

Fig 1: Final Render

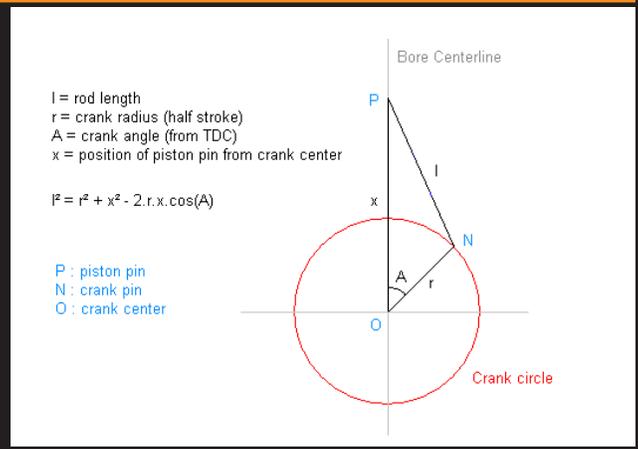


Fig 2: Piston Equation Proof

Position with respect to crank angle (by rearranging the triangle relation):

$$l^2 - r^2 = x^2 - 2 \cdot r \cdot x \cdot \cos A$$

$$l^2 - r^2 = x^2 - 2 \cdot r \cdot x \cdot \cos A + r^2[(\cos^2 A + \sin^2 A) - 1]$$

$$l^2 - r^2 + r^2 - r^2 \sin^2 A = x^2 - 2 \cdot r \cdot x \cdot \cos A + r^2 \cos^2 A$$

$$l^2 - r^2 \sin^2 A = (x - r \cdot \cos A)^2$$

$$x - r \cdot \cos A = \sqrt{l^2 - r^2 \sin^2 A}$$

$$x = r \cos A + \sqrt{l^2 - r^2 \sin^2 A}$$

Fig 3: Rearranging the piston equation in order to solve for position x.



Located inside the subnet. A copy is located outside the subnet in /obj.

Engine Speed: Controls the rotation speed of the engine. Can go in reverse.

Piston Radius: Determines the radius of the pistons. Does not contribute to height.

Number of Cylinders: Determines the number of cylinders and automatically places them. Will clip if Piston Radius is too large!

Cutaway: Cuts the engine in half to reveal the pistons and internal workings.