
When I met with the owner, I learned that the streamlined art-deco styled streetcars I saw were called PCC cars, short for Presidents’ Conference Committee (a group formed in 1929 by the presidents of transit companies to decide on a new streetcar design). While these cars were unified in design under PCC regulation, different transit companies had them custom built with different door configurations, different size trucks for different track gauges, different colors, and even made some double-ended for two-way operation. When it came time to do this project, I decided to design a PCC streetcar to be used if Penn State had its own streetcar system. I loosely based my design off of a San Francisco streetcar (painted in Illinois colors) shown in Figure 5 and a dimensioned multiview drawing shown in Figure 6 from an archive by the Seashore Trolley Museum located in Kennebunkport, Maine.

Figure 5: Doubled-ended PCC streetcar in San Francisco¹
In creating my CAD model, the hardest part was probably creating the roof. I spent over an hour trying to create horizontal lofts from the front to back of the streetcar, but I had a hard time getting that to work. I finally decided on a vertical loft going from one shape on the top down to the top of the car body, which ended up working very well. Another problematic spot was the front windshield. To make the extruded cut, I had to go from the back side from a flat surface through all in front of it as I could not simply select the curved front and make a cut on it.

By doing this project, I learned a great deal about using Solidworks. While it was, at times, frustrating, the end product of my work was satisfying. From these difficulties, I learned that there are many times where one has to do things differently than what seems obvious. Sometimes there are ways of doing things that would make sense to a person using the software but are not possible because of the way the program works. Overall, Solidworks is a powerful modeling tool with many features I have not yet grasped. By doing this project however, I have gained some skills in the program and I hope to continue learning about the software so I can gain a skill useful in the workforce!
References

   <http://commons.wikimedia.org/wiki/File:San_Francisco_F_line_streetcars_at_Jones.jpg>
