Solid Works Personal Project – J/70 Sailboat

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Figure 1: Picture of the overall sailboat from the bow of the starboard side

Figure 2: Picture of the overall sailboat from the starboard stern
Figure 3: Zoomed in picture of the connection of the rudder and tiller to the cockpit of the sailboat

Figure 4: Drawing of the full assembly of the sailboat
I decided to create the J/70 model Sailboat for my solid works final project because I am an avid sailor along with my entire family. The J/70 model is the type of boat that I am most familiar with since this is the model that I typically race on. My Aunt owns a J/70 named spice and always asks me to come to all of her regattas and serve as crew. I miss it being up at Penn State with no real water and sailing close by! So since sailing is such an important part of my life I decided this would make a challenging yet achievable project that I could even hopefully print out and give to my aunt for Christmas!

I used many features to create the sailboat. Some of which I did not even know existed. I used lines and splines to create the outline of the stern, beam, and bow of the boat and lofted them together using the guide by line style of lofting. I then created the cockpit by drawing a sketch of the outline I wanted with lines and extruding a cut through the middle of the boat to hollow it out. I used an extruded boss to create the top part of the cabin in the middle of the boat and played around with different types of fillets until I got the shape I wanted. Just about every part on the boat utilized some sort of a fillet. I used an extruded cut to create the hole that the mast would sit in. To create the spinnaker pole which is the thing on the bow of the ship I extruded a circle out of a plane and then extruded a cut back over it in the shape of a washer and then used some fillets. This created the hull of the boat. To create the mast and boom (the black thing sticking up from the middle), I used a cylinder going up and then halfway up made a series of planes at an angle to make the oval beams. I learned a lot about how to use planes in this part. I then lofted more cylinders together to make the boom at the bottom. The winches are three cylinders with some lofts and more fillets. For the rudder and the tiller I used a lot of splines and more lofts and fillets. It was very tricky lofting a rectangle to an awkward spline but I finally got it. Then I just made the bolts shown in the picture above to match up with the holes I created in the hull. I then just mated the sections together and formed a Sailboat!

The hardest part of this model to create would probably have been the hull of the boat. It seems like such a simple task but really turned into a big issue when I tried to do it on my own. I was originally
trying to draw a sketch of the stern of the boat using lines, arcs, and fileting the edges but this did not work to well at all. Luckily though, I stumbled upon the fancy “spline” tool! I am still not exactly sure how it works but in essence it allowed me to draw points throughout various parts of the curve I wanted to create and allowed me to create exactly how much curve I wanted which I could not figure out with just arcs. Then my plan was to create a sketch of the outline of the stern (back), beam (middle), and bow (front) of the boat and just simply loft tem together. When I tried to do this it came out with a shape nothing like I had hoped. I began some more experimentation and created guidelines I wanted the hull of the boat to look like. Now I used a loft but this time I used the guide by line action and with a little bit of moving points around finally created the hull of the boat. There were a couple other tricky sections too, but I remember this one the most because it was the very beginning and made me start to think twice about my selection for my project.

I learned that solid works can be extremely aggravating at times… but with a little bit of patience it is a great tool for creating drawings animations and sketches of just about whatever someone wants to create. I much prefer using solid works to drawing by hand because I have the artistic ability of a five year old failing preschool. I learned so much through the solid works portion of the class. My brother is a senior year engineering major at the Coast Guard Academy and he was amazed with the stuff we were doing because he has never done anything as advanced as the projects we were doing. I really enjoyed spending time on the final project and I felt extremely accomplished when I finished and it actually resembled a boat!