Mechanical Shredder

Problem Definition and Project Plan

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Overview

- Identify Customer Needs
- Project Goals
- Project Objectives
- Constraints
- Testing Environments
- Current Market
- Quality Function Deployment (QFD)
- House of Quality (HOQ)
- Gantt Chart
- Conclusion
- Reference

Introduction

This group was given the task to develop a mechanical paper shredder for the common workspace and took multiple steps towards identifying customer needs and finding common trends that we can keep track of with both mechanical and electrical paper shredders.

Identify Customer Needs

A majority of paper shredders in today’s market are electric driven, which limits them to only being useful near a power source.
A mechanical paper shredder can be portable and useful at all times in an office workspace.

Project Goal

Our design needs to be portable, environmentally friendly and a fully mechanical system with no electrical components.

Objectives

Objective	Measurement Basis	Units
Inexpensive	The unit must cost less than a $100	$
Shreds papers in efficient way with a reasonable required power	Required a 400 w	watt
shreds up to 36 page per minute	The Number of papers per minute	
The shredder should have a small carbon footprint	The amount of carbon footprint does the shredder have	kg
The shredder has container	Size of the container	gallons
Shreds up to 10 paper together	The amount of paper the shredder can shreds	# of papers
The shredder should have a noise level less than 65db	noise level	db

Constraints

- Environmentally friendly with minimum carbon footprint
- The design cost must be less than $100.00 for fabrication
- Minimum of 10 Sheets per feed
- Speed: 36 pages/min
- Paper size: 8.5x11 inches
- Type of material shredded: Papers, CDs, Credit cards
- Volume: 5 cubic ft

Testing Environment

- An office that can fit $5ft^3$ mechanical system.

  Data to collect and analyze:

  - Run time
  - Shred Speed
  - Sheet shred capacity
  - Noise level

Current Mechanical Paper Shredders

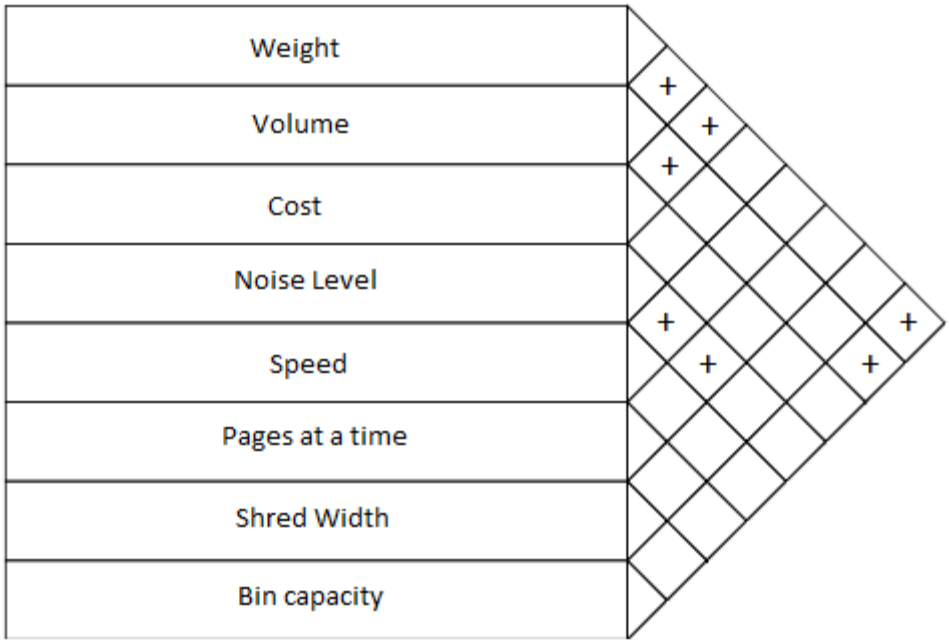
Competitor 1: The Premium Connection Paper Shredder [2]

Competitor 2: Manual Paper Shredder from IDEA

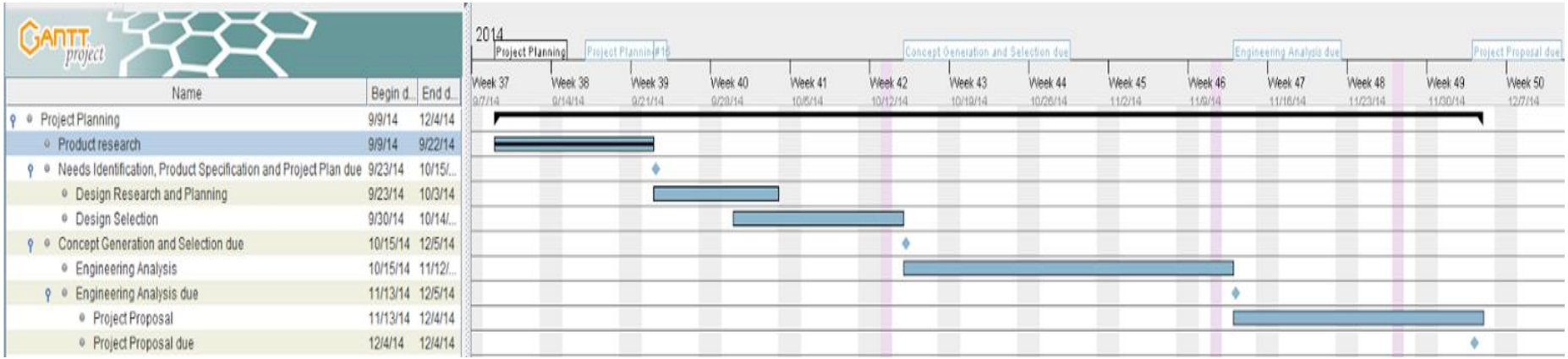
Quality Function Deployment (QFD)

		Engineering Requirements								Competitors	
		Weight	Volume	Cost	Noise Level	Speed	Pages at a Time	Shred Width	Bin Capacity	Product 1	Product 2
Customer Requirements	Minimum Carbon Footprint		X								
	Reliable					X	X	X			
	Inexpensive	X	X	X					X	O	O
	All Mechanical System				X	X				O	O
	Cost Effective			X		X	X			O	
	Units	lbs	ft^3	$	db	Pages/Min	x Pages/Iteration	inches	gallons		
		20-25	5	100	65	36	10	0.25	5.25		

House of Quality (HOQ)



Project Planning Gantt Chart (Fall Semester)



Summary

- The Customer needs a paper shredder that is completely mechanical, portable, environmentally friendly, and can compete with a simple electric paper shredder
- The group will be limited to a budget of $100 for our designs and the system has to fit within a $5ft^3$ volume
- Mechanical paper shredders that can be bought online are not reliable or strong enough for what is required by the client.
- QFD and HOQ show common trends involving cost, size, and reliability of systems that we will need to show focus in.
- Our group plans to have a project proposal ready by the end of the semester that properly documents the planning and work that goes into this project.

References

[1] Science Club. *How Many Watts of Electricity does a Paper Shredder Use* [Online]. Available: http://www.cockeyed.com/science/power_use_database/paper_shredder.html

[2] Amazon. *Paper Shredder* [Online]. Available: http://www.amazon.com/The-Premium-connection-290-SHRED-Shredder/dp/b006J99PQQ

[3] Better Living Through Design. *Manual Paper Shredder* [Online]. Available: http://www.betterlivingthroughdesign.com/accessories/manual-paper-shredder/

Questions ?