

Physics Happenings with Amusements, Newton's Laws, Triangulation, and Other Magic Park (PHANTOM Park)

SAMPLE DATA

Students of Shadowville General High School have collected the following data for the rides at PHANTOM Park. Some of this information was measured, while other data were gathered from the ride operators.

The middle car of the roller coaster went up the forward hill and then reversed its direction. We found the height of this point of reversal using a 15 m baseline and:

$$\theta_1 = 28^\circ \qquad \theta_2 = 22^\circ$$

Free-Fall

The time of free-fall was just over 2 s, the time in the curve was about 0.4 s, and braking lasted about 1.5 s. Surveying, using a 15 m baseline, we found the angles of elevation to be:

$$\theta_1 = 22^\circ \qquad \theta_2 = 19^\circ$$

The elevation of the curve, using the same baseline, was:

$$\theta_1 = 26^\circ \qquad \theta_2 = 18^\circ$$

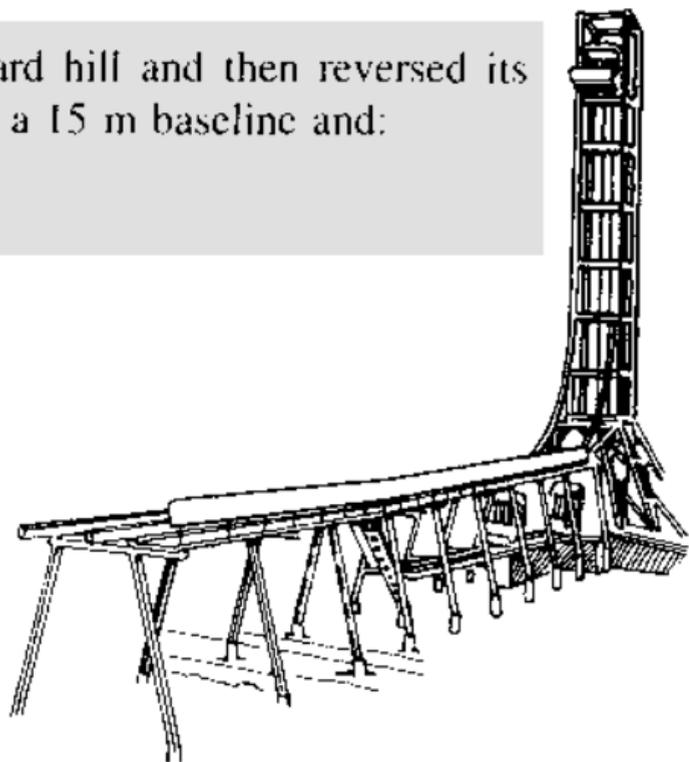
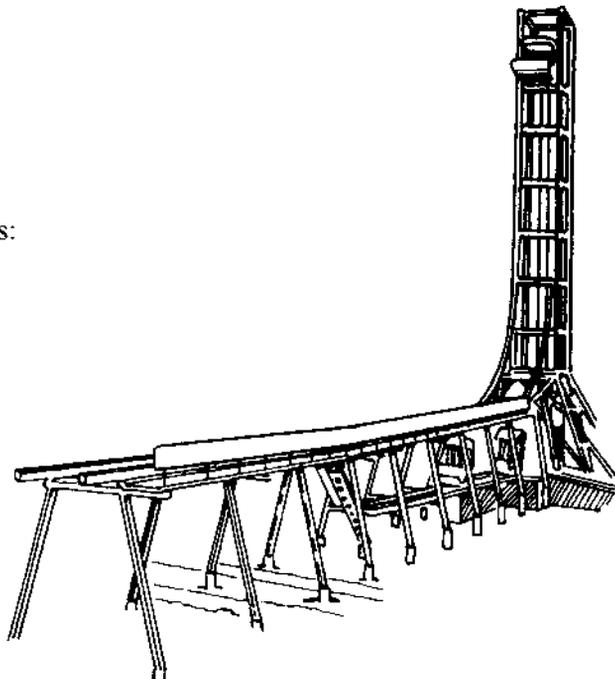


Figure 37
Free-Fall

FREE-FALL**Group A**

1. In terms of force, describe your feelings:
 - a. when ascending.
 - b. when suspended at the top.
 - c. during the straight fall.
 - d. at the turn.
 - e. while stopping.
2. Measure the time of:
 - a. free-fall.
 - b. going through the curve.
 - c. braking.
3. Note the readings on the spring accelerometer when:
 - a. you are in free-fall.
 - b. you are going through the curve.
 - c. you are braking.

*Free-Fall***Group B**

4. Measure the following lengths:
 - a. distance of free-fall.
 - b. height of curve.
 - c. braking track.
5. Calculate the time for the free-fall part and compare it with the measured time. Account for any significant discrepancies.
6. Determine the average force acting on you during braking.
7. Determine the work done in lifting you to the top.
8. Find the power used in lifting you to the top.
9. Does the rider gain speed after the free-fall portion of the ride? Please explain your answer.

Group C

10. Determine the radius of the curved section of track.
11. Find the centripetal acceleration of the car going through the curve.