

height: 22m

duration: 50s

capacity: 20 pers

duration of the drop: 5,4s

mass of the boat with 20 persons: 6940 kg

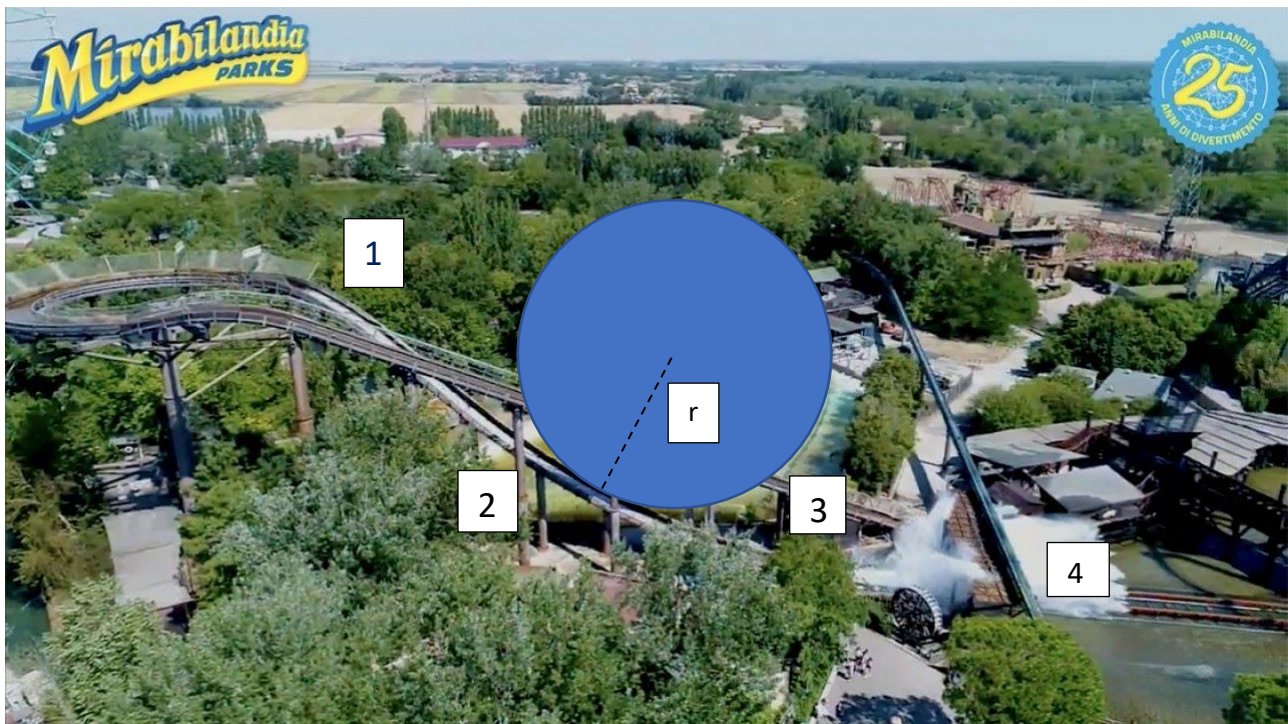
$a_{\max} = 4,5 \text{ m/s}^2$

$\text{speed}_{\max} = 5s * 3,5 \text{ m/s}^2 = 17,5 \text{ m/s} = 63 \text{ km/h}$

$r = 16 \text{ m}$

Description:

You get on board of big boats carried by a chain up to a climb 22m high. From there you go down at full speed (about 70 km/h) in a large ditching basin, this create a big wave 15 m high.



1. $F - F_p = mg = 6940 \text{ kg} * 9,81 \text{ N/kg} = 68081 \text{ N}$

$E_m = mgh = 6940 \text{ kg} * 9,81 \text{ N/kg} * 22 \text{ m} = 1497790 \text{ J}$

2. $F = F_p * \text{sen} \alpha = 6940 \text{ kg} * 9,81 \text{ N/kg} * \text{sen}(60^\circ) = 58960 \text{ N}$

$E_m = mgh/2 + mv^2/2 = 6940 \text{ kg} * 9.81 \text{ N/kg} * 11 \text{ m} + \frac{1}{2} * 6940 \text{ kg} * v^2$

$\Rightarrow v = t/2 * a = 2,7 \text{ s} * 4,5 \text{ m/s}^2 = 12,15 \text{ m/s} \Rightarrow E_m = 1261145 \text{ J}$

$$3. a_c = v^2/r = (4,5 * 3,5)^2 / 16m = 15,5 \text{ m/s}^2 \quad F_c = a_c * m = v^2/r * m =$$

$$(4,5 * 3,5)^2 * 6940 \text{ kg} / 16m = 1,076 * 10^5 \text{ N}$$

$$E_m = 1/2 * m * v^2_f = 1/2 * 6940 \text{ kg} * (4,5 * 3,5)^2 = 860777 \text{ J}$$

$$4. F_{\text{slowdown}} = 6940 \text{ kg} * 3 \text{ m/s}^2 = 20820 \text{ N}$$

$$V_f = 2 \text{ m/s} \quad E_c = 1/2 m v^2 = 13380 \text{ J}$$

$$\text{Trajectory} = -g x^2 / 2 v_0^2 = -9,81 \text{ m/s}^2 x^2 / 2 * (1,88 \text{ m/s})^2 = -1,388 x^2$$