Objective

Customer Requirements
• Maintain a balanced Fishing Rod
• Provide smooth and quiet operation
• Compatible with standard rod fixture
• Gear ratio adjustment while reeling
• Compact
• Maintain adequate drag (line tension)

Constraints
• Size
• Material
• Adaptability

Market Size and Patents
• Fishing reel manufacturers
• Fishermen and boat charter companies
• 60 million anglers in U.S.

Physics of Tasks

Operation of Product
• User cranks reel handle with right hand in order to retrieve line.
• While reeling, left hand is used to turn gear ratio adjustment.
• Clockwise (forward) rotation of the gear change handle moves the belt into position to provide a high rate of retrieval of the line.
• Counter-clockwise rotation of the gear handle moves the belt into position to provide a slower rate of retrieval, with a greater mechanical advantage

Prototype and Testing

Current Prototype

Procedures
• Input RPM vs. Output RPM
• Time to reel in 20” line
• Time to get from high to low gear
• Maximum Drag (Line Tension)

Test Results and Future Work

Process Reflection
• Embodiment Design helped the team to evaluate the weaknesses and strengths of the chosen concept
• Initial prototyping allowed the team to further understand the operation of the product based on its visualization, allowing key design changes to be implemented.

Future Design
• Perform testing on the prototype using ideal Material
• Utilize prototype under real-life conditions – gain feedback
• Further investigation on the current design
• Pursue Patent for our design

Selection Criteria

<table>
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<tr>
<th>Weight</th>
<th>Max Torque</th>
<th>CVT Efficiency</th>
<th>Max Gear Ratio</th>
<th>Moment</th>
<th>Weight</th>
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<td>0.4364</td>
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Advantages:
• Most simple to manufacture and assemble
• Simple, linear shifter
• Minimal slip yielding greater efficiency

Disadvantages:
• Efficiency issues due to roller slippage.
• Potentially unbalanced about fishing rod
• Difficult manufacturing for chain and ribbed cones; Cones could be heavy

Weight
• Roller Driven Dual Cone: 3.218
• Roller Driven Single Cone: 2.5851
• Final Concept: Dual Cone with Belt: 3.5912