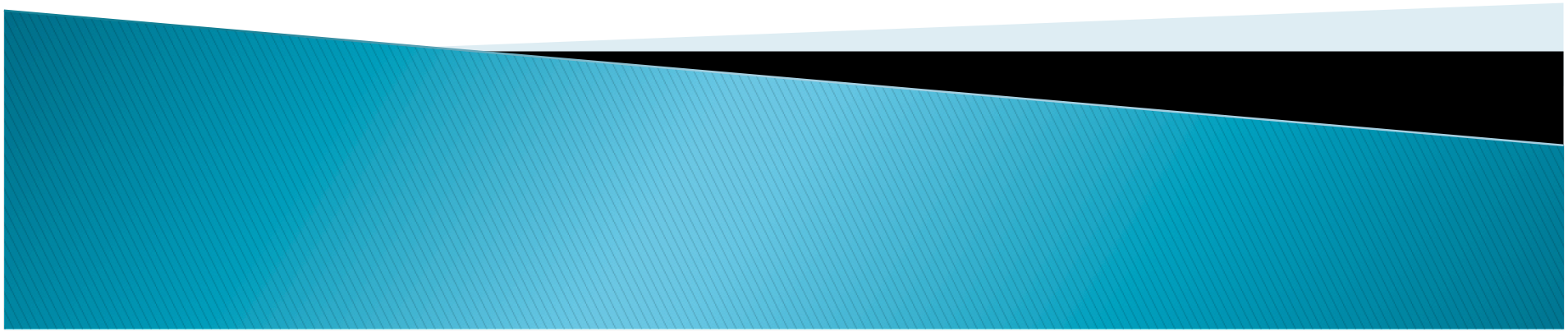
Mechanical Ice Scraper

Silver A



The Product

- A hand-held, motorized, ice scraper

Product Context

- 133 million drivers in regions that are exposed to icy weather
- Current Ice Scraper models
  - Slow, flimsy, and uncomfortable to use
- Market Research: Auto-parts Stores
  - Contact: Justine Sheffield, Autozone (Somerville)

Major Risks

- Testing
  - Making Ice
    - Liquid Nitrogen
- Improved Effectiveness
  - Heating
  - Vibrating Mechanisms

Heated Ice Scraping

- Method: Heat then scrape
- Commercially Available Model
  - Electrically heated
  - Insufficient power
- Butane Torch
  - Effective when directly applied
  - Ineffective when used to heat blade
  - Safety Issues

Ultrasound

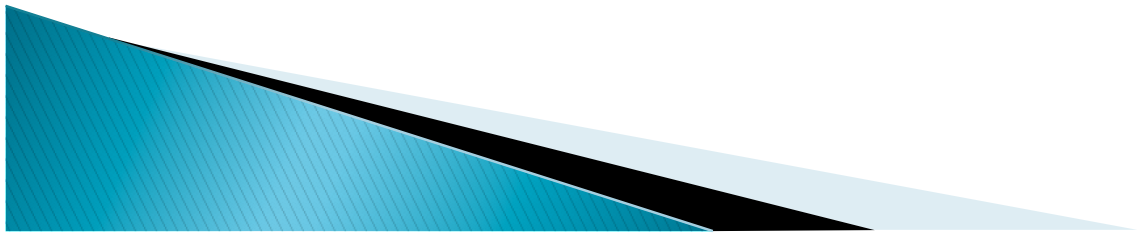
- Diathermy Muscle Therapy (1-3 MHz)
  - Heats ice but does not break it
  - Very Expensive

Linear Actuation

- Components from Reciprocating Saw
  - Drive-train
  - Casing

Linear Actuation: Testing

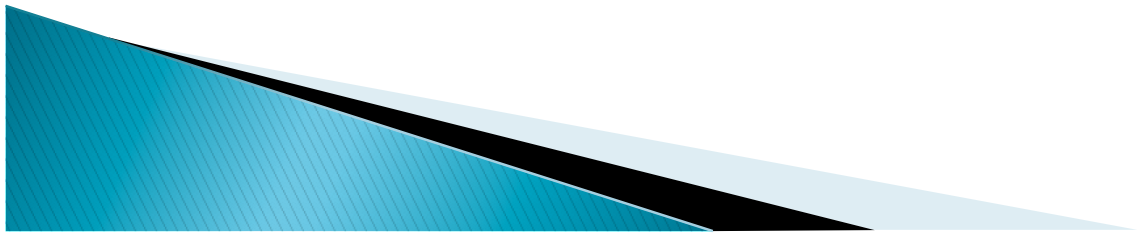
- First Test (with Saw Motor)
  - Cracked ice but stalled-Not Enough Torque
- Second Test (with Drill Motor)
  - Did not crack ice-Not Enough Speed
- Final Test (with Corded Drill)
  - Effective but used 110 V wall-socket



Product Contract

Description: Powered ice scraper
Intended Customer: Drivers in colder areas of the U.S.
Market: Automotive accessories

Customer Need	Design Attribute	Engineering Specification
Lightweight	Weight	Less than 3 lbs
Comfortable to hold	Handle Diameter	Less than 2 in.
Quick Clearing Time	Time	Less than 5 minutes for hard rime
Thorough clearing of the windshield	Percentage of Windshield	90%
Easy to store	Size	4”x4”x18”



Future Work

- Reduce power requirement
  - Experiment with different blade geometries
    - Blade profiles
    - Multiple blades
- Explore power options