Team Members: Keith Spitzer, Sean Liu

Short Project Description (what you made):

A **Sail Drive** is an output shaft and propeller linkage for the engine on a sailboat that is more hydrodynamically efficient than traditional methods. They can become generators when spun under sail assuming the engine is an electric motor.

List of part files and a short description of each part:

Exit Shaft is a shaft that is connected from the boat/engine through the thrust ball bearing fr\_ai and the Test base to the Straight bevel pinion\_ai right.

Propeller is a revolving shaft with broad angled blades attached to it. This transmits rotational energy into trust then by creating rotational energy into pushing water this thrust the boat in the opposite direction.

Shaft prop is a connection of the straight bevel gear\_ai to the Propeller through the Test base and thrust ball bearing fr\_ai.

Straight bevel pinion\_ai right is a bevel gear pinion that meshes with the straight bevel gear\_ai to form a reduction gear box that translates the Exit shaft rotation by 90 degrees to be utilized by the propeller. The part attaches directly via a key press fit to the Exit shaft.

Test base is connecting piece which keeps the thrust ball bearing fr\_ai’s in alignment to ensure that the straight bevel pinion\_ai right and straight bevel gear\_ai are meshed properly in a 90-degree form to transfer the power/rotation.

Thrust ball bearing fr\_ai are used for eliminating friction and supporting the Exit shaft and prop shaft to keep the propeller running. When the ball bearings in the pack are moving allowing for lower friction the bevel gear is rotating the propeller to provide propulsion for the boat.

Test Shell1 water inlet left/right is either half of a total cover that wraps around the sail drive to keep gearbox and shafts hydrodynamically efficient as well as providing protection. This make the sail drive stable and run efficiently under water due to the efficient shape and specific design of support within the shell.

List of assembly file(s):

1 Assembly: ENGR1501\_Group18\_Final\_Project\_Assembly\_Liu\_Sean\_Spitzer\_Keith\_good

With 10 parts files:

 exit shaft

Propeller

round head screw\_ai

shaft prop

straight bevel pinion\_ai right

straight bevel gear\_ai

test base

test shell1 water inlet left

test shell1 water inlet right

thrust ball bearing fr\_ai

How many total hours would you estimate your team spent on this final project?

This project probably consisted of 30 hours total amongst the two of us.

What was the most challenging aspect of this project?

The propeller was for sure the hardest aspect as it required the application of many advanced forms of the basic principles learned in this class as well as some additional principles that we had to draw on from past knowledge and online resources. However, it turned out to be a fairly decent looking propeller so it is our favorite part of the project.

How would you compare this final project to the earlier work in the course?

The final project was a collective work of all the weekly assignments we had from SolidWorks with some extra knowledge on the web. It also made us expand our usage of tools/ generic parts from the toolbox, teaching us vital skills to have optimal productivity in a future work environment.