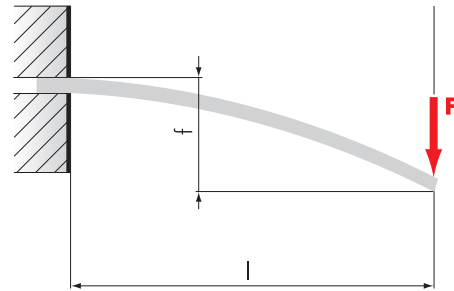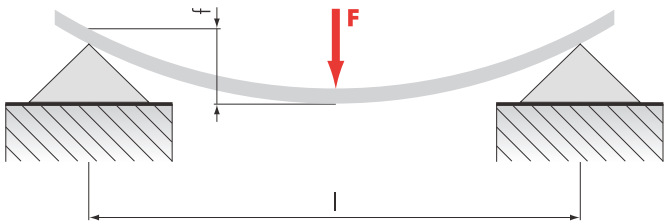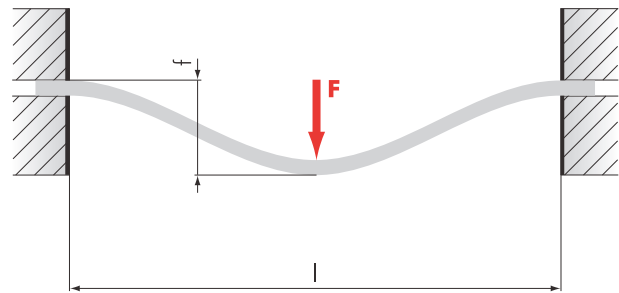*Exposure Case 1 (on two stilts, distributed load)*

Exposure Case 2 (fixed one-sided, point load)

Exposure Case 3 (on two stilts, point load)

Exposure Case 4 (fixt two-sided, point load)

To calculate deflection the following calculations are to be used:

Exposure Case 1

$$f = \frac{5 \cdot F \cdot L^3}{384 \cdot E \cdot I \cdot 10^4}$$

Exposure Case 1

$$f = \frac{F \cdot L^3}{3 \cdot E \cdot I \cdot 10^4}$$

Exposure Case 3

$$f = \frac{F \cdot L^3}{48 \cdot E \cdot I \cdot 10^4}$$

Exposure Case 4

$$f = \frac{F \cdot L^3}{192 \cdot E \cdot I \cdot 10^4}$$

To calculate deflection caused by dead weight the following calculations are to be used:

Exposure Case 2

$$f = \frac{F \cdot L^3}{8 \cdot E \cdot I \cdot 10^4}$$

Exposure Case 3

$$f = \frac{5 \cdot F \cdot L^3}{384 \cdot E \cdot I \cdot 10^4}$$

Exposure Case 4

$$f = \frac{F \cdot L^3}{384 \cdot E \cdot I \cdot 10^4}$$

F   load [N]
L   profile length [mm]
I   moment of inertia [cm⁴]
E   modulus of elasticity [N / mm²]
   E_{Al} = 70,000 N / mm²

Control Of The Deflection

$$s = \frac{M_b}{W \cdot 10^3}$$

s   deflection [N / mm²]
M_b maximum bending [N / mm]
W   resistive moment [cm³]

Example

known values: Profile 40 x 80 double bridge, upright
   F = 10,000 N
   L = 500 mm
   I = 73.74 cm⁴

to calculate: deflection f

Results
Exposure Case 1: f = 1.17 mm
Exposure Case 2: f = 8.07 mm
Exposure Case 3: f = 0.50 mm
Exposure Case 4: f = 0.126 mm