NeoBuild Technical Notes

Report Title:

Comparison between Warren and Pratt floor trusses



Discipline:

LGS

Date:

2023.06.20

Provided By:

NeoBuild Engineering

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Discipline:	⊠LGS □FRW □RCS □HRS ☑RDD □GMD			

1. Purpose of the study

The purpose of this study is a comparison between Warren and Pratt floor joists.

2. Geometry of the model

2.1. Shape and specifications



Pratt floor joist

Warren joist

Joist specifications

Span	5000mm
Depth	400mm
Spacing	450mm
Eccentricity	55mm
Max node space value	450mm
Section	C89-41-0.75

2.2. Support condition

Support condition is considered in the following two cases:

- Rigid support
- Pinned support

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Support condition detail

Rigid	It is connected to the bearer joist with two screws at the top and two screws at the bottom.	
Pinned	sits on the top of the wall	

3. Loading

Loading is considered as below table:

Imposed load	1.5 $\frac{KN}{m^2}$
Dead load	0.5 $\frac{KN}{m^2}$
Concentrated load	1.8 KN
Partition load	0.5 $\frac{KN}{m^2}$

Load values

4. Comparison of the result

The comparison of the results is presented in the below table:

Design result summary

Support condition			Maximum values						
	Shape	Joist NO.	O. Top chord D/C ratio	Bottom chord D/C ratio	Web D/C ratio	Connection D/C ratio	Deflection- distributed load (mm)		Deflection-point load (mm)
							DL	ш	1.8 KN Concentrated live load
Rigid	Pratt	FT 108	0.79	0.58	0.31	1.00	4.01	2.8	1.82
	Warren	FT 118	0.84	0.58	0.34	0.87	4.13	2.91	1.87
Pinned	Pratt	FT 204	0.89	0.56	0.32	0.875	4.93	3.45	2.15
	Warren	FT 214	0.88	0.52	0.36	0.937	4.73	3.32	2.09

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5. Comparison of the weight and screws

The following table presents a comparison between the total weight of each joist and also total number of required screws.

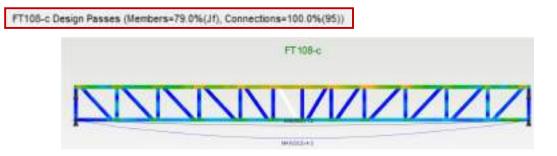
Comp ID	connection	Shape	Total Weight	Height	Length	Screw Qty
FT108	Rigid	NNNNNAZZZZ	24.24	400	5000	144
FT118	Rigid		22.40	400	5000	124
FT204	Pinned	DINERRYZZZA	23.61	400	5178	156
FT214	Pinned		23.61	400	5178	136

Weight and quantity of screws

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6. Detailed result for more information

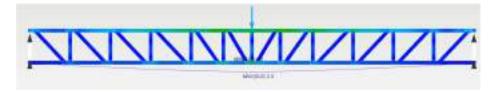
6.1. FT 108



Truss engineering design

Result:

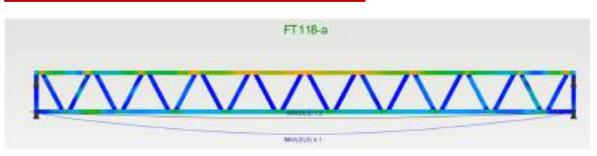
Top chord		Bottom	chord
Califice state		Schuling with	
Catal Dense Section 1 Tarright 1	09541-0.75	Later Clear Decision Longitic	039-41-8.75
	100%	1485	1007
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Shear forcedy) utility, All. = 14, 900 kW	4,222,69	Draw Incelly/uRp. AL + 14 3001H	4.0510.00
Compression Fances withly, All. + 25,000 KM	DZ STOLO	Compression force stilly, 44 = 0.0801xM	0.000 MK
Termine-Secondify, All. = 0.0003-M	0.000 kH	Tessiandade utility, All + 32/512348	12 12 12 10
hannene conclose/unity. At ~ 0.000 kH	6/380 M	Transvene conclused attigs, 48 = 0 800 kH	0 000 144
Contineed compression and moment. All. + 1/08	10	Condined compression and moments, All = 1.30	A SA PERSONAL PROPERTY AND INCOME.
Contrivent terminist and incoment. All. = 1.00	The state of the s	Cosidered termine and represent. All = 1.90	441
Senial mament utility: #2 = (7.00)	0.08	Brand memory (AB), Ad (30)	6.00
Combined transverse load and interest. All = 0.10	0.0#	Eindenid traccore had and manyst. AE = 0.00	0.00
Continent data, numerit and axial bad, All, +1.00		Condined shear, numeri and asia/koat.Al. +1.00	5.21
utal land deflecters. All = 1,7400 (1.800 em-	1.(2140)(D191)mm	Total load deflection, All. = L/400 [1]; BOL we	1/10/514.05") em
factual based defines traces, All. + 1,40,30 (00) more	Liver (2001) ees	Total line defection, Ak + L/O (5:00) ren	A, Hogen (85.007°) team
Live load defection, All. + LP001 (E.82) rate	1.13044 (0.14") mm	Une load deflection, All + LPSB (20.00) ven	(0570 (2.90 ⁻) we
	04. Carol		OK Garrel



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6.2. FT 118

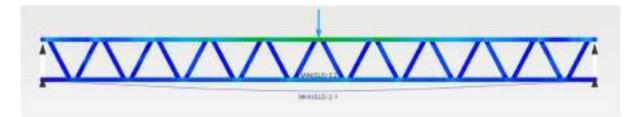
FT118-a Design Passes (Members+83.6%(Gm), Connections+87.1%(11))



Truss engineering design

Result:

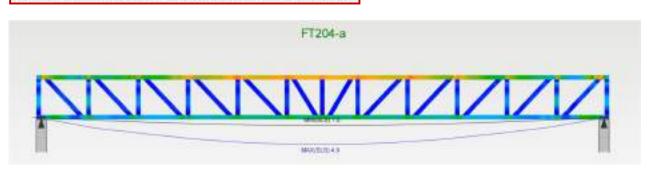
Top chord			Bottom chord		
Label Em Cove Service: C89-41-0.75 Length 5000			Lubel FI Cass Section: 209-41-0.75 Lwgth 5000		
2010-0399749	- C	100%		1000 Contraction 1000	1084
mant(z) ukłąz, All. – II. 432 kłów	2.338 65m	200	entizi utiity, AE = 0.481 i/Nre	1222 MM	
nartisceþó utilty, All = 14,900 kM	1.302 MV		facody) utility. All. + 14(300 kN	4.754.85	
ngnerream Faces vAlly, All. = 25, 1131A	ER TIREN	ing	encolar force utility, AL = 0.0001-M	0.000 48	
miter losse uHBy, All. = 0:000161	0.000 kM		on force utility. All = 32:512 kN	13.354145	
initivene conciload uNity, All. + 0.000 KN	0.000 KN		weene concload utily, All = 0.0001M	0.000 49	
ndared compression and moment, AR = 1.00	2.04	des	exect compression and receivers, All. + 1.00		
ndirved tension and instrumt. All = 1.05		end.	ined tension and moreore, All = 1.00	1152	
real-manuent utility, Alt. = 0.00	0.00	100	d rozsient utility. All. = 0.00	0.00	
ndered itera-erret load and somers. All +0.00	0.00	inb	ened transverse load and moment, AE + 0.00	0.00	
ndamed shear, recoverst and axial load, All. = 1.00	0.51	int	ined invex, moment and oxidi load, Ad. = 1.00	21	
tal load deflection, All. + L/400 (T. 10) and	L/1889 (0.227) see	e al	load defection: A8. = L/408 (12.00) me.	L(241814.13") ===	
tel final deflection. All, = L/0 (0.00) ram	L/nen (3/90") min	-	feal deflection, AL + L/0 (0.00) mm	L/nex(0.00") nex	
e Isad defectors. All. = L/500 (0.98) ner	2./2601 (0.16") eve	(4)	and deflection, All + 1/500 (28.80) any		
E lado deletoren Ale - Craso Mont Inel	and the real lines		Md defection, All + LPSOE (28 80) was	10442(2.9F) nee	



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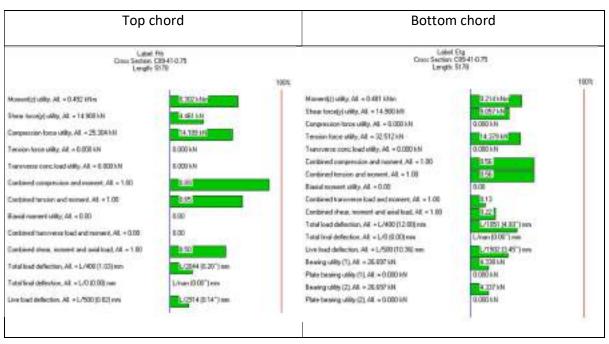
6.3. FT 204

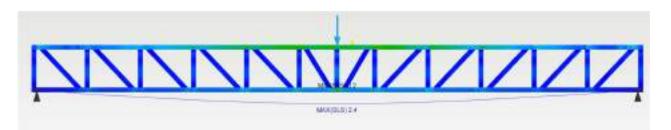
FT204-a Design Passes (Members+88.6%(Fth), Connections+87.5%(27))



Truss engineering design

Result:

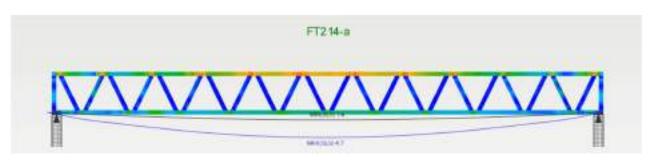




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6.4. FT 214

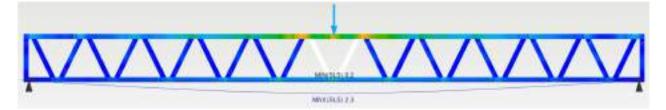
FT214-a Design Passes (Members=87.8%(Eauo), Connections=93.7%(25))



Truss engineering design

Result:

Top chord		Bottom	Bottom chord	
		Cious Sectory		
Mamanetics (ANN), AK = 0.45230546 Diseas harves(g) (allig, AK = 14.200367 Despension force allig, AK = 25.205307 Tervision faces allig, AK = 25.205307 Tervision faces allig, AK = 25.205307 Tervision faces allig, AK = 25.205307 Despension faces allig, AK = 20.000187 Eastband freewoor and manyer, AK = 1.00 Eastband freewoor and manyer, AK = 1.00	A 240 LAN A 240 LAN R 2000 LAN	NDE Maximul() ullig, AL = 0.401 Mills Share facing) ullig, AL = 0.401 Mills Share facing) ullig, AL = 0.000 Mil Companies (socie ullig), AL = 0.000 Mil Tanamines concload ullig, AL = 0.000 Mil Continued companies and manaret, AL = 1.00 Destined transfer and tanameter, AL = 1.00 Destined transfer and tanameter and tanameter Destined transfer and tanameter and tanameter Destined transfer and tanameter and tanameter Destined transfer and tanameter and tanameters Destined transfer and	100 101/3614/44 100014/4 1000114/4 100014/	
Tatal load definition, All. + L/400 (1.62) nm Tatal final defension, All. + L/5 (2000) em Live load definition, All. + L/500 (5.02) em	L/2023 (0.20") ress L/100" (0.00") ress L/2008 (0.14") ress	Plate bearing utility (1), 42 = 0.000149 Bearing utility (2), 44 = 25,857149 Plate bearing utility (2), 44 = 0.000149	C DODAM L 227 KN C DODAN	



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