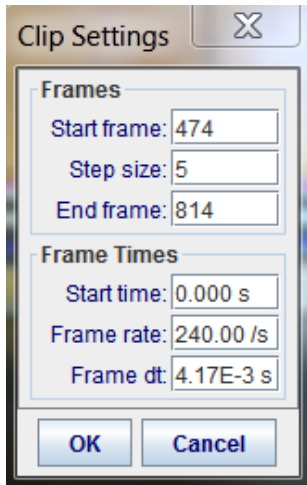This assignment serves to introduce you to the Tracker Motion Analysis software and to review concepts of linear relationships. You will analyze a plastic car's position and time.

Procedure

1. Important! From the memory stick copy the file: *cart_collision_mass_difference.*mov to your U drive.
2. Open the Tracker program from the USB drive.
3. Load the file you just copied and set up all of the clip settings as below-left.

Clip Settings ☒

Frames
Start frame: 474
Step size: 5
End frame: 814

Frame Times
Start time: 0.000 s
Frame rate: 240.00 /s
Frame dt: 4.17E-3 s

OK   Cancel

4. Create a calibration stick and stretch it from one black hole to the other and make its length 0.20 (that will give the position measurements the unit of meters).

5. Insert a coordinate system and place the origin near the left edge of the video.

6. Track the red car as it travels from the left side, bounces and returns to the left.

7. Open a WORD document to save your results.

Analysis

1. Right click on the graph and choose analyze (near the bottom of the list). Looking at the graph, how can you tell that the car travelled fastest when moving to the left?
2. Click on analyze and check off curve fits.
    a. Select the first half of the data and record the linear relation (x=At+B).
    b. Select the second half of the data and record the linear relation.
    c. What to the parameters A and B represent?
    d. Copy the graphs into WORD.
3. Why do the points not fall in a perfect straight line?
4. Look at the shape of the graph near the peak. Is it a sharp corner or a smooth curve of points? What do you think that represents.
5. What are at least two factors (called experimental errors) that prevent your results from accurately representing the motion of the car?