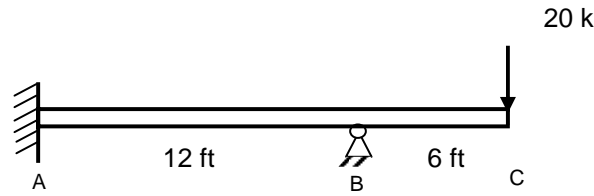


CEE 379

BEAM EXAMPLE #1

All members are steel W16 x 57
A36 steel, $F_a = 24$ ksi



(all spreadsheet quantities in units of kips and inches)

Member AB

	E	I	L	depth	w_{unif}	P_{center}					
W16x57	29000	758	144	16.43	0	0					
							θ_1	d	kd	q_o	$kd+q_o$
q_{Ny}	88.3407	6360.53	-88.341	6360.53	d_{Ny}	0	-15.0	0	-15.00	0	-15.00
m_{Nz}	6360.53	610611	-6360.5	305306	θ_{Nz}	0	-720.0	0.0	-720.00	0.0	-720.00
q_{Fy}	-88.3407	-6360.5	88.3407	-6360.5	d_{Fy}	0	15.0	0	15.00	0	15.00
M1 m_{Fz}	6360.53	305306	-6360.5	610611	θ_{Fz}	-0.0024	-1440.0	0.0	-1440.00	0.0	-1440.00

Member BC

	E	I	L	depth	w_{unif}	P_{center}							
W16x57	29000	758	72	16.43	0	0							
							θ_1	d_2	θ_3	d	kd	q_o	$kd+q_o$
q_{Ny}	706.726	25442.1	-706.73	25442.1	d_{Ny}	0	20.0	0	20.00	0	20.00		
M1 m_{Nz}	25442.1	1221222	-25442	610611	θ_{Nz}	-0.0024	1440.0	0.0	1440.00	0.0	1440.00		
Q2 q_{Fy}	-706.726	-25442	706.726	-25442	d_{Fy}	-0.283	-20.0	0	-20.00	0	-20.00		
M3 m_{Fz}	25442.1	610611	-25442	1221222	θ_{Fz}	-0.0047	0.0	0.0	0.00	0.0	0.00		

Structural System

	θ_1	d_2	θ_3	Q_{01}
M1	1831833	-25442	610611	0.0 kip-in.
Q2	-25442.1	706.726	-25442	0 kips
M3	610611	-25442	1221222	0.0 kip-in.
K_{11}				
	1.6E-06	0.00012	1.6E-06	Q_1
K_{11}^{-1}	0.00012	0.01415	0.00024	$Q_1 - Q_{01}$
	1.6E-06	0.00024	4.9E-06	$D_1 = K_{11}^{-1}(Q_1 - Q_{01})$
				0
				0
				-0.00236 radians
				-20
				-20
				-0.283 inches
				0
				0
				-0.00472 radians

Member Ends Flexural Stresses

Member	$S = 2^*I/d$	Value
Member AB	92.2702	
(ends only)	m_N	-720.0 k-in.
	ft_N	-7.80 ksi
	fb_N	7.80 ksi
	m_F	-1440.0 k-in.
	ft_F	15.61 ksi
	fb_F	-15.61 ksi
Member BC	92.27	
(ends only)	m_N	1440.0 k-in.
	ft_N	15.61 ksi
	fb_N	-15.61 ksi
	m_F	0.0 k-in.
	ft_F	0.00 ksi
	fb_F	0.00 ksi