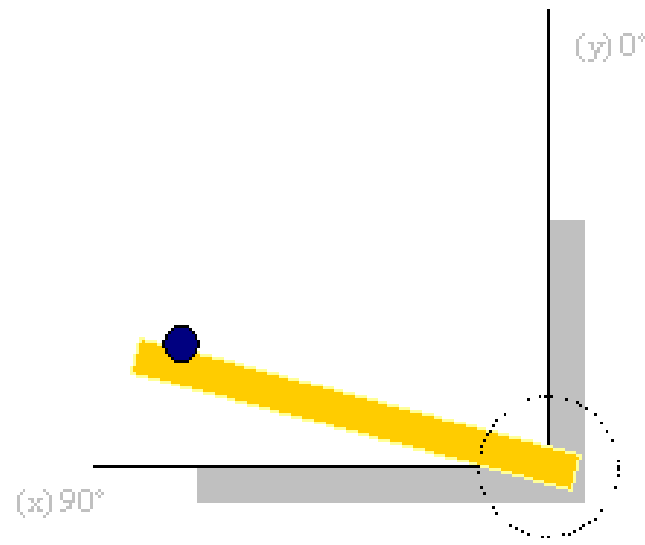


Electronic Catapult

TRAINING GUIDE V1.00.1



Release 3/2009

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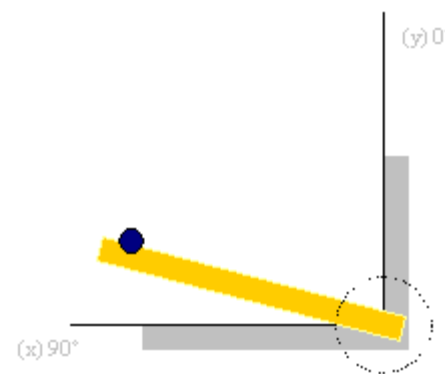


Electronic Catapult

Introduction

The electronic catapult is an interactive desktop work bench to demonstrate process variation. The electronic catapult gives the student hands on experience of a “process” however avoids the time consuming task of setup, tear down clean up and maintenance. The student can spend time on identifying the sources of variation, the relationship between inputs and output.

Contained on the CD is the Electronic Catapult setup. The setup file will need to be ran on the training pc. The system requirements are Windows 95,98,2000,XP,Vista with Internet Explorer.



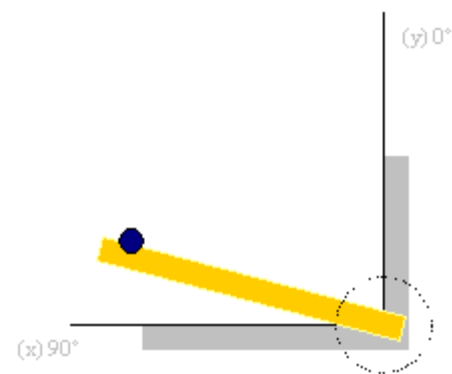
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Electronic Catapult

Training Overview

1. **Electronic Catapult**
2. **Experiment Setups**
3. **Datasheets**



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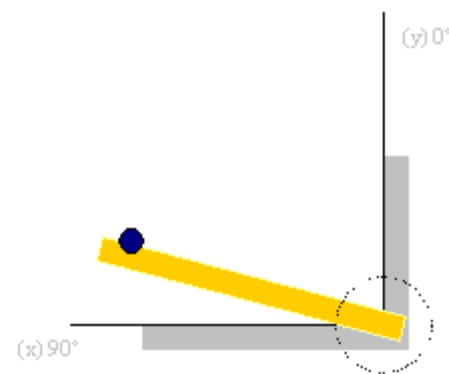
Electronic Catapult

1. Electronic Catapult

A. Load CD and install setup for Electronic Catapult.

B. Experiment 1.

- 100 data points.
- Recording distance, launch angle, pull angle.
- Can modify pull angle to hit target.



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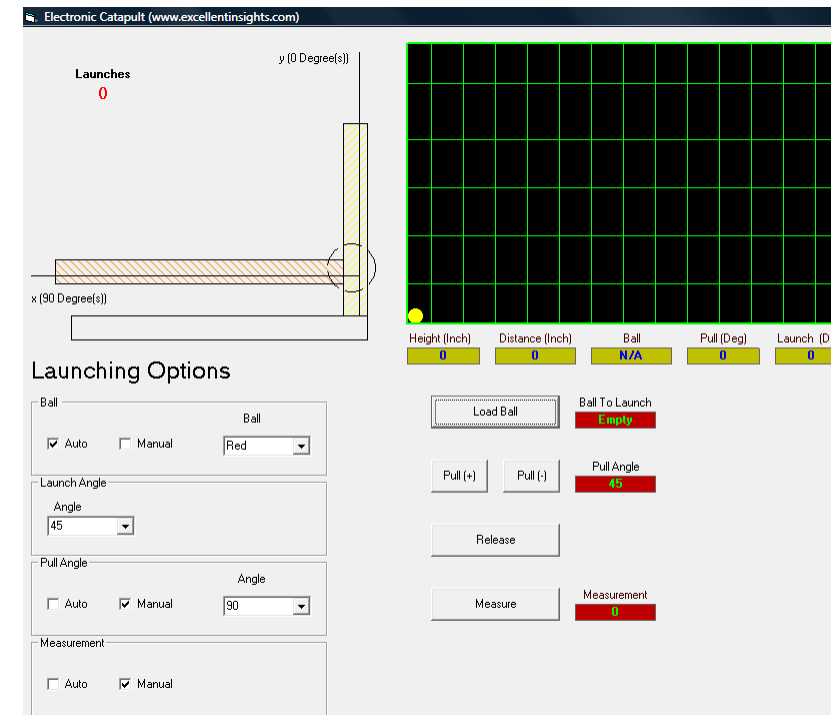
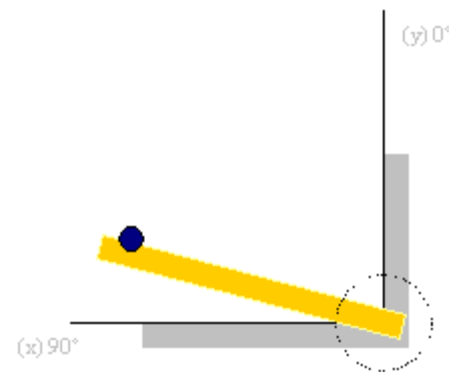


Electronic Catapult

Electronic Catapult

A. Operation Steps

1. Load Ball
 - Ball will automatically change.
2. Pull(+) or Pull(-) until desired angle is reached.
 - Click will increase or decrease pull angle.
3. Release (Launch)
 - Launch settings will be listed below the flight screen.
4. Measure
 - (Click measure button. Once clicked measurement is recorded.)



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Electronic Catapult

Experiment Setup 1

1. Setting Option 1

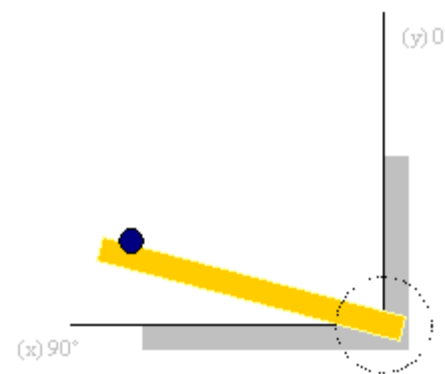
Ball (Auto)

Launch Angle 45°

Pull Angle (Manual)

Measurement (Manual)

Specifications $96'' \pm 1''$



The screenshot shows the 'Electronic Catapult' software interface. At the top left, it says 'Electronic Catapult (www.excellentinsights.com)'. Below this, there is a 'Launches' counter showing '0'. A diagram of the catapult arm is shown with a yellow ball at the end. To the right of the diagram is a green grid. Below the grid, there are five data fields: 'Height (Inch)' with value '0', 'Distance (Inch)' with value '0', 'Ball' with value 'N/A', 'Pull (Deg)' with value '0', and 'Launch (Deg)' with value '0'. The 'Launching Options' section includes: 'Ball' with 'Auto' checked and 'Manual' unchecked, and a dropdown menu set to 'Red'; 'Launch Angle' with a dropdown menu set to '45'; 'Pull Angle' with 'Auto' unchecked and 'Manual' checked, and a dropdown menu set to '90'; and 'Measurement' with 'Auto' unchecked and 'Manual' checked. On the right side of the interface, there are several buttons: 'Load Ball', 'Ball To Launch' (displaying 'Empty'), 'Pull (+)', 'Pull (-)', 'Release', and 'Measure' (displaying '0').

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Electronic Catapult

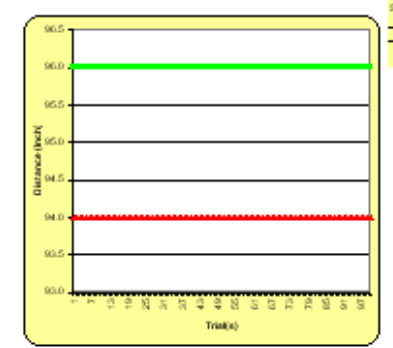
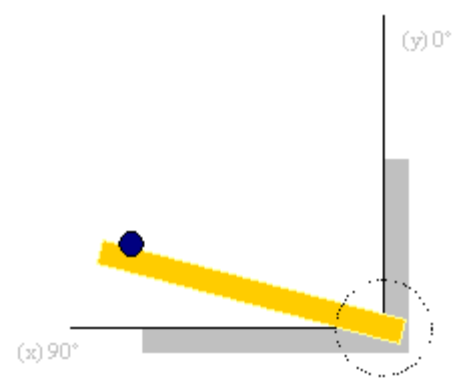
Data Sheets

A. Operation Steps

1. Enter Information in blue cells.
2. Enter Team name and date
3. Enter max and min distance requirements.
4. Enter data, distance, launch angle, pull angle, and ball.
5. Enter scrap cost, setup cost, and launch cost.

Team				Date				Score			
Run	Ball	Pull Angle	Launch Angle	Distance (inch)	Run	Ball	Pull Angle	Launch Angle	Distance (inch)		
1					51						
2					52						
3					53						
4					54						
5					55						
6					56						
7					57						
8					58						
9					59						
10					60						
11					61						
12					62						
13					63						
14					64						
15					65						
16					66						
17					67						
18					68						
19					69						
20					70						
21					71						
22					72						
23					73						
24					74						
25					75						
26					76						
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31					81						
32					82						
33					83						
34					84						
35					85						
36					86						
37					87						
38					88						
39					89						
40					90						
41					91						
42					92						
43					93						
44					94						
45					95						
46					96						
47					97						
48					98						
49					99						
50					100						

Average (in)	#37.68	Launch Cost	\$ 100.00
Min (in)	0.0	Setup Cost	\$ 25.00
Max (in)	0.0	Scrap Cost	\$ 1,000.00
Standard Deviation (in)	#37.68	Distance Max (in)	96
Launch Cost	\$ -	Distance Min (in)	94
Scrap Cost	\$ -		
Setup	\$ 1,000.00		
COAG	\$ -		



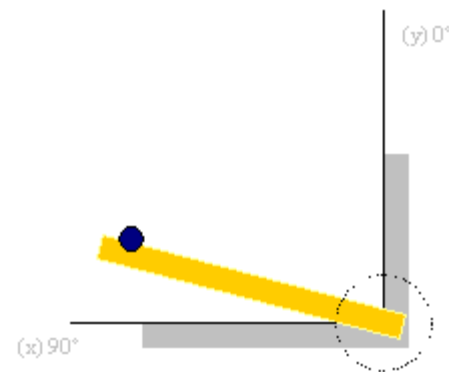
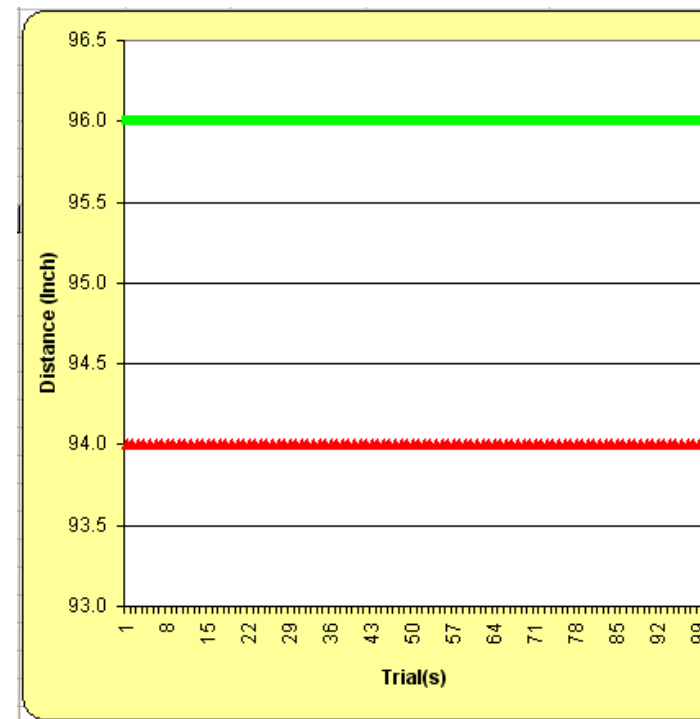
Electronic Catapult

Data Sheets

B. Reporting

1. Process statistics summary.
2. Process run time data.
3. COPQ (Cost of Poor Quality).

Average	(in)	#DIV/0!
Min	(in)	0.0
Max	(in)	0.0
Standard Deviation	(in)	#DIV/0!
Launch Cost	\$	-
Scrap Cost	\$	-
Setup	\$	1,000.00
COPQ	\$	-



Electronic Catapult

Experiment Setup 2

1. Setting Option 1

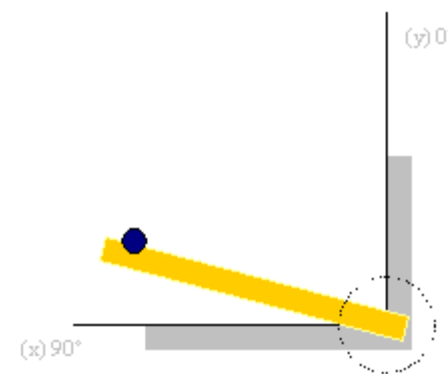
Ball (Team Decide)

Launch Angle (Team Decide)

Pull Angle (Team Decide)

Measurement (Auto)

Specifications 75" \pm 1"



Height (Inch)	Distance (Inch)	Ball	Pull (Deg)	Launch (Deg)
0	0	N/A	0	0

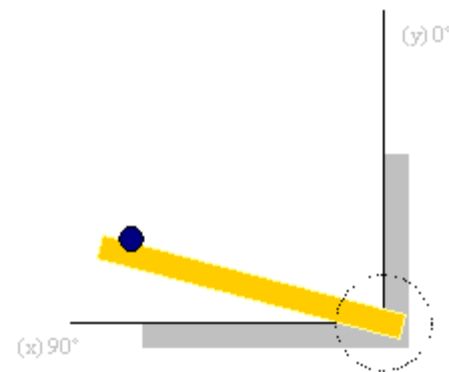
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Electronic Catapult

Ground Rules

1. **Keep track of teams launches.**
2. **Keep from practice launches.**
3. **Teams have 100 shots to perfect the process.**
4. **Avoid process changes with the exception of launch angle from experiment 1.**
5. **At end of experiment 1 make sure each teams can state the major sources of variation (Ball, Angle, Measurement).**



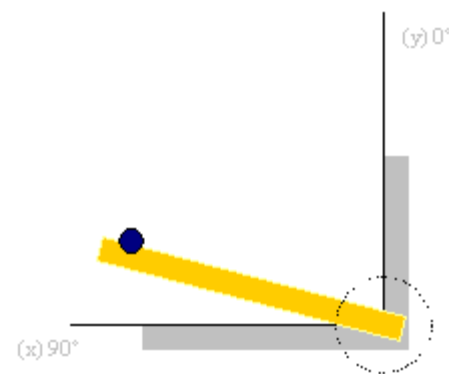
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Electronic Catapult

Summary

1. Compare results from Experiment 1 and 2. Teams can see process improvement changes.
2. Discuss the sources of variation (Measurement, Launch Angle and Balls)
3. Discuss the statistics to characterize the process.



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