STRUCTURAL CONDITION ASSESSMENT
1818 Michigan Ave
Miami Beach, Florida

Prepared for

J. Luis Quintana

February 22, 2024

PREPARED BY

www.yhengineering.com

Youssef Hachem Consulting Engineering

99 NW 27 AVE, Miami, FL. 33125, (305) 969-9423, Fax (305) 969-9453

YOUSSEF H. HACHEM LICENSE No. 43302 STATE OF FLORIDA PROFESSIONAL ENGINEER

Digitally signed by Youssef H Hachem
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Date: 2024.03.12 16:06:25-04'00'

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STRUCTURAL CONDITION ASSESSMENT for
1818 Michigan Ave
Miami Beach, Florida

I. INTRODUCTION

General

Per the request of Mr. Quintana, we have conducted a visual structural condition assessment on the existing structure located at 1818 Michigan Ave in Miami Beach, Florida.

The purpose of the inspection is to assess the structural condition of the property to determine the feasibility of the development of the structure.

Structural System

The Structure is a two story masonry building with a detached storage area on the north elevation of the property. The Building Structural System is as follows:

- First Floor:
    - Elevated wood floor framing, with wood planking (except at the storage, which is a concrete slab)
    - Exterior wood bearing walls
    - Interior wood load bearing stud walls
- Second Floor:
    - Wood floor framing, with wood planking
    - Exterior wood bearing walls
    - Interior wood load bearing stud walls

The components and cladding of the house, such as doors, windows and roof waterproofing are not addressed in this report. Moreover, Mr. Quintana should perform termite and asbestos testing on the building. The electrical and electrical systems are not part of this report, but essentially are non-existent in the building.

II. METHODOLOGY

This inspection was visual in nature from the exterior and interior of the building. Our office did not perform any destructive or non-destructive testing, however Mr. Quintana will engage a company of their choosing to perform concrete core samples to test for:

1- Concrete compressive strength
2- Extent of Carbonation
3- Chloride Content

Currently, there are several locations in the building that has decayed wood framing which made a full inspection in parts of the building challenging. Every attempt was made to access all portions of the building to observe any signs of distress in the structural members of the building, which includes masonry, wood, and concrete. Distress signs are cracking, spalling, water damage, and termite damage.

No structural analysis was performed on the building to determine the capacity of the structural systems. It's our opinion that the current structural system of the building does not comply Florida Building Code 2018, HVHZ (High Velocity Hurricane Zone) edition.

III. STRUCTURAL SYSTEMS

Based on Miami Dade County tax records, the structure was built in 1925 with an area of 7,571 square feet. The building is approximately 50 feet long (East-West direction) by 45 feet wide (North-South direction). The building's structural members are as follows:

Foundations: The building is built on shallow foundations about 24" wide x 12" thick. The foundations support a concrete stem walls (interior and exterior). The interior stem walls support the interior wood stud walls and the exterior stem walls support the exterior masonry walls.

Exterior Walls: The exterior walls of the building are 2"x4" wood members. The walls have a 5/8" cdx plywood with a wire lathe and stucco in the exterior.

Interior Walls: There are two types of interior walls, load bearing and non-load bearing. Both types are wood 2"x4" stud walls. The load bearing walls support the floor joists system extending from the exterior walls. These stud walls are in turn supported by the concrete stem walls and foundations.

Floors: The flooring system is typical on all floors. The wood floor joists are 2"x10" spaced at 16" on center and spanning North-South from the exterior wood wall over the interior load bearing wood stud walls (running North-South). The joists system is supporting 1"x 6" wood planks make up the 1st and 2nd floor system. All wood joists are "Fire Cut" into the wood wall, meaning the wood joists are resting in openings in the wood wall and are not connected to the walls via strapping or any other mechanism.

Roof: Typical construction of the time the actual roof deck is 2"x8" wood joists supporting 1"x6" wood planks. The roof deck is supported by wood knee wall made up of 2"x4" vertical studs. The knee wall in turn is supported by 2"x8" wood joists. The Knee wall system is used to slope the actual roof deck for stormwater drainage.

IV. SITE OBSERVATIONS

We have inspected the structure on several occasions, and our summary of the evaluation of the existing conditions of the structural components are as follows:

Wood members; The roof of the structure has failed in multiple locations, and the moisture intrusion had caused severe and extensive damage to all the wood members of the building (please see photos). There is moisture damage (rot) of wood, that has caused wood members to deflect, sag, fail, and total collapse. The wood members collapse in the building had created hazardous conditions within the building. The fact that the building had been vacant for some time now, and the moisture intrusion from the roof, door, and window openings had created an atmosphere for the wood to deteriorate severely.

The foundations have failed due to the seawall having damages and allowing water to intrude under the building. Water is noted under the crawlspace access panels (see attached pictures), the crawlspace is very damp and concrete foundations supporting the first floor wood joists have shifted, making the floor unstable and uneven.

The foundations for the house are just concrete piers that are under designed and inappropriately designed and installed.in our opinion 100% of the foundations are compromised.

Damaged foundations

The wood floors are water damaged, water clogged, please see below. 90% of the wood beams are damaged.

Damaged first floor joists and beams

The metal staircase leasing to unit 6 on the second floor is completely deteriorated and unstable to use, the stair case is 80% compromised and failed.

Steel staircase 80% failed

All connections have failed

The whole portion of the house close to the seawall (units 5 and 6) have separated from the house and are slanted and leaning towards the canal. This is evident from the cracking in the walls and floors of the second floor.

Cracking in the 2nd floor walls

Cracking in the 2nd floor

Unit 5 floor cracking

Units 6 walls cracking and evidence of settlement and leaning towards canal

2nd floor walls cracking

2nd floor deck unwalkable and leaning towards canal

The components and cladding elements of the building and accessories such as doors, windows, louvers, rails, are all in poor condition. Moreover, the roof waterproofing membrane is also in a poor condition (please see photos).

V. STRUCTURAL EVALUATION

There are several factors to be considered in the structural evaluation of this building;

Initial Construction:

Building construction and standards of the 1920's are considered deficient in today's standards. This applies to this structure and other structures built in the 1920's. This building under current building code is deemed deficient. The structure's roof connections for wind uplift forces, and for wind lateral resistance are non-existent. Moreover, openings protection, and wood reinforcing is also non-existent. To develop this building, it has to undergo level III alteration of the Florida Building Code 2018 for existing structures. This means that the building has to be strengthened to comply with the current Florida Building Code. Which means that the roof connection tie downs have to be implemented to strengthen the roof, and lateral load structural systems have to be installed such as shearwalls. Wall openings such as doors and windows and the exterior wood walls have to reinforced. Hence, the foundations also have to be strengthened to resist such lateral loads.

Materials Status:

Site Conditions

Based on the visual observation in the field, all the wood members of the building such as the roof, floor joists on all floors, and interior stud walls are in very poor and failing condition. Exterior walls have termite damage. There are no wood connectors present and wood members are not connected structurally.

The structural elements of the house including foundations, floor joists, floor beams, walls, stairs are compromised and vary in deterioration from 80%-100% and are no longer supporting their intended use, and cannot be depended on for safety and are in imminent danger of collapse.

We ran structural analysis on the roof and the second floor of the building. We did not consider any wind uplift loads because the roof rafters are not strapped to the walls of the building, and this automatically renders them under design, and do not

follow the building code. The results of that analysis shows that the roof of the structure and the second floor of the structure are both overstressed based on residential loads of buildings. This shows that the roof and the second floor of the building, are not capable of carrying the loads under the building code.

VI. RECOMMENDATIONS

Based on the site observations of the conditions of structural members of the building and level III alteration required by the Florida Building Code, the structural members of this building need to be replaced rather than repaired. Hence, in order to do so, these structural members need to be demolished.

The seawall along the canal has deteriorated beyond repair, and has shifted leading to unstable ground conditions undermining the structure foundations.

It is evident that portions of the structure were built illegally and without permits when built, they were not built up to standards to support loading conditions.

The structure is in bad condition, leading to deficient structural conditions. The structural members which are mainly wood are deteriorated and moisture damaged and rotting. Most of the structural members cannot be replaced.

We are not confident that the replacement process will not damage the structure, even furthermore due to the connectivity between the members.

The structure cannot be repaired without the repair of the seawall, and the seawall cannot be repaired without the demolition of the structure over the seawall.

It is imperative to have a proper seawall installed to have adequate foundations for the house.

The current house foundations are inadequate, and cannot support the house based on the continuous water intrusion, and the lack of inappropriate support.

Structure does not comply with today's building code, and even when certain parts of it were built.

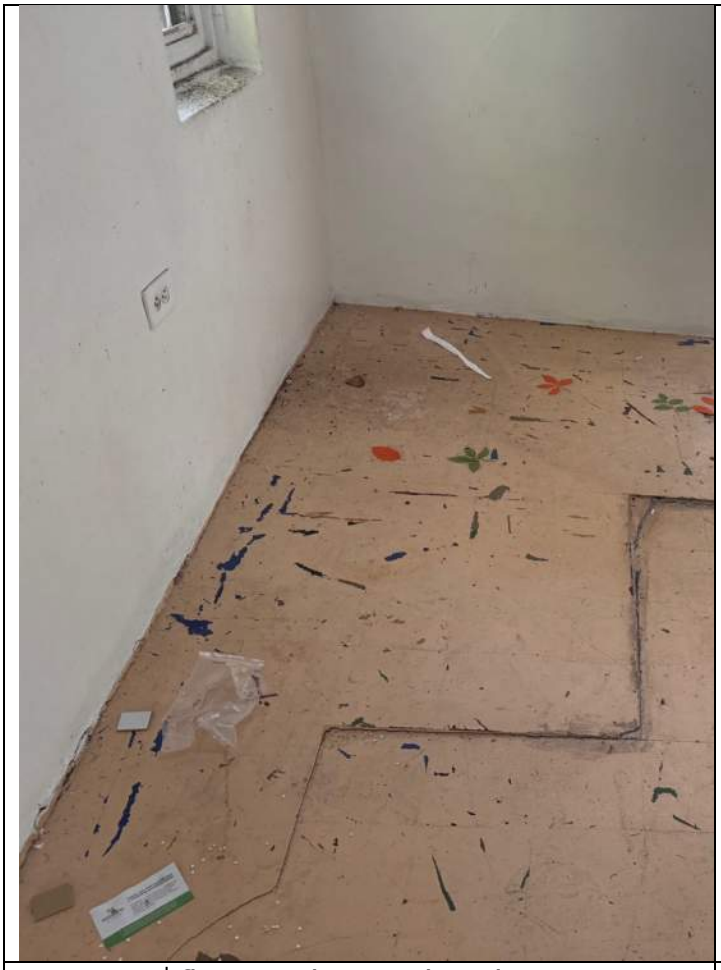
It is in imminent danger of collapse as it lacks any lateral support system, proper design and construction when portions of it were constructed, and current decay conditions of the structural member deem it unstable to support load conditions of the current permitted use.

APPENDIX A

PHOTOS

	
Foundation view showing damaged beams	Failed foundations
	
Damaged 1st floors walls	2nd floor cracking

	
2nd floor wall cracking	2nd floor cracking
	
Beam cracking	Beam cracking

	
2nd floor cracking and settlement	Steel stair connections failure

	
Wall cracking and settlement and leaning towards canal	Wall cracking and seperation

	
Structure wall on the seawall	Uneven decking and subfloor failure
	
Wall cracking	Inappropriate wall structure

Appendix B
Calculations

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: 1818 Floor Joist, 2x12 16' span

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

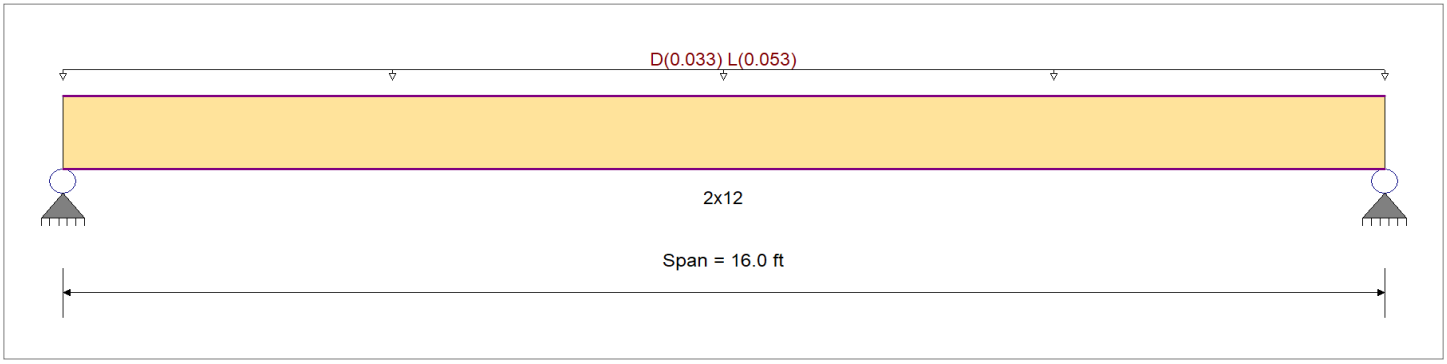
Wood Species : Southern Pine
Wood Grade : No.1 Non-Dense: 2"-4" Thick: 12" Wide

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	900.0 psi
Fb -	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	480.0 psi
Fv	175.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,400.0 ksi
Eminbend - xx	510.0 ksi
Density	34.330 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.0330, L = 0.0530 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	1.160 : 1	Maximum Shear Stress Ratio	=	0.309 : 1
Section used for this span		2x12	Section used for this span		2x12
fb: Actual	=	1,043.72 psi	fv: Actual	=	54.01 psi
F'b	=	900.00 psi	F'v	=	175.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	15.066 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.315 in	Ratio =	608 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.512 in	Ratio =	375 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.494	0.132	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.06	400.5	810.0	0.23	20.7	157.5
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	1.160	0.309	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.75	1,043.7	900.0	0.61	54.0	175.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.785	0.209	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.33	882.9	1,125.0	0.51	45.7	218.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.167	0.044	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.63	240.3	1,440.0	0.14	12.4	280.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: 1818 Floor Joist, 2x12 16' span

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.5119	8.058		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.688	0.688
Max Upward from Load Combinations	0.688	0.688
Max Upward from Load Cases	0.424	0.424
D Only	0.264	0.264
+D+L	0.688	0.688
+D+0.750L	0.582	0.582
+0.60D	0.158	0.158
L Only	0.424	0.424

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: 1818 Floor Joist, 2x12 19' span

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

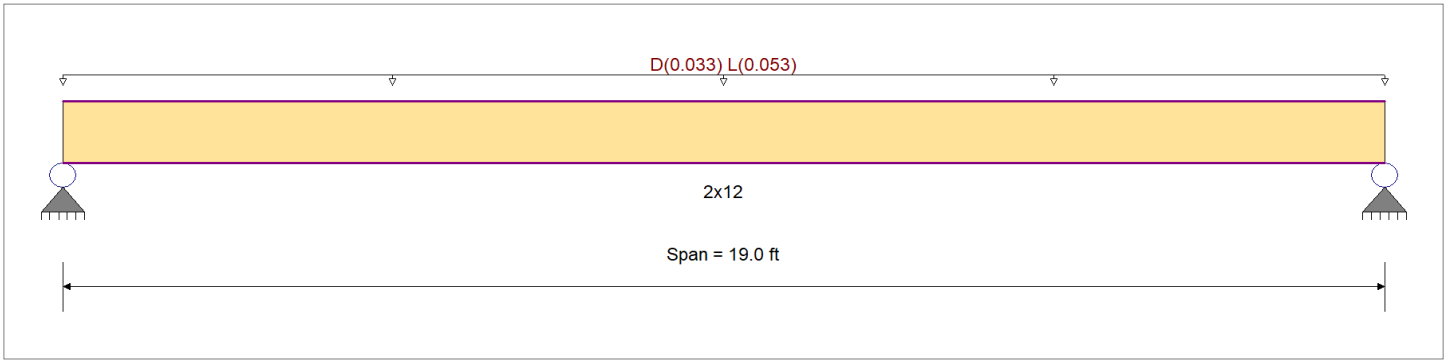
Material Properties

Analysis Method :	Allowable Stress Design
Load Combination :	IBC 2021
Wood Species :	Southern Pine
Wood Grade :	No.1 Non-Dense: 2"-4" Thick: 12" Wide
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling

Fb +	900.0 psi
Fb -	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	480.0 psi
Fv	175.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,400.0 ksi
Eminbend - xx	510.0 ksi
Density	34.330 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.0330, L = 0.0530 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	1.635 : 1	Maximum Shear Stress Ratio	=	0.376 : 1
Section used for this span		2x12	Section used for this span		2x12
fb: Actual	=	1,471.81 psi	fv: Actual	=	65.73 psi
F'b	=	900.00 psi	F'v	=	175.00 psi
Load Combination		+D+L	Load Combination		+D+L
Location of maximum on span	=	9.500 ft	Location of maximum on span	=	18.099 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.627 in	Ratio =	363 >=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	1.018 in	Ratio =	223 >=180	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 19.0 ft	1	0.697	0.160	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.49	564.8	810.0	0.28	25.2	157.5
+D+L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 19.0 ft	1	1.635	0.376	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.88	1,471.8	900.0	0.74	65.7	175.0
+D+0.750L					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 19.0 ft	1	1.107	0.254	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.28	1,245.0	1,125.0	0.63	55.6	218.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 19.0 ft	1	0.235	0.054	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.89	338.9	1,440.0	0.17	15.1	280.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: 1818 Floor Joist, 2x12 19' span

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	1.0180	9.569		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.817	0.817
Max Upward from Load Combinations	0.817	0.817
Max Upward from Load Cases	0.504	0.504
D Only	0.314	0.314
+D+L	0.817	0.817
+D+0.750L	0.691	0.691
+0.60D	0.188	0.188
L Only	0.504	0.504

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: 1818 Roof Joist, 2x12 16' span

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

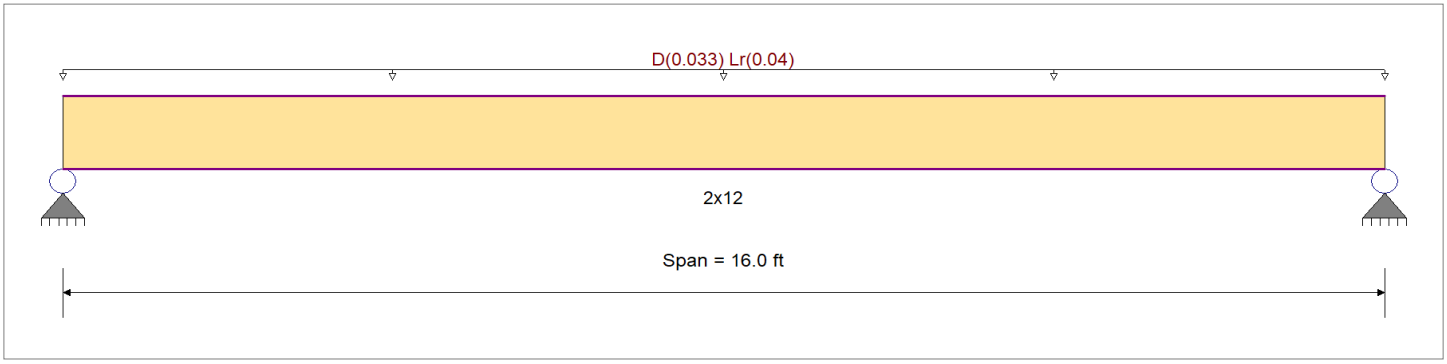
Wood Species : Southern Pine
Wood Grade : No.1 Non-Dense: 2"-4" Thick: 12" Wide

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	900.0 psi
Fb -	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	480.0 psi
Fv	175.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,400.0 ksi
Eminbend - xx	510.0 ksi
Density	34.330 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.0330, Lr = 0.040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.788 : 1	Maximum Shear Stress Ratio	=	0.210 : 1
Section used for this span		2x12	Section used for this span		2x12
fb: Actual	=	885.95 psi	fv: Actual	=	45.85 psi
F'b	=	1,125.00 psi	F'v	=	218.75 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	15.066 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.238 in	Ratio =	806 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.435 in	Ratio =	441 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.494	0.132	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.06	400.5	810.0	0.23	20.7	157.5
+D+Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.788	0.210	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.34	885.9	1,125.0	0.52	45.8	218.8
+D+0.750Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.680	0.181	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.02	764.6	1,125.0	0.45	39.6	218.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.167	0.044	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.63	240.3	1,440.0	0.14	12.4	280.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: 1818 Roof Joist, 2x12 16' span

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.4345	8.058		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.584	0.584
Max Upward from Load Combinations	0.584	0.584
Max Upward from Load Cases	0.320	0.320
D Only	0.264	0.264
+D+Lr	0.584	0.584
+D+0.750Lr	0.504	0.504
+0.60D	0.158	0.158
Lr Only	0.320	0.320

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: 1818 Roof Joist, 2x12 19' span

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method : Allowable Stress Design
Load Combination : IBC 2021

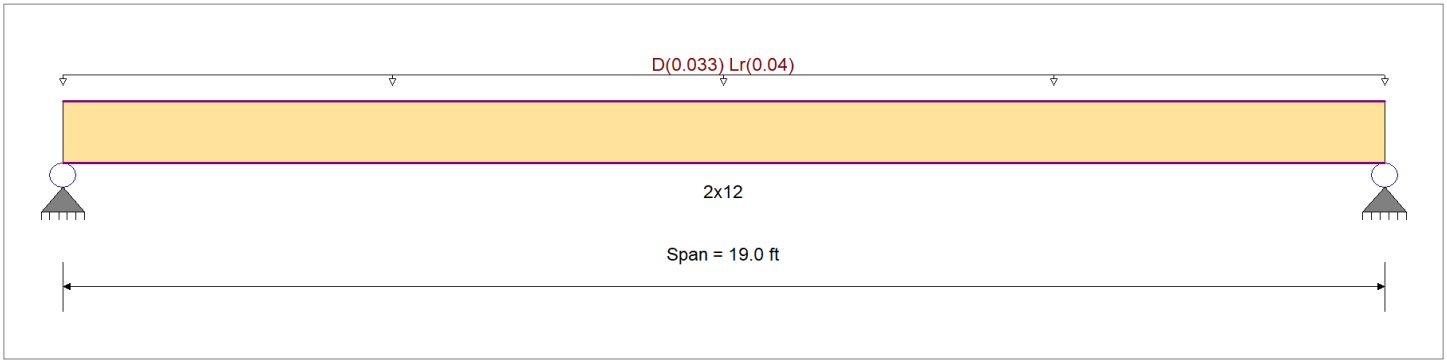
Wood Species : Southern Pine
Wood Grade : No.1 Non-Dense: 2"-4" Thick: 12" Wide

Beam Bracing : Beam is Fully Braced against lateral-torsional buckling

Fb +	900.0 psi
Fb -	900.0 psi
Fc - Prll	1,350.0 psi
Fc - Perp	480.0 psi
Fv	175.0 psi
Ft	575.0 psi

E : Modulus of Elasticity

Ebend- xx	1,400.0 ksi
Eminbend - xx	510.0 ksi
Density	34.330 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.0330, Lr = 0.040 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	1.111 : 1	Maximum Shear Stress Ratio	=	0.255 : 1
Section used for this span		2x12	Section used for this span		2x12
fb: Actual	=	1,249.33 psi	fv: Actual	=	55.79 psi
F'b	=	1,125.00 psi	F'v	=	218.75 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	9.500 ft	Location of maximum on span	=	18.099 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.473 in	Ratio =	481 >=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0 <360	n/a
Max Downward Total Deflection	0.864 in	Ratio =	263 >=180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0 <180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	Moment Values M	fb	F'b	Shear Values V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 19.0 ft	1	0.697	0.160	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.49	564.8	810.0	0.28	25.2	157.5
+D+Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 19.0 ft	1	1.111	0.255	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.29	1,249.3	1,125.0	0.63	55.8	218.8
+D+0.750Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 19.0 ft	1	0.958	0.220	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.84	1,078.2	1,125.0	0.54	48.2	218.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 19.0 ft	1	0.235	0.054	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.89	338.9	1,440.0	0.17	15.1	280.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: 1818 Roof Joist, 2x12 19' span

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.8641	9.569		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.694	0.694
Max Upward from Load Combinations	0.694	0.694
Max Upward from Load Cases	0.380	0.380
D Only	0.314	0.314
+D+Lr	0.694	0.694
+D+0.750Lr	0.599	0.599
+0.60D	0.188	0.188
Lr Only	0.380	0.380

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

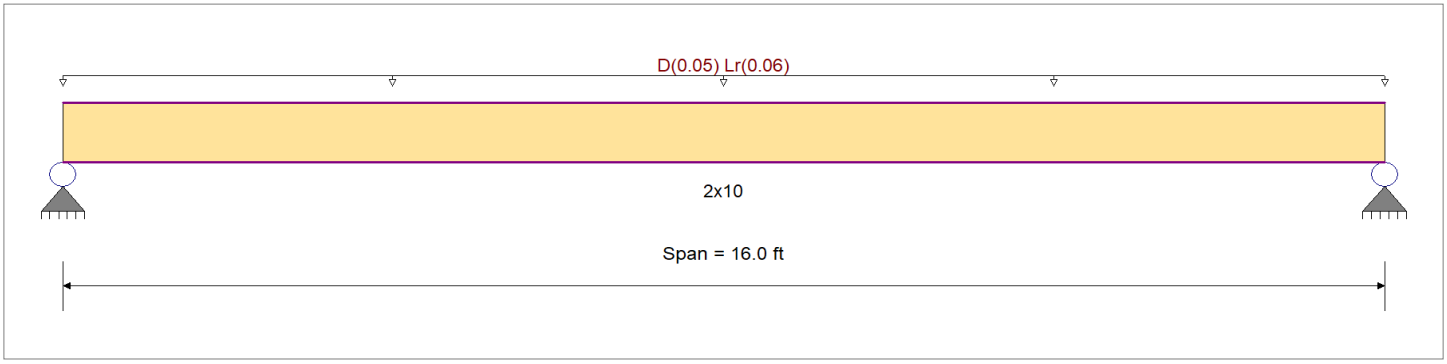
DESCRIPTION: middle building Roof Joist, 2x10 16' span

CODE REFERENCES

Calculations per NDS 2018, IBC 2021, ASCE 7-16
Load Combination Set : IBC 2021

Material Properties

Analysis Method :	Allowable Stress Design	Fb +	950 psi	*E : Modulus of Elasticity*	
Load Combination :	IBC 2021	Fb -	950 psi	Ebend- xx	1400 ksi
		Fc - Prll	1400 psi	Eminbend - xx	510 ksi
Wood Species :	Southern Pine	Fc - Perp	480 psi		
Wood Grade :	No.1 Non-Dense: 2"-4" Thick: 10" Wide	Fv	175 psi		
		Ft	625 psi	Density	34.33 pcf
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling				



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.050, Lr = 0.060 , Tributary Width = 1.0 ft

DESIGN SUMMARY

Design N.G.

Maximum Bending Stress Ratio	=	1.663 : 1	Maximum Shear Stress Ratio	=	0.394 : 1
Section used for this span		**2x10**	Section used for this span		**2x10**
fb: Actual	=	1,974.70 psi	fv: Actual	=	86.11 psi
F'b	=	1,187.50 psi	F'v	=	218.75 psi
Load Combination		+D+Lr	Load Combination		+D+Lr
Location of maximum on span	=	8.000 ft	Location of maximum on span	=	15.241 ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.643 in	Ratio =	298	<360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	1.178 in	Ratio =	162	<180	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0	<180	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C_t	CLx	C_F	Cfu	C_i	C_r	M	fb	F'b	V	fv	F'v
D Only														0.0	0.00	0.0	0.0
Length = 16.0 ft	1	1.050	0.249	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.60	897.6	855.0	0.36	39.1	157.5
+D+Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	1.663	0.394	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.52	1,974.7	1,187.5	0.80	86.1	218.8
+D+0.750Lr					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	1.436	0.340	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.04	1,705.4	1,187.5	0.69	74.4	218.8
+0.60D					1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 16.0 ft	1	0.354	0.084	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	0.96	538.6	1,520.0	0.22	23.5	280.0

Project Title:
Engineer:
Project ID:
Project Descr:

Wood Beam

Project File: H232100.ec6

DESCRIPTION: middle building Roof Joist, 2x10 16' span

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	1.1779	8.058		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	0.880	0.880
Max Upward from Load Combinations	0.880	0.880
Max Upward from Load Cases	0.480	0.480
D Only	0.400	0.400
+D+Lr	0.880	0.880
+D+0.750Lr	0.760	0.760
+0.60D	0.240	0.240
Lr Only	0.480	0.480