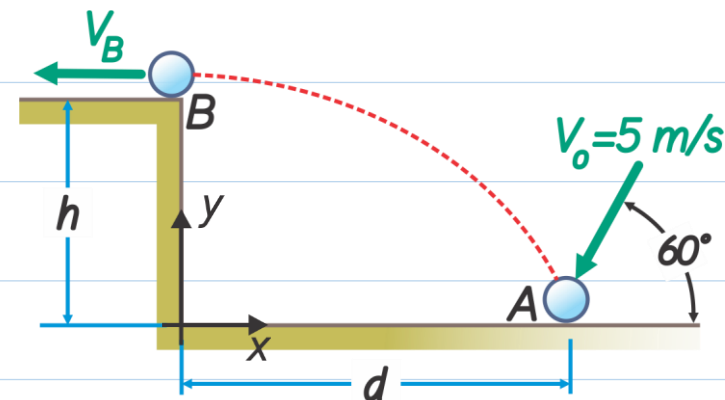


Ejempló 2: Una pelota choca con el suelo con una velocidad $v_0 = 5 \text{ m/s}$ formando un ángulo de 60° con la horizontal. Sabiendo que el coeficiente de restitución para el choque es $e = 0,60$ y que la pelota tras el rebote, alcanza el punto B con una **velocidad horizontal**, halle:

- las distancia h y d ;
- la **velocidad** de la pelota cuando llega a B.



Resolución:

Sabemos que se trata de un choque inelástico

$$\sin 60 = \frac{V_{\perp 1}}{V_0}$$

$$V_{\perp 1} = V_0 \sin 60$$

$$V_{\perp 1} = 5 \sin 60$$

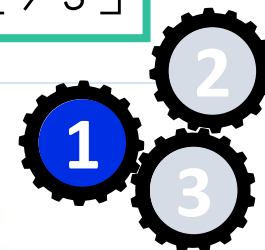
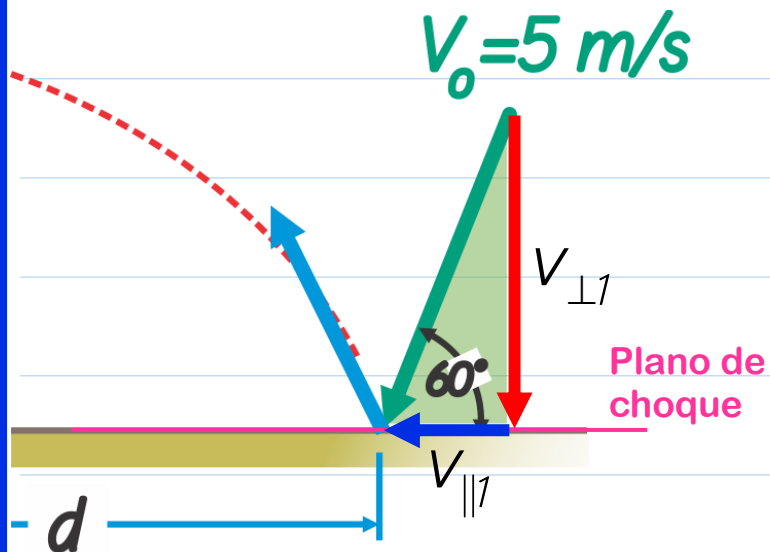
$$V_{\perp 1} = 2.16 \left[\frac{\text{m}}{\text{s}} \right]$$

$$\cos 60 = \frac{V_{\parallel 1}}{V_0}$$

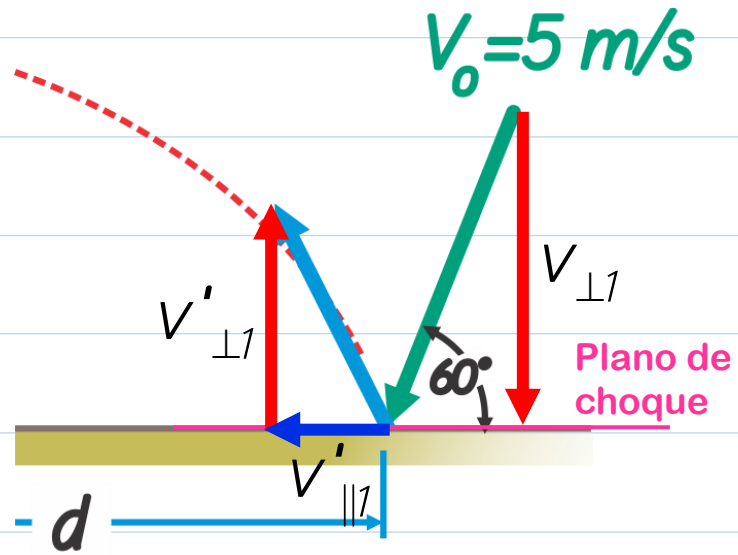
$$V_{\parallel 1} = V_0 \cos 60$$

$$V_{\parallel 1} = 5 \cos 60$$

$$V_{\parallel 1} = 2.5 \left[\frac{\text{m}}{\text{s}} \right]$$



Condición choque



$$V_{\perp} \neq V'_{\perp}$$

$$v_{||} = v'_{||} = 2.5 \left[\frac{\text{m}}{\text{s}} \right]$$

$$e = \frac{v'_{\perp 1} - v'_{\perp 2}}{v_{\perp 2} - v_{\perp 1}}$$

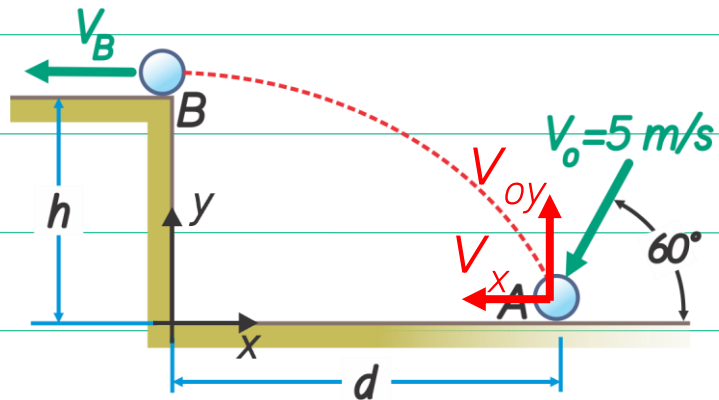
$$e = \frac{v'_{\perp 1} - v'_{\perp 2}}{v_{\perp 2} - v_{\perp 1}}$$

$$e = \frac{v'_{\perp 1}}{-v_{\perp 1}}$$

$$0.6 = -\left(\frac{v'_{\perp 1}}{-2.16} \right) \Rightarrow$$

$$v'_{\perp 1} = 1.3 \frac{\text{m}}{\text{s}}$$

Movimiento PARABÓLICO



$$v_{\parallel} = v_x = 2.5 \left[\frac{m}{s} \right]$$

$$v'_{\perp} = v_{oy} = 1.3 \left[\frac{m}{s} \right]$$

En "y"

$$y = y_o + v_{oy}t + \frac{1}{2}gt^2$$

$$h = 0 + 1.3t - 4.9t^2$$

$$h = 1.3t - 4.9t^2$$

⇒

En "x"

$$x = x_o + v_x t$$

$$0 = d - 2.5t$$

$$d = 2.5t$$

$$v_y = v_{oy} + gt$$

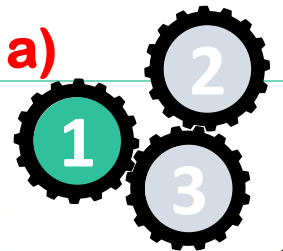
$$0 = 1.3 - 9.8t$$

$$t = \frac{1.3}{9.8} = 0.13 [s]$$

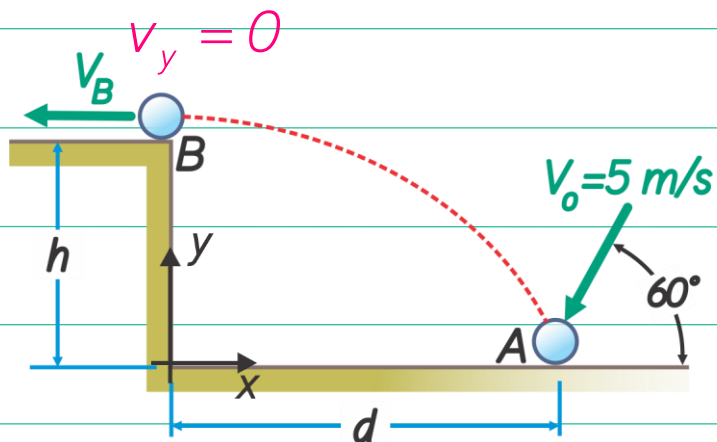
$$h = 1.3 * 0.13 - 4.9 * 0.13^2$$

$$\therefore h = 0.086 [m] \quad \text{a)}$$

$$\therefore d = 0.33 [m] \quad \text{a)}$$



En "y"



$$v_x = 2.5 \left[\frac{\text{m}}{\text{s}} \right]$$

$$v_y = 0 \quad \text{En su punto mas alto}$$

$$V_B = (v_x i + \cancel{v_y} j) \left[\frac{\text{m}}{\text{s}} \right]$$

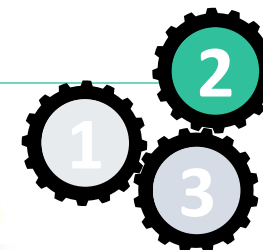
$$v_y^2 = v_{oy}^2 + 2g\Delta y$$

$$0 = 1.3^2 - 2 * 9.8 * h$$

$$h = \frac{1.3^2}{19.6}$$

$$\therefore h = 8.6 [m] \quad \text{a)}$$

$$\therefore V_B = 2.5 i \left[\frac{\text{m}}{\text{s}} \right] \quad \text{b)}$$



Resultados:

Inciso a)

 \therefore

$$d = 0.33[m]$$

 \therefore

$$h = 0.086[m]$$

Inciso a)

 \therefore

$$v_B = 2.5i[m/s]$$

