

Retractable Pool Cover

Problem Definition and Project Plan

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Abdulhadi Alkhaldi, Zachary Keller, Cody Maurice, Bradley Miller,
and Patrick Weber



Overview

Introduction

- Problem Definition
- Project Goal
- Objectives
- Constraints

Project Plan

Quality Function Deployment

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References

Introduction

- Our client, Brian Herzog, is a resident of Flagstaff, AZ and the retired CEO of Frontline Energy Services.
- Mr. Herzog would like to bring an affordable and retractable pool cover to the market.
- There is not an affordable and comparable product on the market today.

Problem Definition

“There is not an affordable and automated retractable pool cover on the market that can withstand the weight of multiple people.”

Project Goal

Design and manufacture a retractable pool cover that is:

- Automated
- Easily maintainable
- Rigid
- Aesthetically pleasing
- Lightweight

Objectives

Objective	Measurement	Units
Retractable (motor)	Torque	N·m
Easily maintained	Number of Parts	-
Rigid	Strength	kPa
Spans entire pool	Area	m ²
Lightweight	Weight	kg

Constraints

- Must support at least 827 kPa of pressure
- Must span an area of 13.378 m² (144 ft²)
- Must be automated and fully retract within 1 min
- Must cost less than \$50,000

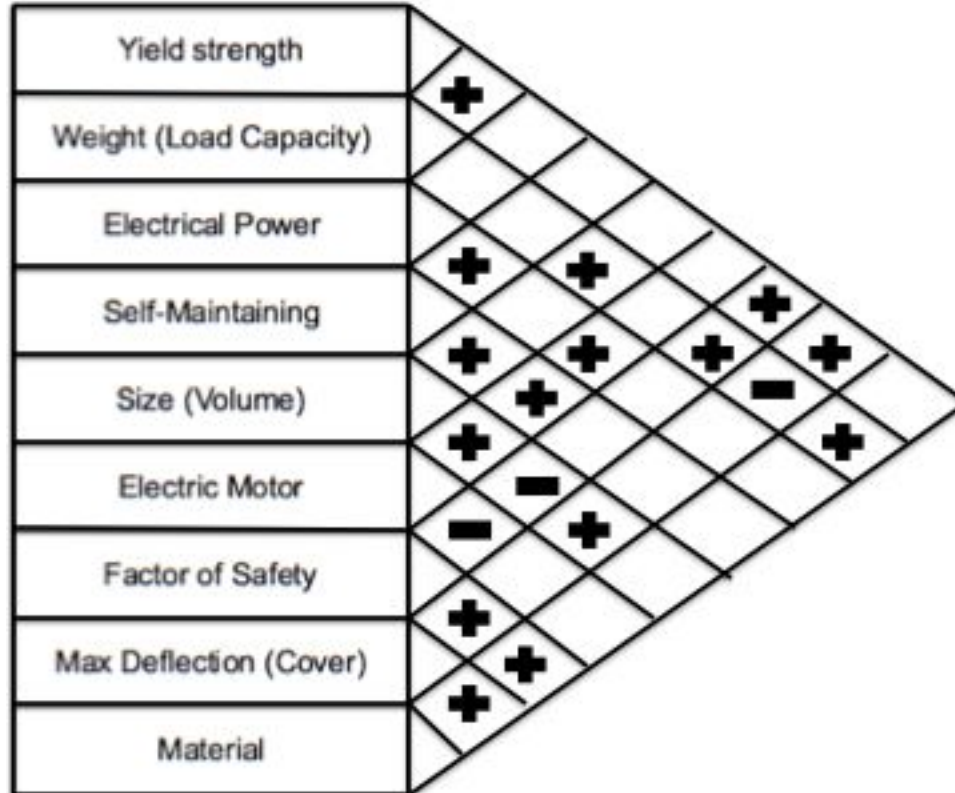
Project Plan

Task	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15	Week 16
Introduction -Meet With Client	█															
Problem Definition & Project Plan -Need Statement and Project Goal -Objectives and Constraints -QFD and SOTA -Project Plan		█	█	█												
Concept Generation & Selection -Design Generation/Brainstorming -Design Evaluation & Selection				█	█	█	█	█	█							
Proof of Concept & Prototyping -Develop Prototype -Build Prototype -Test prototype								█	█	█	█	█	█	█		
Final Project Proposal -Final Project Presentation													█	█	█	█
Deliverables																
Problem Definition & Project Plan Presentation				◆												
Concept Gen. & Selection Presentation								◆								
Proof of Concept Demonstration												◆				
Project Proposal Due & Presentation																◆

Quality Function Deployment

<div style="text-align: center;">Engineering Specs</div> <div style="text-align: center;">Customer Requirements</div>	Yield strength	Weight (Load Capacity)	Electrical Power	Self-Maintaining	Size (Volume)	Electric Motor	Factor of Safety	Max Deflection (Cover)	Material
Easy to Maintain				●					
Easy Installation and Removal	●		○	●	○	●			
Automated Retraction			●	●		●			○
Able to Sustain Weight	●	●			○		●	●	●
Fit Within Alloted Space					●	●			○
Aesthetically Pleasing		●			●		●		●
Non-Corrosive			●			●	●		●

House of Quality



Research

- Aquamatic Cover Systems provides automated, hydraulic powered, rigid, lightweight, and appealing retractable pool covers [1].
- To improve this system, we need to make it affordable and able to hold the weight of multiple people.
- WutPool provides automated, rigid, and appealing retractable pool covers that can withstand the weight of multiple people [2].
- To improve this system, we need to make it affordable, lightweight, and run on hydraulic power.

Conclusions

- There are no retractable pool covers on the market right now that are affordable, automated, and can withstand the weight of multiple people.
- Design to be automated, easily maintainable, rigid, aesthetically pleasing, and lightweight.
- Must support over 800 kPa of pressure, span about a 3m X 5m area, and reduce to a more desirable cost.
- Plan to start researching design ideas and begin prototype production by late October.
- There are pool covers on the market right now that are close to what is needed, but some changes will need to be made for the objectives to be met.

References

[1] 'Aquamatic Cover Systems | Hydramatic | Energy Efficient Pool', 2015. [Online]. Available: <http://www.aquamatic.com/>. [Accessed: 23- Sep- 2015].

[2] WutPool™, 'Retractable, Load-bearing Flooring Systems & Automatic Pool Covers', 2015. [Online]. Available: <http://wutpool.com/>. [Accessed: 23- Sep- 2015].