



# Straight beams with constant cross-section

- i Calculation without errors.
- ii Project information

## Input section

### 1.0 Beam type, dimensions and loading

#### 1.1 Calculation units

Imperial (lbf, in, HP...)

#### 1.2 Left beam end

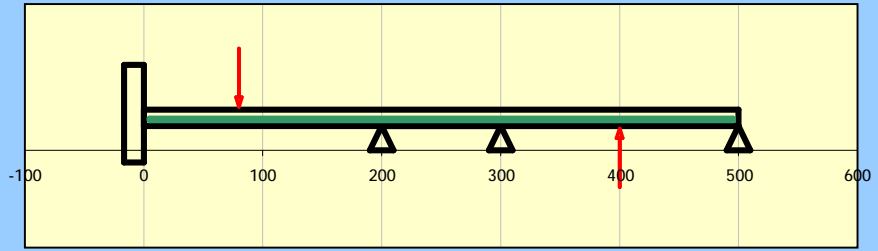
C...Fixing

#### 1.3 Number of supports between

2

#### 1.4 Right beam end

B...Support



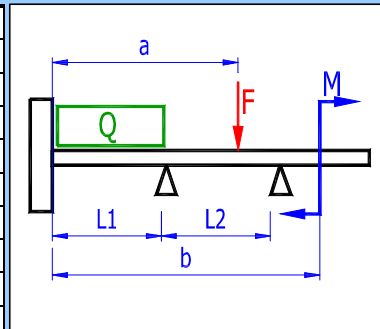
#### 1.5 Beam field no:

L1 L2 L3

1.6 Length of beam field	L	200,0	100,000	200,0	[in]
1.7 Continuous loading	Q	0,000	0,000	0,000	[lbf/in]
1.8 Field beginning co-ordinates			200,0	300,0	[in]

#### 1.9 Beam loading

	a [in]	F [lbf]	b [in]	M [lbf*ft]
Force F1 / Moment M1	80,0	5000,0	0,0	0,0
Force F2 / Moment M2	400,0	-5000,0	0,0	0,0
Force F3 / Moment M3	0,0	0,0	0,0	0,0
Force F4 / Moment M4	0,0	0,0	0,0	0,0
Force F5 / Moment M5	0,0	0,0	0,0	0,0
Force F6 / Moment M6	0,0	0,0	0,0	0,0
Force F7 / Moment M7	0,0	0,0	0,0	0,0
Force F8 / Moment M8	0,0	0,0	0,0	0,0
Force F9 / Moment M9	0,0	0,0	0,0	0,0
Force F10 / Moment M10	0,0	0,0	0,0	0,0
Force F11 / Moment M11	0,0	0,0	0,0	0,0
Force F12 / Moment M12	0,0	0,0	0,0	0,0

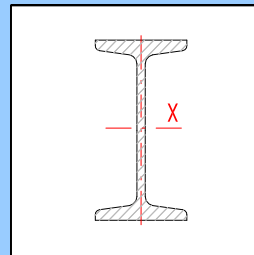


- 1,10 Dead weight load  Yes
- 1,11 Other input field for force

### 2.0 Static values of the profile and material values of the beam

#### 2.1 Beam profile

- 2.2 Profile type: 29...I-profile, hot-rolled (DIN 1025)
- 2.3 Profile dimensions: I 200
- 2.4 User properties of the profile: No
- 2.5 Number of beams abreast: 1
- 2.6 Area: A = 5,177010354 [in^2]
- 2.7 Quadratic moment to the axi: Ix = 51,41370565 [in^4]
- 2.8 Cross-section bending modulu: Sx = 13,05908124 [in^3]



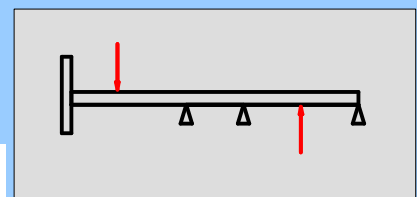
#### 2.9 Beam material

- 2.10 List of materials: According to the selected profile (210000)
- 2.11 Density:  $\gamma$  = 486,9 [lbf/feet^3]
- 2.12 Modulus of elasticity in tension: E = 30457770 [psi]
- 2.13 Permissible bending stress:  $S_b$  = 20305 [psi]

## Results section

### 3.0 Calculation results

3.1 Support number from left	R1	R2	R3	R4	
3.2 Reaction in supports	3484,89	4109,54	-5169,95	-1680,68	[lbf]
3.3 Bending moment Min. / Max.	Mo	-14625,48	11175,95		[lbf*ft]
3.4 Beam deflection Min. / Max.	y	-0,135	0,301		[in]
3.5 Bending stress Min. / Max.	$S_b$	-13439	10270		[psi]
3.6 Weight of the beam	m		729,4		[lbf]



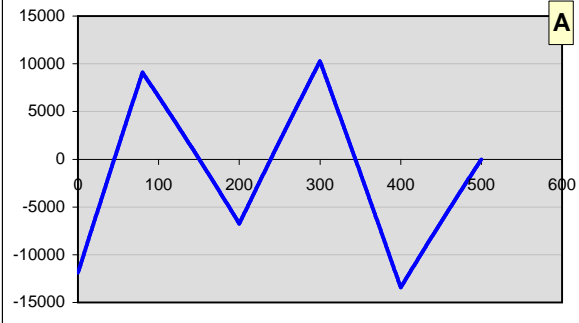
3.7 Max. length of the free end (buckling).

Lmax 58,2 [in]

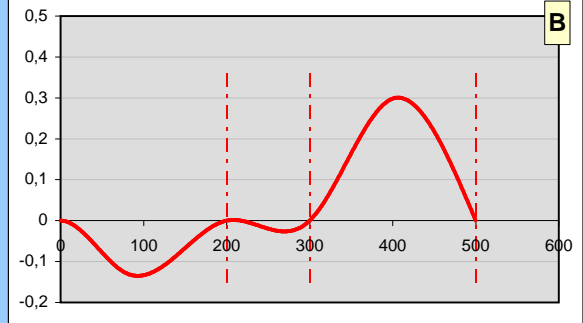
3.8 Relative beam deflection Max.

y' 0,150 [%]

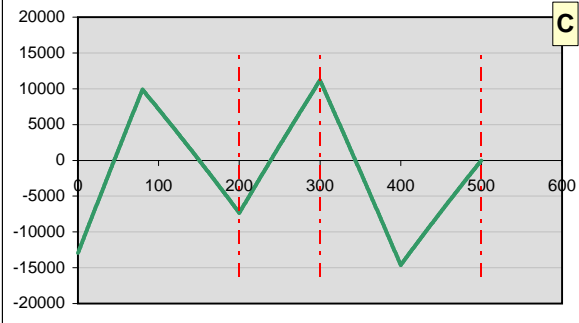
Bending stress [psi]



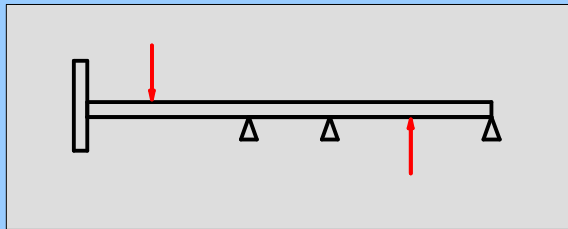
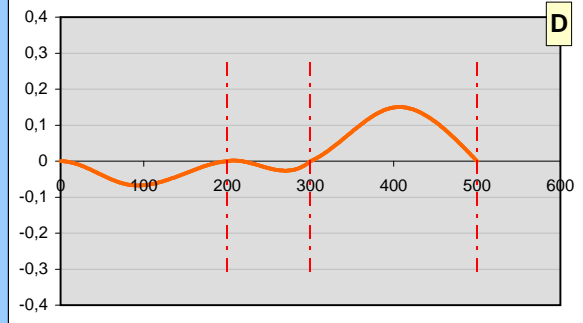
Beam deflection [in]



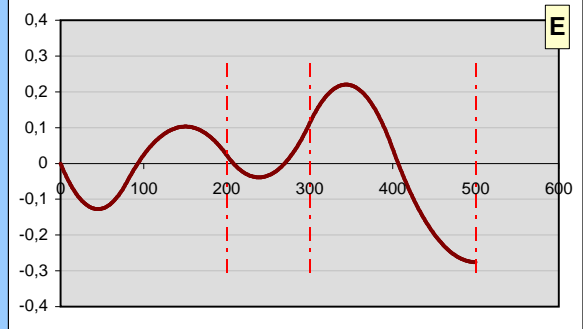
Bending moment [lbf\*ft]



Relative beam deflection [%]



Rotation [°]



3.9

3.10 Move the force no: 1 X= 80 [in]

#### 4.0 Detailed results

##### 4.1 Requested parameters

4.2 X - coordinate	247	[in]
4.3 Bending stress	1391,40	[psi]
4.4 Beam deflection	-0,02	[in]
4.5 Relative beam deflection	-0,018	[%]
4.6 Bending moment	1514,20	[lb]
4.7 Rotation	-0,036	[°]

