STRUCTURAL BUILDING COMPONENTS MAGAZINE
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Human Faces

WTCA Members "Pound the Pavement" by Libby Maurer and Kirk Grundahl, P.E. in collaboration with Jack Parker, Eastern Building Components, Scott Coffman, P.E., Builders FirstSource, Tom Hollinshed, Comtech, Inc. and Joe Kannapell, P.E., MiTek Industries, Inc.

A whole lot of leadership, patience, emotional highs and lows, conflict, perseverance and heart resulted in a recent success for WTCA's North Carolina Chapter (WTCNC). They arrived at a collective agreement with the North Carolina Department of Insurance (NCDOI) for a solution that met the needs of NCDOI and allowed our industry to continue to supply truss placement plans in a manner that falls within the laws and rules applicable to the state of North Carolina.

The North Carolina saga began in the mid-1990s when local building officials and Bill Murchison of NCDOI decided that truss placement plans were engineering documents and would require a professional engineering seal. The wood truss industry position has always been that truss placement plans are installation guides and do not require any special knowledge and use of the mathematical, physical and engineering sciences and the principles and methods of engineering analysis and design. Thus, they are not engineering documents that require a seal.

This issue resurfaced in the latter half of 1999 when local building officials were asking for sealed truss placement plans. At this time, the North Carolina Board of Examiners for Engineers and Surveyors (NCBEES) stated that when there was a professional engineer or architect involved in a project, they would need to review the truss placement plan and provide a shop drawing approval stamp after the review. This worked well when there was a building designer on the job, but did not work as well for most residential projects. The issue lay dormant until the spring/ summer of 2002 when local building officials were again calling for sealed placement plans for residential projects. As a result, members of WTCNC met with NCBEES on August 13, 2002, to work through the key issues. The outcome of the meeting was as follows:

- NCBEES (the "Board") stated that when there is a registered architect or engineer involved in the project, the truss placement plan should be reviewed and approved by the engineer of record and then properly certified (sealed) or annotated as an approved shop drawing.
- The Board agreed that the trusses must be evaluated and coordinated with the other structural components to ensure adequacy and safety of the entire structure.
- As there is not a requirement in the law or the code for there to be a registered architect or engineer involved in most residential structures, there is no requirement for the seal of a design professional unless specifically required by the code, by a local enforcement official or by a builder using an alternative means of construction not called for within the code.
- Certainly, if a truss placement plan is prepared by an engineer, it must be sealed by such engineer. The Board has purview over the engineering requirements in the building code only when an engineer is involved in creating designs and plans that involve the code. Building Officials have the right to be more restrictive in their engineering requirements. If they choose to be more restrictive and it does involve engineering then the Board has authority over the engineer performing the work and the engineering issues.
- The Board stated at that time that it believed that if there is no professional engineer of record for the project and if a truss placement plan is sealed, the sealing engineer is responsible for the application of the loads of the trusses to the structure below. This would mean that if a truss design engineer is involved in creating a truss placement plan on a project where there was no engineer of record he/she will be responsible for how the loads are applied to the rest of the building, for many residential structures.
- The Board also expressed concern over a code official requiring a truss placement plan be sealed if it is not routinely prepared by an engineer as this would not comply with existing North Carolina engineering statutes.

This led to a meeting with NCDOI where we advised of the Board's positions, yet NCDOI remained committed to it's belief was that the truss manufacturers were not responsible for the application and transfer of loads below the plate line. This was contrary to the interpretation of the NCBEES.

Simultaneously with the NCDOI meeting, an alternative strategy was also formulated in the event that this became a political and legislative issue. We began by listing our contacts within the North Carolina Senate and Assembly, the Governor's office and the North Carolina Home Builder's Association. This was our choice of last resort, but we were prepared to take political or legislative action if the need arose.

Throughout Fall 2002 and into Spring 2003, we committed ourselves to the main strategy of developing a close working relationship with NCDOI to find common ground. NCDOI remained firm in its requirement that the placement plan be sealed by the truss design engineer because they believed that the truss placement plan was an integral part of the truss design drawings. Since the North Carolina Residential Code was changed to require all truss design drawings to be sealed by a design professional, NCDOI felt their requirement for sealed truss placement plans was appropriate.

This led to an interim agreement with NCDOI, subject to approval by NCBEES, that the following scope of responsibility statement be placed onto the truss placement plan whenever a request was made for it to be sealed by the truss design engineer:

> "This placement plan shows the designation and relative location of each truss component and is to be used in conjunction with the corresponding truss designs. The Truss Design Engineer's responsibility relative to this structure consists solely of the design of the individual trusses and does not include the design of any supporting structural elements. Should any truss reactions exceed 2860 lbs., a structural engineer is then required to design the transfer of such reactions to the foundation. Reactions exceeding 2860 lbs. are highlighted on truss design drawings."

We met again with the Board on February 16, 2003, and decided that since we are still working with NCDOI to determine the correct number for the magnitude of the concentrated load over which a professional engineer would be required to undertake the design, this issue would be tabled and placed for final resolution with the NCBEES Engineering Committee upon further work.

This led to a series of meetings with NCDOI in which they were still adamant about requiring that truss placement plans be sealed.

THE TABLES TURN

After a May 23, 2003 meeting with NCDOI and the WTCA negotiating team, Jack Parker, WTCNC President, announced a major breakthrough. "We made great headway with this issue by providing NCDOI with tables that show the maximum point loads that are already allowed within the NC Building Code. Even though NCDOI has been adamant about the requirement for a seal being applied to truss placement plans, their stance softened during this meeting with our code information. NCDOI said several times during the meeting that they 'have in the past and always will require a sealed truss placement plan.'"

At the end of the meeting, NCDOI charged WTCANC with the following tasks:

1. Develop a complete set of maximum-reaction tables from the North Carolina Building Code.
2. Develop a statement to be placed on all truss placement plans.
3. Provide specific information within the truss placement plan title block.
4. Provide a reaction load summary page for all components shown on the truss placement plan.

The single-most positive element that came out of this work is that these tables gave us much higher point loads than we had previously been able to use. Thus, there would be no requirement to seal the truss placement plan if point loads fit within our tables.

Parker noted, "The path we were originally going down was littered with obstacles that we couldn't overcome. We had to back up, re-evaluate the challenge before us and make the commitment to work with NCDOI to find a resolution that would work to the advantage of both parties. This led us to another path that enabled us to find common ground with NCDOI. It was just a matter of finding our way to a place that already existed."

Hollinshed added, "This was the point that we realized that we had many of the same concerns as NCDOI. We had common goals for the end result, but we were approaching that end result from different perspectives. Once we were able to communicate those goals to each other, we finally got an understanding for where each of us was coming from."

All this work led to the following memo from NCDOI:

Date: September 16, 2003
To: Jack Parker, President, Wood Truss Council of NC
From: Barry Gupton, P.E.,
Staff, Chief Building Code Consultant, NCDOI
Re: Residential Truss Package

The Residential Truss Package shall consist of the truss design drawings, a truss reaction summary sheet, and the truss placement plan if required. The following information shall be contained on each document comprising the Residential Truss Package:

Truss Design Drawing:
a) Truss manufacturer's name, address and phone number
b) Job number assigned by the truss manufacturer
c) Job location; either street address, city and county or lot number, block number, section or subdivision and county
d) Information detailed in code sections R502.11 or R802.10
e) Designer's seal, signature and date (specified in sections R502.11 or R802.10)

Truss Reaction Summary Sheet:
a) Truss manufacturer's name, address and phone number
b) Job number assigned by the truss manufacturer
c) Job location; either street address, city and county or lot number, block number, section or subdivision, and county
d) Truss ID and maximum calculated reaction for each bearing location

Residential Truss Placement Plan:
a) Truss manufacturer's name, address and phone number
b) Job number assigned by the truss manufacturer
c) Job location; either street address, city and county or lot number, block number, section or subdivision, and county
d) Name and signature of person responsible for producing the placement plan
e) General Note:

> Bearing reactions less than or equal to 3,000 lbs are deemed to comply with the prescriptive Code requirements. The contractor shall refer to the attached Tables (derived from the prescriptive Code requirements) to determine the minimum foundation size and number of wood studs required to support reactions greater than 3,000 lbs but not greater than 15,000 lbs. A registered design professional shall be retained to design the support system for any reaction that exceeds those specified in the attached Tables. A registered design professional shall be retained to design the support system for all reactions that exceed 15,000 lbs.

Our group also produced a series of tables that will be provided to all North Carolina Building Code officials as their allowable point load references. Samples of these are shown in figures below. (Visit www.wtcnc.com for a complete set of these tables.)

CONCLUSION

Sealing truss placement plans would still be required had Jack Parker, President of WTCNC, and Tom Hollinshed, Past President of WTCNC, not met face-to-face many times with NCDOI. Jack made his first two-hour drive to Raleigh because his hometown inspector identified NCDOI as the source of the requirement. Then he summoned the considerable national resources and experience of WTCA, and the local WTCA Chapter to respond. Hollinshed quickly engaged outside engineering assistance to design sample wall sections and personally took these calculations to Raleigh. Jack Parker, Scott Coffman and Kirk Grundahl worked with the International Building Code and NC Building code provisions to address all of the NCDOI concerns by creating new tables that met the state's engineering concerns.

Was this a wood truss problem? No, inadequately designed walls and foundations were the problem leading NCDOI to take the actions that it did.

Why were we involved? Building Officials were requiring that truss placement plans be sealed by truss design engineers and builders were beginning to back-charge truss manufacturers for outside engineering.

How did we resolve the problem? By working with NCDOI, being patient and persistent and presenting constructive tools/solutions that improved the process.

The hard work of Jack Parker, Tom Hollinshed, Scott Coffman, P.E., Steve Cabler, P.E., Dave Brakeman, P.E., S.E. and Kirk Grundahl, P.E., cannot be overstated.

In his own words, Parker reflected on the journey: "This process has been very time consuming but educational for everyone involved, and most importantly we have built a relationship with NCDOI as a partner and not an opponent."

Hollinshed credited sound communication and a trusting relationship between the two organizations as the key to the group's triumph: "This was made possible by our being able to establish communication with all parties involved. Over several years, we developed a positive rapport and a trustworthy relationship with the key players. That communication made all the difference in the end. We ended up with a win-win."

Parker said, "I attribute this success to both the persistence and cooperation between the agencies and our chapter. Without that perseverance and determination, we would still be running into the same roadblocks that kept us from reaching a resolution."

This has been a grueling nine months of meetings, teleconferences and countless hours at the meeting table, with the outcome a product of compromise and teamwork. This is a perfect example of how our industry, in total, can work together to arrive at the best possible industry-wide solution.

This will indeed be a catalyst to a far better future as we continue to develop a very strong positive relationship with DOI and NCBELS. This surely will serve the entire construction industry very well.

LOAD CHART FOR BEAMS & GIRDER END REACTIONS

(Per code section R5052.5(1)b pg. 84.1 NC Residential Code)

	ROOF SPAN	ATTIC FLOOR SPAN	FLOOR SPAN 1st	FLOOR SPAN 2nd	BEAM / GIRDER SPAN	1st FLOOR LIVE	1st FLOOR DEAD	2nd FLOOR LIVE	2nd FLOOR DEAD	ATTIC FLOOR LIVE	ATTIC FLOOR DEAD	ROOF LIVE	ROOF DEAD	WALL LOAD (PLF)	PLF LOAD	END REACTION	Number of Jack Studs Required @ Each End of Header 1,2		
																	3" (2-2x)	4.5" (3-2x)	6" (4-2x)
ROOF & CEILING (1 STORY)	36	0	0	0	2	40	10	30	10	30	10	20	20		720	720	1	1	1
	36	0	0	0	4	40	10	30	10	30	10	20	20		720	1440	1	1	1
	36	0	0	0	6	40	10	30	10	30	10	20	20		720	2160	2	1	1
	36	0	0	0	8	40	10	30	10	30	10	20	20		720	2880	2	2	1
	36	0	0	0	10	40	10	30	10	30	10	20	20		720	3600	3	2	2
	36	0	0	0	12	40	10	30	10	30	10	20	20		720	4320	3	2	2
	36	0	0	0	14	40	10	30	10	30	10	20	20		720	5040	4	3	2
	36	0	0	0	16	40	10	30	10	30	10	20	20		720	5760	4	3	2
ROOF, CEILING, & 1 FLOOR (CTR BRG) (2 STORY)	36	0	18	0	2	40	10	30	10	30	10	20	20	80	1250	1250	1	1	1
	36	0	18	0	4	40	10	30	10	30	10	20	20	80	1250	2500	2	1	1
	36	0	18	0	6	40	10	30	10	30	10	20	20	80	1250	3750	2	2	1
	36	0	18	0	8	40	10	30	10	30	10	20	20	80	1250	5000	3	2	2
	36	0	18	0	10	40	10	30	10	30	10	20	20	80	1250	6250	4	3	2
	36	0	18	0	12	40	10	30	10	30	10	20	20	80	1250	7500	4	3	2
	36	0	18	0	14	40	10	30	10	30	10	20	20	80	1250	8750	5	3	3
	36	0	18	0	16	40	10	30	10	30	10	20	20	80	1250	10000	6	4	3
ROOF, CEILING, & 1 FLOOR (CTR BRG) (2 STORY, CTR SUPPORT)	0	36	18	0	2	40	10	30	10	20	0	20	20	80	890	890	1	1	1
	0	36	18	0	4	40	10	30	10	20	0	20	20	80	890	1780	2	1	1
	0	36	18	0	6	40	10	30	10	20	0	20	20	80	890	2670	2	2	1
	0	36	18	0	8	40	10	30	10	20	0	20	20	80	890	3560	3	2	2
	0	36	18	0	10	40	10	30	10	20	0	20	20	80	890	4450	4	3	2
	0	36	18	0	12	40	10	30	10	20	0	20	20	80	890	5340	4	3	2
	0	36	18	0	14	40	10	30	10	20	0	20	20	80	890	6230	5	3	3
	0	36	18	0	16	40	10	30	10	20	0	20	20	80	890	7120	6	4	3
ROOF, CEILING, & 1 FLOOR (CLEAR SPAN) (2 STORY)	36	0	36	0	2	40	10	30	10	30	10	20	20	80	1700	1700	1	1	1
	36	0	36	0	4	40	10	30	10	30	10	20	20	80	1700	3400	2	2	1
	36	0	36	0	6	40	10	30	10	30	10	20	20	80	1700	5100	3	2	2
	36	0	36	0	8	40	10	30	10	30	10	20	20	80	1700	6800	4	3	2
	36	0	36	0	10	40	10	30	10	30	10	20	20	80	1700	8500	5	3	3
	36	0	36	0	12	40	10	30	10	30	10	20	20	80	1700	10200	6	4	3
	36	0	36	0	14	40	10	30	10	30	10	20	20	80	1700	11900	6	4	3
	36	0	36	0	16	40	10	30	10	30	10	20	20	80	1700	13600	7	5	4
ROOF, CEILING, & 2 FLOORS (CTR BRG) (3 STORY)	36	0	18	18	2	40	10	30	10	30	10	20	20	160	1690	1690	1	1	1
	36	0	18	18	4	40	10	30	10	30	10	20	20	160	1690	3380	2	2	1
	36	0	18	18	6	40	10	30	10	30	10	20	20	160	1690	5070	3	2	2
	36	0	18	18	8	40	10	30	10	30	10	20	20	160	1690	6760	4	3	2
	36	0	18	18	10	40	10	30	10	30	10	20	20	160	1690	8450	5	3	3
	36	0	18	18	12	40	10	30	10	30	10	20	20	160	1690	10140	6	4	3
	36	0	18	18	14	40	10	30	10	30	10	20	20	160	1690	11830	7	5	4
	36	0	18	18	16	40	10	30	10	30	10	20	20	160	1690	13520	8	5	4
ROOF, CEILING, & 2 FLOORS (CTR BRG) (3 STORY, CTR SPPORT)	0	36	18	18	2	40	10	30	10	20	0	20	20	160	1330	1330	1	1	1
	0	36	18	18	4	40	10	30	10	20	0	20	20	160	1330	2660	2	2	1
	0	36	18	18	6	40	10	30	10	20	0	20	20	160	1330	3990	3	2	2
	0	36	18	18	8	40	10	30	10	20	0	20	20	160	1330	5320	4	3	2
	0	36	18	18	10	40	10	30	10	20	0	20	20	160	1330	6650	5	3	3
	0	36	18	18	12	40	10	30	10	20	0	20	20	160	1330	7980	6	4	3
	0	36	18	18	14	40	10	30	10	20	0	20	20	160	1330	9310	6	4	3
	0	36	18	18	16	40	10	30	10	20	0	20	20	160	1330	10640	7	5	4
ROOF, CEILING, & 2 FLOORS (CLEAR SPAN) (3 STORY)	36	0	36	36	2	40	10	30	10	30	10	20	20	160	2500	2500	2	1	1
	36	0	36	36	4	40	10	30	10	30	10	20	20	160	2500	5000	3	2	2
	36	0	36	36	6	40	10	30	10	30	10	20	20	160	2500	7500	5	3	3
	36	0	36	36	8	40	10	30	10	30	10	20	20	160	2500	10000	6	4	3
	36	0	36	36	10	40	10	30	10	30	10	20	20	160	2500	12500	7	5	4
	36	0	36	36	12	40	10	30	10	30	10	20	20	160	2500	15000	9	6	5
	36	0	36	36	14	40	10	30	10	30	10	20	20	160	2500	17500	10	7	5
	36	0	36	36	16	40	10	30	10	30	10	20	20	160	2500	20000	12	8	6

FOOTNOTES:

1. Jack stud requirements are based on a roof span (W) of 36'. For other roof spans, the tabulated number of jack studs required at each end of the header shall be multiplied by (W/48 + 1/4).
2. Where the number of jack studs equal 1, the header shall be permitted to be supported by a framing anchor attached to the full-height wall stud.

ASSUMPTIONS:

50 1. FIRST FLOOR 50# PSF (40 PSF LIVE, 10 PSF DEAD)
40 2. SECOND FLOOR 40# PSF (30 PSF LIVE, 10 PSF DEAD)
20 3. ATTIC FLOOR 20# PSF (20PSF LIVE, 0 PSF DEAD)
30 4. ROOF 30# PSF (20 PSF LIVE, 10 PSF DEAD)

Load Bearing Value of Soil (psf)			5000				
Footing Width (in)			16	20	24	28	32
Wall Supporting	Footing Thickness (in)	Wall PLF to Footing	Maximum Column Load (lbs)	Maximum Column Load (lbs)	Maximum Column Load (lbs)	Maximum Column Load (lbs)	Maximum Column Load (lbs)
Roof and Ceiling	8	980	31751	41056	50362	59667	68973
	10	980	33646	43507	53368	63229	73091
	12	980	35542	45958	56375	66792	77208
	14	980	37437	48409	59382	70354	81326
	16	980	39333	50861	62388	73916	85444
	18	980	41228	53312	65395	77478	89562
	20	980	43124	55763	68402	81041	93679
Roof, Ceiling and One Center Bearing Floor	8	1430	29238	38544	47849	57155	66460
	10	1430	30984	40845	50706	60567	70428
	12	1430	32729	43146	53563	63979	74396
	14	1430	34475	45447	56419	67391	78364
	16	1430	36220	47748	59276	70804	82331
	18	1430	37966	50049	62133	74216	86299
	20	1430	39711	52350	64989	77628	90267
Roof, Ceiling and One Floor Clear Span	8	1880	26726	36031	45337	54642	63948
	10	1880	28321	38182	48043	57904	67766
	12	1880	29917	40333	50750	61167	71583
	14	1880	31512	42484	53457	64429	75401
	16	1880	33108	44636	56163	67691	79219
	18	1880	34703	46787	58870	70953	83037
	20	1880	36299	48938	61577	74216	86854
Roof, Ceiling, and Two Center Bearing Floor	8	1890	26670	35975	45281	54586	63892
	10	1890	28262	38123	47984	57845	67706
	12	1890	29854	40271	50688	61104	71521
	14	1890	31446	42419	53391	64363	75335
	16	1890	33039	44566	56094	67622	79150
	18	1890	34631	46714	58798	70881	82964
	20	1890	36223	48862	61501	74140	86779

Load Bearing Value of Soil (psf)		2000						
Footing Width (in)			16	20	24	28	32	
Wall Supporting	Footing Thickness (in)	Wall PLF to Footing	Maximum Column Load (lbs)	Maximum Column Load (lbs)	Maximum Column Load (lbs)	Maximum Column Load (lbs)	Maximum Column Load (lbs)	
Roof and Ceiling	8	1500	6514	10236	13958	17681	21403	
	10	1500	6903	10847	14792	18736	22681	
	12	1500	7292	11458	15625	19792	23958	
	14	1500	7681	12069	16458	20847	25236	
	16	1500	8069	12681	17292	21903	26514	
	18	1500	8458	13292	18125	22958	27792	
	20	1500	8847	13903	18958	24014	29069	
Roof, Ceiling and One Center Bearing Floor	8	1950	4001	7724	11446	15168	18890	
	10	1950	4240	8185	12129	16074	20018	
	12	1950	4479	8646	12813	16979	21146	
	14	1950	4718	9107	13496	17885	22274	
	16	1950	4957	9568	14179	18790	23401	
	18	1950	5196	10029	14863	19696	24529	
	20	1950	5435	10490	15546	20601	25657	
Roof, Ceiling and One Floor Clear Span	8	2400	1489	5211	8933	12656	16378	
	10	2400	1578	5522	9467	13411	17356	
	12	2400	1667	5833	10000	14167	18333	
	14	2400	1756	6144	10533	14922	19311	
	16	2400	1844	6456	11067	15678	20289	
	18	2400	1933	6767	11600	16433	21267	
	20	2400	2022	7078	12133	17189	22244	
, and	8	2850	-1024	2699	6421	10143	13865	
	10	2850	-1085	2860	6804	10749	14693	

LOAD CHART FOR JACK STUDS					
(Based On Tables R502.5(1) & (b))					
Number of Jack Studs Required @ Each End of Header / Girder					
END REACTION	3" (2-2x)	END REACTION	4.5" (3-2x)	END REACTION	6" (4-2x)
1700	1	2550	1	3400	1
3400	2	5100	2	6800	2
5100	3	7650	3	10200	3
6800	4	10200	4	13600	4
8500	5	12750	5	17000	5
10200	6	15300	6		
11900	7				
13600	8				
15300	9				

The work done by WTCA's North Carolina Chapter and all of the individuals involved in this issue will provide a template for other areas of the country to follow if necessary. For more information on this topic, contact one of the following individuals:

- Jack Parker, Eastern Building Components, 252/638-6506 or jack@ebctruss.com
- Tom Hollinshed, Comtech, Inc., 910/864-8787 or tshed@worldnet.att.net
- Joe Kannapell, MiTek Industries, Inc., 800/325-8075 ext. 7901 or r.joe.kannapell@mii.com
- Kirk Grundahl, Wood Truss Council of America, 608/274-2345 or kgrundahl@qualtim.com

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SBC HOME PAGE

The mission of Structural Building Components Magazine (SBC) is to increase the knowledge of and to promote the common interests of those engaged in manufacturing and distributing of structural building components to ensure growth and continuity, and to be the information conduit by staying abreast of leading-edge issues. SBC will take a leadership role on behalf of the component industry in disseminating technical and marketplace information, and will maintain advisory committees consisting of the most knowledgeable professionals in the industry. The opinions

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