Gravity Beam Design

RAM Steel 17.01.01.05
V&V RAM TEMPLATE V2019-12-19
Revere Beach S Bldg
DataBase: Riverview Bldg 1 Beam Penetrations 09/21/20 16:31:30
Building Code: IBC Steel Code: AISC 360-10 LRFD

Floor Type: First **Beam Number = 269**

SPAN INFORMATION (ft): I-End (1464.23,-972.79) J-End (1476.11,-972.79)

Maximum Depth Limitation specified = 29.00 in
Beam Size (Optimum) = W14X22 Fy = 50.0 ksi
Total Beam Length (ft) = 11.88
Mp (kip-ft) = 138.33

POINT LOADS (kips):

Dist	DL	RedLL	Red%	NonRLL	StorLL	Red%	RoofLL	Red%	PartL
10.191	1.93	0.00	0.0	1.41	0.00	0.0	0.00	Snow	0.00
10.691	1.93	0.00	0.0	1.41	0.00	0.0	0.00	Snow	0.00
0.656	3.07	0.00	0.0	2.90	0.00	0.0	0.00	Snow	0.00
6.941	0.20	0.00	0.0	0.18	0.00	0.0	0.00	Snow	0.00
10.191	5.13	0.00	0.0	3.73	0.00	0.0	0.00	Snow	0.00
10.691	5.13	0.00	0.0	3.73	0.00	0.0	0.00	Snow	0.00
0.656	7.54	0.00	0.0	7.11	0.00	0.0	0.00	Snow	0.00

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	0.000	1.238	0.857	---	NonR	0.000
	10.190	1.238	0.857			0.000
2	0.000	0.728	0.000	---	NonR	0.000
	11.878	0.728	0.000			0.000
3	0.000	0.205	0.373	0.0%	Red	0.000
	11.878	0.205	0.373			0.000
4	10.191	0.211	0.146	---	NonR	0.000
	11.878	0.211	0.146			0.000
5	10.691	1.026	0.711	---	NonR	0.000
	11.878	1.026	0.711			0.000
6	0.000	0.022	0.000	---	NonR	0.000
	11.878	0.022	0.000			0.000

SHEAR (Ultimate): Max Vu (1.2DL+1.6LL) = 58.61 kips 1.00Vn = 94.53 kips

MOMENTS (Ultimate):

Span	Cond	LoadCombo	Mu	@	Lb	Cb	Phi	Phi*Mn
			kip-ft	ft	ft			kip-ft
Center	Max +	1.2DL+1.6LL	115.7	6.5	0.0	1.00	0.90	124.50
Controlling		1.2DL+1.6LL	115.7	6.5	0.0	1.00	0.90	124.50

REACTIONS (kips):

	Left	**Right**
DL reaction	24.78	25.69
Max +LL reaction	18.04	16.69
Max +total reaction (factored)	58.61	57.53

DEFLECTIONS: **Ratio**

Multipliers for effects of Web Openings:

Span	Noncomp
Center Span	1.000

Dead load (in)	at	6.06 ft	=	-0.241		L/D	=	591		
Live load (in)	at	6.06 ft	=	-0.152		L/D	=	941	> 360	0.38
Net Total load (in)	at	6.06 ft	=	-0.393		L/D	=	363	> 240	0.66

WEB OPENINGS:

Opening #	Dist* ft	Shp	H/Dia in	B in	Position	to in	Stiffener Width in	Thick in	Length in	Sides	Weld in
1	8.88	Circ	3.00	---	Centered	Center	---	---	---		---

*Dist is the distance along the beam from the left end.

Opening #1 at 8.880 ft

Capacity - Noncomposite / Precomposite

Top Tee

Prt = 0.00 kips mut = 0.00 nut = 0.25 alphavt = 1.00
Vpt = 36.52 kips Vmt = 36.52 kips

Bottom Tee

Prb = 0.00 kips mub = 0.00 nub = 0.25 alphavb = 1.00
Vpb = 36.52 kips Vmb = 36.52 kips

Capacity: Vpbar = 90.96 kips
Upper Limit Vm = 0.67 Vpbar = 60.64 kips
Vm = 36.52 + 36.52 = 60.64 kips
Mm = 131.80 kip-ft

Noncomposite +M

Vu = 11.53 kips Mu = 101.55 kip-ft at 8.88 ft (1.2DL+1.6LL)

Interaction: Vu / 0.90 Vm = 0.211
Mu / 0.90 Mm = 0.856
M - V Interaction = 0.860

Compression Tee Buckling

Top Tee Aspect Ratio = 0.56 < 4.0 Check not required.