

د افغانستان اسلامي جمهوریت

د نړو زده کړو وزارت

لғمان پوهنتون

انجینیری پوهنځی



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د پلار نوم : مسٹر خان

صنف : دريم

سکشن: B

حاضرې شمیره : 37

اسئاد : پوهنځی خښ (ځپلواک)

کال: ۱۳۹۹ د ش

بسم الله الرحمن الرحيم

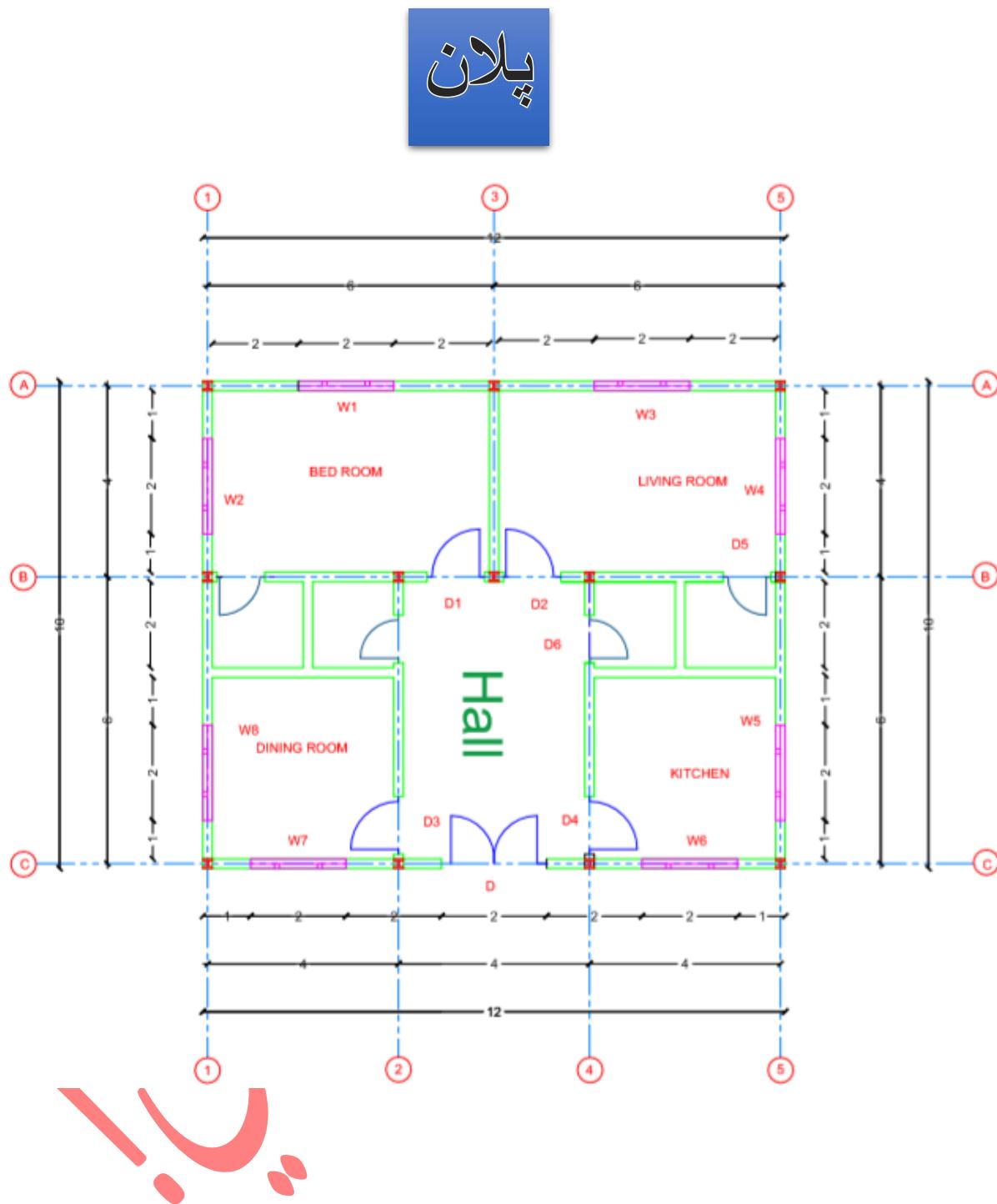
سريزه

له کله نه چى انسان د حمکى په مخ قدم اىينى نو له همغه پيل نه يى د اوسيدو لپاره خان ته ديوه سرپناه د پيداکولو هېم كرى . دا حکه چى هر انسان له هوا او اوبو وروسته ترتولو لمى ارين عنصر چى د هوسا ژوند تيرولو لپاره ورته ارتيا لرى هغه هم سرپنا ده نه يواخى انسانان بلکى الوتونكى هم چى کله په يوه سيمه کى وغوارى دېير وخت لپاره ووسېرى نو لومرى خان ته له ونو ، بوقتو او خابناكو خخه د اوسيدو لپاره خاي برابروى .

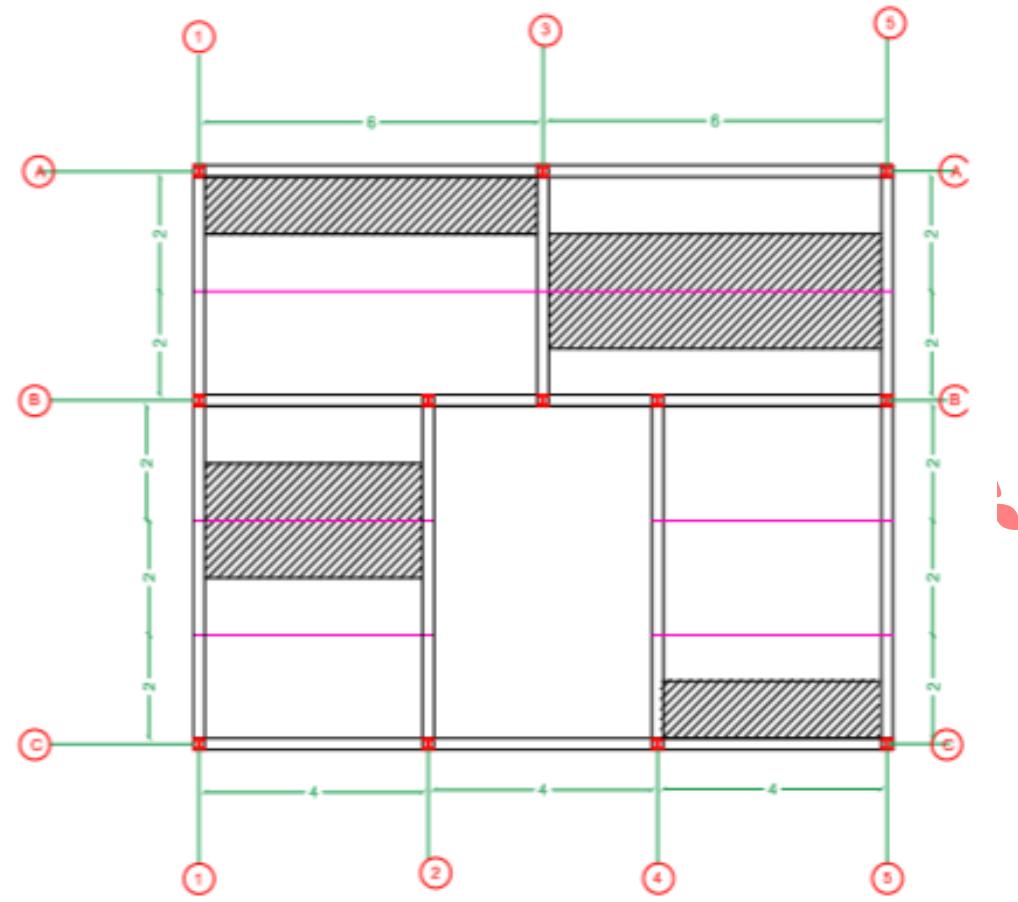
په پخوانى وختونوكى کله چى د انسانانو ژوند په مشترک بول نه و نو په هغه وخت کى خلکوپه غارونو او د لويو ېبرو په اړه خونو او کنجونو کى ژوند تيراوه نو دوى دي ته اړ و چى خپل خانونه د طبيعت د نا مؤزنې شرایط او همدارنګه د ځنګلونو ، غرونو او دشتو وحشى حيواناتو خخه خان په امن وساتي .

نو له دی خخه څرګندېرى چى انسانانو له همغه پيله خان ته سرپناه جوره وي چى د انسان په متمن کيدو سره د سرپناه په جورولوکى مختلف بدلونونه راغلل چى اوس وخت عموما چى کوم ساختمانونه جوريېرى هغه د اوسيپنيز کانكريت ، لرگيو، او فولادي ساختمانونو خخه عبارت دی چى نظر دي ټولو ته فولادي ساختمانونه ډير کارول کيرو . او فولاد ډو ډيره مهمه ساختماني ماده ده چى نن سبا په ساختماني چاروکى په پراخه اندازه ورڅه استفاده کيرو . لکه په مسکونى ودانيو ، سركونو ، پلونو، هايدروليکى ساختمانونو او داسى نور....

موږ چي کوم فولادي ساختمان ديزاين کوو د هغه پلان په لاندي بول دي



د پیمونو اوکادر و چوکات



لومړۍ برخه

د تولو نه ورومبې د دغې ساختمان Roof deck بیزاین کوو

د Roof د بیزاین د پاره یوازي live load په نظر کي نیسو.

د مسکونی و دانيو د پاره live load = 192 kg/m²

$$W_u = 1.4 * 192 \text{ kg/m}^2 = 268.8 \text{ kg/m}^2$$

د نهایي بار واحد د SI څخه PSF ته اړوو

$$W_u = 268.8 * 2.204 / 3.28^2 = 55.06 \text{ PS}$$

اویس VULCRAFT MENUAL ته مراجعه کوو او ده ګه د جدولونو څخه انتخابیوو . موږ چې کوم Roof deck انتخاب کړي دي د هغه وايہ 2m ده اویس موبه دغه واحد په Ft بدلوو

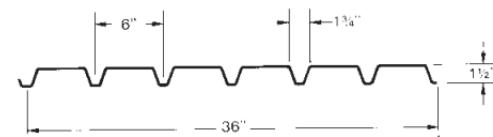
$$2m = 2 * 3.28 \text{ Ft} = 6.56 \text{ Ft}$$

د DECK F20 1.5F په لوړی برخه څلورمه صفحه کي انتخابیوو

کوم چې 6in - 6 Ft - 6 Ft - 6 in دی 6in - 6 Ft - 6 Ft - 6 in

1.5 F

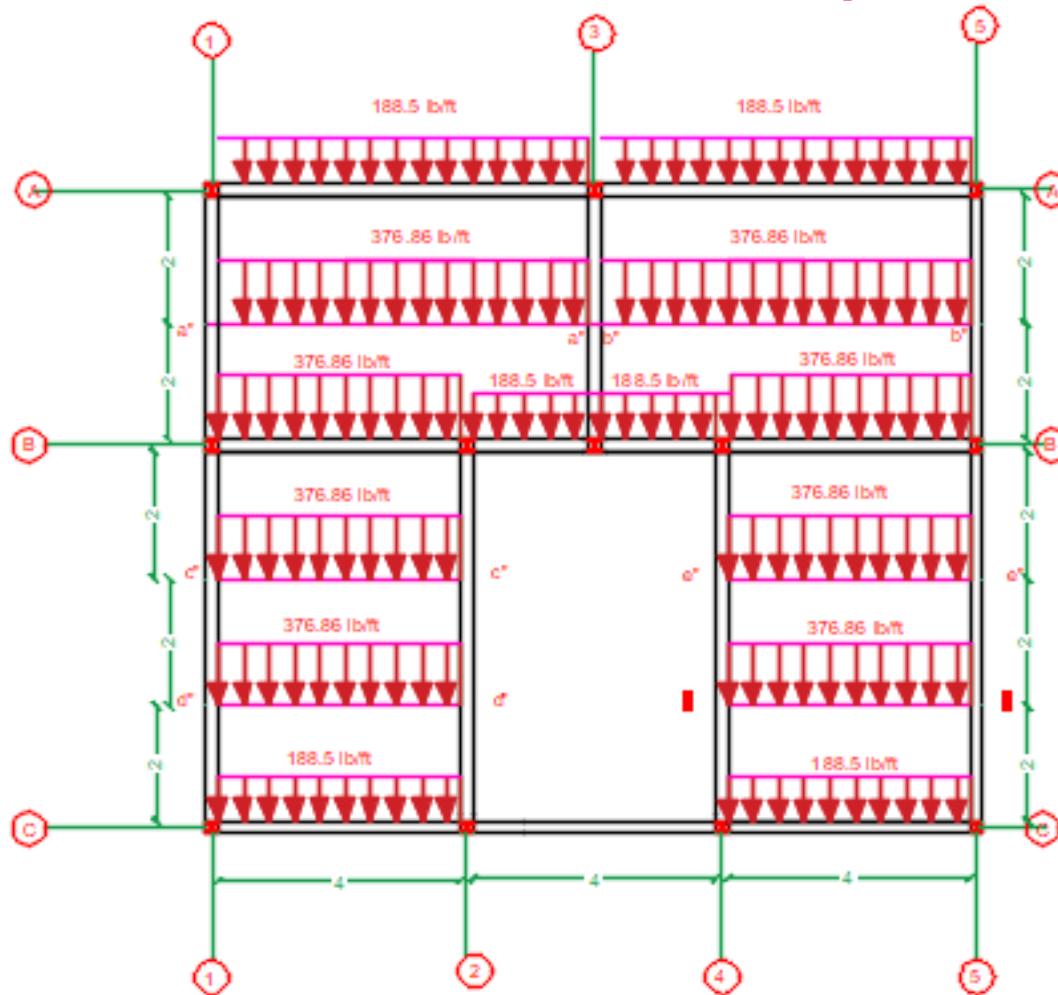
Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
ICBO Approved (No.3415)
Factory Mutual Approved
Deck type & gauge — Max. deck span
1.5F22..... 4'-11"
1.5F20..... 5'-5"
1.5F18..... 6'-3"
FM Approvals No. 0C8A7.AM



VERTICAL LOADS FOR TYPE 1.5F

No. of Spans	Deck Type	Max. Span	Allowable Total (Dead + Live) Uniform Load (PSF)								
			4'-0	4'-6	5'-0	5'-6	6'-0	6'-6	7'-0	7'-6	8'-0
1	F22	4'-9	93	74	60	49	41	35	30	27	23
	F21	5'-1	106	84	68	56	47	40	35	30	26
	F20	5'-5	116	92	74	61	51	44	38	33	29
2	F19	6'-0	138	109	89	73	61	52	44	38	33
	F18	6'-5	158	125	101	84	70	59	49	42	36
	F22	5'-10	101	80	65	53	45	38	33	29	25
3	F21	6'-2	113	89	72	60	50	43	37	32	28
	F20	6'-6	123	97	79	65	55	47	40	35	31
	F19	7'-1	143	113	92	76	64	54	47	41	36
	F18	7'-8	163	128	104	86	72	62	53	46	41
	F22	5'-10	126	100	81	67	56	48	41	36	32
	F21	6'-2	141	111	90	74	63	53	46	40	35
	F20	6'-6	154	122	99	82	69	68	50	44	39
	F19	7'-1	179	142	115	95	80	68	59	51	45
	F18	7'-8	203	160	130	107	90	77	66	58	51

په لاندی چوکات کې هربیم ته لود په خطې بول پسندل شوي



په پورته چوکات کې خینې بیمونه د اوبردوالی او پر هغوي د وارده بار له مخي بول دی

$$A_{1-3} = A_{3-5}$$

$$C_{1-2} = C_{4-5}$$

$$B_{1-2} = B_{4-5}$$

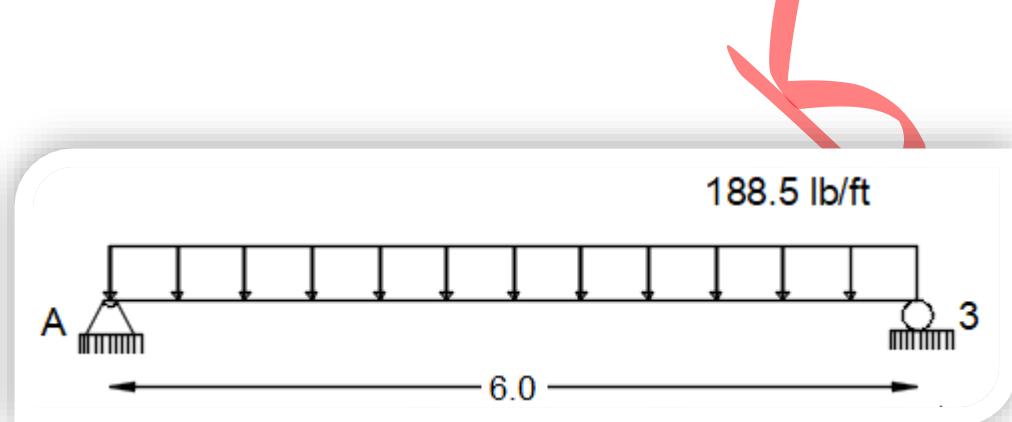
$$B_{2-3} = B_{3-4}$$

$$a'' - a'' = b'' - b'' , \quad c'' - c'' = d'' - d'' = e'' - e'' = f'' - f''$$

اوس نو لو مردي A1-3 بيم ديرلين کوو

په هر بيم د ROOF DECK 1.99 PSF وزن په نظر کي نيوں کيوري

نوت : د بيمونو او گاپرو اندازه گذاري په متر ده چي په محاسبه کي په فوت اړول کيوري



$$W_u = 188.5 \text{ lb/ft}$$

$$M_{max} = W * L^2 / 8$$

$$M_{max} = \frac{188.5 \text{ lb/ft} * (19.7 \text{ ft})^2}{8} = 9144.4 \text{ lb * ft}$$

$$S_{required} = \frac{M}{\delta_{Allowable}}$$

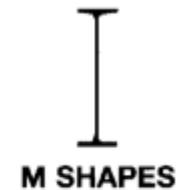
$$\delta_{Allowable} \text{ for steel} = 29 \text{ ksi}$$

$$ft = 12 \text{ in}$$

$$S_{req} = \frac{9144.4 * 12 \text{ lb * in}}{29000 \text{ psi}} = 3.78 \text{ in}^3$$

اوسي (28, 29) صفحو ته ټو او د in^3 ، $M_{8*6.2}$ بيم مقطع انتخابوو

Table 1-2 (continued)
M Shapes
Properties



Nominal Wt. lb/ft	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_o	$\frac{J}{S_x h_o}$	Torsional Properties	
	b_t	$\frac{h}{2t_f}$	I	S	r	Z	I	S	r	Z				J	C_w
			in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³				in. ⁴	in. ⁶
12.4	8.22	74.8	89.3	14.2	4.96	16.5	2.01	1.07	0.744	1.68	0.100	12.3	0.000283	0.0493	76.0
11.6	8.29	74.8	80.3	12.8	4.86	15.0	1.51	0.864	0.667	1.37	0.099	12.3	0.000263	0.0414	57.1
11.8	6.81	62.5	72.2	12.0	4.56	14.3	1.09	0.709	0.559	1.15	0.108	11.8	0.000355	0.0500	37.7
10.8	7.30	69.2	66.7	11.1	4.58	13.2	1.01	0.661	0.564	1.07	0.104	11.8	0.000300	0.0393	35.0
10	9.03	74.7	61.7	10.3	4.57	12.2	1.03	0.636	0.592	1.02	0.098	11.8	0.000240	0.0292	35.9
9	6.53	58.4	39	8.83	9.22	0.672	0.500	0.503	0.809	0.117	9.81	0.000411	0.0314	16.1	
8	7.39	65.0	34.0	6.95	3.82	8.20	0.593	0.441	0.500	0.711	0.111	9.81	0.000328	0.0224	14.2
7.5	7.77	71.0	33.0	6.60	3.85	7.77	0.562	0.418	0.503	0.670	0.107	9.81	0.000289	0.0187	13.5
6.5	6.03	53.8	18.5	4.63	3.11	5.43	0.376	0.329	0.443	0.529	0.131	7.81	0.000509	0.0184	5.73
6.2	6.44	56.5	17.6	4.39	3.10	5.15	0.352	0.308	0.439	0.495	0.127	7.81	0.000455	0.0156	5.38
4.4	5.39	47.0	7.23	2.41	2.36	2.80	0.180	0.195	0.372	0.311	0.152	5.81	0.000707	0.00990	1.53
3.7	7.75	54.7	5.96	2.01	2.34	2.33	0.173	0.173	0.398	0.273	0.137	5.75	0.000459	0.00530	1.45

مونږ د AISC MENUAL په 28 صفحه کې M8*6.2 دوله مقطع انتخابو

اوسم یاده مقطع د عرضي تشنج دپاره چیک کوو $V = 1854.15$

$$A = t_w * d , \quad A = 0.129 * 8 , \quad A = 1.032 \text{ in}^2 ,$$

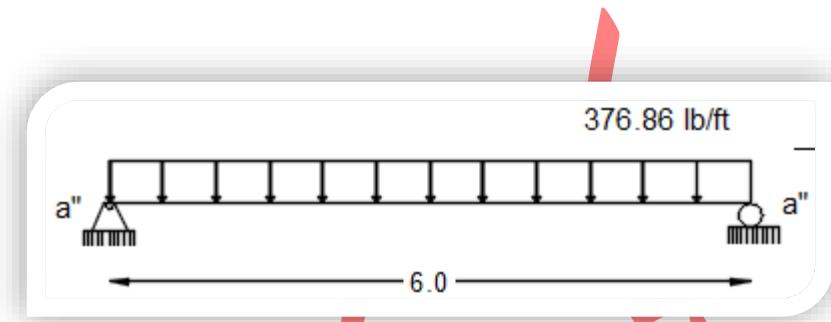
$$\tau = V/A$$

$$\tau = 1854.15 / 1.032 = 1.79665 \text{ ksi}$$

$$\tau_{\text{allowable}} = 12 \text{ ksi}$$

$$\tau_{\text{allowable}} > \tau \dots \text{ok}$$

اوس بیم دیزاین کوو a"-a"



$$W_u = 376.86 \text{ lb/ft}$$

$$M_{\max} = W * L^2 / 8$$

$$M_{\max} = (376.86 * 19.68^2) / 8 = 18244.8 \text{ lb*ft}$$

$$S_{\text{required}} = \frac{M}{\delta_{\text{allowable}}}$$

$$\text{ft} = 12 \text{ in}$$

$$S_{\text{req}} = (18244.8 * 12) \text{ lb*in} / 29000 \text{ psi} = 7.55 \text{ in}^3$$

اوس (28, 29) صفحو ته خو او د M_{10*9} بیم مقطع انتخابو $s = 7.79 \text{ in}^3$

Table 1-2 (continued)
M Shapes
Properties



Nominal Wt. lb/ft	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{IS}	h_o	$\frac{J}{S_x h_o}$	Torsional Properties	
	b_t	$\frac{h}{2t_f}$	I	S	r	Z	I	S	r	Z				J	C_w
			in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³				in. ⁴	in. ⁶
12.4	8.22	74.8	89.3	14.2	4.96	16.5	2.01	1.07	0.744	1.68	0.100	12.3	0.000283	0.0493	76.0
11.6	8.29	74.8	80.3	12.8	4.86	15.0	1.51	0.864	0.667	1.37	0.099	12.3	0.000263	0.0414	57.1
11.8	6.81	62.5	72.2	12.0	4.56	14.3	1.09	0.709	0.559	1.15	0.108	11.8	0.000355	0.0500	37.7
10.8	7.30	69.2	66.7	11.1	4.58	13.2	1.01	0.661	0.564	1.07	0.104	11.8	0.000300	0.0393	35.0
10	9.03	74.7	61.7	10.3	4.57	12.2	1.03	0.636	0.592	1.02	0.098	11.8	0.000240	0.0292	35.9
9	6.53	58.4	39.0	7.79	3.83	9.22	0.672	0.500	0.503	0.809	0.117	9.81	0.000411	0.0314	16.1
8	7.39	65.0	34.6	6.95	3.82	8.20	0.593	0.441	0.500	0.711	0.111	9.81	0.000328	0.0224	14.2

اویس یی د عرضی تشنج دپاره محاسبه کوو

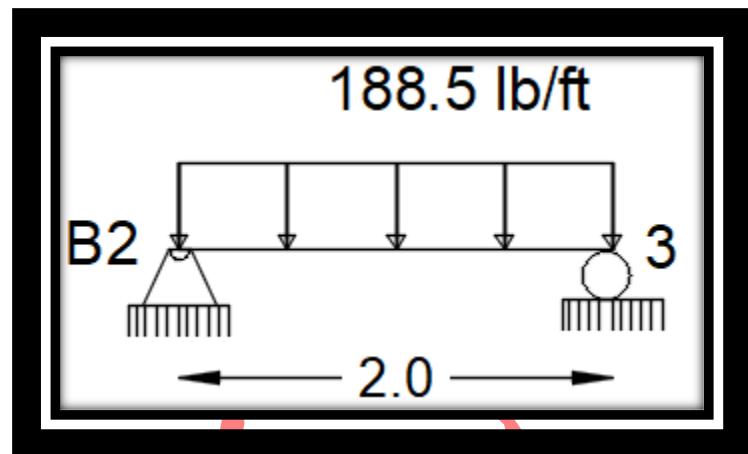
$$\tau = V/A \quad , \quad v = 3708.3 \text{ lb}$$

$$A = tw * d \quad , \quad A = 0.157 * 10 \quad , \quad A = 1.57 \text{ in}^2$$

$$\tau = 3708.3 / 1.57 = 2.362 \text{ ksi}$$

$$\tau_{\text{allowable}} = 12 \text{ ksi} \quad \tau_{\text{allowable}} > \tau \quad \dots \quad \text{ok}$$

اوس بیزائیں کوو B₂₋₃



$$W_u = 188.5 \text{ lb/ft}$$

$$M_{\max} = (188.5 * 6.56^2) / 8 = 1014 \text{ lb*ft}$$

$$S_{\text{required}} = \frac{M}{\delta_{\text{Allowable}}}$$

$$\text{ft} = 12 \text{ in}$$

$$S_{\text{req}} = (1014 \text{ lb*ft} * 12) / 29000 \text{ psi} = 0.42 \text{ in}^3$$

اویس پہ ۲۸، ۲۹ صفحو کی $M_{3*2.9}$ بیم مقطع انتخابو

Table 1-2 (continued)
M Shapes
Properties

M SHAPES

Nominal Wt. lb/ft	Compact Section Criteria			Axis X-X				Axis Y-Y				r_x	h_o	Torsional Properties			
	b_f	$\frac{b}{t_w}$	I	S	r	Z	I	S	r	Z	J			J	C_w		
			in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³	in.			in. ⁴	in. ⁴		
12.4	8.22	74.8	89.3	14.2	4.96	16.5	2.01	1.07	0.744	1.68	0.100	12.3	0.000283	0.0493	76.0		
11.6	8.29	74.8	80.3	12.8	4.86	15.0	1.51	0.864	0.667	1.37	0.099	12.3	0.000263	0.0414	57.1		
11.8	6.81	62.5	72.2	12.0	4.56	14.3	1.09	0.709	0.559	1.15	0.108	11.8	0.000355	0.0500	37.7		
10.8	7.30	69.2	66.7	11.1	4.58	13.2	1.01	0.661	0.564	1.07	0.104	11.8	0.000300	0.0393	35.0		
10	9.03	74.7	61.7	10.3	4.57	12.2	1.03	0.636	0.592	1.02	0.098	11.8	0.000240	0.0292	35.9		
9	6.53	58.4	39.1	-	-	9.22	0.672	0.500	0.503	0.809	0.117	9.81	0.000411	0.0314	16.1		
8	7.39	65.0	34.6	-	-	3.82	8.20	0.593	0.441	0.500	0.711	0.111	9.81	0.000328	0.0224	14.2	
7.5	7.77	71.0	33.0	-	-	6.60	3.85	7.77	0.562	0.418	0.503	0.670	0.107	9.81	0.000289	0.0187	13.5
6.5	6.03	53.8	18.5	-	-	4.63	3.11	5.43	0.376	0.329	0.443	0.529	0.131	7.81	0.000509	0.0184	5.73
6.2	6.44	56.5	17	-	-	4.33	5.15	0.352	0.308	0.439	0.495	0.127	7.81	0.000455	0.0156	5.38	
4.4	5.39	47.0	7.23	-	-	2.41	2.36	2.80	0.180	0.195	0.372	0.311	0.152	5.81	0.000707	0.00990	1.53
3.7	7.75	54.7	5.96	-	-	2.01	2.34	2.33	0.173	0.173	0.398	0.273	0.137	5.75	0.000459	0.00530	1.45
18.9	6.01	11.2	24.2	-	-	9.67	2.08	11.1	8.70	3.48	1.25	5.33	0.28	4.56	0.00709	0.313	45.7
6	11.9	22.0	4.72	-	-	2.48	1.64	2.74	1.47	0.771	0.915	1.18	0.22	3.56	0.00208	0.0184	4.85
4.08	6.62	26.4	3.53	-	-	1.77	1.67	2.00	0.325	0.289	0.506	0.453	0.220	3.81	0.00218	0.0147	1.19
3.45	8.65	33.9	2.86	-	-	1.43	1.68	1.60	0.248	0.221	0.496	0.346	0.200	3.88	0.00148	0.00820	0.930
3.2	8.65	33.9	2.86	-	-	1.43	1.68	1.60	0.248	0.221	0.496	0.346	0.200	3.88	0.00148	0.00820	0.930
2.9	8.65	23.6	1.50	1.00	-	1.28	1.12	0.248	0.221	0.521	0.344	0.250	2.88	0.00275	0.00790	0.511	

اوس يى عرضي تشنج ته محاسبه كوو

$$\tau = V/A$$

$$V = 618.05$$

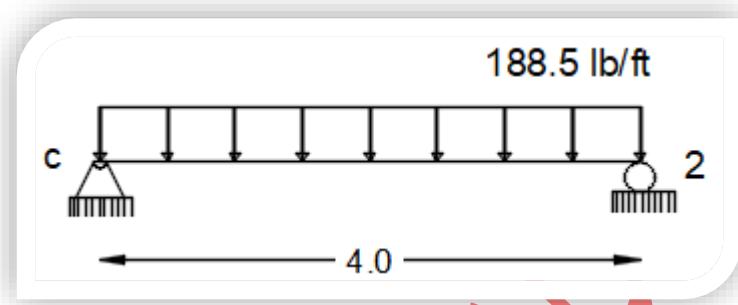
$$A = t_w \cdot d , A = 0.09 \cdot 3 , A = 0.27 \text{ in}^2$$

$$\tau = (618.05)/(0.27) = 2289.07 \text{ psi} , \tau_{\text{allowable}} = 12 \text{ ksi}$$

$$\tau = 2.28907 \text{ ksi}$$

$$\tau_{\text{allowable}} > \tau \dots \text{ok}$$

اوس سی ۱-۲ بیم دیزاین کوو



$$W_u = 188.5 \text{ lb/ft}$$

$$M_{\max} = W * L^2 / 8$$

$$M_{\max} = (188.5 * 13.12^2) / 8 = 4056 \text{ lb*ft}$$

$$\text{ft} = 12 \text{ in}$$

$$S_{\text{required}} = \frac{M}{\delta_{\text{Allowable}}}$$

$$S_{\text{req}} = (4056 * 12) / 29000 \text{ psi} = 1.67 \text{ in}^3$$

اویس پ ۳۱,۳۲ صفحو کی د مقطع انتخابو
و

Table 1-3 (continued)
S Shapes
Properties



Nominal Wt. lb/ft	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts} in.	h_o in.	Torsional Properties	
	$\frac{b_f}{2t_f}$	$\frac{h}{t_w}$	I in. ⁴	S in. ³	r in.	Z in. ³	I in. ⁴	S in. ³	r in.	Z in. ³			J in. ⁴	C_w in. ⁶
121	3.69	25.9	3160	258	9.43	306	83.0	20.6	1.53	36.3	1.94	23.4	12.8	11400

5.7	4.48	11.0	2.50	1.67	1.23	1.94	0.447	0.383	0.518	0.656	0.605	2.74	0.0433	0.838
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او س بی عرضی تشنج ته محاسبه کوو

$$\tau = V/A$$

$$V = 1236.1 \text{ lb}$$

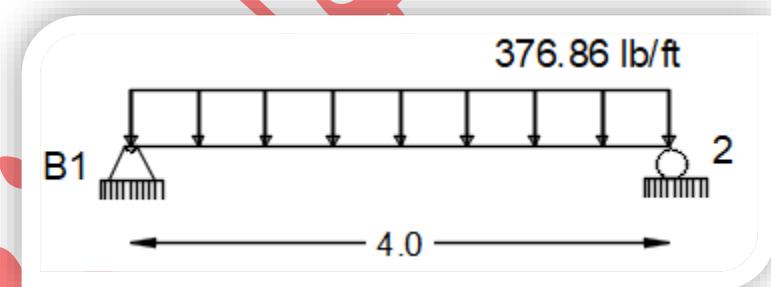
$$A = tw * d , A = 0.17 * 3 = 0.51 \text{ in}^2$$

$$\tau = 1236.1 \text{ lb} / 0.51 \text{ in}^2 = 2423.7 \text{ psi} , \tau_{\text{allowable}} = 12 \text{ ksi}$$

$$\tau = 2.4237 \text{ ksi}$$

$$\tau_{\text{allowable}} > \tau \dots \text{ok}$$

او س بیم دیزاین کوو B₁₋₂



$$W_u = 376.86 \text{ lb/ft}$$

$$M_{\max} = W * L^2 / 8$$

$$M_{\max} = (376.86 \text{ lb/ft} * 13.12^2 \text{ ft}^2) / 8 = 8108.8 \text{ lb*ft}$$

$$Ft = 12 \text{ in}$$

$$S_{\text{required}} = \frac{M}{\delta_{\text{Allowable}}}$$

$$S_{\text{req}} = (8108.8 * 12) / 29000 \text{ psi} = 3.365 \text{ in}^3$$

اوس د مینول په (صفحه 31,30) بیم مقطع انتخابوو $S=38\text{in}^3$, $S_{4*9.5}$

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_o	Torsional Properties	
			I	S	r	Z	I	S	r	Z			J	C_w
	b_f	$\frac{h}{2t_f}$	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³	in.	in.	in. ⁴	in. ⁶
121	3.69	25.9	3160	258	9.43	306	83.0	20.6	1.53	36.3	1.94	23.4	12.8	11400
9.5	4.77	8.33	6.76	3.38	1.56	4.04	0.887	0.635	0.564	1.13	0.698	3.71	0.120	3.05

اوسي عرضي تشنج ته محاسبه کوو

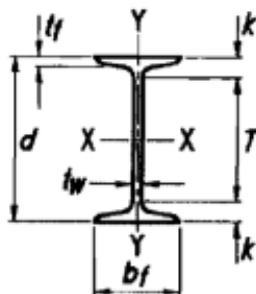


Table 1-3
S Shapes
Dimensions

Shape	Area, A	Depth, d		Web		Flange		Distance		
				Thickness, t_w	$\frac{t_w}{2}$	Width, b_f	Thickness, t_f	k	T	Workable Gage
	in. ²	in.	in.	in.	in.	in.	in.	in.	in.	in.
S24x121	35.5	24.5	24 $\frac{1}{2}$	0.800	$\frac{13}{16}$	$\frac{7}{16}$	8.05	8	1.09	$1\frac{1}{16}$
S4x9.5	2.79	4.00	4	0.326	$\frac{5}{16}$	$\frac{3}{16}$	2.80	$2\frac{3}{4}$	0.293	$\frac{5}{16}$
									$\frac{3}{4}$	$2\frac{1}{2}$
										-

$$\tau = V/A$$

$$V = 2472.2 \text{ lb}$$

$$A = t_w * d , A = 0.326 * 4 = 1.304 \text{ in}^2$$

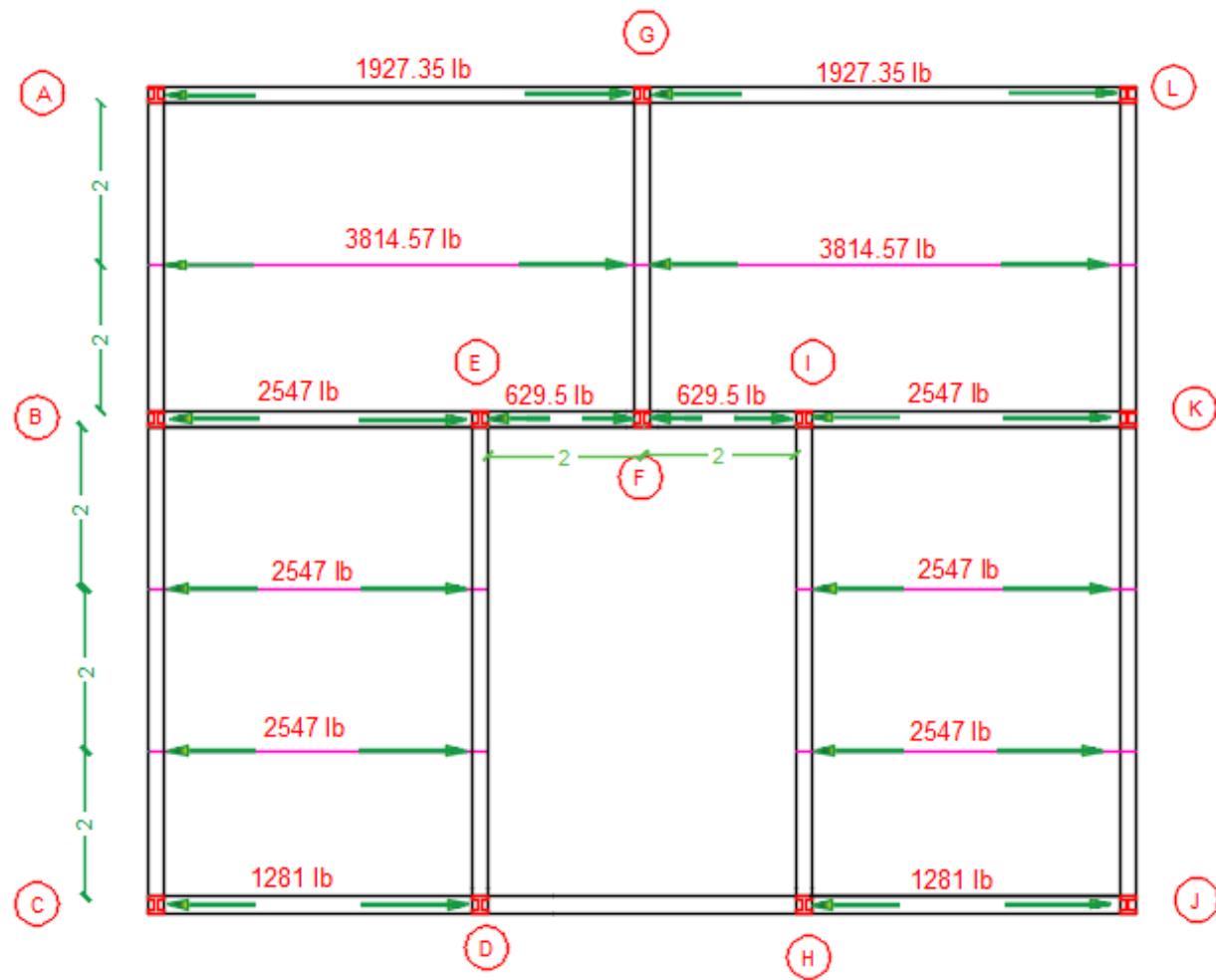
$$\tau = 2472.2 \text{ lb} / 1.304 \text{ in}^2 = 1895.86 \text{ psi} , \tau_{\text{allowable}} = 12 \text{ ksi}$$

$$\tau = 1.89586 \text{ ksi}$$

$\tau_{\text{allowable}} > \tau \dots \text{ok}$

د ګاډرو دېټاين محاسبه

په لاندي چوکات کي مجموعي لوډ د بیمونو څخه ګاډروته د انتقال په حالت کي بنودل شوي. کوم چې د بیمونو او Roof د بیدلوډ او لايف لوډ څخه ترلاسه شوي.



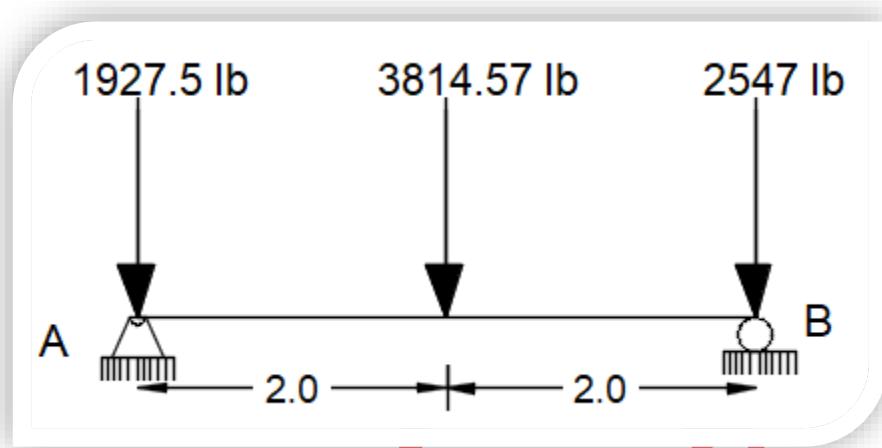
په پورته چوکات کي ځیني ګاډرونه د اوږدوالي او پر هغوي د وارده بار له مخي یو ډول دي. لکه :

$$A-B = L-K$$

$$B-C = K-J \quad , \quad E-D = I-H$$

$$G-F$$

د گادر دیزاین A-B



$$W = 3814.57 \text{ lb}, L = 4\text{m}$$

$$M_{max} = w * l / 4$$

$$M_{max} = 12511.79 \text{ lb*ft}$$

$$S_{\text{required}} = \frac{M}{\delta_{\text{Allowable}}}$$

$$S_{\text{req}} = 12511.79 \text{ lb * 12 in} / 29000 \text{ psi} = 5.18 \text{ in}^3$$

او س په 27 صفحه کي $w_6 * 9$ مقطع دکادر لپاره انتخابو و $S = 5.56 \text{ in}^3$

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_o	Torsional Properties	
	b_f	h	I	S	r	Z	I	S	r	Z			J	C_w
	lb/ft	$2t_f$	t_w	in.^4	in.^3	in.	in.^3	in.^4	in.^3	in.			in.^4	in.^6
67	4.43	11.1	272	60.4	3.72	70.1	88.6	21.4	2.12	32.7	2.43	8.07	5.05	1440
	9	9.16	29.2	16.4	5.56	2.47	6.23	2.20	1.11	0.905	1.72	1.06	5.69	0.0405
														17.7

اویس بی عرضی تشنج ته محاسبه کوو

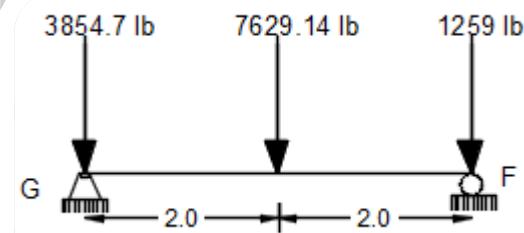
$$\tau = V/A , v = 1907.28 \text{ lb} ,$$

$$A = tw * d \quad A = 0.17 * 5.9 , \quad A = 1.003 \text{ in}^2$$

$$\tau = 1907.28 \text{ lb} / 1.003 \text{ in}^2 = 1796.6 \text{ psi} , \quad \tau_{\text{allowable}} = 12 \text{ ksi}$$

$$1.7966 \text{ ksi} < \tau_{\text{allowable}} \dots \text{ok}$$

~~اویس د G-F د گادر دیزاین کوو~~



$$W = 7629.14 \text{ lb} , L = 4 \text{ m}$$

$$M_{\max} = w * l / 4 = 25023.58 \text{ lb*ft}$$

$$S_{\text{required}} = \frac{M}{\delta_{\text{allowable}}} ,$$

$$1 \text{ m} = 3.28 \text{ ft} , \quad 1 \text{ ft} = 12 \text{ in}$$

$$S_{\text{req}} = 25023.58 * 12 / 29000 \text{ psi} = 10.35 \text{ in}^3$$

اویس په 25 صفحه کي W_{10*12} د بیم مقطع انتخابوو چي عبارت ده له:

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_t	h_o	Torsional Properties	
	b_r	$\frac{h}{2t_r}$	I	S	r	Z	I	S	r	Z			J	C_w
	lb/ft		in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³			in.	in. ⁶
58	7.82	27.0	475	78.0	5.28	86.4	107	21.4	2.51	32.5	2.82	11.6	2.10	3570
10	7.41	30.5	60.9	13.0	3.90	10.0	2.09	1.40	0.010	2.30	1.01	9.72	0.104	66.3
12	9.43	46.6	53.8	10.9	3.90	12.6	2.18	1.10	0.785	1.74	0.983	9.66	0.0547	50.9

اویس بی عرضی تشنج ته محاسبه کوو

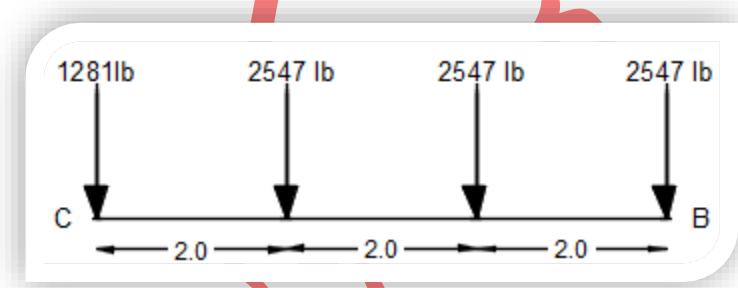
$$\tau = V/A, \quad v = 3814.57 \text{ lb}, \quad A = 1.87 \text{ in}^2$$

$$\tau = 3814.57 \text{ lb} / 1.87 \text{ in}^2 = 2039 \text{ psi}, \quad \tau_{\text{allowable}} = 12 \text{ ksi}$$

$$\tau = 2.039 \text{ ksi}$$

$$\tau < \tau_{\text{allowable}} \dots \dots \text{ok}$$

اویس C-B گادر دیزاین کوو



$$Ay = 3828 \text{ lb}, \quad By = 5094 \text{ lb}$$

$$M_{\max} = 16708.32 \text{ lb*ft}$$

$$S_{\text{required}} = \frac{M}{\delta_{\text{Allowable}}}$$

$$S_{\text{req}} = 16708.32 * 12 \text{ in} / 29000 \text{ psi} = 6.91 \text{ in}^3$$

اویس په 27 صفحه کي W_{6*12} د بیم مقطع انتخابوو چي عبارت ده له:

$$S = 7.31 \text{ in}^3$$

Nominal Wt.	Compact Section Criteria		Axis X-X				Axis Y-Y				r_{ts}	h_0	Torsional Properties	
	b_f	$\frac{h}{2t_f}$	I	S	r	Z	I	S	r	Z			J	C_w
	lb/ft	in.	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³			in.	in. ⁶
67	4.43	11.1	272	60.4	3.72	70.1	88.6	21.4	2.12	32.7	2.43	8.07	5.05	1440

| 12 | 7.14 | 21.6 | 22.1 | 7.31 | 2.49 | 8.30 | 2.99 | 1.50 | 0.918 | 2.32 | 1.08 | 5.75 | 0.0903 | 24.7 |

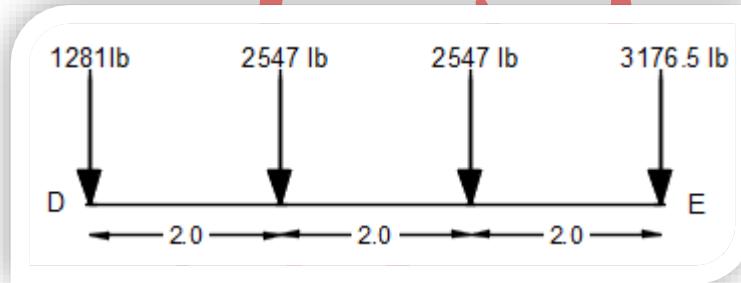
اوسمی عرضی تشنج ته محاسبه کوو

$$\tau = V/A , V=2547 \text{ lb} , A=1.4 \text{ in}^2$$

$$\tau = 2547/1.4 = 1819.3 \text{ psi} , \tau_{allowable} = 12 \text{ ksi}$$

$$1.8193 \text{ ksi} < 12 \text{ ksi} \dots \dots \dots \text{ok}$$

گادر پیزاين E-D



$$Dy = 3828 \text{ lb} , Ey = 5723.5 \text{ lb} , 1 \text{ ft} = 12 \text{ in}$$

$$S_{\text{required}} = \frac{M}{\delta_{\text{allowable}}}$$

$$M_{\text{max}} = 16708.32 \text{ lb*ft}$$

$$S_{\text{req}} = 16708.32 \text{ lb * 12 / 29000 psi} = 6.91 \text{ in}^3$$

د مینول پ ۲۷۴ صفحه کي $6^{*}12$ د بيم مقطع انتخابو وكمه چي د C-B گادر لپاره

$$S = 7.31 \text{ in}^3$$

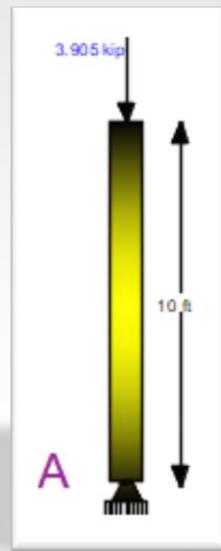
اوسمی عرضی تشنج ته محاسبه کوو

$$\tau = V/A , V=2547 \text{ lb} , A=Tw*d = 0.23*6.03 = 1.4 \text{ in}^2 , A = 1.4 \text{ in}^2$$

$$\tau = 2547/1.4 = 1819.3 \text{ psi} , \tau_{allowable} = 12 \text{ ksi} , 1.8193 \text{ ksi} < 12 \text{ ksi} \dots \dots \text{ok}$$

A = L پایی بیزاین

$W_u = 3.905$
kip



اوں د menual په
صفحہ کی د
HSS2*2*1/8
مقطع
انتخابوو

R = 0.761 in

SR = AL/R ≤ 200

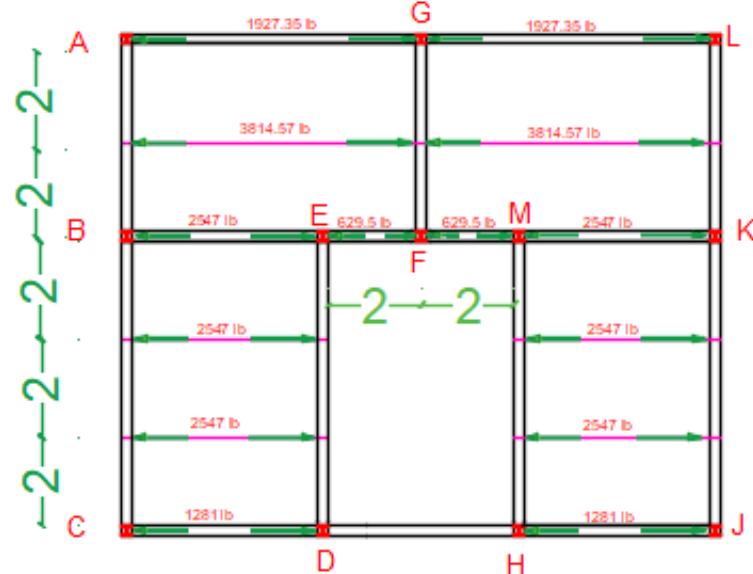
کالم ارتفاع A=10 ft

SR = (10 * 12) in / 0.76 in

SR = 157.7

157.7 < 200 ok

د پایو بیزاین



د هری پایی اوبردوالی 10 ft دی

د تولو پایو انکاوی په دواړو خواوو کي PIN دی

په دی پلان کی ټینی پای پر هفوی د وارديو قوو له
مخی یو پول دې

$A = L$, $B = K$, $E = M$, $C = D = H = J$, F , G

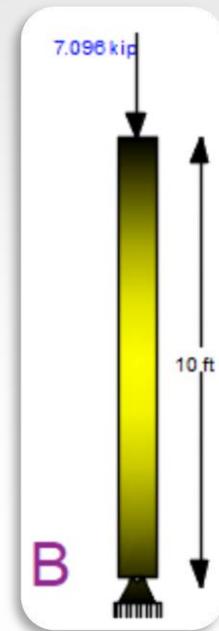
Shape	HSS2 $\frac{1}{4}$ x $\frac{2}{3}$ x $\frac{1}{8}$						HSS2 $\frac{1}{2}$ x $\frac{2}{3}$					
	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{16}$	$\frac{1}{8}$	$\frac{1}{4}$
	Design	$P_n/I_{z,c}$ ASD	Q_nP_a LRFD	$P_n/I_{z,c}$ ASD	Q_nP_a LRFD	$P_n/I_{z,c}$ ASD	Q_nP_a LRFD	$P_n/I_{z,c}$ ASD	Q_nP_a LRFD	$P_n/I_{z,c}$ ASD	Q_nP_a LRFD	$P_n/I_{z,c}$ ASD
	0	37.7	56.6	26.3	39.6	41.5	62.4	32.9	49.4	23.1	34.8	
	1	37.1	55.8	26.0	39.0	40.7	61.2	32.3	48.5	22.7	34.2	
	2	35.6	53.5	25.0	37.6	38.4	57.7	30.6	45.9	21.6	32.5	
	3	33.2	49.9	23.4	35.2	34.8	52.3	27.9	42.0	19.9	29.9	
	4	30.1	45.3	21.4	32.1	30.4	45.6	24.6	37.0	17.7	26.6	
	5	26.6	40.0	19.0	28.6	25.5	38.3	20.9	31.5	15.2	22.9	
	6	22.8	34.3	16.5	24.8	20.5	30.9	17.2	25.8	12.7	19.0	
	7	19.1	28.6	13.9	20.9	15.9	23.9	13.6	20.4	10.2	15.3	
	8	15.5	23.3	11.5	17.2	12.2	18.3	10.4	15.7	7.93	11.9	
	9	12.3	18.5	9.17	13.8	9.63	14.5	8.26	12.4	6.26	9.42	
	10	9.95	15.0	7.43	11.2	7.80	11.7	6.69	10.1	5.07	7.63	

نوموري بیزاین د $C=D=H=J$ لپاره هم کفایت کوي ځکه
چي 4.08 kip/ft ظرفیت لرونکی دي او په J , C, D, H, J کالمونو باندي لدی کمه قوه موجوده ده.

پايو بيزاين B=K

$$W_u = 7.096$$

kip



Shape	HSS2 1/4 x 2 1/4 x				HSS2 x 2 x			
	3/16	1/8	1/4	3/16	1/8	3/16	1/8	
t_{design} , in.	0.174	0.116	0.233	0.174	0.116			
Wt/R	4.94	3.47	5.38	4.30	3.04			
Design	P_n/Ω_c	$\phi_c P_n$	P_g/Ω_c	$\phi_c P_g$	P_n/Ω_c	$\phi_c P_n$	P_g/Ω_c	$\phi_c P_g$
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
$t_{ratio of gage to r_y}$	0	37.7	56.6	26.3	39.6	41.5	62.4	32.9
	1	37.1	55.8	26.0	39.0	40.7	61.2	32.3
	2	35.6	53.5	25.0	37.6	38.4	57.7	30.6
	3	33.2	49.9	23.4	35.2	34.8	52.3	27.9
	4	30.1	45.3	21.4	32.1	30.4	45.6	24.6
	5	26.6	40.0	19.0	28.6	25.5	38.3	20.9
	6	22.8	34.3	16.5	24.8	20.5	30.9	17.2
	7	19.1	28.6	13.9	20.9	15.9	23.9	13.6
	8	15.5	23.3	11.5	17.2	12.2	18.3	10.4
	9	12.3	18.5	9.17	13.8	9.63	14.5	8.26
	10	9.95	15.0	7.43	11.2	7.80	11.7	6.69

کوئی ممکن نہیں!

اوس د 468 په صفحہ کي د
قطع HSS2*2*1/8
انتخابوو

$$R=0.761 \text{ in}$$

$$SR = AL/R \leq 200$$

$$B=10 \text{ ft} \text{ ارتفاع کالم}$$

$$SR = (10 * 12) / 0.761 \text{ in}$$

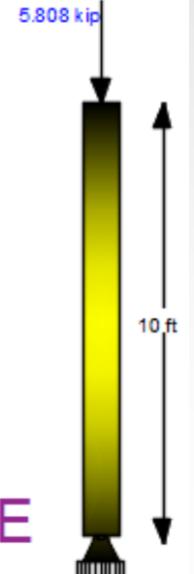
$$SR = 157.69$$

$157.69 < 200 \dots \text{ok}$

E=M پايو ديزain

$W_u = 5.808$

kip



Shape	HSS2 1/4 x 2 1/4 x				HSS2 x 2 x					
	3/16	1/8	1/4	3/16	1/8	1/4	3/16	1/8		
t_{design} in.	0.174	0.116	0.233	0.174	0.116					
W_u/R	4.94	3.47	5.38	4.30	3.04					
Design	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$		
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD		
0	37.7	56.6	26.3	39.6	41.5	62.4	32.9	49.4	23.1	34.8
1	37.1	55.8	26.0	39.0	40.7	61.2	32.3	48.5	22.7	34.2
2	35.6	53.5	25.0	37.6	38.4	57.7	30.6	45.9	21.6	32.5
3	33.2	49.9	23.4	35.2	34.8	52.3	27.9	42.0	19.9	29.9
4	30.1	45.3	21.4	32.1	30.4	45.6	24.8	37.0	17.7	26.6
5	26.6	40.0	19.0	28.6	25.5	38.3	20.9	31.5	15.2	22.9
6	22.8	34.3	16.5	24.8	20.5	30.9	17.2	25.8	12.7	19.0
7	19.1	28.6	13.9	20.9	15.9	23.9	13.6	20.4	10.2	15.3
8	15.5	23.3	11.5	17.2	12.2	18.3	10.4	15.7	7.93	11.9
9	12.3	18.5	9.17	13.8	9.63	14.5	8.26	12.4	6.26	9.42
10	9.95	15.0	7.43	11.2	7.80	11.7	6.69	10.1	5.07	7.63

اوں د manual په 468

صفہ کی د

مقطع HSS2*2*1/8

انتخابو

$R=0.761$ in

$SR = AL/R \leq 200$

کالم ارتفاع $B=10$ ft

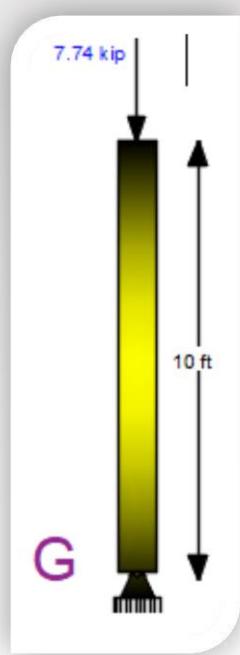
$SR = (10 * 12) / 0.761 \text{ in} = 157.69$

$SR = 157.69$

و پاپی دیزاین

$W_u = 7.7 \text{ kip}$

Shape	HSS2 1/4 × 2 1/4 ×				HSS2 × 2 ×					
	3/16		1/8		1/4		3/16			
	t_{design} in.	0.174	0.116	0.233	0.174	0.116	0.233	0.174		
W_u/ft		4.94	3.47	5.38	4.30	3.04	5.38	4.30		
Design	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$	P_n/Ω_c	$\phi_c P_n$		
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD		
0	37.7	56.6	26.3	39.6	41.5	62.4	32.9	49.4	23.1	34.8
1	37.1	55.8	26.0	39.0	40.7	61.2	32.3	48.5	22.7	34.2
2	35.6	53.5	25.0	37.6	38.4	57.7	30.6	45.9	21.6	32.5
3	33.2	49.9	23.4	35.2	34.8	52.3	27.9	42.0	19.9	29.9
4	30.1	45.3	21.4	32.1	30.4	45.6	24.6	37.0	17.7	26.8
5	26.6	40.0	19.0	28.6	25.5	38.3	20.9	31.5	15.2	22.9
6	22.8	34.3	16.5	24.8	20.5	30.9	17.2	25.8	12.7	19.0
7	19.1	28.6	13.9	20.9	15.9	23.9	13.6	20.4	10.2	15.3
8	15.5	23.3	11.5	17.2	12.2	18.3	10.4	15.7	7.93	11.9
9	12.3	18.5	9.17	13.8	9.63	14.5	8.26	12.4	6.26	9.42
10	9.95	15.0	7.43	11.2	7.80	11.7	6.68	10.1	5.07	7.63
11	8.22	12.4	6.14	9.23	6.44	9.68	5.53	8.31	4.19	6.30
12	6.91	10.4	5.16	7.75			4.64	6.98	3.52	5.30
13	5.89	8.85	4.40	6.61						
14			3.79	5.70						



او س د menual په 468

صفہ کي د

HSS2*2*3/16 مقطع

انتخاب و

$$R=0.733\text{in}$$

$$SR= AL/R \leq 200$$

کالم ارتفاع $B=10 \text{ ft}$

$$SR=(10*12) \text{ in}/0.733\text{in}$$

$$SR=163.7$$

$163.7 < 200 \dots \text{ok}$

F پاپی دیزاین

$W_u = 5.1445$

kip

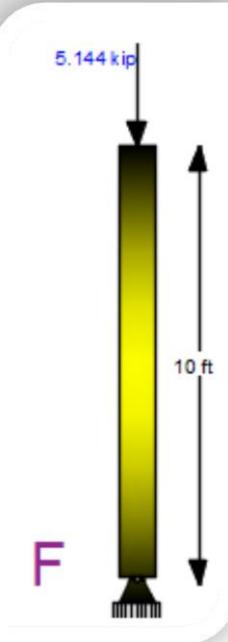


Table 4-4 (continued) Available Strength in Axial Compression, kips											
		HSS2 ^{1/4} ×2 ^{1/4} ×				HSS2 ^{1/4} ×2 ^{1/4} ×					
Shape		$\frac{3}{16}$		$\frac{1}{8}$		$\frac{1}{4}$		$\frac{3}{16}$		$\frac{1}{8}$	
t_{design} in.		0.174		0.116		0.233		0.174		0.116	
Wu/ft		4.94		3.47		5.38		4.30		3.04	
Design		P_e/Ω_c	$\phi_e P_n$	P_e/Ω_c	$\phi_e P_n$	P_e/Ω_c	$\phi_e P_n$	P_e/Ω_c	$\phi_e P_n$	P_e/Ω_c	$\phi_e P_n$
		ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
	0	37.7	56.6	26.3	39.6	41.5	62.4	32.9	49.4	23.1	34.8
	1	37.1	55.8	26.0	39.0	40.7	61.2	32.3	48.5	22.7	34.2
	2	35.6	53.5	25.0	37.6	38.4	57.7	30.6	45.9	21.6	32.5
	3	33.2	49.9	23.4	35.2	34.8	52.3	27.9	42.0	19.9	29.9
	4	30.1	45.3	21.4	32.1	30.4	45.6	24.6	37.0	17.7	26.6
	5	26.6	40.0	19.0	28.6	25.5	38.3	20.9	31.5	15.2	22.9
	6	22.8	34.3	16.5	24.8	20.5	30.9	17.2	25.8	12.7	19.0
	7	19.1	28.6	13.9	20.9	15.9	23.9	13.6	20.4	10.2	15.3
	8	15.5	23.3	11.5	17.2	12.2	18.3	10.4	15.7	7.83	11.9
	9	12.3	18.5	9.17	13.8	9.63	14.5	8.24	11.4	6.26	9.42
	10	9.95	15.0	7.43	11.2	7.80	11.7	6.44	10.7	5.07	7.63
	11	8.22	12.4	6.14	9.23	6.44	9.68	5.53	8.31	4.19	6.30
	12	6.91	10.4	5.16	7.75			4.64	6.98	3.52	5.30
	13	5.89	8.85	4.40	6.61						
	14			3.79	5.70						

ومن الله توفيق

اختتام

او س د manual پ
W_{8*58} صفحہ کی د 468
قطع انخابو و

R=0.761

in

SR= AL/R≤ 200

B=10 ft کالم ارتفاع

SR=(10*12)

in/0.761in

SR=157.69

157.69< 200 ok

لِيَقْرَأُونَ

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