Roof Deck Selection

$$D := RoofDeadLoadNoSelectedDecking + SnowLoad = 49.84\ psf$$

After calculating the allowable stress combinations, the dead plus snow load was determined to be the greatest stress. For the decking selection a deadload of 50 psf was rounded to and from the vulcraft steel roof and floor deck catalog the decking selection was chosen to be "1.5B - B24." The reason for this specific deck type was chosen was due to it weighing the least. The values and selection process are show in figures D-1 and D-2.

$$RoofDeckWeight := 1.46\ psf$$

Floor Deck Selection

$$DeadFloorLoad := FloorDeadLoadNoSelectedDecking + MaxLiveLoad = 178\ psf$$

After calculating the allowable stress combinations, the dead plus live load was determined to be the greatest stress. For the decking selection a deadload of 180 psf was rounded to and from the vulcraft steel roof and floor deck catalog the decking selection was chosen to be "1.5VL20." This deck type was chosen based on it being able to support the load and the slab depth. The values and selection process are show in figures D-3 and D-4.

$$FloorDeckWeight := 2.14\ psf$$

SECTION PROPERTIES

Deck type	Design thickness in.	W psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft		
B24	0.0239	1.46	0.107	0.120	0.135	0.131	2634	60
B22	0.0295	1.78	0.155	0.186	0.183	0.192	1818	33
B20	0.0358	2.14	0.201	0.234	0.222	0.247	2193	33
B19	0.0418	2.49	0.246	0.277	0.260	0.289	2546	33
B18	0.0474	2.82	0.289	0.318	0.295	0.327	2870	33
B16	0.0598	3.54	0.373	0.408	0.373	0.411	3578	33

Figure D-1.

VERTICAL LOADS FOR TYPE 1.5B

No. of Spans	Deck Type	Max. SDI Const. Span	Allowable Total (PSF) / Load Causing Deflection of L/240 or 1 inch (PSF) Span (ft.-in.) ctr to ctr of supports										
			5-0	5-6	6-0	6-6	7-0	7-6	8-0	8-6	9-0	9-6	10-0
1	B24	4'-8	115 / 56	95 / 42	80 / 32	68 / 26	59 / 20	51 / 17	45 / 14	40 / 11	35 / 10	32 / 8	29 / 7
	B22	5'-7	98 / 81	81 / 61	68 / 47	58 / 37	50 / 30	44 / 24	38 / 20	34 / 17	30 / 14	27 / 12	25 / 10
	B20	6'-5	123 / 105	102 / 79	86 / 61	73 / 48	63 / 38	55 / 31	48 / 26	43 / 21	38 / 18	34 / 15	31 / 13
	B19	7'-1	146 / 129	121 / 97	101 / 75	86 / 59	74 / 47	65 / 38	57 / 31	51 / 26	45 / 22	40 / 19	36 / 16
	B18	7'-8	168 / 152	138 / 114	116 / 88	99 / 69	85 / 55	74 / 45	65 / 37	58 / 31	52 / 26	46 / 22	42 / 19
	B16	8'-8	215 / 196	178 / 147	149 / 113	127 / 89	110 / 71	96 / 58	84 / 48	74 / 40	66 / 34	60 / 29	54 / 24
2	B24	5'-10	124 / 153	103 / 115	86 / 88	74 / 70	64 / 56	56 / 45	49 / 37	43 / 31	39 / 26	35 / 22	31 / 19
	B22	6'-11	100 / 213	83 / 160	70 / 124	59 / 97	51 / 78	45 / 63	39 / 52	35 / 43	31 / 37	28 / 31	25 / 27
	B20	7'-9	128 / 267	106 / 201	89 / 155	76 / 122	66 / 97	57 / 79	51 / 65	45 / 54	40 / 46	36 / 39	32 / 33
	B19	8'-5	150 / 320	124 / 240	104 / 185	89 / 145	77 / 116	67 / 95	59 / 78	52 / 65	47 / 55	42 / 47	38 / 40
	B18	9'-1	169 / 369	140 / 277	118 / 213	101 / 168	87 / 134	76 / 109	67 / 90	59 / 75	53 / 63	48 / 54	43 / 46
	B16	10'-3	213 / 471	176 / 354	149 / 273	127 / 214	110 / 172	95 / 140	84 / 115	74 / 96	66 / 81	60 / 69	54 / 59
3	B24	5'-10	154 / 120	128 / 90	108 / 69	92 / 55	79 / 44	69 / 35	61 / 29	54 / 24	48 / 21	43 / 17	39 / 15
	B22	6'-11	124 / 167	103 / 126	87 / 97	74 / 76	64 / 61	56 / 50	49 / 41	43 / 34	39 / 29	35 / 24	31 / 21
	B20	7'-9	159 / 209	132 / 157	111 / 121	95 / 95	82 / 76	72 / 62	63 / 51	56 / 43	50 / 36	45 / 31	40 / 26
	B19	8'-5	186 / 250	154 / 188	130 / 145	111 / 114	96 / 91	84 / 74	74 / 61	65 / 51	58 / 43	52 / 37	47 / 31
	B18	9'-1	210 / 289	174 / 217	147 / 167	126 / 132	108 / 105	95 / 86	83 / 71	74 / 59	66 / 50	59 / 42	54 / 36
	B16	10'-3	264 / 369	219 / 277	185 / 214	158 / 168	136 / 135	119 / 109	105 / 90	93 / 75	83 / 63	74 / 54	67 / 46

Notes: 1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. FM Global approved numbers and spans available on page 21.

Figure D-2.

STEEL SECTION PROPERTIES

Deck Type	Design Thickness in	Deck Weight psf	Section Properties				V_a lbs/ft	F_y ksi
			I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft		
1.5VL22	0.0295	1.78	0.143	0.169	0.177	0.179	2754	50
1.5VL20	0.0358	2.14	0.186	0.224	0.222	0.231	3322	50
1.5VL19	0.0418	2.49	0.230	0.271	0.260	0.282	3857	50
1.5VL18	0.0474	2.82	0.272	0.311	0.295	0.324	4350	50
1.5VL16	0.0598	3.54	0.373	0.404	0.373	0.411	4336	40

Figure D-3.

(N=14.15) LIGHTWEIGHT CONCRETE (110 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span			Superimposed Live Load, PSF Clear Span (ft.-in.)														
		1 SPAN	2 SPAN	3 SPAN	5'-0	5'-6	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0
3.50 (t=2.00) 26 PSF	1.5VL22	6'-4	8'-5	8'-6	278	247	222	185	167	152	139	124	105	89	76	66	57	50	44
	1.5VL20	7'-8	9'-7	9'-11	305	271	243	220	201	184	154	135	114	97	83	72	62	54	48
	1.5VL19	8'-8	10'-7	11'-0	329	292	262	237	216	198	173	145	122	104	89	77	67	58	51
	1.5VL18	9'-6	11'-4	11'-9	350	311	279	252	230	211	184	153	129	110	94	81	71	62	54
	1.5VL16	9'-8	11'-5	11'-10	352	312	280	253	231	212	195	171	144	122	105	91	79	69	61

Figure D-4.