



Wtca Update

Introduction to The Load Guide (TLG) - Part 1

by WTCA Staff

The Load Guide (TLG) is a helpful new tool for truss technicians to calculate proper roof and floor truss loading.

Building codes require that all necessary information be provided as part of the construction documents, including structural loading information, either by prescriptive methods or by providing engineering guidelines. Trusses and other structural building components (SBC) require a clear presentation of design loads and their application on the structure as detailed by the building designer. WTCA, in cooperation with the Truss Plate Institute (TPI), has created a Microsoft Excel® spreadsheet program, that is essentially a comprehensive **LOAD CALCULATOR**, intended to help with developing the proper loading for roof and floor structural building components.

We have called it the **GUIDE TO GOOD PRACTICE FOR SPECIFYING & APPLYING LOADS TO STRUCTURAL BUILDING COMPONENTS (The Load Guide [TLG])**. We have made this guide freely available for download from the WTCA web site (www.woodtruss.com/loads.php).



TLG is intended to be used by building designers (architects and engineers), building code officials, component manufacturers, truss designers and truss technicians, with the goal of helping everyone that uses it to more easily understand, define and specify all the loads that should be applied to the design of each structural building component used to resist these loads. It is purely a guide to be used, similar in concept to that of a calculator, and is not intended to replace engineering analysis nor engineering judgment.

TLG provides summary sheets for roof truss and floor truss live and environmental loads and load design parameters, as well as a calculator for dead loads commonly used in light frame construction. These summary sheets are linked to commentary pages that include code interpretation, examples and discussion regarding application of loads. The 2003 International Building Code (IBC) and the International Residential Code (IRC), as well as SEI/ASCE 7-02, Minimum Design Loads for Buildings and Other Structures, are the basis for the discussions. Although local code variations may be mentioned, **TLG** does not include a discussion of all local amendments.

at a glance

- ❑ WTCA has created a spreadsheet program that is essentially a comprehensive **CODE CALCULATOR**.
- ❑ The goal of **TLG** has been to provide a standardized format that can be used:
 - To quickly and easily define the loads to be applied to trusses and structural building components.
 - By jurisdictions that require loading summary pages to be produced as part of the construction project submittal process.

The positions, interpretations, comparisons and commentary included in **TLG** are intended to assist anyone using it with specifying and applying loads on trusses and structural building components. They are intended to aid in the consistent interpretation and application of loads, yet are not intended to supersede an architect or engineer's judgment and design specification for the loads that should be applied to a specific building.

To assist in the process of verifying that all load information is provided for review, some code jurisdictions have developed summary pages to consolidate specific loading information from the construction documents into one location. Generally, the content and format varies greatly. Our industry's approach with **TLG** has been to focus on what information is required to properly design a structural building component and place it into a form that is easy to use. Our forms follow:

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Detailed Dead Load for Assemblies:

Description		Unit	PSF	
Roof: TC:	OE Roofing & Reroofing	2x	Light asphalt shingles (220 lb)	
	OE Felt		15 lb Felt	
	OE Sheathing		19/32" plywood	
	OE Insulation (in inches)		0.00	
	E Truss (not a spec)		Roof (2x4 TC or BC, 24" o.c.)	
	E Over-framing or purlins		0.00	
	E Other (enter PSF)			
	SUBTOTAL TC = DL on horizontal projection			7.45
	E Slope (inches)	6	Correction Factor for Slope	1.12
TOTAL Roof Truss TC = TC DL Corrected for Slope			8.33	
BC:	E Truss (not a spec)		Roof (2x4 TC or BC, 24" o.c.)	
	OE Insulation (in inches)	12	Fuli-Tenon (0.1 PSF per 1" of thickness)	
	E Mechanical		Minimum for misc. (1.5 PSF)	
	E Sprinkler System		0.00	
	OE Ceiling (layers)	1	5/8" gypsum	
	E Other (enter PSF)			
	SUBTOTAL BC = DL on horizontal projection			6.60
	E Slope (inches)		Correction Factor for Sloped Ceiling	1.00
TOTAL Roof Truss BC = BC DL Corrected for Slope			6.60	
FLOOR: TC:	E Floor Finish Covering		Carpet & pad	
	E Floor Fill		0.00	
	OE Subfloor		5/8" OSB or Com-Ply	
	OE Underlayment		15/32" plywood	
	E Truss (not a spec)		12-18" Floor (Single chord, 4x2, 24" o.c.)	
	L Insulation (in inches)		0.00	
	E Non-bearing Partition Load		50 or less PLF	
	E Sprinkler System		0.00	
	E Other (enter PSF)			
	TOTAL Floor Truss TC =			8.09
BC:	E Truss (not a spec)		12-18" Floor (Single chord, 4x2, 24" o.c.)	
	OE Insulation (in inches)		0.00	
	E Mechanical		Minimum for misc. (1.5 PSF)	
	OE Ceiling (layers)	1	5/8" gypsum	
	E Sprinkler System		0.00	
	E Other (enter PSF)			
TOTAL Floor Truss BC =			6.30	

FLOOR TRUSS: (all trusses may not have the same specifications or one or more notations may be required)

Describe Floor Area or similar trusses: _____

DEFINE FLOOR LOAD DESIGN INFORMATION:

TC Uniform Floor Truss Live Load (LL): _____

OE (Select) 50 PSF (Apply LL on 2nd floor and below, unless noted on form)
 HX (Enter other live load) _____

BC Uniform Floor Truss Live Load (LL): _____

OE (Zero, unless there is a specific reason for it being otherwise)

SPECIAL LOADING: (Must be specified on notes unless otherwise noted)

L	Y/N	N/A	1/8" LONGSPAN MOVABLE PARTITION LOAD	
L	Y/N	N/A	1/8" LONGSPAN PARTITION LOAD	
L	Y/N	N/A	2" DIA. ROLLER LOAD - CON	
L	Y/N	N/A	2" DIA. ROLLER LOAD - ROOF	
L	Y/N	N/A	CONCENTRATED LOAD CHECK TC	1/8" (ON 12" x 12" DIMS)
L	Y/N	N/A	CONCENTRATED LOAD CHECK BC	1/4" (ON 12" x 12" DIMS)
L	Y/N	N/A	CONCENTRATED LOAD CHECK TC	(APPROXIMATE EQUIV. LOAD INCLUDING BEARING LOAD)
L	Y/N	N/A	CONCENTRATED LOAD CHECK BC	

Check for Connections:

L	Y/N	2x4 Vertical	Flow type	_____
L	Y/N	2x6 LL	_____	_____
L	Y/N	2x4	LONGSPAN JOINT/BEAM CONNECTION	_____

IS THERE SOMETHING SPECIFIC TO THIS? If yes, describe: _____

FINAL DESIGN SIGN-OFF:

Class	Specification	Value	Unit	Designation
TC LL	48	PSF		TC LL (Design Load)
TC DL	18	PSF		TC DL (Design Load)
BC LL	0	PSF		BC LL (Design Load)
BC DL	15	PSF		BC DL (Design Load)

I, the undersigned, accept the above floor loads and design information.

Project Name: _____

Contractor: _____

Design Per: _____

Specifier Design Load Sign-off (typical for roofs and floors).

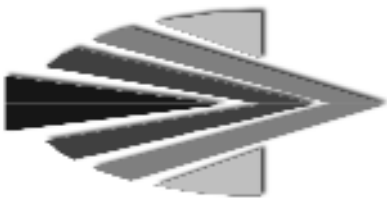
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the side of the majority,
it is time to pause and reflect.

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ROOF TRUSS: (all roof areas or similar trusses may not have the same specifications; one or more worksheets may be required.)
Describe Roof Area or similar trusses: [Common]

DETAILED LIFT & ENVIRONMENTAL DESIGN LOAD INFORMATION

ITEM	DESCRIPTION	UNIFORM VALUE	NON-UNIFORM VALUE	REMARKS
1	Default Roof Live Load	1.00		[T] Tributary Reduction Factor
2	Tributary area in sq. ft.	0.50		[T] Tributary Reduction Factor
3	Roof slope	18.00		[T] Tributary Reduction Factor

II) Detailed Snow Load (L)

ITEM	DESCRIPTION	UNIFORM VALUE	NON-UNIFORM VALUE	REMARKS
1	Ground Snow Load	20.00		[T] Use per design loads
2	Exposure Category	Exposure Category		
3	Exposure Factor	0.80		
4	Roof Slope Factor	1.00		
5	Wind Directionality Factor	1.00		
6	Thermal Coefficient	0.90		
7	Roof Form Factor	1.00		
8	Roof Leakage Factor	1.00		
9	Roof Surface Factor	1.00		
10	Wind Uplift Factor	1.00		
11	Wind Uplift Factor	1.00		
12	Wind Uplift Factor	1.00		
13	Wind Uplift Factor	1.00		
14	Wind Uplift Factor	1.00		
15	Wind Uplift Factor	1.00		

III) Uniform Rain Load (L)

Inclination of main slope is not generally required on roofs with a slope greater than 10% (not per 17.7.9.1)

ITEM	DESCRIPTION	UNIFORM VALUE	NON-UNIFORM VALUE	REMARKS
1		0.00		
2		0.00		

IV) Uniform Wind Load (L)

(Use higher value unless noted by design)

ITEM	DESCRIPTION	UNIFORM VALUE	NON-UNIFORM VALUE	REMARKS
1		0.00		
2		0.00		

V) Wind Design Parameters (W)

ITEM	DESCRIPTION	UNIFORM VALUE	NON-UNIFORM VALUE	REMARKS
1	Wind Velocity (Exposed)	70.00		
2	Wind Velocity (Protected)	70.00		
3	Wind Velocity (Semi-Protected)	70.00		
4	Wind Velocity (Semi-Protected)	70.00		
5	Wind Velocity (Semi-Protected)	70.00		
6	Wind Velocity (Semi-Protected)	70.00		
7	Wind Velocity (Semi-Protected)	70.00		
8	Wind Velocity (Semi-Protected)	70.00		
9	Wind Velocity (Semi-Protected)	70.00		
10	Wind Velocity (Semi-Protected)	70.00		
11	Wind Velocity (Semi-Protected)	70.00		
12	Wind Velocity (Semi-Protected)	70.00		
13	Wind Velocity (Semi-Protected)	70.00		
14	Wind Velocity (Semi-Protected)	70.00		
15	Wind Velocity (Semi-Protected)	70.00		

Special Loading Considerations:

ITEM	DESCRIPTION	UNIFORM VALUE	NON-UNIFORM VALUE	REMARKS
1	Consider Uniform Loads	1.00		
2	Include Mechanical Loads	1.00		
3	Consider Impact Loads	1.00		
4	Consider Concentrated Loads	1.00		
5	Consider Wind Uplift	1.00		
6	Consider Wind Uplift	1.00		
7	Consider Wind Uplift	1.00		
8	Consider Wind Uplift	1.00		
9	Consider Wind Uplift	1.00		
10	Consider Wind Uplift	1.00		
11	Consider Wind Uplift	1.00		
12	Consider Wind Uplift	1.00		
13	Consider Wind Uplift	1.00		
14	Consider Wind Uplift	1.00		
15	Consider Wind Uplift	1.00		

VI) Uniform Seismic Load (MSR) (I)

ITEM	DESCRIPTION	UNIFORM VALUE	NON-UNIFORM VALUE	REMARKS
1		0.00		
2		0.00		

WTCA Update

Continued from page 23

The goal of **TLG** has been to provide a standardized format:

- That can be used to quickly and easily define the loads to be applied to the specific roof or floor structural building component types created for a specific building.
- That can be used in jurisdictions that require loading summary pages to be produced as part of the project submittal process.
- That can be used by component manufacturers, Building Designers, Truss Designers and Building Officials to ensure that everyone involved in a project is talking the same code language.
- That can be used in the submittal process of any jurisdiction.
- That enhances uniformity of interpretation, so that the proper loads are applied to a structure, which will improve building safety. **SBC**

Guide to Good Practice for Specifying & Applying Loads to Metal Plate Connected Wood Trusses (THE LOAD GUIDE [TLG]) is freely available for download from the WTCA web site (www.woodtruss.com/loads.php).

As a point of comparison, the following are two examples of state forms that can easily be replaced by our industry standard TLG summary forms:

STRUCTURAL DESIGN

DESIGN LOADS:

Importance Factors: Wind (I_w) _____
 Snow (I_s) _____
 Seismic (I_e) _____

Live Loads: Roof _____ psf
 Mezzanine _____ psf
 Floor _____ psf

Snow Load: _____ psf

Wind Load: Basic Wind Speed _____ mph (ASCE-7-98)
 Exposure Category _____
 Wind Base Shears (for MWFRS) $V_x =$ _____ $V_y =$ _____

SEISMIC DESIGN CATEGORY A
 Compliance with Section 1616.4 only? Yes No

SEISMIC DESIGN CATEGORY B, C, & D
 Provide the following Seismic Design Parameters:

Seismic Use Group _____
Spectral Response Acceleration S_{AS} _____ %g S_{AS1} _____ %g
Site Classification _____
Basic structural system (check one)
 Bearing Wall Dual w/Special Moment Frame
 Building Frame Dual w/Intermediate R/C or Special Steel
 Moment Frame Inverted Pendulum

Seismic base shear V_x _____ V_y _____
Analysis Procedure _____ Simplified _____ Equivalent Lateral Force
 _____ Modal
Architectural, Mechanical, Components anchored? _____

LATERAL DESIGN CONTROL: Earthquake _____ Wind _____

SOIL BEARING CAPACITIES:
 Field Test (provide copy of test report) _____ psf
 Presumptive Bearing capacity _____ psf
 Pile size, type, and capacity _____

SD-1

STRUCTURAL DESIGN WORKSHEET

- Design loads** must be shown on construction documents:

Floor area use _____	live load shown _____ PSF	Building is in _____ county
_____ PSF	_____ PSF	Ground snow load $P_g =$ _____ PSF (1608.2)
_____ PSF	_____ PSF	Snow load importance factor $I_s =$ _____ (1608.3.3)
_____ PSF	_____ PSF	Snow load exposure factor $C_e =$ _____ (1608.3.1)
_____ PSF	_____ PSF	Sloped roof/flat roof factor $C_d =$ _____ (1608.4)
Are live load reductions used? _____	_____ PSF	Roof thermal factor $C_t =$ _____ (1608.3.2)

Roof snow load from the above ground snow times adjustments is $PSF = P_g \cdot 0.7(I_s)C_e C_d C_t$

Unbalanced or sliding or drifting snow locations and amounts are clearly shown on plans and calculations (1608.6 to 1608.9).

Impact or concentrated load locations & amounts are shown on plans and in calculations (1607).

- Wind** load resistance design method used? *ASCE 7* or *IBC 1609.6 Simplified for Low Rise*

Amount of openings on each side are: North _____ East _____ South _____ West _____
 Amount exterior wall on each side are: North _____ East _____ South _____ West _____
 Is building Open, Partially Enclosed, or Enclosed? _____ Worst case is _____ % openings
 Width of end zone - _____ feet edge strip calculation - _____

Coefficients used

C_e	Windward Wall		Leeward Wall		Windward Roof		Leeward Roof	
	End zone	Interior zone	End zone	Interior zone	End zone	Interior zone	End zone	Interior zone
MWFRS								
Components & Cladding								

Wind load importance factor (I_w) _____ Building use is importance category _____

Exposure terrain is _____ North _____ $K_z =$ _____
 category terrain is _____ East _____ $K_z =$ _____
 terrain is _____ South _____ $K_z =$ _____
 terrain is _____ West _____ $K_z =$ _____

Gust effect factor $G =$ _____ Wind directionality factor $K_d =$ _____



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