

Linear Instrument Characteristic 115

1. You are manufacturing a new type of string for a bow. When you pull the string back to fire the arrow, you expect the string to return rapidly to its original position. The rate, or lag time, required for the string to return to its original position is known as hysteresis. Describe the term hysteresis and how it affects the accuracy of a measurement.
2. You manufacture a part that weighs two pounds. For two parts, the total weight should equal four pounds. For three parts, the weight should equal six pounds. If this was graphed, you should see a straight line, or system linearity. Describe the term linearity as it applies to measurement.
3. You are required to drill a hole every 6 inches. As you are drilling the holes, you realize that the holes are drilled somewhere between $5 \frac{13}{16}$ inches and $6 \frac{1}{8}$ inches. Thus, you have introduced a small amount of error when drilling the holes. Differentiate between systematic and random errors.
4. You are scheduled to go to lunch at 12:10 pm. The clock in your area only displays the time to the nearest half hour. Your watch, however, measures to the exact second. Your watch has greater resolution than the clock in your area. Discuss what is meant by instrument resolution.



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