

1. input data

1.1. general settings

vibration verification acc. to DIN EN 1995-1-1, 7.3

value acc. to DIN EN 1995-1-1, 7.3.3, figure 7.2: $a = 4.00 \text{ mm/kN} \Rightarrow b = 50.00$

modal damping ratio $\xi = 0.01000$

continuous effect is not taken into account in the stiffness criterion

numerical solution by means of Fourier series expansion

1.2. dimensions

ceiling width $b = 5.000 \text{ m}$, 2 span(s), all outer edges are hinged

span	l m
1	4.500
2	4.500

continuous effect is not taken into account in the stiffness criterion

all intermediate support axles are rigidly mounted

1.3. permanent action effects

Nr.	action eff	g kN/m ²
1	permanent loads	1.480
Σ		1.480

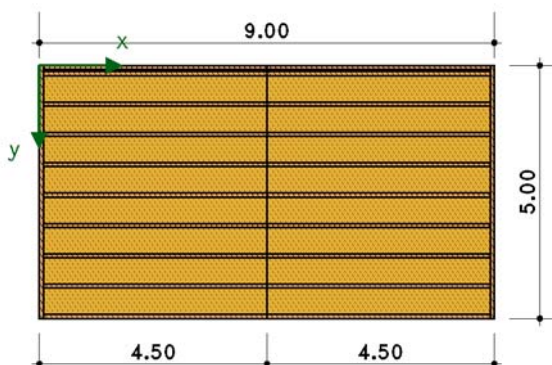
1.4. screed

screed is not taken into account

1.5. beam floor

beam solid coniferous timber C30 80/220 mm, spacing $a_r = 600.000 \text{ mm}$, $\rho_k = 380 \text{ kg/m}^3$

1.6. plan view scale 1:150



2. results

2.1. natural frequency

$EI_{\text{lengthwise}} = 0.851840 \text{ MNm}^2/\text{m}$, $EI_{\text{cross}} = 0.000000 \text{ MNm}^2/\text{m}$, $m = 150.9 \text{ kG/m}^2$

$f_e = 7.671 \text{ Hz} < f_{\min} = 8 \text{ Hz} \Rightarrow \text{special analysis}$

2.2. stiffness criterion

$x_{\max F} = 2.250 \text{ m}$, $x_{\max w} = 2.250 \text{ m} \Rightarrow w_{\max} = 2.203 \text{ mm}$

$w(1\text{kN}) = 2.20 \text{ mm} \leq w_{\text{grenz}} = 4.0 \text{ mm} \Rightarrow \text{criterion fulfilled!}$

2.3. unit pulse velocity

$n_{40} = 10.0000$

$v = 2.187 \text{ mm/s} \leq v_{\text{grenz}} = 27.000 \text{ mm/s} \Rightarrow \text{criterion fulfilled!}$

2.4. heel strike

$v = 120.261 \text{ mm/s} \leq v_{\text{grenz}} = 161.998 \text{ mm/s} \Rightarrow \text{criterion fulfilled!}$

2.5. acceleration/resonance

$a = 1.374775 \text{ m/s}^2 > 0.3 \text{ m/s}^2 \Rightarrow \text{noticeable, not disturbing}$

verification fulfilled!