Adda247

WELCOME TO Adda247

"If there is no struggle, there is no progress."—
Frederick Douglass

Adda247

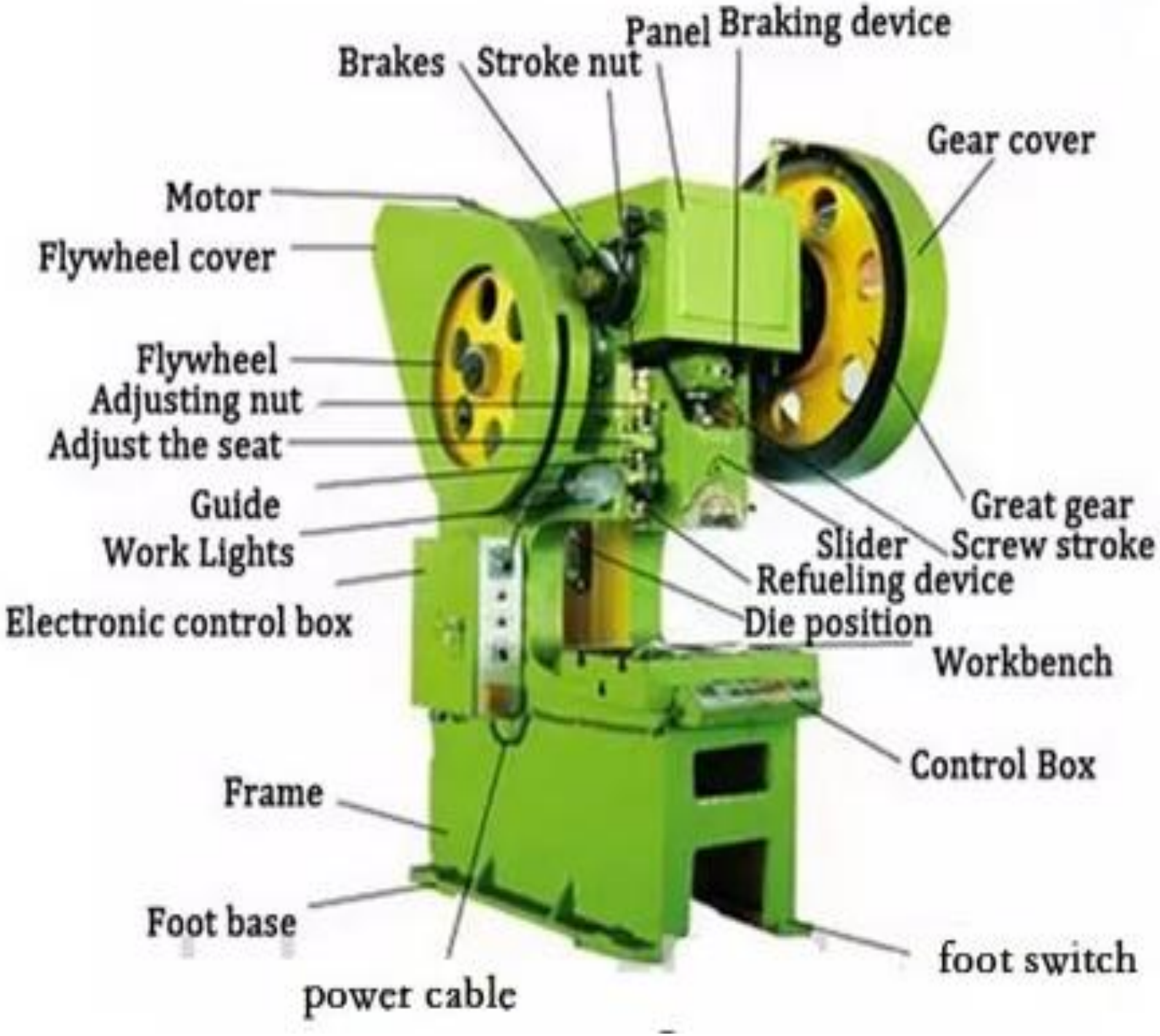
Index :-

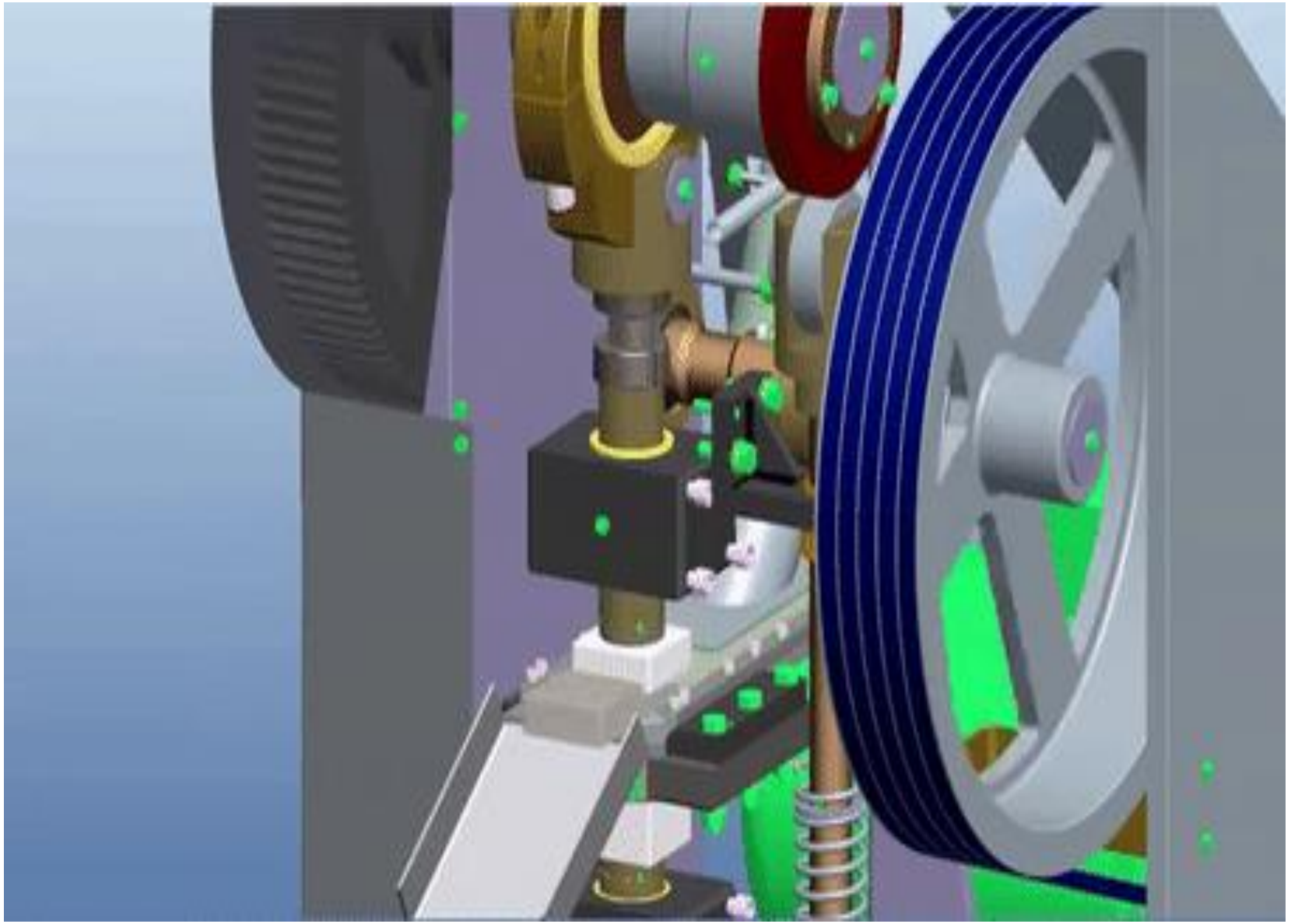
TOM – Theory of Machine

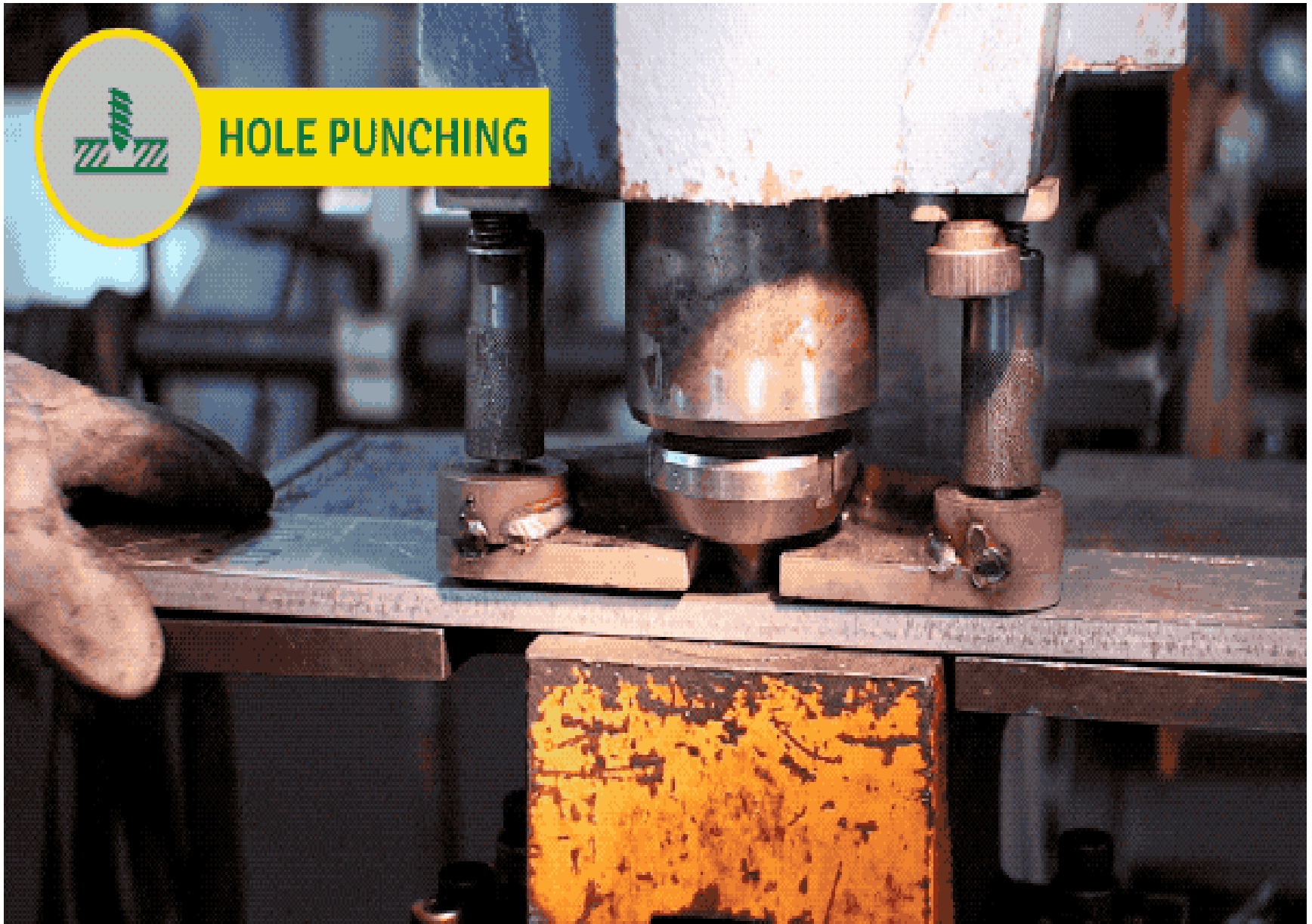
1) Flywheel
2) Punching press
3) Torque
4) Turning Momemt Diagram

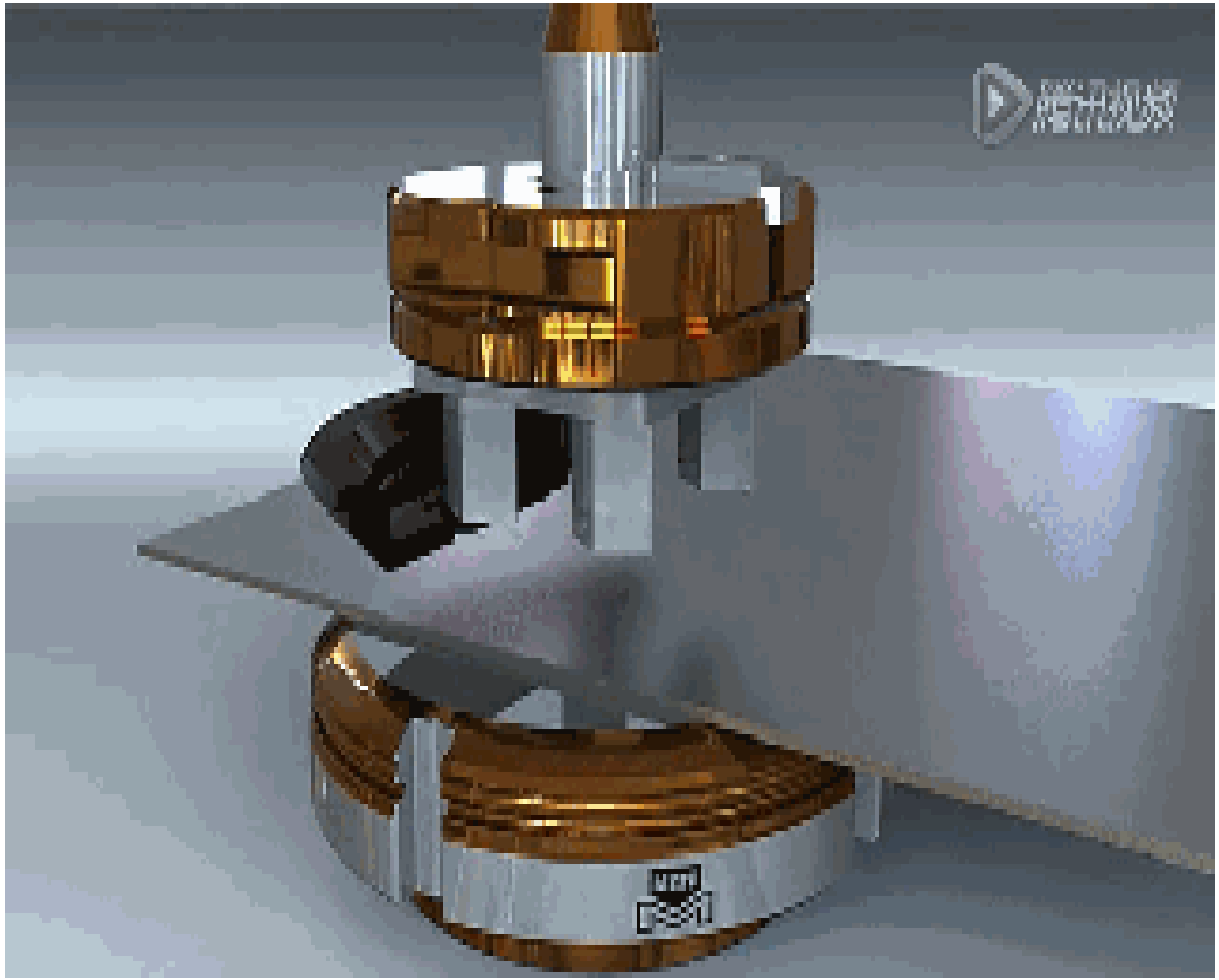
1-2 marks from these Topic

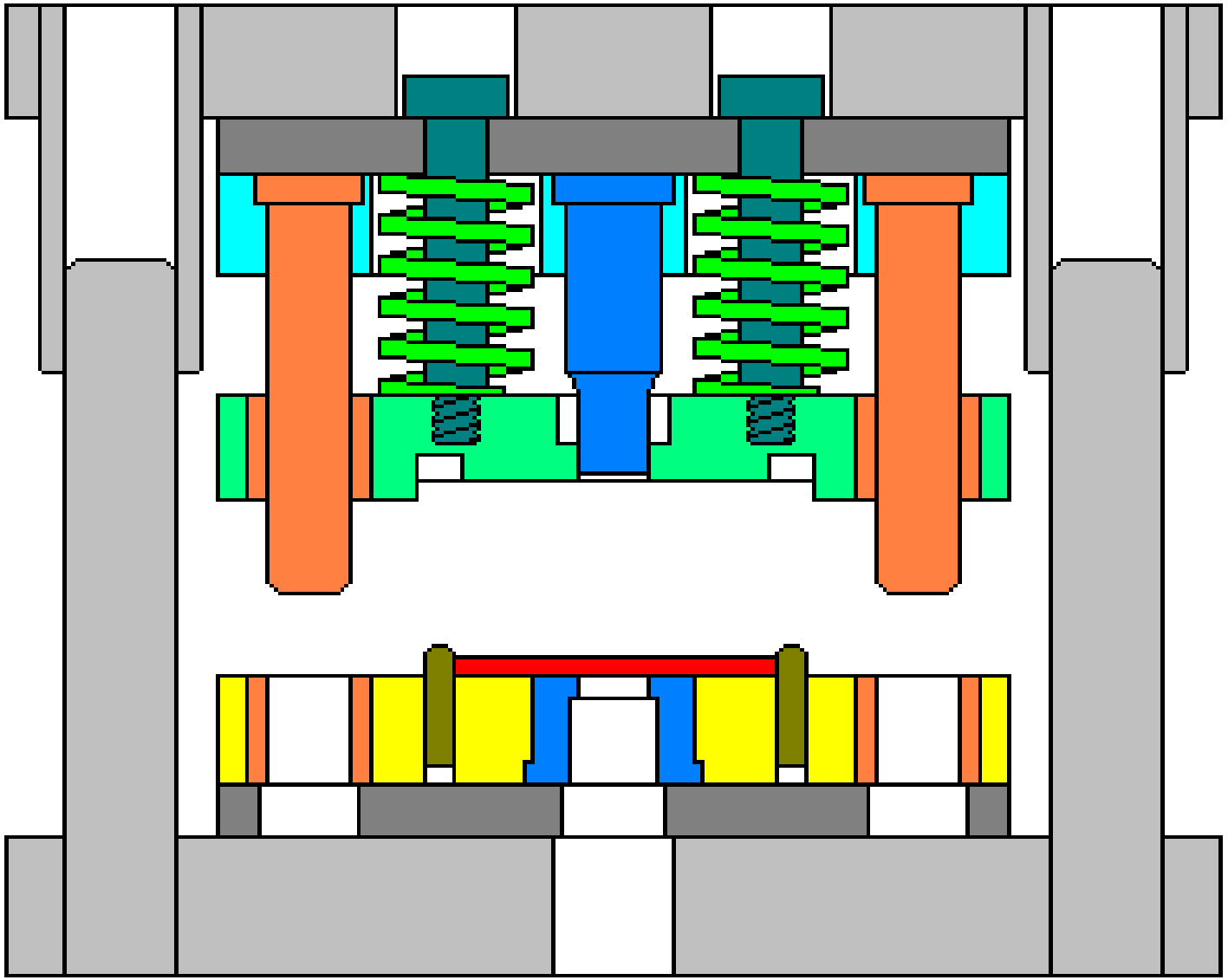
Punching Press

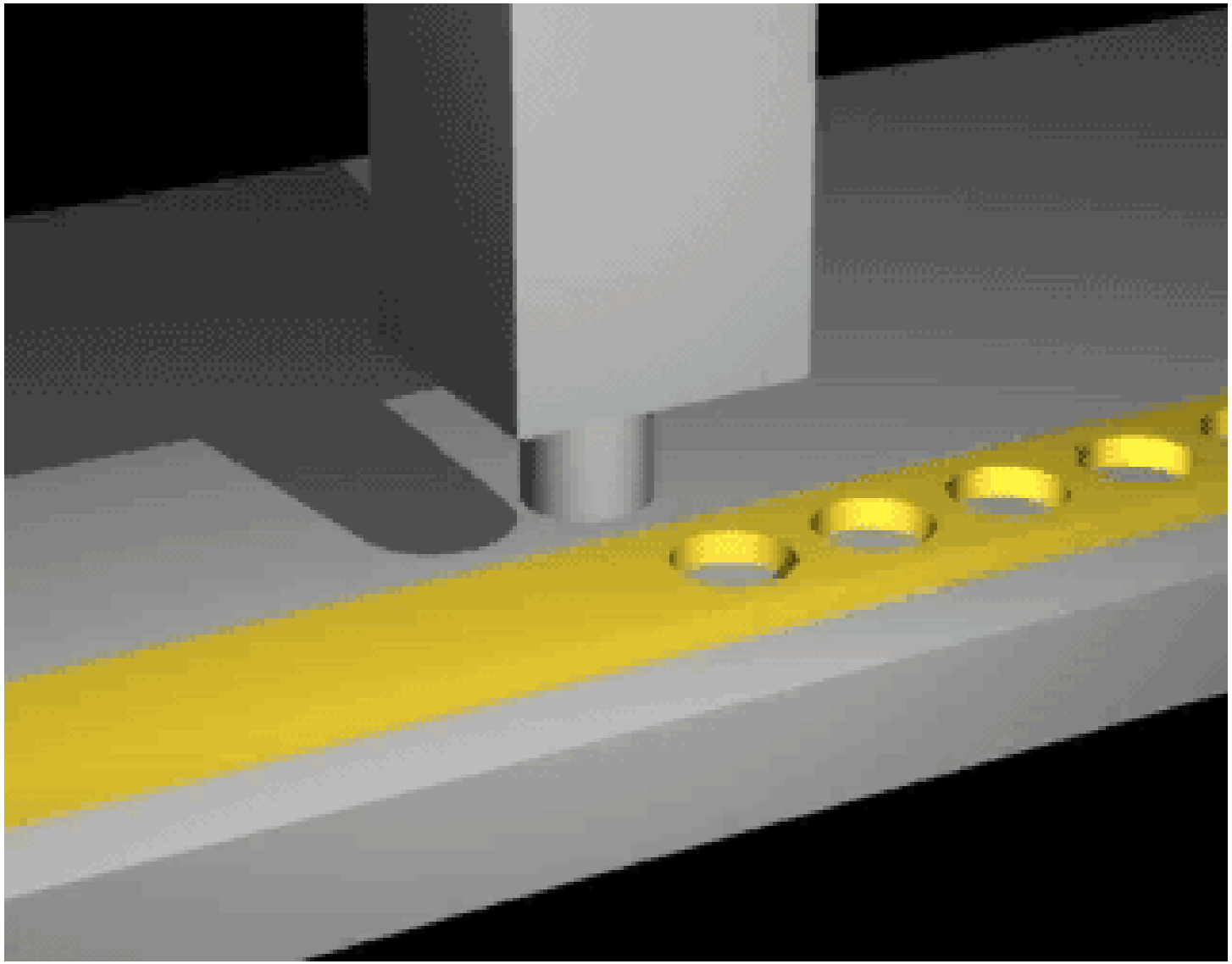


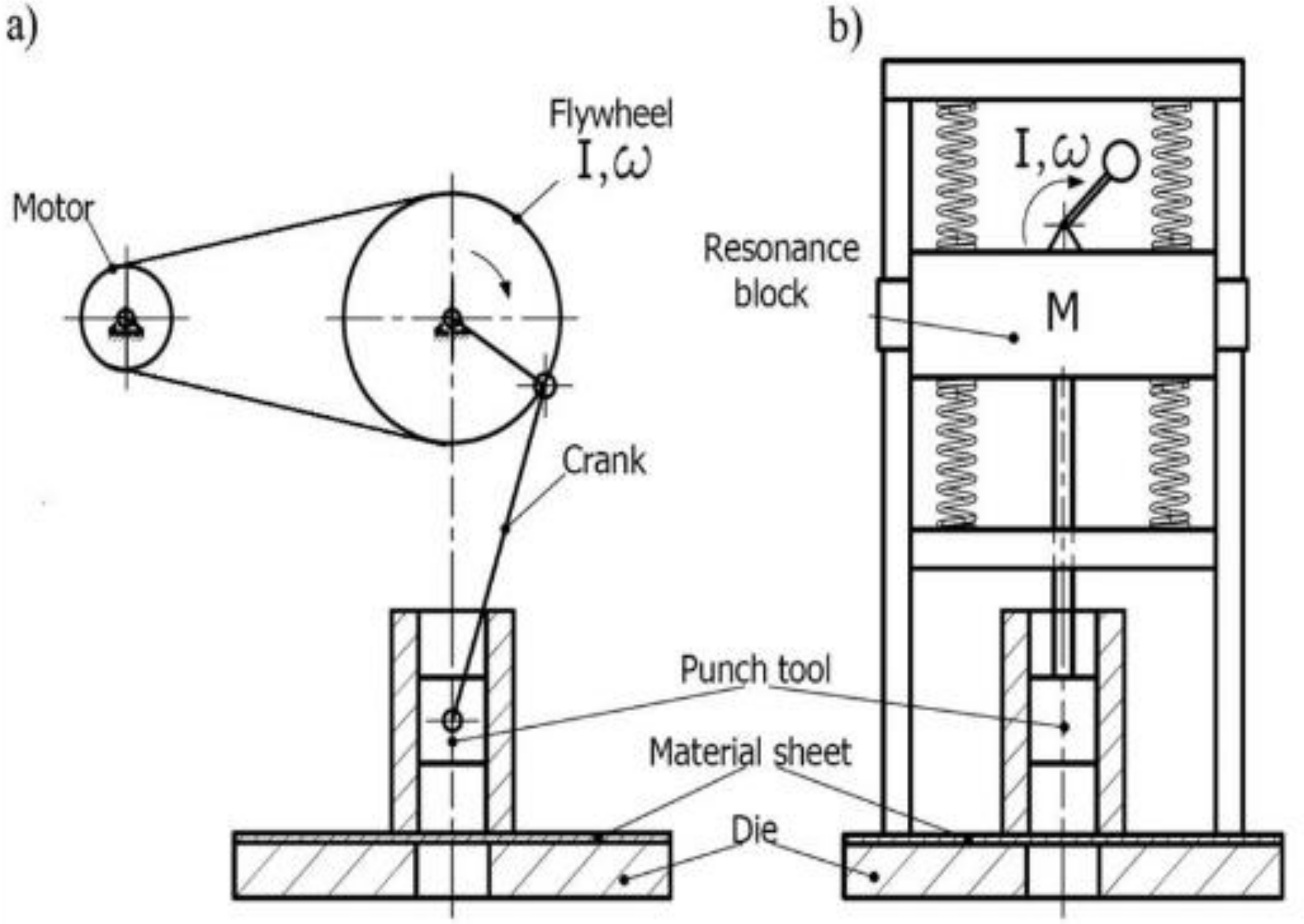


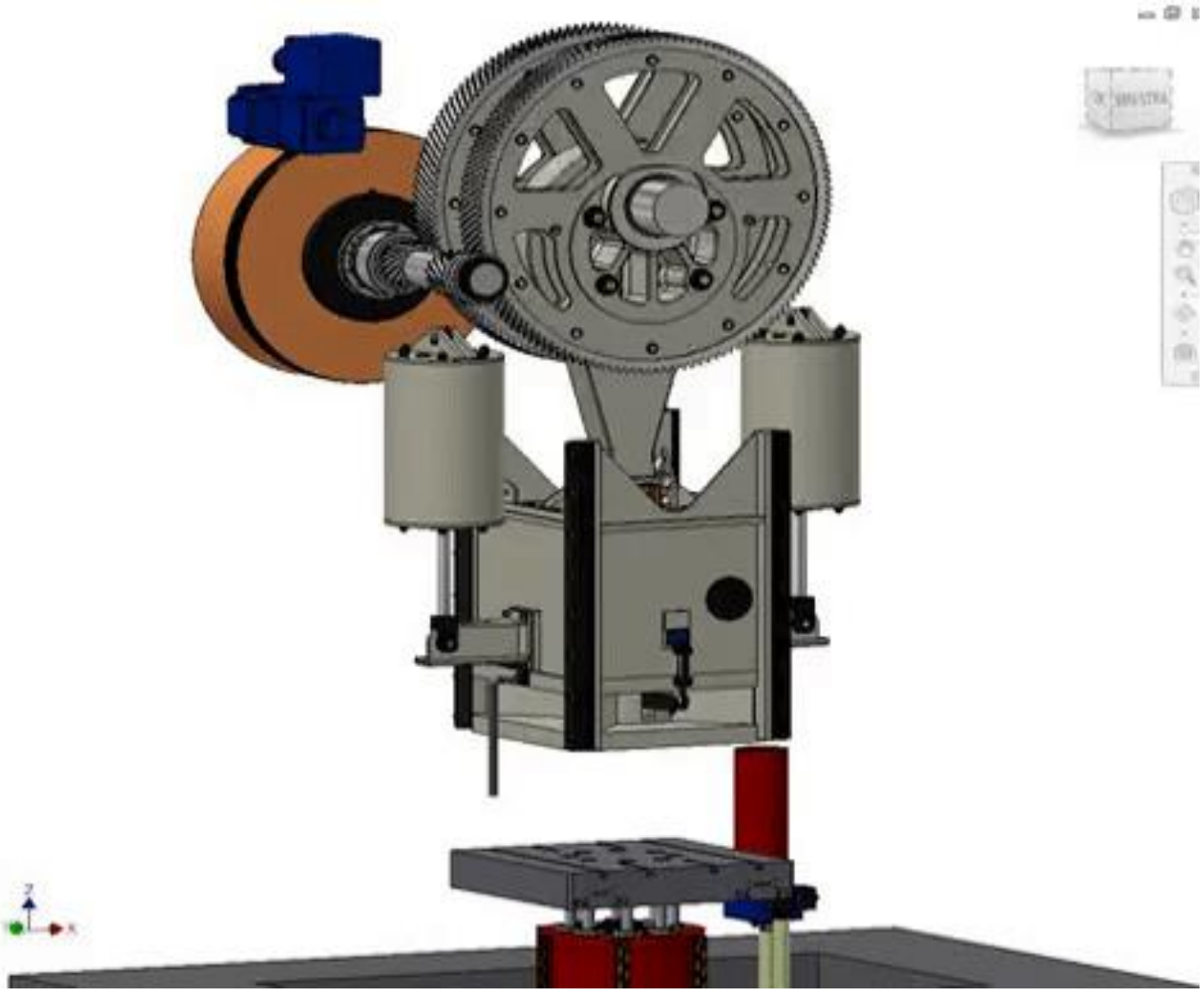












DESIGN OF FLYWHEEL

Design Equation:-

$$I_s = \frac{E_k}{C_f * (\omega_{avg})^2}$$

where "C_f" is the co-efficient of speed fluctuation and "E_k" is the kinetic energy and "ω_{avg}" is the average rotational motion.

Torque Variation and Energy:-

The required change in kinetic energy E_k is obtained from the known torque time relation or curve by integrating it for one cycle and it is given by

$$\int_{\theta@\omega_{min}}^{\theta@\omega_{max}} (T_1 - Ta_{vg}) d\theta = E_k$$

Coefficient of Speed Fluctuation

$$C_s = 2\,\frac{(\omega_{max} - \omega_{min})}{(\omega_{max} + \omega_{min})} = \frac{(\omega_{max} - \omega_{min})}{\omega_{mean}}$$

$$\omega_{mean} = \frac{(\omega_{max} + \omega_{min})}{2}$$

$$E_{max} - E_{min} = \frac{I_z.(\omega_{max}^2 - \omega_{min}^2)}{2}$$

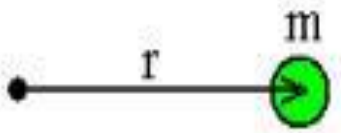
$$= \frac{I_z.(\omega_{max} - \omega_{min}).(\omega_{max} + \omega_{min})}{2} = C_s.I_z.\omega_{mean}^2$$

Therefore

$$I_z. = \frac{E_{max} - E_{min}}{C_s.\omega_{mean}^2}$$

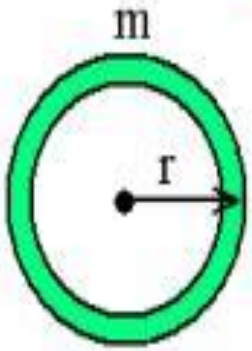
Point mass

$I = mr^2$



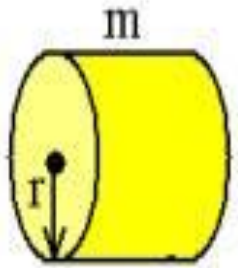
Hollow cylinder

$I = mr^2$



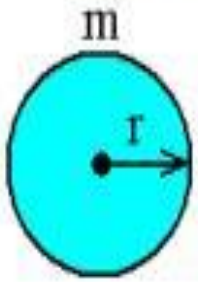
Solid cylinder

$I = \frac{1}{2}mr^2$



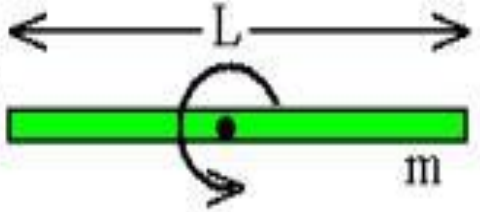
Solid sphere

$I = \frac{2}{5}mr^2$



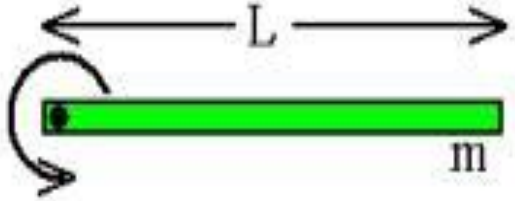
Rod about the middle

$I = \frac{1}{12}mL^2$



Rod about the end

$I = \frac{1}{3}mL^2$

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