Project: Softball Contest

Name: Sterling Jones
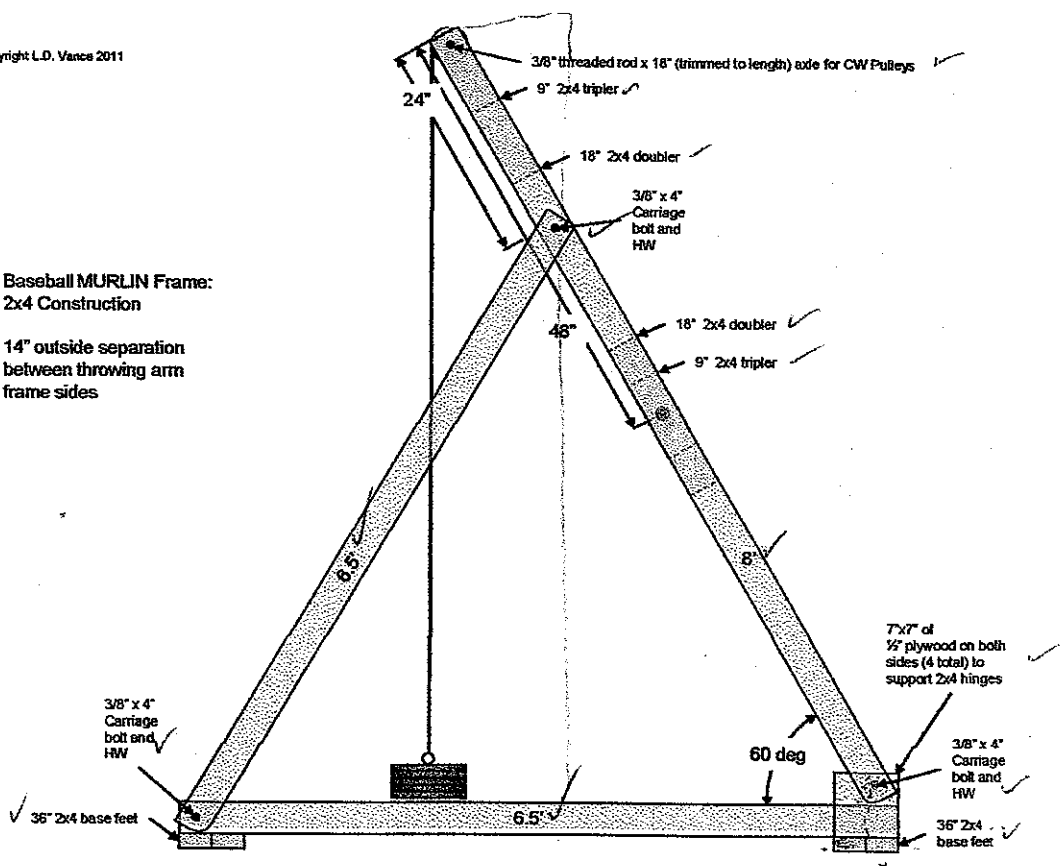
Group: Tyler Whiting, Esteban Cano, and Tanner Sharek

MURLIN

3/8" threaded rod x 18" (trimmed to length) axle for CW Pulleys

9" 2x4 tripler

18" 2x4 doubler

24"

3/8" x 4"
Carriage
bolt and
HW
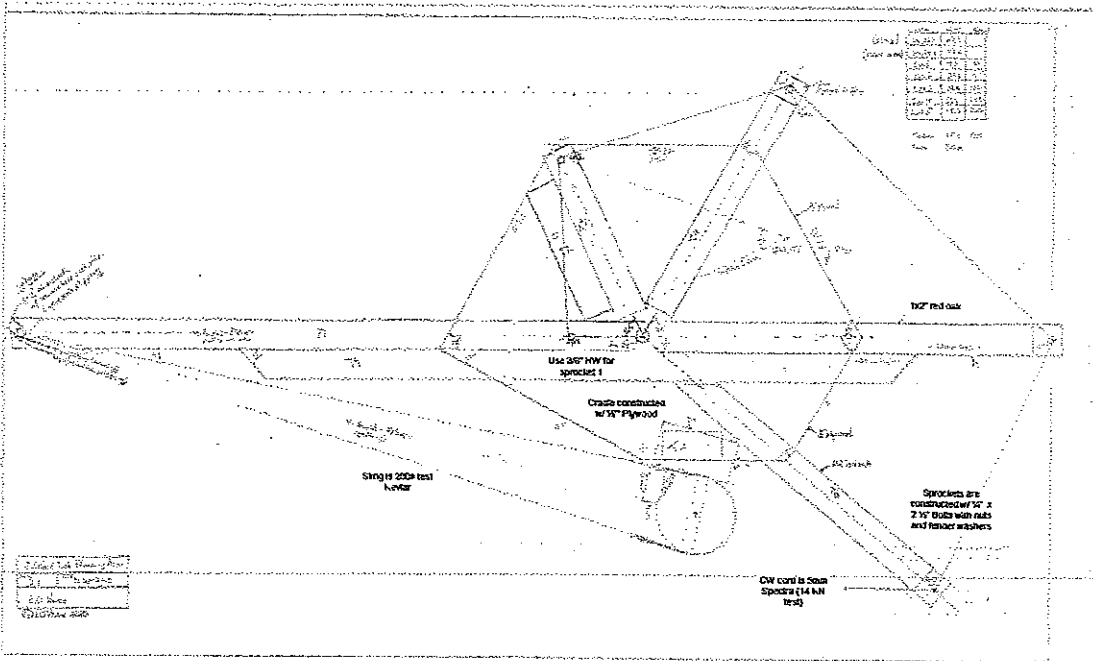
**Baseball MURLIN Frame:
2x4 Construction**

**14" outside separation
between throwing arm
frame sides**

48"

18" 2x4 doubler

9" 2x4 tripler

6.5'

8'

3/8" x 4"
Carriage
bolt and
HW

7"x7" of
½" plywood on both
sides (4 total) to
support 2x4 hinges

60 deg

3/8" x 4"
Carriage
bolt and
HW

36" 2x4 base feet

6.5'

36" 2x4
base feet

Known Values
Ttot= 8.35s
Dx= 89.5m

Unknown Values
tup= ?   Vix= ?   Viy= ?   Vi= ?   Vfx= ?   dy= ?   Launch Angle=θ = ?

Time

$$tup=\frac{Ttot}{2}=tup=\frac{8.35s}{2}=tup=4.18s$$

X Values

$$dx=(vix)(t)$$

$$\frac{89.5m=(vix)(8.85s)}{8.85s \qquad 8.85s}$$

$$10.72m/s = vix$$

$$vfx = vix$$
$$10.72m/s= 10.72m/s$$

Y Values

$$tup=\frac{viy}{g}$$

$$4.18s=\frac{viy}{9.8m/s^2}$$
$$\cdot9.8m/s^2 \quad \cdot9.8m/s^2$$

$$viy= 40.97m/s$$

Displacement at peak

$$dy=vi\cdot t+.5\cdot ay\cdot t^2$$
$$dy=42.33mps\cdot4.18s+.5\cdot-9.8mps^2\cdot4.18s^2$$
$$dy=171.25+-85.61$$
$$dy=85.63m$$

Launch Angle θ

$$\theta=\tan^{-1}\left(\frac{viy}{vix}\right)$$

$$\theta=tan^{-1}\left(\frac{40.97mps}{10.72mps}\right)$$

$$\theta=75.33^o$$

Initial Velocity

$$Vix=Vi(cos(\theta))= \quad \frac{10.72m}{(cos(75.33^o))} \frac{=Vi(cos(75.33^o))}{(cos(75.33^o))} = Vi=42.33mps$$

Data Table

Horizontal Motion	Formula	Vertical Motion	Formula	Projectile Motion	Formula
dx= 89.5m	given	dy= 85.63m	$y = vi \cdot t + .5 \cdot ay \cdot t^2$	Ttot= 8.35s	given
tx= 8.35s	given	tup	Tup=Ttot/2	Vi= 42.33m/s	Vix=Vi*cos (θ)
Vix= 10.72m/s	Vix=dx/t	Viy= 40.97m/s	$tup = \dfrac{viy}{g}$	Launch Angle θ	$\theta = tan^{-1}\left(\frac{viy}{vix}\right)$

Group Scoring

Student Name	Sterling Jones	Esteban Cano	Tyler Whiting	Tanner Sharek
Assessment Criteria	25 Points Possible	25 Points Possible	25 Points Possible	25 Points Possible
Group member follows direction	5	5	5	4
Group member cooperates with group member	5	5	5	5
Group member always follows lab safety rules and lab directions	5	5	5	4
Group member stays on task	5	4	5	4
Group member does their job	5	5	5	4
Total Assesment	25	24	25	21

Analysis Questions

1. How did undertaking this project improve your understanding of projectile motion?

This project helped me improve my understanding in many ways. The major way that it helped me improve my understanding by putting paper to practice. This helped because just writing down formulas and solving fake problems is different then using your own real life situations. So when we did this project it helped me apply all of the concepts that I have learned.

2. How did you feel about this project when it was fist assigned?

When this project was first assigned I had two major feelings. One was a little of overwhelming on how I was actually going to be able to make my own device to throw a softball. Two, I was excited because i knew if we did the project right it would turn out really cool.

3. How do you feel about this project now that it has concluded?

I feel that this project went really well overall. I believe that our device worked well and efficient once we got it calibrated in.

4. What would you have done differently as you and your team worked through this project?

Some things that i would do differently in this project is first, I would have had our team meet more often so we could solve all the bugs right away rather than last minute. Second, I would put more testing time into the project so we could get it calibrated better. And three, I would make sure that all the dimensions in the plans were in one notation not two (standard and metric).