EnPRO 497-352

Battery-Powered Transport for Beach Launched Catamarans

Team Members:

Juan Bueno  
Raghuveer Cumar  
Miry Kim  
Mary McCabe  
Brian Sklena  
Greg Tatkowski  
Bill Watts  
Jay You
Problem

- Transporting boats across sand beaches is physically challenging
- Current approach requires several strong adults to move the boat from storage to the water
Proposed Solution

• Work together towards an innovative catamaran transporter design efficient enough to be operated by one individual
• Dramatically reduce physical labor
Objectives

• Design, build and test a prototype that permits single-handed operation
• Investigate the business potential of the product
• Construct an informational website
Team Structure

IPRO 352
Raghuveer Cumar
Mary McCabe

Business Team
- Brian Sklena
- Mary McCabe
- Raghuveer Cumar

Model / Media Production
- Miry Kim
- Mary McCabe
- Jay You

Engineering Design
- William Watts
- Juan Bueno
- Greg Tatkowski
Boat Analysis
Understand User Experience
Environmental Impact
Initial Ideas

Steering with Hydraulic Lifting

Scissor Lift

Swivel Lifting & Steering
Modeling / Drawings

Lego Model

Finalizing Sketches
New Design Approach

Cat Slippers

Cat Kart
Cat Slippers Testing

Prototype Construction

Prototype
Cat Slippers, Cont.

Final Sketches
Materials Selection for Cat Kart

Stress Analysis

Cross Bar

\[ \sigma = \frac{6FL}{\pi D^2} \]

\[ F = 250 \]

\[ L = 96 \]

\[ D = 2\text{ in} \]

\[ c = 1 \]

\[ M = 7100.6 \]

\[ \sigma = \frac{6FL}{\pi D^2} \left( 1 - \frac{c^2}{2} \right) \]

\[ \sigma_{\text{max}} = \sigma \left( \frac{1 - c^2}{2} \right) \]

\[ \sigma_{\text{max}} = 0.8350000005 \]

\[ S_{\text{max}} = 9600.000006 \]

\[ E = 30\times10^3 \]

\[ S_y = 50000 \]

\[ X = 2 \]

\[ S_{\text{max}} = \frac{S_y}{X} \]

\[ a = 2.5 \text{ to } 12 \]

\[ I = 8 \text{ to } 12 \]

\[ D = 2\text{ in} \]

\[ t = 0.4\text{ in} \]

\[ k = 8 \text{ in} \]
Cat Kart Construction

Shaft is Steel -> Machining
Still Necessary
Market Research

Primary Research

CatKart Questionnaire

We are trying to gain insight and information from individuals who sail catamarans or other small boats. If you could please take a few short minutes to fill out the below survey, it would be greatly appreciated.

* Required

What model of catamaran do you sail? *

- 

Do you own or co-own your boat? *
- My immediate family is sole owner
- We share the boat with another family

How many days does your boat get used during the sailing season? *

- May - September
  - 5 (once a month)
  - 10
  - 15
  - 20 (once a week)
  - 30
  - 40 (twice a week)

Do you own or share a pair of Cat-Trax? *
- Personally own
- Share with someone else
- Use park district's

Generally, how many people haul your boat to the water? *
- One average adult male
- One adult male and a wife or healthy teen
- Two adult males

Secondary Research

- Blogs
- Patent Search
- Trade Associations
Two Business Ideas

Cat Kart
- Beach Valet Service

Cat Slippers
- Direct Sales (kit)
Beach Valet Service

Have a beach stand with personnel to set up and take your boat to and from the water for you.

• Pay Per Use
• Annual Subscription

How likely would you be to subscribe to such a service?

- Very Likely
- Somewhat Likely
- Neither Likely or Unlikely
- Somewhat Unlikely
- Very Unlikely
What we need for this:

- Operation / Concession Agreement with Park District
- Facility Utilization Data
- User Interest
- Beach Stand / Kiosk
- Personnel
- Electricity / Extra batteries
Cat Slippers Direct Sales

Provide customers with a kit which contains all the needed materials except for the wood.
- Allows for shipping
- Can sell to individuals as well as specialty shops
- Users can use even if not interested in Cat Kart or Beach Valet Service
Getting Started

→ Beta testing during the first summer
→ Provide users with free trial

By doing the above, we will gain:
- User feedback on the products
- Measure of actual buyer interest
- Ways to optimize and improve design
- Produce exposure and word of mouth
- Information on the peak hours & days
Value Proposition for Facility

- Increased User Satisfaction
- Increased Utilization
- Differentiation vs. Competing Facilities
- Additional Sources of Revenue

How many additional days might you have chosen to set up and sail your boat if a beach valet took care of moving your boat for you?
Cat Slippers - Marketing Approach

- Require as part of Cat Kart valet service
- Promote through beta testing
- Sell kits through website
  - Individual owners
  - Specialty shops
- Provide service to construct & install kits through valet service kiosk
Financial Basis

• Average customer sails 26 times per season
• 90 customers (50% of current users)
• Season Pass: $300 for unlimited trips
## Financial Summary

### Summary of Costs

<table>
<thead>
<tr>
<th>Capital Costs</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Cat Kart Transporter</td>
<td>$1,500</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Misc. Operating Costs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Promotional Efforts</td>
<td>$250</td>
</tr>
<tr>
<td>Beach Operating Permit</td>
<td>$6,750</td>
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<tr>
<td>(25% of revenues)</td>
<td></td>
</tr>
<tr>
<td>Insurance Liability</td>
<td>$500</td>
</tr>
<tr>
<td>Extra batteries</td>
<td>$300</td>
</tr>
</tbody>
</table>

| Total Misc. Operating Costs | $7,800 |

### Projected Revenue

| Annual revenue per user | $300    |
| Total Revenue (90 users) | $27,000 |

### Labor Costs

| Beach valet (total hours) | 1230    |
| Total Labor Costs for summer ($10/hr) | $12,300 |

| EBITDA                  | $6,900  |
Summary

This IPRO began in January 2010!

Two products – CatKart and CatSlippers

Two business models: Beach Valet and Direct Sales

Beta testing over the summer

All the set objectives were achieved