



Ontario Structural Wood Association

PLANT QUALITY PROGRAM

October 2021

TABLE OF CONTENTS

SECTION	SUBJECT	PAGE
Forward		3
Part A	Program Outline	4
Part B	Plant Quality Program	6
Part C	Certification	10
Part D	Quality Control Measurement	13
Part E	Sample Plant Quality Manual	15
Part F	Membership Agreement	22
Part G	OSWA Plant Certification Audit Tool	25

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ONTARIO STRUCTURAL WOOD ASSOCIATION

PLANT QUALITY PROGRAM

Forward

The Ontario Structural Wood Association (OSWA) includes manufacturers actively engaged in the production of metal plate connected wood trusses, and individuals or firms engaged in related activities.

To accomplish its purpose, OSWA provides this comprehensive Plant Quality Program for its members, and cooperates with related industries and agencies in all matters related to truss manufacture. The Program is the product result of years of accumulated knowledge of many individuals within the industry.

There are two major components of this program: 1) internal in-plant quality inspections and, 2) third party quality audits. Inspections and audits are performed in accordance with the standards established by the program contained in this manual, based on the regulatory requirements of CWTA NQS, TPIC 2019 and CSA S349. This standard provides purchasers and regulators confirmation that a program designed to provide a continuous high level of truss quality is in effect. It also provides a resource for employee training and a bench mark for architects, engineers, authorities, and specifiers.

The OSWA Membership Mark is evidence that the Plant Quality Program is in effect. It is a statement by the members of their commitment to the standards set by the Program.

Plant Quality Policy

The Plant Quality Policy is to consistently produce trusses that comply with this Plant Quality Program.

Plant Management is committed to, and is responsible for, adherence to this Plant Qualification Policy. All plant employees are responsible for carrying out duties in compliance with this program.

Signed: _____

Date: _____

Name: _____

Position: _____

PART A

PROGRAM OUTLINE

The elements that make up the OSWA Plant Quality Program are as follows:

1. CWTA NQS - National Quality Standard for Metal Plate Connected Wood Trusses

- Currently recognized as the national standard for wood truss quality control
- Mandatory adherence for plants wishing to have OSWA Plant Quality Program Certification
- May be a requirement of insurance provider or to qualify for a rate reduction

2. Plant Quality Manual

- Developed by the individual plant member
- Procedures that ensure a plant will meet the requirements of the CWTA NQS
- Unique to each truss plant, developed with the guidance of an OSWA Certified Auditor who will be required, on behalf of OSWA, to certify that the QC processes outlined in the Plant Quality Manual meet requirements of the CWTA NQS.

3. Third Party Audits

- OSWA Certified Auditors will carry out initial Qualification as outlined in the OSWA Plant Quality Program
- Once a plant qualifies, OSWA Certified Auditors shall review a plant's documentation twice per year and carry out an inspection of a minimum of three trusses on each visit to ensure conformance to the plants own QC process as outlined in their Plant Quality Manual
- The auditor is to be certified by OSWA but will be hired directly by the truss plant and not funded directly by OSWA in any way.

4. Plant Certification

- A formal procedure for certifying a plant and then ensuring they maintain adherence to the requirements of the CWTA NQS
- Each plant will have a certification number and will have permission from OSWA to advertise enrollment and adherence to the program
- Certified plants should be noted as such on the OSWA website

Obligations of Parties Involved:

5. OSWA Obligations:

5.1 Establish the requirements for a person to qualify as an OSWA Certified Auditor.

5.2 Formally certify qualified auditors who will carry out OSWA sanctioned audits and inspections as a representative of OSWA.

5.3 Certify qualifying plants and provide the Plant Quality Program Certificate.

5.4 Maintain a list of truss plant members that meet the requirements of the OSWA Plant Quality Program.

5.5 Provide letters to plants being placed on probation in accordance with Part C, section 2.5

5.6 Decertify plants that no longer meet the requirements of the OSWA Plant Quality Program.

6. OSWA Certified Auditor Obligations:

6.1 Auditors must be an OSWA member in good standing (Regular or Affiliate).

6.2 Review and approve the members Plant Quality Manual to ensure that it adheres to the requirements of the OSWA Plant Quality Program.

6.3 Carry out the audits and inspections as needed for a member plant to meet the requirements of the OSWA Plant Quality Program.

6.4 On-going review of in-plant QC inspection documents, data collation as necessary.

6.5 Provide the OSWA Executive Director the inspection results, limited to a pass or fail, where the details of the inspections remain confidential between the auditor and their client.

7. OSWA Member Obligations:

7.1 Certified plant must be a member of OSWA in good standing

7.2 To comply with the building code enforced at the destination, including local building bylaws and regulations as a minimum standard of construction, and to work towards improvement of standards in the interests of building integrity and safety.

7.3 To comply with the governing rules and regulations of providing a safe and healthy working environment to their employees.

7.4 To comply with the by-laws, rules, regulations, and programs of OSWA and work towards attaining the goals and objectives of the Association.

7.5 Promote the effectiveness of OSWA by interchanging information and experience and encouraging research of materials and techniques in order to provide better trusses at a reasonable cost.

7.6 Deal fairly and honestly with employees, customers, sub-contractors and suppliers.

7.7 Avoid all conduct or practice likely to discredit or injure the wood truss industry.

7.8 Hold OSWA, its officers and members, harmless with respect to any actions in the enforcement of these standards including probation, suspension, or termination that may be imposed upon a member.

PART B

PLANT QUALITY PROGRAM

1. Purpose

- 1.1 The purpose of the OSWA Quality Program is to provide a standard of manufacture for wood trusses and maintain and improve the confidence of consumers, engineers, architects, regulatory authorities and specifiers. This Program provides a means to maintain continuing good practice in the fabrication of wood trusses.
- 1.2 The OSWA Member's Certification Mark on trusses is a statement by the Plant that it complies with the minimum requirements of this manual. The Certification Mark may also appear on stationary, sales literature and other approved applications to signify OSWA Membership.

2. General

- 2.1 The manufacturer shall initiate and maintain a program of inspection and records conforming to the terms of this Program. This Program shall, from time to time, be reviewed by OSWA or its designated agents.

3. Plant Quality Manual

- 3.1 Each truss plant shall have a Plant Quality Manual that complies with this Program and shall be approved by an OSWA Certified Auditor
- 3.2 At a minimum, the Plant Quality Manual shall contain:
- a) a production flowchart or a description of the manufacturing process;
 - b) the manufacturer's organizational chart, including a description of the duties and responsibilities assigned to key positions in the quality program;
 - c) quality control procedures, including sampling criteria and how the manufacturing processes are monitored to ensure the product is consistently manufactured within permitted tolerances;
 - d) a document retention policy
 - e) provisions for keeping the manual current, such as updates and revisions;
 - f) a clear delineation as to what constitutes major and minor defects;
 - g) corrective measures for major and minor defects;
 - h) a list of main production equipment;
 - i) a list of manufacturer's specifications and quality control arrangements for raw materials and equipment;
 - j) measuring equipment: type, range, accuracy, frequency of calibration and calibration accuracy;
 - k) methods of disposition of non-conforming items

4. In-House Fabrication Quality Inspections

- 4.1 Regular in-house fabrication inspections shall be conducted to verify on-going conformance

with the requirements of this program. They shall be conducted by a supervisor, the lead hand, or other qualified person(s) designated by the plant. They should also be conducted upon the introduction of a new lead hand, new equipment, or a change in the assembly practice.

- 4.2 A minimum inspection of three trusses per operational set-up location per week shall be completed and duly recorded using the *OSWA Inspection Form* or equivalent. If the plant is running multiple shifts, there shall be three trusses inspected for each set-up location for every shift. Trusses sampled for inspection shall be off the production line after all pressing operations are completed, or from finished product storage.
- 4.3 The completed inspection forms shall be retained for review by the OSWA Certified Auditor for a period commensurate with the project files or a minimum of 5 years.
- 4.4 The OSWA Certified Auditor shall review the in-plant inspection records to determine comparability of OSWA audit files. It is expected that non-conformances will be routinely corrected and non-recurring. Non-conformances that do not appear on the in house records but do appear on the OSWA inspection records shall be reviewed by the OSWA Certified Auditor to determine the reasons for the discrepancies.

5. Truss Fabrication Quality

- 5.1 Manufacturing tolerances shall be in accordance with TPIC Appendix G.
- 5.2 Quality control requirements shall be in accordance with CWTA NQS.

6. Remedial Procedures

- 6.1 Trusses that do not conform to the shop drawings within the allowable tolerances shall be repaired or rejected. Trusses that require repair or rejection shall be marked/sorted/stored in a manner so that there will be no confusion as to the disposition of the trusses.
- 6.2 Fabrication inaccuracies exceeding the allowable tolerances are acceptable upon approval and/or repair and follow-up documentation by a truss designer or engineer as required by plant QC manual policies.

Note: the auditor and plant QC manager shall determine what remediation needs to be reviewed by an engineer.

- 6.3 When any installed (i.e. embedded) connector plate does not meet plating requirements a truss designer shall do one of the following:
 - a) Specify the repair removing the plate
 - b) Specify the repair leaving the plate in place, or
 - c) Review and approve the plate "as is".
- 6.4 When a connector plate is installed in a connection area of lumber that contains tooth holes (wood otherwise not damaged) from a previously installed plate, connector plate teeth shall be considered 50% effective at the location where they cover the tooth holes.

6.5 Connector plate teeth installed into lumber which has been damaged (i.e. wood removed or excessive splits) by the installation/removal of a previous connector plate shall be considered ineffective in the damaged areas.

6.6 Connector plates may be repressed during manufacture to improve plate embedment.

7. Truss Handling and Storage

7.1 Lumber and truss plates shall be stored in a way to protect against the elements.

- a) Lumber stored outdoors should be protected by the lumber wrap. Opened bundles left unprotected greater than 14 days shall be considered wet for design purposes unless there is a method of ensuring the moisture content of the lumber is no greater than 19%.
- b) Truss plates packaged in boxes shall not be stored outdoors. Truss plates banded on pallets or in groups may be stored outdoors provided there is a method of ensuring corrosion of the steel beyond the formation of a zinc-oxide layer does not occur.

7.2 Finished trusses shall be handled and stored in a way to prevent damage (excessive bending, overstressing joints and lumber). They shall be protected from moisture due to ground contact.

- a) If trusses are stored outside for more than one week, blocking of sufficient height should be used on eight to ten foot centers, (or as required to minimize lateral bending), to lessen moisture gain from the ground.
- b) During long term storage, trusses shall be protected from the environment in a manner that provides for adequate ventilation of the trusses. If tarpaulins or other protective covers are used, the ends shall be left open for ventilation. Tight-fitting coverings are not recommended since they can trap moisture.

7.3 Where lumber conforming to National Lumber Grades Authority, NLGA SPS 4 "Special Products Standard for Fingerjoined Machine Graded Lumber (FJ-MGL)" is used in the manufacture of trusses, the document "Truss Fabricator Guidelines on the Use of Fingerjoined Lumber in Metal Plate Connected Trusses" shall be used as a plant guideline for acceptable use and handling procedures of such lumber and trusses.

7.4 Damage to lumber manufactured and grade stamped in accordance with NLGA SPS 4 "Special Products Standard for Fingerjoined Machine Graded Lumber (FJ-MGL)" shall be recorded in the ongoing regular plant in-house quality inspection files. Corrective actions shall also be recorded.

8. Required Documentation

8.1 The manufacturer shall maintain records of each truss order. All relevant notes, design data, design changes, etc. shall be documented and organized in such a manner to enable a review by plant management.

8.2 Documentation provided to the purchaser includes: truss design drawings (TDD), placement drawings and individual truss member bracing information.

8.3 Truss Design Drawings

- a) A truss design drawing shall be prepared for every truss manufactured and identified by marks corresponding with those on the layout drawings.
- b) The truss design drawing shall include: lumber requirements, plating requirements, design loading, spacing, special framing details, permanent truss members bracing locations, framing instructions and adjustments to plate and design values.
- c) Truss design drawings shall indicate at minimum the information contained in TPIC "Minimum Information on Truss Design Drawings", Appendix H.

8.4 Truss Placement Drawings (Layouts)

- a) Truss placement drawings shall be provided in all cases other than a straight run of trusses unless such placement is readily apparent from the truss design drawings. Also they are provided when requested by regulatory authorities. OSWA recommends that a truss placement drawing be generated for all jobs, whether required or not.
- b) Truss placement drawings shall include truss I.D. markings, truss placement locations, bearing conditions and if required special hardware.
- c) Bearing locations and locations of point loads shall be identified with stamps, tags or other appropriate marking on each truss, or with the drawings that accompany the truss shipment. Bottom chord bearing parallel chord trusses shall be clearly marked to avoid inverted installation.
- d) If a truss placement drawing differs from the intent of the building designer (including all resulting load changes) this shall be made clear to the responsible party, i.e. purchaser, project engineer, or building designer.

PART C

CERTIFICATION

1. Certification Requirements

- 1.1 Develop a Plant Quality Manual conforming to this program, approved by an OSWA Certified Auditor.
- 1.2 The plant must be operating in accordance with their approved Plant Quality Manual, accumulating inspection data during this time, for a period of no less than two weeks.
- 1.3 The plant must have two initial certification audits with at least a two-week interval between audits and within a maximum period of 6 months.
- 1.4 During each certification audit, an inspection will be carried out on a minimum of three trusses to be selected at random for inspection and may be from orders already produced, in storage and considered ready for delivery.
- 1.5 The OSWA Certified Auditor will inspect the trusses for compliance with TPIC Appendix G.
- 1.6 For a plant to qualify, all trusses inspected during two consecutive certification audits must show evidence of the plant's ability to continuously meet the minimum certification requirements.
- 1.7 At the discretion of the auditor, additional certification audits during a 12-month period may be required as a result of non-conformances.

2. Maintenance Requirements

- 2.1 A minimum of two (2) in-person OSWA audits per year are required. See Part G for full details of the third party audit tool.
- 2.2 As part of the maintenance audit, the inspection of a minimum of three trusses is required, where procedures are similar to the Certification Requirements above. If any of the three trusses fails to conform to minimum standards, the auditor shall review the reasons for the non-conformances. Depending on the results of the review, additional trusses may be inspected.
- 2.3 If the overall audit report is unsatisfactory, the plant may be given formal (written) warning from the OSWA Certified Auditor and/or be put on recall to receive an “extraordinary” audit.
- 2.4 If on this subsequent “extraordinary” audit it is determined that corrective measures have not been taken and the overall audit report is still unsatisfactory, a formal letter shall be given by the OSWA board and the plant will be put on probation and require a successful follow-up probationary plant audit to maintain its certification, to be carried out within a two-month period of being placed on probation.

2.5 While on probation, the plant will continue to be certified under the OSWA Plant Quality Program.

2.6 During the “probationary” audit, three trusses shall be inspected at random. If any of the three trusses fail to meet the minimum standards, the plant will be considered as no longer conforming to the OSWA Plant Quality Program and will be decertified.

2.7 The decertified plant will no longer be allowed to promote themselves as being certified under the OSWA Plant Quality Program until they successfully recertify.

3. Recertification Procedures

3.1 Recertification shall be as per the Certification Requirements in Section 1.

3.2 Members losing certification are eligible to be re-audited at any time following decertification. Costs of the recertification are the responsibility of the truss plant.

4. OSWA Plant Quality Program Certificate

4.1 A truss plant meeting the minimum requirements contained within this document will receive a certificate verifying their conformance to the OSWA Plant Quality Program. Although not a requirement, OSWA encourages the certified member to attach a copy of the certificate as part of their standard submission package to promote both the program as well as the member’s certification.

4.2 A certified truss plant has the permission of OSWA to use their OSWA Plant Quality Program certification in marketing their company to prospective clients or building officials but it cannot be used to disparage other OSWA members not enrolled in the program.

5. Certification of Auditors

5.1 All OSWA Certified Auditors shall be approved by the OSWA Board of Directors. Application for certification shall be submitted to the OSWA Executive Director.

5.2 The minimum criteria to become an OSWA Certified Auditor is as follows:

- a) The Auditor shall be a Professional Engineer licensed with Professional Engineers Ontario (PEO) and;
- b) The Auditor shall carry a minimum of \$2 million professional liability insurance and;
- c) The Auditor shall have a minimum of four (4) years truss design and/or truss manufacturing experience.

5.3 OSWA Certified Auditors shall not be direct employees of the plant they are auditing.

6. ANSI-TPI Certification

6.1 Submission of proof of ANSI-TPI certification through a recognized third-party plant quality program shall be considered equivalent to this Program.

6.2 The certification requirements of auditors under Section 5 are not applicable to ANSI-TPI certified plants.

PART D

QUALITY CONTROL MEASUREMENT

In Plant Measure of Quality Performance

A minimum inspection of three trusses per operational set-up location per week shall be completed and duly recorded. If the plant is running multiple shifts, there shall be three trusses inspected for each set-up location for every shift. Trusses sampled for inspection shall be off the production line after all pressing operations are completed, or from finished product storage. Inspections shall follow a format that includes the manufacturing and material variances prescribed in TPIC, Appendix G.

Notes:

1. *Inspections should be of the type representative of the range of production and should include all joints and all members, dimensions, and lumber grades.*
2. *As an example of the quantity of inspections: for one shift and two set-up locations, a total of six trusses should be inspected; for two shifts and two set-up locations, a total of twelve trusses should be inspected.*

Non-conformance valuation may be scaled as follows: *(sample)*

<u>ITEM</u>	<u>DEMERIT</u>
<u>PLATES</u>	
Position	1
Over Defect	1
Embedment	1
Flattened/damage	1
Undersize	5
Orientation/missing	5
Gauge missing	5
 <u>WOOD</u>	
Wood to wood gap	1
Grade/species/size/moisture content	5
 <u>MARKING</u>	
Stamped	3
Special (intermediate bearing, top, conc load, etc)	3
 <u>ASSEMBLY</u>	
Overall Dimensions	3
Conformance to drawings	3
 <u>REPLATING</u>	
Corrective (Tooth effectiveness)	5
 <u>RECORDS</u>	
Incompleteness, not regular, compliance with audit	5
 <u>CORRECTIVE ACTION</u>	
Previous nonconformance	5

Sample individual truss check form:

Fabricator: _____ Date (yy/mm/dd) _____ Test No. _____

General		Truss Type	W.O. #	Value	
			Dwg. #		
			# of Bottom Chord Splices ⁽²⁾		
			Span	±1/8"	- 5%
				±1/4"	-10%
			Height	± 1/8"	-5%
				± 1/4"	-10%
Lumber	Size less than indicated on drawing ⁽¹⁾		1 occurrence	-100%	
	Species not as indicated on drawing ⁽¹⁾		1 occurrence	-100%	
	Grade less than indicated on drawing ⁽¹⁾		1 occurrence	-100%	
	Lumber Quality overall - inspector judgement ⁽³⁾		1 2 3 4 5		
Joints	No. _____	Joint does not meet tolerance	x -5 % / occ. =		
Plates	Improperly pressed Number of occurrences		x -5 % / occ. =		
	Orientation = or proper application ⁽¹⁾			-100%	
	Gauge is less than shown on drawing ⁽¹⁾			-100%	
	Size is less than shown on drawing ⁽¹⁾			-100%	
	Plate location exceeds tolerance		x -5 % / occ. =		
	Plate over defect ⁽⁴⁾ - Number of occurrences		x -5 % / occ. =		
Marking	Bracing locations, bearing points			-5%	
Score	Score = 100 - sum = _____		Sum		

Supplemental Checks – tolerance = 1/8"

Roof Truss	Measurement		Pass/Fail	Floor Truss	Measurement		Pass/Fail
	Drawing	Actual			Drawing	Actual	
Left Heel				Left TC height			
Left Overhang				Right TC height			
Right Heel				Beam Pocket Location			
Right Overhang				Beam Pocket Width			

Checked by: _____ Table I.D.: _____

Notes:

1. This defect does not necessarily imply that the truss cannot be used; any variation from the design indicated in drawings **must** be verified with design department before truss can be shipped.
2. Add 1/16" per splice in bottom plate to overall length of truss. Use this value for evaluating geometry
3. Does not imply lumber grade. 1 = low quality 5 = high quality
4. Defect refers to anything under the plate that may reduce plate grip; eg. excessive wane, knots, splits, unsound wood, fasteners.

PART E

SAMPLE PLANT QUALITY MANUAL

(NOTE: This sample Plant Quality Manual is being provided by OSWA for use by truss plants that are enrolled in the OSWA Plant Quality Program. It is being provided as an aid to a plant in assembling their plant specific Plant Quality Manual. The shaded areas and sample language provided in this document are to be reviewed by the plant and modified or eliminated as appropriate to meet the plant's specific needs. The listed sections are recommended minimum topics to be addressed by a Plant Quality Manual but they can be rearranged or combined as deemed appropriate by the plant. If a particular section is deemed to be not applicable, it is recommended that the section title remain and a note be added such as "not applicable" in lieu of completely eliminating the section.)

Plant Quality Manual

for

[Insert plant name]

[Insert plant address, city, Province and postal code]

[Insert phone]

OSWA Plant Number: **[insert Plant Number from OSWA certificate]**

Revision date: **[Insert current revision date]**

Management Initials/Signature: _____

Table of Contents

1) General	2
2) Plant Contact Information	2
3) OSWA Certified Auditor Agreement	2
4) Organizational Information	2
5) Product Description, etc.	3
6) Work Flow	3
7) Set-up Locations	3
8) Traceability	4
9) Incoming Material Specifications	4
10) Incoming Material Inspection	4
11) Non-conforming Materials	4
12) Product Identification	4
13) In-process Quality Control	5
14) Major and Minor Defects	5
15) In-house Fabrication Quality Inspection	5
16) Handling and Storage	5
17) Test Equipment	6
18) Calibrations	6
19) Sample Documents	6
20) Document Approval	6
21) Records Retention	6

1. General

[This template is being provided as an aid for use by truss plants in preparing their Plant Quality Manual. Criteria contained in this guide are derived from CWTA NQS, TPIC 2019 and CSA S349. The user is to modify this template to meet their individual in-plant QC process. Additional information may be warranted as determined by the individual truss plant. Review the material and modify as deemed appropriate for your individual plants requirements. Plants are responsible for the final content of the Plant Quality Manual and assume all associated liability.]

2. Plant Contact Information

2.1 In-house Quality Inspector: [Insert Inspector Name]

2.2 Plant Manager: [Insert Plant Manager Name]

2.3 Authorized representative of the plant: [insert name of authorized plant representative.]

a) Signature:

b) Date:

3. OSWA Certified Auditor Agreement

[Evidence that there is an agreement to perform audits between the manufacturer and an OSWA Certified Auditor shall be provided. Complete the information below.]

Date Third Party Audits Began:

OSWA Certified Auditor:

OSWA Certified Auditor Phone Number:

OSWA Certified Auditor email:

Annual Frequency of Inspection: Bi-Annually

4. Organizational Information

[The manual shall include the manufacturer's organizational chart and a description of the duties and responsibilities assigned to key positions in the quality program. A sample description and organizational chart is outlined below and should be modified to meet the specifics of your manufacturing organization.]

4.1 General Manager

Oversees all plant operations under the direction of the executive(s) in charge (or in smaller companies the owner may act as general manager). Oversight responsibilities include production, personnel, finance, quality control and maintenance.

4.2 Operations Manager

Responsible for the overall management/coordination of production, sales and administration functions of the plant location. Develops operating budgets and capital expenditure recommendations and creates operating policies and procedures as required.

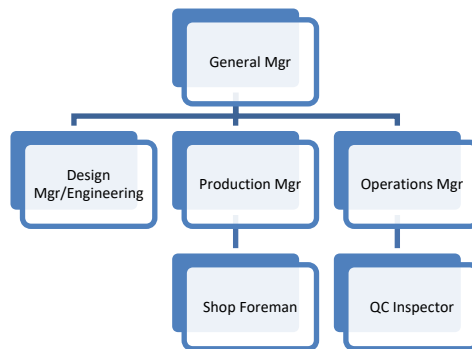
4.3 Production Manager

Facilitates the smooth flow of work through the plant. Ensures that outgoing products meet or exceed standards. Coordinates all activities that relate to trucking, forklifts, and work flow in the yard. Answers questions from customers regarding product or service.

4.4 Quality Control Inspector

Reports to the engineering department or management that does not have direct line production responsibilities. Has knowledge of company standards and requirements, lumber grading rules, CWTA NQS, TPIC and CSA S349 and how the product is used by the customer. Records and identifies product by origin and date. Records data to identify progress of quality, either positive or negative.

Plant organizational chart of Key personnel: [Insert Org chart as appropriate]



5. **Product Description, etc.**

[The product shall be described, and the manual shall provide specifications, manufacturing tolerances, and assembly drawings.]

Sample language: A truss is an individual metal plate connected wood component supplied for the Building Structural System. Design software will contain specifications and assembly drawings for the truss and this Plant Quality Manual will contain manufacturing tolerances.

6. **Work Flow**

[The manual shall include either a production flowchart or a description of the manufacturing process.]

7. **Set-up Locations**

[Provide a diagram or its equivalent of your current plant layout with current set-up locations labeled on the layout. The diagram can be generated from an already existing drawing such as an evacuation plan or can be a free hand sketch. If crews are used to define the set up location, please identify the crews below. The point is to identify the setup locations that will be referenced in the inspection records and weekly log mentioned above.]

8. Traceability

[The manual shall provide a means to trace the finished product back to the production and quality control records. See sections 8 and 9 for further information.]

Sample text: All incoming material to be reviewed and inspected as outlined in sections 8 and 9. Stored material will be clearly marked and non-conforming material will be segregated. Trusses will be manufactured from material specified by the truss drawings and other appropriate documentation. Each finished truss will be individual marked.

9. Incoming Material Specifications

[The manual shall provide specifications for incoming materials used for the manufacture of the product.]

Sample language: Incoming lumber must be grade stamped and records kept of size, species, and grade. Records of incoming metal connector plates shall include manufacturer, model number, size and gauge.

10. Incoming Material Inspection

[Details shall be provided of inspections or tests that are conducted on incoming materials. Truss plant can use own discretion to conduct audits on incoming lumber and metal connector plates but should insert the appropriate wording to reflect their process. Indicate how incoming material is received and verified that it is as ordered. This could be sign offs on incoming shipment records stored in a file. Also include how any non-conforming material is segregated etc. and how the raw material is stored and clearly labeled or identifiable to ensure that non-conforming material does not find its way into the manufacturing process. The recordkeeping source for tracing the truss product back to production and quality control would usually be the truss and engineering drawings and the third party auditor's data processing program.]

11. Nonconforming Materials

[The manual shall specify how nonconforming materials are reworked.]

Sample language: Sawyers are trained to pull lumber that is unsatisfactory for design because of appearance. Material culled will be segregated or discarded. [if culled material is re-purposed such as downgraded and cut to shorter lengths for use elsewhere describe the criteria used to do this and the method for identifying the re-purposed material]. Damaged metal connector plates will not be used in manufacturing and will be segregated or discarded

12. Product Identification

[The manual shall indicate how the product is to be identified in the field. Indicate how the product is to be identified in the field such as with a Job ID and Truss ID.]

Sample language: All metal plate connected wood trusses when designed are uniquely identified with a Job Id and a Truss ID. Each fabricated truss is labeled with the Job ID and Truss ID prior to shipment which is coordinated with a job order and layout plan.

13. In-process Quality Control

[The manual shall detail in-process quality control procedures which should follow, as a minimum, the items outlined in Part B]

Sample language: Inspection procedures found in this Plant Quality Manual originates from the CWTA NQS utilizing the manufacturing tolerances found in TPIC Appendix G. The truss manufacturer shall inspect a sampling of trusses utilizing the minimum manufacturing tolerances per TPIC Appendix G and at a minimum inspect a sampling of three (3) trusses per operating set-up location per shift per week. The three (3) trusses may be of one (1) design sampled for that set-up location or preferably broken up with one (1) truss from design A, one (1) truss from design B, and one (1) truss from design C inspected throughout the week. Set-up location is as shown [on the attached set-up diagram or is defined as a crew, or group of personnel within a defined work area building one truss. If defined as a crew, then each “crew” during each shift will have a minimum of three (3) trusses inspected per week. Set-up locations shall be defined below with a number or letter designation or by crew leader for each shift. An inspection log will be used to record the inspection frequency each week. Individual inspection records will be made available to OSWA Certified Auditors on a regular basis.

14. Major and Minor Defects

[The manual shall clearly define what constitutes a major and minor defect along with who can is qualified to provide a repair solution]

15. In-House Fabrication Quality Inspection

[The manual shall detail the final inspections.]

Sample language: Job number and contents of job will be verified before delivery. Trusses inspected not meeting the minimum manufacturing tolerances in TPIC Appendix G will be repaired or rejected and documented with reason.

16. Handling and Storage

[The manual shall contain information on handling and storage of the product.]

Sample language: Truss jobs are to be banded and stored according to industry standard recommendations outlined in the Part B. All truss jobs to clearly identify the job number and individual truss identification.

16.1 Store trusses with proper banding on smooth surfaces to avoid damage. Do not rely on banding to securely move bundles. Do not store un-braced bundles upright. Banded truss bundles, in a vertical position, should be picked up at the top chords. Do not lift banded trusses by the straps. If trusses are stored vertically, they must be braced in a manner that will prevent tipping or topping.

16.2 Care must be taken during moving to avoid lateral bending of trusses, which can cause damage to the lumber and metal connector plates at the joints.

16.3 WARNING: Exercise care when removing banding to avoid damaging trusses and prevent personal injury. Gloves and safety glasses should be worn.

17. Test Equipment

[The manual shall contain a list of the measuring and test equipment that is used.]

Sample language: Trusses are inspected to TPIC 2019 Appendix G tolerances and tools used include Joint QC Details generated from the truss design software, truss design drawings and tooth reports from the truss design software, tape measure, string line, carpenter's square and a depth gauge.”

18. Calibrations

[The manual shall note the frequency of equipment calibration. Modify the sample language below as appropriate.]

Sample language: Embedment presses and saws will be checked periodically for tolerances. Manufacturing tables will be checked periodically for proper functionality. The frequency will be as follows: [insert frequency as determined by the truss manufacturer but a suggestion is to check embedment, saws, and tables quarterly].

19. Sample Documents

[The manual shall contain sample copies of these documents.]

Sample language: This Plant Quality Manual includes quality control inspection forms. See Appendix _____.

20. Document Approval

[The manual shall describe how the completed documents are approved by responsible personnel. Modify the sample language below as appropriate.]

Sample language: The in-house inspector will assemble the inspection paperwork for each truss into a package and sign and date the work. At the completion of the weekly inspection the inspector will assemble all the paperwork along with a weekly inspection log for review and approval by upper management. Upper management, after review, will initial and date the inspection package and will discuss any issues observed with the in-house inspector. Completed inspection paperwork to be filed for reference and access by the third party inspector and as per the retention policy outlined below.

21. Records Retention

[The manual shall contain a statement indicating the retention policy for completed inspection information. It is recommended that the material be maintained for a minimum of five (5) years.]

PART F

ONTARIO STRUCTURAL WOOD ASSOCIATION **MEMBERSHIP AGREEMENT**

AGREEMENT

This agreement entered into by and between the *Ontario Structural Wood Association (OSWA)* an Association of manufacturers hereinafter called *Service*, and

_____ a
 manufacturer of prefabricated wood trusses, hereinafter called the *Subscriber* with manufacturing operations at _____ to which location(s) and no other, services will be rendered and to which location(s) and no other terms of this agreement will apply, effective _____.

WITNESSETH

The *Service* provides authority to subscribing members to use the OSWA plant identification *Membership Mark* under the audit supervision of the *Service* subject to rules and regulations contained in the OSWA Plant Quality Program.

A *Subscriber* in good standing is authorized to use the *Membership Mark* on all manufactured trusses representing that the product conforms to the OSWA Plant Quality Program. This conformance is supervised by spot check audit inspections performed by the *Service* in accordance with its requirements and procedures.

The *Subscriber* agrees to allow the *Service* representative access to inspect *Subscriber* methods of manufacture, materials, drawings and specifications as necessary to determine the aforesaid conformance. The *Subscriber* further agrees to furnish such assistance as, but not limited to, furnishing copies of prints, specifications, moving materials or products and opening or closing bundles and packages.

The *Subscriber* agrees to use the *Membership Mark* on roof and floor trusses, where required and agrees that they conform fully to the applicable standards, that the aforesaid *Membership Mark* will be placed only upon roof and floor trusses manufactured at the designated locations that are subject to *Service* supervision, and that the *Service Membership Mark* will only be used at the designated plant.

The *Subscriber* agrees that any instrument to apply the *Membership Mark*, such as a stamp, shall be obtained with permission of the *Service* with the understanding that it shall remain the property of the *Service*.

The *Subscriber* agrees that the placing of the *Membership Mark* will conform to the requirements in the OSWA Plant Quality Program and that each *Membership Mark* shall be clear and legible.

The *Subscriber* agrees that quality supervision by the *Service* at the plant consists of audits carried out randomly, and subsequently the inspector provides only a spot-check. The process does not inspect every item produced by the participating plant, and by no means guarantees the said product.

The *Subscriber* shall surrender all *Membership Marks* in its possession upon termination or suspension of this agreement by either party. In the case of suspension or probation, the *Service* will hold the

Membership Marks and return them to the *Subscriber* at such time as the *Subscriber* is reinstated.

The *Service* hereby agrees that the forenamed *Subscriber* has met the minimum requirements and that it is accordingly granted authority to use the aforesaid *Membership Mark* at the above-designated location subject to the conditions set forth in this agreement.

In consideration of this authority, and in order to retain it, said *Subscriber* must continue as a *Subscriber* to the *Service* and must maintain the same standards and efficiency as required for the grant of the right.

The *Subscriber* further agrees that it will:

- not assign or delegate its rights and obligations hereunder to any party without the written consent of the *Service*.
- indemnify and save harmless the *Service*, its officers and employees from all claims, loss, damage, injury, liability, costs and expenses of whatever kind or nature (including legal fees) howsoever the same may be caused resulting directly or indirectly in connection with the services provided herein, whether based in contract or in tort.
- Keep its account with the *Service* current.

Failure on the part of the *Subscriber* to fulfill any of the conditions set forth herein shall be grounds for immediate suspension or termination of this agreement.

The *Subscriber* may terminate or suspend this agreement by notifying the *Service* in writing at least thirty (30) days prior to the date of termination.

This agreement is to remain in full force and effect until revoked as provided herein.

SERVICE

Signature: _____

Name of Signer:

Title:

Date:

SUBSCRIBER

Signature: _____

Name of Subscriber (print):

Title:

Date:

NOTE: This sample agreement should be reviewed/revised as necessary by the (OSWA) officers and legal representatives.

Facsimile of Plant Certificate



CERTIFICATION

This certifies that

XYZ Truss Company

Subscribes to and maintains a compliance level through a third party audited in-plant quality control program inspecting the pre-engineered components as required by the

OSWA Plant Quality Program

This plant is a member in good standing complying with all the by-laws and regulations of the Ontario Structural Wood Association

OSWA Plant Number: XX-XXXX

Executive Officer

Date _____

This certificate is the property of the Ontario Structural Wood Association and becomes invalid upon suspension cancellation, revocation or expiration of certification

PART G

OSWA Plant Certification Audit Tool

1. Scope

This Annex describes the auditing tool implemented by the OSWA Plant Quality Program. Table 1 summarizes the audit categories and allocated weighting. Table 2 lays out the auditing tool elements used for evaluating the criteria provided in this program to determine the eligibility of a manufacturer for certification and on-going truss manufacturing.

2. Sample calculations

In the sample tables below, points have been allocated to components of each element. A total of 100 points are possible for each element. The score achieved for each element at the completion of an audit should be determined as follows:

$$Score (\%) = \sum \left(\frac{Score\ attained}{100} \times Element\ Weight \right)$$

Table 1 provides an example of an audit score calculation.

3. Passing score

Using the grading scheme in Part G, the passing score should be a minimum total score of 80%.

Table 1
Audit Element Weighting Scheme

Element No.	Description	Weight as percent of total 100%*
1	Quality control manual†	Mandatory
2	Internal inspections	40
3	Truss design drawings	10
4	Handling and storage	10
5	External auditor inspected trusses	40
	Total	100%

Notes:

* If any given element or portion of an element has a score of zero (0%), the auditor will withhold certification until the manufacturer has rectified the deficiencies.

† Absence of a Plant Quality Manual results in a mandatory failure of audit.

**Table 2
Auditing Tool Elements**

No.	Description	Points	Commentary
Element #1 – Plant Quality Manual			
<i>This is a mandatory component for plant certification. There are no specific point allocations for the Plant Quality Manual. If the Plant Quality Manual is incomplete or out of date, the plant fails the audit and must address the missing components.</i>			
1.1	Production flow chart and full description of the manufacturing process	N/A	Mandatory requirement
1.2	Organizational chart and description of the duties and responsibilities assigned to key positions	N/A	Mandatory requirement
1.3	Internal truss inspection frequency and procedures	N/A	Mandatory requirement
1.4	Monitoring criteria of manufacturing processes to ensure that the final product is manufactured within TPIC Appendix G tolerances	N/A	Mandatory requirement
1.5	Document retention process	N/A	Mandatory requirement
1.6	Review of internal inspections by management	N/A	Mandatory requirement
1.7	Manufacturer documentation, interview, and/or observation of the procedure for removing and repressing plates	N/A	Mandatory requirement. The auditor will observe and review documentation on how the manufacturer repairs and/or represses plates. Example: If this situation does not arise during a specific audit period, the auditor may ask a worker how they repair or repress plates, including their decision-making process of how to proceed. The auditor may also ask for a demonstration to evaluate their process.
Element #2 – Internal inspections			
2.1	Record of internal inspections that meet or exceed the minimum sampling of three trusses per operational set-up per week for every shift	N/A	Mandatory requirement. The auditor will review the recorded internal inspections and verify that the required number of trusses are being inspected. A minimum of 90% of the required truss inspections must be completed during the time period being audited, and no consecutive audits should have less than 100%. No points are to be awarded to Element #2 if less than 90% of the required truss inspections have been carried out, or if less than 100% have been conducted for consecutive audits. For audits between 90% and 100% of the required inspections, the score awarded to elements 2.2.a through 2.2.f is multiplied by the percentage of required inspections performed.
2.2.a.	Internal inspections check on overall truss dimensions per TPIC Appendix G tolerances	15	In reviewing internal inspections, the auditor will award points if dimensional tolerances are included. Points will not be awarded if inspections are not completed as

No.	Description	Points	Commentary
			<p>per 2.1 above. Example: If only 95% of the required inspections are completed and only 85% of the documented inspection information has the dimension checks recorded, then the number of points awarded for 2.2.a. should be $15 \times 0.85 \times 0.95 = 12.1$</p>
2.2.b.	Internal inspections check on the lumber grade and species	15	<p>The auditor will award points if lumber grade and quality checks are included. Full points are based on checks being performed on all members, prior to reductions per 2.1 above. See 2.2.a for sample calculation.</p>
2.2.c.	Internal inspections evaluating plate placement	15	<p>The auditor will award points if plate placement checks are included. Full points are based on checks being performed on all members, prior to reductions per 2.1 above. See 2.2.a for sample calculation.</p>
2.2.d.	Internal inspections evaluating plate size and gauge	15	<p>The auditor will award points where plate size and gauge checks are included. Full points are based on checks being performed on all members, prior to reductions per 2.1 above. See 2.2.a for sample calculation.</p>
2.2.e.	Internal inspections determining effective teeth	15	<p>The auditor will award points if effective teeth checks are included. Full points are based on checks being performed on all members, prior to reductions per 2.1 above. See 2.2.a for sample calculation.</p>
2.2.f.	Internal inspections checking joint gap tolerance	15	<p>The auditor will award points where joint gap tolerance checks are included. Full points are based on checks being performed on all members, prior to reductions per 2.1 above. See 2.2.a for sample calculation.</p>
2.3.	Internal inspections have been done on trusses that represent the range of production	5	<p>The auditor will review the internal inspections to confirm that the trusses inspected are assembled in all production set-up locations and that they represent typical truss production.</p>
2.4	Manufacturer's process to address non-conforming product in the internal inspection process	5	<p>This will be confirmed either through documentation or interview on how the manufacturer deals with non-conforming product discovered through the internal inspection process. Either all or no points should be awarded of those allowable. Example: When reviewing internal inspections, the auditor will focus on trusses that do not meet tolerances and how the manufacturer evaluates and/or corrects the deficiency, including how other affected trusses were addressed. If no documentation exists, the auditor may award points based on the manufacturer providing examples of how they have corrected deficiencies.</p>
Element #2: Total weighting = 40 %		/100 points	

No.	Description	Points	Commentary
Element #3 – Truss design drawings			
3.1	Trusses designed with current TPIC design procedures	50	The auditor will review three random drawings from different designers, if possible, to confirm that they meet TPIC criteria. Either all or no points will be awarded of those allowable.
3.2	Truss design drawings meet minimum criteria as per TPIC	50	The auditor will review three random drawings from different designers, if possible, to confirm if requirements of TPIC are met. Either all or no points will be awarded of those allowable.
Element #3: Total weighting = 10 %		/100 points	
Element #4 – Handling and Storage			
4.1	Lumber is stored where it is protected against the elements	10	The auditor will observe how lumber is stored and assign a range of points - making deductions for uncovered lumber, lumber used with excessive moisture, etc.
4.2	Metal connector plate storage	10	The auditor will observe how metal plates are stored and note if there is any exposure to elements that can affect the plates. The auditor may award a range of the total points allowable based on their observation. If the auditor observes red-rusted plates on finished trusses, no points can be awarded. (Note: white patches on plates indicates zinc oxide which will not reduce plate capacity)
4.3	Plant truss handling protocols to prevent damage <ul style="list-style-type: none"> • Review of finished product- 1/2 of points • Documentation of damage repair or observation of handling-1/2 of points 	15	<p>The auditor will observe finished trusses and note any damage. The auditor may award a range of points allowable based on their observation.</p> <p>Example: If, when observing five bundles of finished trusses, the auditor observes damage on one bundle, they may award 4/5 or 80% of points available. If the auditor observes repairs to damage during their tour they may award full points.</p> <p>The auditor will review documentation of reviews or repairs of product that was damaged and may award full points if the documentation meets requirements. If no documentation is available the auditor should observe how trusses are handled to prevent damage and may award full points based on their observation.</p> <p>Example: If the manufacturer can provide an example or documentation of reviewing and/or repairing truss damage due to handling, the auditor may award full points. If the auditor observes that trusses are handled in a manner that prevents damage they may award full points.</p>
4.4	Plant truss storage prevents moisture ingress due to ground contact	15	The auditor will observe how trusses are stored. If trusses are stored where they are in contact with the ground or water, points will be deducted. Example: If the auditor observes five orders of trusses and one is not stored properly, 4/5 of the total points available may be awarded.

No.	Description	Points	Commentary
4.5	Truss submittal package contains all the relevant documentation required	20	The auditor will confirm that the required documentation is included in the truss submittal package.
4.6	Finished trusses are marked to provide evidence of certification	15	The auditor will observe if finished trusses are stamped with the correct certification stamp, or if there is an alternative method of proof of certification, and award all or none of the points available.
4.7	Trusses are marked for installation as per the company policy and in accordance with the truss shop drawings	15	The auditor will observe if trusses are marked for special conditions according to the shop drawing, and award all or no points based on their observation. The auditor will review the company policy for labelling instructions. Example: A check will be performed to ensure floor trusses are labelled so that the top is obvious. If the company policy states that a specific label should be attached and it is not, no points should be awarded.
Element #4: Total weighting = 10%		/100 points	
Element #5 – OSWA Certified Auditor inspected trusses			
<i>The auditor will pick a minimum of three trusses that are determined to be representative of the production, selecting from different production set-ups and newly completed off the production line. If newly produced trusses are not available, the auditor may select trusses from inventory, but should ensure that both sides are available for inspection.</i>			
5.1	Do dimension tolerances fall within TPIC, Appendix G, allowable tolerances?	10	The auditor should pick a minimum of three trusses that are determined to be representative of the production, selecting from different production set-ups and fresh off the production line. If newly produced trusses are not available, the auditor may select trusses from inventory, but should ensure that both sides are available for inspection. Example: If only two of the three trusses meet dimension tolerances the maximum points that should be awarded is 2/3.
5.2	Does the lumber meet or exceed the grade and species as shown on the shop drawing?	15	The auditor should examine the lumber used in each truss inspected to ensure that it meets or exceeds the size, grade and species indicated on the shop drawing. Example: If the lumber in one of the three trusses inspected does not meet or exceed the grade and species on the shop drawing, no points should be awarded for that truss; therefore, a maximum 2/3 of the points available should be awarded.
5.3	Does plate placement meet TPIC tolerances?	20	The auditor should examine every plated joint to ensure that the plates are within a tolerance on both sides of the truss. If the auditor determines that plate placement is not within tolerance and cannot confirm that the placement is allowable, no points should be awarded to that truss. Example: If the auditor confirms that a plate is placed in a manner that is not acceptable, no points should be awarded for that truss; therefore, a maximum 2/3 of the points available should be awarded.

No.	Description	Points	Commentary
5.4	Do metal connector plates meet or exceed what is specified on the shop drawing?	15	<p>If a plate does not meet or exceed the size specified, or is of a different gauge in any joint, no points should be awarded for that truss.</p> <p>Example: On one of the three trusses inspected, the wrong gauge plate is installed on a joint. No points should be awarded for that truss; therefore, the maximum allowable points that should be awarded is 2/3 of those available.</p>
5.5	Are there sufficient effective teeth at the joint locations?	20	<p>The auditor should review each joint/splice location to confirm that there are enough effective teeth into good wood according to the shop drawing. If the minimum effective teeth are not shown on the shop drawing, it must be assumed that all teeth are effective. Ineffective teeth could be a result of joint gaps, lumber defects, hammer marks, or gaps under the plate.</p> <p>If the auditor determines that the minimum effective teeth requirement is met, full points may be awarded.</p> <p>Example: If, in one of the three trusses inspected, a plate does not meet the minimum effective teeth into a member due to wane on the lumber, no points should be awarded for that truss, and a maximum of 2/3 of the total allowable points should be awarded.</p>
5.6	Are the lumber joint gaps within TPIC allowable tolerances of 1/16 in in compression joints and 1/8 in in tension joints?	20	<p>The auditor should use a thickness gauge to identify any gaps between lumber members, and if the auditor determines that there are gaps that exceed the tolerance, no points should be awarded for that truss.</p> <p>Example: If joint gaps exceed the tolerance in one of the three trusses, only 2/3 of the allowable points may be awarded.</p>
Element #5: Total weighting = 40%		/ 100	

Note: this auditing tool has been taken from Appendix A of CSA S349-20. See CSA S349 for additional information.

Table 3
Audit score example

Element No.	Description	Sample score attained per element (%)	Weight as percent of total 100%	Total score attained (%)
1	Quality control manual	Yes		
2	Internal inspections	85	40	34
3	Truss design drawings	90	10	9
4	Handling and storage	85	10	8.5
5	External auditor	90	40	36
	Total		100%	87.5