FX Project

- Why the FX Project?
- Comparison of our line versus competitors
- Testing of new pole designs
- Final new pole design

Pole Vault Poles

Gill Athletics, Inc.

- 6 METERS -

FX Technology

- Patented Spiral Inner wraps technique that allows for light weight poles with high hoop strength that do not soften with use.
- Pole design including sail piece shape and orientation that allow poles to roll to vertical in a smooth predictable manner. There is no random jumping around of sail design, mandrel size or sail placement. These are an engineered series system of poles that provide the smoothest transitions in the industry when moving up in weight or length of poles.
- Gill uses laser measurement technology to insure the highest accuracy in testing and weight/flex assignment to poles. Literally lights years ahead of the competition.
- The FX Design Evolution continues, through engineering efforts utilizing acceleration and load testing of evolving prototypes, the use of FEA and genetic algorithms, new materials and advancement of current materials. Actual field testing with experienced vaulters.

Just some Eng. Stuff

- $P_{CR} = \pi^2 E I / L^2$
- $\Delta_{max} = P L^3/48 E I$
- $\sigma_{max} = Mc/I$
- $P_s = P_n * L^2_n / L^2_s$
- The formula above is actual a fairly good indicator of how a pole's wgt or resistance will change when dropping your top hand grip
- This is just for the anal engineer types (like me)

Push Forward or Stand pat

- FX design has proven to be a winning design
- Choose to always strive for improvement
- Can you run faster if you are carrying less weight!

Spring of 2003

- What if? Is this type material available?
- Carbon in the sail piece?
- What do we need to take the next step?

Fall of 2003

- Finally – the material for the next step is available (yes it is a type of carbon material)
- How much and where can we put it
- Push the envelope and then work back to get the lightest pole with acceptable strength characteristics

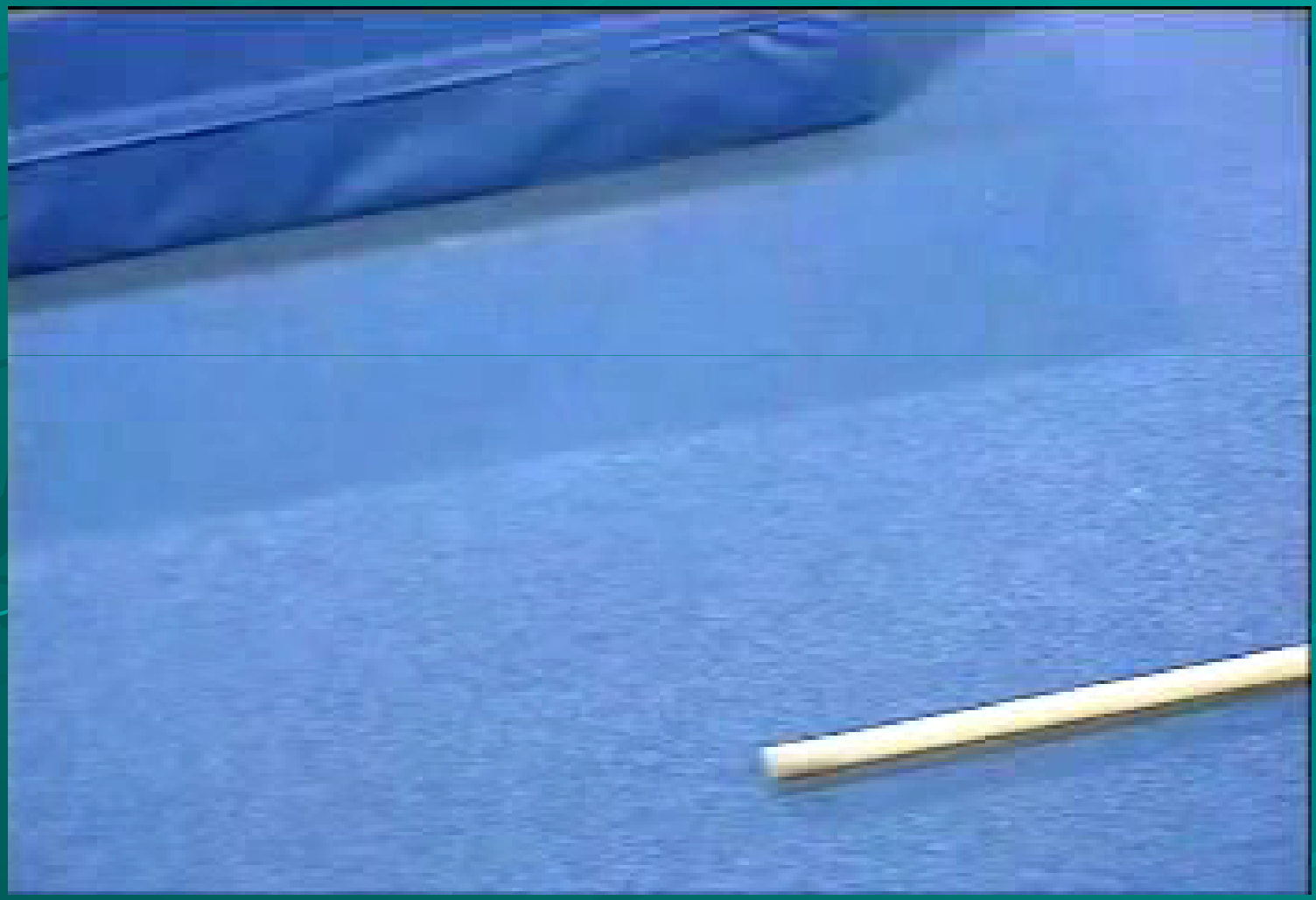
T3 Weave Technology

- Patent Pending Design
- ####/### T3## ## NT (CCF)
- Resin Impregnated Woven Carbon Fiber
- Carbon in the Sail Piece!!!!!!
- Carbon in the body !!!!

First Set of 5 – U of I

- Fall of 2003 – new material
- Built five 15’ poles using various combinations
- Poles A, B, C, D, E – U of I vaulters used and still using some
- How light certain ones where
- Pole C was a Std Carbon FX

Adam



Dynamic Testing and End Loads

- Shop testing comparison to real world vaulting
- How accurately can we forecast pole behavior based on testing in the plant
- We will continue to do both

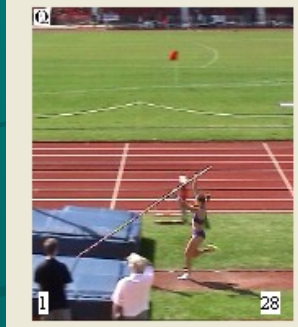
Test Series for UK

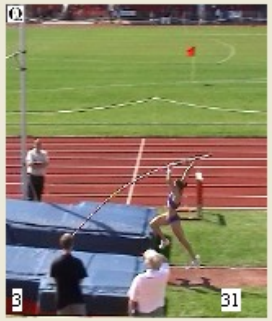
- Built a test series for Steve Rippon
- A series of 425 Carbon Mystic's
- A few 5m Carbon FX concepts
- Carry weights and raw weight

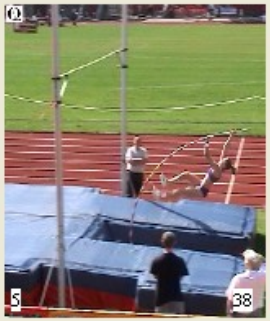
Test Pilots

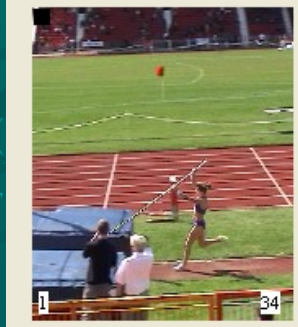
- Various levels of vaulters from all over the globe
  - Russians (Pavlov and Polnova)
  - Polish Vaulters (Pyrek)
  - Germans (various)
  - UK (Tim Thomas, Zoe Brown)
  - Jan Johnson's vaulters
  - U of I vaulters
  - Masters Vaulters (Ken Elllis, Joe Johnston and others)

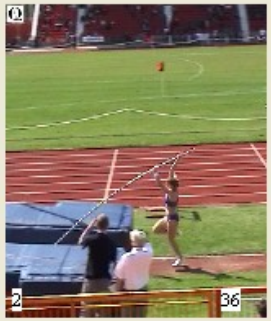
Female Test Pilot – Zoe

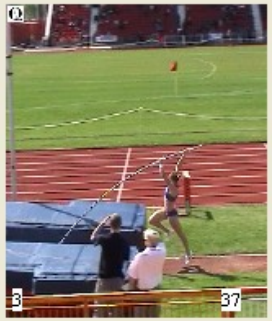


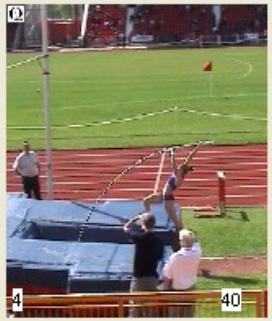


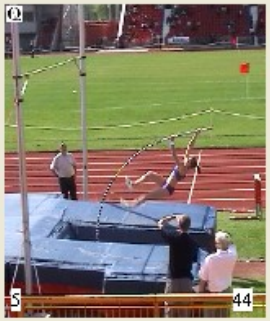






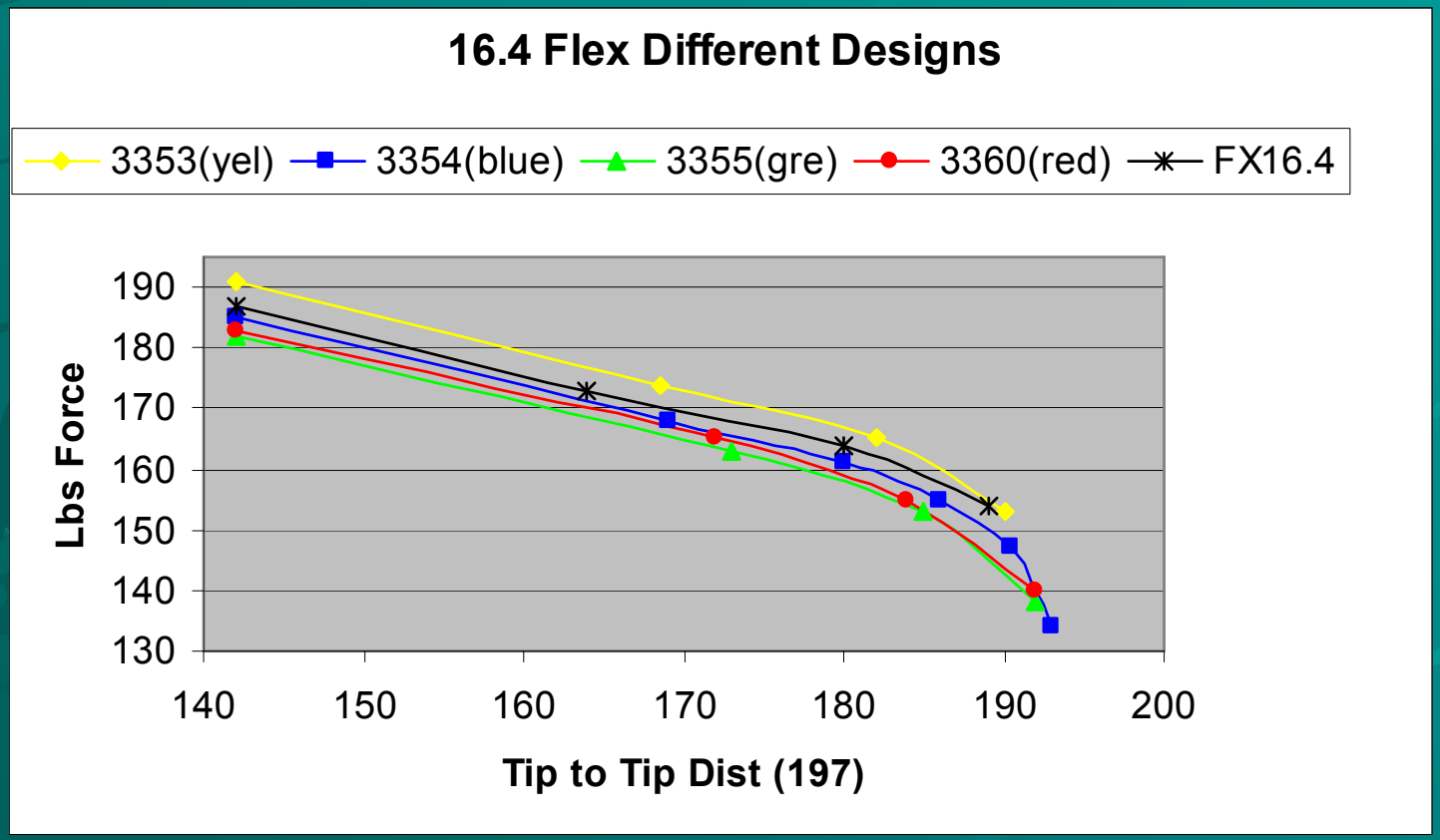






5m 16.4 Series

Engineering Results vs Vaulter Feedback



Acquiring Data

What did the vaulters say?

- From: Steve Rippon [steverippon@hotmail.com]
- Sent: Wednesday, June 16, 2004 8:24 AM
- To: Jeff Watry
- Cc: David Hodge
- Subject: mens test poles

- Jeff/David

- Today we got a chance to jump on the test poles.

- Tim Thomas jumped from 14 steps indoors, so conditions where very constant. He did about 20 jumps in total.

- He really liked the yellow/white (15.8) and blue/white poles (16.4). They did however appear to be about 0.3 softer than the same Fx pole.

- If you take Fx as the base line here is how the poles compare-

- +0.3 Red/White/Blue (first batch of test poles)
- 0.0 Carbon FX
- -0.3 Blue/White
- -0.5 Red/White
- -0.7 Green/White

- so Green/white was 0.7 softer than the carbon fx of the same flex.

- Tim really like the Blue/White-Yellow/white model.

Extreme Testing

5m series weights

850086	16.4	16'5	26.25	5.02	5.229084	Std Carbon FX on M5
850086	16.4	16'5	23.93	4.62	5.179654	white/blue - 200403354 Special
850086	16.4	16'5	23.06	4.42	5.217195	green/white - 200403355 Special
850086	16.4	16'5	23.26	4.45	5.226966	white/red - 200403360 - Special
850086	15.8	16'5	24.5	4.69	5.223881	white/yellow - 200403353 Special
850086	16.4	16'5		4.67	0	Silver - on the wall 200405228

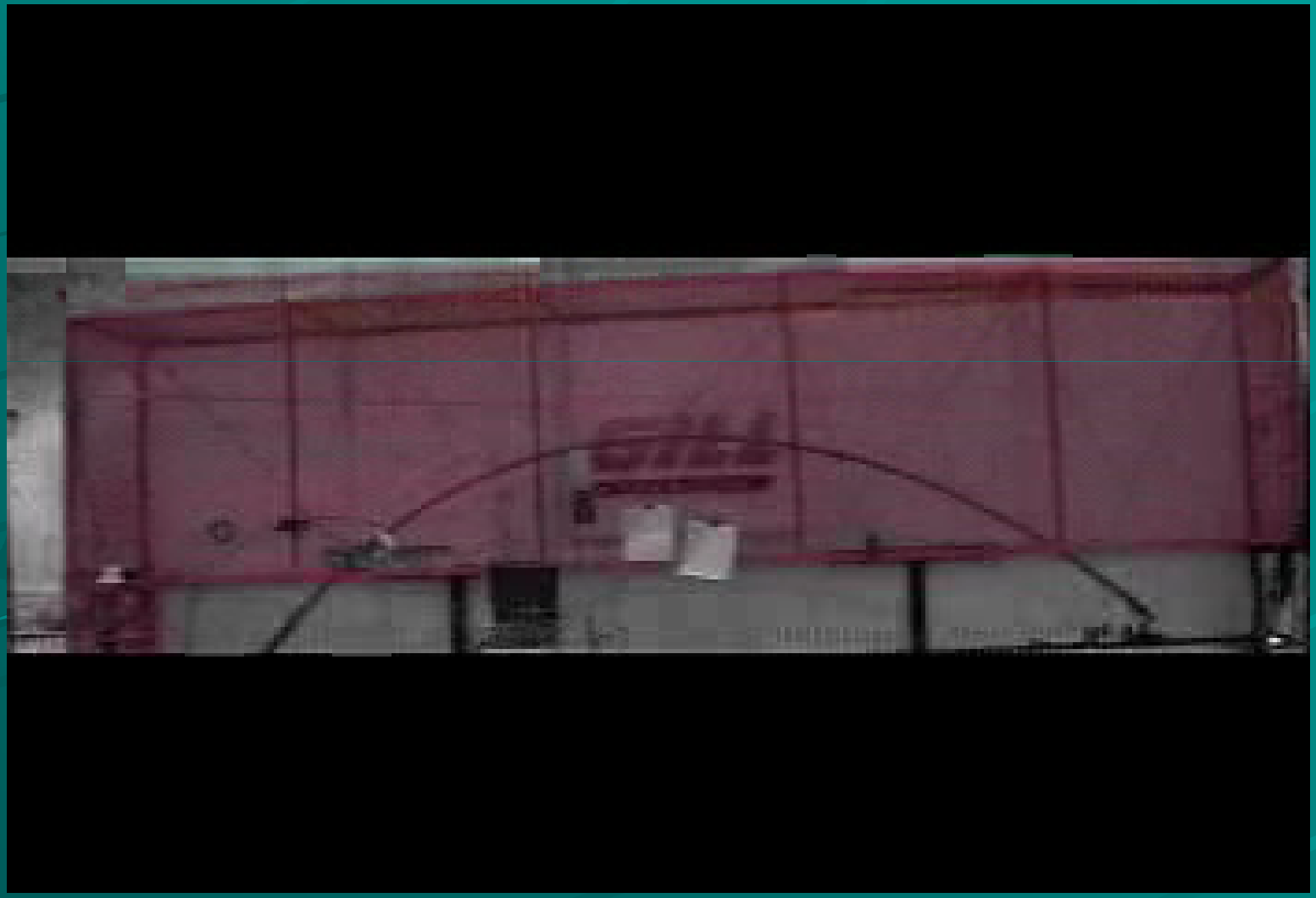
Carry Weight

- Gill Carbon poles are the lightest poles on the market
- Weave Technology Poles range from near 25% lighter to mid teens lighter than standard S – Glass poles
- The bigger the sail the bigger the difference
- Mandrel size does influence weight

Testing

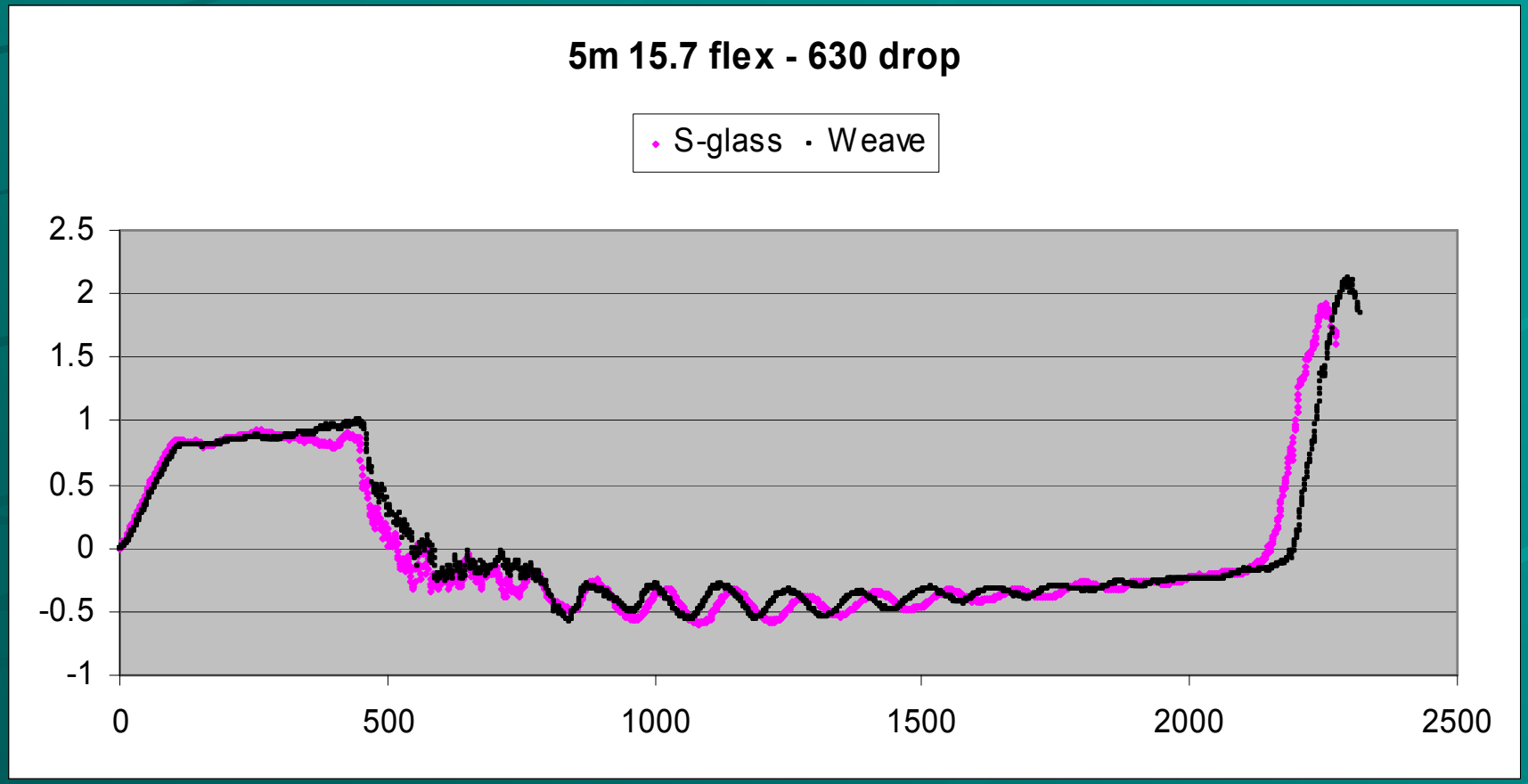
- Dynamic test and measurement
  - End Load
  - Acceleration
  - Velocity
- Static End load Measurement
- Relationship between testing and what the vaulter feels

5m Pole



Dynamic Testing 5m weave

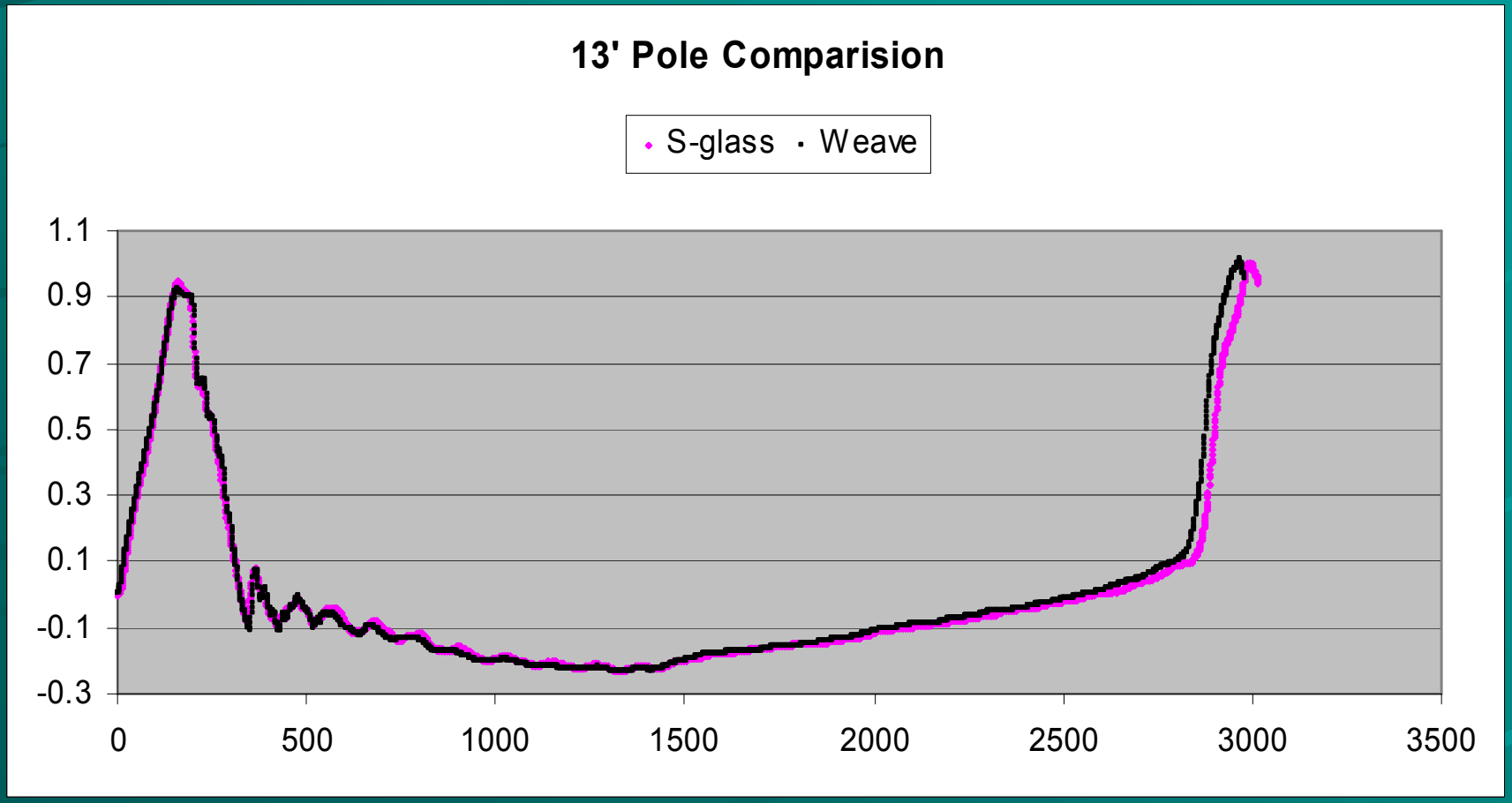
5m Poles


5m 15.7 flex - 630 drop
S-glass
Weave
2.5
2
1.5
1
0.5
0
-0.5
-1
0
500
1000
1500
2000
2500

Dynamic Testing 15' weave

13’ Weave

Dynamic Test - Comparision



FX versus the rest

- A proven consistent engineering and design approach
- New materials for lighter carry weight
- Looking forward constantly
- 3 of the 4 top ranked men in the world are using Carbon FX poles
- Two of them are here today

Vaulting High

- Speed – (lighter carry wgt will help)
- Energy Return – (minimize energy loss)
- Pole Speed (Time up or Sync up)
- Technique (sorry – you have to do that)