M1.2 – Adaptive Rowing Seat

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Texas Rowing For All

Background

Approximately 15% of people in Austin, TX have disabilities.

MISSION STATEMENT
Of Texas Rowing for All – A Texas Non-Profit

“Texas Rowing for All strives to provide programs that build self-esteem, confidence, fitness and lasting friendships for people with physical, sensory, and intellectual disabilities through inclusive rowing and paddling.”

ROWING FUNDAMENTALS

Problem Definition

Creating a rowing seat adapter that will make the ability to switch between regular and adaptive seats for wheelchair athletes seamless without hassle or the use or tools.

Design Process

DESIGN RESEARCH

An original design was given as a basis. This design was redrawn and redesigned based on satisfying the established requirements.

<table>
<thead>
<tr>
<th>Original Design</th>
<th>Immediate Improvements</th>
</tr>
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<tbody>
<tr>
<td>Additional material was located on the bottom of the seat provided.</td>
<td>After additional questioning it was concluded that this material could be removed resulting in lowering the seat 0.933 inches.</td>
</tr>
<tr>
<td>A 90-degree railing was used to connect the top plate to the locating block.</td>
<td>A design improvement was made to eliminate the railing and increase the available surface area on the top plate.</td>
</tr>
<tr>
<td>Some errors in dimensioning</td>
<td>Corrections made to ensure functionality and machinability.</td>
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Structural testing was done in Solidworks to ensure that the proposed design would provide adequate strength and to ensure the factor of safety based on ultimate strength was 2.0 or greater.

Loading conditions were done using static load of 500 lbs applied to mounting locations of the seat. The stress and deflection values of the simulation were correlated with the results of traditional hand stress/deflection calculations.

PART IMPROVEMENT

Reduction of parts increases the functionality and the ease of use of the piece.

Rounded edges were added to the locating block to allow for more user-friendly installation.

Final Solution

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FUTURE WORK

- Testing during the summer
- Making necessary design changes based on testing.
- Manufacturing a minimum of 4 total kits to fit the rest of the seats in the barge at Texas Rowing For All.

Acknowledgements

Sponsor: Greg LaKomski – Texas Rowing For All
Instructors: Mr. Summers, Dr. Talley
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Static Load test of 0.19inch AL 5052-H32

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