Board of Building Standards

EDUCATION COMMITTEE MEETING
AGENDA

DATE: DECEMBER 17, 2020
TIME: 10:00 AM
LOCATION: VIDEOCONFERENCE –
DIAL-IN 1 614-721-2972,
PHONE CONFERENCE ID: 768 098 352#

Member, Staff and Guest "Check-in"

Call to Order

Consent Agenda

Course Applications

ER-1 Perspectives on Hoarding (Hoarding Connection of Cuyahoga County)
BO, BI, FPI, RBO, RBI, RMI (6 hours in the form of three 2-hour sessions)
Staff Notes: Slides to come. Their previous course (BBS2019-399) was a 4-hour course that the Board approved for all certifications. Recommend approval for all BBS certifications
Committee Recommendation:

ER-2 Truss Fundamentals (Simpson Strong-Tie)
BO, BPE, MPE, BI, NRIUI, RBO, RPE, RBI, RIUI (2 hours)
Staff Notes: Originally submitted and approved as a 1-hour course. But the submitter says the initial application was simply in error..
Committee Recommendation:

Old Business

New Business

Adjourn

EDUCATION COMMITTEE MEETING
CONSENT AGENDA

Course Applications

File Attachments for Item:

ER-1 Perspectives on Hoarding (Hoarding Connection of Cuyahoga County)

BO, BI, FPI, RBO, RBI, RMI (6 hours in the form of three 2-hour sessions)

Staff Notes: Slides to come. Their previous course (BBS2019-399) was a 4-hour course that the Board approved for all certifications. Recommend approval for all BBS certifications

Committee Recommendation:

PERSPECTIVES ON HOARDING

A conference series from the Hoarding Connection of Cuyahoga County

HOARDING CONNECTION OF CUYAHOGA COUNTY

Join us Monday through Wednesday, December 14-16 from 1-3pm via Zoom

Each session is $5 and qualifies for two continuing education clock hours. You may register for one, two or three sessions.

HOARDING 101

December 14, 2020 ~ 1:00PM-3:00PM
Presenter: Bert Rahl, MS, LISW

Overview of hoarding disorder, including identification tools, treatment and best practices for managing hoarding situations in the community.

HOARDING IS A FAMILY AFFAIR

December 15, 2020 ~ 1:00PM-3:00PM
Presenter: Randy Frost, PhD, Harold & Elsa Siipola Israel Professor of Psychology at Smith College

Presentation will review indicators of future hoarding behavior in youth, family dynamics and children of people who hoard. Presentation followed by a panel discussion with community members who have experienced issues related to the topic.

HOARDING AND THE PANDEMIC

December 16, 2020 ~ 1:00PM-3:00PM

Moderator: Larry Vavro, LSW, Chief of APS for Cuyahoga County

Panelists include:

- Doug Braun, LISW, Behavior Health Clinical Social Worker, Benjamin Rose Institute on Aging
- Sergeant Kevin Klag, Cleveland Division of Emergency Medical Services
- Debra Mardenborough-White, MSW, CCHW, SC, Millenia Housing
- Lieutenant Mike Norman, Cleveland Fire Department
- Natasha Pietrocola, MEd, MBA, Deputy Administrator of Community Programs and Services at Cuyahoga County Division of Senior an Adult Services
- Kerstin Yoder, MSSA LISWS, Social Worker/Mental Health Day Treatment Group Facilitator, Benjamin Rose Institute on Aging

Discussion of community responses to hoarding throughout the COVID-19 pandemic.

Register online at hoardingconnectioncc.org.

LEARNING OBJECTIVES

Participants will:

- Be able to assess and identify hoarding behaviors and understand best practices for treatment of hoarding disorder.
- Understand the impact of family dynamics and relationships on hoarding behaviors and management of hoarding situations.
- Demonstrate improved knowledge of community responses to hoarding situations during the COVID-19 pandemic.

CONTINUING EDUCATION

Application has been made for six (6) continuing education clock hours for social workers, counselors, and building professionals.

Presented with funding from the ADAMHS Board of Cuyahoga County and with support from Benjamin Rose Institute on Aging

The Ohio Board of Building Standards approves Continuing Education Courses for building department personnel. The courses may be used for the attainment of goals that are connected with technical and professional development as they relate to enforcing and interpreting the Ohio State Building Codes. Board approval is granted only on course instruction pertaining to OBC, OMC, OPC, and RCO requirements and such other content areas directly related to the responsibilities of the certification for which credit is being requested.

Instructors: Anyone or any organization promoting an approved course, is required to make full and accurate disclosure regarding course title, course approval number, number of credit hours, certifications for which the BBS has approved the class, and fees in promotion materials and advertising. ***The Board does not grant retroactive approval. It is recommended that courses be submitted for approval well in advance of any scheduling of classes and advertising***. Advertising shall not disclose improper approval information to the public.

Course sponsors/co-sponsors: provide participants a certificate of completion containing the following information: name of participant, title of approved courses, BBS approval #, BBS approved certifications, date of the continuing education program, number of approved credit hours awarded and signature of authorized sponsor or instructor.

Anyone or any organization administering an approved course shall provide the Board with advanced written information on scheduling of the course(s) (date and place) and provide to the Board a legible list of participants who completed the course with the name of course, date, and location.

Participants: Must attend the complete course as presented by the instructor to receive credit hours approved by the Board. No partial credit shall be given to any participant who failed to complete the entire course as approved. The sponsor/co-sponsor or instructor shall formulate a method to verify the individual's attendance and completion of the course.

Board approval: Remains in effect through the calendar year of approval. The course may be renewed administratively by sponsor application in subsequent years so long as it references current codes and standards Upon the Board's adoption of a new edition of the codes, course sponsors must update their course and submit to the Board for approval. The Board does not grant retroactive approval for courses presented prior to approval date.

Facility/training area: Shall be capable of comfortably and safely seating at least the number of attendees with writing surfaces for each attendee; accessible to/and usable for people with disabilities; sized and provided with audio/visual equipment adequate so that each attendee can see the instructor(s) and overhead screen and hear the content of the training programs; illuminated for writing and that the content on an overhead screen can be seen easily by all attendees; non-smoking in the training room; sound controlled so that outside noise will not interfere with the training.

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Jeanne Hoban
(Contact Name)
Organization: Benjamin Rose Institute on Aging
(Organization/Company)
Address: 11890 Fairhill Road
(Include Room Number, Suite, etc.)
City: Cleveland State: OH Zip: 44120
E-Mail: jhoban@benrose.org
Telephone: 216-373-1686 Fax: 216-373-1816
Course Sponsor: Hoarding Connection of Cuyahoga County

COURSE INFORMATION:

Course Title: Perspectives on Hoarding

New Course Submittal: ■ Update Course: ☐ Prior Approval Number: _____

Purpose and Objective: Three-part conference series exploring different perspectives on hoarding. Participants will be able to assess and identify hoarding behaviors and understand best practices for treatment of hoarding disorder; understand the impact of family dynamics and relationships on hoarding behaviors and management of hoarding situations; and demonstrate improved knowledge of community responses to hoarding situations during the COVID-19 pandemic.

Number of Instructional Contact Hours that can be obtained upon completion: 6

If Multi-Session, Number of Instructional Contact Hours Per Session: 2

Program Applicable for the Following Participants:

Building Official ■ Master Plans Examiner ☐
Building Plans Exam. ☐
Plumbing Plans Exam. ☐
Electrical Plans Exam. ☐
Mechanical Plans Exam. ☐
Fire Protect. Plans Exam. ☐

Building Inspector ■ Fire Protection Inspector ■ Mechanical Inspector ☐
Plumbing Inspector ☐
Non-Res IU Inspector ☐

Res Building Official ■ Res Plans Examiner ☐ Res Building Inspector ■ Res Mechanical Inspector ■ Res IU Inspector ☐

Electrical Safety Inspectors ☐
Location of ESI Course: _____ Date(s) of ESI Course(s): _____

SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	x
	Organization sponsoring or requesting the program (if any)	x
Course Title:	Name of course (related to content)	x
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	x
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	x
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	x
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	x
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	na
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	x
Test Materials:		na
Completed Application:		x

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.

PRESENTER BIOS

DOUGLAS BRAUN, MSSA, LISW-S

Doug Braun is a Behavioral Health Clinical Social Worker at Benjamin Rose Institute on Aging. In that role, he provides mental health counseling and case management. He has worked in the field of aging for thirty years and has presented various workshops on accessing services for families, care givers and care receivers. His areas of expertise include accessing community services and

barriers to serving LGBTQ+ older adults. He received his master's degree from the Mandel School of Applied Social Sciences at Case Western Reserve University.

RANDY O FROST, PhD

Dr. Randy O. Frost is the Harold and Elsa Siipola Israel Professor of Psychology at Smith College. He is an internationally recognized expert on obsessive-compulsive disorder and hoarding disorder and has published more than 180 scientific articles, books, and book chapters on these topics. Dr. Frost serves on the Scientific Advisory Board of the International OCD Foundation, and with Dr. Gail Steketee, co-edits the Hoarding Center on the IOCDF website. He has co-authored several books on hoarding including *Buried in Treasures: Help for Compulsive Acquiring, Saving, and Hoarding* (with Drs. David Tolin and Gail Steketee and published by Oxford University Press). *Buried in Treasures* received a **Self-Help Book of Merit Award** from the Association for Behavioral and Cognitive Therapy in 2010. This book is the backbone of the Buried in Treasures Workshops that have been found to produce significant improvements in hoarding behaviors and are now running in many locations around the world. He has also published the *Compulsive Hoarding and Acquiring Therapist Guide* and client *Workbook,* through Oxford University Press. Second editions of all three of these books were published in 2014. His best-selling book, *Stuff: Compulsive hoarding and the meaning of things* (with Gail Steketee), was published by Houghton, Mifflin, Harcourt in 2010 and was a finalist for the 2010 **Books for a Better Life Award**. *Stuff* was also a New York Times Bestseller and named a **Must Read Book for 2011** by Massachusetts Book Awards. *Stuff* has been translated into 4 languages. His newest work, The *Oxford Handbook of Hoarding and Acquiring* was published in 2014. His work has been funded by the International Obsessive-Compulsive Disorder Foundation and the National Institute of Mental Health. Dr. Frost is one of the original members of the Hoarding of Animals Research Consortium and has served as consultant to numerous communities in setting up task forces to deal with the problem of hoarding. In 2012, he was awarded the Lifetime Achievement Award for excellence in innovation, treatment, and research in the field of hoarding and cluttering by the Mental Health Association of San Francisco. In 2013, he received a Career Achievement Award from the International OCD

Foundation for his work on hoarding. He has given hundreds of talks on hoarding and numerous workshops for clinicians, public health, housing, and elder service professionals, as well as people suffering from hoarding problems.

SERGEANT KEVIN KLAG

Kevin Klag is an EMT with the Cleveland Division of Emergency Medical Service (EMS).

(complete bio to come)

DEBRA MARDENBOROUGH-WHITE, MSW, CCHW, SC

Debra Mardenborough-White is a Service Coordinator for Millennia Housing Management in Cleveland. In that position she serves as a liaison to community agencies, networks with community providers and seeks out new services available to residents. Previously, she was a Community Resource & Referral Center Intern for the Louis Stokes VA Medical Center and a Neighborhood Services Coordinator for the Visiting Nurse Association.

Mardenborough-White has been a member of the Age-Friendly Cleveland Planning Committee; the Greater Cleveland Elder Abuse/Domestic Violence Roundtable; and Advisory Board member for Multicultural Committee for the National Alliance on Mental Illness (NAMI); an advisory committee member for the Benjamin Rose Senior Companion Program; Advisory Board Chair for Cleveland State University Black Studies Department; Advisory Committee member for the Cleveland Office on Minority Health; Visiting Nurse Association (VNA) Liaison for Church Community; a member of the Cleveland Bi-Centile Planning Committee; a member of the VNA Liaison East Cleveland Collaborative; United KAP Wellness Center and Hispanic Coalition Agency; Committee Chair for Lee Sevlle Head Start, and participated in a Mentee program with the Council on Older Persons (COOP).

She received her Master of Social Work from Cleveland State University, Cleveland, Ohio and a Bachelor of Arts in Business Administration from Baldwin Wallace University.

LIEUTENANT MIKE NORMAN

Mike Norman is currently the Public Information Officer for Cleveland Fire Department. He joined the Cleveland Fire Department in 1997 and attended the IAFF Political Training Academy. Norman is a 1993 graduate of Ohio University’s EW Scripps School of Journalism.

NATASHA M. PIETROCOLA, M.Ed., MBA

Natasha M. Pietrocola has spent over 17 years in social services addressing diverse issues in the field of aging including community based long-term care, elder abuse and social advocacy. Pietrocola has been a dedicated professional and advocate in raising community awareness about the challenges serving elder abuse victims. She currently serves as a Board Member, and Chair, of the Consortium Against Adult Abuse and is a Board Member and Board Immediate Past Chair for the Ohio Coalition for Adult Protectives Services. Both coalitions have been strong supporters in promoting services to protect vulnerable older adults throughout the state of Ohio.

Pietrocola currently serves as Deputy Administrator of Community Programs and Services at Cuyahoga County Division of Senior an Adult Services. In her current position as Deputy Administrator, she has the executive oversight over the Adult Protective Services program and manages all the reports and investigations of allegations of abuse, neglect, self-neglect and/or exploitation of impaired, elderly residents 60+ years of age who reside in the community, as well as vulnerable adults 18 to 59 years of age. She also is responsible for oversight with the agency Centralized Intake Unit and the information Services Program which is an Aging and Disability Resource Center. Ms. Pietrocola is the facilitator of the Cuyahoga County Adult Protective Collaborative (I-Team).

Pietrocola holds a Master of Business Administration from Cleveland State University, a Master of Education – Community Counseling - from the University of Toledo and a Bachelor of Arts in Psychology from the University of Toledo. Ms. Pietrocola also completed Fundamentals of Gerontology Courses with the University of Southern California's Davis School of Gerontology.

NORBERT RAHL, MS, LISW

Norbert S. Rahl, LISW, is the retired Director of the Mental Health Program at Benjamin Rose Institute on Aging. Mr. Rahl was employed at the Benjamin Rose Institute on Aging for more than 35 years. Mr. Rahl worked as a Social Worker and then became a Mental Health Case Manager. He assumed the position of Assistant Director of Mental Health Services in 2004 and was promoted to Director in 2006.

Mr. Rahl obtained his Bachelor's Degree from the Pennsylvania State University with a degree in Individual and Family Studies with an emphasis in Gerontology. He obtained his Master of Science in Social Administration with an emphasis in Mental Health from Case Western Reserve University in 1994.

Mr. Rahl has had extensive clinical experience working with mentally ill clients in both individual and group settings. Primarily using evidenced based practices such as Cognitive Behavioral Therapy and Illness Management Recovery, he has worked with individuals suffering from severe mental illness, such as schizophrenia, bipolar disorder, psychotic disorders and personality disorders. As director of the Mental Health program,

he is responsible for program evaluation and technical expertise of the program staff. Mr. Rahl was also a key representative in assisting the agency to become certified by the Commission on Accreditation of Rehabilitation Facilities (CARF).

Mr. Rahl sits on several committees including The Council of Agency Directors, The Suicide Prevention Committee of the ADAMHS Board of Cuyahoga County, The Hoarding Connection of the ADAMHS Board, The Adult Protective Services Steering Committee and the Mental Health Advocacy Committee. Mr. Rahl also sits on the Board of the Supplemental Care Services Association.

In “retirement,” Mr. Rahl continues to provide consultation services and public speaking.

LARRY VAVRO, LSW

Larry Vavro is a Licensed Social Worker with an AB in Social & Behavioral Sciences. He has been employed in public service for over 30 years, the most recent 23 of those in Adult Protective Services (APS). Mr. Vavro serves as the Chief of APS for Cuyahoga County. In addition, Mr. Vavro sat on the local Domestic Violence Fatality Review Committee, is a founding member of the Hoarding Connection of Cuyahoga County, and serves on the Elder Abuse/Domestic Violence Roundtable. He has a history working with mental health patients whose treatment followed a psycho-social rehabilitation model, was an active participant in Project Assist (a SAMHSA grant cooperative venture between APS, Mental Health and AGS), provided services to the Developmentally Disabled population, and has case managed teen parents to complete their high school education. Mr. Vavro completed the inaugural Career Executive Services Program held at Cleveland State University in 2008 and the Fundamentals of Gerontology Course through the University of Southern California in 2017.

File Attachments for Item:

ER-2 Truss Fundamentals (Simpson Strong-Tie)

BO, BPE, MPE, BI, NRIUI, RBO, RPE, RBI, RIUI (2 hours)

Staff Notes: Originally submitted and approved as a 1-hour course. But the submitter says the initial application was simply in error..

Committee Recommendation:

Simpson Strong Tie – Truss Fundimentals

Ohio - Submittal

1. Course Objectives:

Upon completion of this training, you will be able to:

- Differentiate between truss configurations and identify them by their common name.
- Describe how lumber is tested and graded.
- Explain variables that can affect metal plate connectors' holding values.
- Identify different load types and how they affect truss members.
- Explain the Building Designer's responsibilities when designing a truss.
- Describe the truss assembly process.
- Recognize the different types of bracing used when erecting a truss structure.
- Verify that a truss is correctly installed.

2. Instructor Qualifications/Subject Matter Expert Bio:

Presenter Information

Shawn Overholtzer

Shawn Overholtzer is the Integrated Component Systems Business Manager at Simpson Strong-Tie. A graduate of San Diego State University, he majored in Environmental Design. After graduating, he spent a few years managing residential and commercial construction projects throughout the California central valley. In 1996, he began work in the truss industry where he started in design and estimating.

Shawn began his career with Simpson as the Integrated Component Systems Branch Truss Specialist in March of 2012. Before working with Simpson he managed the California operations for Builders Choice, Inc. where he oversaw sales, production and design. Shawn has a wide depth of truss software, design and production knowledge and spent many years working with architects and engineers in the planning stages of various project sizes.

3. Course Syllabus:

Simpson Strong-Tie is an accredited provider of IACET CEUs. This course qualifies for IACET CEUs, AIA HSW LUs, ICC CEUs and AIBD CEUs.

This course reviews how and where trusses are used in construction, and provides an overview of the truss design process, including different load types, failure modes, roles and responsibilities, and the use of truss software. The course also examines how trusses are manufactured and installed. This course reviews truss documentation, different types of truss system bracing, and how to verify the correct installation.

Participants must pass a 10 question quiz (80% to pass) at the conclusion of the course to earn CEUs, see attached quiz. Here is the link to the course.

http://training.strongtie.com/stc/sstpub/psciis.dll?Course=sstpub&code=ONL-TRS102

4. **Sample Course Evaluation link**
5. **Course outline:**

- Lesson 1: Introduction to Trusses (30 min)
- Lesson 2: Truss Materials (30 min)
- Lesson 3: Truss Design Principles (30 min)
- Lesson 4: Truss Manufacturing and Installation (30 min)

Total time 120 min - 2 hrs. Credit

CRITERIA FOR SUBMITTING CONTINUING EDUCATION COURSES FOR BOARD OF BUILDING STANDARDS CERTIFICATIONS

The Ohio Board of Building Standards approves Continuing Education Courses for building department personnel. The courses may be used for the attainment of goals that are connected with technical and professional development as they relate to enforcing and interpreting the Ohio State Building Codes. Board approval is granted only on course instruction pertaining to OBC, OMC, OPC, and RCO requirements and such other content areas directly related to the responsibilities of the certification for which credit is being requested.

Instructors: Anyone or any organization promoting an approved course, is required to make full and accurate disclosure regarding course title, course approval number, number of credit hours, certifications for which the BBS has approved the class, and fees in promotion materials and advertising. ***The Board does not grant retroactive approval. It is recommended that courses be submitted for approval well in advance of any scheduling of classes and advertising***. Advertising shall not disclose improper approval information to the public.

Course sponsors/co-sponsors: Provide participants a certificate of completion containing the following information: name of participant, title of approved course, BBS approval #, date and location of the continuing education program, number of approved credit hours awarded, and signature of authorized sponsor or instructor.

Anyone or any organization administering an approved course shall provide the Board with advanced written information on scheduling of the course(s) (date and place) and provide to the Board a legible list of participants who completed the course with the name of course, date, and location.

Participants: Must attend the complete course as presented by the instructor to receive credit hours approved by the Board. No partial credit shall be given to any participant who failed to complete the entire course as approved. The sponsor/co-sponsor or instructor shall formulate a method to verify the individual's attendance and completion of the course.

Board approval: Remains in effect during the current code edition. Upon the Board's adoption of a new edition of the codes, course sponsors must update their course and submit to the Board for approval. The Board does not grant retroactive approval for courses presented prior to approval date.

Facility/training area: Shall be capable of comfortably and safely seating at least the number of attendees with writing surfaces for each attendee; accessible to/and usable for people with disabilities; sized and provided with audio/visual equipment adequate so that each attendee can see the instructor(s) and overhead screen and hear the content of the training programs; illuminated for writing and that the content on an overhead screen can be seen easily by all attendees; capable of being climatically controlled so that approximately 68° F can be maintained; non-smoking in the training room; sound controlled so that outside noise will not interfere with the training.

ADDITIONAL ELECTRICAL SAFETY INSPECTOR COURSE CRITERIA:

Trainees: During the first year, shall attend an approved thirty-hour course on the "Fundamentals of Electricity" and pass a test upon completion of the course. A second approved thirty-hour course and test covering the "National Electrical Code" shall be successfully completed prior to the examination for a certificate of competency. ESI trainee courses shall be designated as either of the following:

ESI TRAINEE COURSE - PART I - FUNDAMENTALS OF ELECTRICITY (THEORY)
ESI TRAINEE COURSE - PART II - ESI REFRESHER COURSE

ESI course instructors: Shall hold a current certificate of competency as an electrical safety inspector.
ESI course: ESI course applicants must give location(s) and date(s) of course(s).

APPLICATION

FOR

Continuing Education Course Approval

Continuing education programs approved for education credit by the Ohio Board of Building Standards may be used for compliance with certification requirements related to code enforcement, plan review, and inspection responsibilities. The credit is to be used to renew the certifications issued by the Ohio Board of Building Standards pursuant to section 3781.10(E) ORC.

Board of Building Standards
6606 Tussing Road, P.O. Box 4009
Reynoldsburg, Ohio 43068-9009
(614) 644-2613 Fax: (614) 644-3147
dic.bbs@com.state.oh.us
www.com.state.oh.us/dic/dicbbs.htm

COURSE SUBMITTER:

Course Submitter: Ian McCallion (Contact Name)

Organization: Simpson Strong-Tie (Organization/Company)

Address: 5956 W. Las Positas Blvd. (Include Room Number, Suite, etc.)

City: Pleasanton State: CA Zip: 94513

E-Mail: imccallion@strongtie.com

Telephone: 925-560-9112 Fax: _____

Course Sponsor: _____

COURSE INFORMATION:

Course Title: Truss Fundamentals

New Course Submittal: ☐ Update Course: ☑ Prior Approval Number: BBS2019-085

Purpose and Objective: Please see attachment for purpose and objective.

Number of Instructional Contact Hours that can be obtained upon completion: 2 hrs.

If Multi-Session, Number of Instructional Contact Hours Per Session: _____

Program Applicable for the Following Participants:

Building Official	X	Master Plans Examiner	X	Building Inspector	X	Fire Protection Inspector	☐
		Plumbing Plans Exam.	☐				
		Electrical Plans Exam.	☐				
		Mechanical Plans Exam.	☐				

Mechanical Inspector	☐	Plumbing Inspector	☐	Non-Res IU Inspector	☐				

Res Bldg Official	X	Res Plans Examiner	X	Res Building Inspector	X	Res Mechanical Inspector	☐	Res IU Inspector	☐

Electrical Safety Inspectors ☐

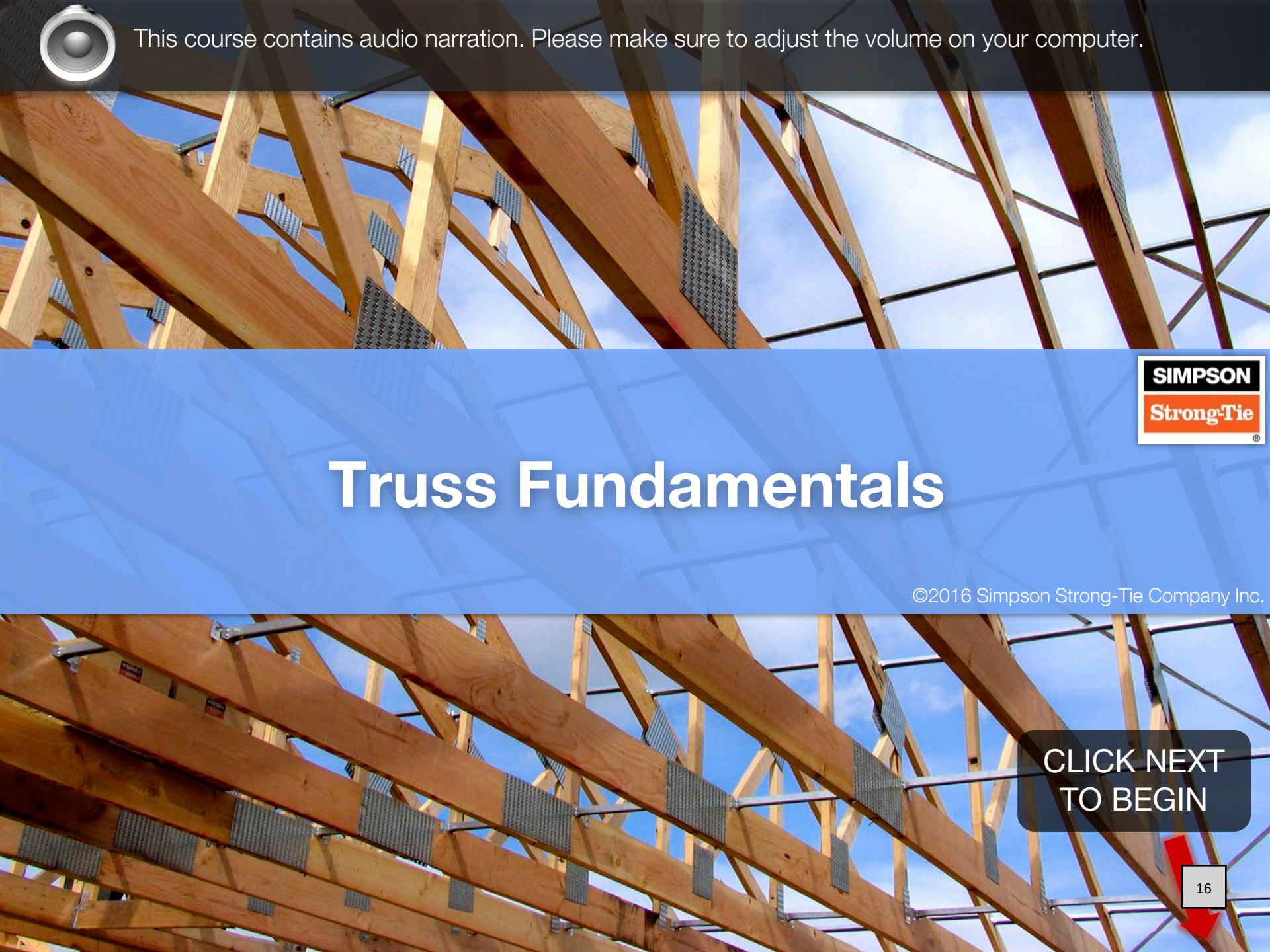
Electrical Safety Inspector Trainee Part I - Fundamentals of Electricity (Theory) ☐

Electrical Safety Inspector Trainee Part II – ESI Refresher Course ☐

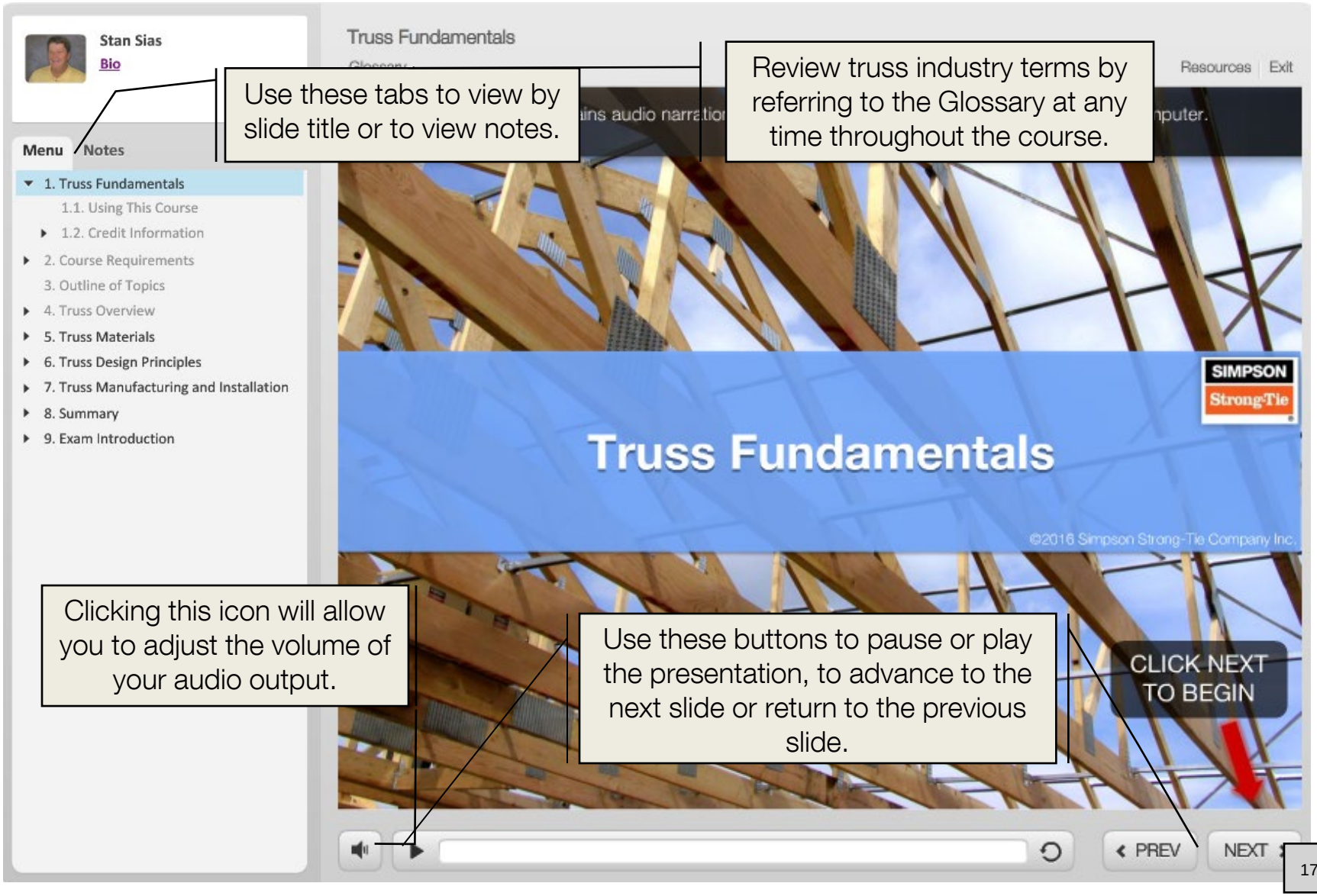
Location of ESI Course: _____ Date(s) of ESI Course(s): _____

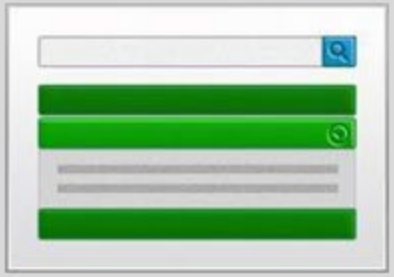
SUBMITTAL CHECKLIST: **Make Sure** all of the Following Information is **Submitted**:		Check Off
Course Submitter:	Name of contact person and their certification numbers, organization, address, fax, phone	X
Course Sponsor:	Organization sponsoring or requesting the program (if any)	X
Course Title:	Name of course (related to content)	X
Purpose/Objective:	Describe purpose and how course will improve competency of certification(s) listed	X
Contact Hours:	Indicate instructional time and credit requested in hours (e.g.: 0.5 hr, 1 hr, 3.5 hrs)	X
Participants:	Check off each certification for which credit is requested (for which course relates to certification)	X
Content of Program:	Include collated agenda, time schedule, course outline; list specific sections of code, references, and topics covered	X
Course Materials:	Collated workbooks, handouts, hard copy or electronic versions of program is available	X
Instructor(s) Info.:	Resume of professional/educational qualifications & teaching/training experience/BBS certifications	X
Test Materials:	Copy of quizzes or tests to be given	X
Completed Application:		X

NOTE: The Board does NOT grant retroactive approval for courses presented prior to approval date.


This course contains audio narration. Please make sure to adjust the volume on your computer.
SIMPSON
Strong-Tie
Truss Fundamentals
©2016 Simpson Strong-Tie Company Inc.
CLICK NEXT
TO BEGIN
16

Using This Course





Credit Information

FAQ - 4 Questions

Last Modified: Dec 12, 2016 at 10:52 AM

PROPERTIES

Show interaction in menu as: Single item

Allow user to leave interaction: At any time

Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties

Course Requirements

In order to successfully pass this course and earn Credits you must:

- View all slides in sequence before attempting the quiz.
- Correctly answer 2 out of 3 ‘Check Your Knowledge’ questions after each lesson throughout the course.
- Pass the Final Assessment after the course
- The course is designed for you to read the material and listen to the audio on each slide. Please ensure that you are able to hear the audio component of this course as it provides valuable information.

Course Description

This course intends to help those new to the truss industry understand why trusses are used as viable solutions to increase strength in a wood-framed building while decreasing design and installation time.

This course will introduce basic truss configurations and explore how they distribute loads, describe the desired material properties for the truss components, explore the truss design process, and review the truss manufacturing and installation process.

Learning Objectives

By the end of this course, you should be able to:

- Recognize the advantages of using triangles to increase strength in a structure
- Describe how lumber is tested and graded
- List the variables that can affect metal plate connector's holding values
- Explain how a truss is manufactured and delivered to the jobsite
- Identify types of bracing

Truss Overview

Lesson 1 Objectives

Welcome to Lesson 1: Introduction to Trusses

Purpose:

To help you understand more about the truss industry and the basics of truss construction

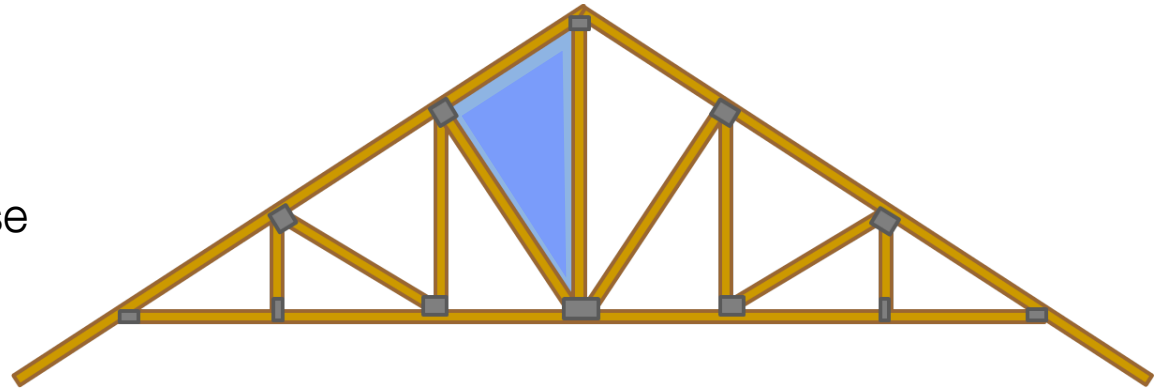
Objectives:

- Explain the advantages of using triangular structures in truss design
- Label the different parts of a truss
- Differentiate truss configurations
- Identify the benefits of using trusses in construction

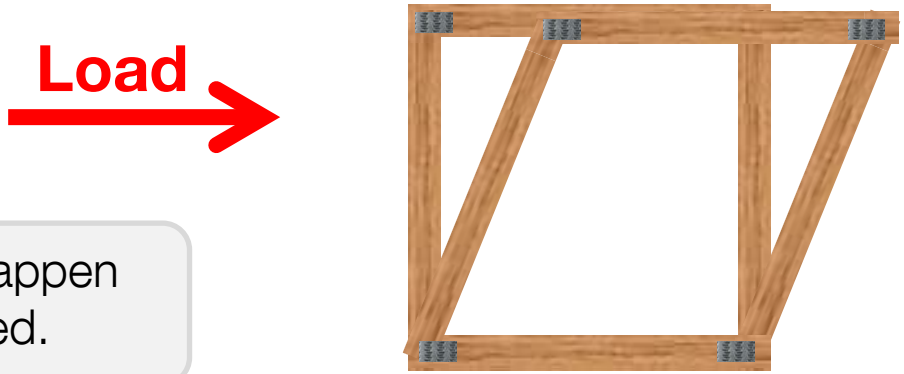
The Triangle

Desirable Traits of the Triangle:

- Rigidity helps distribute and support loads



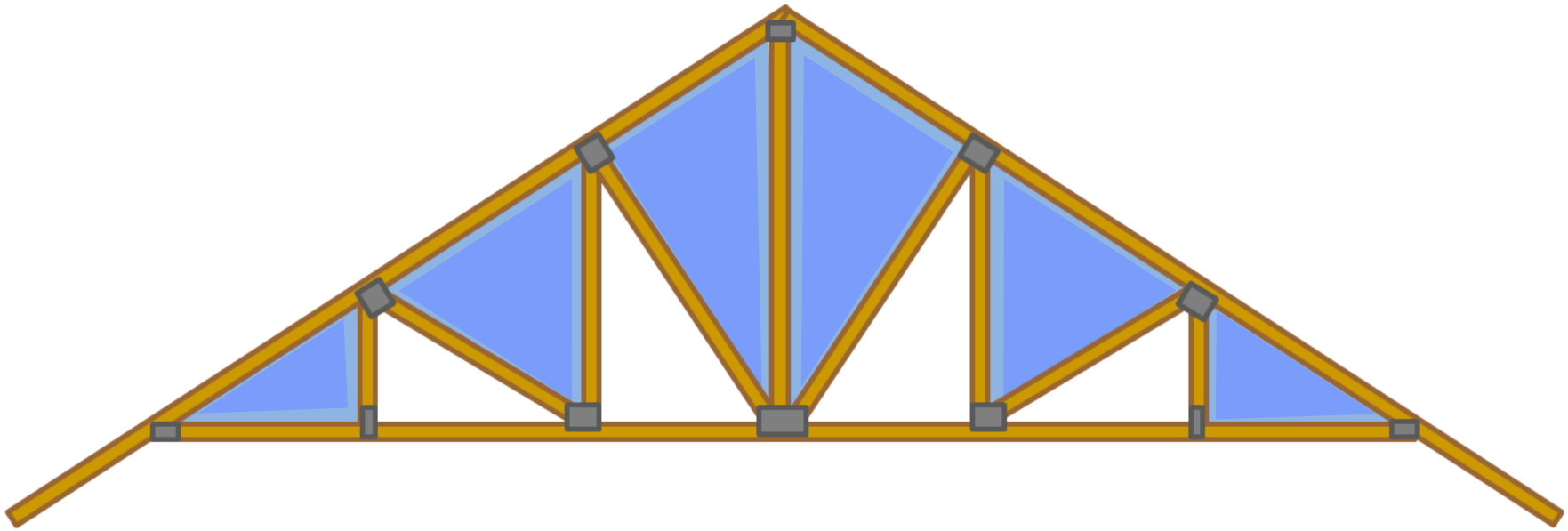
- Restrained ends increase holding values
- More effective at carrying loads than other shapes



Racking is less likely to happen when triangles are used.

Triangulation

A truss is a combination of triangles

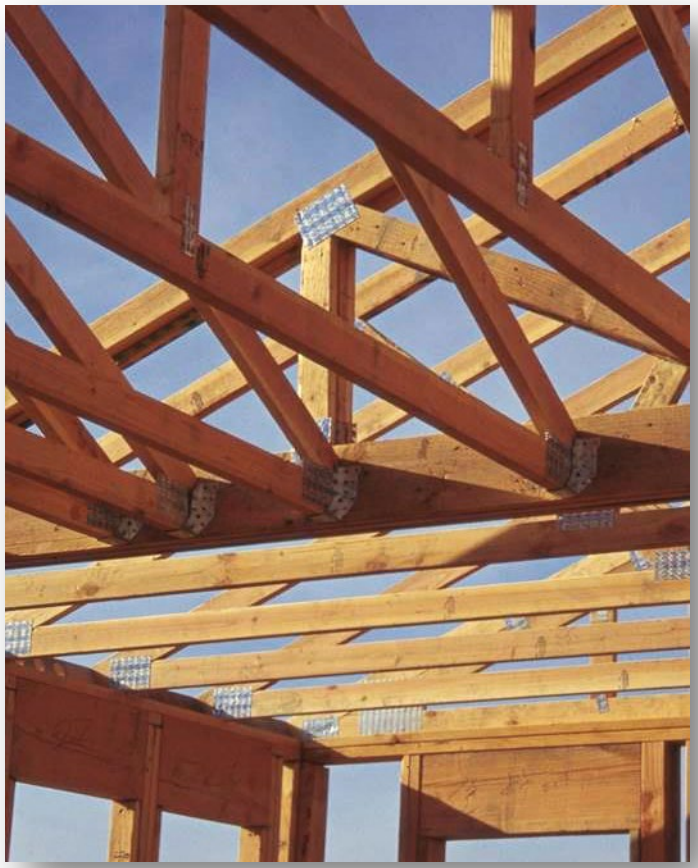


"Triangulation" defers load and uses less lumber than conventional framing

Less wood is needed to carry the same load.

Benefits of a Truss

Why build with trusses?



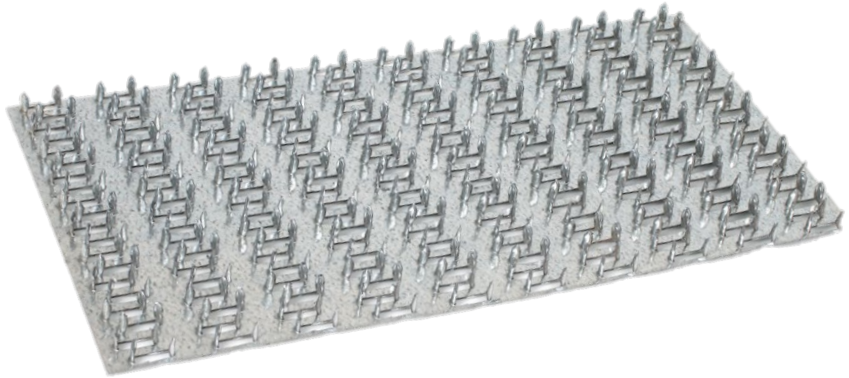
- Strong system increases strength
- Job-specific design
  - Truss engineered for specific loading requirements
- Versatile applications
  - Accommodate for complex designs
  - Can be used with hybrid framing
- Environmentally friendly
  - Wood renewable resource
  - Unused material can be recycled
- Economically sound

Components of a Truss

Structural Members

Easy to work with
High strength-to-weight ratio
Uses standard-sized dimensional lumber

Connectors

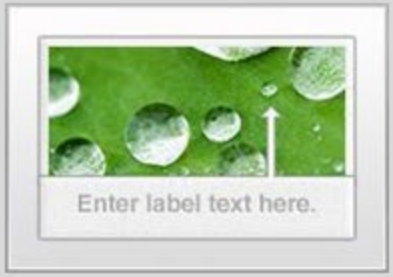


Metal truss plates have integral tooth slots. Plates with teeth on one side are placed on both faces of a truss joint and are pressed with hydraulic or roller presses to embed the teeth into different web and chord members.

Metal Plate Connected Wood Trusses (MPCWT)

Truss Applications

- Residential Houses
- Remodeling
- Commercial Buildings
- Industrial (Warehouses)
- Agricultural



Elements of a Truss

Guided Image - 7 Labels (Including Introduction)

Last Modified: Apr 01, 2016 at 03:58 PM

PROPERTIES

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Prev/Next player buttons go to:	Step in interaction

Edit in Engage

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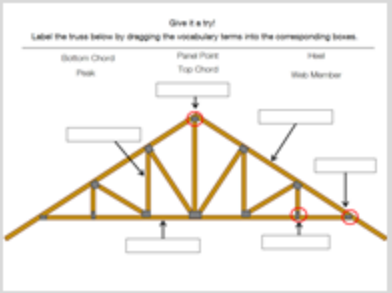

Matching-Lesson 1

Quiz - 2 questions

Last Modified: Apr 27, 2016 at 10:08 AM

PROPERTIES

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On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	At any time
Show in menu as:	Single item

Edit in Quizmaker

Edit Properties

Types of Trusses

Basic Elements of a Truss

…now let's look at the different ways these elements can be configured

Two Categories of Trusses:

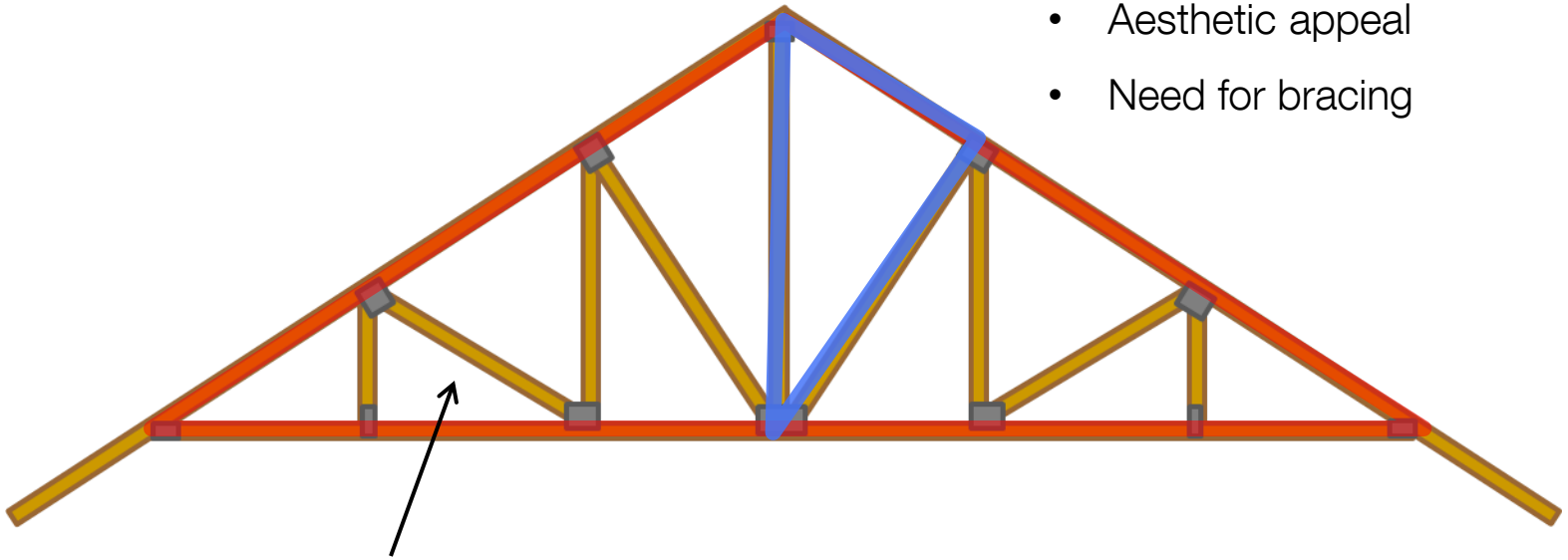
1. Pitched Truss
2. Parallel Truss

Pitched Configuration

Standard Roof Truss Configuration

Web configurations based on:

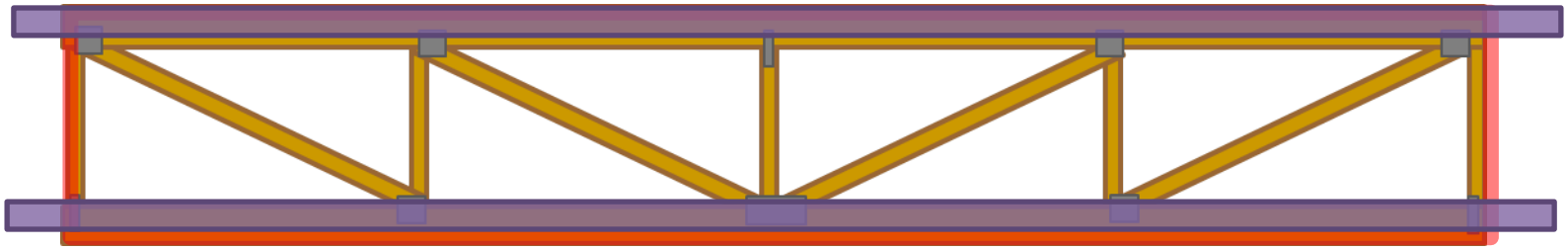
- Loading requirements
- Aesthetic appeal
- Need for bracing



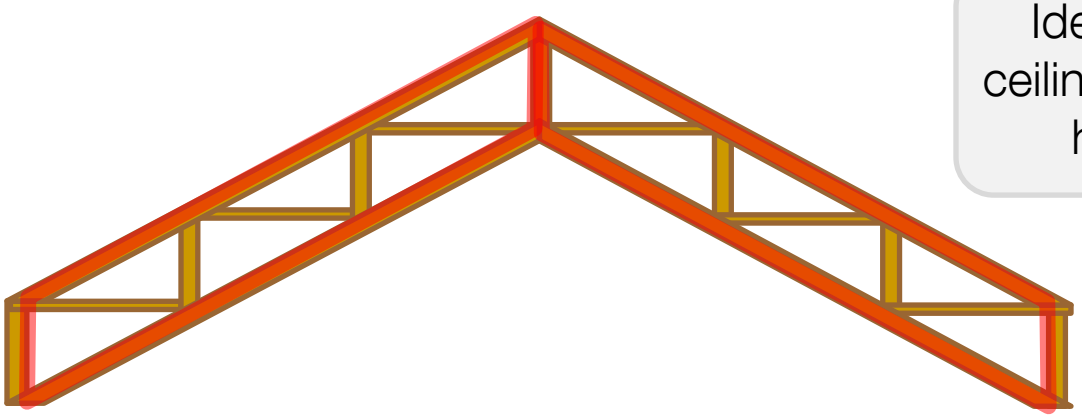
placement of web members affects strength

Parallel Chord Configurations

Parallel Chord Truss Configuration



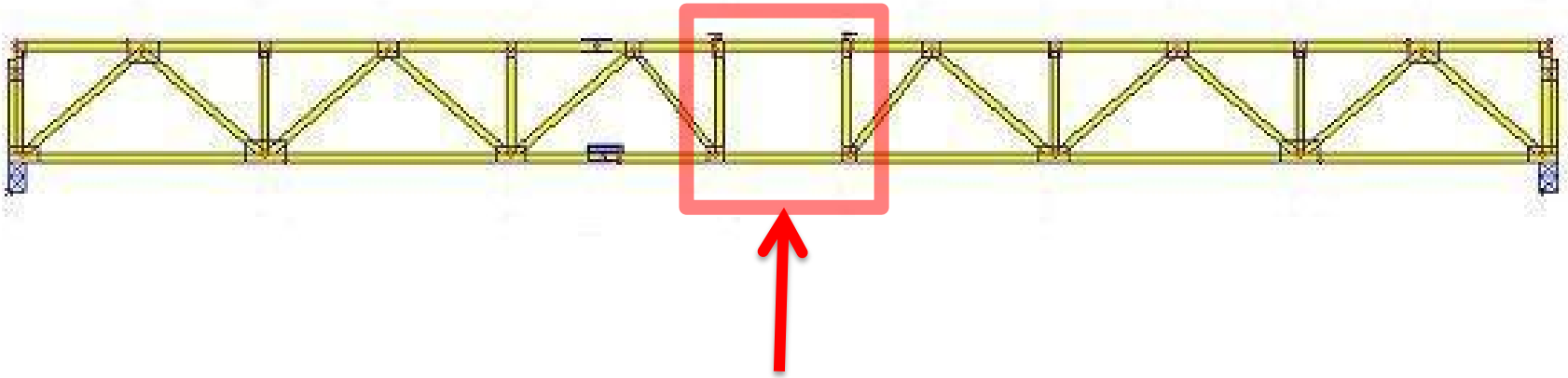
Ideal for floor trusses



Ideal for vaulted ceilings subjected to heavy loads

Floor Trusses

Parallel Chord Trusses = Floor Trusses



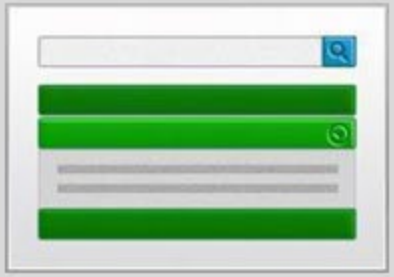
Chase opening for wiring, HVAC or other utilities

Carry more load

Span farther

Quick to install

Squeak-free floor



Truss Configurations

FAQ - 8 Questions (Including Introduction)

Last Modified: Apr 28, 2016 at 08:46 AM

PROPERTIES

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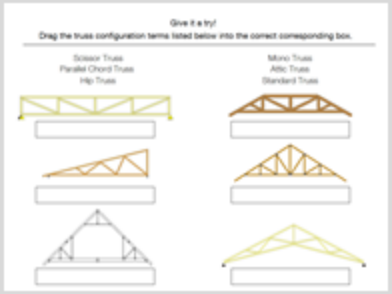
Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties



Matching2-Lesson 1

Quiz - 2 questions

Last Modified: Apr 27, 2016 at 10:07 AM

PROPERTIES

On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	At any time
Show in menu as:	Single item

Edit in Quizmaker

Edit Properties

Building Components

What is a Building Component?

Definition:
Building products that are separately manufactured and are later added to entire structure

Separate, pre-engineered components

Building components are manufactured and tested separately so that the installer can rest assured it will perform as anticipated.

Who benefits?

Benefits:

- Already tested—beneficial to the Building Designer
- Less work for designer without compromising structural integrity
- Ready to be immediately erected
- Saves time and money during installation

Building components can include roof/floor trusses, wall panels, i-joists, engineered beams/hangers, shear walls, and moment frames

Image of pre-manufactured, parallel chord trusses waiting to be shipped to a jobsite

The Truss Industry: SBCA

Structural Building Components Association (SBCA)

Formerly Wood Truss Council of America (WTCA)

Promotes safe, economic, and structurally sound use of structural building components

Considered the "voice" of the structural building component industry

- Educational/training, legislative, and marketing activities
- Release publications
- Put on tradeshows and annual conferences
- Endorse state-wide chapters

SBCA Structural Building Components Association

SBCA is a great resource for all involved in the building component industry

SBCA Website

The Truss Industry: TPI

Truss Plate Institute (TPI)

Create guidelines/standards for truss design, manufacturing and installation

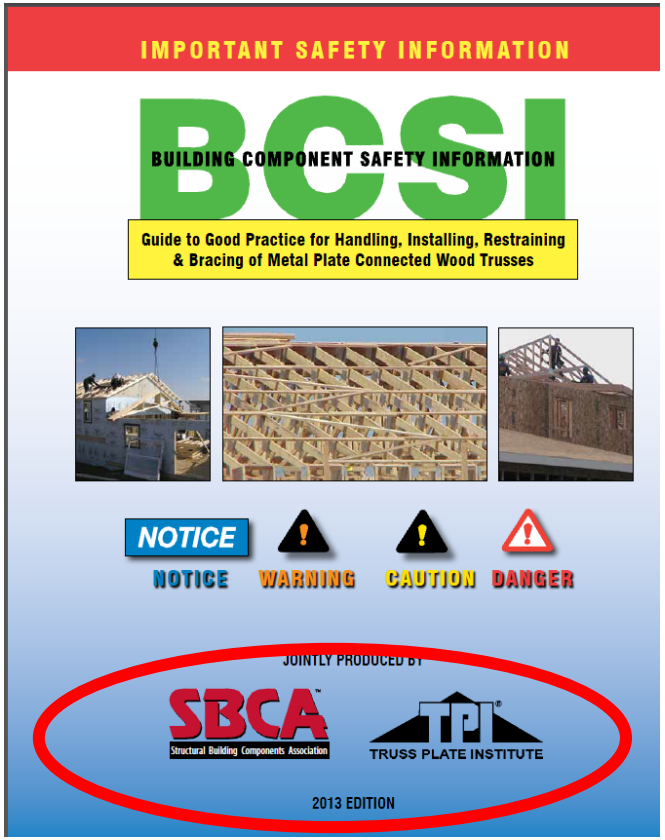
- Provides third-party, in plant quality assurance
- Produces bracing and handling safety guidelines (BCSI) jointly with SBCA
- Publishes design and quality standards

TPI is an excellent resource for design and testing standards in the truss industry

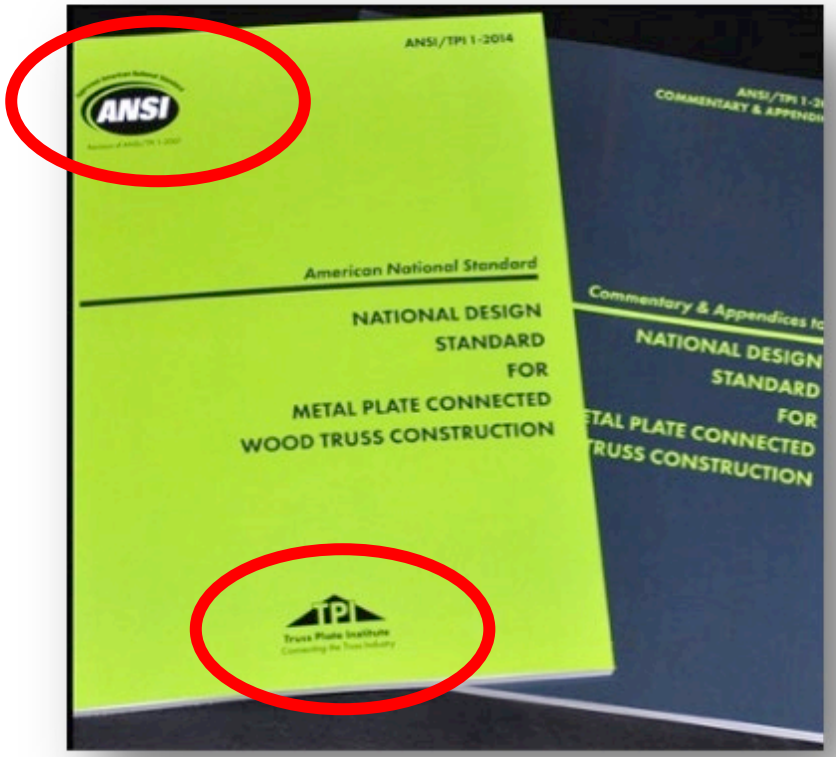
TPI Website

TPI + ANSI = National Design Standard for Metal Plate Connected Wood Trusses

Publications



Safety information on handling, installing restraining and bracing metal plate connected wood trusses



Aids designers in the building process

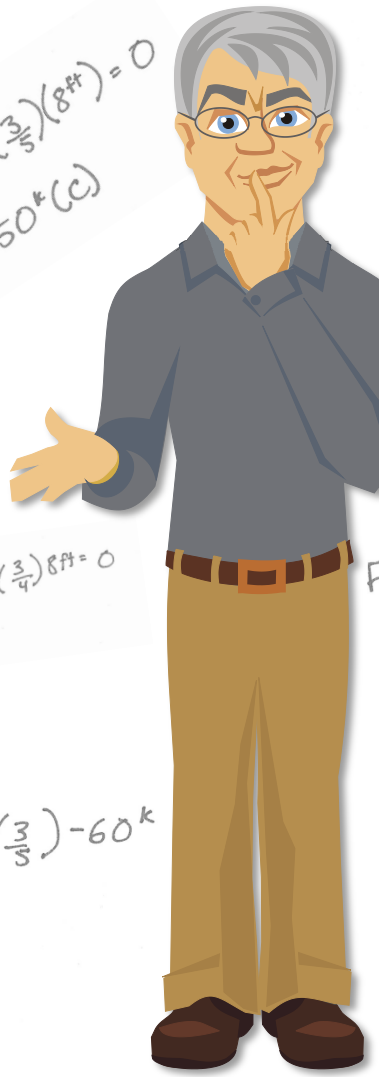
These documents are available under the ‘Resources’ tab

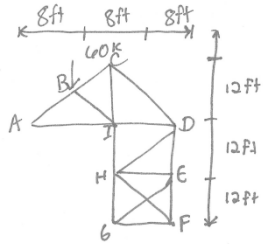
Truss Design

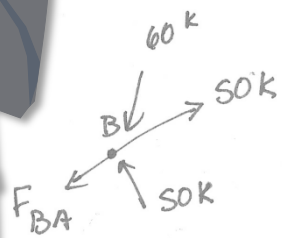
In the past, all calculations had to be done by hand for each job.

Very time consuming!

Very costly!







$$-60^k(8ft) - F_{BI}\left(\frac{4}{5}\right)(6ft) - F_{BI}\left(\frac{3}{5}\right)(8ft) = 0$$

$$F_{BI} = -\underline{\underline{50^k}} = 50^k\,(C)$$

$$60^k(8ft) - F_{BC}\left(\frac{4}{5}\right)(6ft) - F_{BC}\left(\frac{3}{5}\right)8ft = 0$$

$$F_{BC} = \underline{\underline{50^k}}\,(T$$

$$+\uparrow \Sigma F_y = 0 \qquad 50^k\left(\frac{3}{5}\right) + 50^k\left(\frac{3}{5}\right) - 60^k - F_{BA}\left(\frac{3}{5}\right) = 0$$

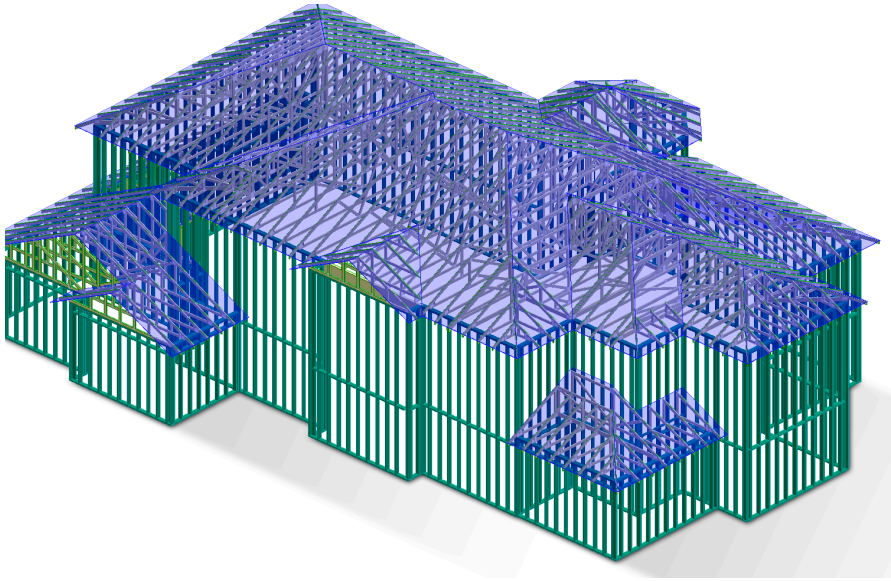
$$F_{BA} = \underline{\underline{0^k}}$$

Technology

Truss Design Software

Assist design process and reduced overall cost

- Input criteria and loads are evaluated
- 3D model to simulate roof systems and individual trusses
- Quickly generates designs and estimates
- Makes building with metal connector plates easy and cost effective



Because software makes truss design easier, more people are building with trusses now than ever before.

Review

- ✓ Triangles- rigid structures that can hold greater loads
- ✓ Buildings types that use trusses
  - ✓ Residential
  - ✓ Commercial
  - ✓ Industrial
  - ✓ Agricultural
- ✓ Organizations in the industry
  - ✓ Structural Building Component Association (SCBA)
  - ✓ Truss Plate Institute (TPI)
- ✓ Supporting literature
  - ✓ Building Component Safety Information (BCSI)
  - ✓ National Design Standard for Metal Plate Connected Wood Trusses
- ✓ Truss Design Software

Note: Next we will move to our first 'Check Your Knowledge' Quiz.

You will need to answer 2 out of 3 questions correctly in order to move forward in the course.

Check Your Knowledge- Lesson 1

Quiz - 3 questions

Last Modified: Apr 28, 2016 at 01:46 PM

PROPERTIES

On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	At any time
Show in menu as:	Multiple items

Edit in Quizmaker

Edit Properties

Truss Materials

Lesson 2 Objectives

Purpose:

To help you communicate effectively with industry professionals about the materials used in truss manufacturing

Examine how material factors affect the overall performance

Objectives:

- Identify type of lumber and variables
- Describe how lumber is tested and graded
- Explain the variables that can affect plates' holding values
- Describe the types of tests for metal plate connectors

Lumber

Why do we use wood for trusses?

- Resilient
- Easy to cut
- Easy to attach with connectors
- High strength-to-weight ratio
- Renewable
- Plentiful
- Available in different strength capacities
- Does not need to be shipped far
- Cost-effective

Good truss design selects specific wood for specific applications based on cost and strength requirements.

How is lumber categorized?

Boards

< 2"

Dimensional Lumber

2"- 5"

Timber

> 5"

How is lumber categorized?

Framing- used for structural applications

- Studs, joists, rafters, and trusses

Appearance- used for aesthetic value

- Paneling, flooring, ceiling, or finishing

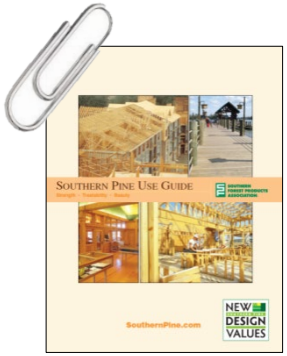
Industrial- small portions of lumber used for temporary applications

- Scaffolding planks and foundations

Dense

Regular

Non-Dense

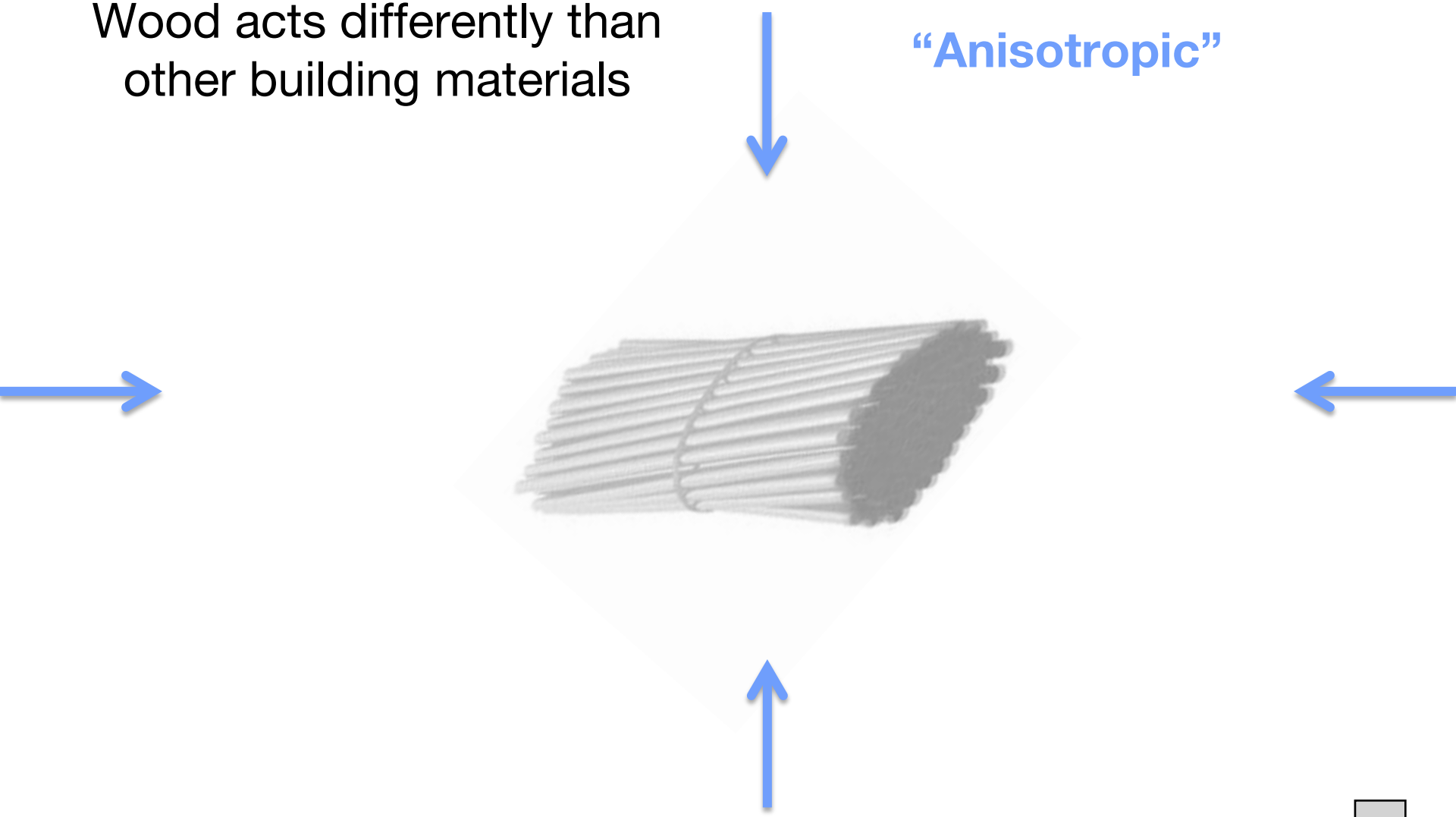


The Southern Pine Use Guide is available under the 'Resources' tab in this course

The Straw Analogy

Wood acts differently than other building materials

"Anisotropic"



Lumber Characteristics

High Density

High Strength

Plentiful

Common species for trusses:

- Southern Pine
- Douglas Fir
- Hem Fir
- Spruce-Pine Fir

Hardwood species are not ideal because they are heavier and more expensive.

Graded for strength properties:

- Visual Grading
- Mechanical Grading
  - MSR (Machine Stress Rated)
  - MEL (Machine Evaluated Lumber)

Lumber Moisture

- Live trees have high moisture content
- As soon as lumber is cut, moisture decreases

Shrinkage

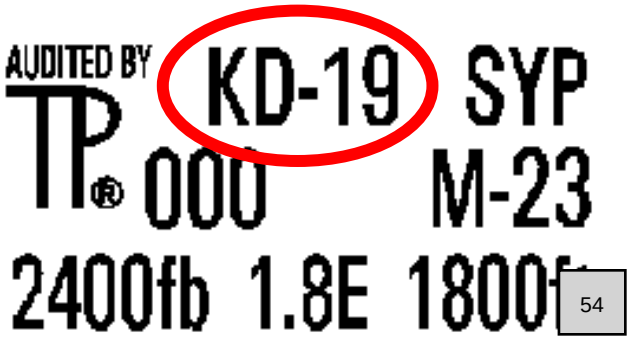
- Occurs when water in the wood evaporates and as a result, the lumber decreases in size
- All lumber undergoes some shrinkage
- Small degrees of shrinkage are taken into account during the design process

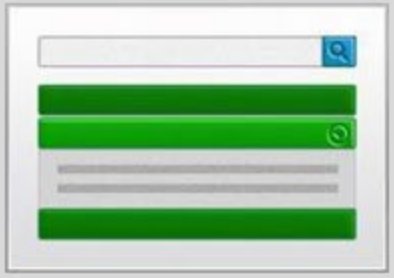
The drier the wood, the stronger the wood!

The Drying Process

Moisture content should be < **19%**

S-Dry	= lumber with MC < 19%
S-GRN	= green lumber *is* > 19%
KDHT	= kiln-dried and heat-treated
KD15/ MC15	= MC at 15% at time of manufacture





Common Lumber Defects

FAQ - 10 Questions (Including Introduction)

Last Modified: Apr 04, 2016 at 07:46 AM

PROPERTIES

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Prev/Next player buttons go to: Step in interaction

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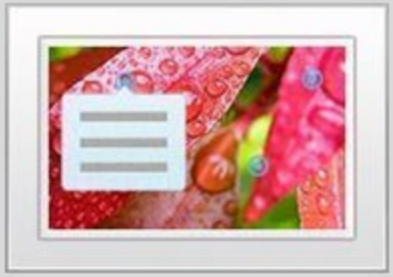
Edit Properties



Dimensional Lumber Grades

Labeled Graphic - 5 Labels (Including Introduction)

Last Modified: Apr 04, 2016 at 07:48 AM

PROPERTIES

Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

Prev/Next player buttons go to: Step in interaction

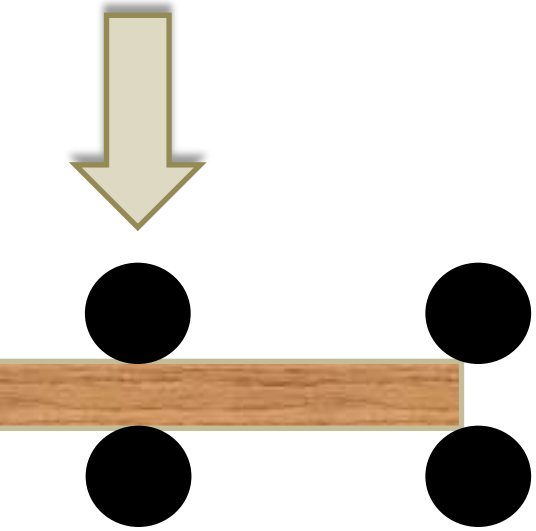
Edit in Engage

Edit Properties

Mechanical Graded Lumber

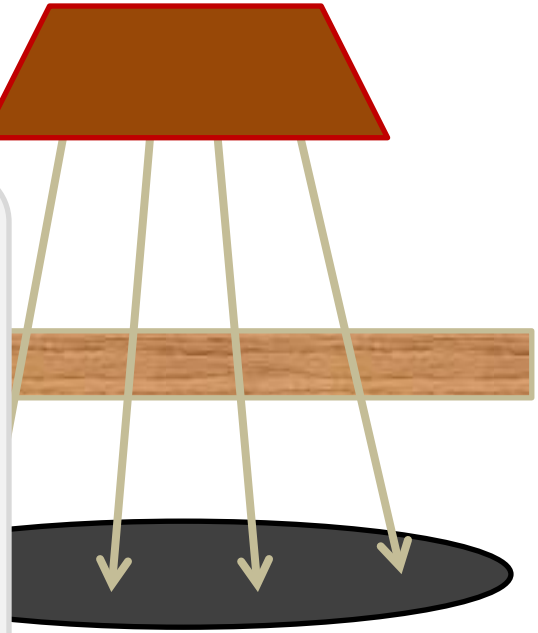
Machine-Stress Rated (MSR)

Measures stiffness



Machine-Evaluated Lumber (MEL)

Measures density



For example, even though the machine might grade the structural characteristics of the lumber higher, if there are significant knots or other lumber characteristics spotted, the lumber will receive a grading associated with the lower visual override.

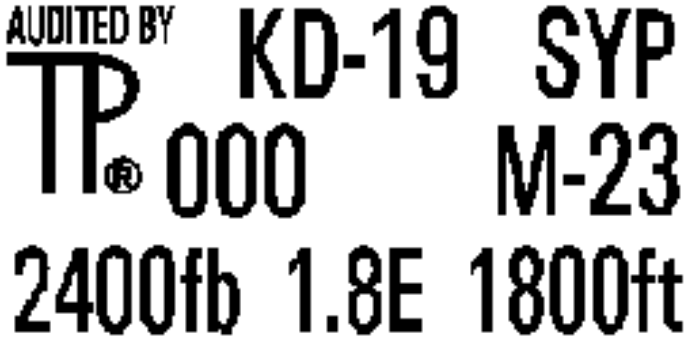
Visual grading ALWAYS takes precedent

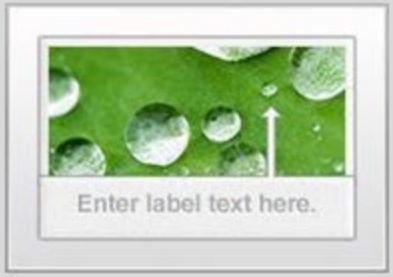
Stamps

Visual Graded Lumber Stamp

Machine Stress Rated Stamp

Machine Evaluated Lumber Stamp





Visually Graded Lumber Stamp

Guided Image - 6 Labels (Including Introduction)

Last Modified: Apr 28, 2016 at 11:01 AM

PROPERTIES

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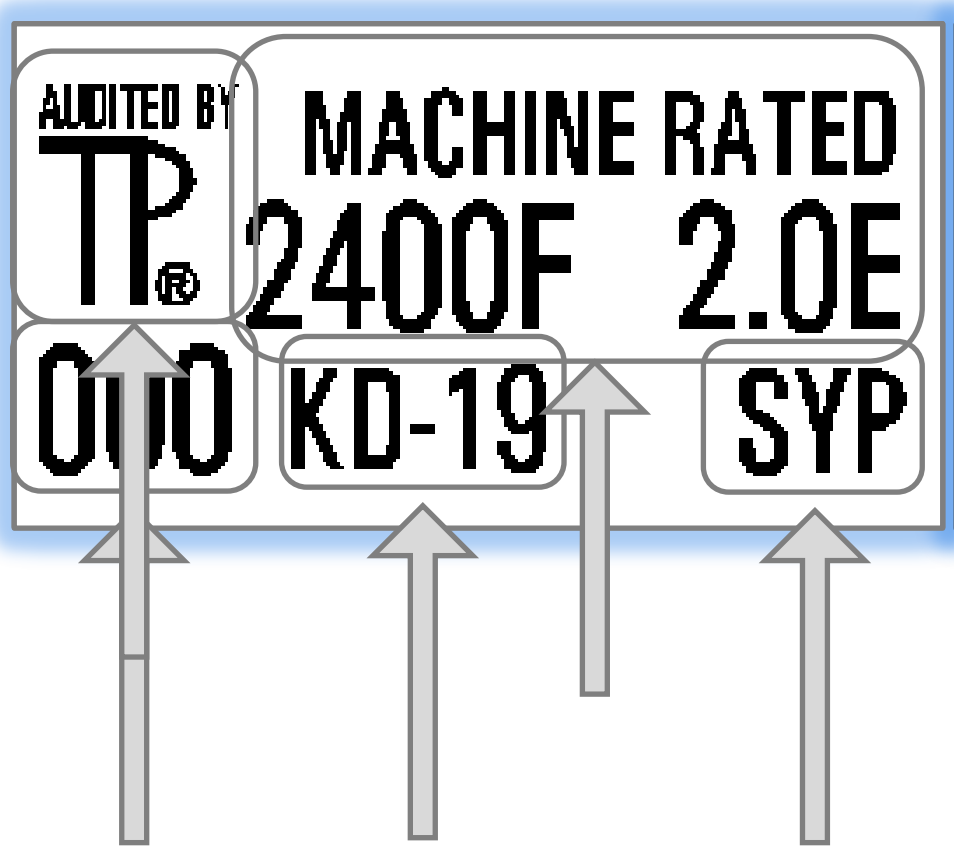
Prev/Next player buttons go to:	Step in interaction

Edit in Engage

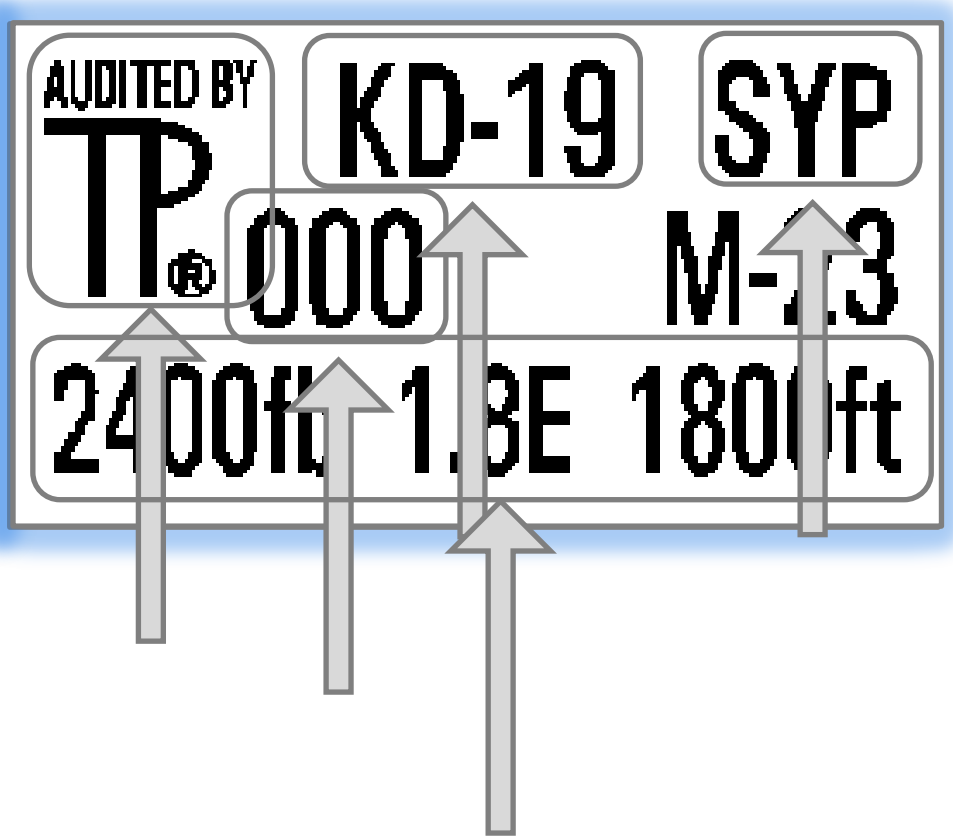
Edit Properties

MSR and MEL Stamps

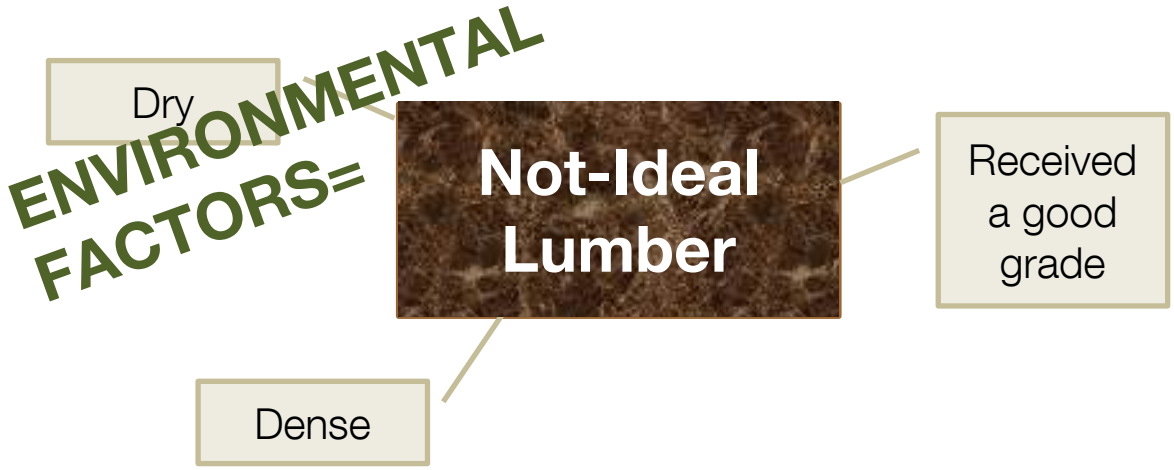
MSR



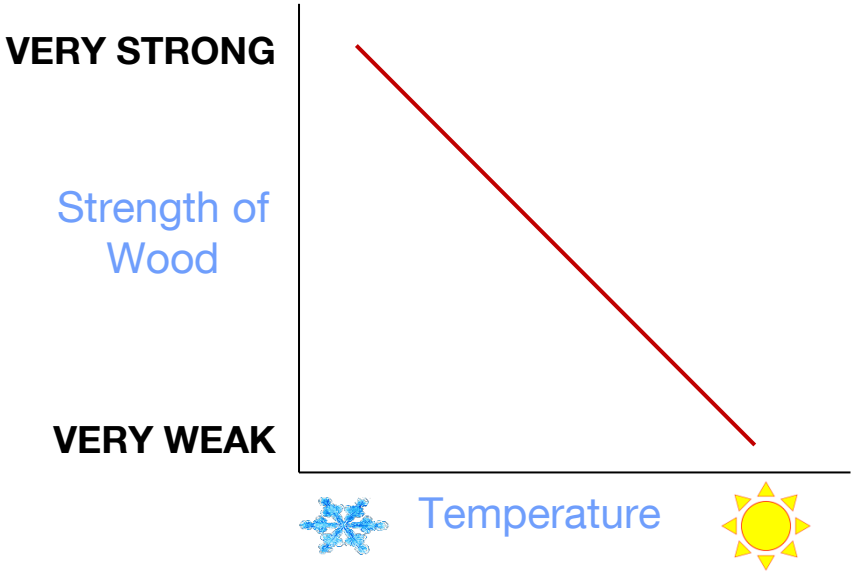
MEL



Environmental Factors



Think about it—the cells in a frozen piece of lumber would constrict and become denser while the cells in a hotter piece of wood would expand and become more flexible.



Environmental Factors

Chemical Attacks:

Certain chemical attacks can compromise the wood's strength and shorten lifespan

- Fertilizers for crops
- Chlorine for swimming pools
- Preservative-treated wood
- Fire retardant treated wood

Not all chemicals are bad!

Chemicals intentionally applied to preserve wood

Environmental Factors

Fatigue:

Exhaustion of wood that results in loss of strength carrying capacities

The wood is strong when first installed…

…but will fatigue over a long period of time.

Creep occurs when load is applied to wood for long period of time, permanently altering the wood's shape.

Decay Fungi

Microscopic organisms feed off wood to survive

Seeps Under the Surface → Feeds off the Wood → Compromises Strength

Essentials:

- Water
- Oxygen
- Warmth
- ~~Nutrients~~

Preservative-treated wood is purposefully poisoned so fungi can no longer use it as a food source.

Non-Decay Fungi

Not structurally damaging, but can decrease aesthetics

Although strength is not compromised, public sees this as an issue

Sap-Staining Fungi
blue-stain fungi

Surface-Staining Fungi
mold and mildew

Most superficial mold can be removed by cleaning.

Critters

Insects similarly use wood as food

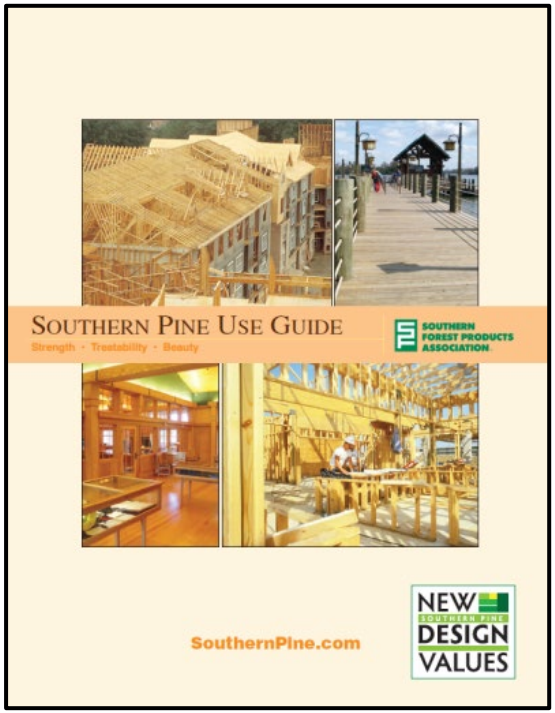
Termites

Carpenter Ants

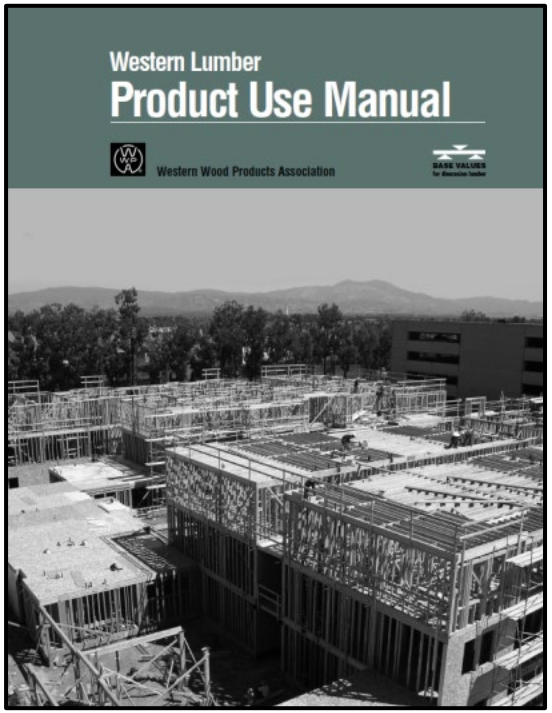
Gribble

TIPS: Remove wood from ground
Use preservative-treated wood

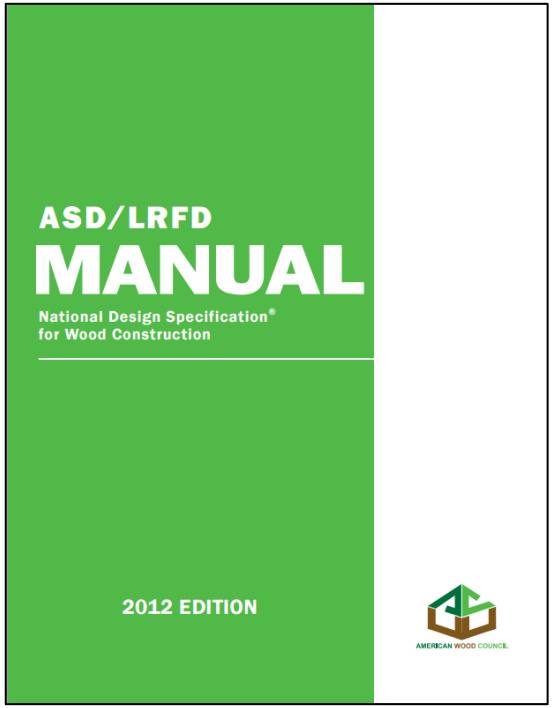
Useful Publications



Southern Pine Use Guide



Western Lumber Use Manual

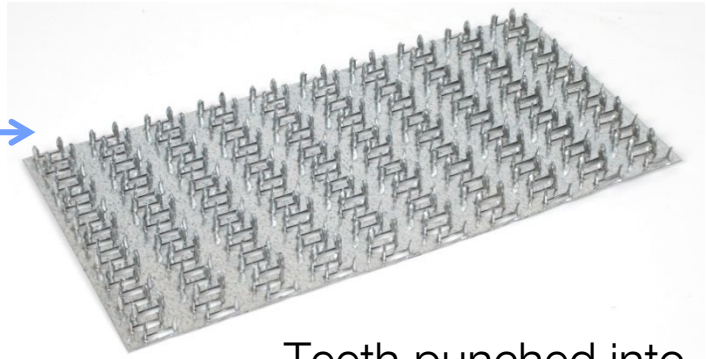


National Design Specification

Metal Plate Connectors

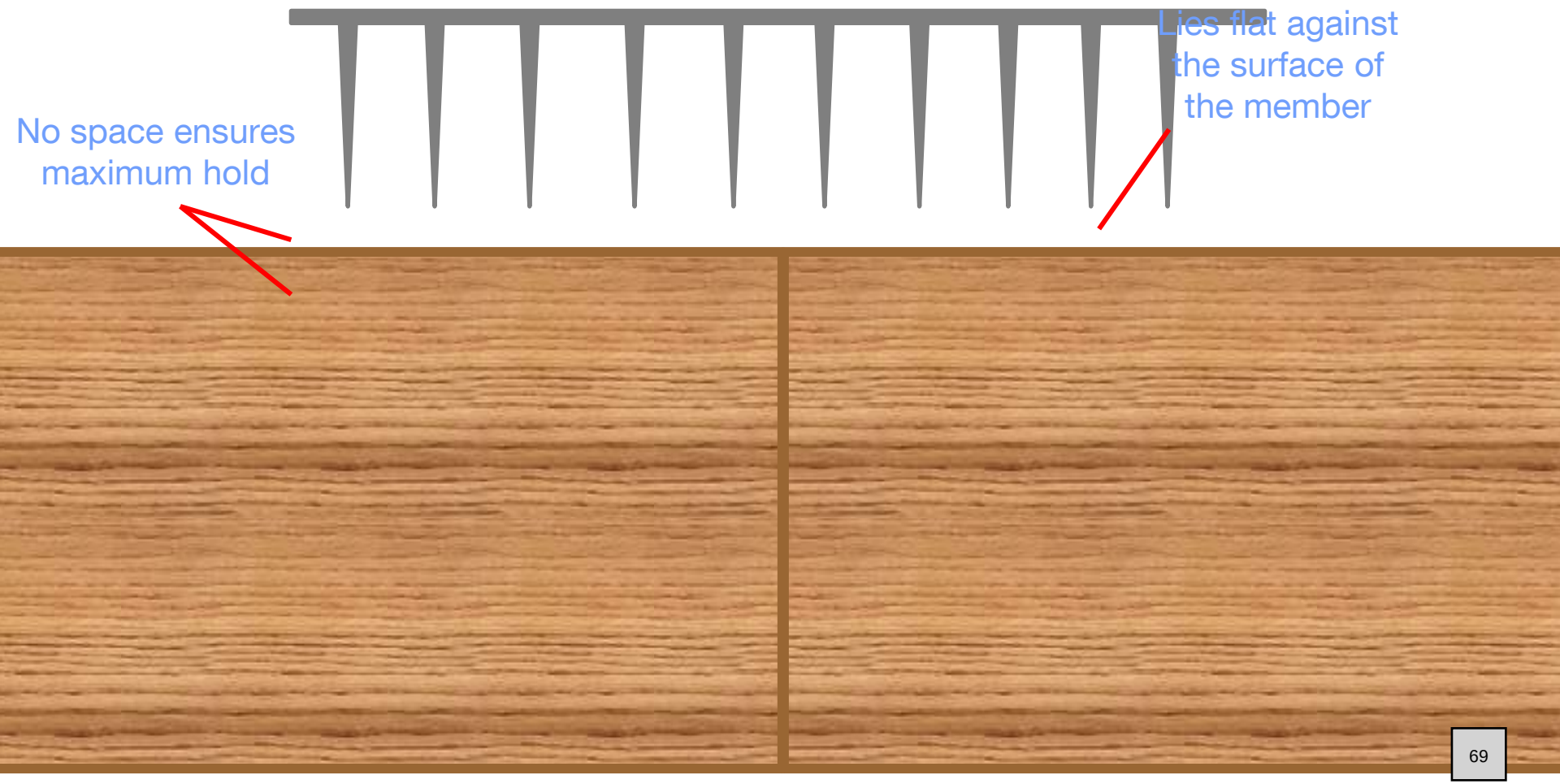
Most common and cost effective way to connect a truss

(truss plates)



Teeth punched into galvanized steel

How Metal Plate Connectors Work

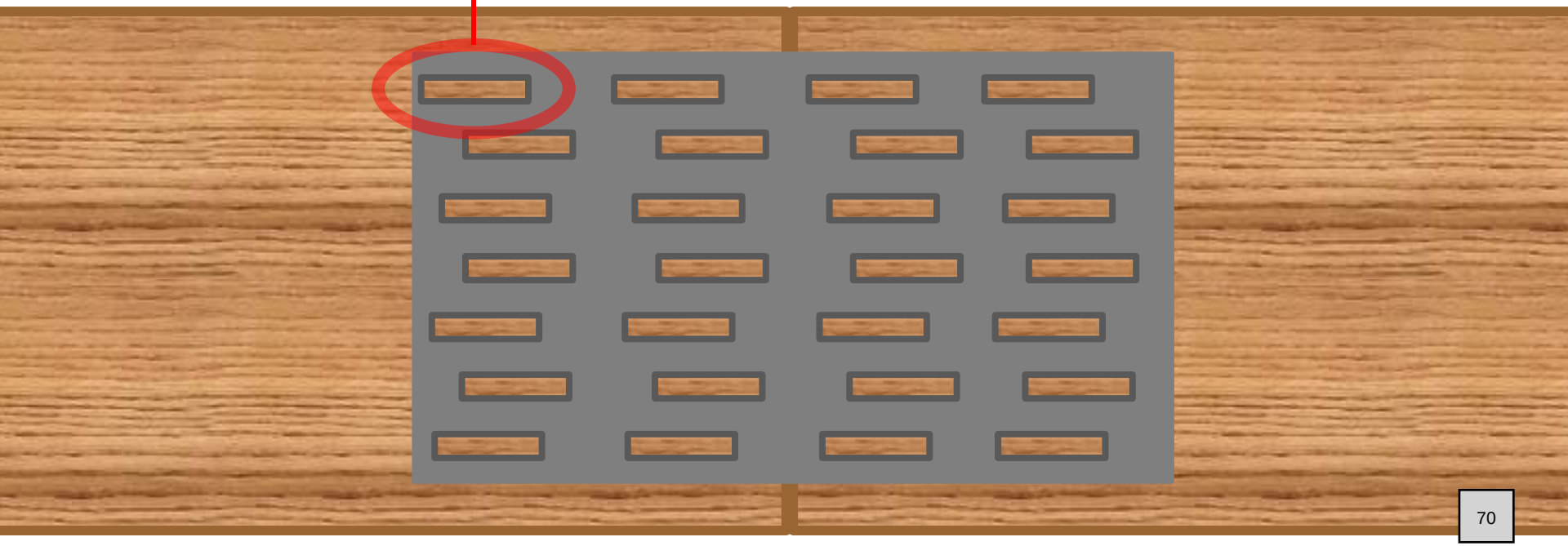


How Metal Plate Connectors Work

Plate specifications vary based on the manufacturer

Wood can be seen through holes

Only use engineering values from plate's specific manufacturer



Metal Plate Connector Variables

Tabbed Image - 5 Tabs (Including Introduction)

Last Modified: Apr 04, 2016 at 08:01 AM

PROPERTIES

Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties

Lateral Resistance Strength Testing

Tabs - 5 Tabs (Including Introduction)

Last Modified: Apr 28, 2016 at 11:17 AM

PROPERTIES

Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties

Net Shear Strength Testing

Tabs - 7 Tabs (Including Introduction)

Last Modified: Apr 05, 2016 at 03:27 PM

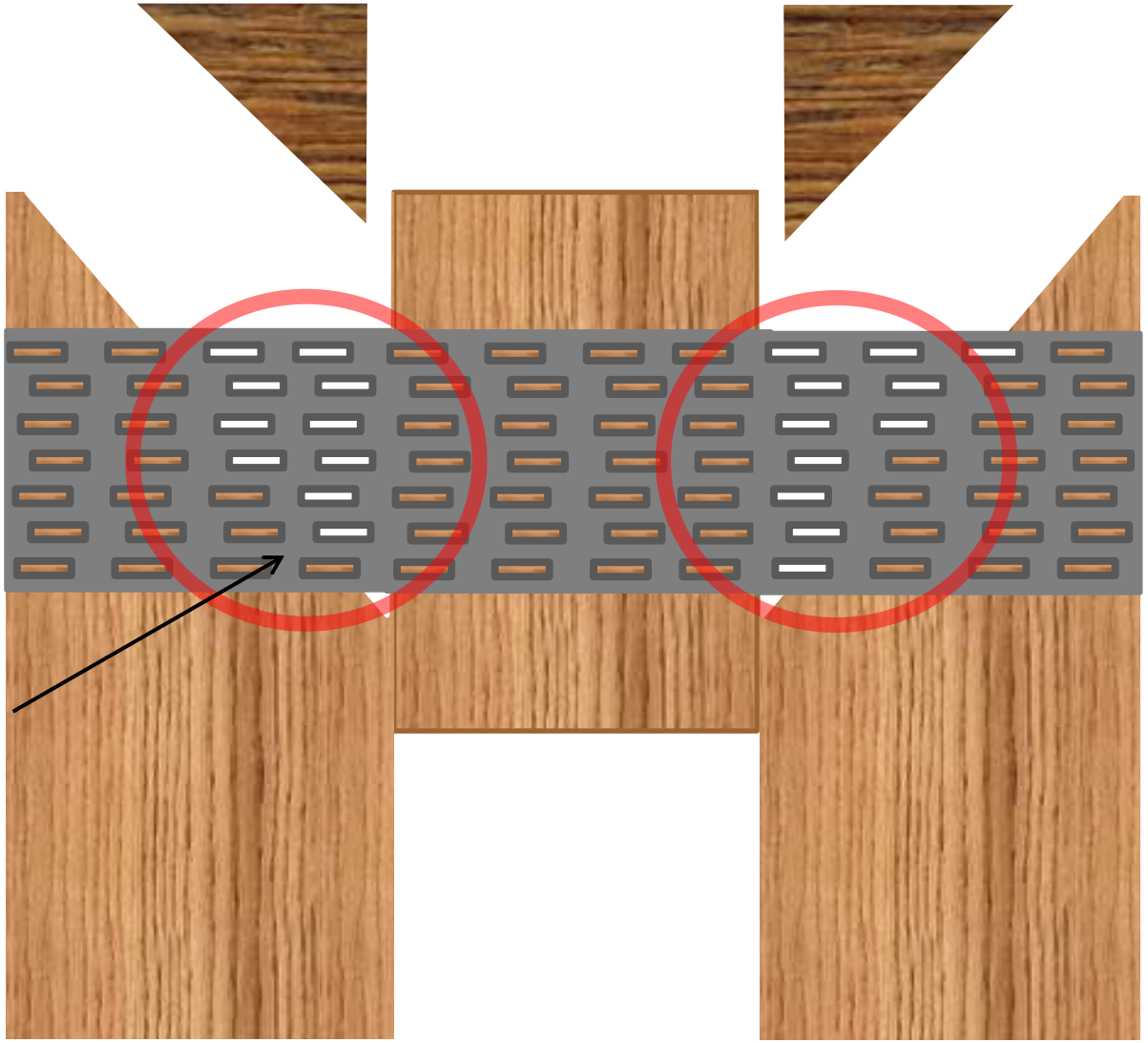
PROPERTIES

Show interaction in menu as:	Multiple items
Allow user to leave interaction:	After viewing all the steps
Prev/Next player buttons go to:	Step in interaction

Edit in Engage

Edit Properties

Buckling



Once a plate buckles, the full strength of the plate cannot be restored.

Testing as a System

Truss testing is conducted to ensure the safety of those within the structure.

Metal plate connectors tested by manufacturers according to ANSI/TPI design specifications

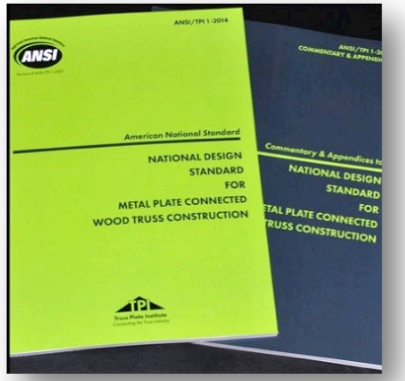
Full Scale Load Testing

- Verifies the truss's load carrying capacity
- Analyzes truss's performance when subjected to its maximum allowable load
- ANSI/TPI and ASTM literature

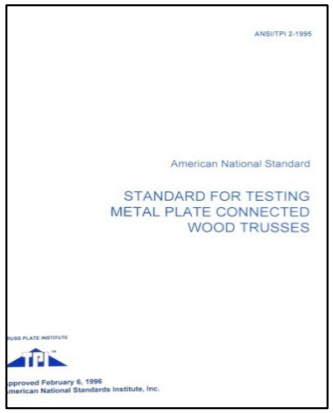
Performance Testing

- Conducted on existing trusses
- Testing used to verify that minimum design specifications have been met
- ANSI/TPI 2 *Standard for Testing Performance of Metal Plate Connected Wood Trusses*

ANSI/TPI 1-2014



ANSI/TPI 2-1995



Truss Materials Summary

Checklist - 6 Items (Including Introduction)

Last Modified: Apr 04, 2016 at 01:36 PM

PROPERTIES

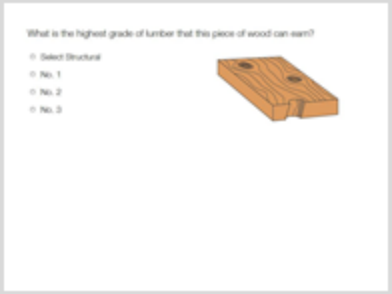
Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties



Check Your Knowledge - Lesson 2

Quiz - 3 questions

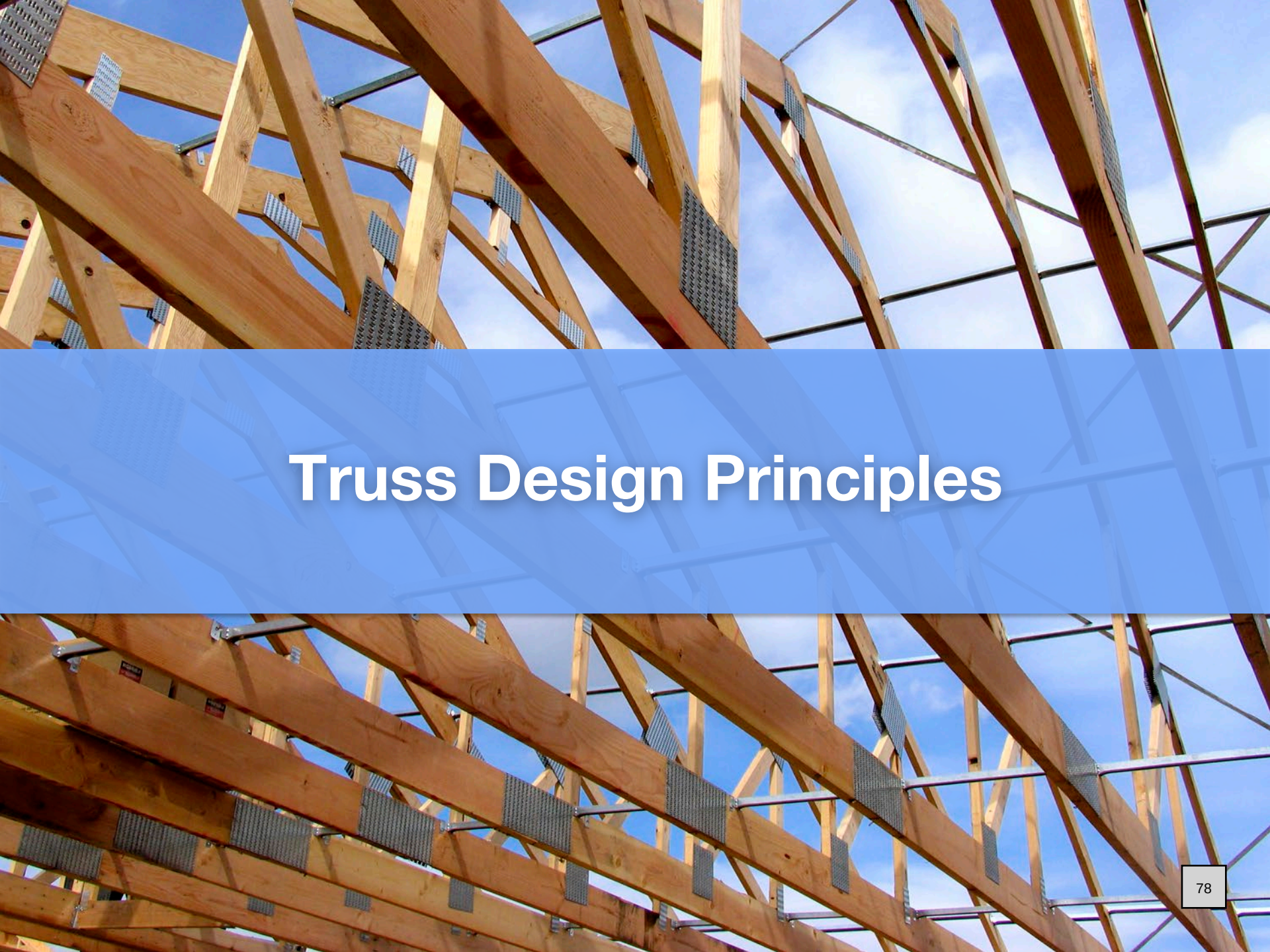
Last Modified: Apr 27, 2016 at 01:10 PM

PROPERTIES

On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	After passing quiz
Show in menu as:	Single item

Edit in Quizmaker

Edit Properties



Truss Design Principles

Lesson 3 Objectives

Truss industry professionals will use many terms and equations that may be unfamiliar to you.

Purpose:

To familiarize you with truss design concepts and terminology

Objectives:

- Identify load types
- Recognize how truss materials fail
- Explain the Building Designer's responsibilities
- List truss design software input information

Overview

Loads

Live

Dead

Uniform

Concentrated

Triangular

Design

Can be configured for almost any roofing type

Loads

Categories of Loads

Live Loads

Dead Loads

Load Types

Tabs - 4 Tabs (Including Introduction)

Last Modified: Apr 04, 2016 at 08:25 AM

PROPERTIES

Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

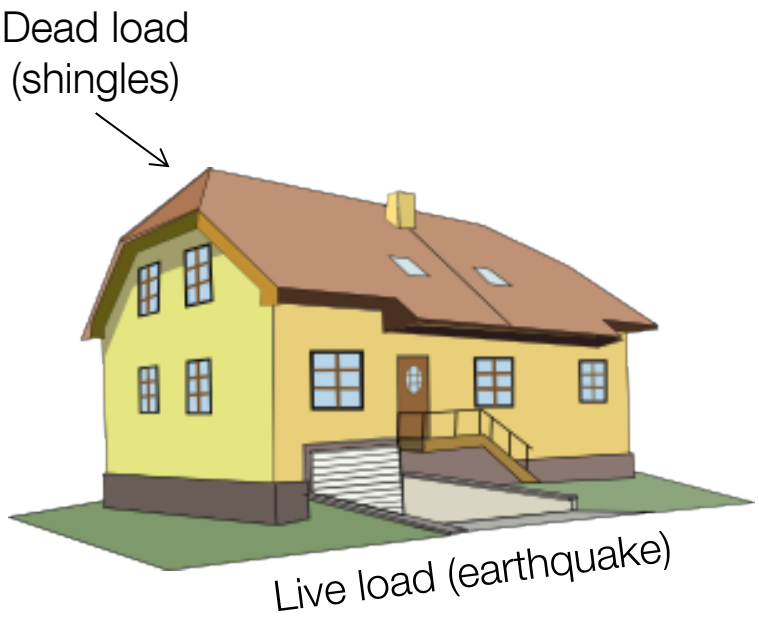
Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties

Design Loads

Design Load: The overall load a structure is designed to support



This building may be affected by all of the following loads:

- Material loads (i.e., shingles, drywall etc.)
- Mechanical loads (i.e., HVAC etc.)
- Environmental Loads (i.e., wind, snow, rain)
- Impact Loads (i.e., falling branches)

The design load takes all potential loads into account

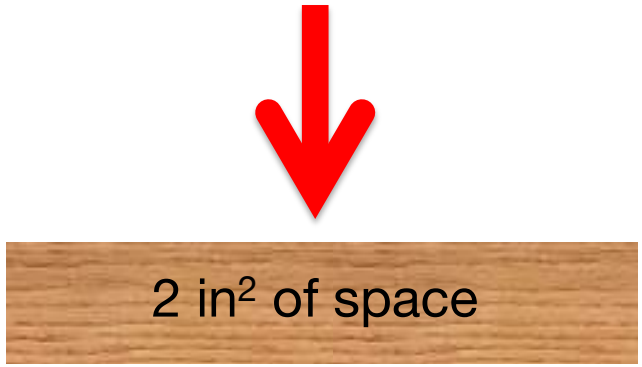
Stress

Stress:
The force on a single point along a member

How is stress measured?

$$\frac{\text{Force}}{\text{Area}} = \sigma \frac{lb}{in^2}$$

50 lb of force

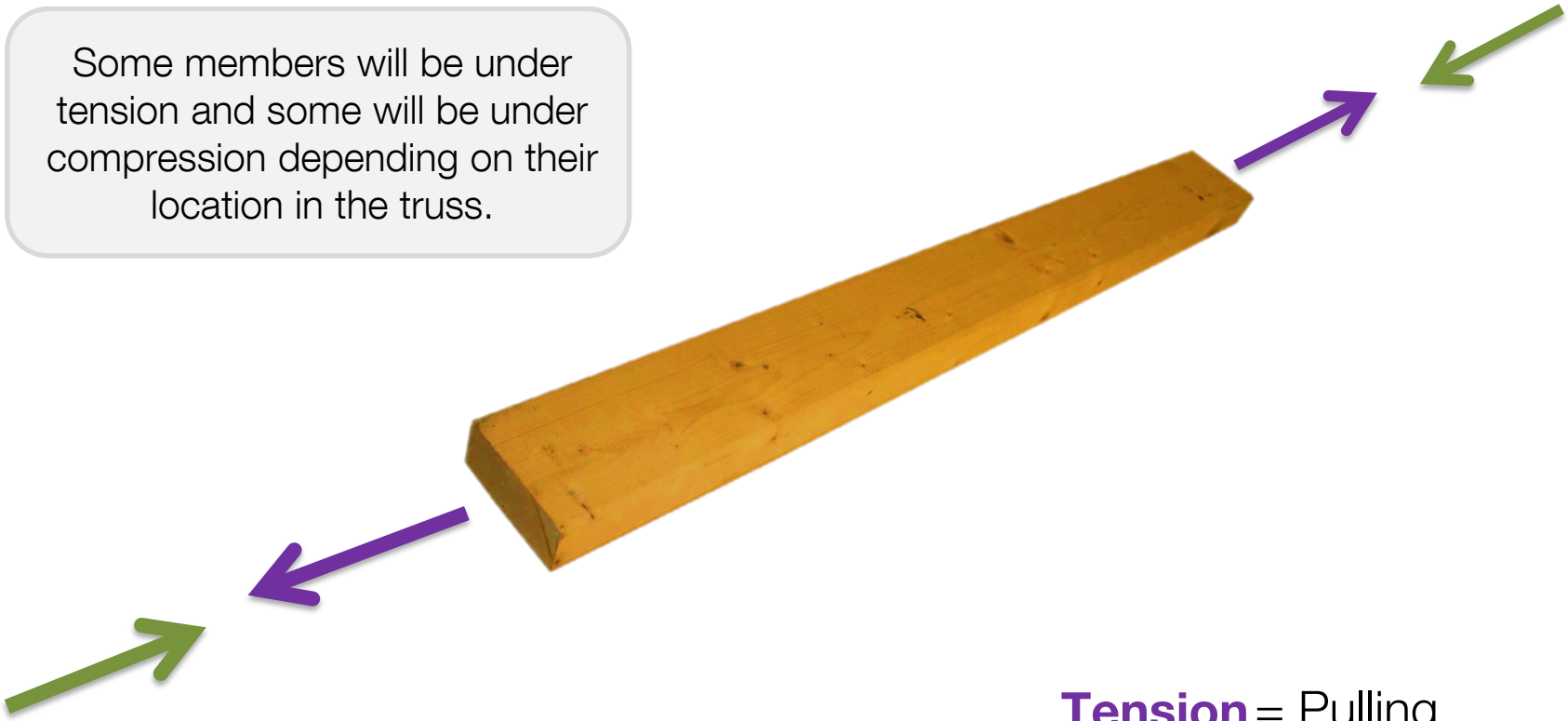


$$\frac{50\text{lb}}{2\text{in}^2} = 25\frac{lb}{in^2}$$

Tension and Compression

Axial Forces

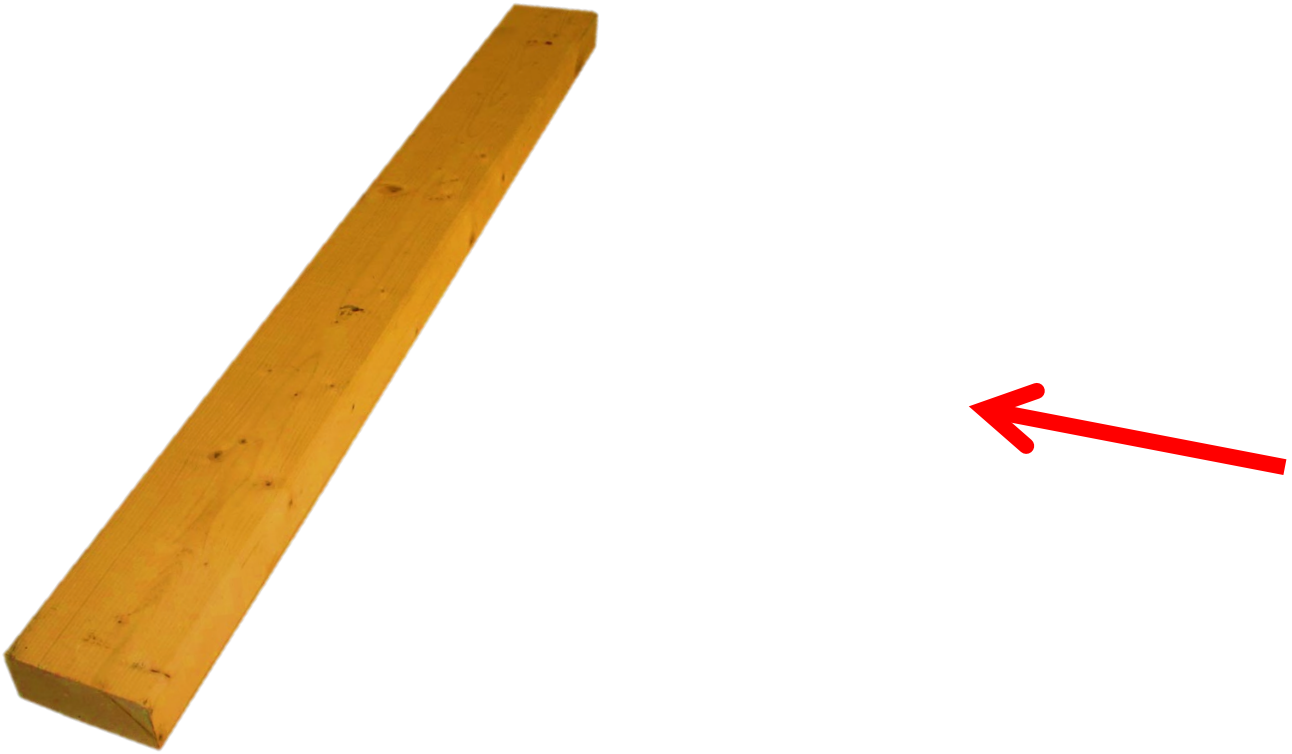
Some members will be under tension and some will be under compression depending on their location in the truss.



Tension = Pulling

Compression = Pushing

Bending Force can deform the material out of plane

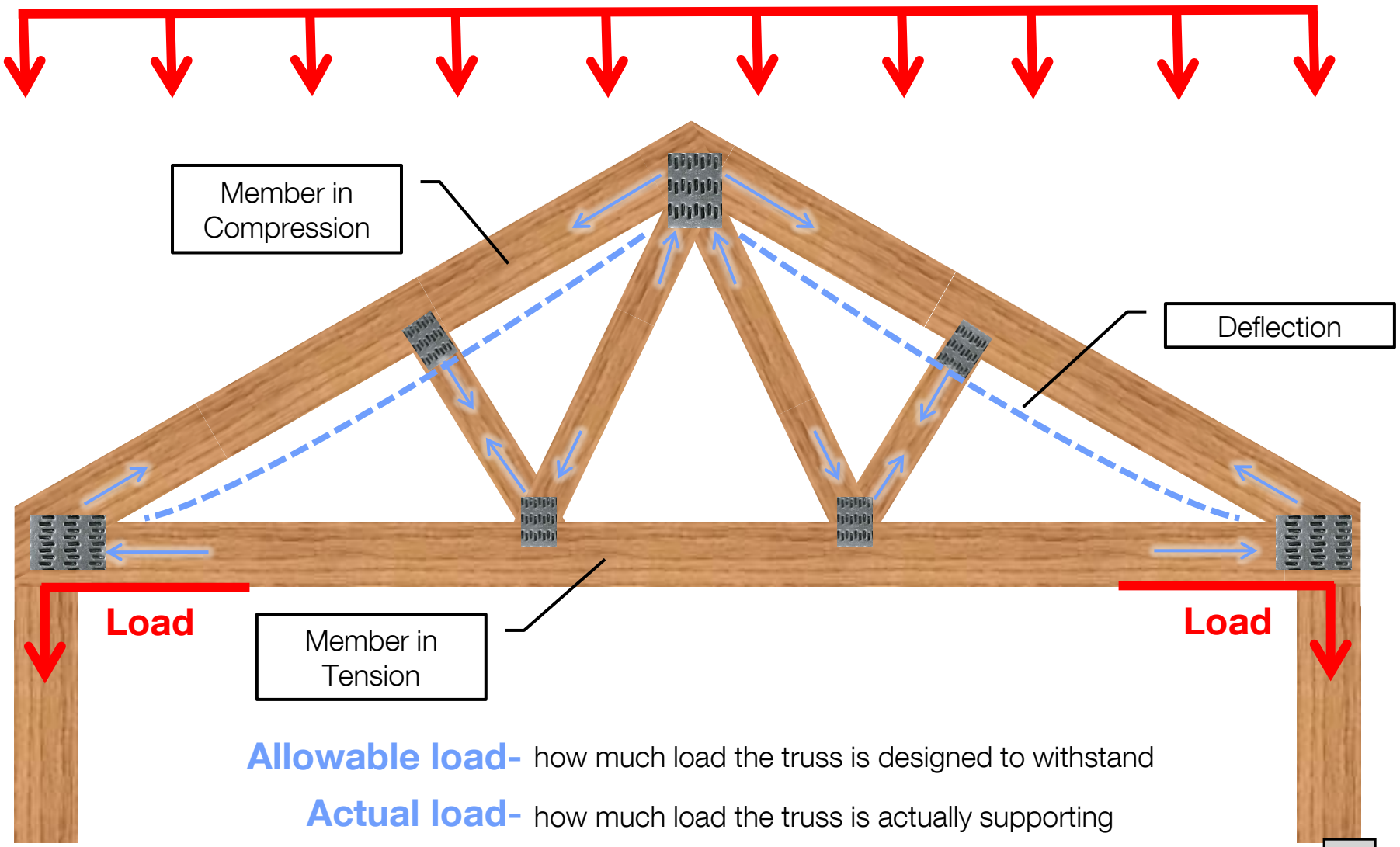


Continuous Load Path

Transfer loads to adjacent members in the load path.

Every piece in the structure needs to work together to successfully transfer loads.

Allowable and Actual Loads

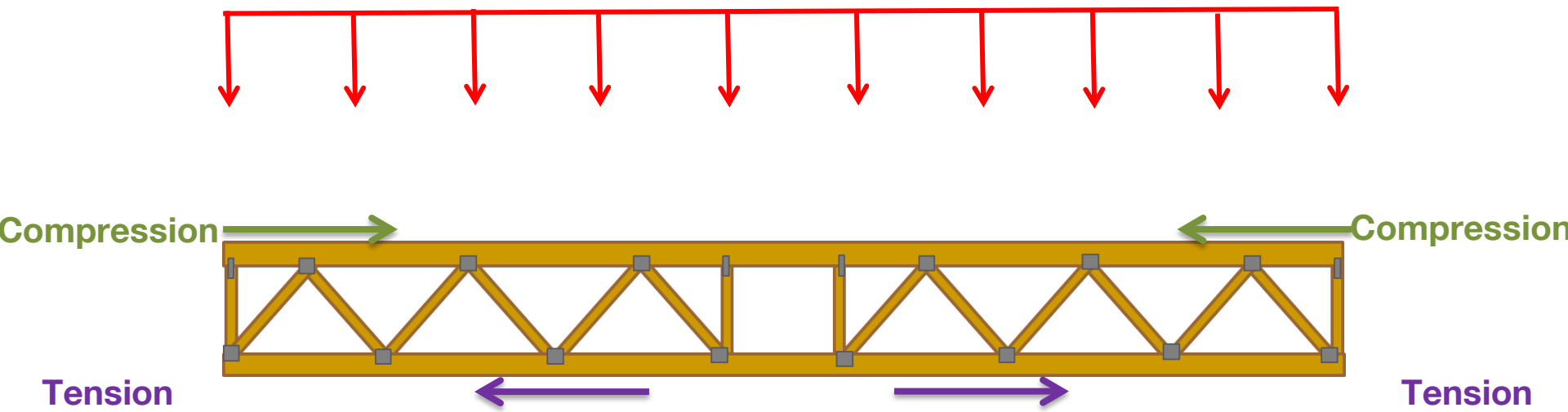


Allowable load- how much load the truss is designed to withstand

Actual load- how much load the truss is actually supporting

Parallel Chord Trusses

Question: How does a parallel chord truss react to loads?



Answer: just like a standard truss

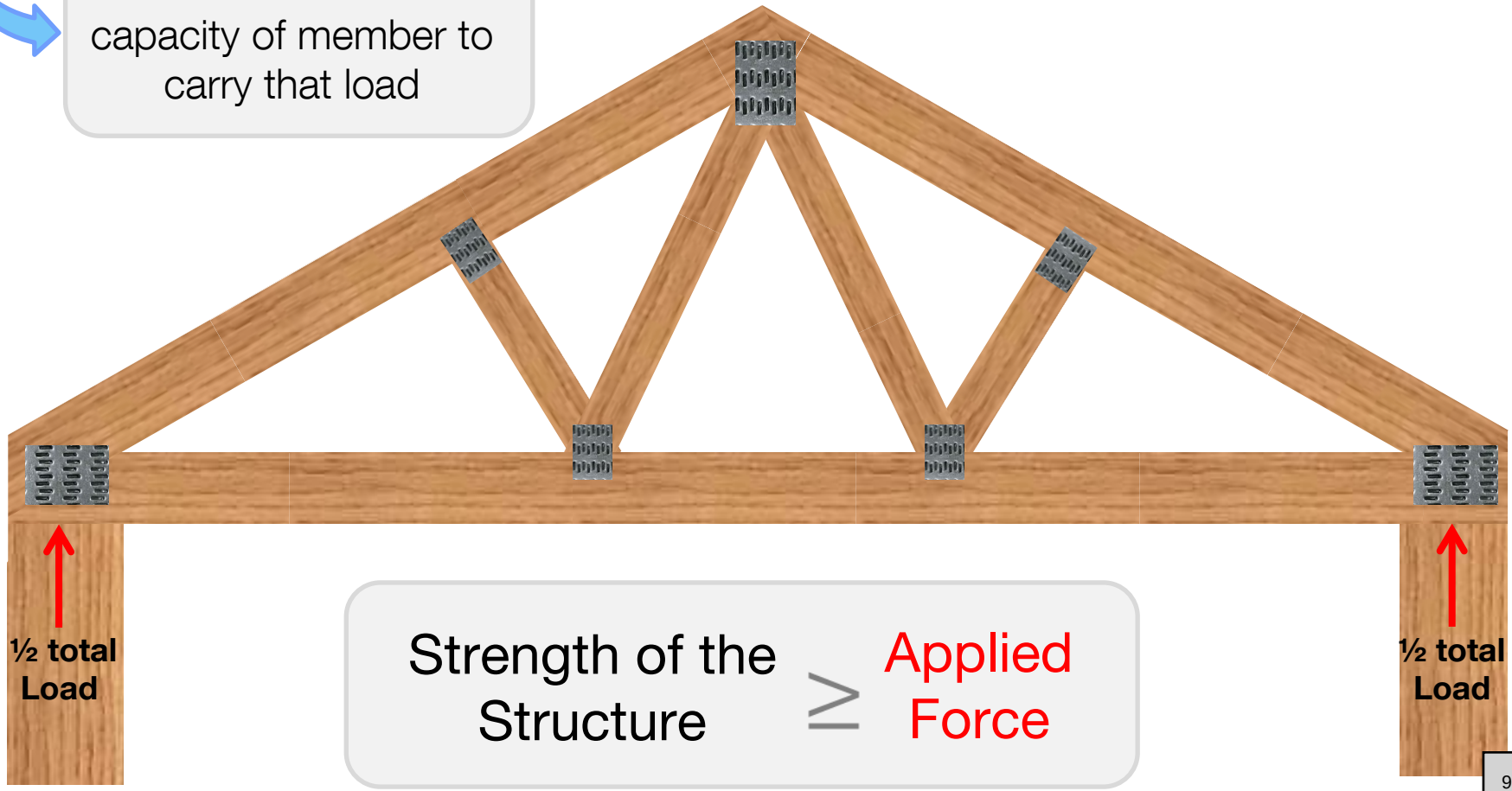
Truss Design Principles

Equilibrium

Load cannot exceed capacity of member to carry that load

Load

The bearings must push up with the same force that the truss pushes down for the truss to be in equilibrium.



Strength of the Structure $\geq$ Applied Force

Stress Index

Can the material withstand the stresses imposed?

Design Load: the actual demand load

$$\frac{Actual\ Load}{Allowable\ Load} = Stress\ Index$$

Governing Standard: the maximum allowable load

≤ 1

Combined Stress Index

REMEMBER:

Materials can be under many different forces at the same time

CSI: Combined Stress Index

Measures simultaneous loading

$$\frac{F_b\ actual}{F_b\ allowable} + \frac{F_t\ actual}{F_t\ allowable} = CSI$$

Stress Index for bending

Stress Index for tension

≤ 1

An indicator of how well a material will perform

What does the CSI tell us?

A CSI too far beneath 1 would mean we are not using the materials efficiently

= CSI of 0.5

How could this truss be more efficient?

- Could change to different lumber grade
  - Less costly and just as effective
- Could reduce the material size
  - Also less costly and just as effective

Load Review

LET'S REVIEW:

Live Load = Temporary

Dead Load = Permanent

Uniform Load = Along entire structure

Concentrated Load = At one point

Triangular Load = Changes intensity over length

Design Load = Max. loading structure is designed for

Continuous Load Path = Transfers loads effectively through the system

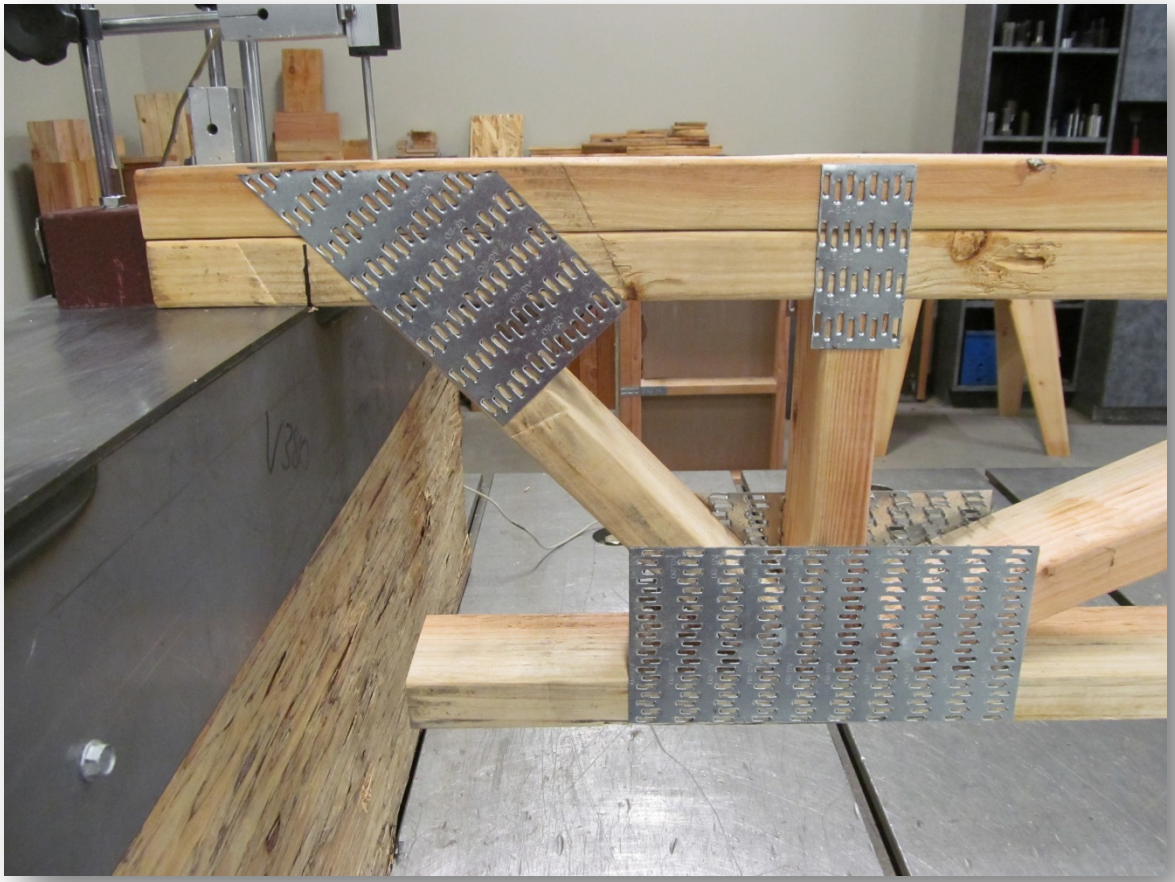
$$\text{Stress} = \frac{\text{Force}}{\text{Area}}$$

$$\text{Strength of Material} \geq \text{Applied Force}$$

Material Failure

How do these loads affect the truss materials?

Effective truss design uses materials efficiently and thus reduces cost.



Materials will fail by deforming or fracturing (breaking).

Wood's Design Properties

Six ways to measure lumber strength

Tension Stress:
F_t

F_c
Compression
Parallel

F_c
Compression
Perpendicular

Bending Stress:
F_b

Horizontal
Shear Stress:
F_v

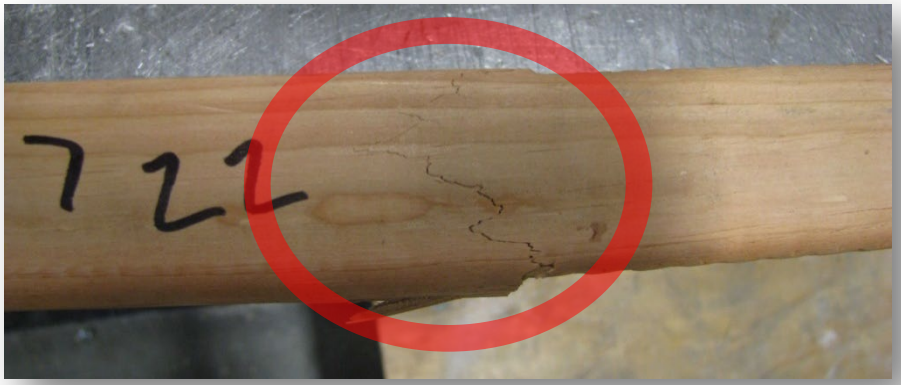
Stiffness
MOE

Tension Stress

Tension Stress:

F_t

=



Compression Stress

There are two types of compression stress

Compression Parallel-to-Grain

F_c
Compression
Parallel

=

Compression Stress

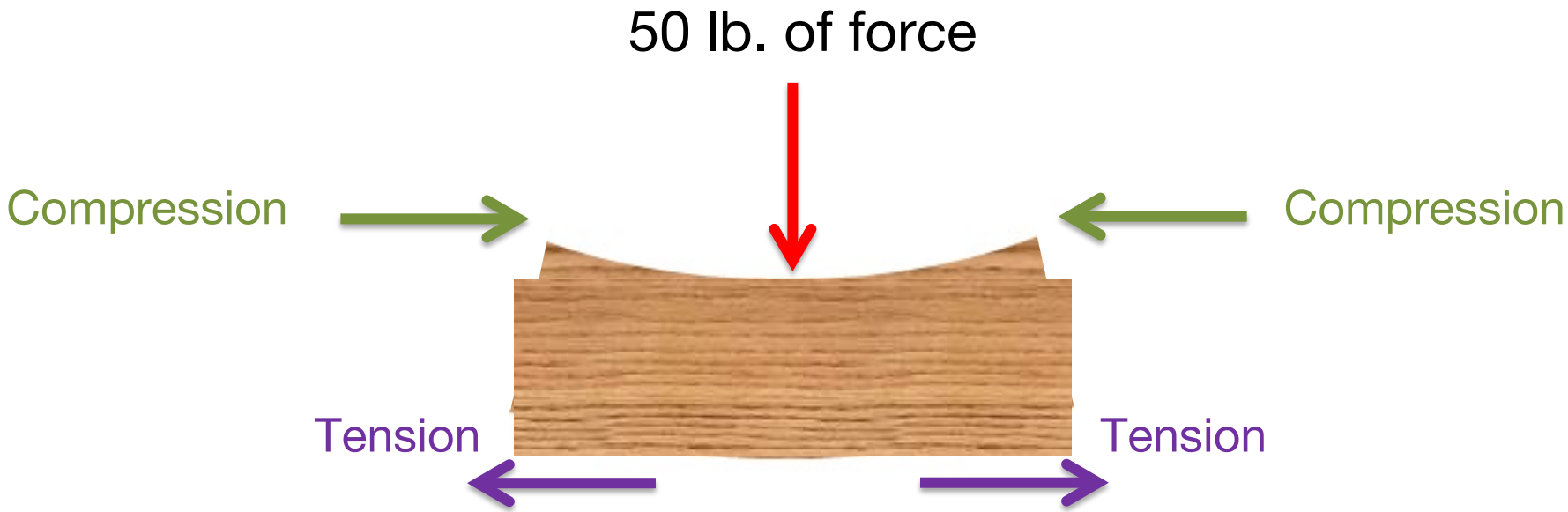
Compression Perpendicular-to-Grain

$F_{c\perp}$
Compression Perpendicular

Crushing of wood fibers

Bending and crushing compromises the structure's integrity

Bending Stress



Bending Stress: when a force causes the bending of a member

Bending Stress:

F_b =

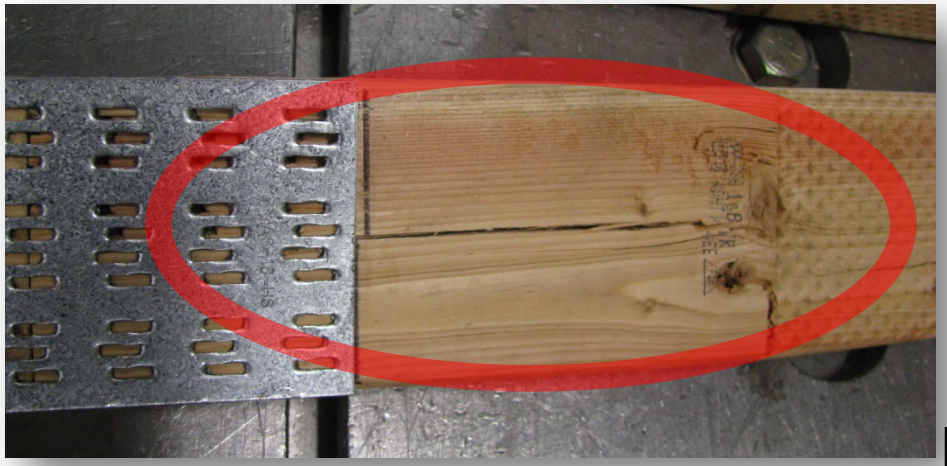
Shear Stress

"Horizontal" Shear Stress

Horizontal Shear Stress:

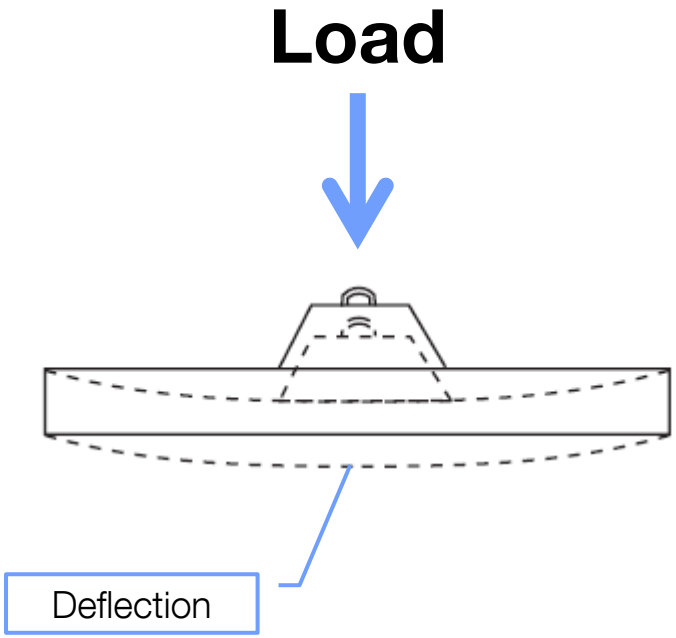
F_v

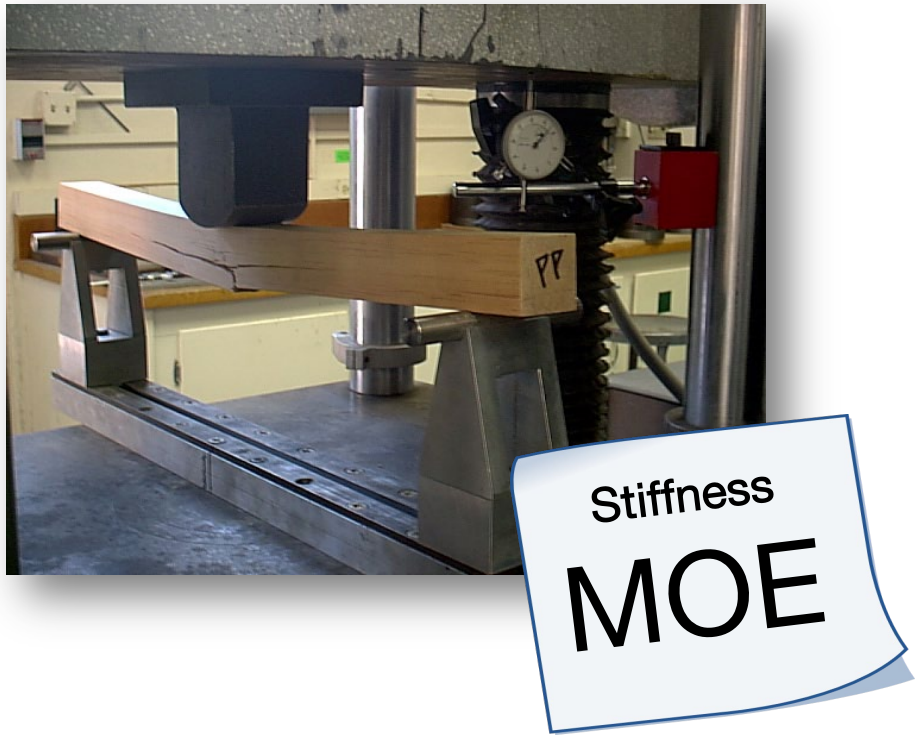
=



Modulus of Elasticity (MOE)

Measures stiffness, not strength

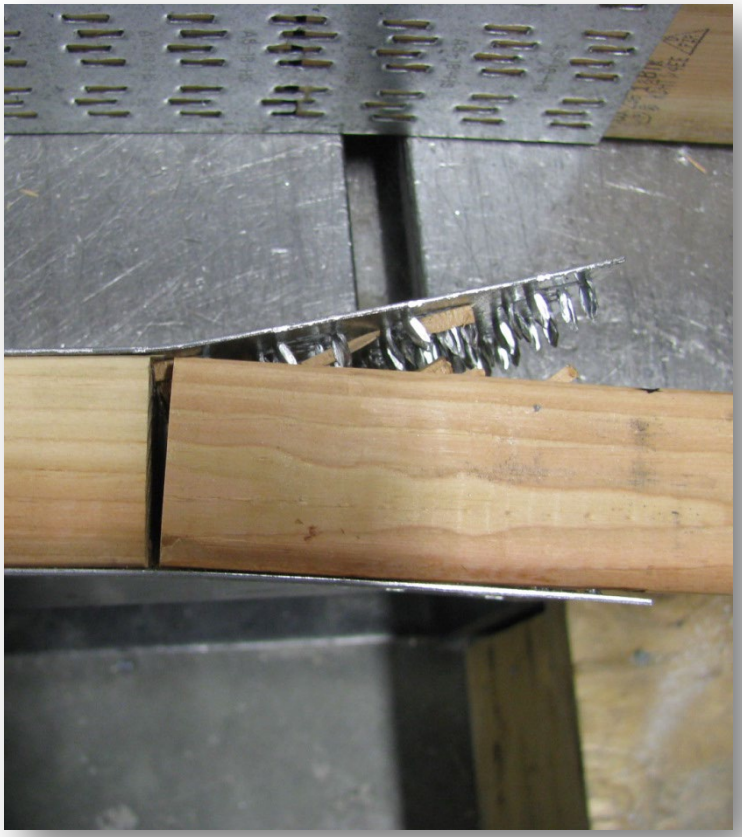




Expressed in pounds per square inch (psi)

Connector Plate Failure Modes

Issue: tension tear (plate deformation)
Remedy: use a thicker gauge plate



Issue: teeth withdrawal
Remedy: larger plate or different tooth configuration

Plate deformation results in loss of strength

Matching- Lesson 3

Quiz - 2 questions

Last Modified: Apr 28, 2016 at 09:57 AM

PROPERTIES

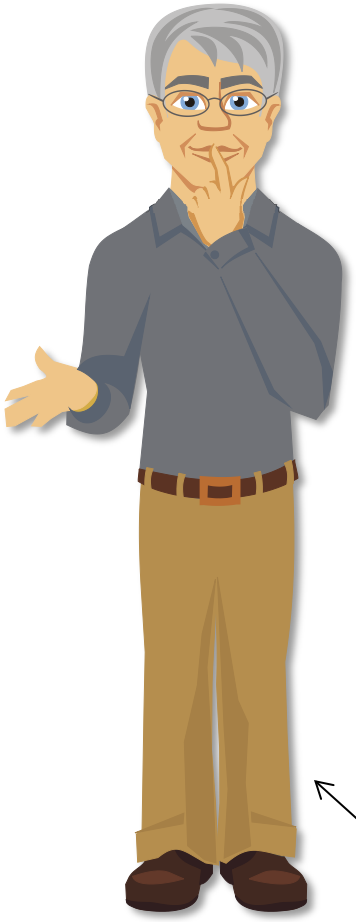
On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	At any time
Show in menu as:	Single item

Edit in Quizmaker

Edit Properties

Building Codes

Basic design rules are used even when designing simple structures

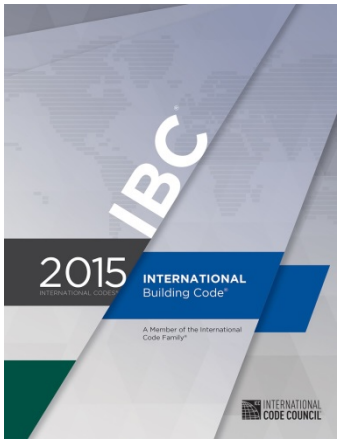


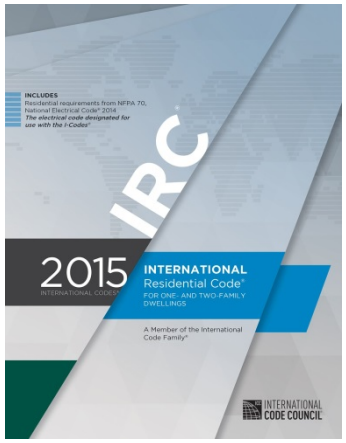
Building Designer

Building Codes:

International Building Code (IBC)

International Residential Code (IRC)





Design Standard:

ANSI/TPI, National Design Standard for Metal Plate Connected Wood Truss Construction

Responsible for overall design of the building in accordance with regulations

Building Criteria

Structural Criteria

Load Criteria

Serviceability Issues

Environmental Considerations

Criteria input into the software

- Truss Span, Pitch
- Heel Height, Overhangs, Cantilevers
- On-center Spacing
- Bearing Size and Location
- Materials
- Live, Dead, Lateral, Partition, Roof, Floor, Wind, Snow, Seismic Loads
- Allowable, Differential Deflections
- Adjustments for Long-Term Creep
- Moisture, temperature, corrosion conditions
- Building Code necessary to adhere to

Software Applies Loads

The software applies loads to the theoretical structure

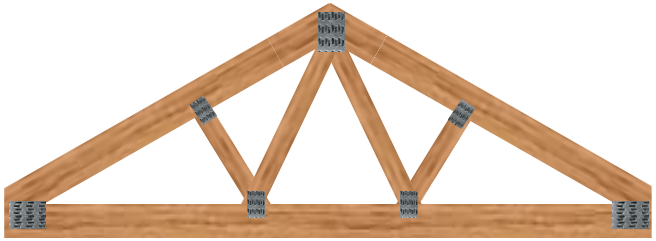
Loads are analyzed to see if truss can withstand stresses.

Design Example

Criteria input into the software

- Truss Span: *24'*
- Pitch: *6/12*
- Heel Height: *Standard 2x4 heel with 12" top chord overhangs*
- On-center Spacing: *24"*
- Bearing Size/Location: *Bearing walls at each end*
- Materials: *2x4 Spruce-Pine-Fir*
- Roof Live Load: *20 psf (no snow area)*
- Roof Dead Load: *10 psf for both top and bottom chord*
- Wind Loads: *90 mph*
- Building Code: *IRC 2009*

Building Designer must also supply web configurations



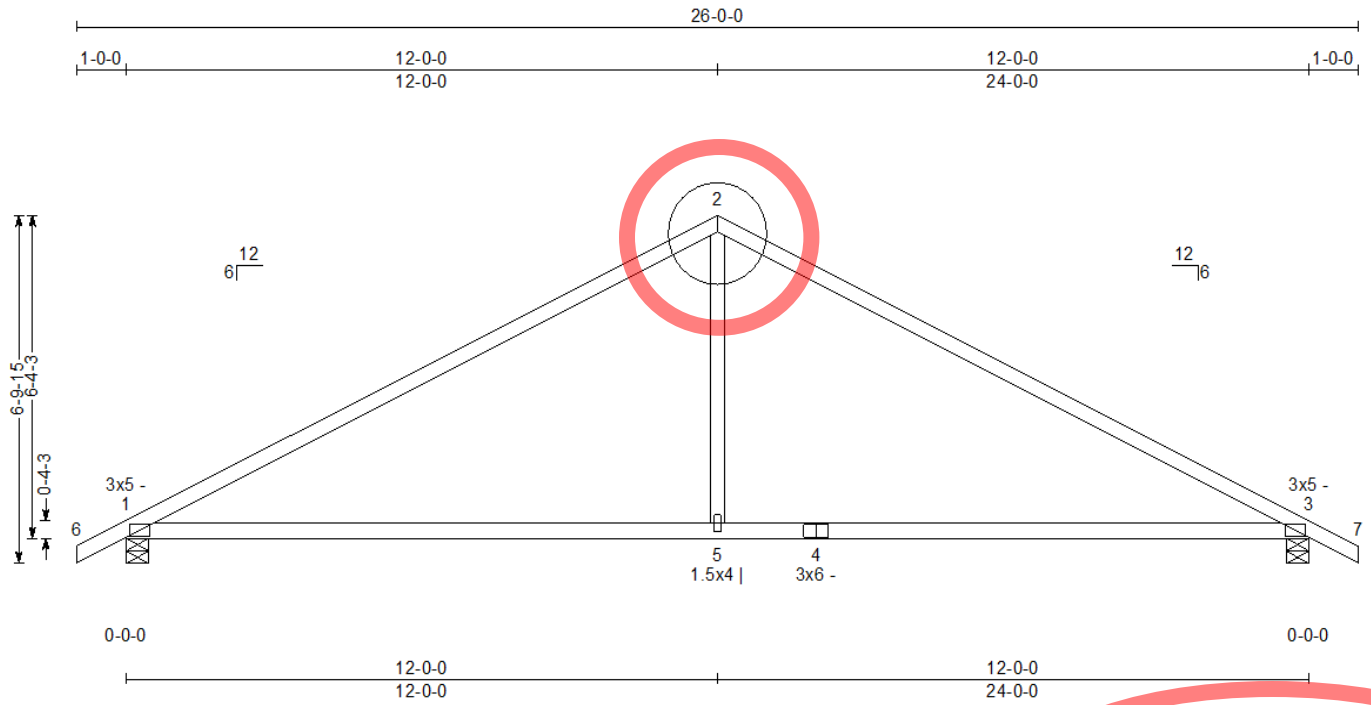
Design Example: Results

SIMPSON StrongTie
Component Solutions™
Truss
Version: 5.4 [Build 53]

Simpson Strong-Tie
5956 W. Las Positas Blvd.
Pleasanton, CA 94588

Truss: Example A
ProjectName: Truss Design 101
Date: 12/3/2014 11:32:10 AM
Page: 1 of 1

Span	Pitch	Qty	OHL	OHR	CANT L	CANT R	PLYS	Spacing	WGT/PLY
24-0-0	6 /12	20	1-0-0	1-0-0	0-0-0	0-0-0	1	24 in	64 lbs



Loading		General		CSI Summary		Deflection		L/	(loc)	Allowed
Load	(psf)	Bldg Code :	BCBC 2006/ TPI 1-2007	TC :	1.04 (2-3)	Vert TL:	0.79 in	L / 350	(3-4)	L / 180
TCLL :	20	Rep Mbr Increase :	Yes	BC :	0.88 (5-1)	Vert LL:	0.3 in	L / 937	(3-4)	L / 240
TCDL :	7	D.O.L. :	125 %	Web :	0.26 (2-5)	Horz TL:	0.04 in		3	
BCLL :	0					Creep Factor, Kcr = 1.5				
BCDL :	7									

MATERIAL DESIGN FAILED
DEFLECTION CHECKS FAILED
CONNECTION DESIGN INCOMPLETE
(Material overstressed,
-0.298" @ 25-0-0 12"/180 = 0.067",

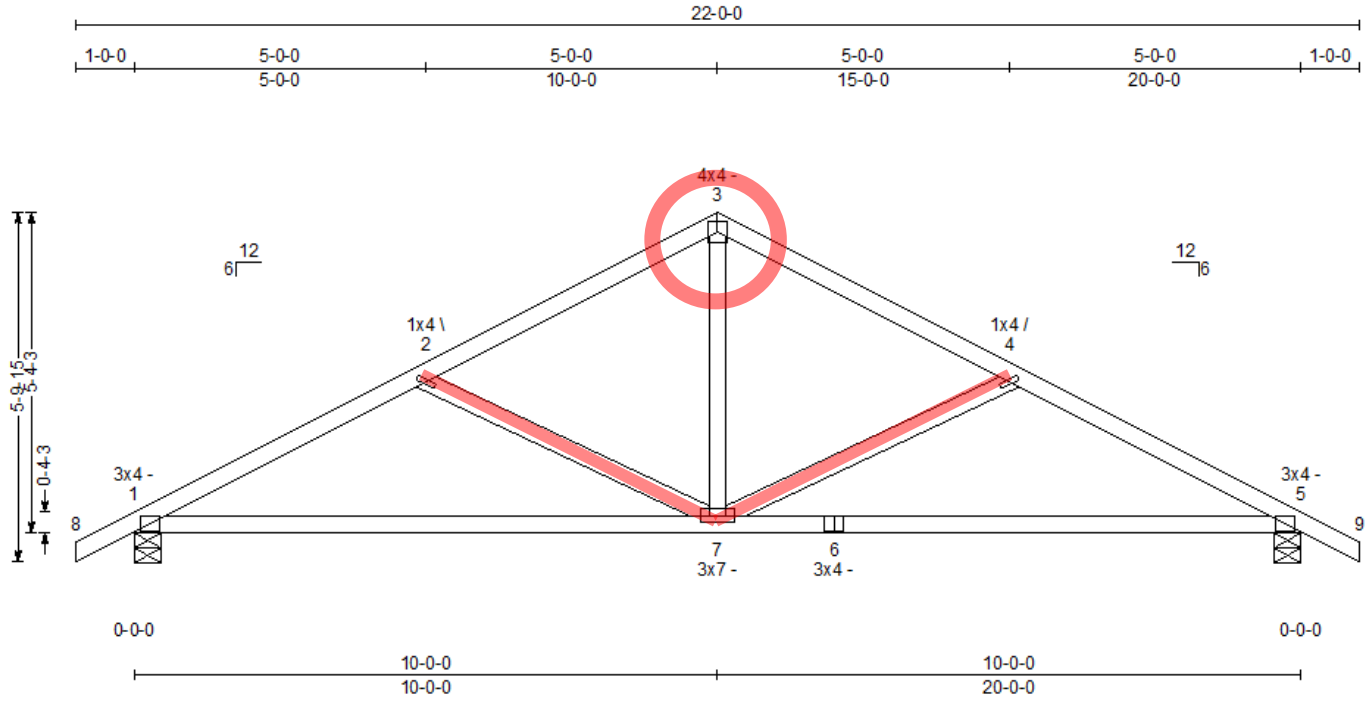
Design Example: Adjustments

SIMPSON Strong-Tie
Component Solutions™
Truss
Version: 5.4 [Build 53]

Simpson Strong-Tie
5956 W. Las Positas Blvd.
Pleasanton, CA 94588

Truss: Example A
ProjectName: Truss Design 101
Date: 12/3/2014 10:53:33 AM
Page: 1 of 1

Span	Pitch	Qty	OHL	OHR	CANT L	CANT R	PLYS	Spacing	WGT/PLY
20-0-0	6 /12	20	1-0-0	1-0-0	0-0-0	0-0-0	1	24 in	66 lbs



Loading		General		CSI Summary		Deflection		L/	(loc)	Allowed
Load	(psf)	Bldg Code :	BCBC 2006/	TC :	0.35 (1-2)	Vert TL:	0.25 in	L / 930	(5-6)	L / 180
TCLL :	20		TPI 1-2007	BC :	0.79 (7-1)	Vert LL:	0.05 in	L / 999	(5-6)	L / 240
TCDL :	7	Rep Mbr Increase :	Yes	Web :	0.24 (2-7)	Horz TL:	0.04 in		5	
BCLL :	0	D.O.L. :	125 %			Creep Factor, Kcr = 1.5				
BCDL :	7									

Plate Offsets (Jnt,X,Y,Ang): (1:3-4,2-5,0.) (2:0-0,3-15,24.) (3:0-0,3-15,0.) (4:0-0,3-15,24.) (5:3-4,2-5,0.) (6:0-0,1-12,0.) (7:0-0,3-8,0.)

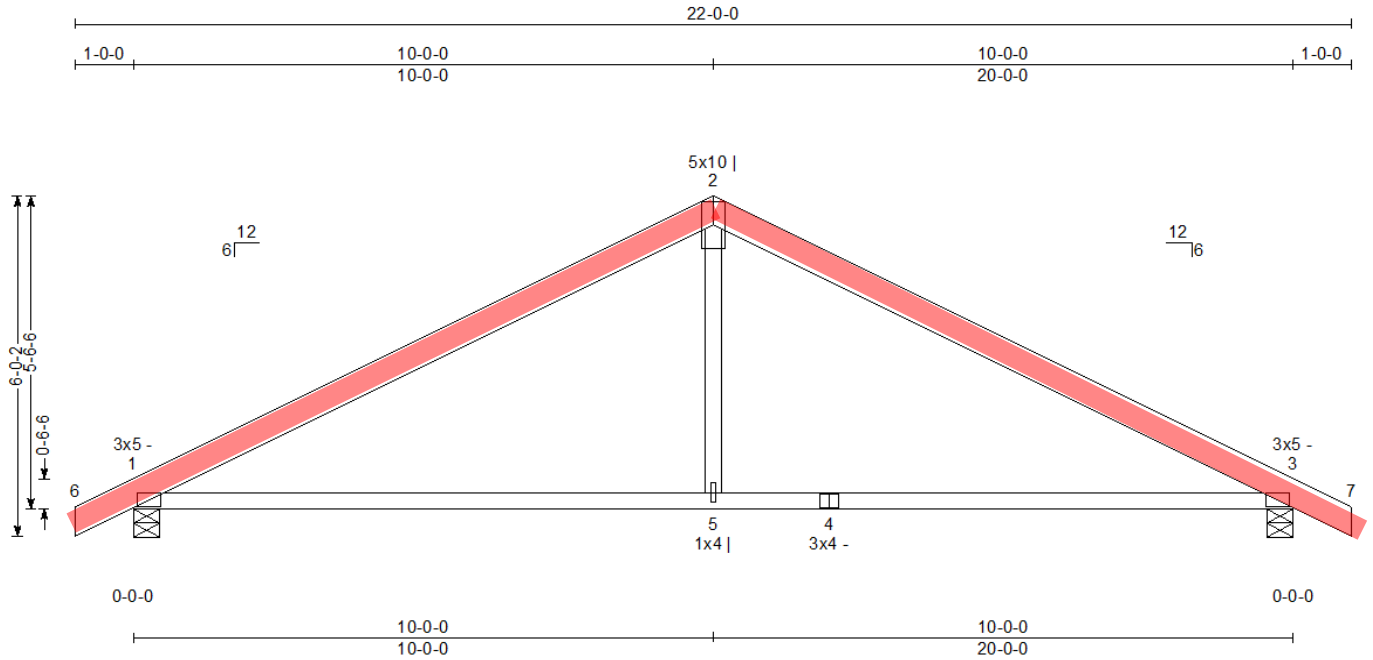
Design Example: Alternatives

SIMPSON StrongTie
Component Solutions™
Truss
Version: 5.4 [Build 53]

Simpson Strong-Tie
5956 W. Las Positas Blvd.
Pleasanton, CA 94588

Truss: Example B
ProjectName: Truss Design 101
Date: 12/16/2014 3:25:12 PM
Page: 1 of 1

Span	Pitch	Qty	OHL	OHR	CANT L	CANT R	PLYS	Spacing	WGT/PLY
20-0-0	6 /12	10	1-0-0	1-0-0	0-0-0	0-0-0	1	24 in	70 lbs



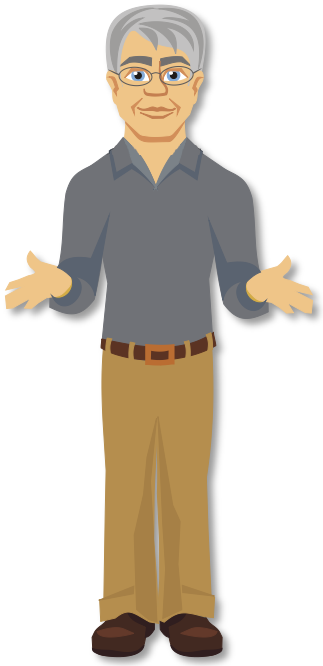
Loading		General		CSI Summary		Deflection		L/	(loc)	Allowed
Load	(psf)	Bldg Code :	BCBC 2006/ TPI 1-2007	TC :	0.56 (1-2)	Vert TL:	0.31 in	L / 744	(5-1)	L / 180
Roof Snow (Ps) :	23.1 psf	Rep Mbr Increase :	Yes	BC :	0.73 (5-1)	Vert LL:	0.06 in	L / 999	(3-4)	L / 240
TCDL :	7	D.O.L. :	125 %	Web :	0.16 (2-5)	Horz TL:	0.03 in		3	
BCLL :	0					Creep Factor, Kcr = 1.5				
BCDL :	7									

Plate Offsets (Jnt:X,Y,Ang): (1:3-4,4-8,0) (2:0-0,6-4,90) (3:3-4,4-8,0) (4:0-0,1-12,0) (5:0-0,3-8,90)

Who Uses the Design Output?

Question: Who needs what information?

Building Designer



reviews output information for accuracy

Manufacturer
(Truss Technician)

needs lumber and connector plate information from output

Installer

needs installation requirements from output

Truss Design Adjustment Factors

1

Load Duration Factor:
Trusses can carry greater loads for shorter periods of time

2

Repetitive Member Increase:
Trusses can carry more load when part of system, rather than individually

Load Duration Factor

The shorter period of time something is under stress, the heavier load it can withstand.

For shorter periods the arm can be stronger…

…but after longer periods, the arm fatigues.

The same principle applies to trusses.

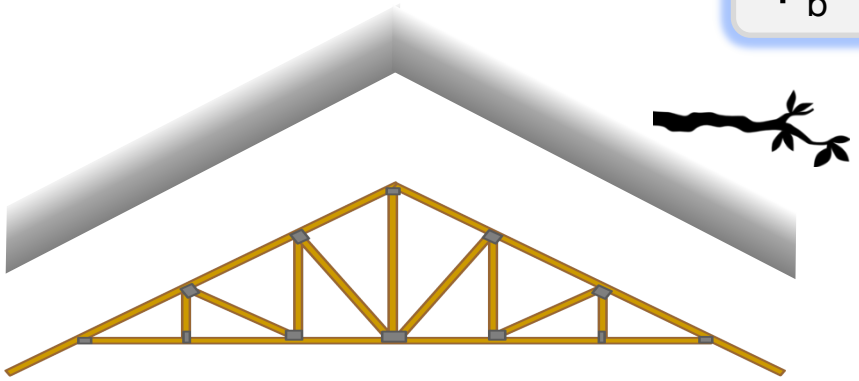
Load Duration Factor

Weight of a given load is multiplied by the "multiplier" depending on how long the load will act on the structure.

Length of time the structure experience the load	Multiplier	Example of Load
Life of the structure	**.9**	Permanent dead loads
Ten years	**1**	Floor
Two months	**1.15**	Snow
Seven days	**1.25**	Construction materials
Ten minutes	**1.6**	Wind/Seismic loads
Impact	**2.0**	Falling debris

Example 1: Snow

Example 2: Falling Tree Branch



F_b= 1500 psi

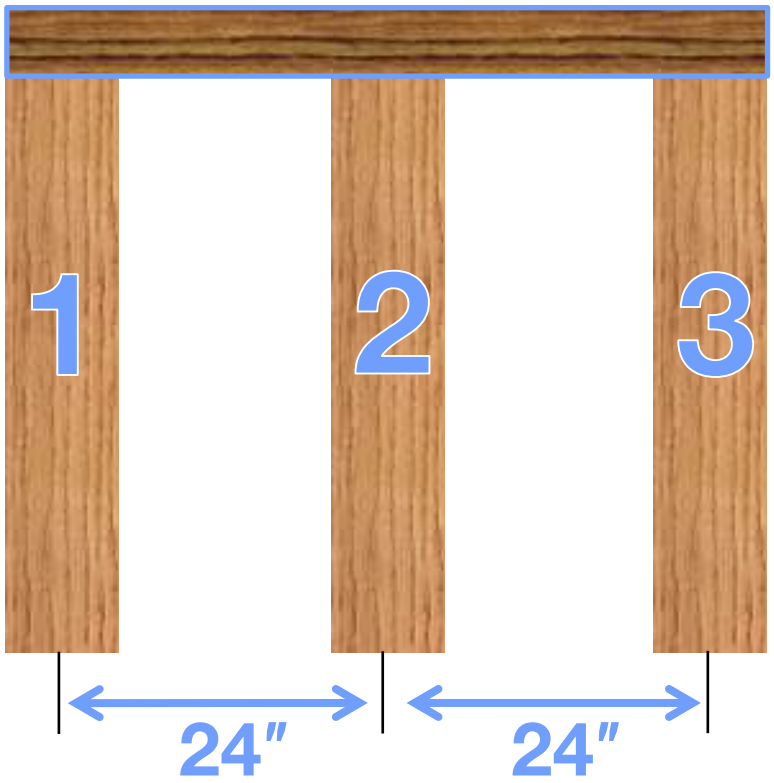
1: $1500 \text{ psi} \times \mathbf{1.15} = 1725 \text{ psi}$

2: $1500 \text{ psi} \times \mathbf{2} = 3000 \text{ psi}$

Repetitive Member Increase

Repetitive Member Increase

Trusses can carry more load when part of a system, rather than individually.



Summary

KEY POINTS:

Loads

Live

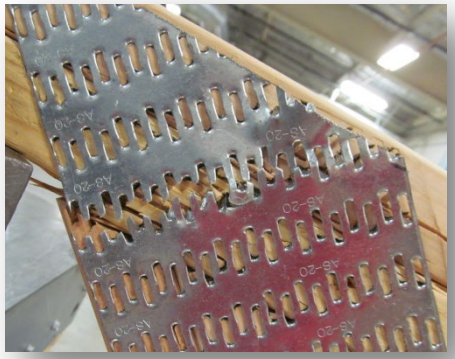
Dead

Uniform

Concentrated

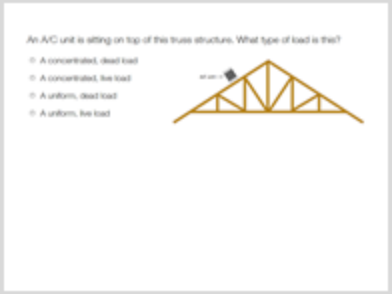
Triangular

Design



$$\frac{F_b\ actual}{F_b\ allowable} + \frac{F_t\ actual}{F_t\ allowable} = CSI$$

Building Designer



Check Your Knowledge- Lesson 3

Quiz - 3 questions

Last Modified: Apr 28, 2016 at 01:49 PM

PROPERTIES

On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	After passing quiz
Show in menu as:	Single item

Edit in Quizmaker

Edit Properties

Truss Manufacturing and Installation

Lesson 4 Objectives

There are many guidelines that can help with truss manufacturing and installation …but some guidelines suggest "good judgement."

Purpose:

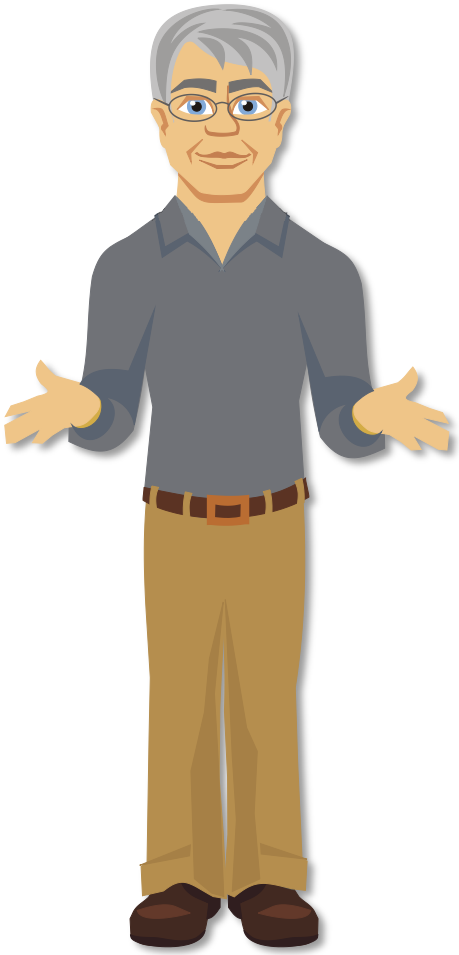
To help you communicate effectively with those in the truss industry about the manufacturing and installation of trusses

Objectives:

- Identify who is responsible for truss documentation
- Describe the truss assembly process
- Identify shipping and storing precautions
- Recognize different types of bracing
- Verify that a truss is correctly installed

People in the Truss Design Process

Building Designer



Truss Technician

Truss Designer

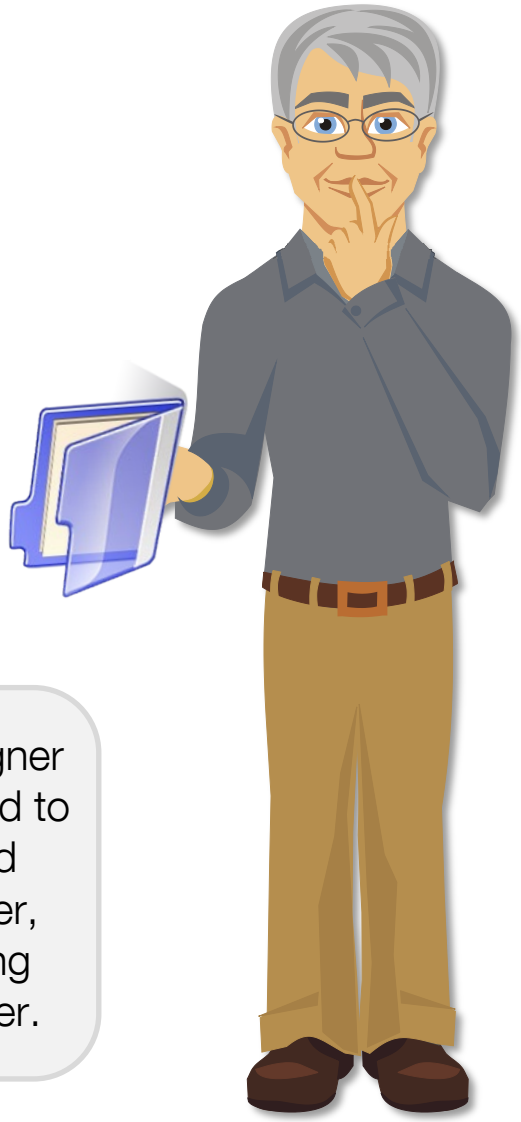
Construction Design Documents

Building Designer

- Responsible for the overall building design
- Must be registered if building jurisdiction requires it
- Ensures that manufacturer has necessary information

Construction Design Documents

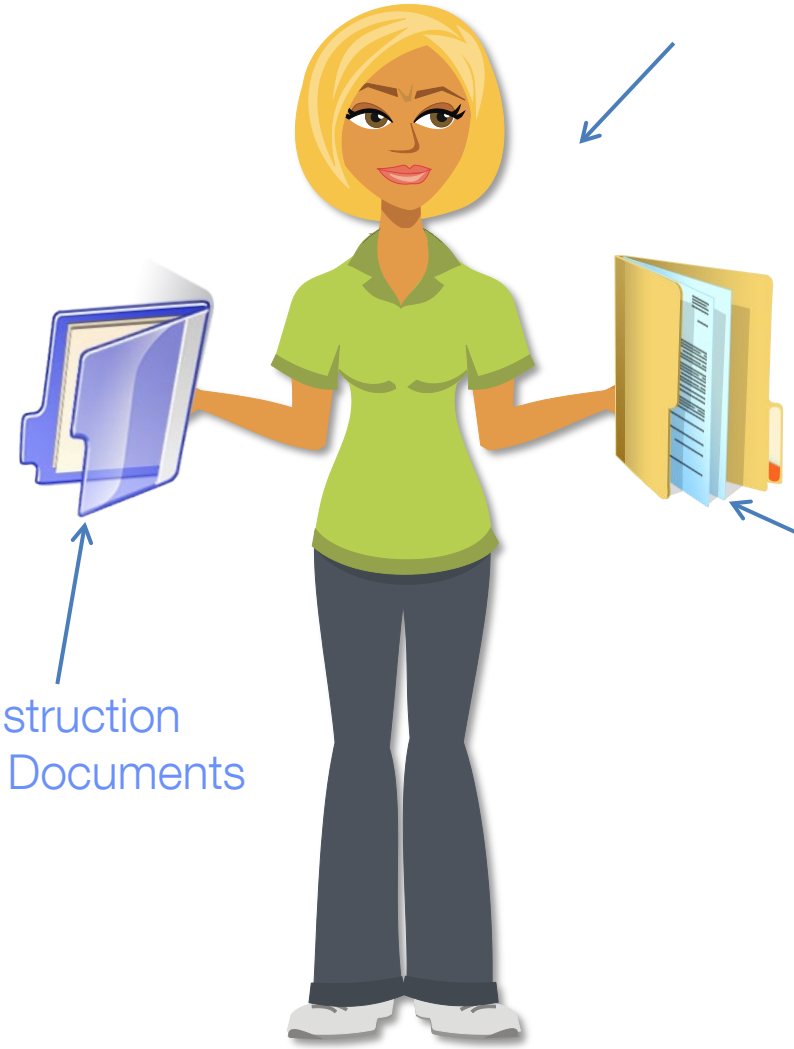
- Loading
- Building dimensions
- Bearing size
- Bearing heights
- Roof pitches
- Ceiling pitches



The Building Designer can also be referred to as the registered architect, engineer, registered building designer, or owner.

Truss Placement Diagram

Truss Technician



Construction Design Documents

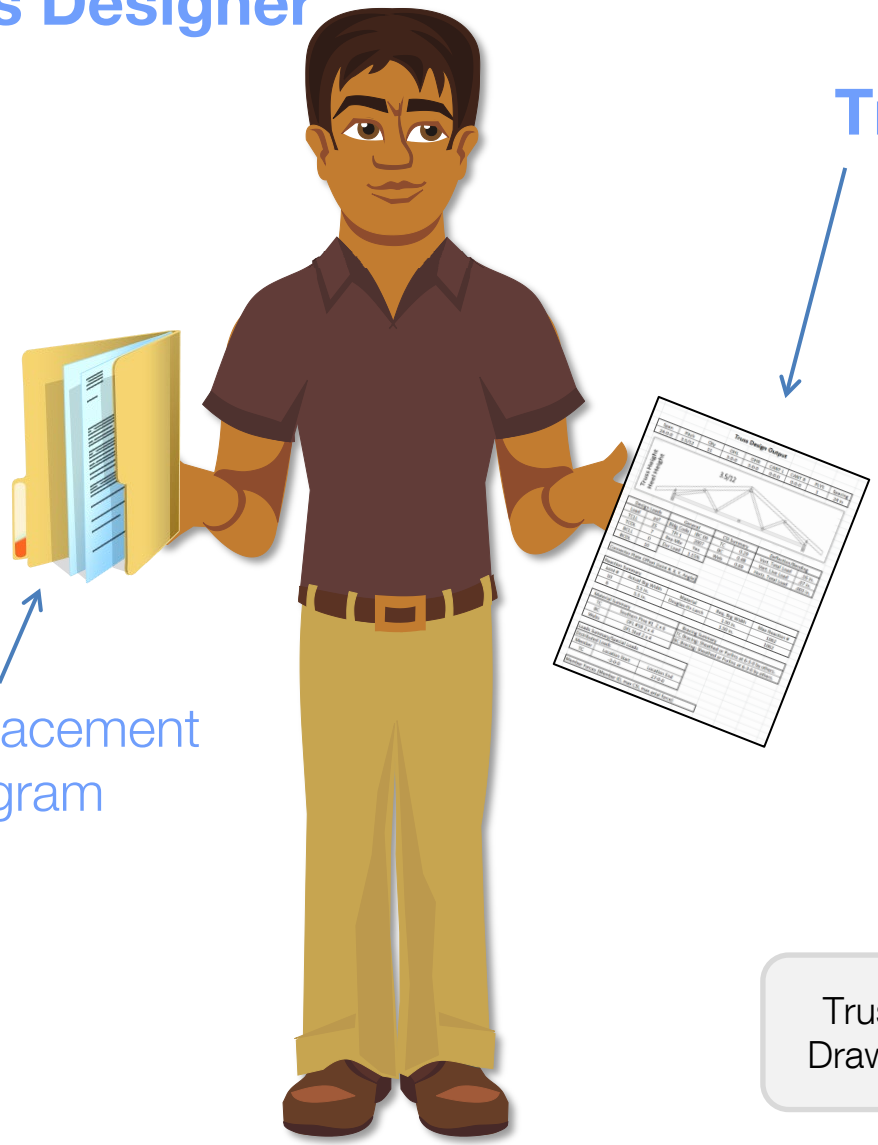
Sometimes, the truss placement diagram has already been created by the Building Designer. If this is the case, the Truss Technician simply imports or copies the information into the software.

Truss Placement Diagram

- Installation details
- Hanger schedule
- On-center spacing
- Truss locations
- Misc. job information

Truss Design Diagram

Truss Designer



Truss Placement Diagram

Truss Design Drawings

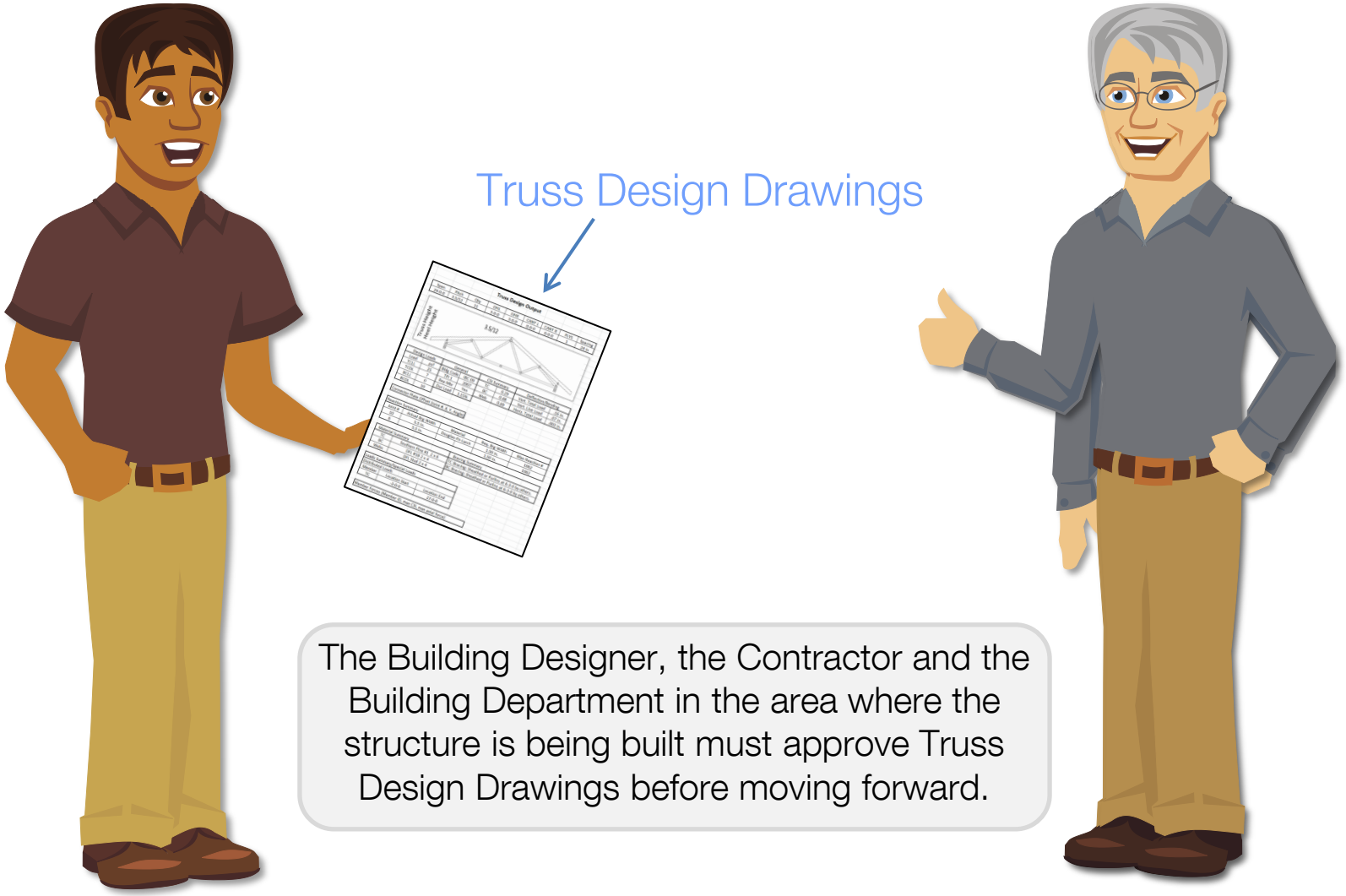
- Geometry
- Bearings
- Lumber specification
- Plating information
- Bracing information
- Max. allowable forces
- CSI
- Max allowable deflection
- Design loads
- Conditions of use

Truss Designer only creates the Truss Design Drawings and DOES NOT design the structure

Submit for Approval

Truss Designer

Building Designer



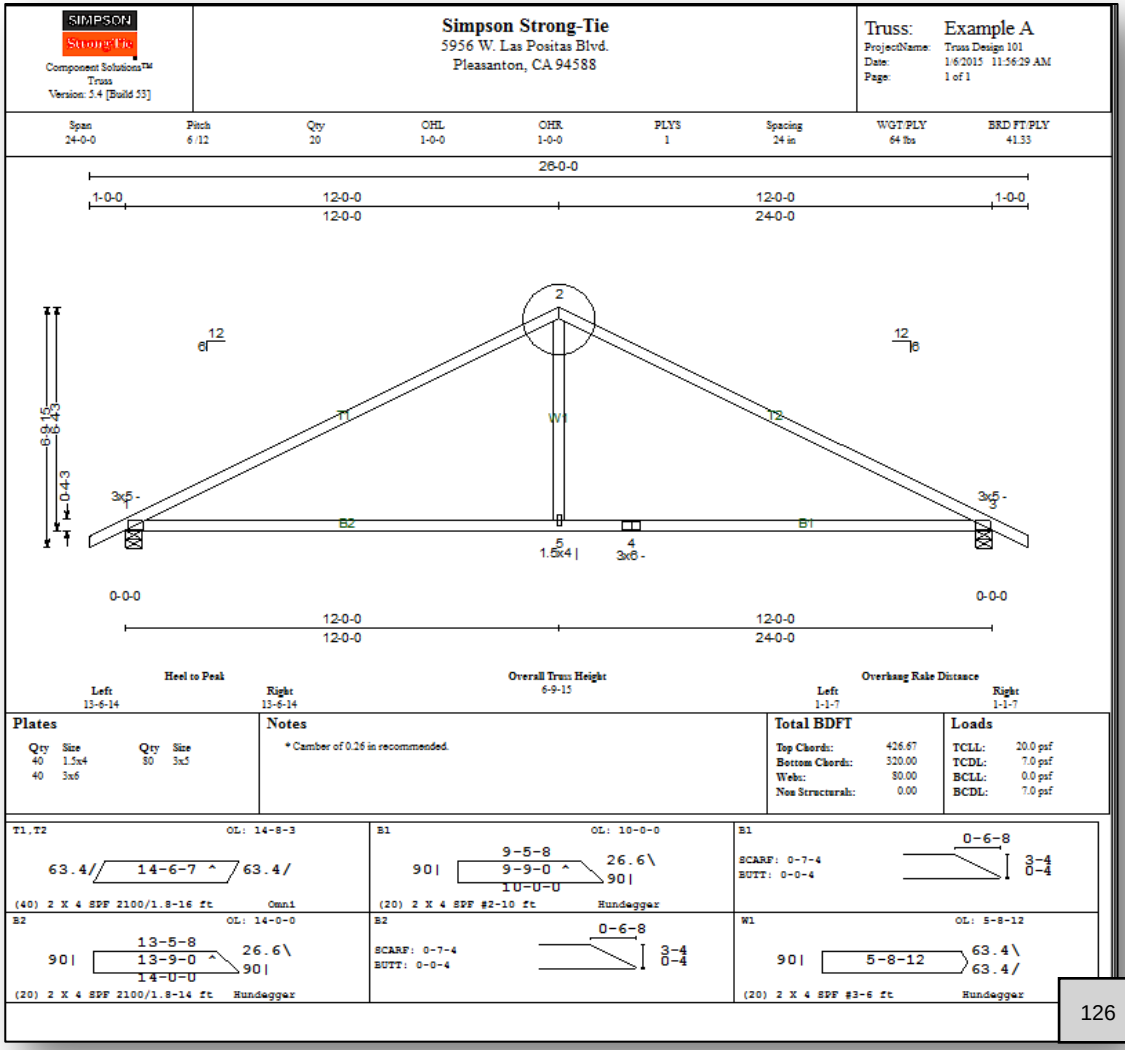
The Building Designer, the Contractor and the Building Department in the area where the structure is being built must approve Truss Design Drawings before moving forward.

Truss Cut Sheets

Once the design process is approved the manufacturing process can begin.

Truss Cut Sheets

- Sent to plant
- Specify how to cut lumber
- Specify how to assemble truss



Component Saw

How do we make these lumber cuts?

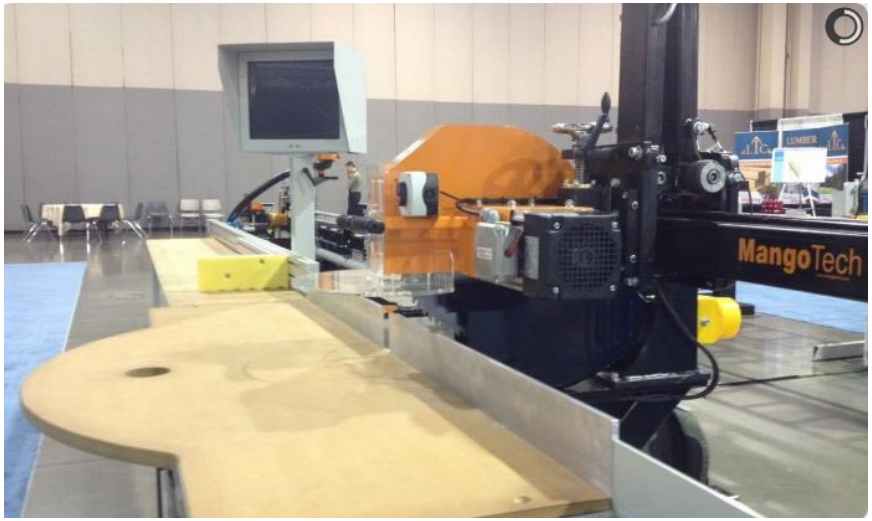
Component Saw

Linear Component Saw by Hundegger USA

- Programmed by a computer
- Machine is programmed to make cuts for each member
- Lumber is fed into machine

Radial Arm Saw

Radial Arm Saw



Radial Arm Saw: Apollo by Mango Tech

- Saw moves back and forth across wood
- Smaller and slower = not ideal for large projects
- Ideal for specific, precise cuts

Assembly

Assembly with use of jig

A jig is the staging area where the lumber and plates are placed as specified in the design drawing.

Roller- rolls over plates and presses them into wood

Hydraulic Press- stamps plates into wood

Plant Storage

In an ideal world trusses would be shipped to jobsite as soon as they are assembled
…but this is not always feasible.

When the trusses are finally ready to be shipped, we want them to be in the same condition.

Parallel chord trusses stacked and awaiting delivery

GUIDELINES:

Proper storage of trusses in plant:

- Vertically—since this is the way they will carry loads once erected
- In order—makes it easier for installers
- On “stickers” (risers) to keep off ground

BCSI Summary Sheets

Folders - 9 Folders (Including Introduction)

Last Modified: Apr 28, 2016 at 11:24 AM

PROPERTIES

Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties

Shipping

Moving trusses is awkward and can be dangerous.

Larger trusses are more unstable.

When moving trusses with a forklift:

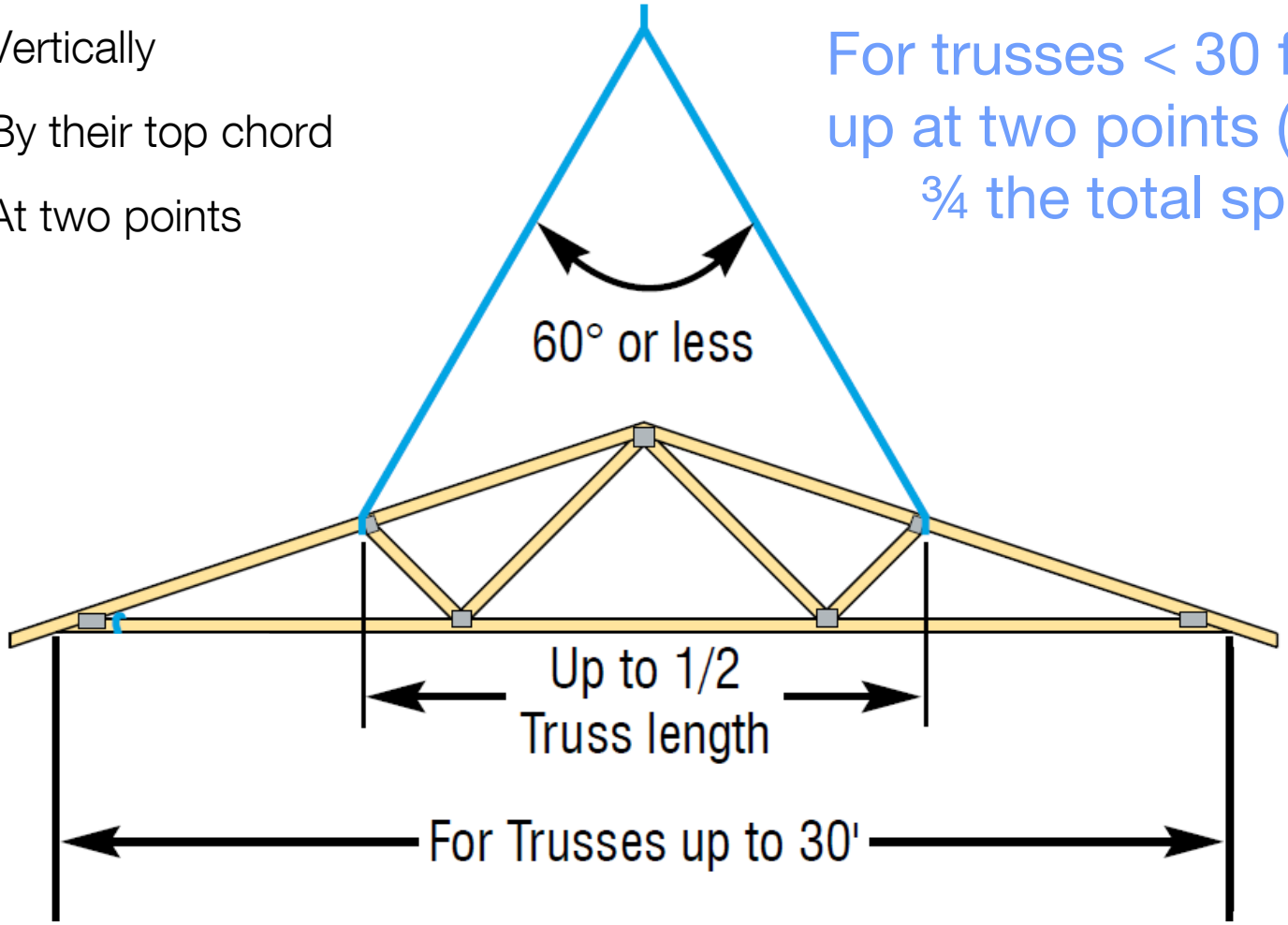
- Pick up trusses at the top chords, keeping the center of gravity low and balanced
- Forks must be spaced far enough apart
  - Multiple forklifts may be used

Handling Trusses

GUIDELINES:

- Vertically
- By their top chord
- At two points

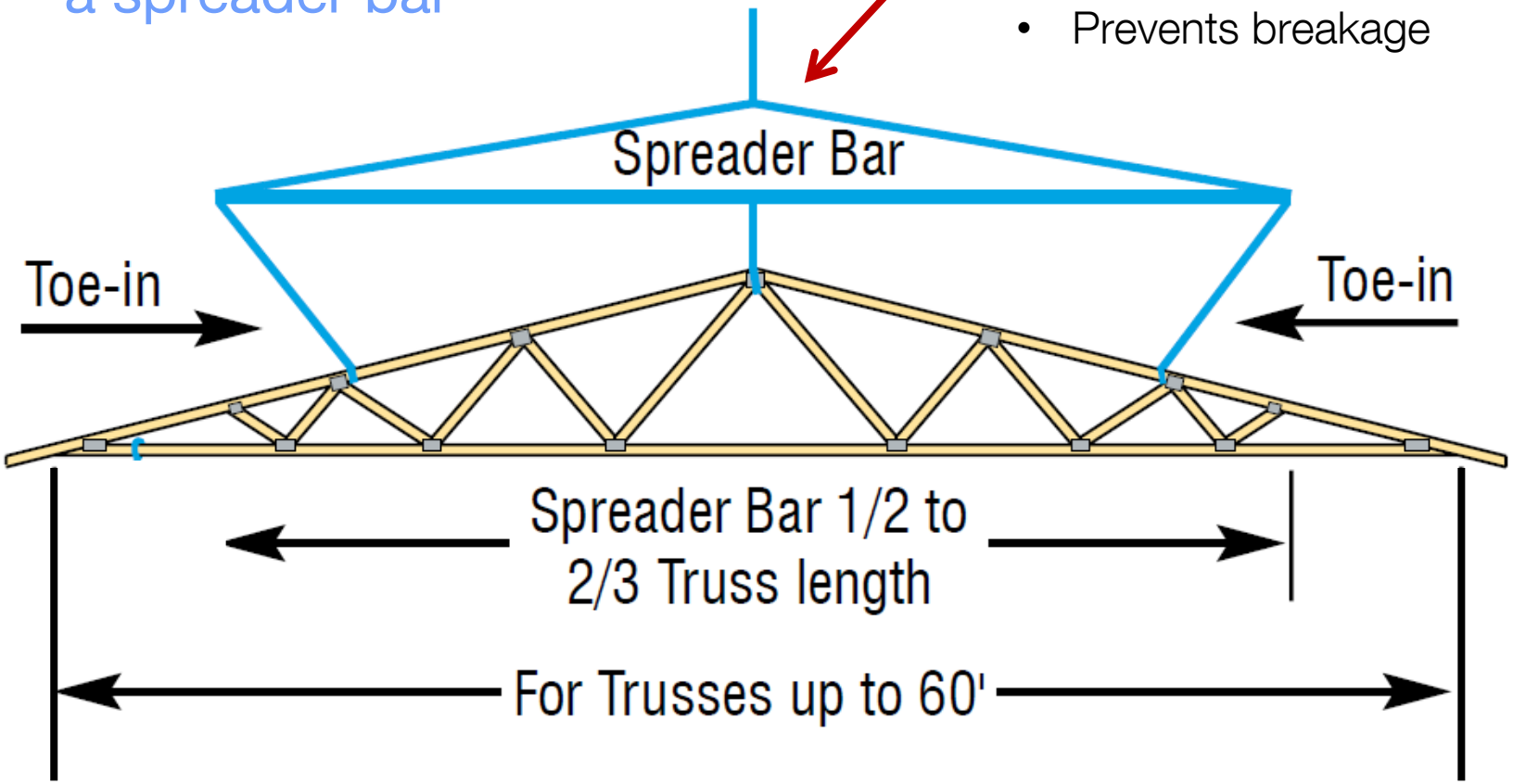
For trusses < 30 ft. pick up at two points (¼ and ¾ the total span)



Handling Trusses

For trusses 30–60 ft. use a spreader bar

- Runs length of truss
- Distributes the load
- Prevents breakage



"Toe-in" pick up points to prevent buckling.

Trusses Bending Out of Plane

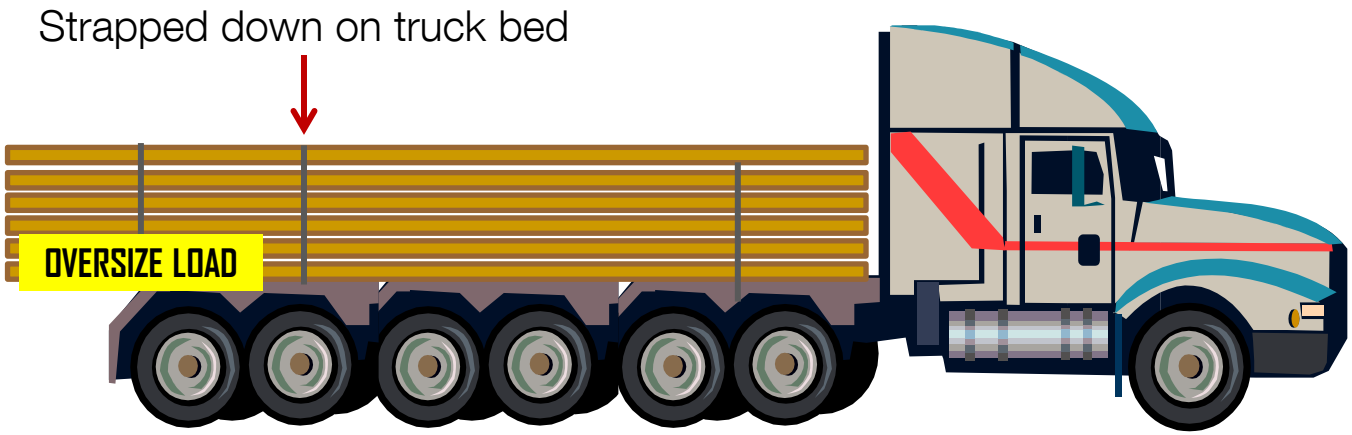
Improper handling of trusses can cause them to bend out of plane

PHOTO B1-14

In this image, tension forces resulted in severe deflection, compromising strength.

Refer to the B-1 summary sheet for information on truss handling.

In Transit



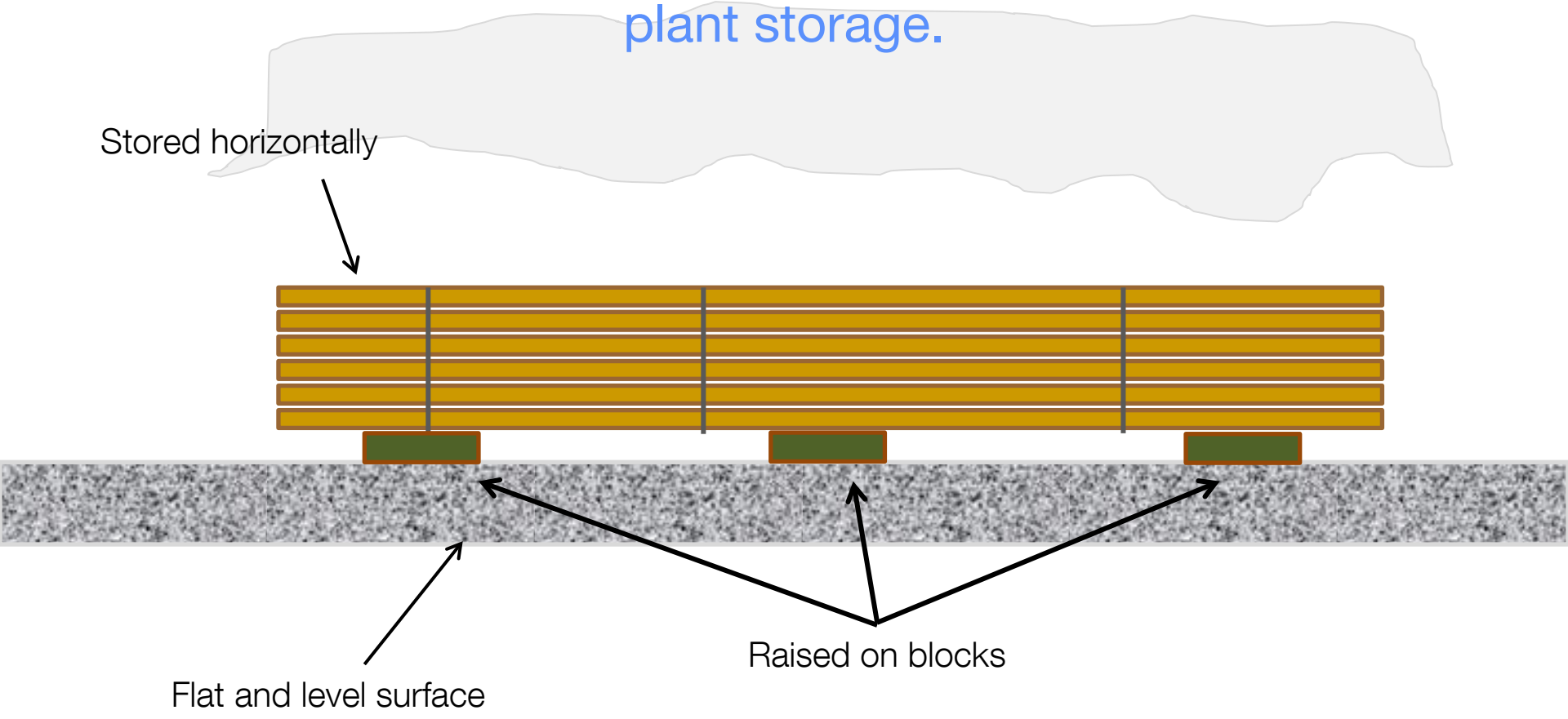
Since trusses are typically manufactured in plants close to the jobsite, trusses are hardly ever shipped by boat or airplane.

BCSI-B1 GUIDELINES:

- Send copy of TDD to contractor before delivery
- Unload on level ground
- Have place to store trusses ready

Jobsite Storage

Jobsite storage differs somewhat from manufacturing plant storage.



Unbundled loads are not recommended and can be dangerous.

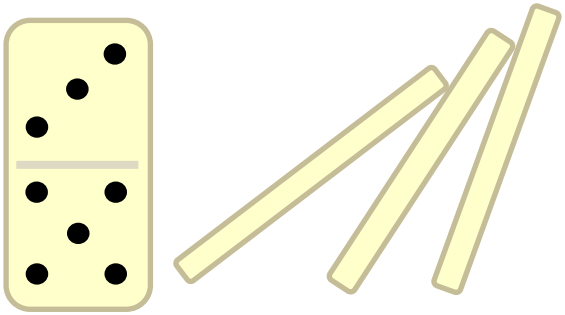
Restraint & Bracing

Trusses need to be **laterally** and **diagonally** braced

Series of unbraced trusses

Series of braced trusses

- Prevents buckling
- Helps maintain truss spacing
- Resists and transfers lateral loads



Without bracing, trusses can rack in a “domino effect”

Bracing

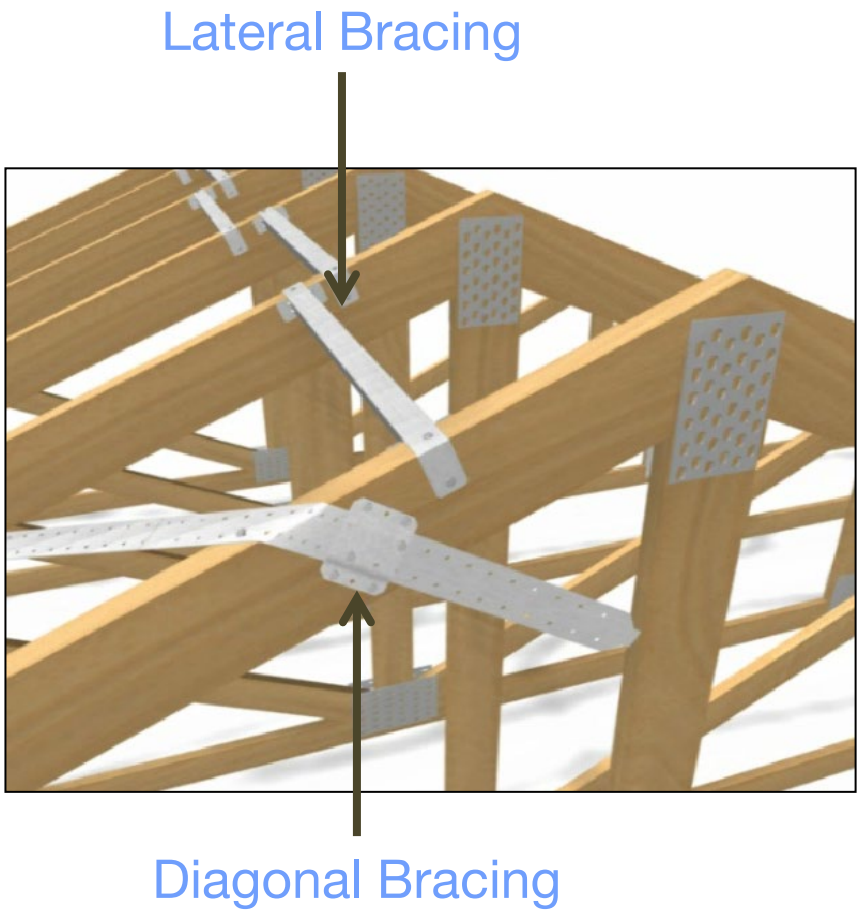
Typically braced at 90° angle

Braces placed at:

- Top chord
- Bottom chord
- Through web member

Can be either temporary or permanent

Temporary bracing can often help the structure's stability and can decrease overall cost since it was installed during initial construction.



Spacer Brace

Can provide support during installation and throughout the life of the structure

In this image, a spacer brace spans between two trusses, providing lateral support throughout the life of the structure

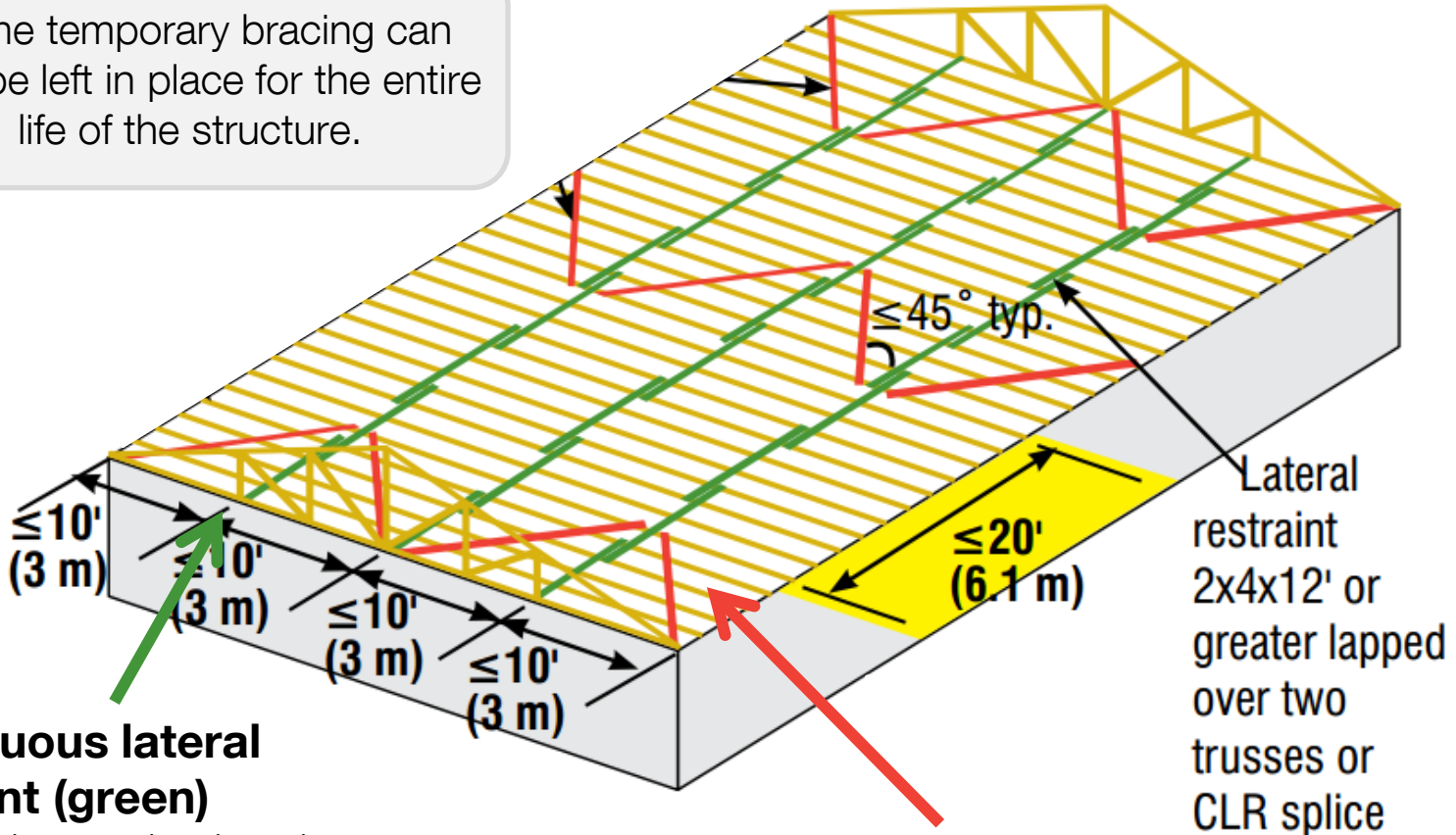
Temporary reinforcements can be removed after system is erect or left in place to provide additional support.

Spacer Braces:

- May be used in temporary and/or permanent lateral bracing
- Accurately holds truss on-center spacing

Continuous Lateral Bracing

Some temporary bracing can also be left in place for the entire life of the structure.



Continuous lateral restraint (green)

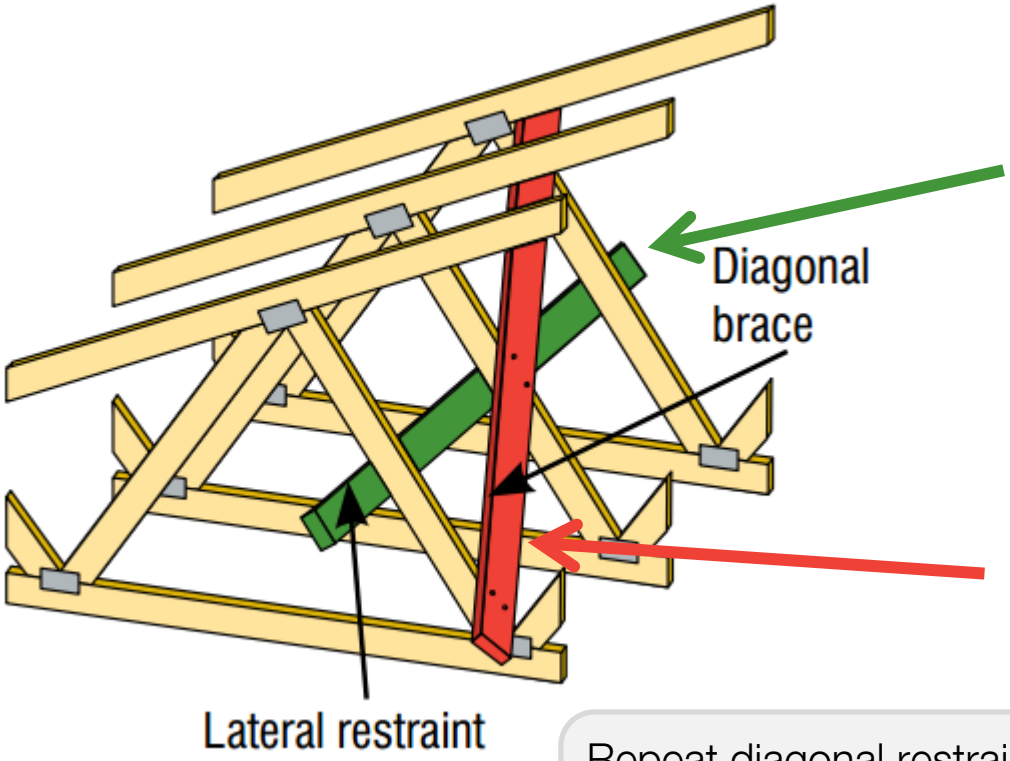
- Placed at top chord, peak, heel, and bottom chord planes
- See BCSI-B2

Diagonal bracing (red)

- Slope from top to bottom chord diagonally
- Repeated every 20 ft.

Continuous Lateral Bracing

When continuous lateral restraints are used permanently, they should always be used with diagonal bracing.



The green member represents the continuous lateral restraint (at 90 degrees to the member being restrained)

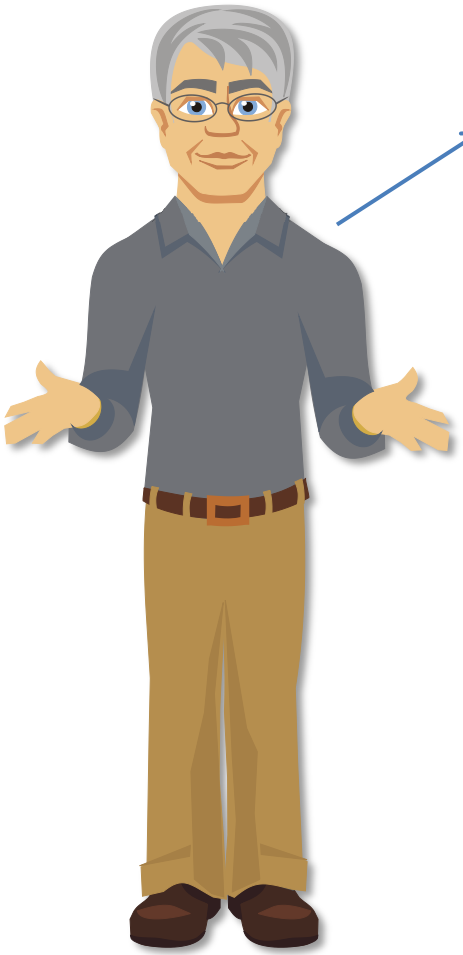
The red line represents the diagonal bracing (at approx. 45 degrees to the lateral restraints)

Repeat diagonal restraints every 20 ft. to provide sufficient support.

Who Specifies Permanent Bracing?

Who is responsible for permanent bracing?

Building Designer

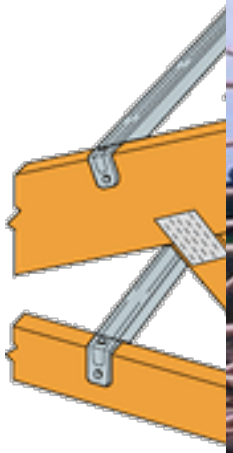


- Responsible for how trusses work as a system
- Specifies the size and attachment of all lateral restraint and their anchorage

Truss Designer

- Specifies the locations of required lateral restraints assumed in the design of individual trusses

Inadequate Lateral Restraint and Diagonal Bracing



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Your caption here.

Web Reinforcement

Media Tour - 5 Items

Last Modified: Apr 04, 2016 at 09:55 AM

PROPERTIES

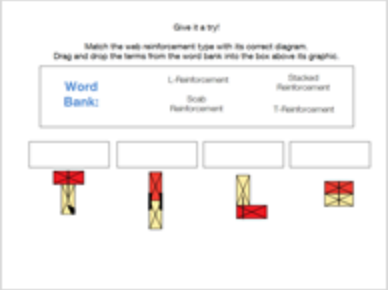
Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties



Matching-Lesson 4

Quiz - 2 questions

Last Modified: Apr 27, 2016 at 11:01 AM

PROPERTIES

On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	At any time
Show in menu as:	Single item

Edit in Quizmaker

Edit Properties

Truss Connectors

Who is responsible for which connections?

Truss-to-Truss Connections

Truss Designer

i.e., truss-to-girder connections, hip-end-truss-to-girder

According to the code, the Truss Designer can only specify connections that refer solely to trusses (i.e., Web Reinforcements)

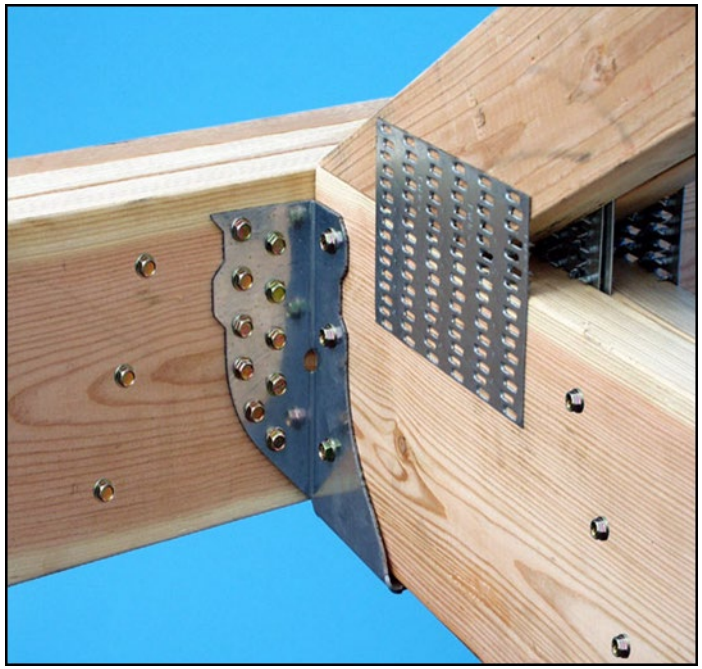
Truss-to-Everything-Else Connections

Building Designer

Job is to create continuous load path—responsibility to specify all other connections in building

Structural Connectors

How are trusses connected to the main structure?

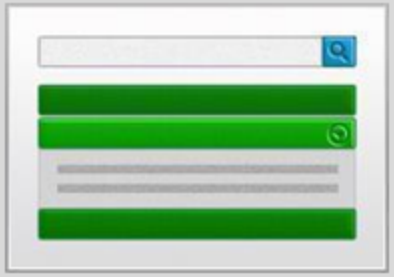


Hangers are commonly used to connect trusses to the main structure.

Trusses need to be secured to resist uplift and lateral forces. Simply toe-nailing the truss in place will not be enough.

- Truss Hangers
- Truss Clips
- Truss Tie-Downs

These connections help make a continuous load path.



Check for Correct Truss Installation

FAQ - 8 Questions (Including Introduction)

Last Modified: Apr 28, 2016 at 11:25 AM

PROPERTIES

Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties

Check Your Knowledge - Lesson 4

Quiz - 3 questions

Last Modified: Apr 28, 2016 at 01:16 PM

PROPERTIES

On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	After passing quiz
Show in menu as:	Single item

Edit in Quizmaker

Edit Properties

Summary

Checklist - 6 Items (Including Introduction)

Last Modified: Apr 28, 2016 at 11:26 AM

PROPERTIES

Show interaction in menu as: Multiple items

Allow user to leave interaction: After viewing all the steps

Prev/Next player buttons go to: Step in interaction

Edit in Engage

Edit Properties

Final Exam- Truss Fundamentals

Quiz - 10 questions

Last Modified: Dec 12, 2016 at 11:04 AM

PROPERTIES

On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Close Window
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	After passing quiz
Show in menu as:	Multiple items

Edit in Quizmaker

Edit Properties

This concludes the course!

***CT*:** Congratulations, you have earned 2 hour of CT Continuing Education credit. The Office of Education and Data Management will be notified of your completion, and will apply the credit to your training record. Please do not send your Certificate of Completion to OEDM, but retain only for your records.

IACET: For those seeking IACET CEUs: Congratulations, you have earned 0.2 CEUs (2 hours of credit).

AIA: For those seeking AIA LUs: Congratulations, you have earned 2 LU/HSWs. If your AIA Member number has been inserted into your profile, Simpson Strong-Tie will report your credits on your behalf to the AIA.

ICC: For those seeking ICC CEUs: Congratulations, you have earned 0.2 CEUs (2 hours of credit). Please make sure your ICC member number has been inserted into your profile. It is your responsibility to self-report your credits to the ICC. Please retain your Completion Certificate for your records.

Click **EXIT** in the upper right corner to finish this course.

Acknowledgements: The Department of Administrative Services, Office of Education and Data Management, would like to thank Simpson Strong-Tie for providing this online training module free-of charge.