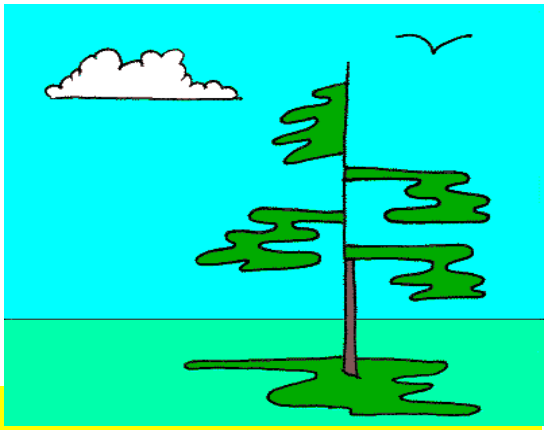
Northwoods Software

Uniform Beam Load Reactions, Moments and Deflection

Last Revised: October 31, 2016



Applicable Codes

CSA S16

Project Information

Date:	**Saturday, July 07, 2018**
Project Number:	
Project Name:	
Description:	
Designer:	**Dik**
Checked:	**Dik**
Date:	

Load Factors

α_{DL} =	1.25	Dead Load Factor
α_{LL} =	1.5	Live Load Factor

Material

Steel

Fy =	50	Ksi	Yield Strength of Steel
ϕ_S =	0.9		Material Property Factor

Deflection Limits (L / nnn)

Total Load =	180
Live Load =	240

Loading Uniform)

	Service (Ksf)	Factored (Ksf)	Service (KPa)	Factored (KPa)	
q_{SDL} =	0.089	0.111	4.26	5.33	Uniform Dead Load
q_{SLL} =	0.063	0.094	3.00	4.50	Uniform Live Load
q_{STL} =	0.152	0.205	7.26	9.83	Uniform Total Load

Beam: Eng Tips

W =	17.390	ft	5.300	m	Tributary Width
L =	28.200	ft	8.595	m	Span

Loading

	Service (Klf)	Factored (Klf)	Service (KN/m)	Factored (KN/m)	
q_{SDL} =	1.603	2.003	23.39	29.24	Uniform Dead Load
q_{SLL} =	**1.090**	1.636	15.91	23.87	Uniform Live Load
q_{STL} =	2.693	**3.639**	39.30	53.11	Uniform Total Load

Design Information

Reactions	Service (K)	Factored (K)	Service (KN)	Factored (KN)	
$R_A = R_B$ =	22.60	28.25	100.52	125.65	Dead Load Beam Reactions
$R_A = R_B$ =	**15.37**	23.06	68.39	102.58	Live Load Beam Reactions
$R_A = R_B$ =	37.97	**51.31**	168.91	228.23	Total Load Beam Reactions

Moments	Service (K-ft)	Factored (K-ft)	Service (KN-m)	Factored (KN-m)	
M_{LL} =	108.4	162.6	146.95	220.43	Live Load Beam Moment
M_{TL} =	267.7	**361.7**	362.96	490.44	Total Load Beam Moment

S_{Xreqd} =	96.5	in^3	1580.70	10^3x mm^3	S_X required	
Section:	**W18x55**		**W460x82**			
S_{Xprov} =	98.3	in^3	1610.85	10^3x mm^3	**OK**	S_X provided
I_{Xprov} =	890.0	in^4	370.45	10^6x mm^4		I_X provided

Deflections

D_{LL} =	0.60	in	15.3	**OK**	L / 560	Defl Ratio for LL
D_{TL} =	1.49	in	37.9	**OK**	L / 227	Defl Ratio for TL