

Objective:



Design, manufacture, and test a direct drive lever drag fishing reel that is robust and reliable which entices true fishermen looking to challenge their skills.

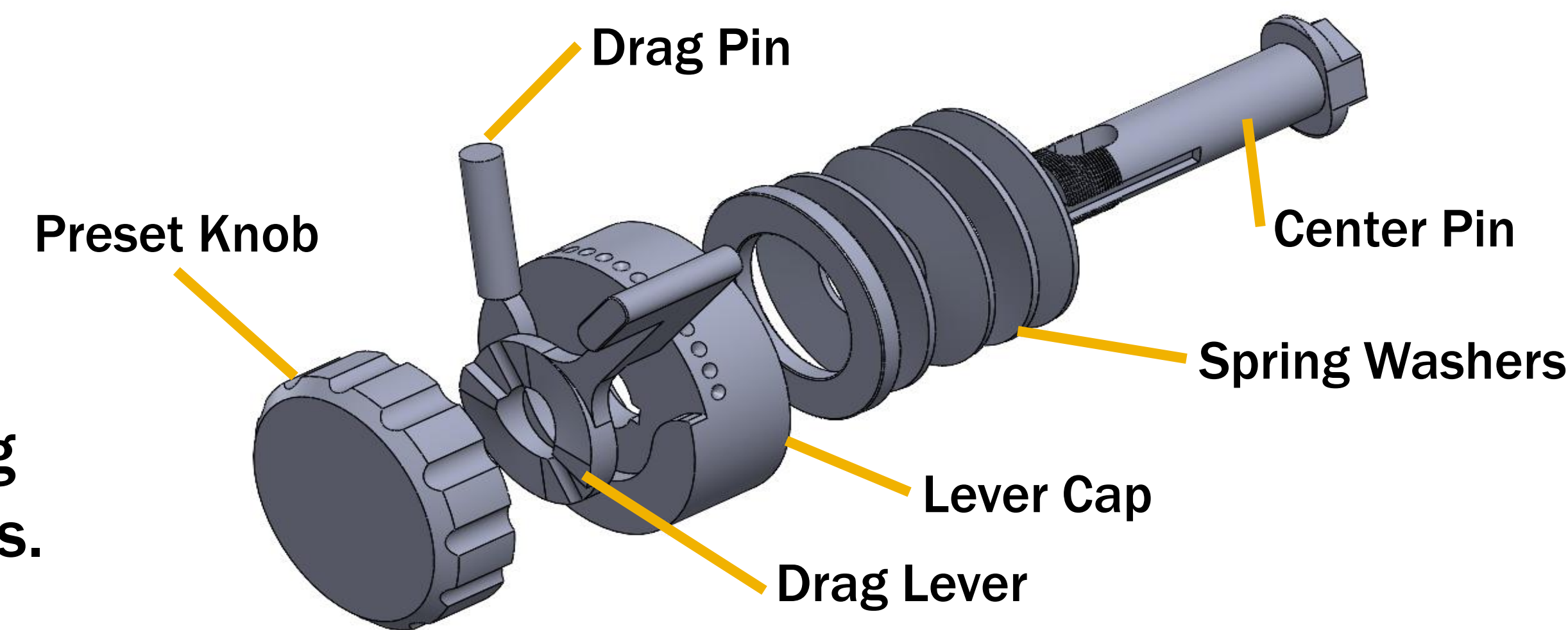
Background/Value Proposition:

Modern fishing reels have made sport fishing more accessible to all levels of fishermen, but what about fishermen looking to test their skills. This fishing reel combines the feel and aesthetics of a fly fishing reel with the robust nature and technology of modern reels to challenge its user and ensure that it can only be successful when in the hands of a true fisherman.

Product Requirements:

- Single Action (direct drive)
- Lever drag system with linear drag curve
- Lever engageable free spool mechanism
- Max drag output of 50 pounds
- Large spool to produce fast pick up rate
- Spool capacity of 500 yards of 100-pound hollow core spectra braided line
- One way drag application
- Reel foot which fits most standard reel seats

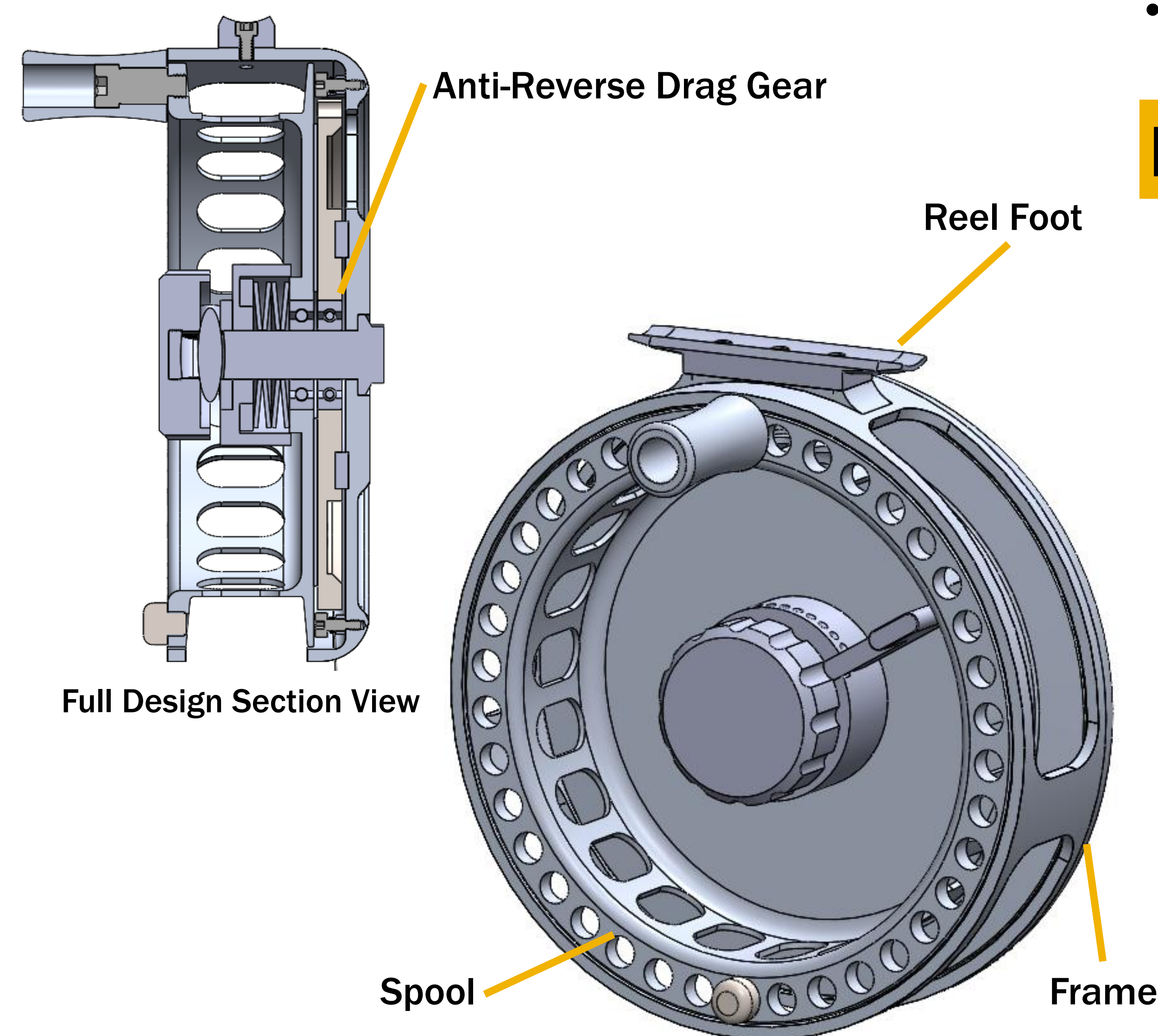
Drag System Design:



Drag System Exploded View

- Four stacked spring washers
- Ramped lever for adjustable drag
- Preset knob to set initial drag
- Lever recess to accommodate free spool

Final Design:



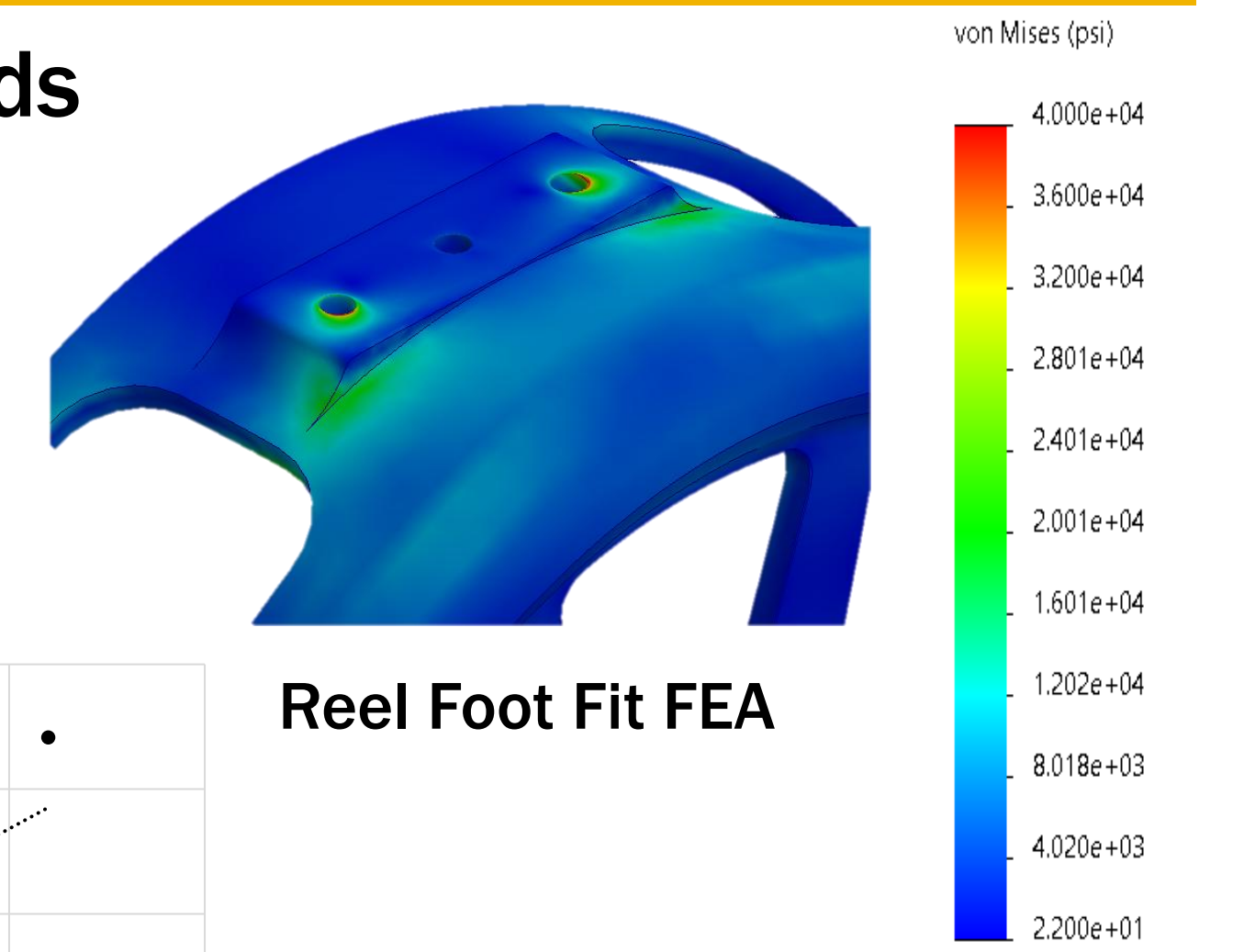
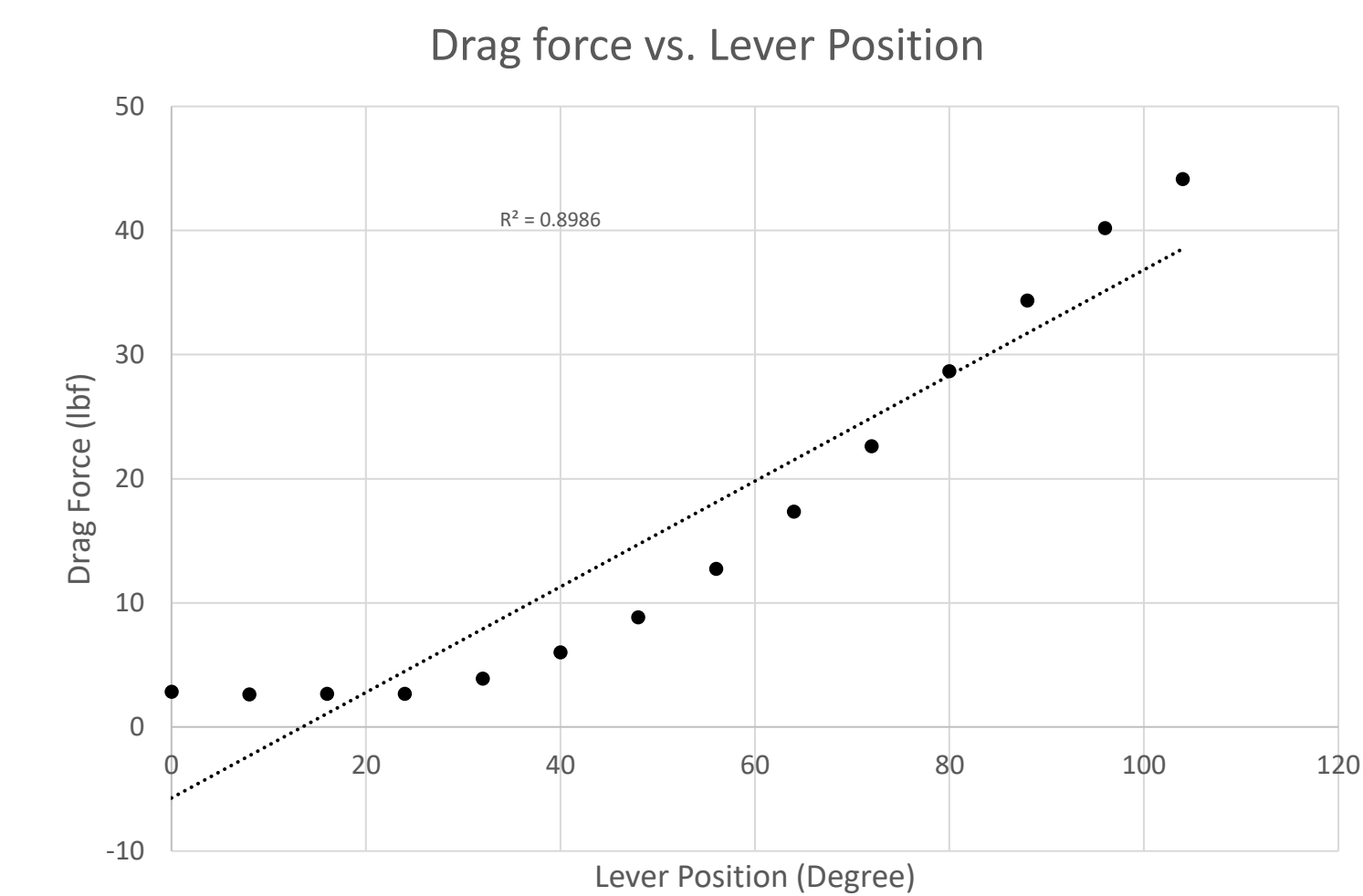
Full Design Section View

Complete Fishing Reel Assembly

Design Validation:

Max drag Output: 53 pounds

Linearity of Drag Lever:
 $R^2 = 0.899$ which shows a near perfect linear fit



FEA analysis shows stresses below 70% of yield stresses

Theoretical max spool capacity of 556 yards

Other Testing:

- Frame/Spool Deflection at max loading
- Stress testing – Fatigue and heat generation under continuous loading

Future Recommendations:

- Pawl screw supports
- Flange on preset knob for improved grip
- Increase tolerance between frame and spool
- Lower lever ramp height for preset knob engagement

Acknowledgements:

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