

Big M Steel Inc. Bolton L7E 5A8 905-857-9995

LIMIT STATES DESIGN to S16.09 & OBC Latest Editions
 ALL LOADS Below ARE FACTORED LOADS-----
 abm's Mac Using FB*5 V5.7.102 Sept 2017 and FBtoC OS 10146

Importance Factor = 1

This Output is for a Symmetrical Joist

Material Specification---Metric Output & Input

Chords:-A/N. Web:-L's= 350Mpa; Rods = 350Mpa Tube = 350W ClassCA500

Contract No. = 1535

Design Sheet = DF1

Customer = Ganawa Company

Location = Bowmanville

Project = Clear Water Operations

Design Date= 06/22/22 Time= 10:39:39

Joist Depth = 355mm Design Span = 5.95M wf = 14.843Kn/M

Live load= 7.2Kpa Dead load= 6.313Kpa Load factor= 1.37183

Top Chord= Angle 51x 51x 5 Fy= 350Mpa Design Yield= 350Mpa Ptr= 290.55Kn

Btm Chord= Angle 38x 38x 5 Fy= 350Mpa Ptr= 214.34Kn Ptf= 197.02Kn

[0.741- 100.251- 105.472] { 10.82- 4.8- 5.05} [3.602] { 1.098& 0.9515- 13.886} [19.521] { 5.95}
 =[102x 254x 11]=[127x 203x 8]=[152x 178x 6]=[178x 152x 5]=[203x 127x 3]

Gravity Reactions-- Left end = 44.139Kn Right End = 44.139Kn

Location of zero Shear = 2.975M Max Mom = 65.658 Kn*m (48.426 Kip*Ft)

Max TC Pf= 199.402Kn Max BC Pf= 197.024Kn

DEFLECTION INFORMATION using Williot calcs

Design depth= 329mm @ location 2.975Mwith Inertia of 42.773x10⁶ mm⁴ [102.762inches⁴]

Deflection/SPAN

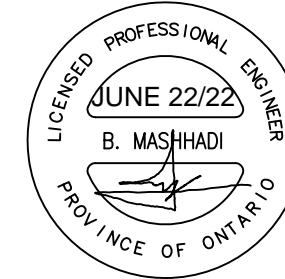
L.L. 12 mm 1/ 478 Dead Load 13 mm1/ 455

Camber due to S16.09 = 2mm Deflection below horiz= 23mm 1/ 258

DEFL/SPAN RATIO Total Load= 1/ 258

Based on AISC/CISC Guide 11

For 2.5ins Conc on 1.5ins Deck:Eff.Comp.Inertia= 265.05Natural Frequency= 11.318Hz Dead load used= 0.186 kips/ft



Panel	Number	Pan.M	Px	fa/Fa PP	fb/Fb PP	Total PP	Cf/Cr PC	Mf/Mr PC	Total PC	We	MaxBCKn	MinBCKn	Rev	Depth mm
CHORD Analysis	1	0.65	199.402	0.686	0.267	0.953	0.763	0.053	0.816	14.84	197.024	0	0	
	2	0.65	173.308	0.654	0.276	0.93	0.664	0.059	0.722	14.84	139.929	0	0	
	3	0.7	76.038	0.455	0.411	0.866	0.297	0.102	0.4	14.84	0	0	0	
Panel	Vfg Kn	Vfu Kn	Rod mm	Co mm	To mm	Vrc Kn	Vrt Kn	Vrt/c Kn	Kl/r	Lgth M	Weld mm	Type/Size		
WEB Analysis	1	13.232	-5.899	16	325	17.49	45.02	17.49	106.5	2.818	38			
	2	29.627	0	16	102	33.2	32.79	7.7	146.25	1.998	55			
	3	44.881	0	19	65	60.11	41.99	11.18	135.76	1.137	55			

Shoe Clearance 2 1/2 ins (65mm)= 75 & 4 ins (100mm)= 143 & 5 ins(125mm)= 188 & chord+1/2ins(12mm)= 75 Twice chord depth= 143

Shoe Ecc. Designed= 6 Addt. Ecc. allowed= 12

TC % = 50.035 BC % = 29.475 Web % = 20.49

Kg per Meter = 14.704[#/Ft 9.881]

Matl Cost= \$ 88 Fab.Factor= \$ 51.840000153 Total= \$ 139

B.C. Length= 15.854Ft.{ 4.832} Ratio Labour:Matl= 37: 63

Bridging for Btm Chord NO Uplift 240*Ryy 18.75{ 5.715}

Top chord Bridging @ 170Ryy 0.625= 15.25{ 4.65} 0.75= 16{ 4.87}

Top Chord unrestrained= 5.75{ 1.75}-

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Material Specification---Metric Output & Input

Chords:-A/N. Web:-L's = 350Mpa; Rods = 350Mpa Tube = 350W ClassCA500

Contract No. = 1535

Design Sheet = DF2

Customer = Ganawa Company

Location = Bowmanville

Project = Clear Water Operations

Design Date= 06/22/22 Time= 10:54:55

Joist Depth = 355mm Design Span = 3.9M wf = 16.462Kn/M
 Live load= 7.2Kpa Dead load= 6.313Kpa Load factor= 1.37183
 Top Chord= Angle 32x 32x 5 Fy= 350Mpa Design Yield= 350Mpa Ptr= 176.23Kn
 Btm Chord= Angle 32x 32x 5 Fy= 350Mpa Ptr= 176.23Kn Ptf= 90.95Kn

ADDITIONAL LOADING Total Eq. UDL= 16.458

[0.822- 100.251- 105.472] { 12- 4.8- 5.05} [3.996] { 1.218& 1.1516- 16.806} [12.795] { 3.9}
 =[102x 229x 8]=[127x 178x 5]=[152x 152x 3]=[178x 127x 2]=[203x 127x 2]

Gravity Reactions-- Left end = 38.654Kn Right End = 31.789Kn
 Location of zero Shear = 1.95M Max Mom = 31.291 Kn*m (23.079 Kip*Ft)
 Max TC Pf= 93.226Kn Max BC Pf= 90.949Kn

DEFLECTION INFORMATION using Williot calcs

Design depth= 336mm @ location 1.951Mwith Inertia of 31.618x10^6 mm^4 [75.962inches^4]

Deflection/SPAN

Eq. L.L. 4 mm 1/ 996 Dead Load 4 mm1/ 954

Camber due to S16.09 = 1mm Deflection below horiz= 7mm 1/ 562

DEFL/SPAN RATIO Total Load= 1/ 562

Based on AISC/CISC Guide 11

For 2.5ins Conc on 1.5ins Deck:Eff.Comp.Inertia= 221.17Natural Frequency= 21.465Hz Dead load used= 0.206 kips/ft

Cant. Lgth= 0.38M @ L.H.E
 T C unReinforced for= 0.298M Cant depth= 102mm
 Vf= 0.305Kn & Mf= 1.188KnM
 Cant Angle 76x 76x 6 Fy= 350Mpa
 Ixx= 7.81mm^4 Sxx= 45.09mm^3 Mr cant= 17.28KnM
 Defl @ end; Max Downward= -1mm. Max Upward= -1mmCant only= 0mm



Panel	Number	Pan.M	Px	fa/Fa PP	fb/Fb PP	Total PP	Cf/Cr PC	Mf/Mr PC	Total PC	We	MaxBCKn	MinBCKn	Rev	Depth mm
CHORD Analysis	1	0.5	0.61	93.226	0.529	0	0.529	0.711	0	0.711	16.46	90.949	0	0
	2	0.569	84.718	0.529	0	0.529	0.619	0	0.619	16.46	74.524	0	0	
	3	0.508	39.517	0.343	0	0.343	0.272	0	0.272	16.46	0	0	0	
Panel	Vfg Kn	Vfu Kn	Rod mm	Co mm	To mm	Vrc Kn	Vrt Kn	Vrt/c Kn	Kl/r	Lgth M	Weld mm	Type/Size		
WEB Analysis	1	6.672	-4.282	16	305	305	18.78	46.37	18.78	103.4	0.912	38		
	2	19.76	0	16	284	284	20.17	47.78	20.17	100.35	1.77	38		
	3	32.184	0	16	38	470	35.82	36.49	10.25	131.41	0.997	38		

Shoe Clearance 2 1/2 ins (65mm)= 58 & 4 ins (100mm)= 108 & 5 ins(125mm)= 142 & chord+1/2ins(12mm)= 33 Twice chord depth= 58
 Shoe Ecc. Designed= 6 Addt. Ecc. allowed= 30

TC % = 40.477 BC % = 31.227 Web % = 28.296
 Kg per Meter = 11.123[#/Ft 7.474]
 Matl Cost= \$ 44 Fab.Factor= \$ 40.319999695 Total= \$ 84
 B.C. Length= 10.129Ft.{ 3.087} Ratio Labour:Matl= 47: 53

Bridging for Btm Chord NO Uplift 170Ryy 0{ 0}
 Top chord Bridging @ 170Ryy 0.625= 11.17{ 3.41}
 Top Chord unrestrained= 5.5{ 1.684}-

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Importance Factor = 1

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Material Specification---Metric Output & Input

Chords:-A/N. Web:-L's= 350Mpa; Rods = 350Mpa Tube = 350W ClassCA500

Contract No. = 1535

Design Sheet = DF3

Customer = Ganawa Company

Location = Bowmanville

Project = Clear Water Operations

Design Date= 06/22/22 Time= 10:45:03

Joist Depth = 355mm Design Span = 4.12M wf = 15.09Kn/M

Live load= 7.2Kpa Dead load= 6.313Kpa Load factor= 1.37183

Top Chord= Angle 38x 38x 5 Fy= 350Mpa Design Yield= 350Mpa Ptr= 214.34Kn

Btm Chord= Angle 32x 32x 5 Fy= 350Mpa Ptr= 176.23Kn Ptf= 94.3Kn

[0.754- 100.251- 105.472] { 11- 4.8- 5.05} [3.665] { 1.1176 1.1021- 16.084} [13.517] { 4.12}
 =[102x 178x 5]=[127x 152x 3]=[152x 127x 2]=[178x 102x 0]=[203x 102x 0]

Gravity Reactions-- Left end = 31.093Kn Right End = 31.093Kn

Location of zero Shear = 2.06M Max Mom = 32.025 Kn*m (23.621 Kip*Ft)

Max TC Pf= 95.869Kn Max BC Pf= 94.304Kn

DEFLECTION INFORMATION using Williot calcs

Design depth= 334mm @ location 2.06MWith Inertia of 34.405x10⁶ mm⁴ [82.657inches⁴]

Deflection/SPAN

L.L. 4 mm 1/ 1027 Dead Load 4 mm1/ 976

Camber due to S16.09 = 1mm Deflection below horiz= 7mm 1/ 585

DEFL/SPAN RATIO Total Load= 1/ 585

Based on AISC/CISC Guide 11

For 2.5ins Conc on 1.5ins Deck:Eff.Comp.Inertia= 222.32Natural Frequency= 20.335Hz Dead load used= 0.189 kips/ft



Panel	Number	Pan.M	Px	fa/Fa PP	fb/Fb PP	Total PP	Cf/Cr PC	Mf/Mr PC	Total PC	We	MaxBCKn	MinBCKn	Rev	Depth mm
CHORD Analysis	1	0.526	95.869	0.447	0	0.447	0.511	0	0.511	15.09	94.304	0	0	
	2	0.581	88.944	0.447	0	0.447	0.492	0	0.492	15.09	79.771	0	0	
	3	0.635	44.95	0.21	0.614	0.824	0.258	0.168	0.427	15.09	0	0	0	
Panel	Vfg Kn	Vfu Kn	Rod mm	Co mm	To mm	Vrc Kn	Vrt Kn	Vrt/c Kn	Kl/r	Lgth M	Weld mm	Type/Size		
WEB Analysis	1	6.672	-4.135	16	263	21.67	49.25	21.67	97.35	0.859	38			
	2	17.961	0	16	290	19.75	47.35	19.75	101.26	1.786	38			
	3	30.36	0	16	76	559	34.49	32.35	148.21	1.077	38			

Shoe Clearance 2 1/2 ins (65mm)= 70 & 4 ins (100mm)= 130 & 5 ins(125mm)= 170 & chord+1/2ins(12mm)= 50 Twice chord depth= 90

Shoe Ecc. Designed= 6 Addt. Ecc. allowed= 12

TC % = 46.211 BC % = 28.168 Web % = 25.621

Kg per Meter = 11.833[#/Ft 7.951]

Matl Cost= \$ 50 Fab.Factor= \$ 40.319999695 Total= \$ 90

B.C. Length= 10.268Ft.{ 3.13} Ratio Labour:Matl= 44: 56

Bridging for Btm Chord NO Uplift 240*Ryy 15.75{ 4.81}

Top chord Bridging @ 170Ryy 0.625= 12.5{ 3.81}

Top Chord unrestrained= 7.25{ 2.199}-