CONSISTENT HIT
DESIGN REVIEW

Jay Anderson, Jason Borth, Dillon Glover, Kylie Touchstone

University of Idaho
College of Engineering

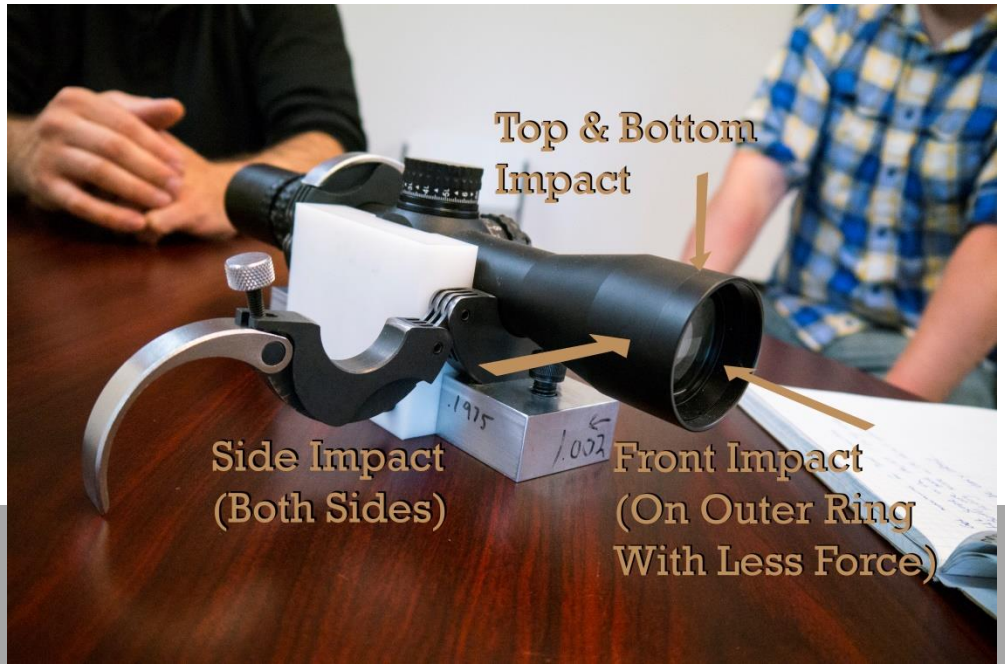
BACKGROUND:

- Currently every riflescope is impact tested as it goes through production line.
- This is done manually by impacting it against a padded pedestal.
- After each impact the riflescope is checked to insure nothing internally has shifted.

https://vimeo.com/92284997#t=278s

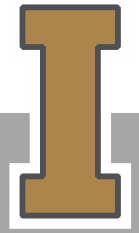
DESIGN GOAL

Design and build a proof of concept, impact testing device than can consistently deliver a calibrated impact at required orientations to a riflescope.

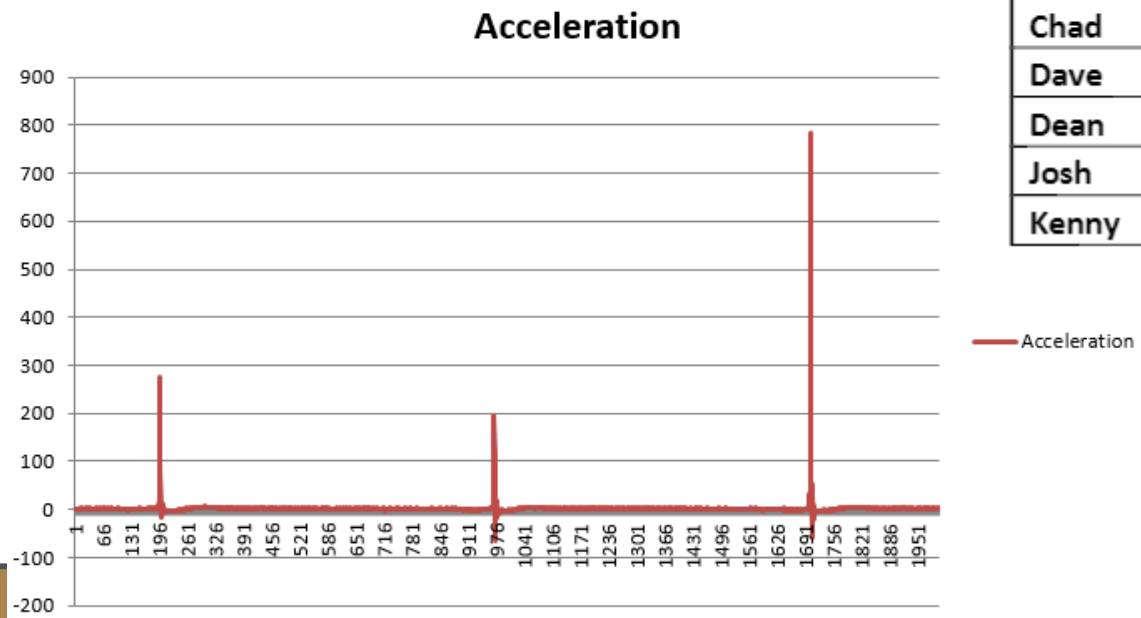


DESIGN SPECS

Specification	Threshold	Objective
Force applied to scope	500g-1600g	200-2000g
Impact Region	All four sides and forward impact	360 capability
Impact Mode	Single	Single and Cyclic (3)
Machine Use	Research and development. Proof Concept	Production floor ready
Size of Machine	2’x2’x3’	1’x1’x2’
Different Sizes of Scopes	Attachment methods for 30mm and 34mm diameters tubes.	Single, adjustable attachment method.



PROJECT LEARNING

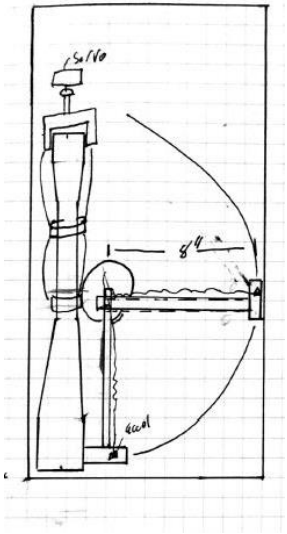


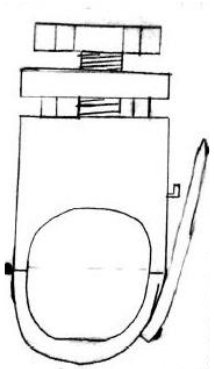
	Overall			
Name	Max	Average	std.	Avg. std.
Cameron	1905	1589	158	135
Carolynn	1640	1517	97	86
Chad	1275	1136	90	69
Dave	945	878	81	74
Dean	1595	1460	68	70
Josh	1990	1695	182	171
Kenny	1160	1002	118	57

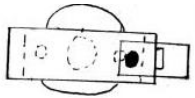
Working on:
Math model
Data from testing

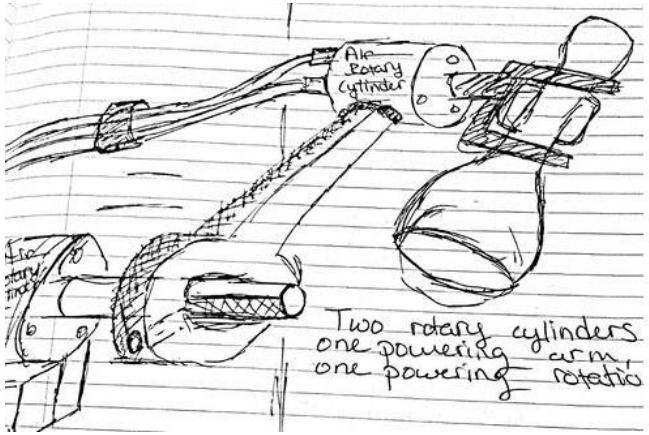
PROJECT LEARNING

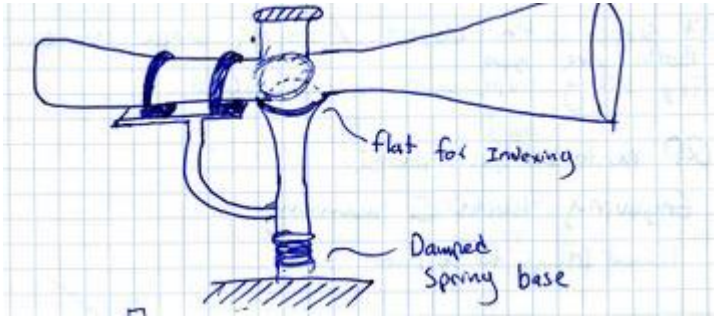
CONCEPT DRAWINGS





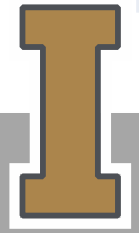






DESIGN CONCEPTS

	Linear Actuator	Motor	Mechanical Spring	Pneumatic Rotary
Price (3)	4	3	5	3
Speed (5)	2	4	4	4
Size (3)	3	5	5	5
Durability (4)	3	2	3	4
Availibity (2)	5	5	3	5
Ease (2)	3	4	2	3
Calibration (5)	4	5	2	4
Total	79	95	82	96



PROTOTYPE

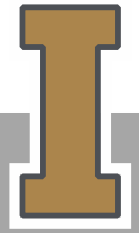
PROS AND CONS

Electric Motor

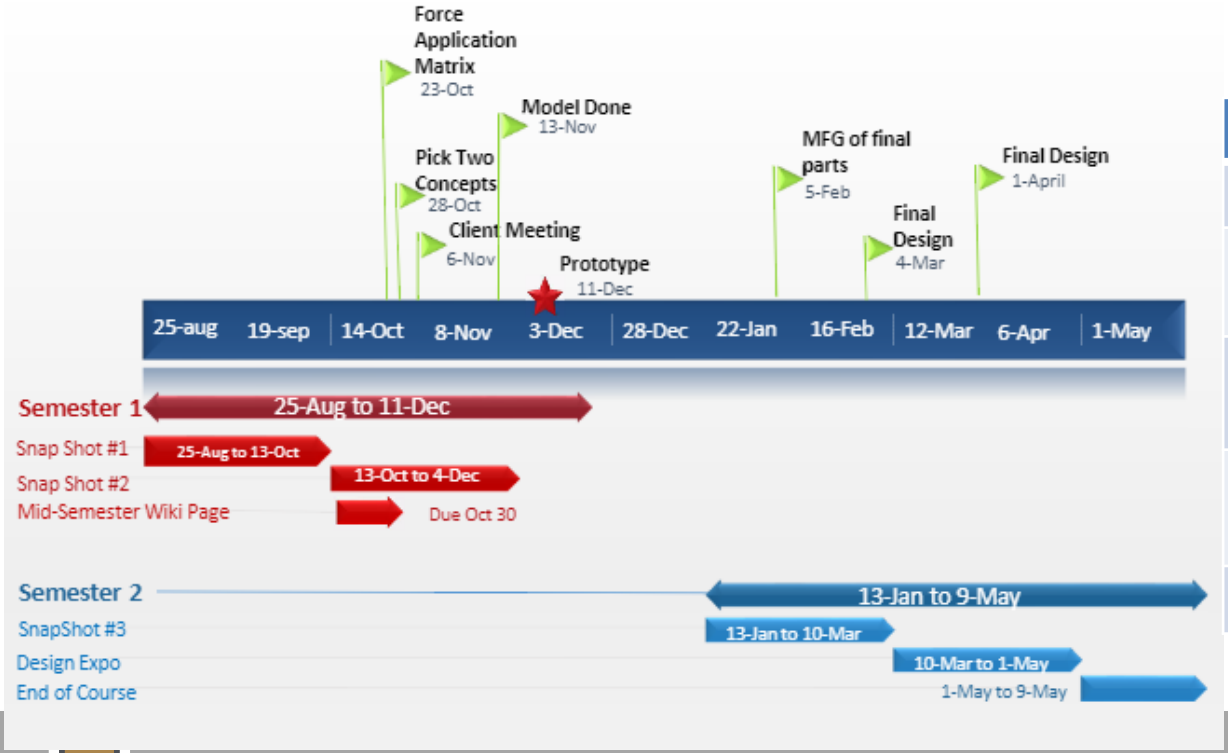
Pros	Cons
Ease of Programming	Potential Damage to Motor
Ease of Relocation	Weight
Concept Compatibility	Electrical Danger
Less Noise	Only Slotted Shaft
Better Overload Protection	

Pneumatic Actuator

Pros	Cons
Less Potential Damage to Actuator	Loud
Concept compatibility	Slightly More Expensive
Ease of Calibration	More Difficult to Program
Threaded Shaft Ends Available	Needs Both Electricity & Air



PROJECT SCHEDULE



Dates	Milestones
Nov 13th	Math Model Done
Dec 11th	Prototype finished with mechanisms
Feb 5th	Final parts pick out and ordered
Mar 4th	Final Design completely designed and modeled
April 1st	Final design completed

BUDGET

Electric Motor

- Mechanical Parts - $1100
  - Motor, Drive, Controller - $800
  - Pendulum - $100
  - Scope Mounts - $ 200
- Frame - $300

Pneumatic Actuator

- Mechanical Parts - $1300
  - Actuator, Piping, Control Block - $1000
  - Pendulum - $100
  - Scope Mounts - $ 200
- Frame - $300

QUESTIONS?