

Calculations:

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Velocity of Horse

Feet are 2times faster than body

$$24\text{m}/5.1\text{s}=4.7\text{m/s}$$

$$4.7\text{m/s} * 2=9.4\text{m/s}$$

9.4m/s to 0m/s back to 9.4m/s

Which means change in velocity 18.8m/s

Force in motion varies depending on how many feet(1-3) are on the ground at one time.

Force of horse exerts on ground

Standing- $F=ma$

$$F=475\text{kg} (9.8\text{m/s}^2)$$

$$F=4655\text{N}$$

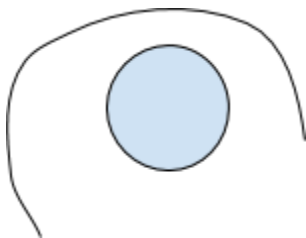
Deceleration into curve

Width of barrel: 23.3 inches

Change in time/ change in velocity

Velocity- change in distance over change in time

Path ↓



Time: 1.9 seconds

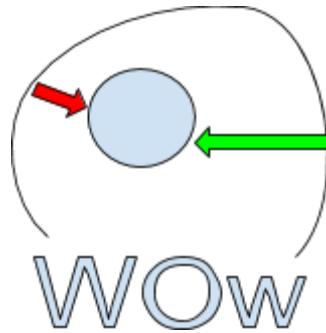
Distance from barrel: 2-1.5----- red arrow in next picture

Velocity: (.868m/s)

Deceleration: .457 m/s²

Acceleration out of curve

$\Delta v / \Delta t$ / change in velocity



Time: 1.25 seconds

Distance from barrel: 4ft green arrow

Velocity: 1.32m/s

Acceleration:

$$a = \Delta v / \Delta t$$

$$a = 1.056 \text{ m/s}^2$$

Momentum start to finish difference

→ Start: $p = mv$

→ momentum = mass of horse x velocity (velocity is $\Delta d / \Delta t$)

→ momentum = 475kg x (1.65m/1.9s)

→ momentum = 475kg x .868m/s

→ momentum = 412 Ns

→ Finish: $p = mv$

→ momentum = mass of horse x velocity

→ momentum = 475kg x (1.65m/1.25s)

→ momentum = 475kg x 1.32

→ momentum = 627 N

The Difference:

- Momentum #1 -Momentum #2=difference in momentum from start to finish
- 412 N - 627 N= -215N
- There is a 215 Newton difference in the momentum from the start of the curve to the end of the curve.
- This means that there was less momentum going into the turn and more momentum coming out of it.

The Velocity:

- $V = \Delta d / \Delta t$
- $V = 3.3\text{m} / 3.15\text{s}$
- $V = 1.048\text{m/s}$

Barrel distances:

-240meters

-205meters

<https://youtu.be/v2GbRiBlvHs>