

Testing hook-tissue interactions in toothed whale mouths

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The Marine Mammal Commission

ANNUAL REPORT TO CONGRESS

2 0 0 9







Necropsy Team Leader

**Conducted necropsies on
over 250 large whales and
3000 small cetaceans**



Sit on:

Atlantic Large Whale TRT

Bottlenose Dolphin TRT

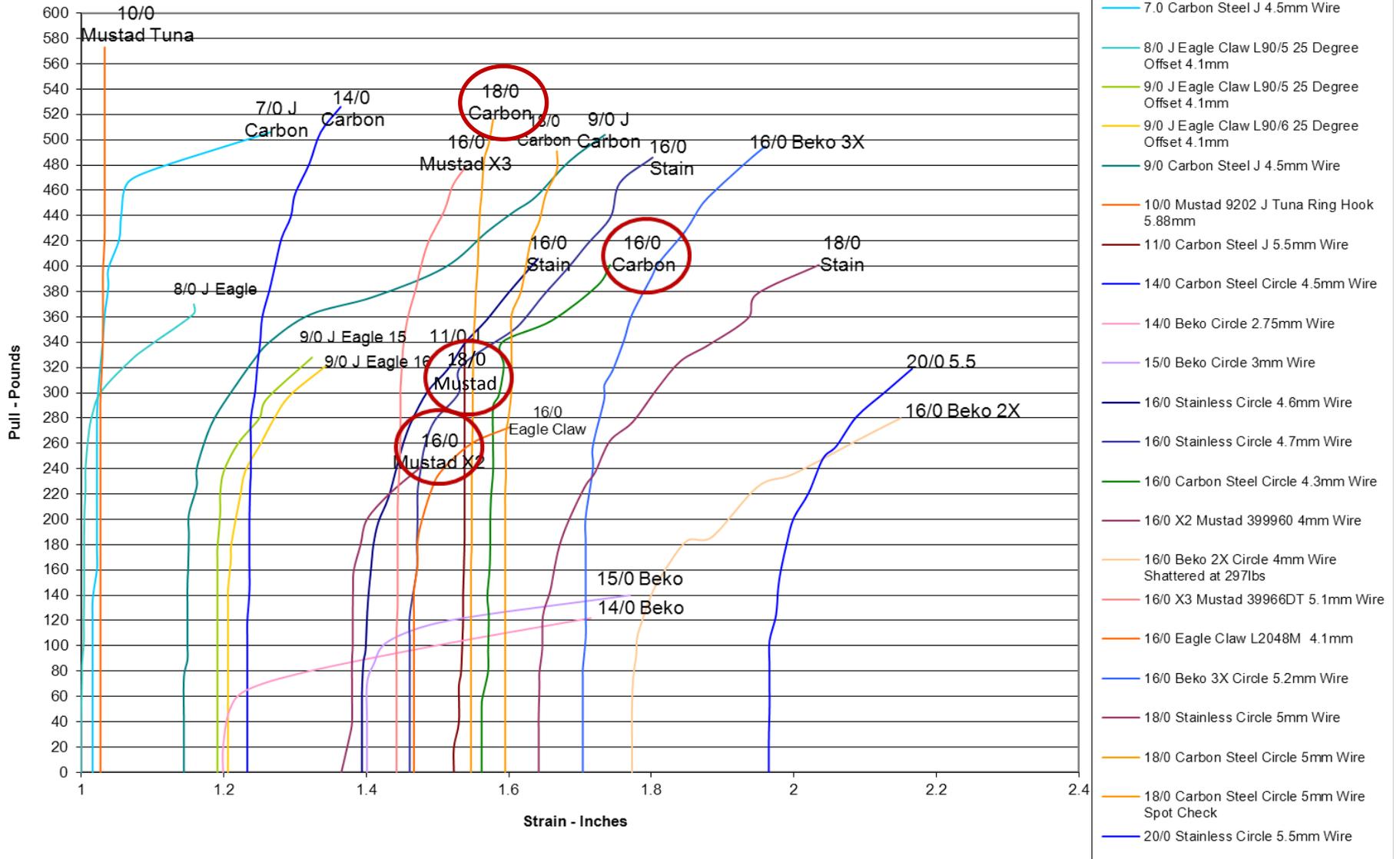
Harbor Porpoise TRT

Pelagic Trawl TRT

Pelagic Longline TRT

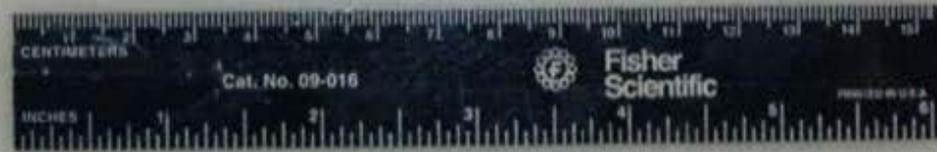
Hook Pull vs Strain

Note The X axis represents the measurement of the hook between the tip and shank after being pulled to the listed pounds on the Y axis



This plot came from Charlie Bergman via Dave Kerstetter , 4 June 2012

Hooks Tested to Date



Korean 18



Mustad 16

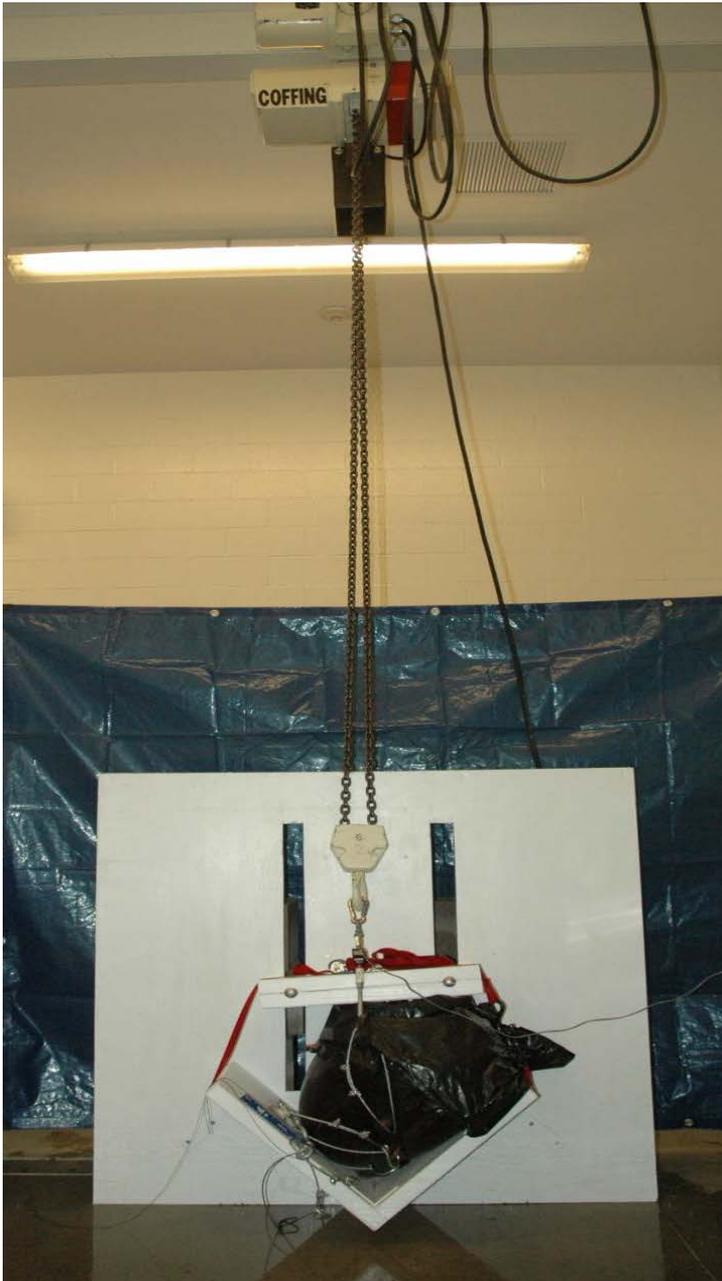


Mustad 18



Korean 16





Set Up:

Overhead crane to 3 tons of force



Stanchion to strap down head
loaded with 1,000 lbs of weight

Head is strapped onto stanchion

Hooks inserted and pulled with
force gauge recording



In-line Load Cell

Measures forces up to 1,000 lbs

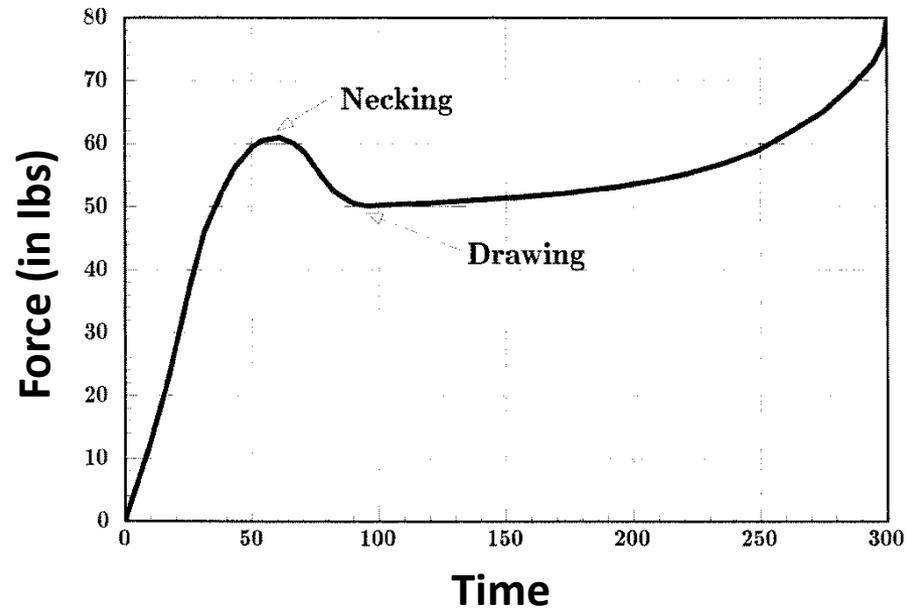
Samples at 20 samples/second

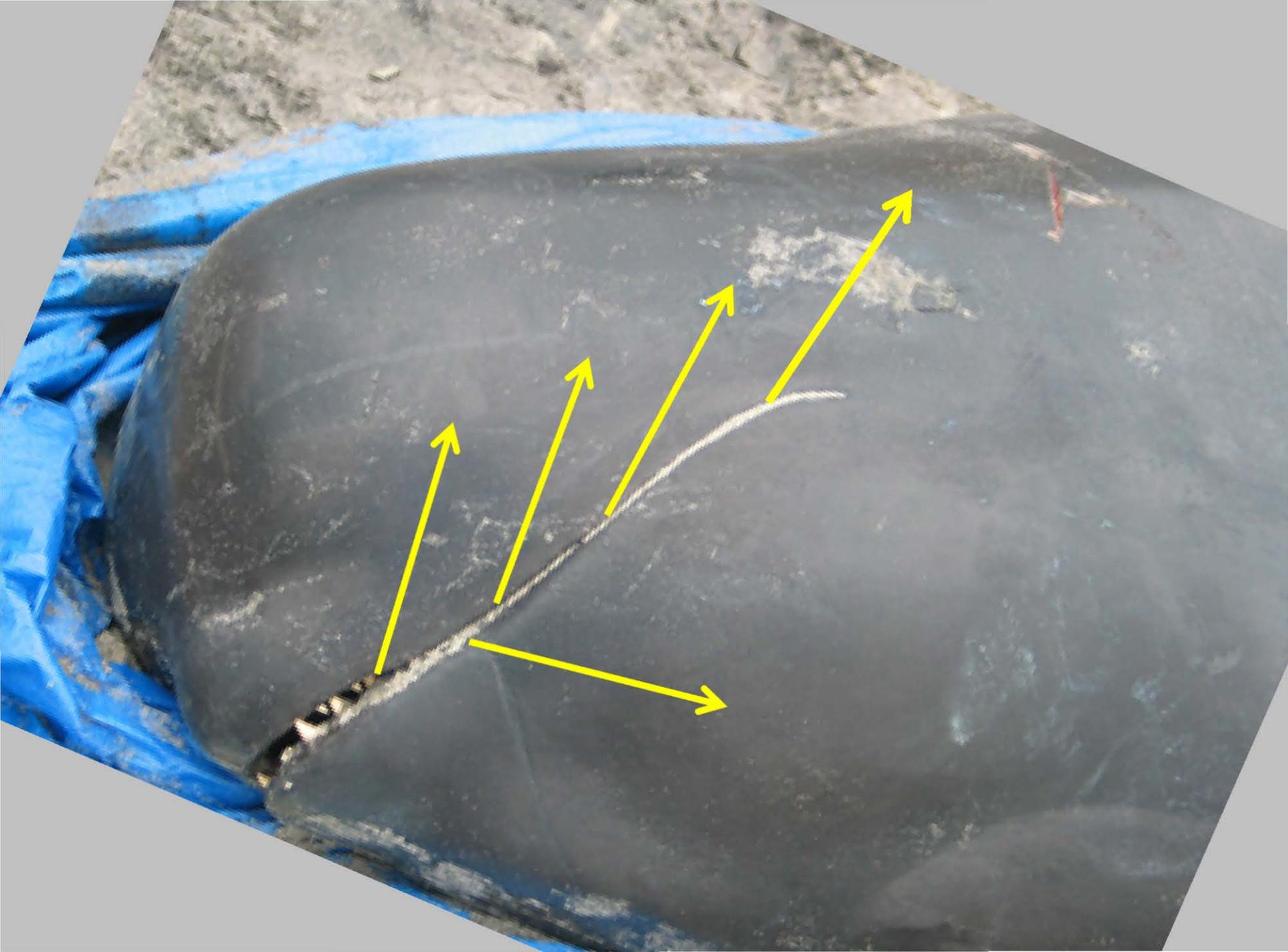


In-line Load Cell

Measures forces up to 1,000 lbs

Samples at 20 samples/second





Species Tested To Date:

2x short-finned pilot whales (*Globicephala macrorhynchus*)

2x Risso's dolphins (*Grampus griseus*)

1x false killer whale (*Pseudorca crassidens*)

Species Tested To Date:

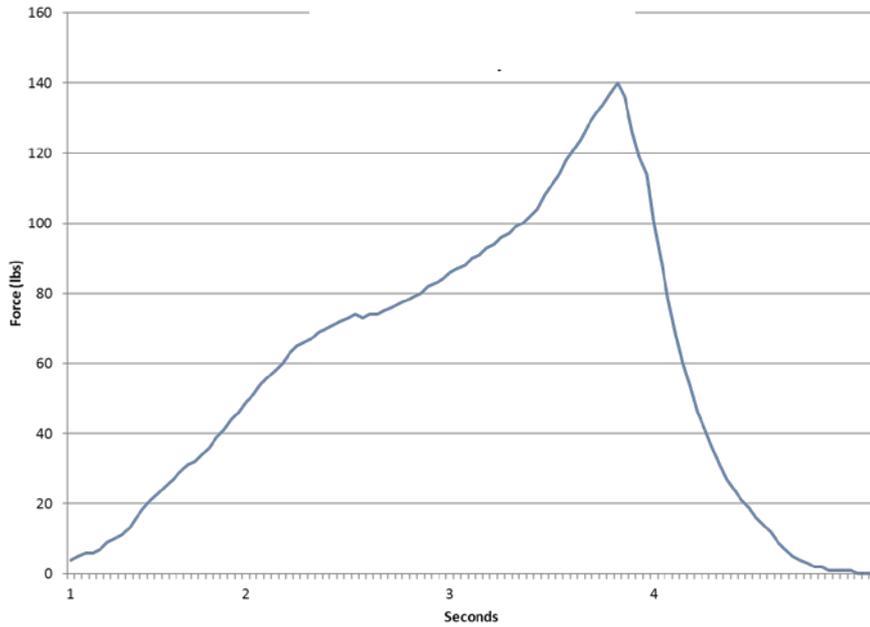
1x short-finned pilot whales (*Globicephala macrorhynchus*)

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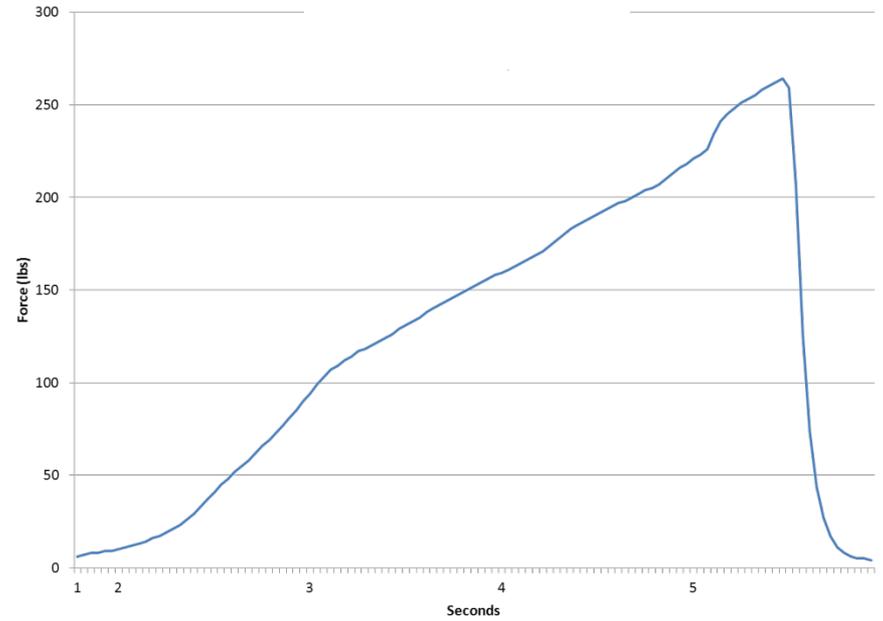
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Mustad Circle Hooks

Mustad 16



Mustad 18

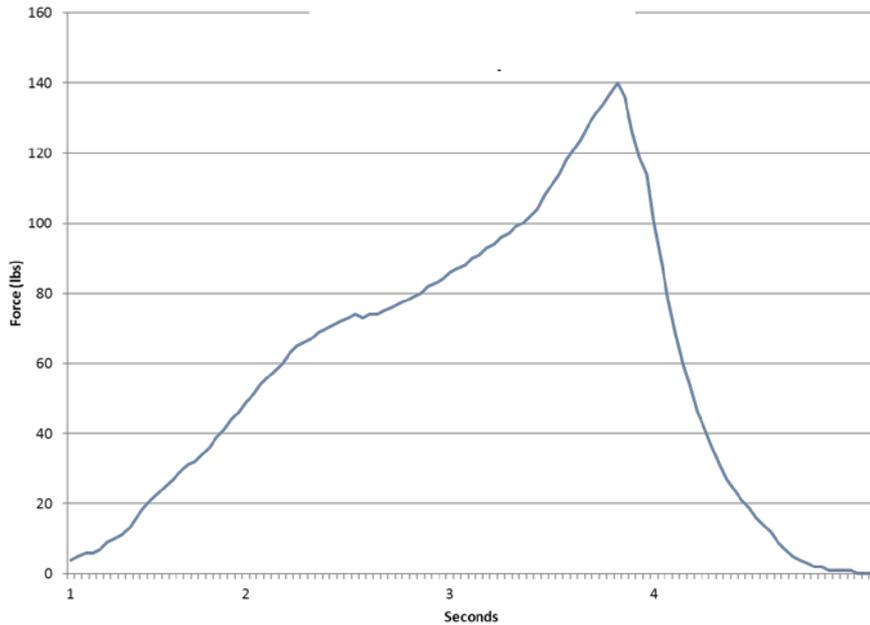


Short-finned pilot whale

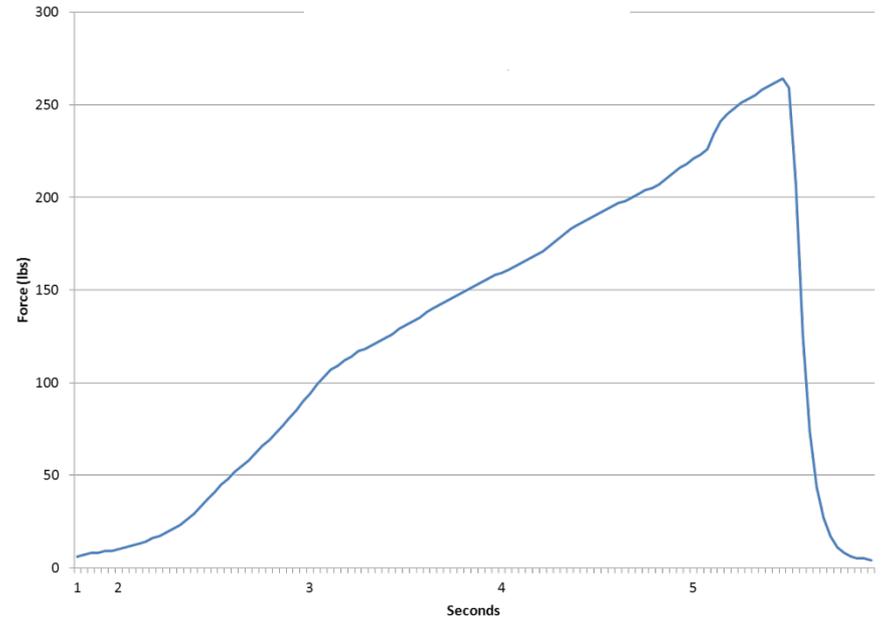
Mustad Circle Hooks

Take home: bent then sliced through and out of lip tissue

Mustad 16



Mustad 18



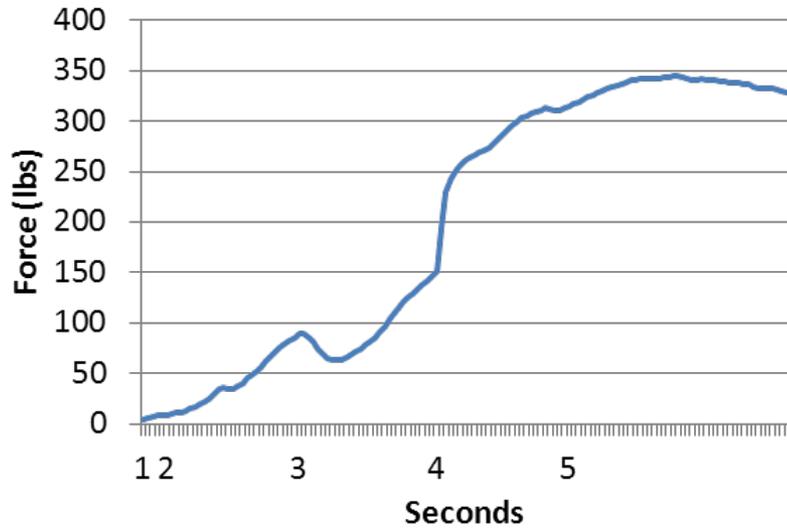
Short-finned pilot whale

Mustad 16

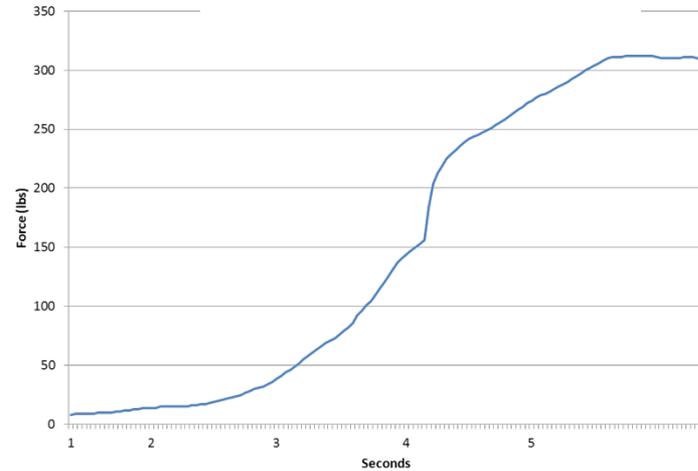


Korean Carbon Circle Hooks

Korean Carbon 16



Korean Carbon 18

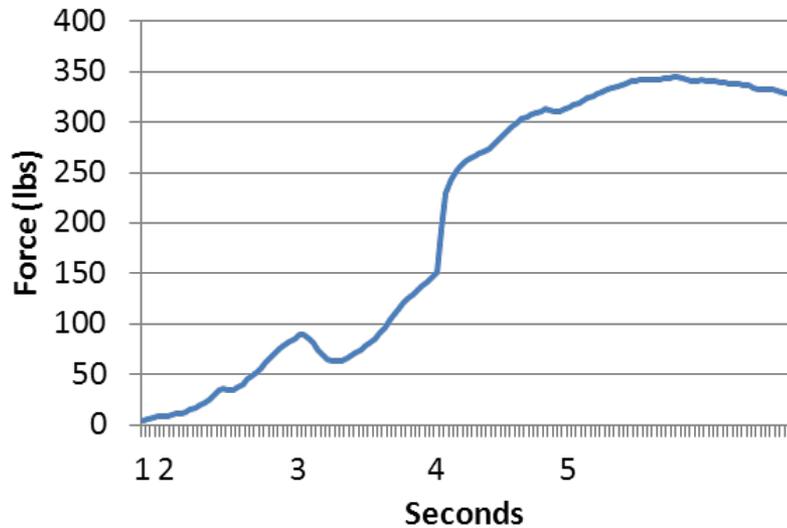


Short-finned pilot whale

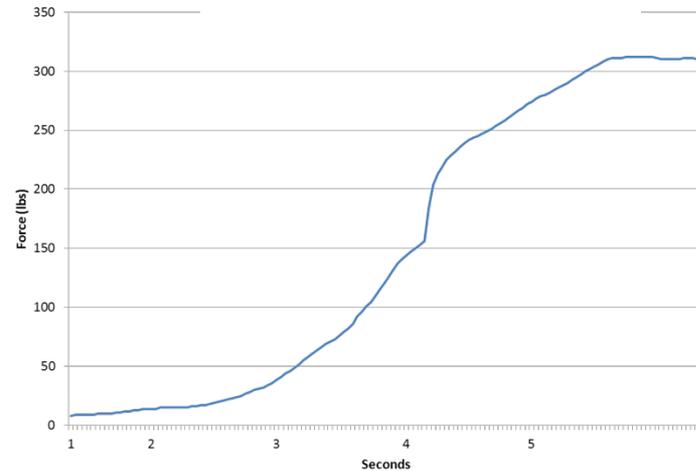
Korean Carbon Circle Hooks

Take home: bent then tear large section through the lip

Korean Carbon 16

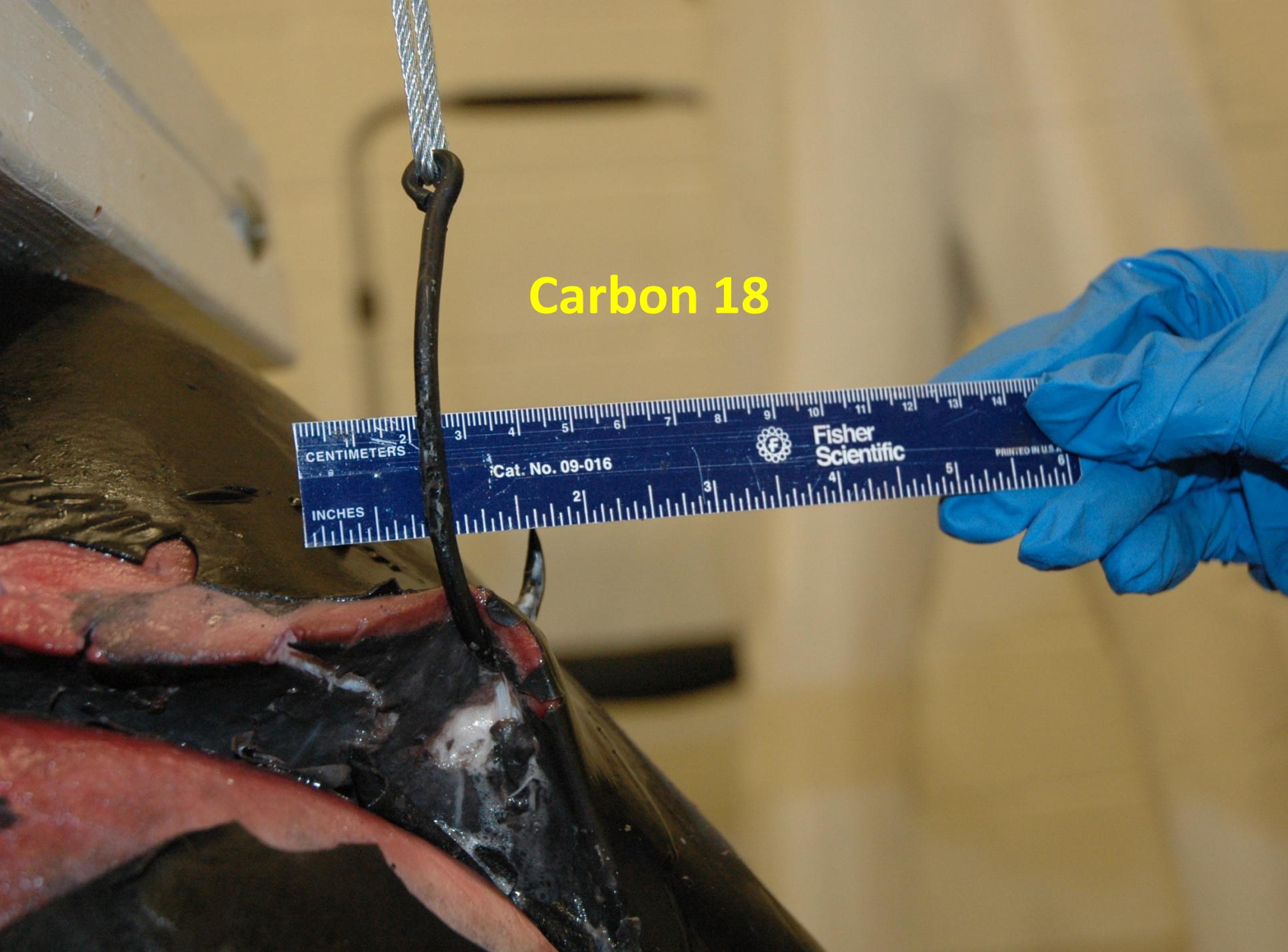


Korean Carbon 18

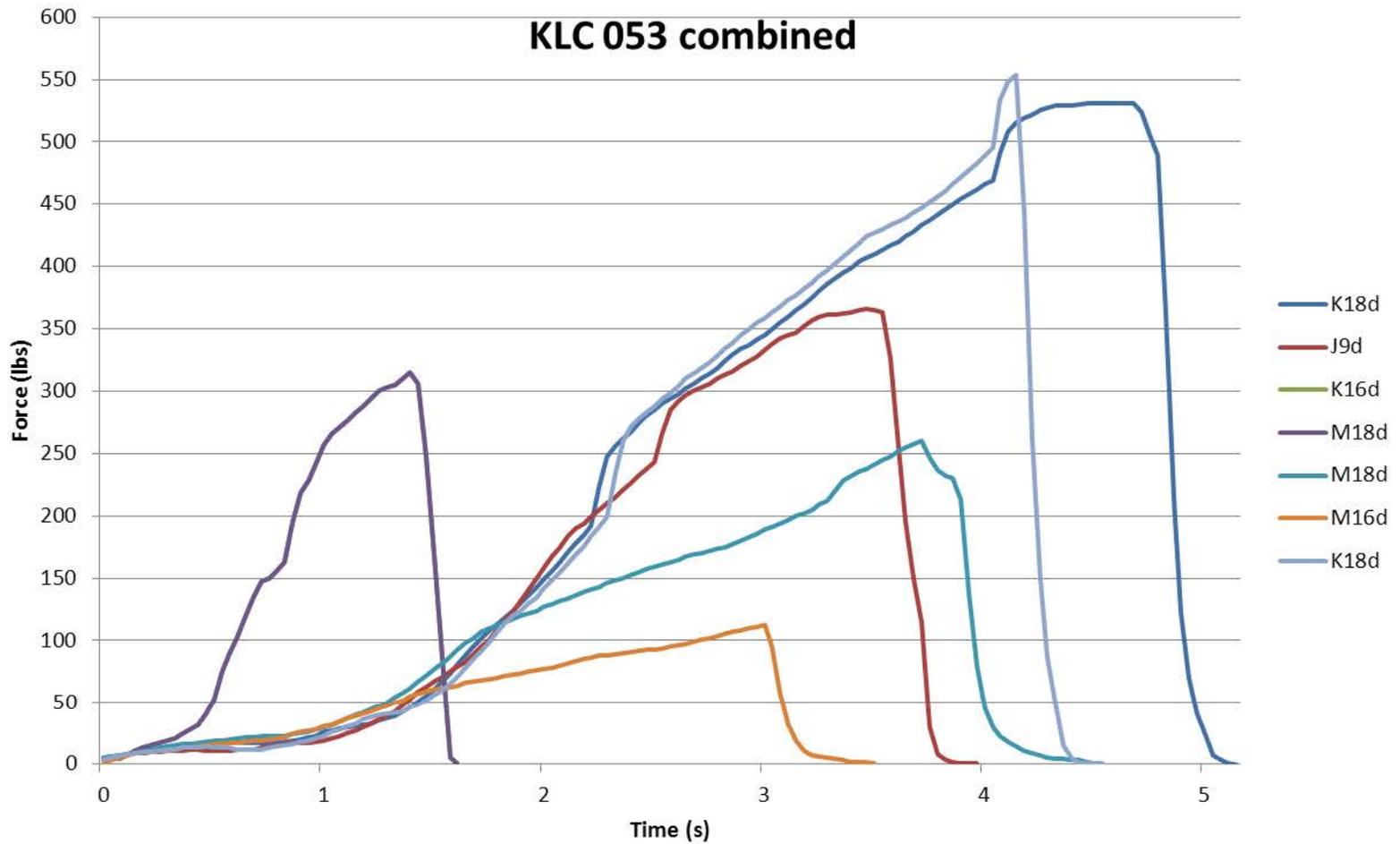


Short-finned pilot whale

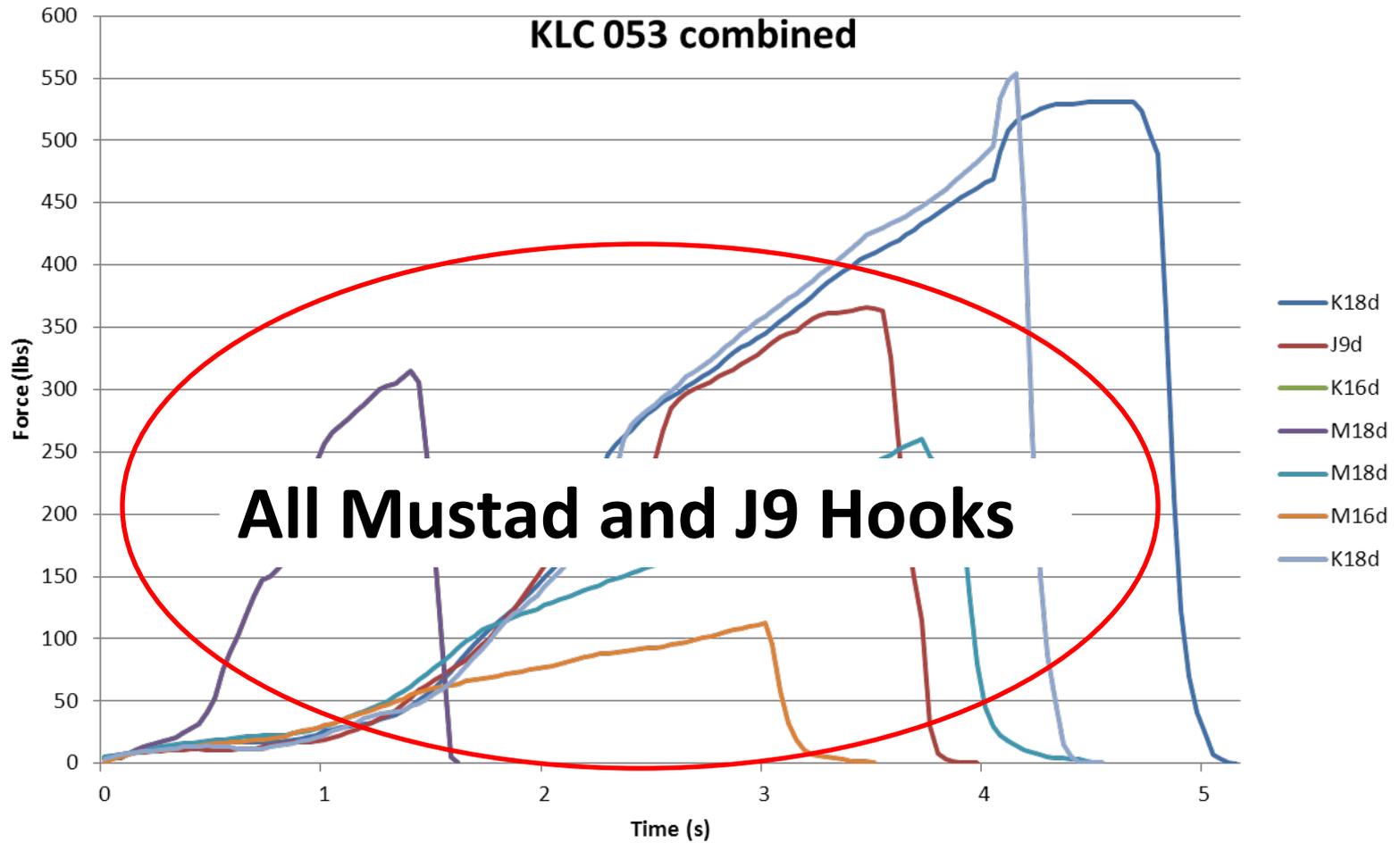
Carbon 18



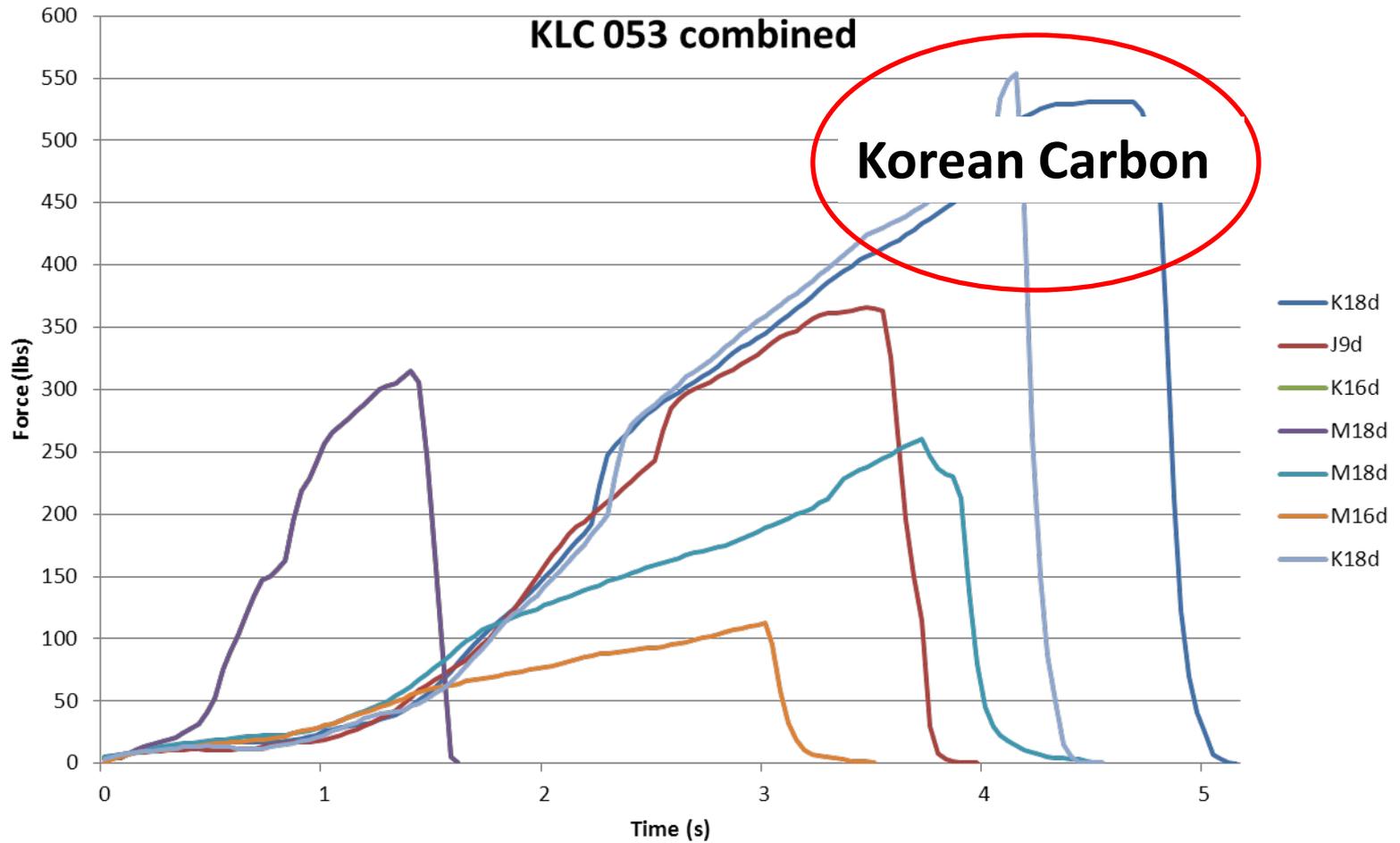
False Killer Whale Data Set



False Killer Whale Data Set



False Killer Whale Data Set



Korean 18

Mustad 16

Mustad 18

Korean 16

Before



Korean 18

Mustad 16

Mustad 18

Korean 16

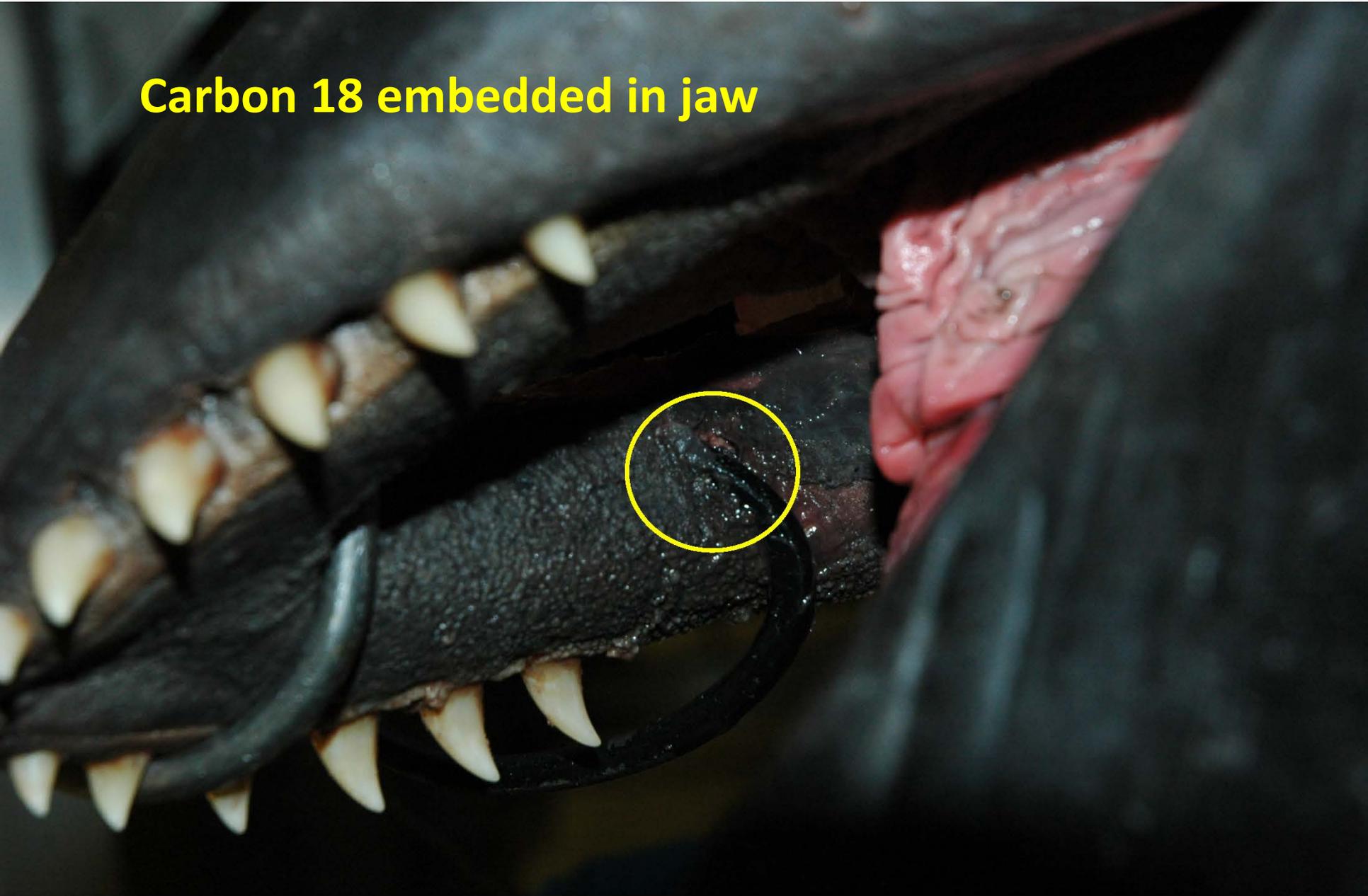
Before



After

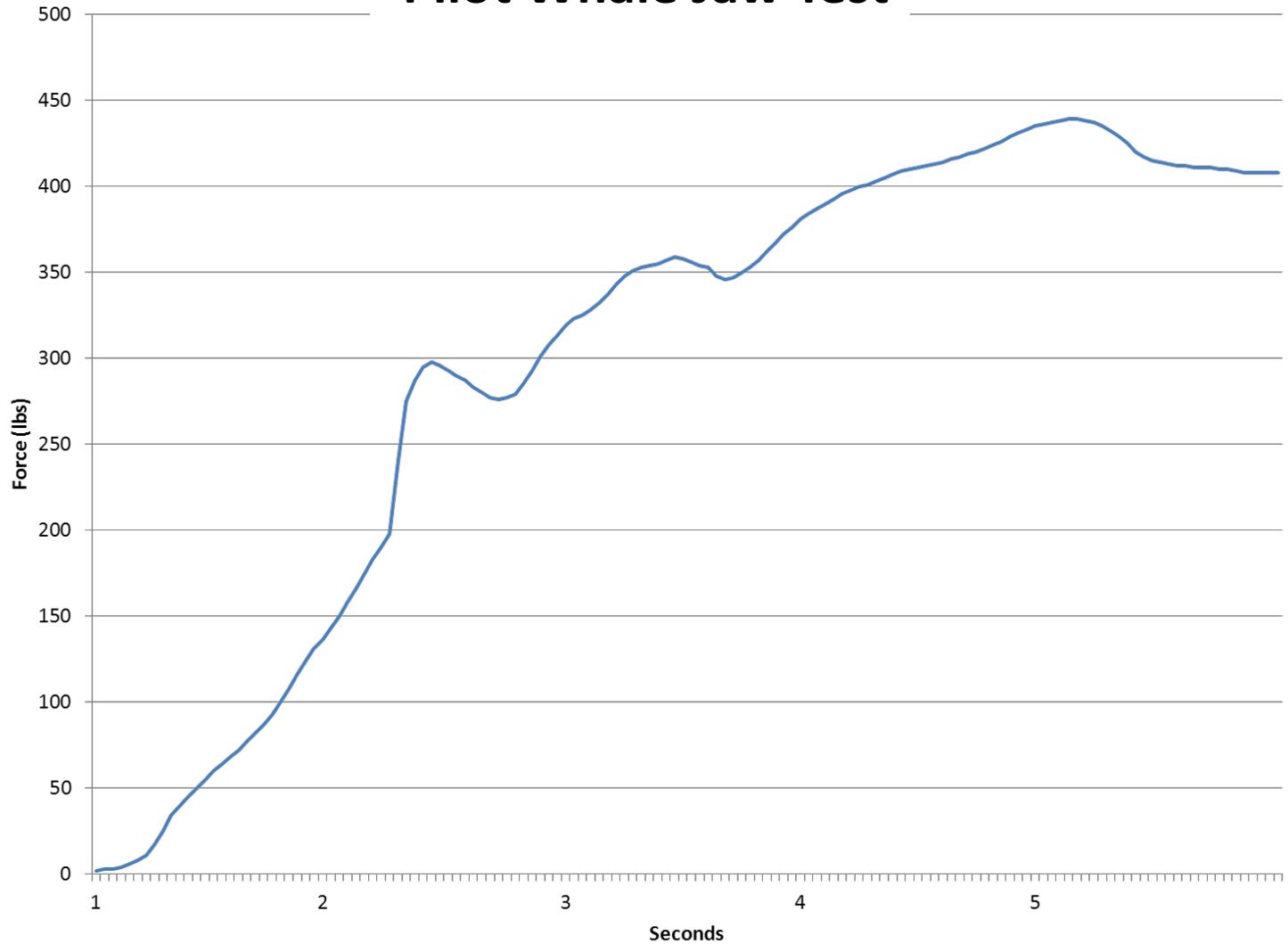


Carbon 18 embedded in jaw



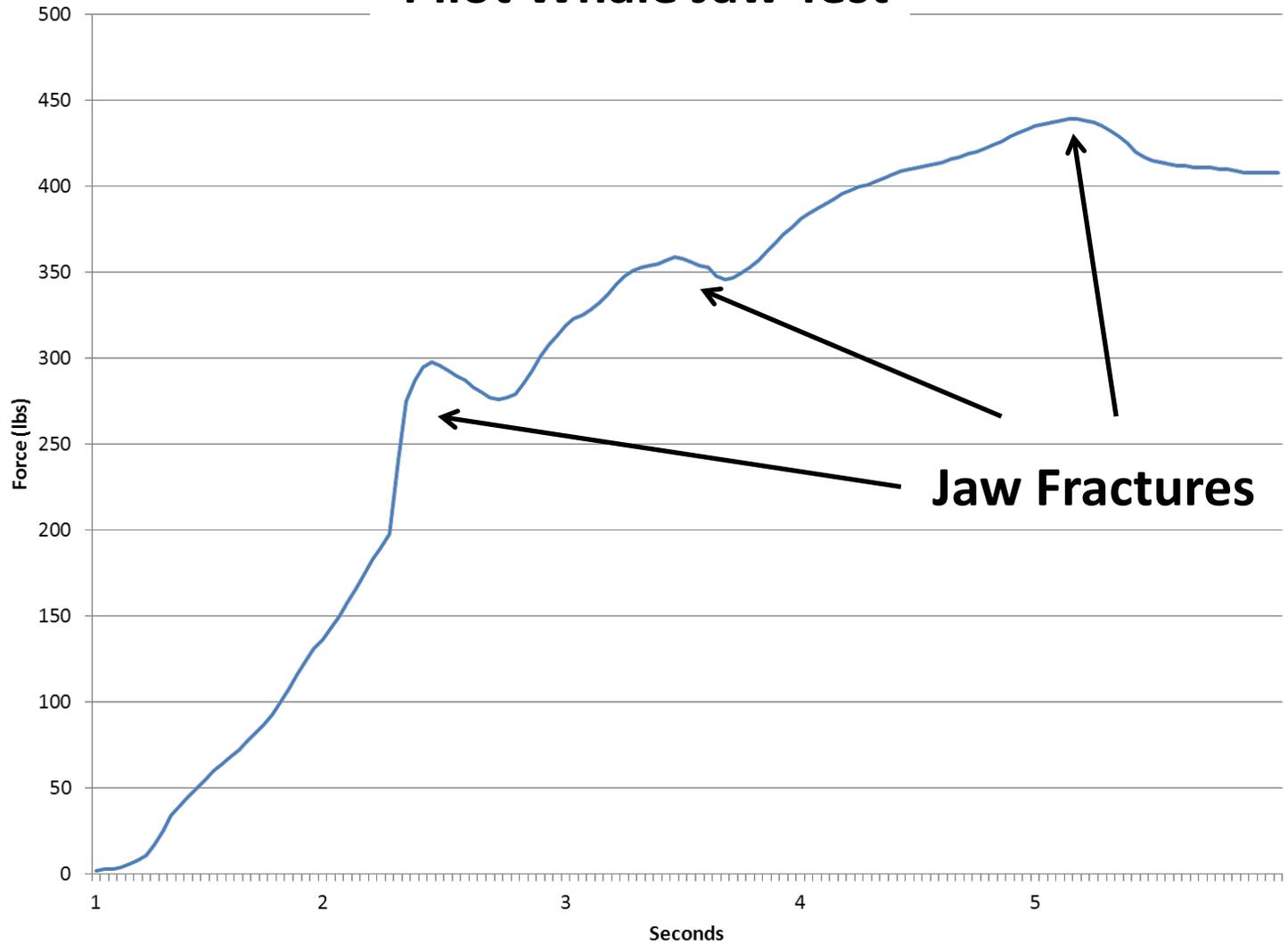
Korean Carbon 18

Pilot Whale Jaw Test



Korean Carbon 18

Pilot Whale Jaw Test



Conclusions:

-Mustad steel hooks bend, then shed hook by slicing

-Korean carbon hooks bend but keep J hook tip, then tear

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- Korean carbon hooks bend but keep J hook tip, then tear**
- Pilot whale lip withstood over 500 lbs of force**
- False killer whale lip withstood over 550 lbs of force**
- It is not the “lip” it is the hook that determines catch**

Conclusions:

- Mustad steel hooks bend, then shed hook by slicing**
- Korean carbon hooks bend but keep J hook tip, then tear**
- Pilot whale lip withstood over 500 lbs of force**
- False killer whale lip withstood over 550 lbs of force**
- It is not the “lip” it is the hook that determines catch**
- 18/0 hooks can fracture pilot whale jaw bone**

Acknowledgments:

North Carolina Stranding network for stranding response

Andy Read and Dave Kerstetter for continued discussions

Ann Pabst, VABLAB students

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Consortium for Bycatch Reduction

NOAA Prescott Grants

Charlie Bergman has just sent us:

Korean 18 Round “Weak Hook”

Korean 20 Straight “Weak Hook”

Korean Carbon 18 Circle