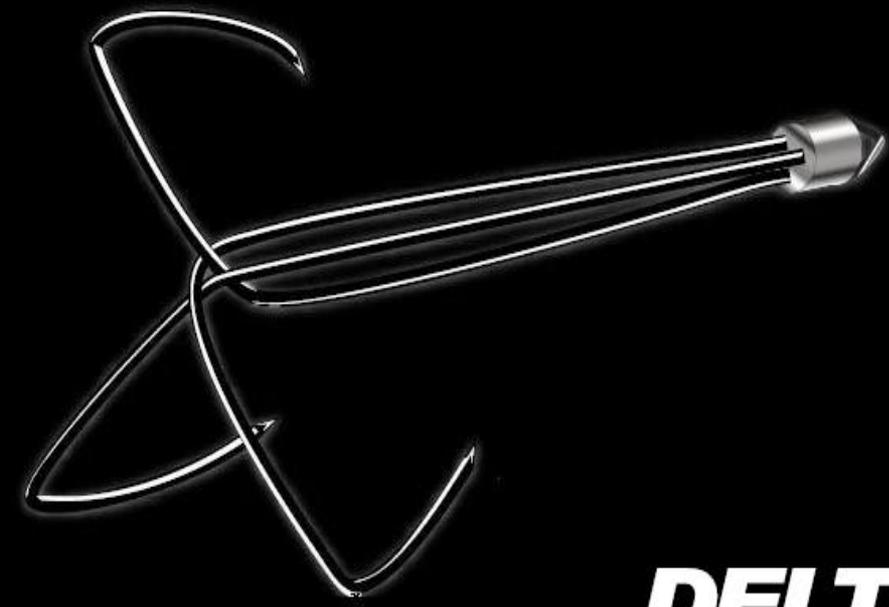
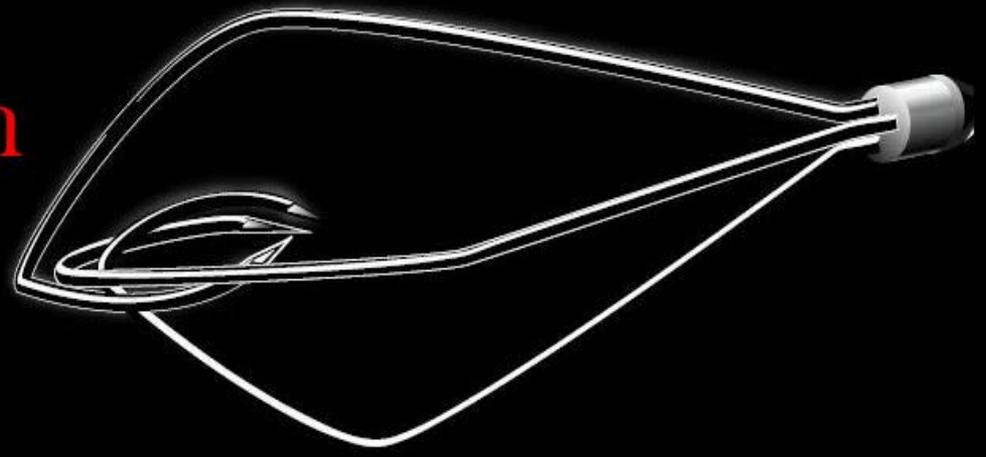


I PRO 358

Product Development and Business Planning for a Fishing Innovation

Interlocking Design

The way nature intended



Outline

- Sponsor
- Problem and Solution
- Team Structure
- Team Accomplishments
 - Product
 - Business
- Team Recommendations
- Ethical Concerns
- Questions



SPARROWHAWK™



iPRO 358



Problem

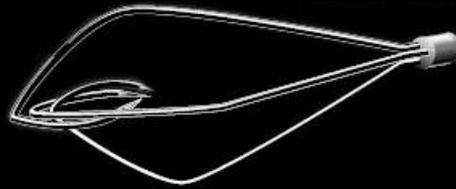


Solution

Hooks
pointed
inward

Interlocking
design

**Delta Hook
Technology**

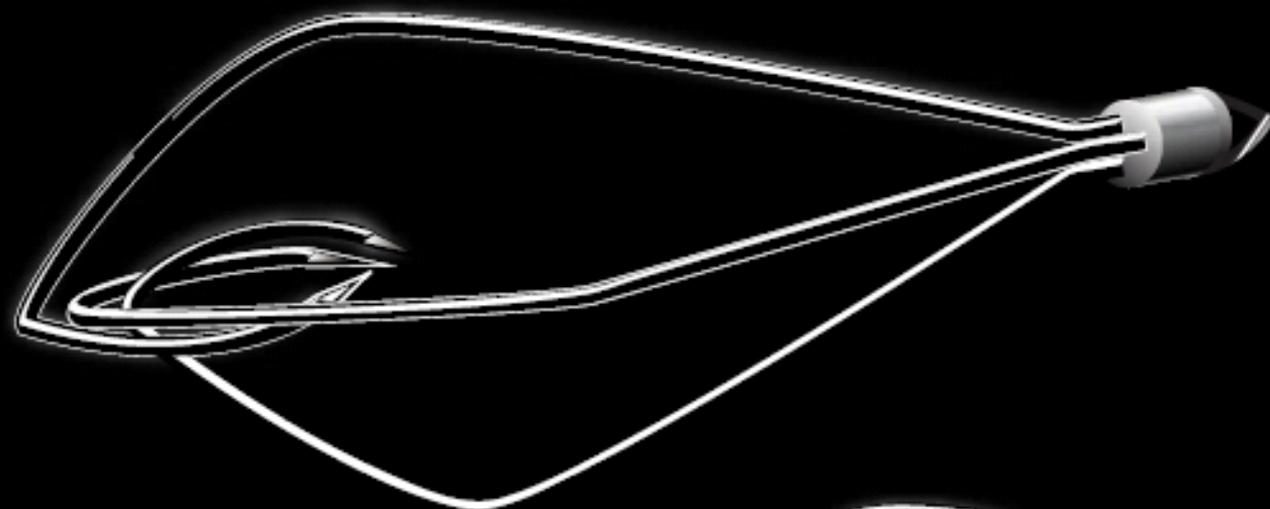


Flexible

Barbless

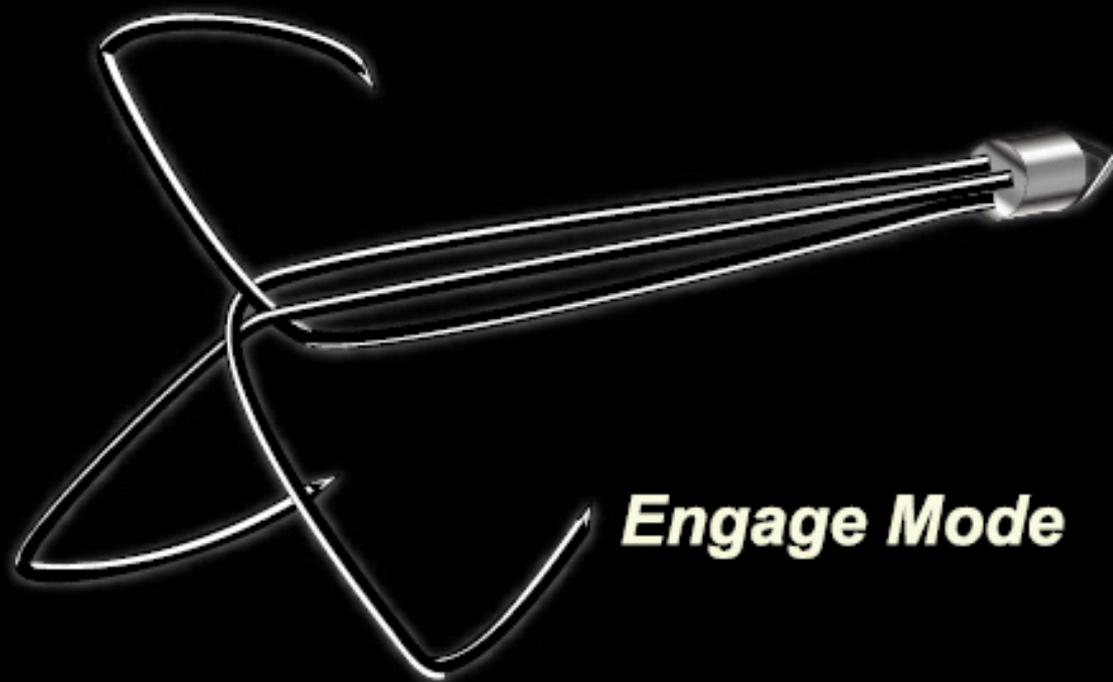
TECHNOLOGY

Standard Mode

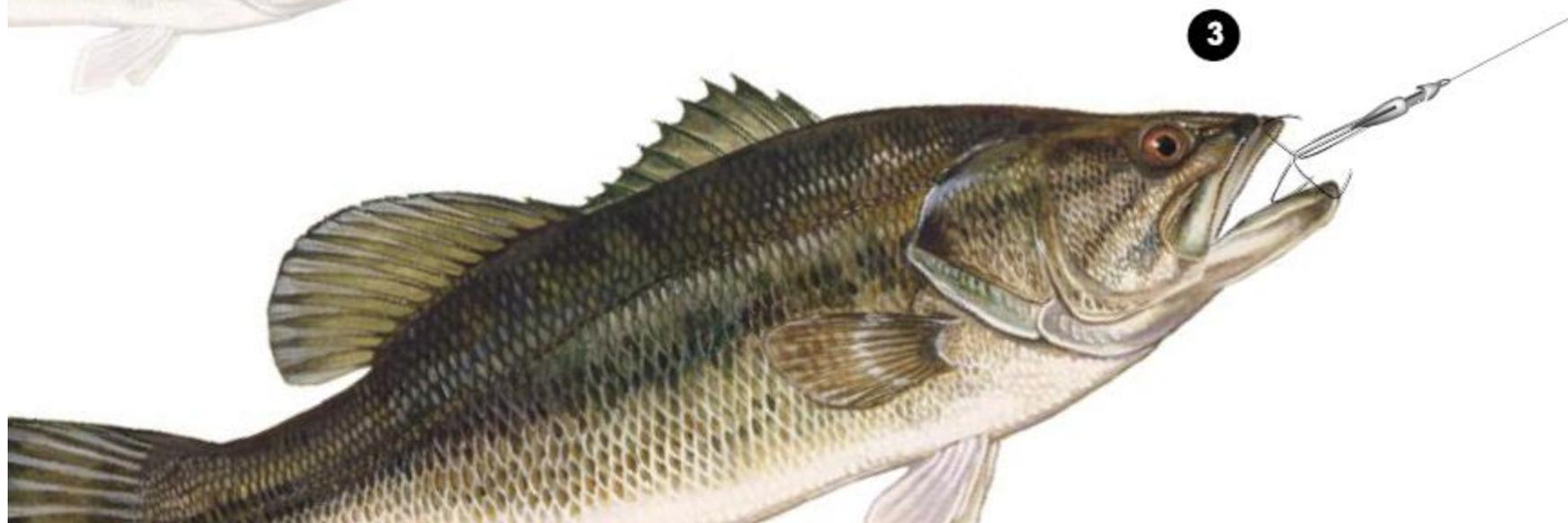
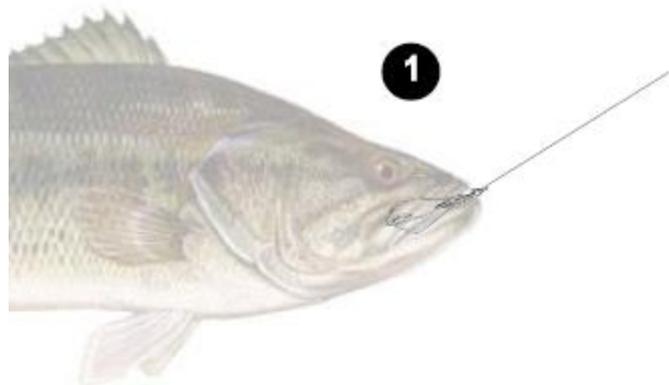


DELTA
HOOK TECHNOLOGY

Engage Mode

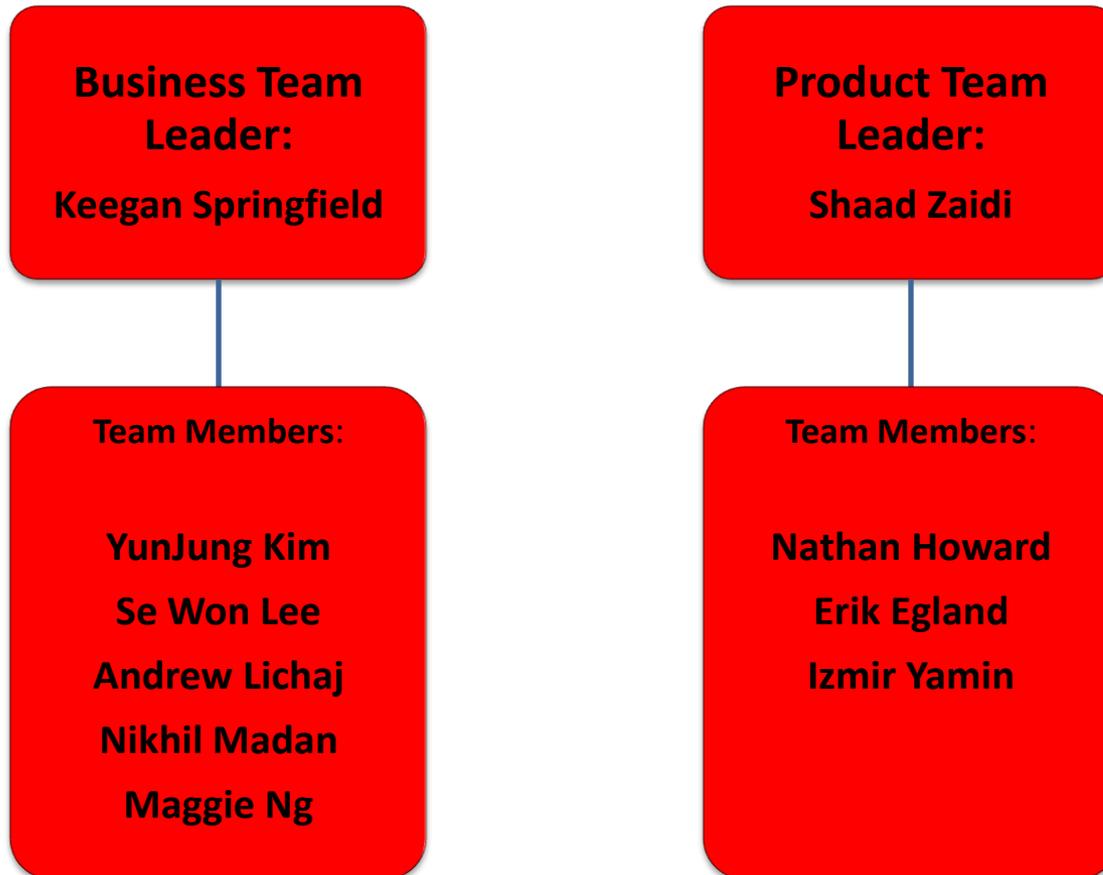


TECHNOLOGY OPERATION



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Team Structure



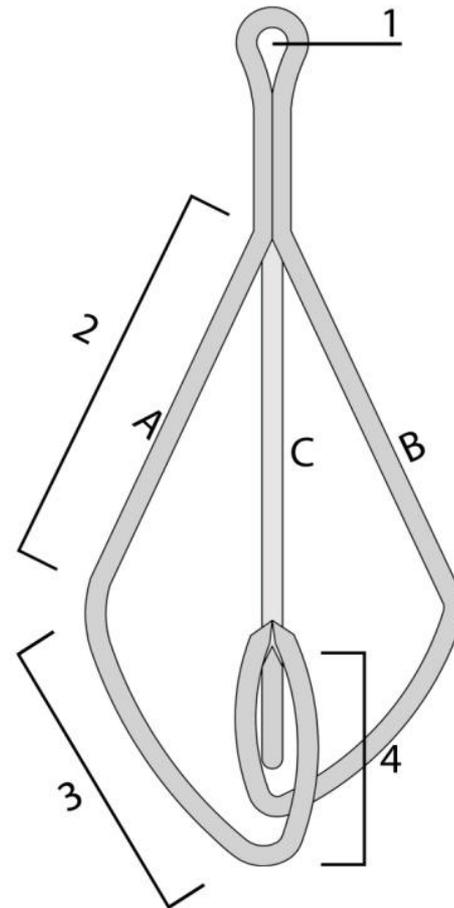
Product Team

Product Team Objectives

- Construct 4-7 mock-ups
- Complete testing series
- Determine manufacturing methods
- Develop final prototype

Design Requirements

- Flexible shaft
- Rigid arm and engaged section
- Acute angle
- Sharp hook point
- Corrosion resistant



Mock-up A



Mock-up B



Mock-up B  Mock-up C



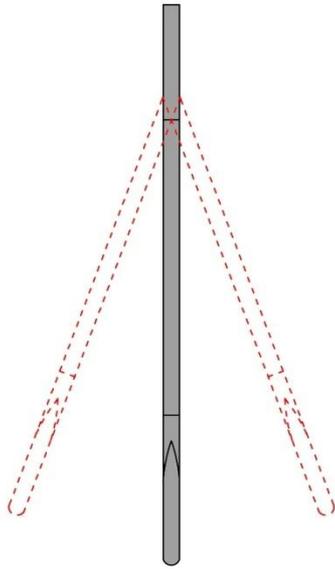
Mock-up C



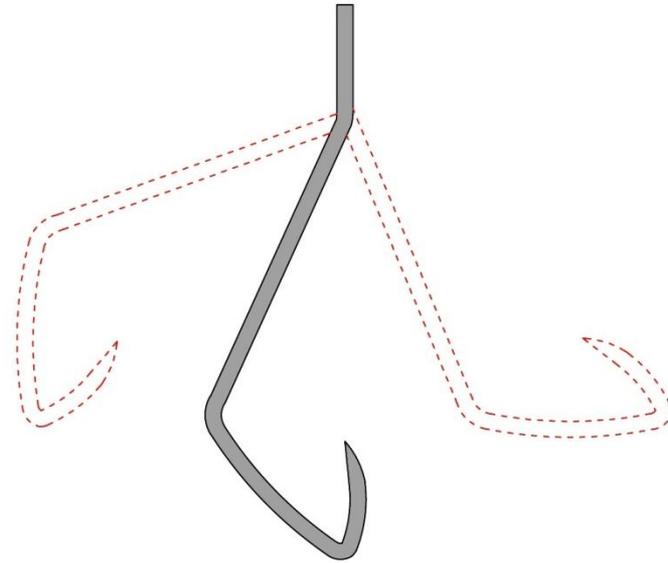
Mock-up D



Failure Analysis



Out of plane



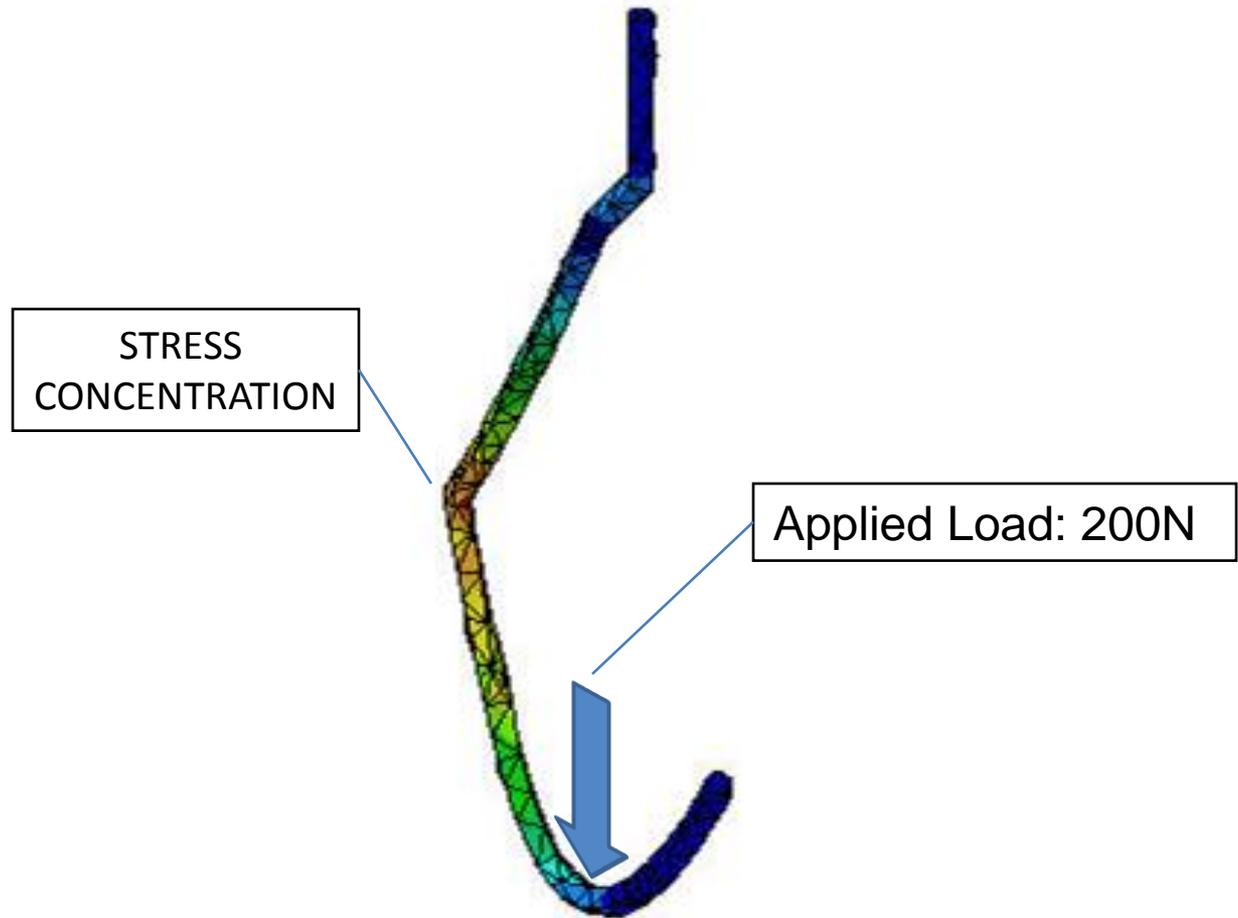
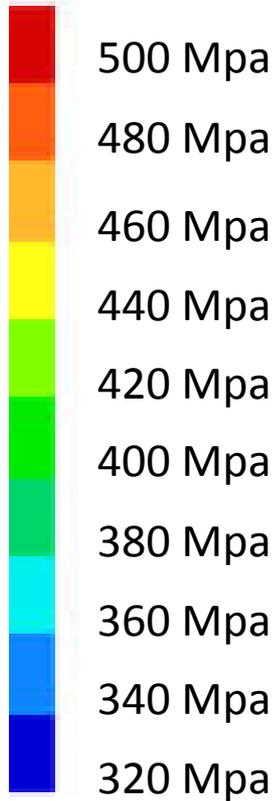
Planar motion

Material Selection

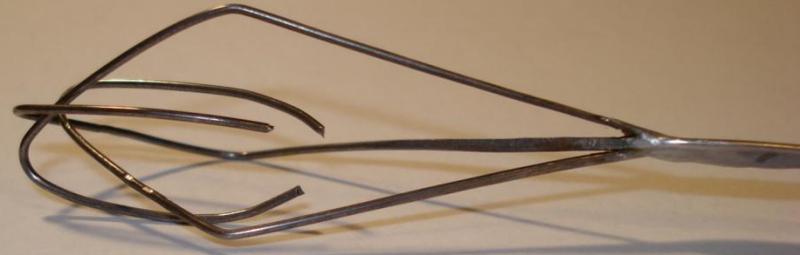
material	modulus of resilience [Mpa]
316 stainless steel	0.11
medium carbon steel (0.3 to 0.6% carbon)	0.23
titanium alloy (Niobium, 30%) (Titanium, 70%)	1.8
high carbon spring steel (0.7 to 1.0% carbon)	2.2

Finite Element Analysis (FEA)

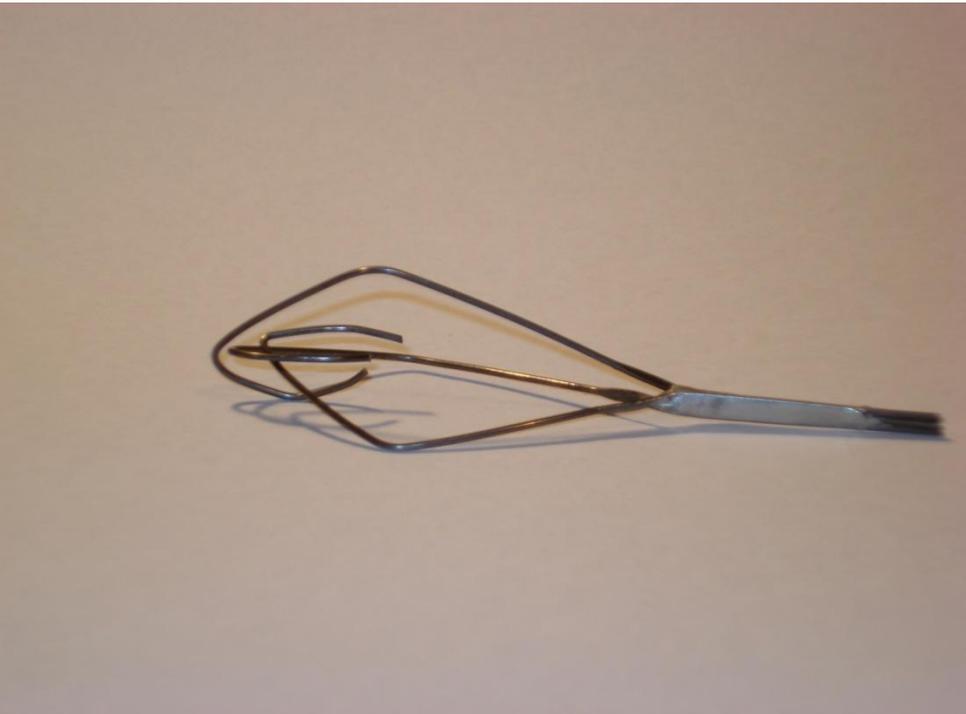
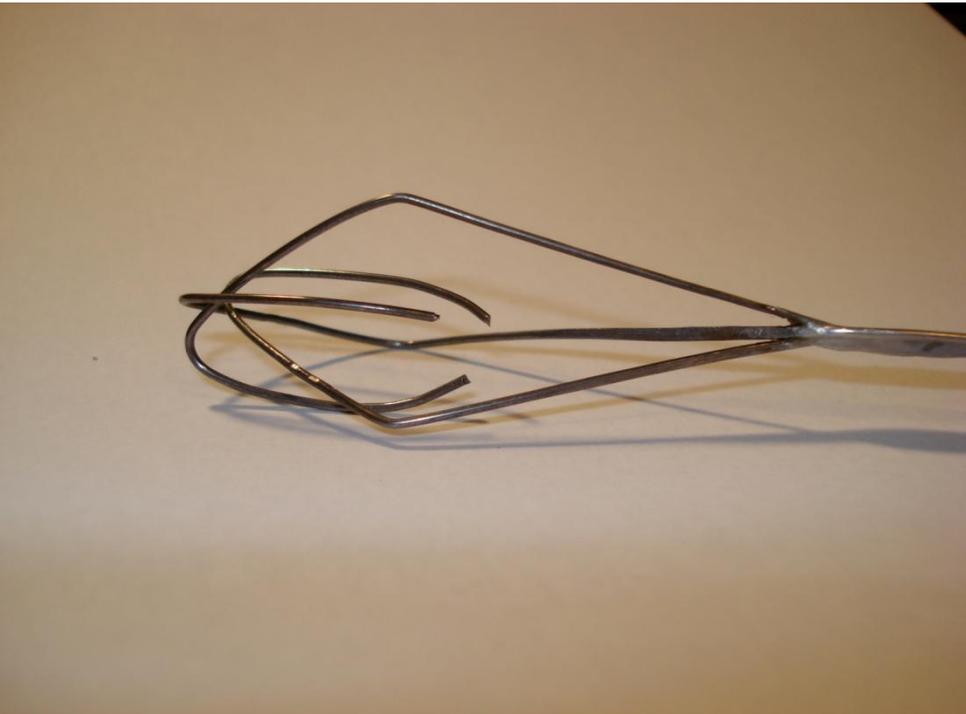
PRESSURE (Mpa)



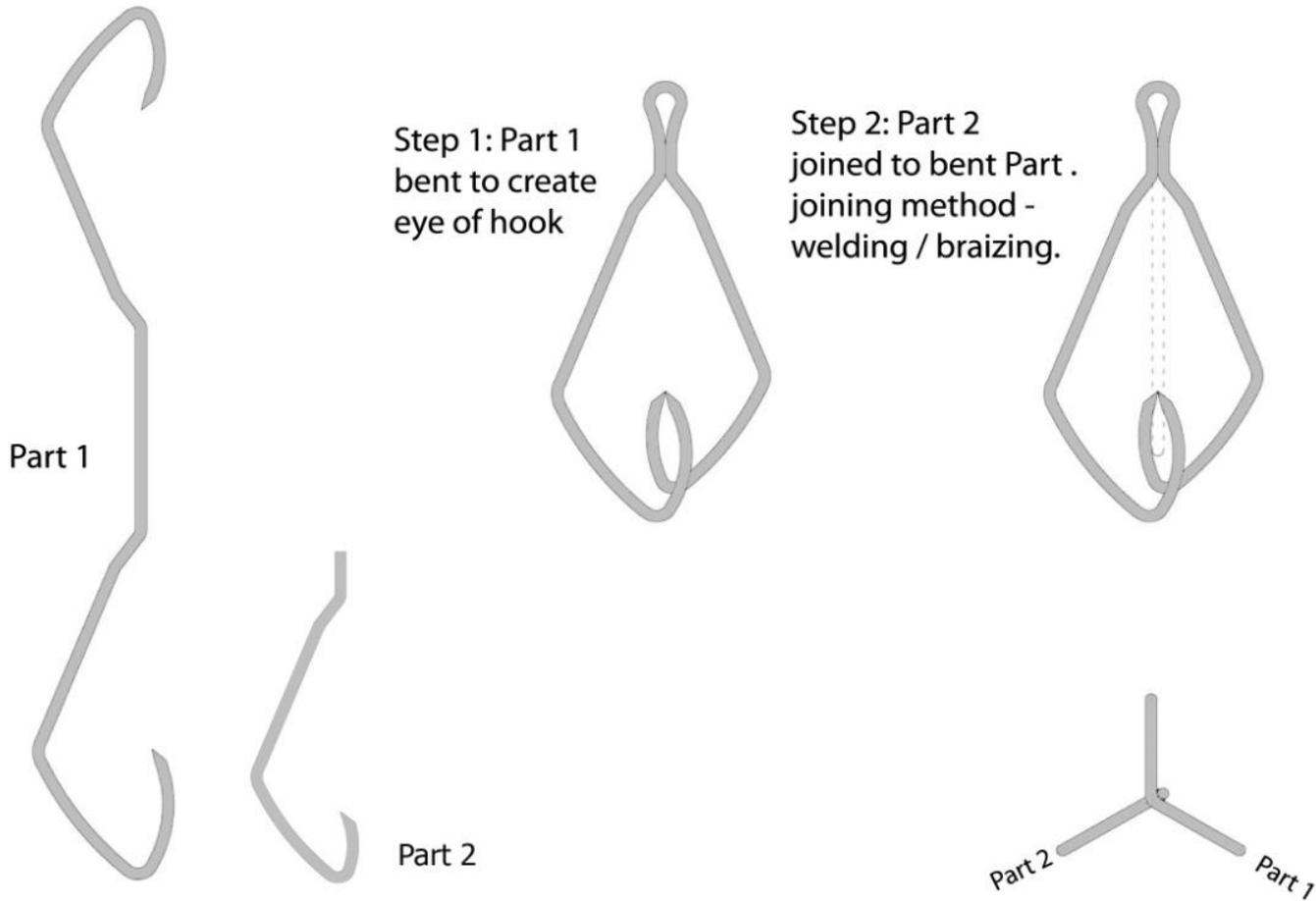
Mock-up D  Mock-up E



Mock-up E  Mock-up F



Manufacturing



Manufacturing

- Master Spring and Wire Form Co.
 - Wire bending
 - Swaging
 - Heat treating
 - Welding
 - Coating
 - Rapid prototyping
 - Small quantity orders

Tests

INDUSTRY STANDARDS

- 1) Unbending
- 2) Sharpness
- 3) Corrosion resistance
- 4) Customer satisfaction

DHT SPECIFIC

- 1) Fatigue
- 2) Hook set
- 3) Snag

Unbending

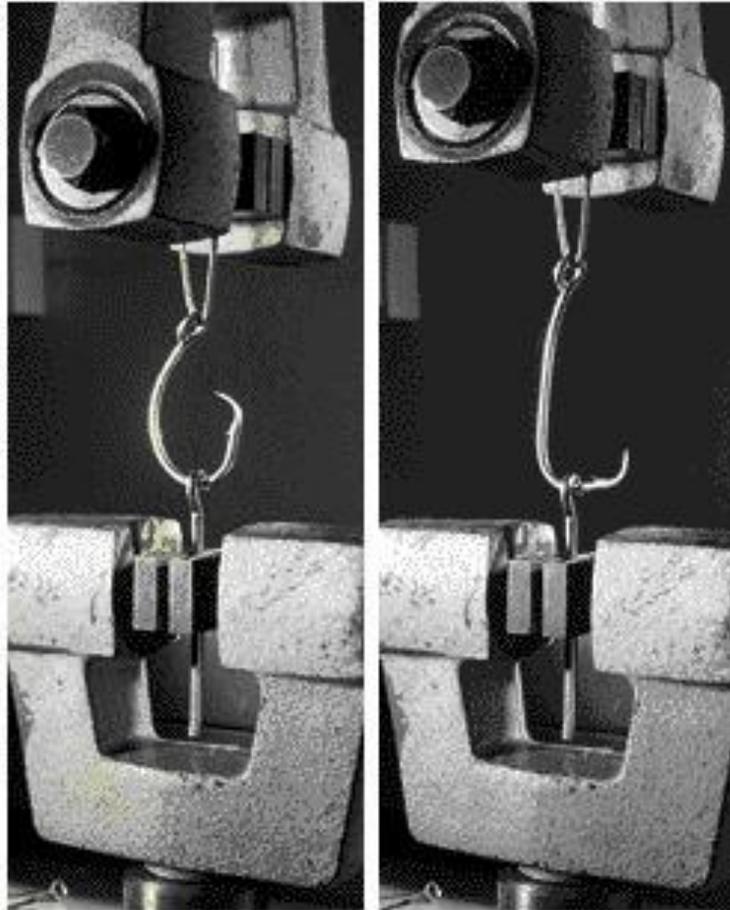
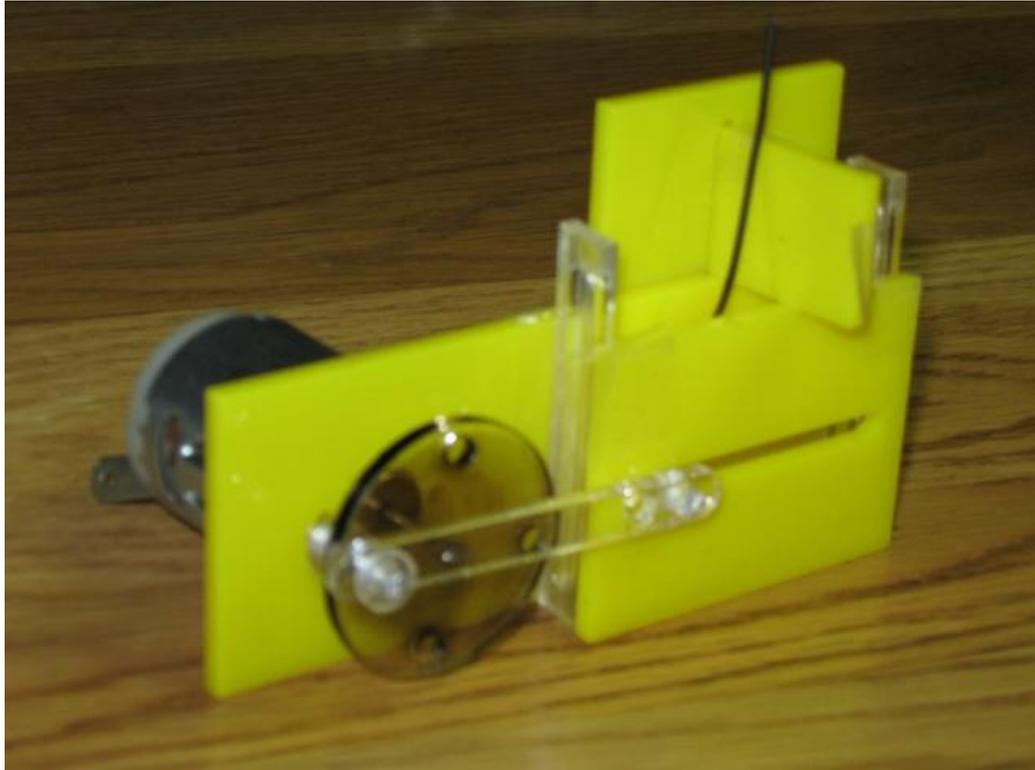
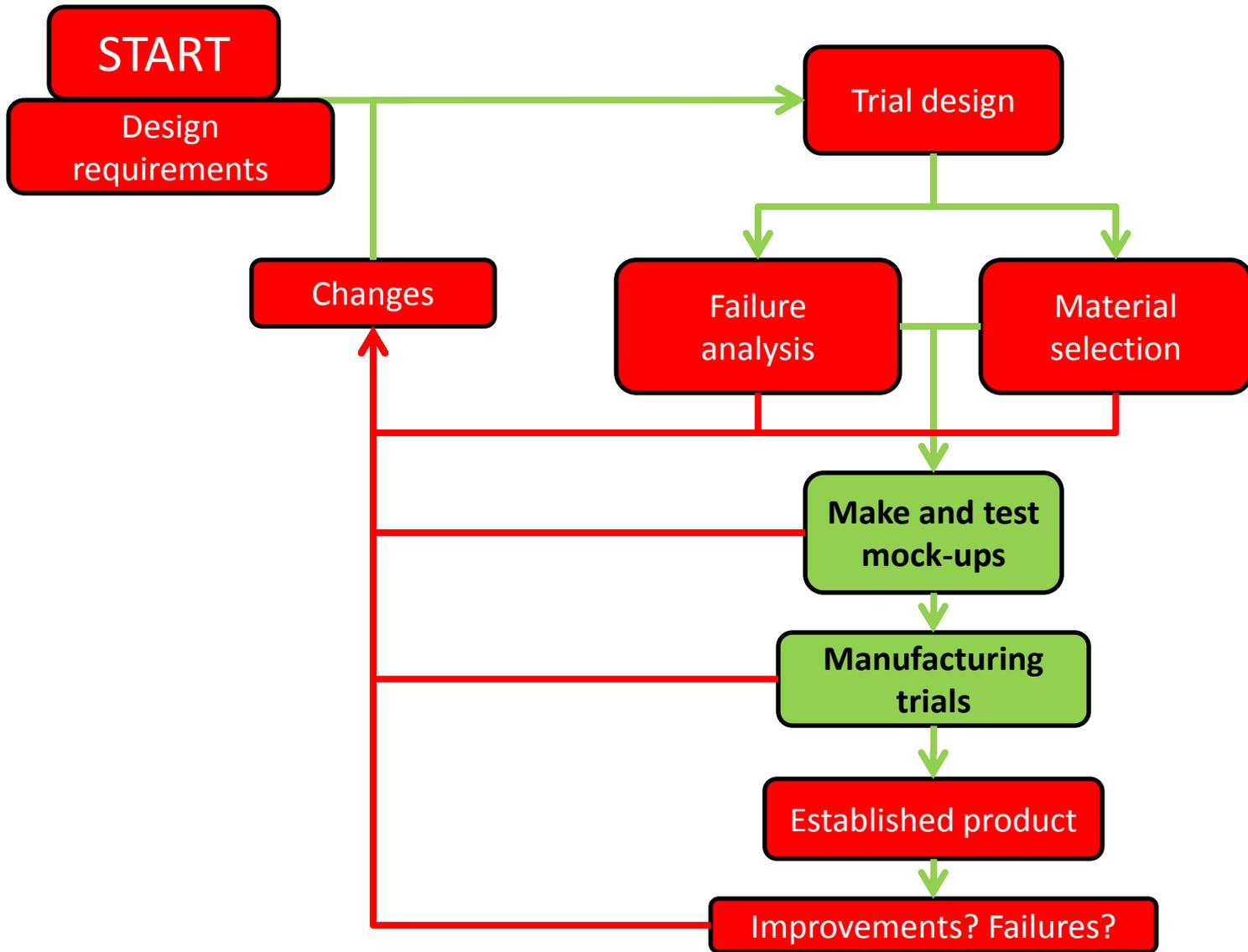


Photo taken from Mustad & Son

Fatigue



Constructed by IPRO 358 at the
Museum of Science and Industry FabLab



Future

- Identify ways to produce inhomogeneous properties
- Continue to establish manufacturing contacts
 - Master Spring and Wire Form Co.
 - Rapid prototyping
 - Small order sizes
- Complete testing series
- Produce 10,000 - 100,000 units
- Unveil at ICAST 2010

Business Team

Business Team Objectives

- Conduct in-depth market research
- Build positioning strategy
- Create a distinct market mix

SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none">• Innovative design• Disruptive technology	<p>Weaknesses</p> <ul style="list-style-type: none">• Small player• Limited budget
<p>Opportunities</p> <ul style="list-style-type: none">• Market response to new ideas	<p>Threats</p> <ul style="list-style-type: none">• Seasonal demand• Competitor's reaction

Business Team Timeline

Sep-09 Oct-09 Nov-09 Dec-09 Jan-10 Feb-10 Mar-10 Apr-10 May-10 Jun-10 Jul-10 Aug-10

Revise consumer behavior survey



Conduct survey



Survey Analysis



Positioning Strategy



Marketing: Promotion



Supply Chain



Marketing: Pricing



Financial Analysis



Research on Manufacturers

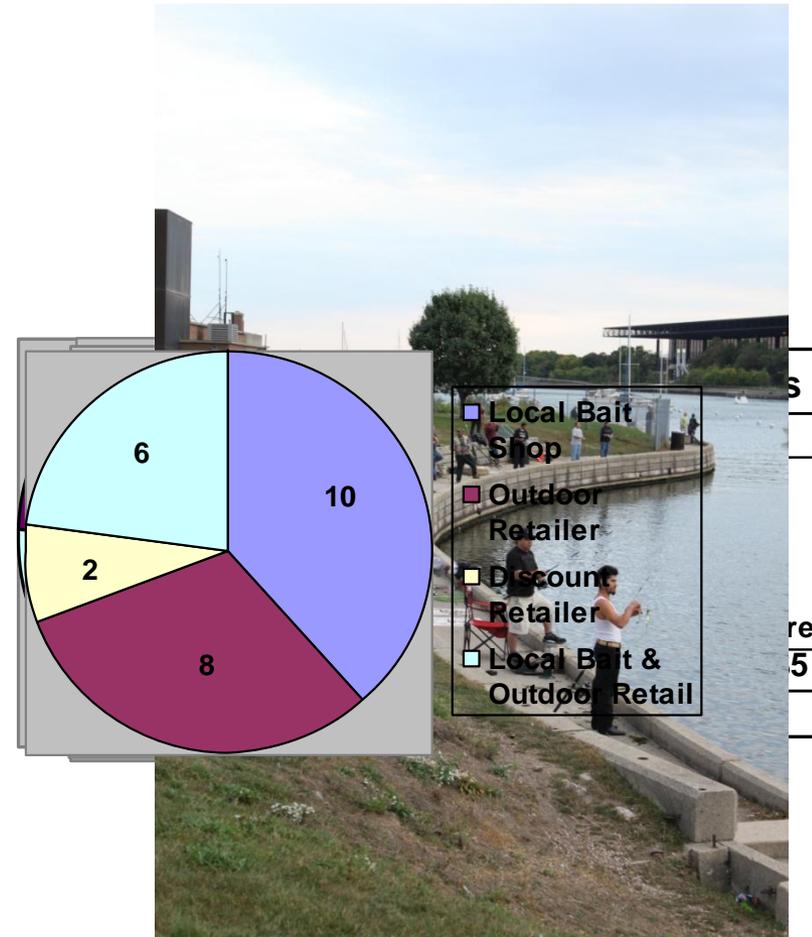


ICAST

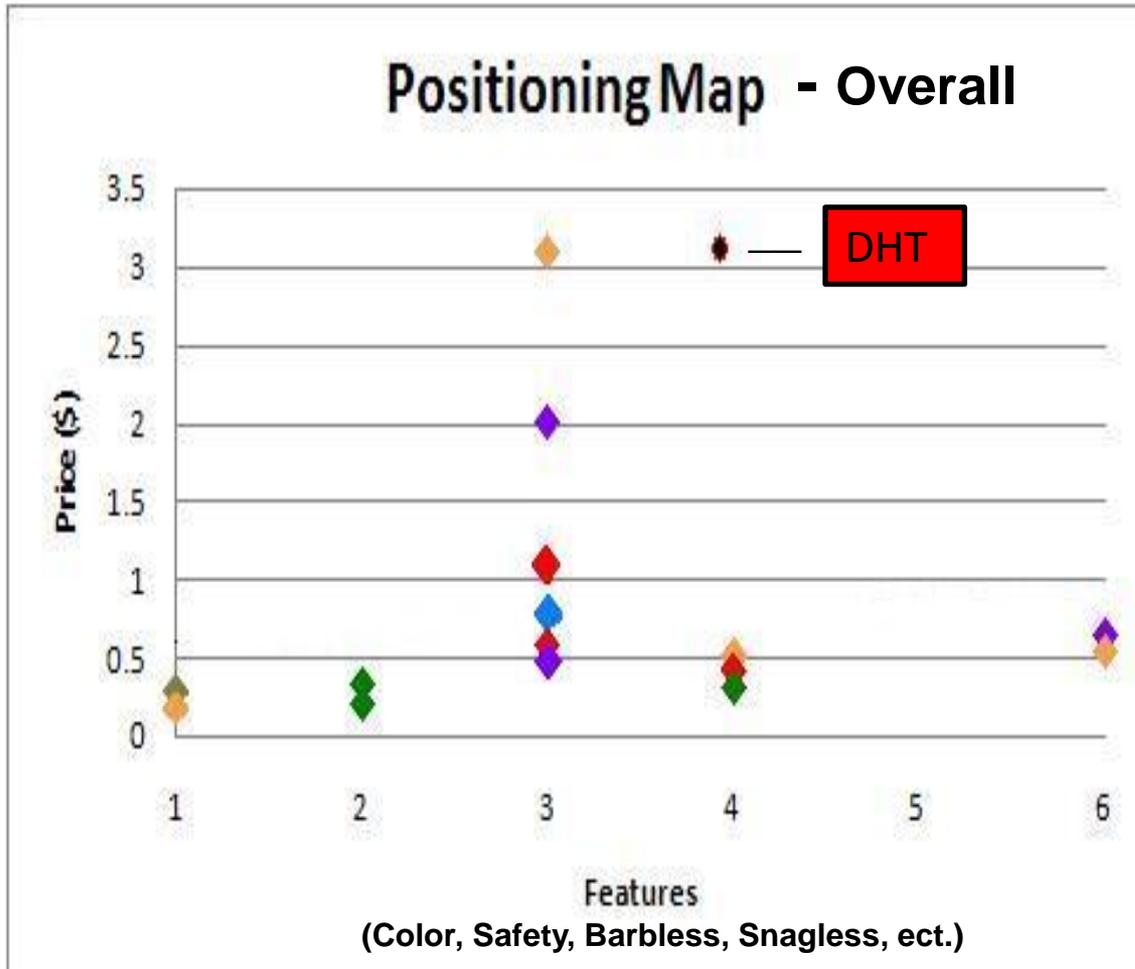


Survey Analysis

- 26 anglers surveyed
- Results
 - Place
 - Frequency
 - Willingness to pay
 - Media channels



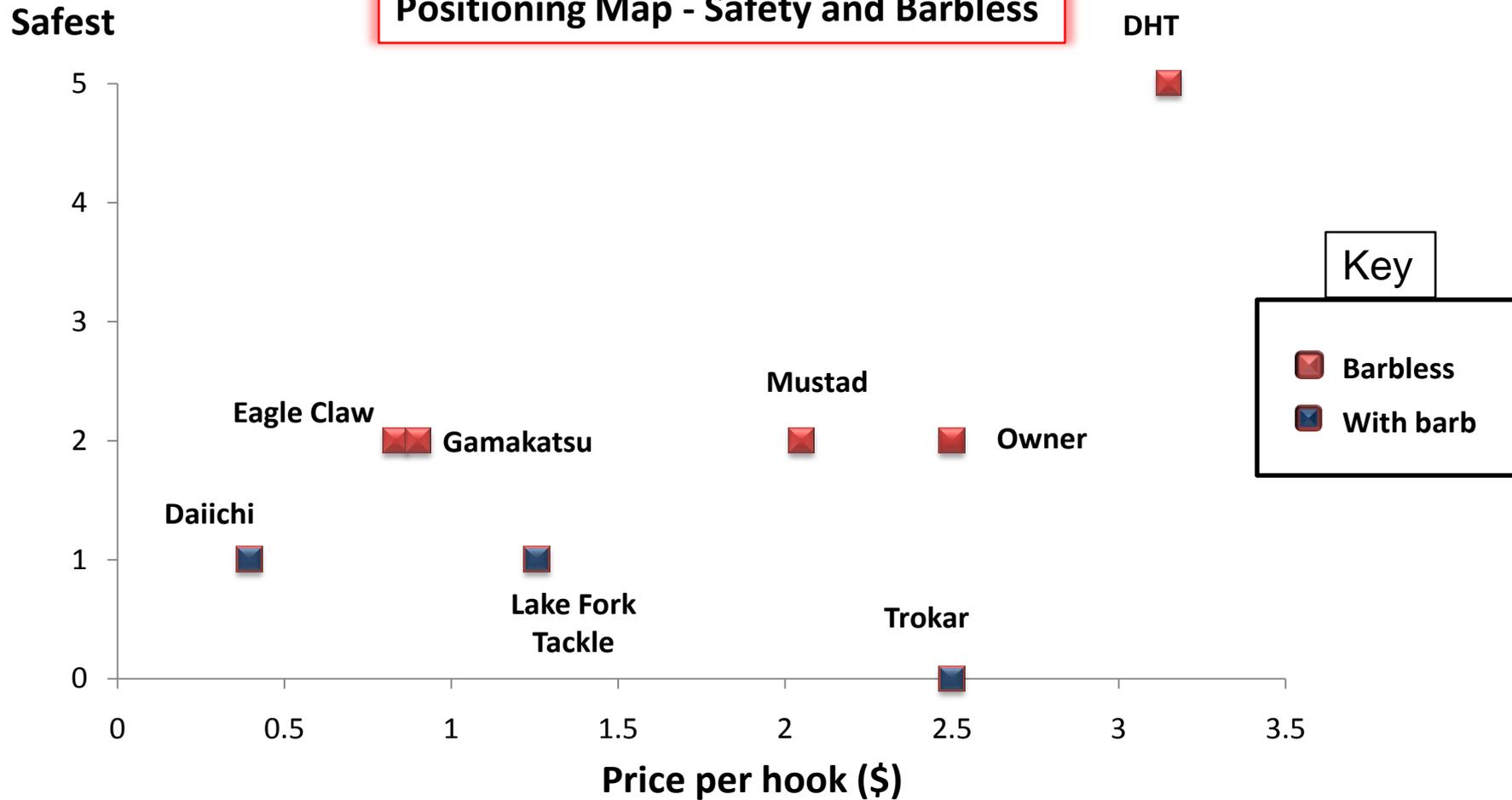
DHT Positioning



Hook
Bill Dance-Advantage Spring (Single)
Bill Dance-Advantage Spring (Treble)
Gamakatsu-Circle Hooks
Gamakatsu-EWG Worm Hook
Gamakatsu-Split shot
Eagle Claw-Kahl Hooks
Eagle Claw-Circle Sea Offset Hook
Eagle Claw- Extra Wide Gap Hook
Mustad Ultra Point Big-Mouth Tube Hooks
Mustad Ultra Point Power Lock Plus Hooks
Mustdad-Ultra Point UltraLock Hooks
Mustad-XPS SuperLock Hooks
Bass Pro- XPS Octopus Hooks
Bass Pro-XPS Magna Superlock Hooks
Owner-TwistLOCK Open Gap Hooks (5132)
Owner-SSW w/ Cutting Point
Owner-Down Shot Offset Hook (5133)
Sparrowhawk – Delta Hook

DHT Positioning

Positioning Map - Safety and Barbless



Supply Chain



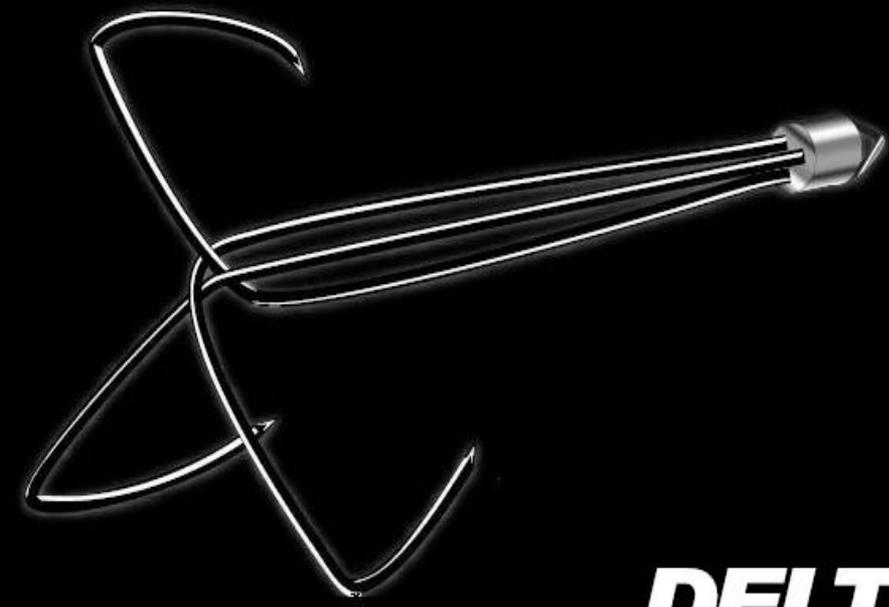
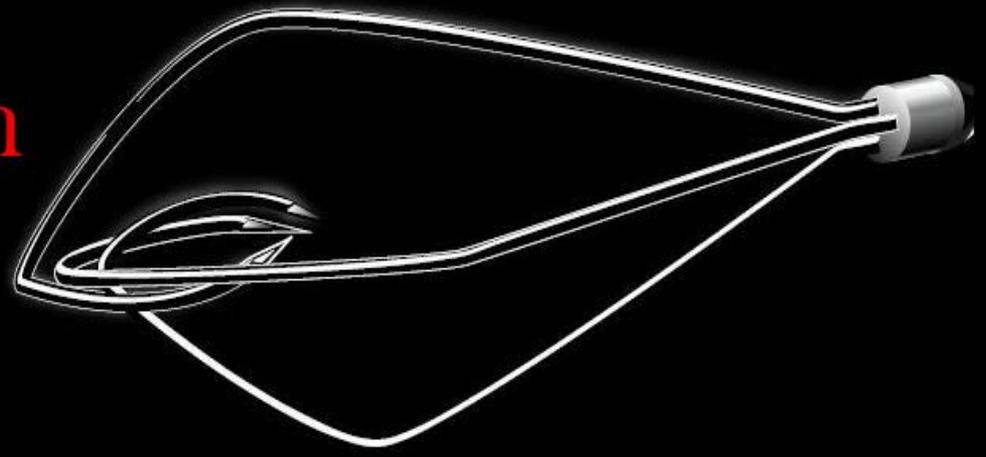
Promotion



- The International Convention of Allied Sportfishing Trades
- Las Vegas
- July 14-16
- Attendants

Interlocking Design

The way nature intended

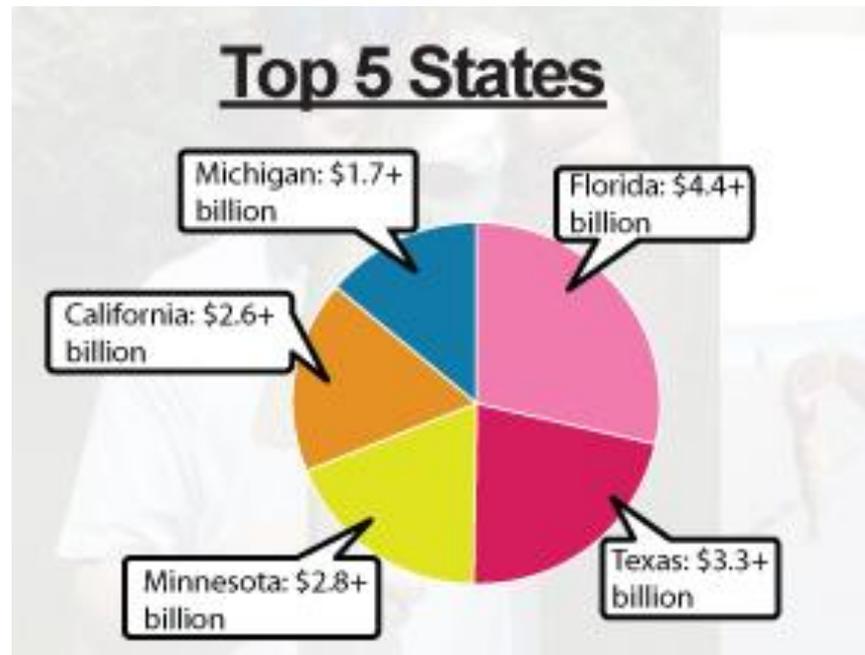


Financial Analysis

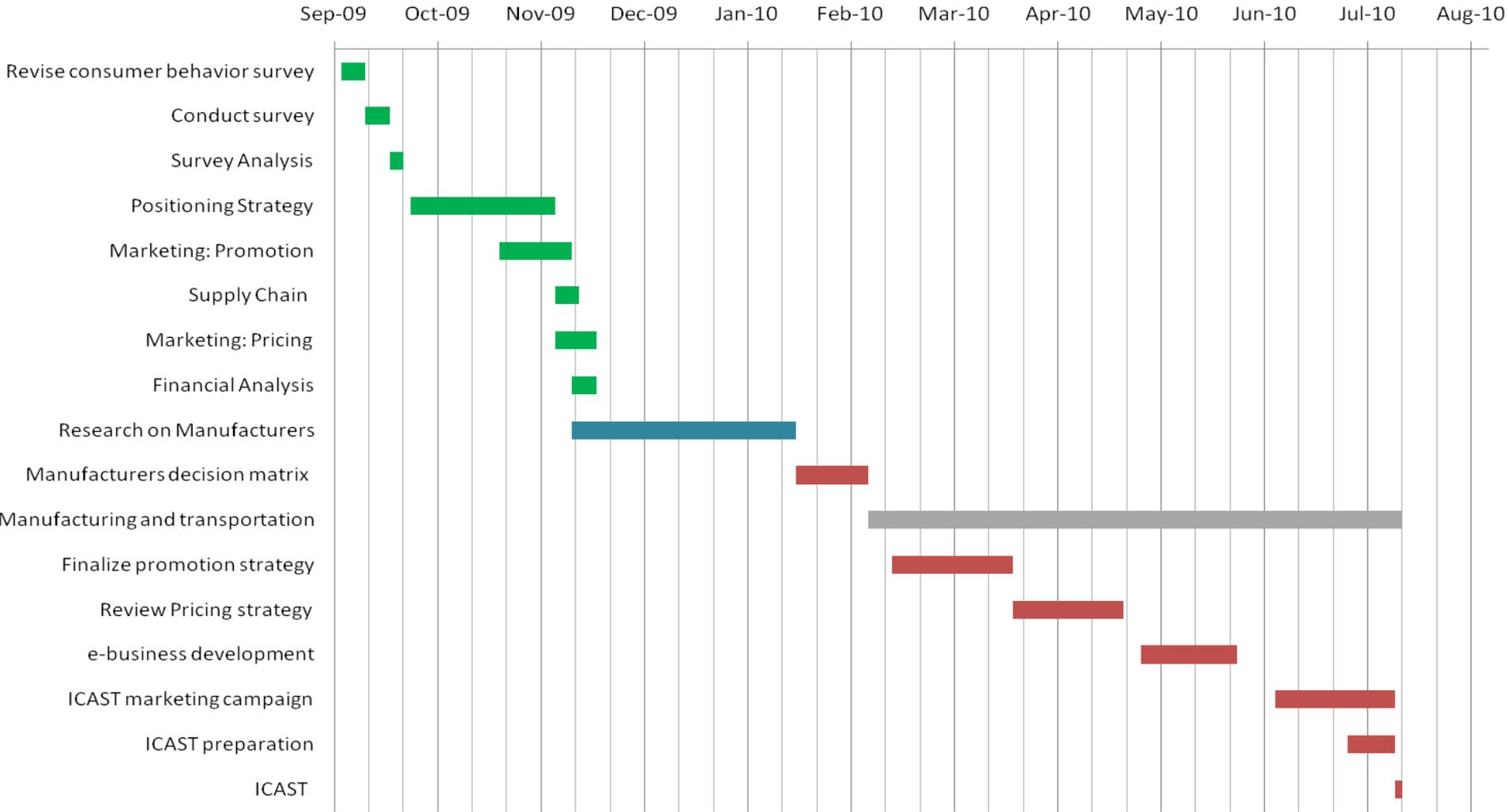
- Price
 - \$3.25 per hook
- Fix costs
 - ICAST (\$50,000)
 - Marketing and Administrative Expense (\$20,000)
- Variable cost
 - \$ 0.50 per hook
- Break even point
 - 26,415 hooks

Market

- \$ 45 billion spent by anglers yearly
- \$ 1.2 billion spent on lures, hooks, and other tackle



Business Recommendations



Questions