

## Dynamischer Faktor Bedingung

$$\rho_s := 7850 \frac{\text{kg}}{\text{m}^3} \quad \rho := 1.2 \frac{\text{kg}}{\text{m}^3} \quad \xi := 0.002$$

$$d := 1035.45 \text{ mm} \quad t := 4.7 \text{ mm}$$

$$A := 14826 \text{ mm}^2$$

$$m := \rho_s \cdot A = 116.384 \frac{\text{kg}}{\text{m}}$$

$$\frac{m \cdot \xi}{\rho \cdot d^2} = 0.181$$

$$\frac{1.9 \cdot \rho \cdot d^2}{\xi} = 1222.3 \frac{\text{kg}}{\text{m}}$$

## Spitzengeschwindigkeitsfaktor

$$\alpha_r := 0.19$$

$$z_e := 7.64 \text{ m}$$

$$z_g := 380 \text{ m}$$

$$c_{\text{pic}} := \left( 1 + 0.375 \cdot \left( \frac{z_g}{z_e} \right)^{\alpha_r} \right)^2 = 3.196$$

## Reduktionsfaktor

$$b := d \quad h := z_e$$

$$h_0 := 670 \text{ m} \quad \beta := \frac{b}{h} = 0.136$$

$$B := \frac{4}{3} \cdot \int_0^{\frac{h_0}{h}} \left( \frac{1}{1 + \frac{h \cdot x}{457 \text{ m}}} \right) \cdot \left( \frac{1}{1 + \frac{h \cdot x}{122 \text{ m}} \cdot \beta} \right) \cdot \left( \frac{x}{(1 + x^2)^{\frac{4}{3}}} \right) dx = 1.669$$

$$c_{\text{red}} := \frac{1 + (c_{\text{pic}} - 1) \cdot \sqrt[2]{\frac{B}{1.91}}}{c_{\text{pic}}} = 0.955$$

## Grössenfaktor

$$E := 205 \text{ GPa} \quad q_{p0} := 0.9 \frac{\text{kN}}{\text{m}^2} \quad L := z_e \quad f_0 := 1.64 \text{ Hz}$$

$$f_{\text{red}} := \frac{f_0 \cdot z_e^{1 - \alpha_r}}{\sqrt[2]{q_{p0}}} \cdot \frac{\sqrt[2]{\rho}}{\sqrt[2]{3.2}} \cdot z_g^{\alpha_r} = 0.537$$

$$C_{\text{dim}} := \frac{\pi}{3 \cdot 1.91} \cdot \frac{1}{1 + \frac{8}{3} \cdot f_{\text{red}}} \cdot \frac{1}{1 + 10 \cdot \beta \cdot f_{\text{red}}} = 0.13$$

## Spektrale Dichtefunktion

$$f_{\text{red}} := \frac{f_0 \cdot z_e^{(1 - \alpha_r)}}{\sqrt[2]{q_{p0}}} \cdot \frac{\sqrt[2]{\rho}}{\sqrt[2]{3.2}} \cdot z_g^{\alpha_r} = 0.537$$

$$C_{\text{spec}} := 26.25 \cdot \frac{f_{\text{red}}}{(0.5 + 33 \cdot f_{\text{red}})^{\frac{5}{3}}} = 0.112$$

## Dynamische Faktor

$$C_d := \frac{1}{C_{\text{pic}} \cdot C_{\text{red}}} \cdot \left( 1 + \sqrt[2]{(C_{\text{pic}} \cdot C_{\text{red}} - 1)^2 + \frac{C_{\text{dim}} \cdot C_{\text{spec}}}{\xi} \cdot (C_{\text{pic}} - 1)^2} \right) = 2.382$$

$$C_d \cdot C_{\text{red}} = 2.275$$