Features

Standard Treble
- Three exposed prongs
- Barbed
- Inflexible

Delta Hook
- Three concealed prongs
- Barbless
- Flexible

ENPRO 358
DHT Mechanical Requirements

STRENGTH

FLEXIBILITY

ENPRO 358
Non-Planar Motion

Weak

Bulky

ENPRO 358
TESTING: Unbending
Commercial Test Results

Brand Hook vs. Max Load

<table>
<thead>
<tr>
<th>Hook Type</th>
<th>Max Load [lbf]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eagle Claw Aberdeen</td>
<td>20</td>
</tr>
<tr>
<td>Eagle Claw Baitholder</td>
<td>40</td>
</tr>
<tr>
<td>Eagle Claw Lazer Sharp</td>
<td>20</td>
</tr>
<tr>
<td>Eagle Claw Lazer Sharp Treble</td>
<td>30</td>
</tr>
<tr>
<td>Tru Turn</td>
<td>25</td>
</tr>
</tbody>
</table>
MATERIAL ANALYSIS: Elemental Composition

SCANNING ELECTRON MICROSCOPE

Steel

Brass

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DELTA

HOOK TECHNOLOGY
Commercial Testing Results
HOOK FORMATION

BENDING
Non-Galvanized Black Wrought Iron Pipe

NORMALIZING

Crushed Charcoal

Final Bent Hook

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DELTA HOOK TECHNOLOGY
STRENGTHENING

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DELTA HOOK TECHNOLOGY
Meeting the Standard

Brand Hook vs. Max Load

Max Load [lbf]

- Eagle Claw Aberdeen
- Eagle Claw Baitholder
- Eagle Claw Lazer Sharp
- Eagle Claw Lazer Sharp Treble
- Tru Turn
- DHT

ENPRO 358
FLEXIBILITY

Out of Plane
In Plane

ENPRO 358
FINAL MOCK-UPS

ENPRO 358
Market Demographics

• International market

• Terminal Tackle Sales $399 million
• Lures and Artificial Baits $905 million
• Total Market $1.3 billion

Delta Hook Varieties

• Delta Hook Product Lines
  – Pro
  – Family
  – Memento

• Marketing to each Segment (Penetration)
Sales by Segment

• Sparrowhawk Pro
  – Year 1: $585,000
  – Year 2: $730,000
  – Year 3: $915,000

• Sparrowhawk Family
  – Year 1: $65,000
  – Year 2: $81,000
  – Year 3: 102, 000

Who do you fish with

- Adults 44%
- Both 48%
- Children 3%
- Neither 5%

n=150
### Mock-Up Costs

<table>
<thead>
<tr>
<th>Features</th>
<th>1080</th>
<th>Ti-6al-4v</th>
<th>Ball 1080</th>
<th>Ball TI-64</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wire</strong></td>
<td>0.024</td>
<td>0.720</td>
<td>0.024</td>
<td>0.720</td>
<td>0.090</td>
</tr>
<tr>
<td><strong>Brass Crimping</strong></td>
<td>0.042</td>
<td>0.042</td>
<td>0.000</td>
<td>0.083</td>
<td>0.042</td>
</tr>
<tr>
<td><strong>Rubber ball</strong></td>
<td>0.000</td>
<td>0.000</td>
<td>0.250</td>
<td>0.250</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td>0.0655</td>
<td>0.7615</td>
<td>0.274</td>
<td>1.053</td>
<td>0.1315</td>
</tr>
</tbody>
</table>
Corporate Profitability

- **Revenue**
  - Year 1: $650,000
  - Year 2: $725,000
  - Year 3: $1,000,200

- **Profit/Year**
- **Net Profit/Sales**
  - Year 1: $115,500 17.77%
  - Year 2: $159,950 19.72%
  - Year 3: $211,085 20.76%

ENPRO 358
# Sparrowhawk

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
<th>Profit</th>
<th>NetProfit/Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>$650,000</td>
<td>$115,500</td>
<td>17.77%</td>
</tr>
<tr>
<td>Year 2</td>
<td>$812,500</td>
<td>$159,950</td>
<td>19.72%</td>
</tr>
<tr>
<td>Year 3</td>
<td>$1,017,000</td>
<td>$211,085</td>
<td>20.76%</td>
</tr>
</tbody>
</table>
Exit Strategy

• Acquisition Target
• Value generators
Strategic Advantages

• Manufacturing Contracts
• Sophisticated Marketing
  – Spokesman
  – Strategic partnerships (SOG knives, tournament sponsorship)
Patent

- Utility patent pending
- Application published 18 months after filing (June 18th, 2009)
- Prosecution by Brinks, Hofer, Gilson & Lione of Chicago
Acknowledgements

- Craig Johnson
- Sheldon Mostovoy, Ph.D
- Russ Janota
- Phil Nash, Ph.D
- MMAE Graduate Students
Thank You
Appendix

• Test Data
• Chart
• Finite element analysis
• Delta Hook Design
• Microstructure
<table>
<thead>
<tr>
<th>Name</th>
<th>Shank Shape</th>
<th>Category</th>
<th>Chord Length</th>
<th>Wire Diameter</th>
<th>Max Load (lbf)</th>
<th>Mode of Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trokar J</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0602</td>
<td>44.64 Bend 90</td>
</tr>
<tr>
<td>500C Sample 3</td>
<td>Standard</td>
<td>2</td>
<td>1.09375</td>
<td>0.0441</td>
<td>37.46</td>
<td>Bend 90</td>
</tr>
<tr>
<td>500C Sample 4</td>
<td>Flattened</td>
<td>2</td>
<td>1.4375</td>
<td>0.0441</td>
<td>35.62</td>
<td>Bend 90</td>
</tr>
<tr>
<td>500C Sample 5</td>
<td>Flattened</td>
<td>2</td>
<td>1.34375</td>
<td>0.044</td>
<td>33.43</td>
<td>Bend 90</td>
</tr>
<tr>
<td>Gamakatsu Worm Eye</td>
<td></td>
<td></td>
<td></td>
<td>0.042</td>
<td>33.4</td>
<td>Bend 90</td>
</tr>
<tr>
<td>Bass Pro Worm Hook</td>
<td></td>
<td></td>
<td></td>
<td>0.0747</td>
<td>29.67</td>
<td>Bend 90</td>
</tr>
<tr>
<td>500C Sample 1</td>
<td>Standard</td>
<td>3</td>
<td>1.03125</td>
<td>0.0454</td>
<td>25.19</td>
<td>Bend 90</td>
</tr>
<tr>
<td>500C Sample 2</td>
<td>Flattened</td>
<td>3</td>
<td>1.125</td>
<td>0.0404</td>
<td>13.13</td>
<td>None (slip from vise)</td>
</tr>
<tr>
<td>300C Sample 2</td>
<td>Standard</td>
<td>3</td>
<td></td>
<td>0.044</td>
<td>11.93</td>
<td>Fracture</td>
</tr>
<tr>
<td>300C Sample 1</td>
<td>Flattened</td>
<td>2</td>
<td></td>
<td>0.0449</td>
<td>11.41</td>
<td>Fracture</td>
</tr>
<tr>
<td>U-Clamp</td>
<td></td>
<td></td>
<td></td>
<td>0.0394</td>
<td>6.76</td>
<td></td>
</tr>
</tbody>
</table>
TESTING
Appendix A-2

ENPRO 358
Finite Element Analysis - FEM

Appendix B

PRESSURE (Mpa)

- 500 Mpa
- 480 Mpa
- 460 Mpa
- 440 Mpa
- 420 Mpa
- 400 Mpa
- 380 Mpa
- 360 Mpa
- 340 Mpa
- 320 Mpa

STRESS CONCENTRATION

Applied Load: 200N

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EnPRO 358 Plan

SparrowHawk

EnPRO 358

Business Team
Business Plan
Market Research

Product Team
Prototype
Testing/Development
DESIGN

1 - Eye
2 - Flexible shaft
3 - Rigid arm and engaged section
4 - Acute angle
  Sharp hook point
  Corrosion resistant

ENPRO 358
MATERIAL ANALYSIS: Microstructure
SCANNING ELECTRON MICROSCOPE

ENPRO 358
## Cost

<table>
<thead>
<tr>
<th>Material</th>
<th>Cost</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel wire</td>
<td>0.003</td>
<td>$/in</td>
<td><a href="http://www.mcmaster.com/#9666k33/=6s0yax">http://www.mcmaster.com/#9666k33/=6s0yax</a></td>
</tr>
<tr>
<td>Ti-64</td>
<td>0.09</td>
<td>$/in</td>
<td>TI is 30 times more expensive per ton</td>
</tr>
<tr>
<td>Brass</td>
<td>0.083</td>
<td>$/ft</td>
<td><a href="http://www.mcmaster.com/#brass/=6s0zfe">http://www.mcmaster.com/#brass/=6s0zfe</a></td>
</tr>
<tr>
<td>Rubber ball</td>
<td>0.25</td>
<td>$/ball</td>
<td>$.52 per ball from McMaster $.04 for raw rubber so I split the difference</td>
</tr>
</tbody>
</table>
## Cost

<table>
<thead>
<tr>
<th>Features</th>
<th>Units</th>
<th>108 Ti-6al-4v</th>
<th>Ball 1080</th>
<th>Ball Ti-64</th>
<th>Sprin</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire</td>
<td>in</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>30 spring assume .35” diam coil and 20 coils</td>
</tr>
<tr>
<td>Brass Crimping</td>
<td>in</td>
<td>0.5</td>
<td>0.5</td>
<td>0</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Rubber ball</td>
<td>unit</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Corrosion resistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ignore cost probably less than the accuracy of this exercise</td>
</tr>
</tbody>
</table>