

Cam and Follower

Exercise 4.1 Calculating Cam Displacement

Objective

At the conclusion of this exercise, you will be able to do the following:

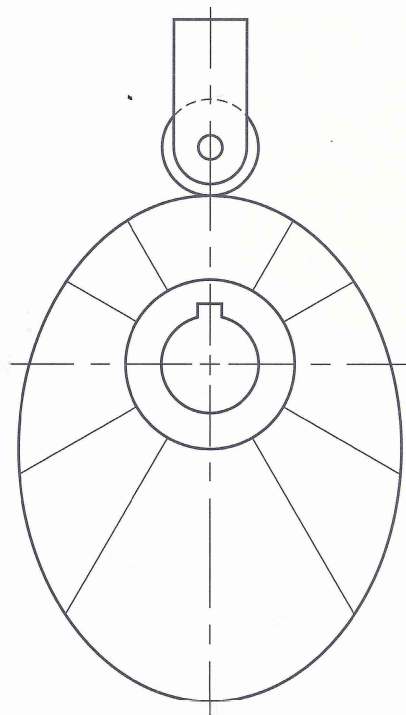
1. Identify the base circle of a cam.
2. Determine the shortest and longest radial distance of a cam.
3. Create a cam displacement diagram to identify the rise, drop, and dwell cycles of a specific cam.

Procedure

Read the section on the cam and follower in Chapter 4 in your textbook.

Materials

- Compass (drafting)
- Standard inch rule with an accuracy of 1/16 inch (see Figure 14-4 on page 449 of your textbook)



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FIGURE 4-1 A cam and follower schematic.

Complete the following exercises for the cam and follower system in Figure 4-1.

- Carefully draw the base circle on Figure 4-1 using a compass.
- Label the radial divisions on Figure 4-1 starting at 0° , where the follower is shown in contact with the cam profile, and continuing clockwise in 30° increments. (For example, see Figure 4-12a on page 108 of your textbook.)
- Measure the shortest radial distance for this cam and record the measurement and angle in the space provided.

Shortest radial distance _____ in. at _____ $^\circ$

- Measure the longest radial distance for this cam and record the measurement and angle in the space provided.

Longest radial distance _____ inch at _____ $^\circ$

- Calculate the total follower displacement for this cam. Show your math work in the space below.

Total follower displacement _____

- Using the chart provided in Figure 4-2, draw the displacement diagram for the cam and follower in Figure 4-1. (Assume that the follower is currently at 0° and that the cam rotates counterclockwise.) Label the rise, drop, and dwell periods on the cam displacement diagram. For an example, see Figure 4-12b on page 108 of your textbook.

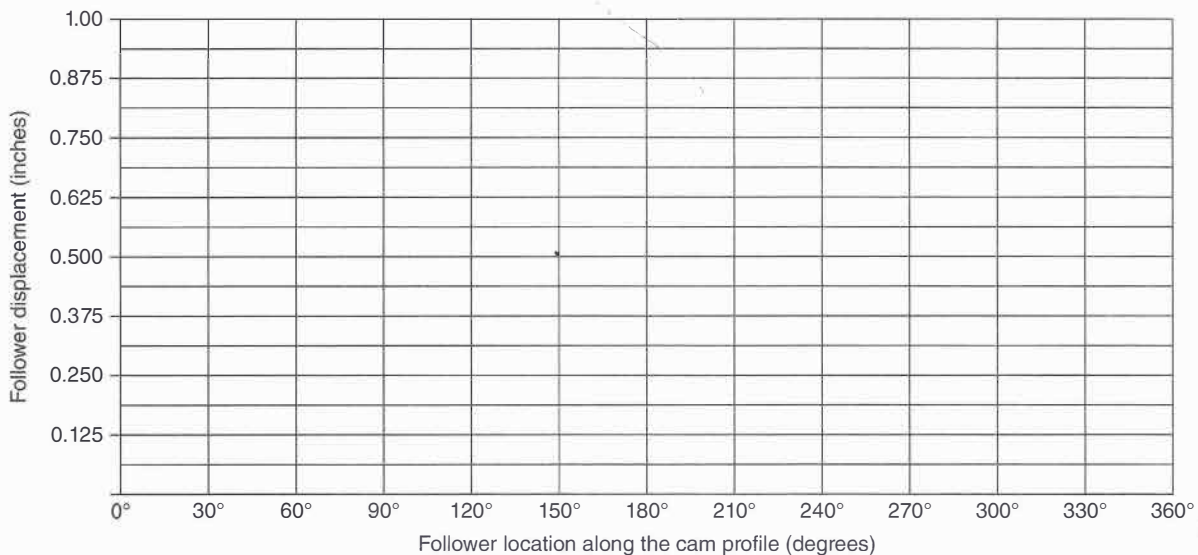


FIGURE 4-2 Draw the displacement diagram for the cam in Figure 4-1.

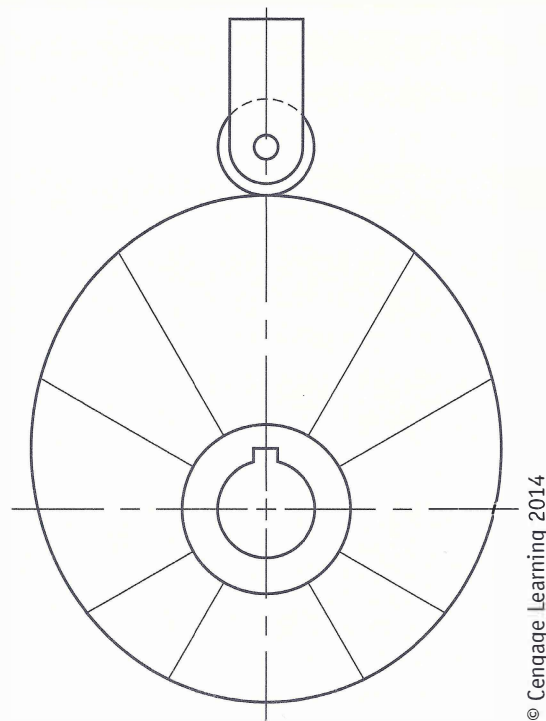


FIGURE 4-3 A different cam and follower schematic.

Complete the following exercises for the cam and follower system in Figure 4-3.

1. Carefully draw the base circle on Figure 4-3 using a compass.
2. Label the radial divisions on Figure 4-3 starting at 0° , where the follower is shown in contact with the cam, and continuing clockwise in 30° increments. For an example, see Figure 4-12a in your textbook.
3. Measure the shortest radial distance for this cam and record the measurement and angle in the space provided.

Shortest radial distance _____ inch at _____ $^\circ$

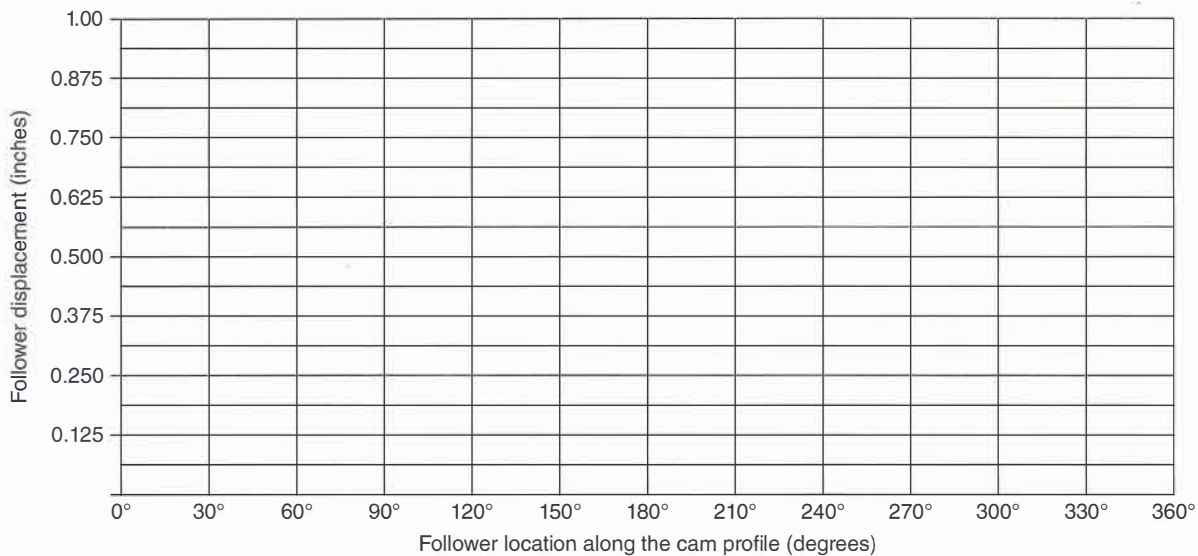
4. Measure the longest radial distance for this cam and record the measurement and angle in the space provided.

Longest radial distance _____ inch at _____ $^\circ$

5. Calculate the total follower displacement for this cam. Show your math work in the space below.

Total follower displacement _____

6. Using the chart provided in Figure 4-4, draw the displacement diagram for the cam and follower in Figure 4-3. (Assume that the follower is currently at 0° and that the cam rotates counterclockwise.) Label the rise, drop, and dwell periods on the cam displacement diagram. For an example, see Figure 4-12b in your textbook.



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FIGURE 4-4 Draw the displacement diagram for the cam in Figure 4-3.

TIP SHEET

When drawing a displacement diagram, it is important to ensure that the cam profile is correctly defined. The displacement diagram should be drawn on a grid that is scaled according to the cam's dimensions. The cam's profile should be drawn on the grid, and the displacement diagram should be drawn on the same grid. The displacement diagram should be drawn on the grid, and the cam's profile should be drawn on the same grid. The displacement diagram should be drawn on the grid, and the cam's profile should be drawn on the same grid.