
Activity 3.3 ALTERNATE Making Linear Measurements

Introduction

How thick is one of the hairs on your head? Could it be measured accurately with a standard inch scale? If the smallest increment on an inch scale is 1/6 inch, then 20 average size human hairs could fit within the space of a 1/16 inch gap. The required degree of accuracy needed is dependent on the application. If you were to build a home, a standard inch scale is perfect for laying out walls and locating window openings.

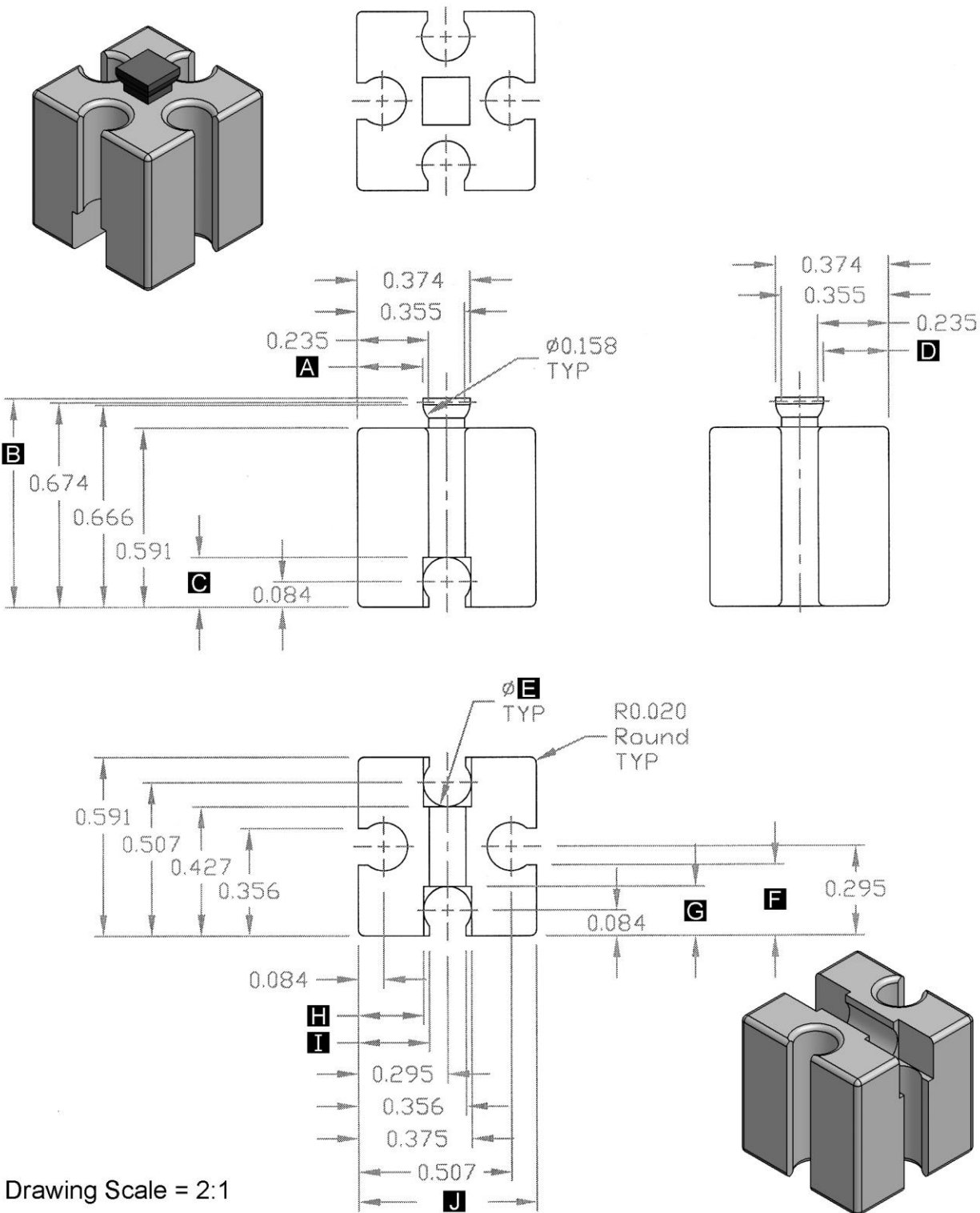
A dial caliper is a precision measurement tool that is often used in the design and manufacturing of consumer products, and is, perhaps, the most common of all the precision measurement tools. Engineers, technicians, scientists and machinists all use dial calipers every day to assist the processes of analysis, inspection, engineering design, reverse engineering and manufacturing.

Equipment

- Engineering notebook
- Pencil
- Fischertechnik building block – part #32881

Procedure

In this activity, you will use your knowledge of technical drawings and dimensioning to interpret which part features must be measured and recorded. You will then use a dial caliper to perform multiple types of measurements of the actual mass-produced part to the nearest thousandth of an inch (.001”).



Drawing Scale = 2:1

Study the technical drawing of the fischertechnik® building block. Ten of the measurements/dimensions (A through J) have been omitted from the drawing. You will use the dial caliper to measure the actual block and find the missing dimensions to the nearest .001 inch.

1. Use the dial caliper to measure the fischertechnik® building block and find the missing dimensions. Record the information on the lines below. Each recorded

value must come directly from a dial caliper measurement. No distances should be derived from multiple measurements and mathematical calculations. [Measure to the nearest 0.001 inch]

- | | |
|----------|----------|
| A. _____ | F. _____ |
| B. _____ | G. _____ |
| C. _____ | H. _____ |
| D. _____ | I. _____ |
| E. _____ | J. _____ |

2. Measure each of the distances A - E using a ruler with US Customary units. Record your measurements (with appropriate precision) in brackets on the same line above.
3. Identify which of the four types of measurements (outside diameter/part width, inside diameter/space width, hole/feature depth, and step distance) were used to find each dimension.

- | |
|----------|
| A. _____ |
| B. _____ |
| C. _____ |
| D. _____ |
| E. _____ |
| F. _____ |
| G. _____ |
| H. _____ |
| I. _____ |
| J. _____ |

Conclusion

1. Why might there be discrepancies between the measured values of different blocks?

2. What are some of the reasons for discrepancies between your classmates' measurements of identical features on the fischertechnik[®] block?

3. Which measurements do you believe to be better, those taken with the caliper or those taken with the ruler? Explain your answer in terms of accuracy and precision.