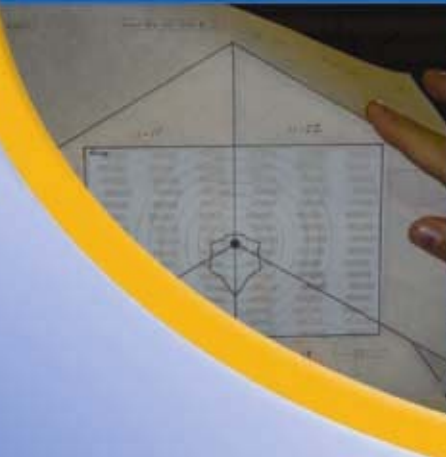




Inspector Training



What is In-Plant WTCA QC?

- The **In-Plant WTCA QC** is a voluntary, in house program developed by WTCA that helps truss manufacturers monitor the quality of trusses they manufacture.



Goals of WTCA QC Program

- Main goal of Program:

“To implement an in-plant quality management program for the truss industry.”

- Additional goals:

- Help plant meet building code QC requirements
- Objective tool to evaluate quality plant-wide
- Voluntary use or certification show plant is proactive with quality



Goals of WTCA QC Program

- To Meet The Building Code
- How do you comply with IBC/IRC?
 1. Have third party inspections
 - The authority with jurisdiction such as a local building official defines the quality requirements for structural building components in the context of the IBC and IRC requirements.
 - One definition would be a third party inspection agency.
 2. Have an in-plant quality control program
 - An in-plant quality control program is required by the third party inspection agency's quality assurance program and per ANSI/TPI 1, which is referenced in the IBC and IRC.
 - This includes an in-plant quality control process documented within a quality control manual.



Goals of WTCA QC Program

- To Meet The Building Code
 - IBC/IRC: Getting Into The Details
 - IBC 2003 1704: References special inspections or third party inspections
 - “IBC 2003 2303.4 Trusses. Metal-plate-connected wood trusses shall be manufactured as required by TPI 1.”
 - “ANSI/TPI 1 – 2002 3.1.1 Chapter 3 is the quality standard for the manufacturing processes of metal plate connected wood trusses, and shall be used in conjunction with a manufacturing quality assurance procedure and a truss design. These provisions shall be included in the quality assurance program of each Truss Manufacturer.”
 - “ANSI/TPI 1 – 2002 3.2.1 An in-plant quality control manual shall be maintained for each truss manufacturing facility, which will include the requirements for daily quality control and any audits that will be performed.”



How Does It Work?

1. Inspecting trusses
2. Recording information
3. Storing data
4. Creating reports to evaluate quality

Preliminary Check Truss Inspection Form Frequency: 3 Trusses Per Set-Up Location Per Week - Inspect Non-Critical Joints On Each Side Of Truss

Inspection: PPM TCM Inspection Date: _____ Job/Drawing Number: _____
 Inspection Number: _____ Inspection Time: _____ Truss Design/Truss ID: _____
 Inspector: _____ Truss Type: Roof Floor
 Line/Table: _____ C₁ Value: _____
 Shift: _____ Note for PPM: Roof C₁ = 1.00
 Crew: _____ Note for TCM: Floor C₁ = 1.11
 C₂ likely = 1.25 1/32"

Preliminary Check OK?

1) Do truss dimensions conform to design (span within 3/4" and height within 1/2")? yes no
 Note: Dimensions are required.

Truss Dimensions (ft-in-16th)		
Component	Actual	Specified
Span		
Overall Height		

2) Does all lumber conform to design (top chords, bottom chords, and webs)? yes no / no

Lumber Information						
Member Type	Actual			Specified		
	Grade	Species	Size	Grade	Species	Size
TC BC W						

In-Plant WTCA QC - [QC Inspection Form]

Inspection Select Inspection: 01/10/03 07:00 a

QC Inspection Form New Review Close Print

Inspection: Plate Placement Method-PPM Date: 01/10/2003 Job Number: [] Metal Web
 Inspection Number: 10 Time: 7:00 am Truss ID: [] Rounded Web
 Comments: [] Inspector: Bob B. Truss Type: Roof Truss Type: [] Finger Joint Web
 Line: Mark S Line C₁ Value: [] Treated Lumber
 Shift: Third Crew: Jim's Crew Initials - Errors Fixed: []

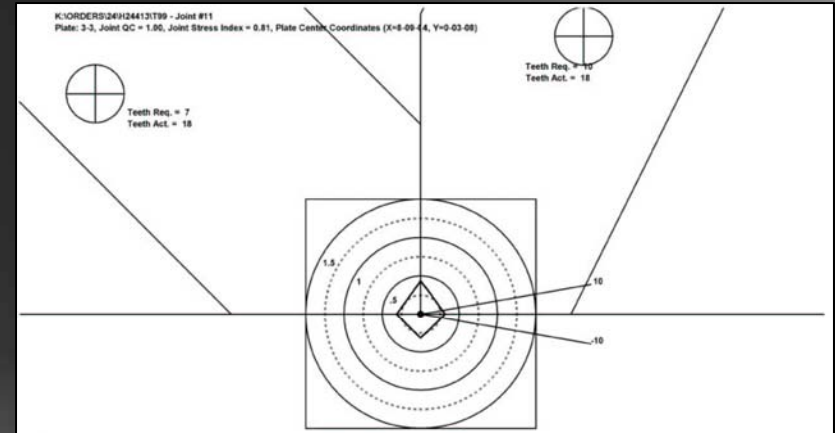
Preliminary: [PPM Joint] PPM Member Optional (Dimensions)

F/B #	Type	Plate		Plate Placement		Plate Rotation		Tooth Embedment		Gap (min-to-max)	
		Actual Size	Specified Size	Inside plyng?	Dist. from specified	Within 10°?	Degree	Plate gap ≤1/32"?	Gap if >1/32"?	Gap ≤1/8"?	Gap if >1/8"?
▶ F	1	S	18	18	[Yes]	0	0	[Yes]	0	[Yes]	0
▶ B	1	S	18	18	[Yes]	0	0	[Yes]	0	[Yes]	0
*											



How Does It Work?

1. Inspecting trusses using Joint QC Details
2. Recording the information on paper inspection forms



Preliminary Check Truss Inspection Form

Frequency: 3 Trusses Per Set-Up Location Per Week - Inspect Non-Critical Joints On Each Side Of Truss

Inspection: PPM TCM Inspection Date: _____ Job/Drawing Number: _____
 Inspection Number: _____ Inspection Time: _____ Truss Design/Truss ID: _____
 Inspector: _____ Truss Type: Roof Floor
 Line/Table: _____ C₁ Value: _____
 Shift: _____ Note for PPM Roof C₁ = 1.00
 Crew: _____ Note for TCM Floor C₁ = 1.11
 C₂ likely = 1.25

Preliminary Check OK?
 1) Do truss dimensions conform to design (span within 3/4" and height within 1/2")? yes no
Note: Dimensions are required.

Truss Dimensions (ft-in-16th)		
Component	Actual	Specified
Span		
Overall Height		

2) Does all lumber conform to design (top chords, bottom chords, and webs)? yes no / no

Member Type	Actual			Specified		
	Grade	Species	Size	Grade	Species	Size
TC BC W						
TC BC W						
TC BC W						

3) Do all plate sizes conform to design (both dimensions must be equal to or greater than specified)? yes no

Joint Number	Side	Comments (list specific cause for failure and decided remedy)
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____
_____	F/B	_____

4) Are all plates properly embedded (including less than 1/32" gap and without excessive rolled teeth and lumber characteristics)? yes no

5) Do all plates have visibly acceptable placement (including rotation 10° or less and actual midpoint appears close to specified midpoint)? yes no

6) Do all joints clearly have an acceptable member to member gap (within 1/8" or within 1/16" for floor truss splices)? yes no

Initials verifying that errors on form have been corrected: _____

In-Plant WTCA QC 4.2 Copyright © 2008, WTCA 4.2 Update



How Does It Work?

3. Entering the data into the database program to store inspection data

In-Plant WTCA QC - [QC Inspection Form]

Inspection

QC Inspection Form [New] [Review] [Close] [Print]

Inspection: Plate Placement Method-PPM | Date: 12/21/2007 | Job Number: 12345
 Inspection Number: 1 | Time: 7:00 am | Truss ID: 123
 Comments: [Yellow Box] | Inspector: John Smith | Truss Type: Roof
 Line: Line 1 | Shift: First | C_q Value: 1
 Crew: Crew 1 | Initials - Errors Fixed: []

[Copy header enter new truss]

Preliminary | **PPM Joint** | PPM Member | Optional (Dimensions)

Side	Joint	Plate				Placement	Rotation	Embedment		Member Gap		
		Specified	Actual		Inside			10° or less?	Plate gap	Gap if	Gap	Gap if
F/B	#	Type	Size	Gage	Size	Gage	Dist. from specified	TCM?	≤1/32"	>1/32"	≤1/8"	>1/8"
F	1	H	4 x 6	20	4 x 6	20	0" 4 /16	Yes	Yes	1 °	Yes	Yes
B	1	H	4 x 6	20	4 x 6	20	0" 6 /16	Yes	Yes	4 °	Yes	Yes
*			x		x		" /16			°		



How Does It Work?

4. Creating reports from the database to make quality improvements to manufacturing

SUMMARY REPORT

Selected Dates: 7/10/2006 through 9/1/2006

OVERALL QC INSPECTIONS

Total Number Inspected:
Number Out of Conformance:
% Out of Conformance:

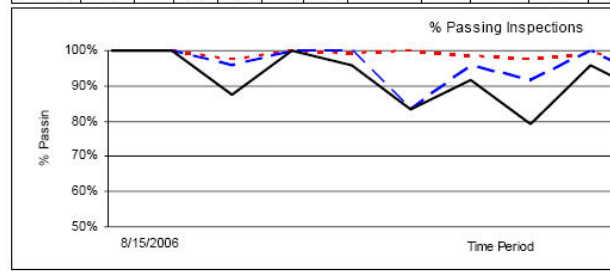
Out of Conformance Overall Stats

Truss Inspections:	134
Inspections Out of Conformance:	10
% Out of Conform:	7.5%
Total Items Out of Conformance:	10

WEEKLY SUMMARY REPORT

Selected Dates: 8/15/2006 through 11/13/2006

Date	Total Inspections			Preliminary Inspections							
	Trusses	Out	% Out	Prelims	Out	% Out	Dimensions	Lumber	Plate Size	Teeth Gap	Rotation
8/14/2006	24	0	0%	24	0	0%	0	0	0	0	0
8/21/2006	24	0	0%	24	0	0%	0	0	0	0	0
8/28/2006	24	3	13%	24	1	4%	0	0	0	0	0
9/4/2006	24	0	0%	24	0	0%	0	0	0	0	0
9/11/2006	24	1	4%	24	0	0%	0	0	0	0	0
9/18/2006	24	4	17%	24	4	17%	0	0	3	0	0
9/25/2006	24	2	8%	24	1	4%	0	0	0	0	0
10/2/2006	24	5	21%	24	2	8%	0	0	0	0	0
10/9/2006	24	1	4%	24	0	0%	0	0	0	0	0
10/16/2006	24	3	13%	24	2	8%	0	0	0	0	0
10/23/2006	24	0	0%	24	0	0%	0	0	0	0	0
10/30/2006	24	1	4%	24	0	0%	0	0	0	0	0
11/6/2006	24	1	4%	24	0	0%	0	0	0	0	0
11/13/2006	15	2	13%	15	0	0%	0	0	0	0	0



Non-Passing

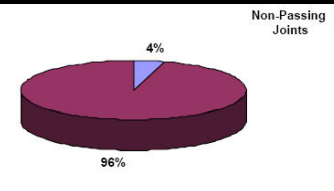
PPM JOINT REPORT

Selected Dates: 7/10/2006 through 9/1/2006

SUMMARY

Total Number Inspected: 1176
Number Out of Conformance: 51
% Out of Conformance: 4.3%

Plates Upsized From Specified: 13.6%
160 of 1176



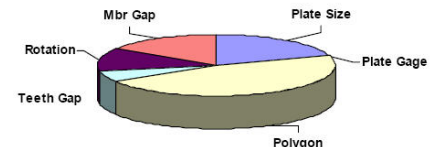
BREAKDOWN

Out of Conformance Joints		
Type	Number	% of All
Plate Size:	10	19.6%
Plate Gage:	0	0.0%
Teeth Gap:	3	5.9%
Rotation:	6	11.8%
Mbr Gap:	8	15.7%
Tooth Count:	1	2.0%

Ave Dist From Spec Midpoint (16ths)	5.7
% Perfect Placement	26.6%

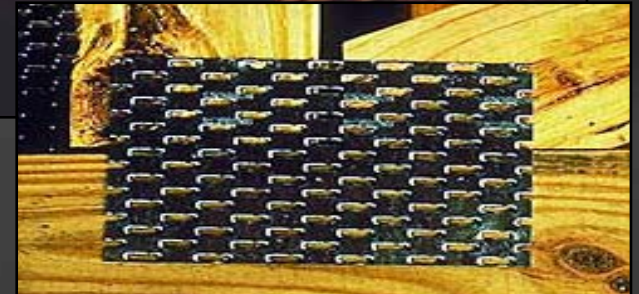
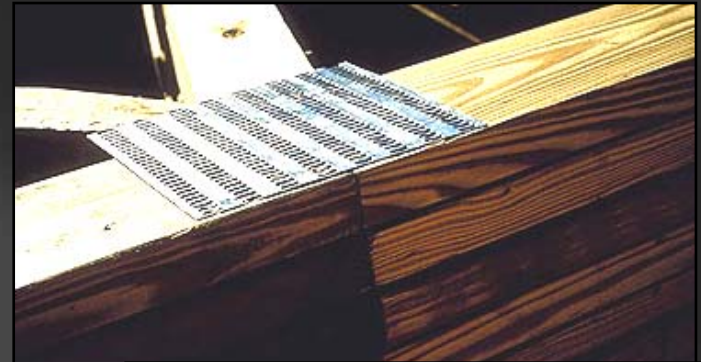
Tolerance Polygon Details		
Type	Number	% of All
Joints Out of Polygon:	140	11.9%
(back side):	97 of 140	69.3%
Not Passing Tooth Count:	23 of 140	16.4%
(back side):	17 of 23	73.9%

Ave Actual Rotation	1.3
% No Rotation	53.5%



How Does It Work?

- It establishes the frequency and criteria by which trusses are checked by the manufacturer for:
 - Accuracy of cutting
 - Assembly
 - Plate Placement
 - Quality of wood used



Inspection Basis

- Trusses are designed and built to conform with the ANSI/TPI 1 Standard.
- Do trusses meet the standard?
 - Dimensions within tolerance?
 - Specified lumber used?
 - Proper sized plates used?
 - Plates placed correctly?
 - Plates within the rotation tolerance?
 - Plates fully embedded?
 - Members at joints have enough teeth?
 - Are the joints tight?



Inspection Process

- Main Inspection Components

- Inspection Frequency

- 3 trusses per set-up location per shift per week

- Preliminary Inspection

- Performed on each truss
- Goal is to check lumber, dimensions, and scan non-critical joints

- Critical Joints

- Defined in standard if Joint Stress Index:

- > 0.80 for Plate Placement Method
- > 0.65 for Tooth Count Method

- Use PPM or TCM with Joint QC Details to inspect critical joints

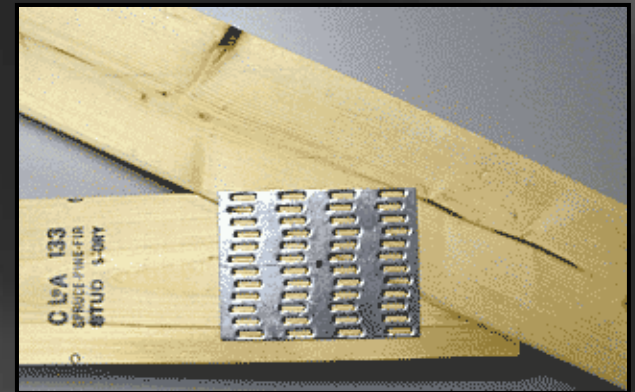
- Plate Placement Method – faster, checklist type inspection, takes into account 20% defects at each joint
- Tooth Count Method – slower, more exact, count teeth for each critical joint



Inspection Process

■ Sample of Plate Placement Method Flow:

- Are plate sizes and gages greater or equal to specified?
- Is midpoint inside tolerance polygon?
- Is plate within $\pm 10^\circ$ rotation tolerance?
- Is plate edge gap within $1/32$ "?
- Are member gaps within $1/8$ "?
- Are defect circles more than filled in?

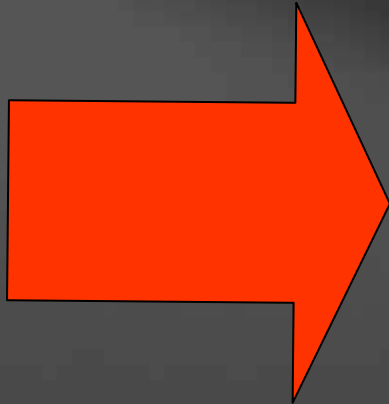


■ Strategy Behind PPM:

- If a majority of the time plates are placed well, embedded well, and there is not an excessive amount of tooth defects, then you are able to do faster checks.
- However...if there is a problem with placement, embedment, or defects, then a more detailed check such as rerunning placement or counting teeth is necessary.

Key Formula of In-Plant WTCA QC

*Continuous
Improvement!!*



Performing Inspections
+
Building A Quality Focused
Environment
+
Focus On Training
+
Equipment Checks

=

*Improvement In Quality In
Terms Of Product And
Process*

Bottom Line for Plant

- Better product at the jobsite
- Reduced or zero callbacks and repairs
- Opportunity to build strong relationships with customers
- Ability to set your plant apart from others
- Possibility to reduce insurance premiums
- QC reports give management a tool to evaluate quality/level of quality
- QC inspector/inspections help pinpoint/facilitate training needs
- Tool to increase plant morale/pride/ownership among employees



How Else Can You Get Going?

The screenshot shows the website for the In-Plant WTCA QC program. The browser address bar displays <http://www.sbcindustry.com/wtcaqc.php>. The website features a navigation menu with links for HOME, MY ACCOUNT, CONTACT US, SEARCH, SITEMAP, and QUESTIONS? A sidebar on the left contains a list of site sections including Home, About WTCA, Board & Committees, Calendar, Careers & Job Search, Control Panel/Options, Education & Training, Newsroom, Members & Chapters, Operations & Management, Resources, Technical Info, WTCA Online Catalog, and HELP. The main content area includes the WTCA logo, a navigation bar with links for BCME, Carbeck, CFSC, EWPA, SBC, SBCLeg, SBCRI, TPI, TTW, WFD, WTCA, and WTCATKO, and a navigation bar with links for LOGIN, INDUSTRY NEWS, FORUMS, EVENTS, RESOURCES, MEMBERS, and PRINT. The main content area features a large image of a truss structure and a smaller image of a person inspecting a truss. Below the images is a section titled "WTCA QC Certified Companies" and a section titled "The In-Plant WTCA QC Program Helps You Comply with the TPI Quality Standard". A yellow box contains a list of links for "Learn More:", "Articles:", "Program Demos:", and "Program Support Documents:". A yellow star graphic indicates a price reduction from \$425.00 to \$100.00. A small text box next to the star says "4.3 Update Released Sept. 25".

- Visit the WTCA website, download free inspection forms...

www.sbcindustry.com/wtcaqc.php

Chapter 3 of ANSI/TPI 1-2002 provides guidelines for achieving minimum acceptable levels of manufacturing quality.

Contact [Tony Piek](#) 608/310-6713 or [Michael Oftedahl](#) 608/310-6709 for more information.

Information about the In-Plant WTCA QC program is subject to change without notice, and should not be considered a guarantee on the part of WTCA.

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How Else Can You Get Going?

- Print Joint QC Details from your design software
- Purchase the WTCA QC database program
- Work towards certification with WTCA
 - Big steps involved:
 - Training by WTCA staff
 - Third Party Inspector
 - Perform inspections to the required frequency
- Remember WTCA is a resource!



Any Questions?

- Contact:

- Tony Piek

- 608/310-6713

- tpiek@qualtim.com





www.sbcindustry.com/wtcaqc.php