

FACTFILE: GCE TECHNOLOGY & DESIGN

1.21 Pneumatic and Mechanical Components



Cams and Followers

Learning outcomes

Students should be able to demonstrate knowledge and understanding of the following mechanical components:

- cams (pear, heart, snail, eccentric and plate) and followers to include knife, roller and flat, using terminology including rise, fall, dwell and stroke length.

Cams

As the cam rotates the follower follows the profile of the cam.

The movement of the follower is dependent on the profile of the cam.

Basic Terms

Rise: The section of cam causing lift.

Fall: The section of cam causing drop.

Dwell: The point on the profile of the cam where the follower does not move.

Stroke: The distance between the highest and lowest points.

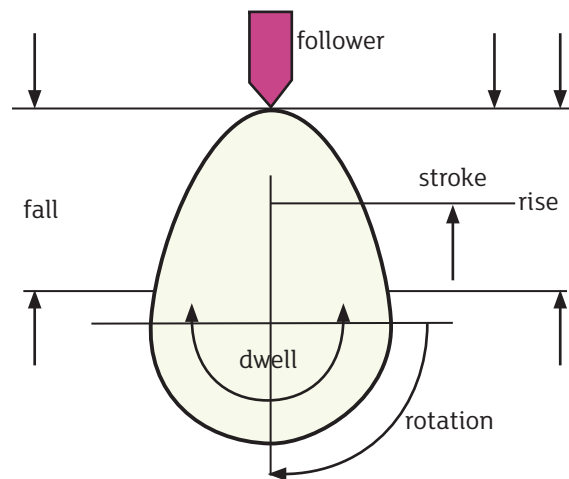


Fig 1

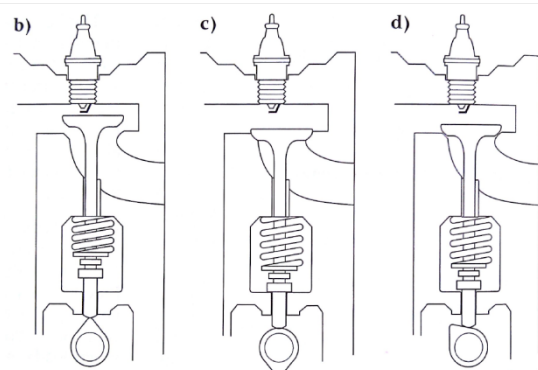


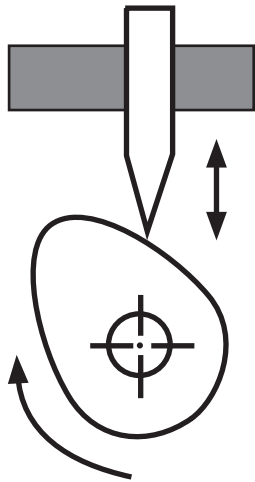
Fig 2

Cams controlling the opening and closing of valves in an engine - Fig 2

The main types of follower used are knife edge, flat and roller

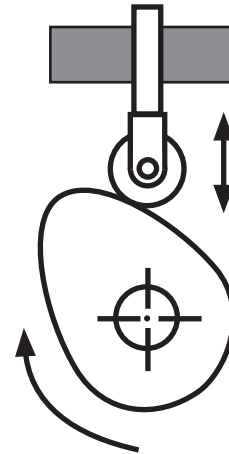
Knife Edge Followers

These are very simple in design. The point of contact of the follower with the cam is a sharp edge, hence the name. Provides very accurate conversion of cam profile. These are not used often in practice as the edge slides on the cam and due to the small area of contact wear would quickly alter the output characteristics.



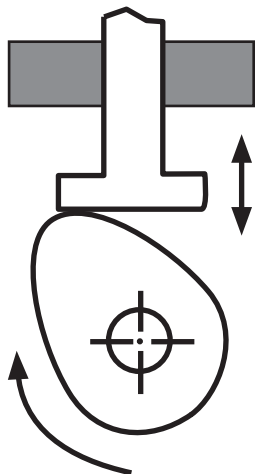
Roller Followers

The contact area is a roller. This helps reduce friction and wear. They are commonly used in aircraft engines. More expensive.

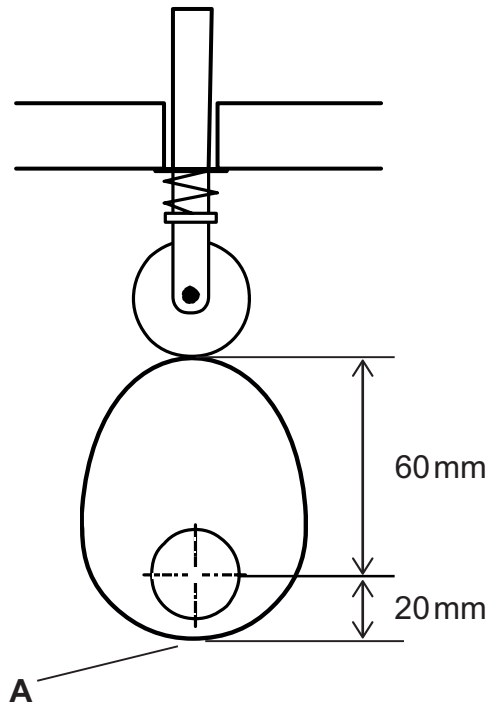


Flat Followers

These are used where space is limited e.g. to operate valves in a car engine. The contact surface is perfectly flat. Cannot follow tight contours and high friction.



The figure below shows a cam and follower.



(a) Select the word from the list below to describe:

- the motion of the cam, and
- the output motion.

Reciprocation Linear Rotary Oscillating

(i) Cam motion _____ [1]

(ii) Output motion _____ [1]

(b) (i) Select the correct name for the cam from the following list.

Eccentric Heart Shaped Pear Shaped Snail

_____ [1]

- (ii) Determine the direction in which the follower will move if the cam turns until the point **A** is in contact with the follower.

_____ [1]

- (iii) Determine the distance moved by the follower when the cam turns from this position to the position shown in the figure above.

[2]

