STATE OF MINNESOTA
BOARD OF ARCHITECTURE, ENGINEERING, LAND SURVEYING, LANDSCAPE ARCHITECTURE, GEOSCIENCE AND INTERIOR DESIGN

In the Matter of R. Arlen Heathman

ORDER TO LIFT SUSPENSION OF LICENSE

Professional Engineer License No. 16177

Board File No. 2009-0008

1. The Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience and Interior Design ("Board") is authorized, pursuant to Minnesota Statutes sections 214.10, and 326.111 (2010), to license, regulate, and take appropriate disciplinary action against applicants, licensees, or certificate holders regulated by Minnesota Statutes section 326.02 - 326.15 (2010).

2. The Board is authorized, pursuant to the authority contained in Minnesota Statutes sections 214.10 and 326.111, subdivision 4 (a) (1) (2010), to take action if an individual fails to comply with an order issued by the Board.

FINDINGS

3. On October 22, 2010, the Board issued an Order for Additional Discipline, which suspended R. Arlen Heathman ("Respondent")'s Professional Engineer license until such time as the Respondent complies with the June 12, 2008 Stipulation and Order, Board File No. 2006-0005, by successfully completing the ten (10) hours of live instruction on Minnesota Building Code required therein and submitting satisfactory documentation thereof to the Board; and which ordered that the Respondent pay a civil penalty in the amount of Two Thousand Five Hundred Dollars ($2,500.00). A true and correct copy of the Order for Additional Discipline issued by the Board on October 22, 2010 is attached as Exhibit A.

4. On October 28, 2010, the Board received the civil penalty in the amount of Two Thousand Five Hundred Dollars ($2,500.00) from the Respondent, submitted by the Respondent's attorney. In addition, Respondent's attorney submitted an Affidavit by the

Respondent, dated October 27, 2010, containing information about courses that the Respondent attended since the Respondent's August 3, 2010 affidavit was submitted to the Board. A true and correct copy of the Affidavit of R. Arlen Heathman dated October 27, 2010 is attached as Exhibit B.

5. On November 17, 2010, the Complaint Committee of the Board reviewed the courses submitted in the Affidavit of R. Arlen Heathman, dated October 27, 2010. The Complaint Committee determined that the course information contained in Respondent's August 3, 2010 and October 27, 2010 affidavits and exhibits thereto, taken together, comply with the live instruction requirement in the Board's June 12, 2008 Stipulation and Order. The Complaint Committee is recommending that the Board accept Respondent's October 27, 2010 Affidavit and Exhibits into the record in this matter and that the Board approve the courses submitted in Respondent's October 27, 2010 and August 3, 2010 Affidavits.

CONCLUSIONS

6. The Board accepts Respondent's October 27, 2010 Affidavit and Exhibits into the record in this matter.

7. The Board concludes that the requirements and conditions in the Board's Order for Additional Discipline, dated October 22, 2010, have been met.

8. This Order is in the public interest.

ORDER

NOW, THEREFORE, based on all the files and records and proceedings herein, IT IS ORDERED, pursuant to Minnesota Statutes section 326.111, subdivision 4 (2010), that the suspension of Respondent's Professional Engineer License, No. 16177, is **LIFTED** effective December 13, 2010.

Dated: 13 December 2010

STATE OF MINNESOTA
BOARD OF ARCHITECTURE,
ENGINEERING, LAND SURVEYING,
LANDSCAPE ARCHITECTURE,
GEOSCIENCE AND INTERIOR DESIGN

Krist A Kubes

Kristine A. Kubes, J. D.
Board Chair

STATE OF MINNESOTA
BOARD OF ARCHITECTURE, ENGINEERING,
LAND SURVEYING, LANDSCAPE ARCHITECTURE, GEOSCIENCE,
AND INTERIOR DESIGN

In the Matter of
R. Arlen Heathman
Professional Engineer
License Number 16177

ORDER FOR ADDITIONAL DISCIPLINE

The Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience, and Interior Design (the "Board") has been created under the authority contained in Minnesota Statutes section 326.04 (2010). The Board is authorized, pursuant to the authority contained in Minnesota Statutes sections 214.10 and 326.111, subdivision 4 (a) (1) (2010), to take action if an individual fails to comply with an order issued by the Board. The Board has, in accordance with the authority contained in Minnesota Statutes section 326.111, subdivision 1 (b) (2010), created a Complaint Committee to review complaints filed with the Board and to make recommendations regarding the resolution of such complaints.

The Board has been presented with information that R. Arlen Heathman ("Respondent") has previously entered into and consented to the Board's issuance of a Stipulation and Order, dated June 12, 2008, Board File No. 2006-0005, a copy of which is attached hereto and incorporated herein by reference, which contained certain conditions with which Respondent agreed and was

EXHIBIT A

required to comply (the "Stipulation and Order"). The Board has further been presented with information that Respondent has failed to comply with one of the conditions contained in the Stipulation and Order: the completion of ten (10) hours of live instruction on Minnesota Building Code Requirements and submission to the Board of written documentation of successful completion of such instruction within twelve (12) months of the date the Board Chair signed the Stipulation and Order. The Stipulation and Order was signed on June 12, 2008. Based on Respondent's failure to comply with the Stipulation and Order, the Complaint Committee has made a recommendation that the Board issue an order imposing the following additional discipline: that Respondent's Professional Engineering License, #16177, be suspended until such time as Respondent successfully completes ten (10) hours of live instruction on Minnesota Building Code Requirements and submits satisfactory documentation thereof to the Board, and that Respondent pay a civil penalty in the amount of Five Thousand Dollars ($5,000.00) to the Board, by money order or cashier's check payable to the Board, within 60 days of the Board's order imposing the additional discipline.

Pursuant to the provisions contained in Paragraph 5 of the Stipulation and Order, this matter was brought before the Board on October 22, 2010. Respondent was duly notified that this matter would be considered by the Board on such date. Respondent was offered the opportunity to submit affidavits and a written response to the allegations in the Board's Notice of Hearing to Consider

Additional Discipline, and to appear before the Board. Assistant Attorney General Michele M. Owen appeared on behalf of the Complaint Committee. Assistant Attorney General Christopher M. Kaisershot was present to advise the Board. Respondent appeared before the Board with legal counsel. Based upon the files and records of the Board, the attached Affidavit of Doreen Frost, and the findings and recommendation of the Complaint Committee, the Board hereby makes the following findings of fact and conclusions.

FINDINGS OF FACT

1. Respondent voluntarily agreed to enter into and execute a Stipulation and Order, dated June 12, 2008, Board File No. 2006-0005 ("Stipulation and Order").

2. One of the conditions contained in Paragraph 4(c) of the Stipulation and Order was the requirement that Respondent must successfully complete ten (10) hours of live instruction on Minnesota Building Code Requirements and submit to the Board written documentation of successful completion thereof within twelve (12) months of the date the Board Chair signed the Stipulation and Order. The Stipulation and Order was signed by the Board Chair on June 12, 2008.

3. Respondent has not, as of the date of this Order for Additional Discipline, supplied satisfactory information, documentation, or evidence to the Board indicating that he has successfully completed the ten (10) hours of live instruction on Minnesota Building Code Requirements and submitted

satisfactory documentation thereof to the Board as referenced in Paragraph 2 hereinabove.

4. Because of Respondent's failure to timely comply with all the conditions contained in the Stipulation and Order, the Complaint Committee has made a recommendation that the Board issue an order imposing the following additional discipline: that Respondent's Professional Engineer License, #16177, be suspended until such time as he successfully completes ten (10) hours of live instruction on Minnesota Building Code Requirements and submits satisfactory documentation thereof to the Board, and that Respondent pay a civil penalty in the amount of Five Thousand Dollars ($5,000.00) to the Board, by money order or cashier's check payable to the Board, within 60 days of the Board's order.

5. Respondent offered supplemental materials for the Board's consideration at the October 22, 2010 hearing, but Respondent's attorney acknowledged that they were not in the proper form and that they were otherwise untimely.

CONCLUSIONS

1. In Paragraph 5(b) of the Stipulation and Order, Respondent waived any right to a hearing before an administrative law judge, discovery, cross-examination of adverse witnesses, and other procedures governing administrative hearings or civil trials regarding the imposition of additional disciplinary action based on a violation of that Stipulation and Order, and agreed to the process and procedures used by the Board in this matter.

2. Respondent's failure to timely successfully complete ten (10) hours of live instruction on Minnesota Building Code Requirements and submit satisfactory documentation thereof to the Board, as required by the Stipulation and Order, is a violation of the Stipulation and Order and a violation of Minnesota Statutes section 326.111, subdivision 4 (a) (1) (2010).

3 In accordance with the provisions contained in Paragraph 5(c) of the Stipulation and Order, the Board may impose additional discipline.

4. The supplemental materials offered by Respondent are not accepted into the record because they are not in the proper form and are otherwise untimely.

5. This order is in the public interest.

ORDER

Based upon all of the evidence in the record, the Board hereby adopts and incorporates herein the foregoing Findings of Fact and Conclusions.

Based upon the foregoing Findings of Fact and Conclusions, the Board does hereby **ORDER** that the Respondent's Professional Engineer license be suspended, commencing on the date that this Order is approved by the Board, and until such time as the Respondent complies with the June 12, 2008 Stipulation and Order, Board File No. 2006-0005, by successfully completing ten (10) hours of live instruction on Minnesota Building Code Requirements and submitting satisfactory documentation thereof to the Board; and that Respondent pay a **CIVIL PENALTY** in the amount of Two Thousand Five Hundred Dollars

($2,500.00), to the Board, by money order or cashier's check payable to the Board, within sixty (60) days of this Order. Completion of this ten (10) hours of live instruction on Minnesota Building Code Requirements shall not count toward any continuing education requirements pursuant to Minnesota Statutes section 326.107 (2010). Upon satisfaction of all of the aforestated conditions of this Order, Respondent's Professional Engineer License shall be restored to an unconditional status.

Dated: 22 October, 2010

MINNESOTA BOARD OF ARCHITECTURE, ENGINEERING, LAND SURVEYING, LANDSCAPE ARCHITECTURE, GEOSCIENCE, AND INTERIOR DESIGN

By: Krist A. Kubes

Kristine A. Kubes, J. D.
Board Chair

STATE OF MINNESOTA
BOARD OF ARCHITECTURE, ENGINEERING,
LAND SURVEYING, LANDSCAPE ARCHITECTURE, GEOSCIENCE
AND INTERIOR DESIGN

In the matter of
R. Arlen Heathman, PE
License Number 16177

STIPULATION AND ORDER

Board File No. 2006-0005

TO: R. Arlen Heathman, PE
SJS Engineering Inc.
6416 West River Road
Rochester, MN 55901

The Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience and Interior Design ("Board") is authorized pursuant to Minnesota Statutes section 214.10 (2006) and Minnesota Statutes section 326.111(2006) to review complaints against architects, professional engineers, land surveyors, landscape architects, geoscientists, and certified interior designers, and to take disciplinary action whenever appropriate.

The Board received information concerning R. Arlen Heathman ("Respondent"). The Board's Complaint Committee ("Committee") reviewed the information. The parties have agreed that the matter may now be resolved by this Stipulation and Order.

STIPULATION

IT IS HEREBY AGREED by and between Respondent and the Committee as follows:

1. Jurisdiction. The Respondent has held a license to practice Professional Engineering from the Board since July 26, 1983. Respondent is subject to the jurisdiction of the Board with respect to the matters referred to in this Stipulation.

2. Facts. This Stipulation is based upon the following facts:

a. Respondent was retained by a contractor to consult about an attached residential garage that had been built at 863 Southern Ridge Drive SW, Rochester, Minnesota because the City of Rochester inspector identified an incorrectly constructed braced wall line that needed to be corrected. A true and correct copy of the building official's requirement to fix the brace wall is attached as Exhibit 1.

b. On June 29, 2005, Respondent and the City of Rochester's Manger of Building Inspection Services (the "Manager") had a telephone conversation concerning the requirements for alternate engineered designs for portions of light frame wood construction in the city. After this conversation, the Manager sent Respondent a follow up letter describing the city's requirements and stating, "Please be aware that we can not accept narrative design descriptions that appear to blend provisions from numerous sources, without providing substantiating calculations and specific design." A true and correct copy of the Manager's June 29, 2005 letter is attached as Exhibit 1.

c. Respondent prepared a July 26, 2005 submittal ("First Submittal") which was intended to address and correct the incorrectly constructed braced wall line at the residence identified in paragraph 2.a. above. The submittal was in the form of a letter to the contractor, certified by Respondent with his P.E. stamp, containing Respondent's design and described requirements for addressing the problems with the garage wall. A true and correct copy of Respondent's First Submittal is attached as Exhibit 2. The contractor transmitted Respondent's First Submittal to Rochester Building and Safety by facsimile transmission on July 26, 2005. A true and correct copy of the contractor's fax cover sheet is attached as Exhibit 3.

d. The Manager rejected Respondent's submitted design after consulting with the City's Plan Check Engineer. Per the Manager, Respondent's submitted design was rejected because he and the Rochester Plan Check Engineer determined it was incomplete and lacking adequate information to justify the design. These city officials also found that Respondent's submitted design was inconsistent with the applicable building code provisions. Finally, the Manager noted that Respondent's submittal did not include an acceptable equivalent design justifying it. A true and correct copy of the reasons for the Manager's rejection of Respondent's submittal is contained in the Manager's subsequent letter to the Board, dated July 29, 2005, a true and correct copy of which is attached as Exhibit 4.

e. The City notified the contractor that Respondent's submission had to be changed, and the contractor subsequently notified Respondent that his submission had not been accepted.

f. The Committee alleges that Respondent was negligent and did not meet the standard of care for professional engineering when he prepared his First Submittal for addressing the problems with the garage wall, dated July 26, 2005, because:

1. The construction details and specifications were provided in a descriptive text format instead of plans, diagrams and sketches, which are the customary format for such information;

2. Respondent's design consisted of limited notes on plan sheets and did not contain any structural details, such as showing and defining existing framing conditions, providing wood header details, detailing nailing requirements at the ends of the wall opening wood header and clarification details of the specified tie down anchorage system including specific bolting and/or nailing requirements to guide the contractor and to allow verification during construction by the Building Official.

Mr. Tim Saari's June 29, 2005 letter clearly indicated that narrative design descriptions can not be accepted without providing substantiating calculations and a specific design. See, Exhibit 1. Respondent failed to use reasonable care with the July 26, 2005 design submittal which used a narrative description of the wall modifications without clearly identifying specific details of construction. The narrative, sketches and calculations submitted made it difficult for the Building Official to determine if the design complied with the intent of the MN State Building Code (MSBC) or met the requirements of the International Residential Code Section R301.1.2 Engineered Design.

Respondent's design was so inadequate and incomplete that it could not be used for construction and verification of design. The Respondent's July 26, 2005 submittal more closely resembles a preliminary design and concept narrative/sketch rather than a final certified design to be used for construction.

3. Respondent admitted in his July 15, 2007 letter to the Board that "a complete set of drawings was not performed." To meet the appropriate standard of care, Respondent should have stamped or written "preliminary" or "not for construction" on his First Submittal. A true and correct copy of Respondent's July 15, 2007 letter is attached hereto as Exhibit 5.

g. On July 28, 2005, Respondent sent a second letter to the builder, again certified by Respondent with his certified signature. This was Respondent's second design for the project (the "Second Submittal"). The second design contained different recommendations from those provided in the July 26, 2005 letter. A true and correct copy of Respondent's Second Submittal is attached as Exhibit 6.

h. The Committee alleges that Respondent was negligent and did not meet the standard of care for professional engineering when he prepared his Second Submittal, for similar reasons as the First Submittal. In addition, the Second Submittal did not meet the standard of care for the following reasons:

1. The Second Submittal to the builder represents other options and comments which conclude with a recommendation. See, Exhibit 6. This narrative again is an overview of preliminary design and design development concepts which does not represent specific final design details appropriate to address the Building Official concerns.

2. On July 29, 2005, Respondent completed computer calculations for the design. The computer calculations indicate Respondent's apparent completion of his design and analysis work. See, Exhibit 7.

3. Based on the July 29, 2005 date printed at the top of Exhibit 7, the date of the computer calculations, the Respondent's July 26, 2005 and July 28, 2005 designs were prepared and submitted before the Respondent completed the design and analysis work.

4. Because the computer calculations were not completed until July 29, 2005, Respondent submitted an apparent incomplete and inadequate design lacking adequate justification for the Second Submittal.

5. Respondent inappropriately placed a certified signature on the Second Submittal dated July 28, 2005 prior to the analysis and design completion. The Second Submittal again represents a preliminary design and concept rather

than a final design for construction.

3. Violations. Respondent admits that the facts specified above constitute violations of Minnesota Statutes section 326.111 subdivision 4 (a) (3) (2006), and Minnesota Rules Chapter 1805.0200, subp. 4.D. (2007) and are sufficient grounds for the action specified below.

4. Enforcement Action. Respondent and the Committee agree that the Board should issue an Order in accordance with the following terms:

a. Reprimand. Respondent is reprimanded for the foregoing conduct.

b. Civil Penalty. Respondent shall pay to the Board a civil penalty of Three Thousand Dollars ($3,000.00). Respondent shall submit a civil penalty of Three Thousand Dollars ($3,000.00) by cashier's check or money order to the board within sixty (60) days of the Board's approval of this Stipulation and Order.

c. Additional Education. Respondent shall take ten (10) hours of live instruction on Minnesota Building Code Requirements and submit to the Board written documentation of successful completion of such instruction within twelve (12) months of the date the Board Chair signs this Order.

5. Additional Discipline for Violations of Order. If Respondent violates this Stipulation, Minnesota Statutes Chapter 326 (2006), or Minnesota Rules Chapter 1800 (2005) or Minnesota Rules Chapter 1805 (2007), the Board may impose additional discipline pursuant to the following procedure:

a. The Committee shall schedule a hearing before the Board. At least thirty (30) days prior to the hearing, the Committee shall mail Respondent a notice of the violation alleged by the Committee and of the time and place of the hearing. Within fourteen (14) days after the notice is mailed, Respondent shall submit a written response to the allegations. If Respondent does not submit a timely response to the Board, the allegations may be deemed admitted.

b. At the hearing before the Board, the Complaint Committee and Respondent may submit affidavits made on personal knowledge and argument based on the record in support of their positions. The evidentiary record before the Board shall be limited to such affidavits and this Stipulation and Order. Respondent waives a hearing before an administrative law judge and waives discovery, cross-examination of adverse witnesses, and other procedures governing administrative hearings or civil trials.

c. At the hearing, the Board will determine whether to impose additional disciplinary action, including additional conditions or limitations on Respondent's practice or suspension or revocation of Respondent's license.

6. Waiver of Respondent's Rights. For the purpose of this Stipulation, Respondent waives all procedures and proceedings before the Board to which Respondent may be entitled under the Minnesota and United States constitutions, statutes, or the rules of the Board, including the right to dispute the allegations against Respondent, to dispute the appropriateness of discipline in a contested case proceeding

pursuant to Minnesota Statutes Chapter 14 (2006), and to dispute the civil penalty imposed by this Agreement. Respondent agrees that upon the application of the Committee without notice to or an appearance by Respondent, the Board may issue an Order containing the enforcement action specified in paragraph 4 herein. Respondent waives the right to any judicial review of the Order by appeal, writ of certiorari, or otherwise.

7. <u>Collection.</u> In accordance with Minnesota Statutes section 16D.17 (2006), in the event this order becomes final and Respondent does not comply with the condition in paragraph 4(b) above, Respondent agrees that the Board may file and enforce the unpaid portion of the civil penalty as a judgment without further notice or additional proceedings.

8. <u>Board Rejection of Stipulation and Order.</u> In the event the Board in its discretion does not approve this Stipulation or a lesser remedy than specified herein, this Stipulation shall be null and void and shall not be used for any purpose by either party hereto. If this Stipulation is not approved and a contested case proceeding is initiated pursuant to Minnesota Statutes Chapter 14 (2006), Respondent agrees not to object to the Board's initiation of the proceedings and hearing the case on the basis that the Board has become disqualified due to its review and consideration of this Stipulation and the record.

9. <u>Unrelated Violations.</u> This settlement shall not in any way or manner limit or affect the authority of the Board to proceed against Respondent by initiating a

contested case hearing or by other appropriate means on the basis of any act, conduct, or admission of Respondent justifying disciplinary action which occurred before or after the date of this Stipulation and which is not directly related to the specific facts and circumstances set forth herein.

10. Record. The Stipulation, related investigative reports and other documents shall constitute the entire record of the proceedings herein upon which the Order is based. The investigative reports, other documents, or summaries thereof may be filed with the Board with this Stipulation.

11. Data Classification. Under the Minnesota Government Data Practices Act, this Stipulation is classified as public data upón its issuance by the Board. Minnesota Statutes Chapter 13.41, subdivision 5 (2006). All documents in the record shall maintain the data classification to which they are entitled under the Minnesota Government Data Practices Act, Minnesota Statutes Chapter 13 (2006). They shall not, to the extent they are not already public documents, become public merely because they are referenced herein. A summary of this Order will appear in the Board's newsletter. A summary will also be sent to the national discipline data bank pertaining to the practice of Professional Engineering.

12. Entire Agreement. Respondent has read, understood and agreed to this Stipulation and is freely and voluntarily signing it. The Stipulation contains the entire agreement between the parties hereto relating to the allegations referenced herein. Respondent is not relying on any other agreement or representations of any kind,

verbal or otherwise.

13. Counsel. Respondent is aware that he may choose to be represented by legal counsel in this matter. ~~Respondent knowingly waived legal representation.~~ I HAVE NOT WAIVED REPRESENTATION. RAH

14. Service. If approved by the Board, a copy of this Stipulation and Order shall be served personally or by first class mail on Respondent. The Order shall be effective and deemed issued when it is signed by the Chair of the Board.

RESPONDENT

R. Arlen Heathman, P.E.

Dated: 29 MAY, 2008

COMPLAINT COMMITTEE

By: Billie Lawton

Billie Lawton, Public Member,
Committee Chair

Dated: 5-29, 2008

ORDER

Upon consideration of the foregoing Stipulation and based upon all the files, records and proceedings herein, all terms of the Stipulation are approved and hereby issued as an Order of this Board on this the 12th day of June, 2008.

MINNESOTA BOARD OF
ARCHITECTURE, ENGINEERING,
LAND SURVEYING, LANDSCAPE
ARCHITECTURE, GEOSCIENCE AND
INTERIOR DESIGN

By: Duane A Blanck

Duane Blanck, Professional Engineer
Board Chair

ROCHESTER

Minnesota

BUILDING SAFETY DEPARTMENT
2122 Campus Drive S.E., Suite 300
Rochester, MN 55904-4744
(507) 281-6133
FAX (507) 287-2240
www.rochestermn.gov

June 29, 2005

Mr. R. Arlen Heathman, P.E.
SJS Engineering Incorporated
6416 West River Road
Rochester, MN 55901

Dear Mr. Heathman,

You asked me to follow up our conversation today with documentation of what the expectations of the Rochester Building Safety Department are regarding alternate engineered designs for portions of light-frame wood construction in the City of Rochester.

If a residential building is designed in accordance with the 2000 International Residential Code (IRC) and portions of that design will not comply with the conventional requirements of the code, those portions must be designed in accordance with IRC Section R301.1.2.

R301.1.2 Engineered Design. When a building of otherwise conventional light-frame construction contains structural elements not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of non-conventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system.

The two major design features that we typically see not meeting these conventional requirements are inadequate designs for wall bracing in accordance with IRC Section R602.10 and wall framing elements in excess of the height and spacing limitations of IRC Section R602.3.1 and Table R602.3 (5).

There are many acceptable alternatives to these requirements, which are either recognized by model codes, or meet the definition of accepted engineering practice.

Submitted designs that meet the requirements of the 2000 International Building Code (IBC) Section 2305, and include complete construction details, will be accepted. There needs to be a sufficient amount of information in those designs to guide the contractor during construction, and to provide a specific design that can be verified during the inspection process by this department.

There are also numerous pre-engineered systems available to deal with either of these concerns such as, Simpson Strong-Brace™ Wall or Trus Joist MacMillan's Timberstrand LSL studs. Any product that has gone through an accepted evaluation process, as the products mentioned above have, will be accepted as an alternate design.

EXHIBIT 1, pg. 1

We also recognize and accept the most current version of the APA Narrow Brace Wall Method as it has been recognized by the International Code Council and will become part of the 2006 International Residential Code when printed. We are able to approve this design under Minnesota State Building Code Chapter 1300.0110 Subp. 13. *Alternative materials, design, and methods of construction and equipment. The code is not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by the code, provided that any alternative has been approved. An alternative material, design, or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the code, and that the material, method, or work offered is, for the purpose intended, at least the equivalent of that prescribed in the code in quality, strength, effectiveness, fire resistance, durability, and safety. The details of any action granting approval of an alternate shall be recorded and entered in the files of the code enforcement agency.*

Please be aware that we can not accept narrative design descriptions that appear to blend provisions from numerous sources, without providing substantiating calculations and a specific design.

I hope this letter has served to clarify our expectations, and to make it understandable and concise for all parties involved in this process. If these design decisions are made early in the planning stages, they are fairly easy to deal with and to achieve code compliance.

I would welcome your cooperation in helping us make this process successful.

Please call me if you have further questions.

Sincerely,

Tim Saari
Manager of Building Inspection Services
507.281.6125
tsaari@ci.rochester.mn.us

EXHIBIT 1, pg. 2

SJS ENGINEERING incorporated
6416 West River Road NW • Rochester, Minnesota 55901
Phone: (507) 280-7808

26 July 2005

Mr. Les Radcliffe
Radcliffe Homes, Inc.
6885 County Road 6 S.W.
Stewartville, Minnesota 55976

Re: 863 Southern Ridge Drive S.W.- Garage Door Walls

Mr. Radcliffe,

I have reviewed the information given to me on the drawings and thru our phone conversations about the garage wall which includes the two overhead doors. Based on the information at hand and the Code requirements for braced walls I have the following comments:

1. The front and rear wall of the garage may be used as shear walls for a wind that blows lateral to the garage. In this case the door side of the garage has only short walls each side of the doors to carry the loads to the foundation. The simplest modification is to check the panels for shear and construct as per the following and as per the enclosed noted sketch.
2. The headers were analyzed as wind collectors and found to be adequate as sized. They do not need to be extended to the corners of the garage as that would create a hinge in the wall constructed as such.
3. The vertical column on either side of both doors must be at least a double 2 x member. This would probably be the normal construction anyway. Two members are required, more may be placed. At least one of the members is to be installed from the bottom to the top plates as balloon framing.
4. On one side of this double or more vertical column at the four door side locations install a Simpson HD2A tie down or a UPS KST224 strap type tie down with at least 3 each 10d nails at the plate and 3 each 10d nails on the vertical 2 x column. This is in addition to your normal toe-nailing schedule.
5. The OSB sheathing for the garage wall with the doors is to be nailed using 8d nails at 6 inches on center at sheathing perimeters and 12 inches on center at the intermediate stud locations.
6. The roof sheathing nailing requirements have no special nailing schedule beyond that listed in Table R602.3 for roof sheathing attachment under the IRC.

To summarize, the nailing requirements and the tie-downs are the modifications that need to be made for this garage door wall only. All other framing is standard construction under the current building code. If there are questions and/or comments about the above or the enclosed please refer them to my office.

Sincerely,

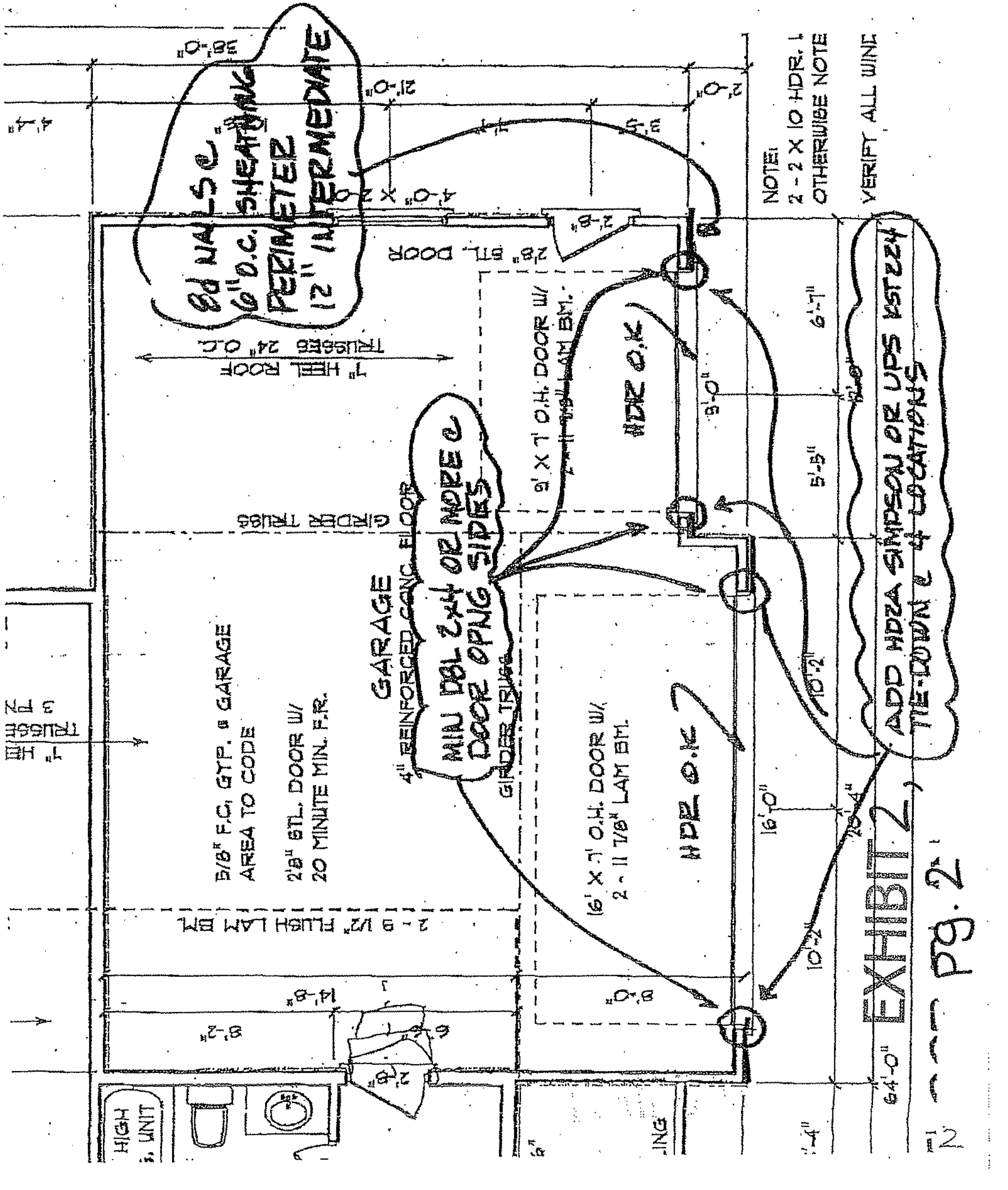
K. Arlen Heathman
Structural Engineer

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

REG. NO. 16177 DATE 26 Jul 05

EXHIBIT 2, PG 1

2


8d NAILS @ 6" O.C. SHEATHING PERIMETER 12" INTERMEDIATE
38'-0"
21'-0"
2'-0"
4'-0" X 2'-0"
2'8" STL. DOOR
7" HEEL ROOF TRUSSES 24" O.C.
9' X 7' O.H. DOOR W/ 2 - 11 7/8" LAM BM.
HDR O.K
GIRDER TRUSS
GARAGE
4" REINFORCED CONC. FLOOR
MIN DBL 2x4 OR MORE @ DOOR OPNG SIDES
5/8" F.C. GYP. @ GARAGE AREA TO CODE
2'8" STL. DOOR W/ 20 MINUTE MIN. F.R.
16' X 7' O.H. DOOR W/ 2 - 11 7/8" LAM BM.
HDR O.K
2 - 9 1/2" FLUSH LAM BM
14'-8"
8'-2"
8'-0"
6'-7"
9'-0"
5'-5"
10'-2"
16'-0"
64'-0"
NOTE: 2 - 2 X 10 HDR. I OTHERWISE NOTE
VERIFY ALL WIND
ADD HD2A SIMPSON OR UPS HST224 TIE-DOWN @ 4 LOCATIONS
EXHIBIT 2, PG. 2

ENGINEERING incorporated

ENGINEERING DEPT.

PAGE 1
CLIENT RADCLIFFE
FILE 05-065
PROJECT 863 SO. RIDGE DR
DATE JUL 2005

WIND TO STRUCTURE

10½' walls ±

@ 6/12 21' + 2' = 23' = 5.75' RISE (+0.4)

5.75(½) 23' = 66.1 FT²

6/12 20.33' = RISE = 6.77'

6.77'(11.5'/2) + 3.04(.5)1.52 = 41.2 FT²

(6.77 - 5.25)/6 = 1.52' - ±/12

((19 - 11.5)/12) 6 = 3.75' RISE (11.5)/2 = 21.6

5.75 (11.5)(.5) = 33.1

TOTAL ROOF SF = 162 FT²

½ wall = 23(5.25) = 120.75

TOTAL = 282.75 ~ 283

19.6 × 283 = 5541.9# ½ TO FDT

2771#/32.33' = 85.7 PLF ON ROOF

EXHIBIT 2, pg 3.

NGINEERING
ıcorporated

ENGINEERING DEPT.

PAGE 2
FILE 05-068
DATE JUL 2005

CLIENT RADCLIFFE
PROJECT 863 SO RIDGE DR.

COLLECTORS.

85.7(9')/2(1 3/4)11 7/8 = 19 PSI
O.K BY INSPECTION

85.7(16')/2(1 3/4)(11 7/8) = 33 PSI
O.K BY INSPECTION

BOTH BEFORE 1.6 INC.

STUDS & 1

85.7(16) 7'/16 = 599.9 ~600#/1.33 = 451#

16d ~ 50#/TOENAIL.

2x6
451/1.5(5.5) = 55 PSI. T OR C
O.K BY INSPECTION.

2x6 UNDER.
2x4
451/1.5(3.5) = 86 PSI T OR C
/2 = 43 PSI T OR C.

DBL 2x4 @ SIDES TIE-DOWN
HD2A OR UPS EST 224
451 - 4(50) = 251# - 3 NAILS 10d.

2771/7.33/1.33 = 284 PLF SHEATHING
6" O.C. 8d blocked ...

EXHIBIT 2, pg. 24.

FACSIMILIE COVER SHEET

Radcliffe Homes, Inc.
6885 County Road 6 SW
Stewartville, MN 55976

Phone Number: 1-507-533-8295
Fax Number: 1-507-533-7865

SEND TO: ROCH BLD & SAFTEY	Date: 7-26-05
Attention:	
Fax Number: 287-2240	Total pages, including cover sheet: 5

☐ Urgent ☐ Reply ASAP ☐ Please Comment ☐ Please Review ☐ For your Information

COMMENTS:

ENGINEERING FOR 863 SOUTHERN RIDGE DRIVE SW
HEADER DID NOT EXTEND WALL TO WALL
FRAMING INSPECTION CALLED OUT TO BE CHANGED
OR HAVE IT ENGINEERED
PLEASE SEE ATTACHED ENGINEERING AND
ADVISE IF ACCEPTABLE

THANKS

[signature]

TIM,
REVIEW SUBMITTED ENGINEERING AND CALL BUILDER BACK. BUILDER WANTS TO KNOW IF ENGINEERING IS ACCEPTABLE.

MIKE

EXHIBIT 3

ALL-AMERICA CITY

ROCHESTER

Minnesota

CITY OF ROCHESTER MINNESOTA INCORPORATED AUGUST 5 A.D. 1858

BUILDING SAFETY DEPARTMENT
2122 Campus Drive S.E., Suite 300
Rochester, MN 55904-4744
(507) 281-6133
FAX (507) 287-2240
www.rochestermn.gov

July 29, 2005

Patricia Munkel-Olson
Investigator
Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience & Interior Design
85 East 7th Place – Suite 160
Saint Paul, MN 55101

Dear Patricia,

I am forwarding you a design that was submitted to the City of Rochester Building Safety Department by:

Mr. R. Arlen Heathman, P.E.
SJS Engineering Incorporated
6416 West River Road
Rochester, MN 55901

This submittal was an attempt to address an incorrectly constructed braced wall line per the submitted and approved APA Narrow Braced Wall Method. Upon review by Randy Johnson, Plan Check Engineer and me, we concurred that the submitted design did not provide adequate information to justify the design. We also felt that the submittal did not provide for a complete design in accordance with IRC Section R301.1.2, or an equivalent design in accordance with Minnesota State Building Code Chapter 1300.0110 Subp. 13. *Alternative materials, design, and methods of construction and equipment.*

We are requesting that the board review this submittal for compliance with the Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geoscience & Interior Design rules and for professional competency. Upon completion of that review we would appreciate a determination be sent to us for our records.

Thank you for your attention to this matter and please call me if you have questions, or need additional information.

Sincerely,

Tim Saari
Manager of Building Inspection Services
507.281.6125
tsaari@ci.rochester.mn.us

Attachments

CC: Dan Kelsey, Structural Engineer, Minnesota Building Codes and Standards Division

EXHIBIT 4

SJS ENGINEERING incorporated

6416 West River Road NW • Rochester, Minnesota 55901
Phone: (507) 280-7808

JUL 18 2007

15 July 2007

Ms. Patricia J. Litchy, J.D.
Minnesota Board of AELSLAGID
85 East 7th Place
Suite 160
St. Paul, Minnesota 55101

Re: File no. 2006-0005

Ms. Litchy,

The enclosed documents, copies of which you sent to me were submitted to the Rochester Building Safety Department by a contractor who is a long time client of mine, Mr. Les Radcliffe. The documents copied to me however are incomplete and do not include all the engineering that was accomplished for this project. Per your itemized list I will try to answer as completely as I can the items outlined in your letter of 17 April 2007.

Item no. 1 – a complete set of drawings was not performed. The engineering was withdrawn before any further submittals were made. The letter to Mr. Radcliffe dated 4 August 2005 from Mr. Saari was never received at my office. Such correspondence would be in the file. I did know from Mr. Radcliffe that my submittal was being discussed and that probably would not be accepted. By joint agreement between myself and Mr. Radcliffe, it was decided rather than delay the project that he would try getting this through the local code jurisdiction using another engineer, which he did.
Item no. 2 – I was hired to perform an engineering analysis for the garage door wall and the modifications if any to the existing in place structure. The engineering was submitted, refused, and discarded. I withdrew from the project and the garage structure braced wall issue was resubmitted by another licensed engineer.
Item no. 3 – I will add the pages submitted that you do not have and another letter dated 28 July 05, that was missing from the documents you sent me.
Item no. 4 – The items enclosed or in your possession constitute the depth of the engineering performed. It was never completed as noted above.
Item no. 5 – Please note the enclosed and the documents you have in hand.
Item no. 6 – No changes were made based on any engineering I performed for the project. Other engineering was submitted. I can only assume that any modifications were based on that submittal.
Item no. 7 – As I was not the engineer of record for what was changed or modified, no corrections were made that I have knowledge of.

While I do not wish comparisons between engineering companies I am enclosing a letter that was passed around by the contractors, given to me by another client and asked if it could be used in other projects. My response to this client was that I can't use the document for any purpose other than maybe reference to read. There were no computations performed, nor any drawings submitted for what appears to be a similar braced wall type issue and there were no questions and/or comments that came back according to my information. Duffy Engineering is a reputable firm and my only point is to show the difference in submittals that one engineer has to provide vs. other engineers to the Rochester Building Safety Department for acceptance in similar issues.

I do have a copy in my file of a letter dated 29 June, 2005 written to me by Mr. Saari. By the time it arrived, I was off this particular project and on to another. I never responded to Mr. Saari's letter as I had no further involvement on the project. Mr. Radcliffe had already hired another engineer for the purposes of obtaining permission to continue the already framed garage. I have performed a dozen or more engineering analyses and submittals since this date in 2005 on similar issues of braced wall theory. Some have required a question answered or a clarification but in all cases were accepted and the structures built and performing as designed under the current Minnesota State Building Code.

The Board has my permission if it wishes to talk with Mr. Radcliffe. His phone number is (507) 533-8295 in Stewartville, Minnesota. The other engineer whose submittal was used was Mr. Jeffrey H. Gisi, P.E. His phone number is (507) 529-5303. He is a professional colleague located also in Rochester, Minnesota.

I appreciate the Board's patience and the information sent to me. It is unclear why this particular project was under scrutiny when the engineering performed was withdrawn and not used, and since this time a number of braced wall designs have been analyzed, performed, and reviewed without such scrutiny and apparently to the satisfaction of the Rochester Building Safety Department.

Sincerely,

R. Arlen Heathman, P.E.
SJS Engineering, Inc.

EXHIBIT 5, pg. 2

SJS ENGINEERING incorporated

6416 West River Road NW • Rochester, Minnesota 55901
Phone: (507) 280-7808

28 July 2005

Mr. Les Radcliffe
Radcliffe Homes, Inc.
6885 County road 6 S.W.
Stewartville, Minnesota 55976

Re: 863 Southern Ridge Drive S.W. – Braced Walls at Garage

Mr. Radcliffe,

Based on my most recent conversation with the Building Safety Department it is my understanding that they have some criticism of the "math" used in the design of the walls for the above garage. Based on what little information I could obtain and without having any correction letter which may or may not be forthcoming, I have decided to look at your garage wall from three different points of view, all of which are based on engineering principles used for any structure. I have the following comments:

1. The garage wall with the doors can be viewed as a **perforated wall panel**. Based on the numbers using either the shear load ratio definition or the perforated total shear on the wall using a opening adjustment factor yields basically the same resulting framing. The wall panels on the garage door wall are to be sheathed with 7/16 minimum OSB or plywood and the nailing pattern to be 8d nails at 4 inches on sheathing perimeter and 12 inches on intermediate framing members. This sheathing must be on both the outside and the interior of the walls for the garage wall with the overhead doors. The extreme corner columns at the end of the 32'-4 " wall are to have a Simpson type HD-2A tie down installed on the corner column. No other tie-downs are needed. The corner columns must be a double 2 x 4 minimum.
2. The garage wall can be viewed as a **conventional shear wall** with actually 4 full length panels although the wall on the interior side of the 16 foot door and the 9 foot door at the jog can be assumed to be acting as one width panel. This method also requires the wall to be sheathed with 7/16 minimum sheathing and the nailing pattern as per above on one side of the wall only. Tie-downs are required however at the sides of each full length panel which means both sides of each door and at the corners also. The tie downs should be capable of carrying approximately 2582 lbs of vertical tension assuming you use 16d toe-nails, minimum of 4 each per stud member in addition at the bottom of the columns either side of the doors and the corners of the garage.
3. In both cases above, the collectors or headers sized above the door are adequate as shown. The jack columns on either side of the doors should be 3 each 2 x 4's at the 9 foot door which is carrying roof trusses and 2 each 2 x 4's at the 16 foot door which is a gable type end. At least one of the plies is to extend beyond the header from the bottom plate to the top plate of the wall.
4. The third evaluation of the wall would be to consider the garage as **an open sided structure** with only three walls, both side walls and the back wall with the door side wall being the open side. This design is based on requirements in section 2305 of the IBC. The aspect ratio of L/W is less than one which most attached garages are and the depth is

EXHIBIT 6, pg. 1

less than 25 feet. Based on this analysis, the roof sheathing will carry the total shear of wind on the garage to the back wall of the garage. The roof sheathring should be attached using 8d nails at 6 inches on sheathing edges and 12 inches on intermediate truss framing unblocked. The wall on the rear of the garage shall be standard framing using studs at 16 inches on center and the sheathing may be 5/8 gypsum as shown on the drawings for the entire length of the inside of the back wall. In lieu of the gypsum the 13 foot of wall extending outside the residence can be sheathed on one side using 7/16 inch OSB with 8d nails at 4 inches on center on panel edges and 12 inches on panel intermediate framing. The door side wall would not require any modification to the standard framing details normally used per Code sections. See Table R502.5 for header support and Section R602 for standard wall framing details and connections.

The use of the APA standard detail for narrow walls cannot be used with the header at the top of the overhead doors as it creates a hinge effect if the header is extended beyond the doors as shown to the corner or jog in the garage wall. This detail is also based on test results rather than a detailed mathematical analysis. It is not a Minnesota Code adopted detail at this time. It is being accepted by the local code jurisdiction as an alternative framing method for narrow walls.

It is my recommendation that the structure be viewed as an open front structure. This requires the least modification to a structure in place and has been allowed on previous residential projects in the City of Rochester.

Questions and/or comments should be referred to my office.

Sincerely,

R. Arlen Heathman, P.E.
Structural Engineer

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA

REG. NO. 16177 DATE 28 Jul 05

EXHIBIT 6, pg. 2

ENGINEERING Incorporated

ENGINEERING DEPT.

PAGE 1

FILE 05-068

DATE JULY 2005

CLIENT RADCLIFFE

PROJECT 863 SO. RIDGE DR.

PERFORATED.

$q = 175 / 10.5(32.33') = .516$

$\beta = \frac{32.33 - 16' - 9'}{32.33} = .226$

$r = 1 / (1 + \frac{q}{\beta}) = .3046$

8d @ 6"

$F = r / (3 - 2r) = .127 \times 270(32.33) = 1109 \times 2 = 2218$
$\times 290(\text{"}) = 1190 \times 2 = 2380$

SHEAR CAPACITY OF SHEATHING, NAILED @ 6" P.
= 270 8d nails @ 4" = 360 12" I $\times 2 = 2956$#.

% FULL HT SHEATHING = 22.6%
54/6 - 8'-4" OPENS 10' NAILS

EFF. SHEAR CAPACITY .45 54/6 = 8'-4"
.36 FULL HEIGHT
.56 24/3 = 6'-8" .50 REASONABLE

$V_p = .50 \binom{270}{360} 7.33' = 990$#
$= 1319$# $\times 2 = 2638$#

95% O.K.

$2771 (10.5') / 32.33' = 900$# UP OR
(HT) @ ENDS.

TIE DOWN @ CORNERS.

EXHIBIT 6, pg. 3

SJS ENGINEERING incorporated

ENGINEERING DEPT.

PAGE 2

FILE 05-068

DATE JUL 2005

CLIENT RADCLIFFE

PROJECT 863 So. RIDGE DR.

CONVENTIONAL SHEAR WALLS.

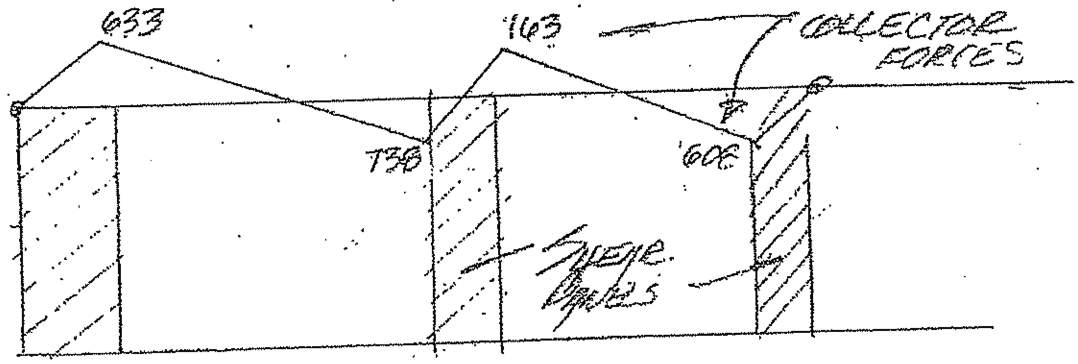
TOTAL SHEAR = 2771# 85.7 PLF
1/2 TOTAL

UNIT = 2771/7.33' = 378 PLF - FULL HT PANELS

378 (2.165') = 818#
└ SIDES OF BIG DOOR (10')

818(10.5)/2.165 = 3967#

2.165' 2.165' .92' 2.08' = 7.33'



378 - 85.7 = 292.3 × PANEL WIDTH.

MAX COLLECTOR = 738/2(1.75)11 7/8 = 18 PSI O.K.

818# 1166# 786# = 2770#

EXHIBIT 6, pg. 4.

ENGINEERING DEPT.

PAGE 3

FILE 05-068

DATE JUL 2005

CLIENT RADCLIFFE

PROJECT 863 So. RIDGE DR.

TIE-DOWNS.

376(2.105) = 818# × 10.5/2.105
= 1166# 10.5/3.005
= 786# 10.5/2.08

= 3967
" / 1.33 = 2982# w/4 × 2 × .50 TOE-NAILS. ~400#

376/1.33 = 284 PLF

USE

2582#
4054 = 3705# ×
3967-400 = 3567#
425 T SPF #2 × 2 × 1.5 (3.5) = 4462.5# O.K.
TAKES 1-2×4 IN TENSION w/IIC.

COLUMNS @ DOORS.

3967# W.L. — 3622.5# 23(35 PSF)(4.5')
S.L. @ 9' DR — 1552.5#
D.L. @ 9' DR

16' DOOR - GABLE END

3-2×4 COL. @ DOOR SIDES 9' DR.
2 - @ 16' DR.

EXHIBIT 6, pg. 5

WoodWorks® Sizer SOFTWARE FOR WOOD DESIGN

July 29, 2005 15:31:29

WoodWorks® Sizer 2000d

Column1

PROJECT

COMPANY

DESIGN RESULTS - NDS-1997

Column DESIGN DATA:

Type: Pinned base; Loadface = width(b)
Material: Lumber n-ply Built-up fastener: nails;
Ke x Lb: 1.00 x 0.00= 0.00 [ft];
Ke x Ld: 1.00 x 10.00= 10.00 [ft];
Total length: 10.00 [ft]
Repetitive factor: applied where permitted(refer to online help);
Load Combinations: ASCE 7-95

LOADS: (force=lbs, pressure=psf, udl=plf, location=ft)
>>Self-weight of members has NOT been included<<

Load	Type	Distribution	Magnitude Start	Magnitude End	Location Start	Location End	Pattern Load
1	Wind	Axial	-3967	(Eccentricity =	0.0 in)		

SUGGESTED SECTIONS that PASSED the CODE CHECK:

	Species Grade	ply-bxd in	Axial ft/Ft'	Bending fb/Fb'	Comb'd	Shear fv/Fv'	Disp./ Allow.
1	S-P-F No.1/No.2	1- 2x4	0.70				

>>For more detailed output, select a Suggested Section from the Data Bar.<<

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.

TENSION
W.L.
MAX

EXHIBIT 7, pg. 1

7

WoodWorks® Sizer SOFTWARE FOR WOOD DESIGN

WoodWorks® Sizer 2000d

July 29, 2005 15:35:48

Column1

COMPANY | PROJECT

DESIGN RESULTS - NDS-1997

Column DESIGN DATA:

Type: Pinned base; Loadface = width(b)
Material: Lumber n-ply Built-up fastener: nails;
Ke x Lb: 1.00 x 0.00= 0.00 [ft];
Ke x Ld: 1.00 x 7.00= 7.00 [ft];
Total length: 10.00 [ft]
Repetitive factor: applied where permitted(refer to online help);
Load Combinations: ASCE 7-95

LOADS: (force=lbs, pressure=psf, udl=plf, location=ft)
>>Self-weight of members has NOT been included<<

Load	Type	Distribution	Magnitude Start	Magnitude End	Location Start	Location End	Pattern Load
1	Wind	Axial	3967	(Eccentricity =	0.0 in)		
2	Dead	Axial	1552	(Eccentricity =	0.0 in)		
3	Snow	Axial	3622	(Eccentricity =	0.0 in)		

SUGGESTED SECTIONS that PASSED the CODE CHECK:

	Species Grade	ply-bxd in	Axial fc/Fc'	Bending fb/Fb'	Comb'd	Shear fv/Fv'	Disp./ Allow.
1	S-P-F No.1/No.2	3- 2x4	0.69				

>>For more detailed output, select a Suggested Section from the Data Bar.<<

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.

EXHIBIT 7, pg. 2

(6)

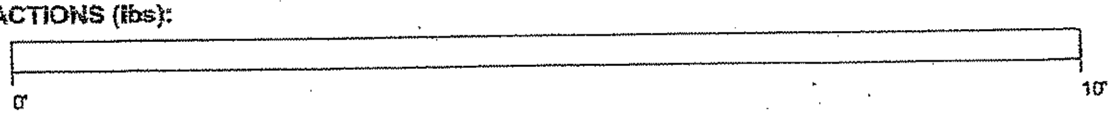
WoodWorks® SOFTWARE FOR WOOD DESIGN	COMPANY	PROJECT
	July 29, 2005 15:36:56	Column1

Design Check Calculation Sheet

LOADS: (lbs, psf, or plf)

Load	Type	Distribution	Magnitude Start	Magnitude End	Location [ft] Start	Location [ft] End	Pattern Load?
1	Wind	Axial	3967	(Eccentricity =		0.0 in)	
2	Dead	Axial	1552	(Eccentricity =		0.0 in)	
3	Snow	Axial	3622	(Eccentricity =		0.0 in)	

MAXIMUM REACTIONS (lbs):



Lumber n-ply, S-P-F, No.1/No.2, 2x4", 3-Plys

Pinned base; Loadface = width(b); Built-up fastener: nails; Ke x Lb: 1.00 x 0.00= 0.00 [ft]; Ke x Ld: 1.00 x 7.00= 7.00 [ft]; Repetitive factor: applied where permitted(refer to online help); Load combinations: ASCE 7-95

SECTION vs. DESIGN CODE NDS-1997: (stress=psi, and in)

Criterion	Analysis Value	Design Value	Analysis/Design
Axial	fc = 460	Fc' = 669	fc/Fc' = 0.69
Axial Bearing	fg = 460	Fg' = 2256	fg/Fg' = 0.20

ADDITIONAL DATA:

FACTORS:	F	CD	CM	Ct	CL	CF	CV	Cfu	Cr	LC#
Fc' =	1150	1.60	1.00	1.00		1.15	(Cp = 0.316)			3
E' =	1.4 million		1.00	1.00						0
Fg' =	1410	1.60		1.00						3

```
Axial      : LC# 3 = D+.75(S+W),   P = 7245 lbs   Kf = 1.00
   (D=dead  L=live  S=snow  W=wind  I=impact  C=construction)
   (All LC's are listed in the Analysis output)
```

DESIGN NOTES:

1. Please verify that the default deflection limits are appropriate for your application.
2. BUILT-UP COLUMNS: nailed or bolted built-up columns shall conform to the provisions of NDS Clause 15.3.

EXHIBIT 7, pg. 3

AFFIDAVIT OF SERVICE BY MAIL

RE: In the matter of R. Arlan Heathman, PE
License Number 16177

STATE OF MINNESOTA)
) ss.
COUNTY OF RAMSEY)

Patricia J. Litchy, J. D., being first duly sworn, deposes and says:

That at the City of St. Paul, County of Ramsey and State of Minnesota, on this the 16 day of June, 2008, she served the attached Stipulation and Order by depositing in the United States mail at said city and state, a true and correct copy thereof, properly enveloped, with first class and certified postage prepaid, and addressed to:

Mr. R. Arlan Heathman, PE
SJS Engineering, Inc.
6416 West River Road
Rochester, MN 55901

CERTIFIED MAIL
Return Receipt Requested
7005 1160 0002 5025 6280

Patricia Litchy, JD.
Patricia J. Litchy, J. D.

Subscribed and sworn to before me on this the 16th day of June, 2008.

Beverly A. Carey
(Notary Public)

BEVERLY A. CAREY
NOTARY PUBLIC - MINNESOTA
MY COMMISSION
EXPIRES JAN. 31, 2010

FILE COPY

DODA & McGEENEY, P.A.
ATTORNEYS AT LAW
DANIEL P. DODA
JAMES MCGEENEY

OCT 2 8 2010
Premier Bank Building
421 1st Avenue SW
Suite 301W
Rochester, Minnesota 55902
Telephone (507) 536-0555
Facsimile (507) 536-0558

October 27, 2010

VIA FACSIMILE & U.S. MAIL
Minnesota Board of Architecture,
Engineering, Land Surveying, Landscape
Architecture, Geoscience, and Interior Design
Attention: Doreen Frost & Lynette DuFresne
85 E. 7th Place, Ste. 160
St. Paul, MN 55101

State of Minnesota
Board of AELSLAGID
OCT 28 2010
Rec'd 2,500.00
29

Re: In the Matter of
R. Arlen Heathman,
Professional Engineer
License Number 16177

Board File No. 2009-0008

Dear Ms. Frost and Ms. DuFresne:

We have received a copy of the Order for Additional Discipline, dated October 22, 2010, wherein the Board suspends Mr. Heathman's Professional Engineer License, License Number 16177, until he complies with the June 12, 2008, Stipulation and Order by successfully completing ten hours of live instruction on Minnesota Building Code requirements, and pays a civil penalty in the amount of $2,500. Assistant Attorney General, Christopher Kaisershot, has suggested that we resubmit the courses taken by Mr. Heathman and identified in our letter, dated October 19, 2010, which was not accepted into evidence at the hearing of October 22, 2010.

Therefore, in addition to the courses identified in Mr. Heathman's Affidavit, dated August 3, 2010, Mr. Heathman has attended the following courses of live instruction on the Minnesota Building Code Requirements, as set forth in the enclosed Affidavit of R. Arlen Heathman:

1. Simplified Design seminar by American Concrete Institute, presented on October 6, 2010;

2. Energy Code, Plan Review, MN Rules 1322, 1323 by the Minnesota Department of Labor and Industry, Construction Codes and Licensing Division, presented on October 7, 2010; and

3. Wood as a Structural and Sustainable Choice Workshop seminar by the Wood Products Council – Woodworks, presented on October 26, 2010.

EXHIBIT B

Please inform our office after the Board and/or Complaint Committee has had the opportunity to review Mr. Heathman's courses to confirm that they comply with fulfillment of the ten hours of live instruction on the Minnesota Building Code requirements so that his engineering license may be reinstated.

Finally, I have also enclosed Mr. Heathman's cashier's check in the amount of $2,500 to cover the civil penalty.

Very respectfully,

DODA & McGEENEY, P.A.

DANIEL P. DODA
Attorney at Law

DPD/ks
Enclosures

cc: R. Arlen Heathman

STATE OF MINNESOTA
BOARD OF ARCHITECTURE, ENGINEERING,
LAND SURVEYING, LANDSCAPE ARCHITECTURE, GEOSCIENCE,
AND INTERIOR DESIGN

In the Matter of:	**AFFIDAVIT OF R. ARLEN HEATHMAN IN SUPPORT OF HIS RESPONSE TO NOTICE OF HEARING TO CONSIDER ADDITIONAL DISCIPLINE**
R. Arlen Heathman Professional Engineer License No. 16177	Board File No.: 2009-0008

STATE OF MINNESOTA)
) ss.
COUNTY OF OLMSTED)

I, R. Arlen Heathman, being first duly sworn, depose and state as follows:

1. I reside at 6416 West River Road NW, Rochester, Minnesota 55901, and make this Affidavit based upon my personal knowledge, and in support of my completion of ten hours of live instruction on the Minnesota Building Code Requirements.

2. In addition to the nine (9) live instruction courses, totaling of 36 hours of live instruction, between June 2008 and March 2010, as identified in my Affidavit of August 3, 2010, I have attended three additional live instruction courses. The three additional live instruction courses I have attended are described below and the respective seminar certificates and seminar information for each course is attached hereto as Exhibits A, B, and C:

Exhibit	Course Description	Presenter	Date	CEU/Hours
A.	Simplified Design	American Concrete Institute	October 6, 2010	.75 (7.5 hours)[1]
B.	Energy Code, Plan Review, MN Rules 1322, 1323	Minnesota Department of Labor and Industry, Construction Codes and Licensing Division	October 7, 2010	2.5 (7.5 hours of class
C.	Wood as a Structural and Sustainable Choice Workshop	Wood Products Council – Woodworks	October 26, 2010	3.5 PDH (4 hour class)

[1] One CEU consists of ten hours.

3. The Simplified Design seminar, for a total of .75 Continuing Education Units, or 7.5 hours focused on design of concrete buildings of moderate size and height in accordance with ACI 318-08 IBC 2009, and ASCE 7-05. This seminar was directed towards civil, architectural, and structural engineers, and building officials involved in concrete buildings, and discussed complying with the building code requirements for structural concrete. ACI 318 is incorporated in the Minnesota Building Code, and provides for Building Code Requirements for structural concrete. ASCE 7-05 is also incorporated into the Minnesota Building Code, and provides for minimum design loads for building and other structures.

4. The Energy Code, Plan Review, MN Rules 1322, 1323 seminar for a total of 2.5 Continuing Education Units covered MN Rule 1322, which is incorporated in the Minnesota Building Code and provides for Minnesota Energy Code for dwelling construction. The seminar also covered MN Rule 1323, which is incorporated into the Minnesota Building Code and provides for Minnesota Energy Code for commercial buildings.

5. The Wood as a Structural and Sustainable Choice Workshop for a total of 4 hours of class focused on Chapter 23 of the IBC, which is incorporated into the Minnesota Building Code.

6. The above described live instruction courses are submitted to the satisfy the requirements of the Stipulation and Order issued by the Board, dated June 12, 2008.

FURTHER AFFIANT SAYETH NOT.

Dated: 10/27/10

R. Arlen Heathman

Subscribed and sworn to before me this 28 day of October, 2010

Notary Public

DANIEL P. DODA
NOTARY PUBLIC - MINNESOTA
My Comm. Exp. Jan. 31, 2013

Affidavit of R. Arlen Heathman
In Support of His Response to Notice
of Hearing to Consider Additional Discipline

Exhibit A

Dated October 27, 2010

Exhibit A - 1

American Concrete Institute®
Advancing concrete knowledge

American Concrete Institute

Presents 0.75 Continuing Education Units (7.5 AIA/CES LU/HSW)
to

Robert Heathman

for Participation in the Simplified Design seminar in
Minneapolis, MN on October 6, 2010.

Michael L. Tholen
Education Programs Director
Ph 248-848-3700
www.concreteseminars.com

CONTINUING EDUCATION AIA

Approved Course Provider:
American Institute of Architects (G115;SMD)
Florida Board of Professional Engineering (Provider # 0003855)
Louisiana Professional Engineering and Land Surveying Board
North Carolina Board of Examiners for Engineers and Surveyors
Wisconsin Safety and Buildings Division(Course NO 6467)

American Concrete Institute®
Advancing concrete knowledge

Welcome to the ACI Seminar

Simplified Design of Reinforced Concrete Buildings for Moderate Size and Height

Lawrence C. Novak, SE, SECB, LEED® AP,Director of Engineered Buildings, Portland Cement Association, Skokie, IL. Novak has more than 20 years of experience as a structural engineer on high-rise, mid-rise and special use structures throughout the world, including seismic regions. He is the Director of Engineered Buildings with the Portland Cement Association. Prior to joining the PCA, he was an Associate Partner with Skidmore, Owings & Merrill where he recently served as the lead structural engineer for the Burj Dubai Tower, the world's tallest building. Novak serves on several technical structural committees and is an active member of the American Concrete Institute including ACI 318 Code Subcommittee E, ACI 445 on Shear and Torsion, ACI 445-A on Strut and Tie Modeling, ACI 209 on Creep and Shrinkage and ACI 130 on Sustainability of Concrete. He is an active member of the American Society of Civil Engineers and the Structural Engineers Association of Illinois and he has served on the Board of Directors of several engineering organizations including SEAOI, TCA and the Illinois Engineering Hall of Fame. He has co-authored numerous publications on structural engineering and is the recipient of the Structural Engineers Association of Illinois' Meritorious Publication Award for both 2001 and 2008, the National Council of Structural Engineers Associations' Outstanding Structural Engineering Publication Award for 2001 and the United Kingdom's Oscar Faber Award for 2002. In addition to being a Licensed Structural Engineer, Mr. Novak is a LEED® Accredited Professional and a Certified Structural Peer Reviewer.

Amy Reineke Trygestad, P.E., is an independent consultant in the concrete industry, specializing in post-tensioned concrete design and construction. She was previously with the Portland Cement Association as a Regional Engineering Manager for the Central United States. She was also a structural engineer at Ericksen Roed & Associates, a major design firm in St. Paul, MN. Reineke Trygestad has a Masters degree in Civil Engineering from the University of Minnesota. She is an active member of the American Concrete Institute, the American Society of Civil Engineers, and the Minnesota Concrete Council.

ACI Seminar

ACI/PCA Simplified Design of Concrete Buildings of Moderate Size and Height

A One - Day Seminar

Register Now

Increase your design efficiency and reduce the time it takes to design small to moderate size buildings by applying the design procedures that you will learn at this seminar in accordance with ACI 318-08, IBC 2009, and ASCE 7-05.

Sponsored jointly by the Portland Cement Association and ACI.

Increase your design efficiency and reduce the time it takes to design small to moderate size buildings by applying the design procedures that you will learn at this seminar in accordance with ACI 318-08, IBC 2009, and ASCE 7-05.

Sponsored jointly by the Portland Cement Association and ACI.

BY REFERENCE PART OF THE MINNESOTA STATE BLDG CODE

Overview

Topics to be covered include:

-Structural systems layout

-Floor systems

-Determination of loads, including wind and earthquake forces

-General reinforced concrete requirements, including simplified design of slabs, beams, columns, walls, and footings

-Detailed building design examples will be presented

Free Publications

As part of the seminar, you will receive **FREE** the following publication(s) a **$120.00** value:

PCA EB104 Simplified Design: Reinforced Concrete Buildings of Moderate Size and Height

Seminar lecture notes authored by the Portland Cement Association

Who should attend?

Civil, architectural, and structural engineers, building officials, and others involved with reinforced concrete buildings of moderate size and height.

Seminar Topics

This seminar will focus on design of concrete buildings of moderate size and height, in accordance with ACI 318-08, IBC 2009, and ASCE 7-05. The purpose of the seminar is to provide civil, architectural, and structural engineers with ways to simplify design procedures, thus reducing time required to analyze, proportion, and detail small to moderate size projects, while still complying with the ACI 318-08 Building Code Requirements for Structural Concrete. Various design considerations that need to be addressed in the structural design and detailing of reinforced concrete buildings will be discussed including fire resistance, economy, and forming techniques. Numerous design examples will be presented. The examples include wind load calculations, seismic force, analysis, simplified design of different slab systems, beams, columns, structural walls, and footings with emphasis on economy. Results obtained fro the simplified design methods are compared to those obtained from computer programs. The seminar is based on the book by PCA, Simplified Design of Reinforced Concrete Buildings of Moderate Size and Height. In addition to detailed design examples, the PCA book includes numerous time saving design aids, graphs, and tables.

- Frame Analysis
- Design of Beams and One-Way Slabs
- Design of Two-Way Slabs
- Design of Columns
- Design of Structural Walls
- Design of Footings
- Structural Detailing of Reinforcement for Economy
- Design Considerations for Economical Formwork
- Design Considerations for Fire Resistance
- Design Considerations for Earthquake Forces

Locations & Dates

Click here to sort by State

Minneapolis, MN
Oct 6, 2010 — Ramanda Plaza Minneapolis, 1330 Industrial Boulevard — Minnesota Chapter ACI
Instructor(s) for this Seminar will be:
Lawrence C. Novak & Amy Reineke Trygestad

Boston, MA
Oct 20, 2010 — Hilton Garden Inn Boston/Waltham, 420 Totten Pond Road — New England Chapter ACI
Instructor(s) for this Seminar will be:
Dominic J. Kelly & Basile G. Rabbat

Seattle, WA
Nov 10, 2010 — Embassy Suites Hotel Seattle-Tacoma International, 15920 W. Valley Hwy. — Washington Chapter ACI
Instructor(s) for this Seminar will be:
Basile G. Rabbat & Andrew W. Taylor

Charlotte, NC
Nov 17, 2010 — Venue To Be Announced — Carolinas Chapter ACI
Instructor(s) for this Seminar will be:
James R. Harris & Mahmoud Kamara

St. Louis, MO
Dec 1, 2010 — Venue To Be Announced — Missouri Chapter ACI
Instructor(s) for this Seminar will be:
Mahmoud Kamara & Andrew W. Taylor

Houston, TX
Dec 15, 2010 — Venue To Be Announced — Houston Chapter ACI
Instructor(s) for this Seminar will be:
James R. Harris & Lawrence C. Novak

Register Now

You will be sent a confirmation of your registration with the address of the Seminar. Please verify the date and location, since changes may occur.

Registration begins at 7:45 a.m. The seminar will begin at 8:00 a.m. and end at 5:00 p.m. Lunch will be from 12:00 p.m. to 1:00 p.m. Breakfast breads/pastries, lunch, coffee breaks, and publications are included in your registration fee.

Faculty

Two of the following will be your instructors:

James R. Harris, PhD, PE, FACI, Principal, J. R. Harris & Company, Structural Engineers, Denver, CO. Harris received his M.S. and Ph.D. in Structural Engineering from the University of Illinois. His experience includes the design or evaluation of several hundred structures ranging from dwellings to high-rise buildings, including industrial facilities, long spans, buildings in the highest seismic zones, excavation bracing, pile and pier foundations, vibration issues, and historic building renovations. His research has focused on loading and response of structures, particularly earthquake and snow loadings, and on improving the formulation and use of engineering standards. He has written over 30 reports and journal articles on the results of his research and practice. His professional society affiliations are numerous. Harris is a member of ACI Committee 318, Structural Concrete Building Code and two subcommittees. He also serves on various technical committees of the American Society of Civil Engineers, the American Institute of Steel Construction, the Applied Technology Council, the Building Seismic Safety Council, the International Standards Organization, the Mid-America Earthquake Engineering Research Center, the Portland Cement Association, and the Structural Engineering Institute of ASCE. His contributions to the advancement of standards for structural engineering practice were recognized by election to the National Academy of Engineering in 2005.

Mahmoud Kamara, PhD, Senior Structural Engineer, Portland Cement Association, Skokie, IL. Mahmoud Kamara is PCA's senior structural engineer for engineered buildings. He is involved in developing technical publications and coordinating and conducting seminars. He is the coauthor of numerous PCA publications and technical guides including; Notes on ACI 318-08 Building Code, Simplified Design of Reinforced Concrete Buildings of Moderate Size and Heights and Blast Resistant Design Guide for Reinforced Concrete Structures. He is an active member of the American Concrete Institute and the American Society of Civil Engineers and he chairs ACI/ASCE Joint Committee 421 Design of Reinforced Concrete Slabs. He received the ACI Structural Research Award in 1992 and is the recipient of the Structural Engineers Association of Illinois' Meritorious Publication Award for 2008. Prior to joining PCA, Kamara held faculty positions at the University of Alexandria, Egypt and the University of Alabama at Birmingham. His experience also includes structural engineering design and consulting, software developing and structural forensic investigations.

Dominic J. Kelly, MS, PE, SE, Consulting Structural Engineer, Simpson Gumpertz & Heger Inc, Boston, MA. Kelly has 20 years experience in the design of new structures, the evaluation of existing structures, the repair of damaged structures, and the strengthening of deficient structures. He is called on frequently to perform structural adequacy and failure analyses. He is an active participant in the committee work of several professional associations. Kelly is currently a member of ACI 318, Structural Concrete Building Code and its subcommittees on Shear and Torsion and on Safety, Serviceability, and Analysis. He is a member of ASCE 7 Seismic Task Committee, which prepares seismic design provisions referenced by the model building codes.

Lawrence C. Novak, SE, SECB, LEED® AP,Director of Engineered Buildings, Portland Cement Association, Skokie, IL. Novak has more than 20 years of experience as a structural engineer on high-rise, mid-rise and special use structures throughout the world, including seismic regions. He is the Director of Engineered Buildings with the Portland Cement Association. Prior to joining the PCA, he was an Associate Partner with Skidmore, Owings & Merrill where he recently served as the lead structural engineer for the Burj Dubai Tower, the world's tallest building. Novak serves on several technical structural committees and is an active member of the American Concrete Institute including ACI 318 Code Subcommittee E, ACI 445 on Shear and Torsion, ACI 445-A on Strut and Tie Modeling, ACI 209 on Creep and Shrinkage and ACI 130 on Sustainability of Concrete. He is an active member of the American Society of Civil Engineers and the Structural Engineers Association of Illinois and he has served on the Board of Directors of several engineering organizations including SEAOI, TCA and the Illinois Engineering Hall of Fame. He has co-authored numerous publications on structural engineering and is the recipient of the Structural Engineers Association of Illinois' Meritorious Publication Award for both 2001 and 2008, the National Council of Structural Engineers Associations' Outstanding Structural Engineering Publication Award for 2001 and the United Kingdom's Oscar Faber Award for 2002. In addition to being a Licensed Structural Engineer, Mr. Novak is a LEED® Accredited Professional and a Certified Structural Peer Reviewer.

Basile G. Rabbat, PhD, SE, Honorary Member of ACI, Manager, Structural Codes, Portland Cement Association, Skokie, Illinois. Rabbat received his MS and PhD in Structural Engineering from the University of Toronto. He has published over fifty papers related to the behavior and design of structural concrete. He serves as Secretary of ACI 318, Structural Concrete Building Code; and is a member of ACI 215, Fatigue of Concrete. He is a Fellow of the Precast/Prestressed Concrete Institute and serves on the PCI Committee on Bridges, and the Research Committee. Rabbat's other professional affiliations include the American Railway Engineering and Maintenance-of-Way Association, the American Society of Civil Engineers, and the Transportation Research Board. He is a licensed structural engineer in the State of Illinois.

Andrew W. Taylor, PhD, SE, FACI, Associate, KPFF Consulting Engineers, Seattle, WA. Taylor has 23 years experience in structural engineering research and practice, including seven years with the Building and Fire Research Laboratory at the National Institute of Standards and Technology. Taylor received his BSCE and MSCE degrees in 1983 and 1985 from the University of Washington, and his PhD from the University of Texas at Austin in 1990. He has extensive research experience in experimental and theoretical investigations of the seismic behavior of reinforced concrete structures. His specialties include performance-based seismic design of concrete structures, seismic base isolation, and seismic damping systems, particularly when applied to the design of critical facilities that require enhanced levels of seismic performance. Taylor is a Fellow of the American Concrete Institute, a member of ACI Committee 318 – Structural Building Code, and is Secretary of ACI Committee 374 – Performance-Based Seismic Design of Concrete Buildings. He has served as a member of technical and advisory committees of the Structural Engineers Association of Washington, the Building Seismic Safety Council, the Multidisciplinary Center for Earthquake Engineering Research, The Portland Cement Association, and the National Research Council. He has served on reconnaissance teams following the 1994 Northridge, 1995 Kobe, and 2001 Nisqually earthquakes, and is a registered Structural Engineer in the

State of Washington.

Amy Reineke Trygestad, P.E., is an independent consultant in the concrete industry, specializing in post-tensioned concrete design and construction. She was previously with the Portland Cement Association as a Regional Engineering Manager for the Central United States. She was also a structural engineer at Ericksen Roed & Associates, a major design firm in St. Paul, MN. Reineke Trygestad has a Masters degree in Civil Engineering from the University of Minnesota. She is an active member of the American Concrete Institute, the American Society of Civil Engineers, and the Minnesota Concrete Council.

NOTE: ACI is not responsible for the statements or opinions expressed by the Faculty. If necessary to substitute an instructor an individual with similar qualifications will be used.

Registration Fees

$597 Non Member Registration Fee
$457 ACI National Members Registration Fee
$125 Full-Time Students (with proof of enrollment)

Register Now

Continuing Education Credit

Attendees receive 0.75 CEUs or 7.5 LUs, worth 7.5 PDHs.

- American Institute of Architects (G115;SMD)
- Florida Board of Professional Engineers (Provider #0003855)
- Louisiana Professional Engineering and Land Surveying Board
- North Carolina Board of Examiners for Engineers and Surveyors
- Wisconsin Safety and Buildings Division (Course 6467)

Request for Custom Seminar Quote

An in-depth, customized seminar on this topic or any other ACI seminar topic can be brought directly to your offices. Pricing is dependent upon seminar topic, length, and number of attendees. Prices subject to change without notice. Publications pertaining to the seminar subject may be purchased at a substantial discount when an in-house seminar is held. For more information, click here, or contact Eva Korzeniewski, ACI's Seminar Coordinator, at 248-848-3754, or eva.korzeniewski@concrete.org.

Fall 2010 ACI Educational Seminars

seminars at-a-glance

For more information on ACI seminars, visit www.concreteseminars.com

CONCRETE REPAIR BASICS

One-day seminar for engineers, repair contractors, material suppliers, maintenance personnel, and public works engineers. Attendees will learn the best methods and materials for economical and effective concrete repairs. The seminar will cover causes and evaluation of problems in deteriorating concrete, repair techniques, repair materials, cracks and joints, protection systems, overlays, and specifications for structures. Complimentary publications include ACI 201.1R, ACI 224.1R, ACI 364.1R, ACI 437R, ACI 546R, and seminar lecture notes.

CONCRETE SLABS-ON-GROUND

One-day seminar for designers, specifiers, architects, engineers, contractors, building owners, and government agencies. Participants will learn about setting expectations for serviceability; sustainability; engineering considerations, loads, soil support systems, and low-shrinkage concrete mixtures with good finishability; minimizing problems with curling, shrinkage, joints, and surface tolerances; placing and finishing equipment; thickness design; designing for shrinkage, joints, details, and reinforcing; curing; surface treatments including polishing; requirements for plans and specifications; preconstruction meetings; and problem recognition and remediation. Complimentary publications include: ACI 302.1R-04, ACI 302.2R-06, ACI 360R-10, industry-related articles, and seminar lecture notes.

ANCHORAGE TO CONCRETE

One-day seminar for engineers, architects, specifiers, and building officials. This seminar will cover the basic ACI design framework for anchorage to concrete, the background of ACI 318-08 Appendix D, several design examples using the provisions in ACI 318-08 Appendix D, and the background behind ACI 355.2-07 anchor qualification requirements. After listening to knowledgeable instructors and working through both simple and more complex problems, you should have the tools you need to design structural connections to concrete using the anchorage provisions of ACI 318-08 with confidence. Complimentary publications include ACI 355.2-07, excerpts from ACI 318-08, excerpts from *PCA Notes*, and seminar lecture notes.

SIMPLIFIED DESIGN OF CONCRETE BUILDINGS OF MODERATE SIZE AND HEIGHT, AN ACI/PCA SEMINAR

One-day seminar will focus on the design of concrete buildings of moderate size and height, in accordance with the latest information in ACI 318-08, 2009 IBC, and ASCE 7-05. The purpose of this seminar is to provide civil, architectural, and structural engineers with ways to simplify design procedures, thus reducing time required to analyze, proportion, and detail small to moderate size projects while still complying with ACI 318-08, "Building Code Requirements for Structural Concrete." Various design considerations that need to be addressed in the structural design and detailing of reinforced concrete buildings will be discussed. Numerous time-saving shortcuts and design aids will be introduced. Complimentary publications include PCA EB104 and seminar lecture notes.

TROUBLESHOOTING CONCRETE CONSTRUCTION

One-day seminar for contractors, design engineers, specifiers, government agencies, and material suppliers. This seminar will provide attendees with solutions to problems with concrete. The seminar will cover placing reinforcement, preventing most cracks, making functional construction joints, vibrating concrete properly, detecting delaminations, and identifying causes of deteriorating concrete. Complimentary publications include: ACI 301, ACI 302.1R, ACI 303R, ACI 303.1, ACI 308R, ACI 309.2R, and seminar lecture notes.

CONTINUING EDUCATION CREDIT

Seminar attendees will receive 0.75 Continuing Education Units (CEUs), worth 7.5 Professional Development Hours (PDHs) per day. Professional Engineers can convert CEUs to PDHs to fulfill their continuing education requirements. ACI is a Registered Provider with the American Institute of Architects, and several state licensing boards.

616047

Customer's Order No. ________ DATE 10-6-10

SOLD TO R. Arlen Heathman P.E.

ADDRESS SSS Engineering Inc

SALESMAN ________ TERMS ________

CASH	CHARGE	C. O. D.	PAID OUT	RETD. MDSE.	RECD. ON ACCT.

PP

QUAN.	DESCRIPTION	PRICE	AMOUNT	
	ACI One-day Seminar			
	Simplified Design			
	10-6-2010			
	Thank You!			
	AMERICAN CONCRETE INSTITUTE			
	BOX 9094			
	FARMINGTON HILLS, MI 48333			

ALL Claims and Returned Goods MUST Be Accompanied By This Bill

SIGNATURE ________

CODES AND REFERENCE MANUALS - 2007 MSBC

* 2006 International Building Code (Latest Printing)
* 2006 International Residential Code (Latest Printing)
* 2006 International Fire Code (Latest Printing)
* 2006International Mechanical Code (Latest Printing)
* 2006 International Fuel Gas Code (Latest Printing)
* 2005 National Electrical Code (NFPA 70)
* ASHRAE 62 – 2001 Ventilation/Indoor Air Quality
* ASHRAE 62n – 2001 Mechanical Design Ventilation Rates (supplement)
* ASHRAE 15 – 2001 Mechanical Refrigeration Safety Code
* ASHRAE 34 – 2004 Refrigerant Designation & Safety Code
* SMACNA – 1995 HVAC Duct Construction Standard
* NFPA 96 – 2001 Ventilation & Fire Protection for Commercial Cooking Hoods
* NFPA 58 – 2004 Liquefied Petroleum Gases
* NFPA 13 – 2002 Installation of Fire Sprinklers
* NFPA 13R – 2002 Installation of Fire Sprinklers for Multifamily
* NFPA 13D – 2002 Installation of Fire Sprinklers for Dwellings
* NFPA 72 – 2002 Installation of Fire Alarm Systems
* 207 Minnesota Building Conservation Code (MN Rule 1311/GREB)
* ACI 318-2005 Building Code Requirements for Structural Concrete
* ACI 530-05/ASCE 5-05/TMS 402-05 Building Code Requirements for Masonry Structures (in one comprehensive manual from ICC)
* ASCE 7 – 2005 Minimum Design Loads for Buildings & Other Structures
* 2007 Minnesota State Building Code (Will contain MN Rules 1300, 1301, 1302, 1303, 1305, 1306, 1307, 1309, 1311, 1315, 1325, 1335, 1350, 1360, 1361 and 1370.)
* 2007 Minnesota State Fire Code (MN Rule 7510)
* MN Rule 1323 – MN Energy Code for Commercial Buildings
* ANSI/ASHRAE 90.1 – 2004 Commercial Building Energy Code
* MN Rule 1322 – MN Energy Code for Dwelling Construction
* MN Rule 4715 – 2003 Minnesota State Plumbing Code
* MN Rule 1346 – 2007 Minnesota Mechanical Code – MN Amendments to the 2000 IMC & 2000 IFGC
* ICC A117.1 – 2003 Accessibility Code
* NDS – 2005 National Design Specification for Wood Construction
* ICC 300 – 2002 ICC Standard on bleachers, folding & telescoping seating and grandstands.

* *"Must Have" Codes and Rules for a Building Department in Minnesota*

Affidavit of R. Arlen Heathman In Support of His Response to Notice of Hearing to Consider Additional Discipline

Exhibit B

Dated October 27, 2010

LABOR & INDUSTRY

CONSTRUCTION CODES AND LICENSING DIVISION

CERTIFICATE OF TRAINING
Equivalent to 2.5 CEUs
Presented to

R. Arlen Heathman

upon successful completion of the

Energy Code, Plan Review, MN Rules 1322, 1323

Presented on: 10/07/2010

Stephen P. Hernick

Stephen Hernick
State Building Official

Education services

This section provides education for building officials, the design profession and the construction industry through several biannual training seminars given two times a year around the state.

The section also meets with and provides education and input to other construction-related industries such as the Homebuilders Association, Minnesota Institute of Architects, Minnesota Coalition of Structural Engineers, Consulting Engineers Council, Minnesota Society of Heating, Air Conditioning and Refrigeration Engineers and other associations.

Mike Godfrey, supervisor, (651) 284-5862

Seminars

CCLD Fall Seminar: Energy Code, Plan Review, MN Rules 1322, 1323

This seminar will cover the basics on completing a plan review in compliance with the Minnesota Residential Energy Code, MN Rule 1322 using a house plan, including construction document requirements, foundation insulation systems, mechanical ventilation, make-up air, heating and cooling systems, building heat loss and radon control.
Read more and register .

55th Annual Institute for Building Officials - Jan. 5-14, 2011

The Annual Institute for Building Officials provides a continuing education opportunity for code officials and inspectors from the building, electrical, fire, housing, mechanical, elevator and plumbing fields as well as permit technicians. **Read more and register ...**

ICC Upper Great Plains Region III Institute - Feb. 7-11, 2011

The 2011 Upper Great Plains Region III Educational Institute features topics of interest to all building design, construction and inspection professionals. Separate tracks provide a week-long course of education for everyone. The institute also provides an excellent opportunity for networking, sharing experiences and solving problems with colleagues.
Read more and register ...

Sign up to be notified of future seminars by registering for the **CCLD Review** newsletter

View past editions of the *CCLD Review* and sign up for notice of publication here.

View a summary of 2010 legislation affecting construction trades and licensing in Minnesota.

Exhibit B - 2

Events Registration System [Administrator]

Please print this page for your records.

Thank you!

Your registration has been submitted and you cannot modify the registration information. Please print this page for your records before you make a payment to finalize the registration.

[redacted]

Attendee

Registration reference number:
102771556U6DX

Name:
R. Arlen Heathman

Date(s):
10/7/2010 - 10/7/2010

Payment information

Payment method:
Online (VISA, MasterCard)

Total amount due:
$85.00

Event

Energy Code, Plan Review, MN Rules 1322, 1323
This seminar will cover the basics on completing a plan review in compliance with the MN's Residential Energy Code, MN Rule 1322 using a house plan, including construction document requirements, foundation insulation systems, mechanical ventilation, make-up air, heating and cooling systems, building heat loss and radon control. The last hour and a half of the program will be on section 5 of ASHRAE Standard 90.1-2004, compliance forms for commercial energy code plan submittal.

Location

14201 Nicollet Ave. S. Burnsville, MN, 55337, Phone: 952.435.2100

More information

Please bring a copy of MN Rule 1322 with you to class.

Please print this page for your records.

Exhibit B - 3

Affidavit of R. Arlen Heathman
In Support of His Response to Notice
of Hearing to Consider Additional Discipline

Exhibit C

Dated October 27, 2010

WOODWORKS FOR NON-RESIDENTIAL CONSTRUCTION

CONTINUING EDUCATION

This certifies that:

R Arlen Heathman
Attendee

Rochester, Mn
Address

16177
Licensee Number(s)

Certificate of Completion

Wood as a Structural and Sustainable Choice Workshop
Eau Claire, Wisconsin, October 26, 2010

Attended 3 of 3 sessions

- [x] **Practical Use of Wood Structural Building Components** *(Presenters: Archie Landreman/Tom Milton, #10NC03, 1.5 HSW)*
- [x] **Designing Durable Wood Buildings** *(Presenter: Tom Milton, #10F016, 1.0 HSW/SD)*
- [x] **Sustainable Design with Wood** *(Presenter: Archie Landreman, #10S018, 1.0 HSW/SD)*

AIA Provider: WoodWorks Wood Products Council
601-207 West Hastings, Vancouver, BC V6B 1H7, Tel: 604-639-0744

Tom Milton Archie Landreman

Tom Milton Archie Landreman
Regional Director, WoodWorks North-central, AIA Provider Number: G516

APA Canada SLMA Southern Forest Products Association Southern Pine

Exhibit C - 1

photos supplied by APA

Radisson Suite Hotel
400 West St. Germain

Radisson Hotel Duluth – Harborview
505 West Superior Street

Courtyard by Marriott
1080 28th Avenue South

Doubletree Hotel Rochester
150 South Broadway

The Plaza Hotel & Suites
1202 West Clairemont Avenue

Jefferson Street Inn
201 Jefferson Street

Radisson Paper Valley Hotel
333 West College Avenue

WoodWorks is an approved AIA and ALA provider. Attendees can earn 3.5 AIA, ALA or PDH credits for attending this workshop. This program has also been submitted to the Minnesota Department of Labor and Industry, Construction Codes and Licensing Division and the Wisconsin Department of Commerce, Safety and Buildings Division for continuing education credits for building officials/inspectors.

Register at woodworks.org

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE
PAID
OAK BROOK, IL
PERMIT NO. 100

Wood Products Council – WoodWorks
153 Carriage Way Drive
Burr Ridge, IL 60527

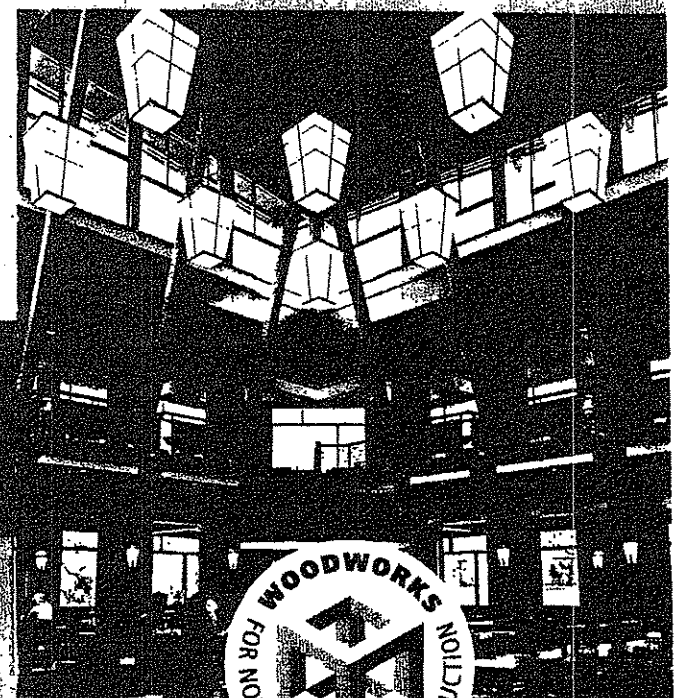
R HEATHMAN
6416 W RIVER RD NW
ROCHESTER, MN 55901-8884

2010 WOOD DESIGN WORKSHOPS

FREE – Earn 3.5 Education Credits

Register at woodworks.org

2010 WOOD DESIGN WORKSHOPS

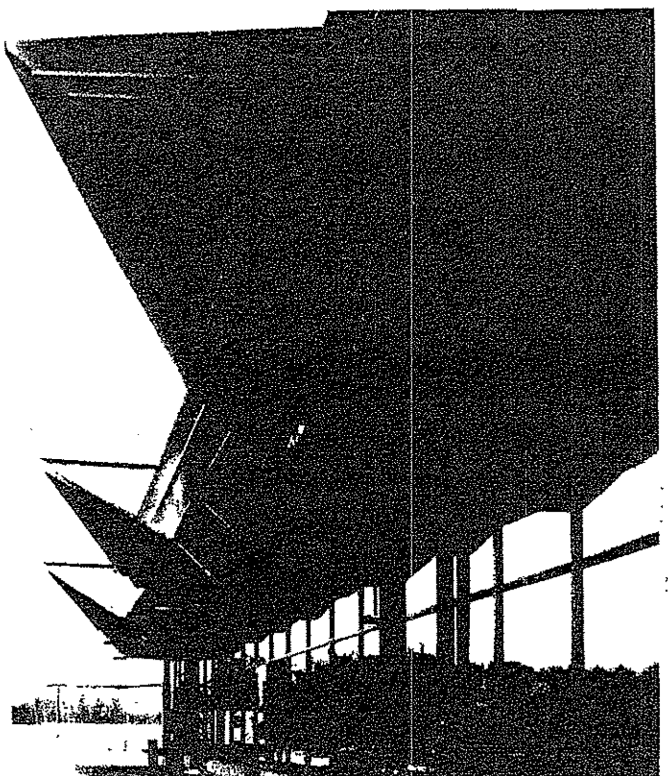


Exhibit

Discover information and techniques that can enhance the performance of your next non-residential wood building. Register at woodworks.org—by clicking the appropriate link under "Events" on the home page.

Who Should Attend

Architects • Specifiers • Structural Engineers • Building Officials • Commercial Builders • Developers/Building Owners • Lumber Dealers



Topics and Speakers

Practical Use of Wood Structural Building Components 1.5 HSW credits

This presentation will provide an overview of structural building components used in wood buildings, including: I-Joists, wood roof and floor trusses, wall panels, structural insulated panels (SIPs), glulam beams and columns, LVL, LSL and PSL wood beams. Comparing the various products available, topics will include advantages such as reduced cost and speed of construction, as well as the unique characteristics of each, specifying and ordering, applications and field conditions such as spans, loads and bearing conditions.

Designing Durable Wood Buildings

1.0 HSW credits

We all know that wood is a sustainable building material, but in order for it to remain durable over many years, we have to build structures that minimize moisture exposure and potential wood deterioration. Preventing biological deterioration on exterior wood members starts by diverting and controlling moisture through proper design, using eaves, overhangs, orientation, flashing, spacing, column bases and other details. However, where moisture exposure to structural wood products cannot be prevented, preservative treated wood must be specified. Focusing on both approaches, this presentation uses dozens of examples of exterior beams, columns, decks, balconies and other applications to provide detailed approaches to protecting wood materials.

Sustainable Design with Wood 1.0 HSW/SD credits

This presentation will use case study examples to demonstrate the attributes of wood that make it an obvious choice for green building. The scientific measurement of "green" will be introduced through discussion of life cycle assessment (LCA), which is becoming the world standard for evaluating the sustainability of materials and assemblies and improving environmentally-based decision making. The world's most popular green rating systems will be introduced as will their relationships to wood and forestry issues in North America. Examples of how wood can be used to reduce greenhouse gas emissions and improve occupant comfort will also be addressed.

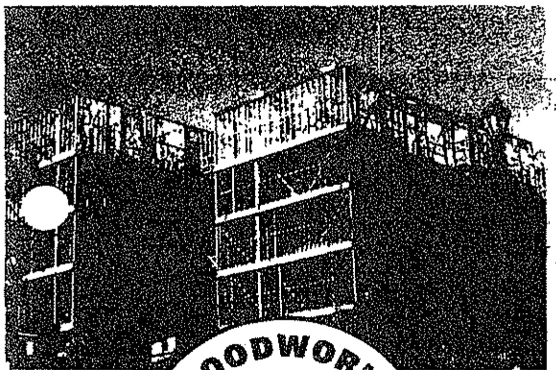
AGENDA

7:30 a.m.	Registration and Refreshments
8:00 a.m.	Practical Use of Wood Structural Building Components
9:30 a.m.	Break
9:45 a.m.	Designing Durable Wood Buildings
10:45 a.m.	Break
11:00 a.m.	Sustainable Design with Wood
12:30 p.m.	Complimentary Buffet Lunch

Speakers:
Archie Landreman, WoodWorks Technical Director, Wisconsin
Tom Milton, WoodWorks Technical Director, Minnesota

WoodWorks provides free resources that can help you design and build non-residential structures out of wood more easily and at less cost.

WoodWorks is an initiative of the Wood Products Council, which includes all of the major North American wood associations.



WOOD DESIGN & BUILDING SERIES

WOODWORKS FOR NON-RESIDENTIAL CONSTRUCTION

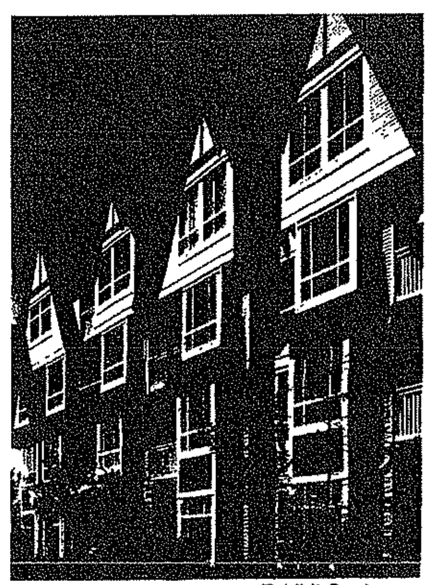
Wood-frame construction is the predominant method for building homes in the United States, and building designers and contractors are increasingly using wood framing for commercial, industrial and other non-residential structures. Wood-frame buildings are economical to build, heat and cool; they provide maximum comfort and aesthetics to occupants; and they are strong and durable. Wood is also a versatile building material, adaptable to traditional as well as contemporary building styles.

The *International Building Code (IBC)* gives architects, engineers, general contractors and others guidelines and design options along with the freedom to build non-residential wood-frame buildings using different design methodologies. It also offers a number of increased opportunities for wood-frame construction, as compared to those offered by previous codes. In addition, industry associations offer powerful tools to help building professionals design with wood.

IBC Chapter 23: Wood Use

Chapter 23 of the IBC governs materials, design, construction and quality of wood members and their fasteners, covering wood use in buildings of Construction Types III, IV and V:

- **Type III** is construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by the IBC. Fire retardant-treated wood framing complying with Section 2303.2 is permitted within exterior wall assemblies with a two-hour rating or less.
- **Type IV** construction, also known as Heavy Timber or HT, is that in which the exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces. Type IV construction must comply with the provisions of Section 602.4 of the IBC. Fire retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies with a two-hour rating or less.
- **Type V** is construction in which the structural elements, exterior walls and interior walls are of any materials permitted by the IBC.



Aside from its prescriptive conventional construction provisions, much of Chapter 23 is performance-based and relies in large part on references to the design standards of the American Forest & Paper Association (AF&PA), most notably the *National Design Specification® for Wood Construction (NDS®)* and the *Special Design Provisions for Wind and Seismic (Wind and Seismic)*.

Code developers organized Chapter 23 around three design methodologies:

ALLOWABLE STRESS DESIGN (ASD)
Section 2306 covers IBC guidelines for structural analysis of wood elements in buildings using Allowable Stress Design methods. ASD is the traditional method of engineering structures. As a deterministic design methodology, ASD prescribes maximum load combinations specified by the building code. The one third allowable stress increase for wood loads is no longer allowed under the 2006 IBC. However, the load duration factor is still permitted, as it is unique to wood and wood connections.

LOAD AND RESISTANCE FACTOR DESIGN (LRFD)
Providing an alternative to ASD, U.S. building codes began adopting Load and Resistance Factor Design for wood in the 1990s as a reliability-based design methodology, compared with the deterministic design approach of ASD. As LRFD has become more common, building professionals and agencies must now clearly distinguish which design provisions are appropriate for ASD versus LRFD.

Load combinations and load factoring account for any major advantages in design results when using LRFD versus ASD. The underlying premise of load factoring is to move more of the safety factor, or reliability, to the loads side, since more information is available on loads.

Building professionals have found that an LRFD approach typically results in more efficient wood member sizing and fire resistance design. For example, one study by the American Wood Council (AWC) found that designers could use wood structural members with as much as 30 percent smaller cross sections to carry multiple transient live loads (roof live and occupancy) using LRFD versus ASD load combinations.

ASD/LRFD Comparison of Structural Headers for Multi-story Structures

Structural Headers	ASD	LFRD
Visually graded #2 HF, DFL, SP, SPF*	Two – 2x10	Two – 2x8
16F Glue-laminated timber	3" x 8-1/2"	3-1/8" x 6-7/8"
1.8 E Laminated Veneer Lumber	Two 1-3/4" x 7-1/4"	Two 1-3/4" x 5-1/2"

**Hem-Fir, Douglas Fir/Larch, Southern Pine, Spruce Pine Fir* *Figure 1*
Source: American Wood Council

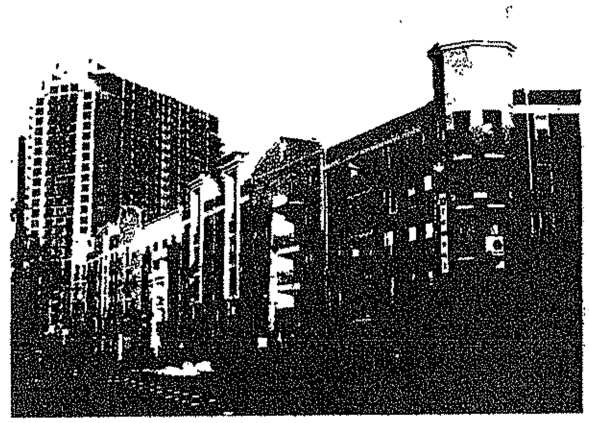
Examples of this application are headers and studs on the first floor of a multi-story non-residential wood building *(Figure 1)*.

The LRFD methodology for wood adopts code-accepted load factors that smooth reliability across load cases. It also adopts the concept of a target reliability index for a reference design case, and then adjusts designs to match that target. LRFD also permits additional adjustment of designs based on individual data set analysis.

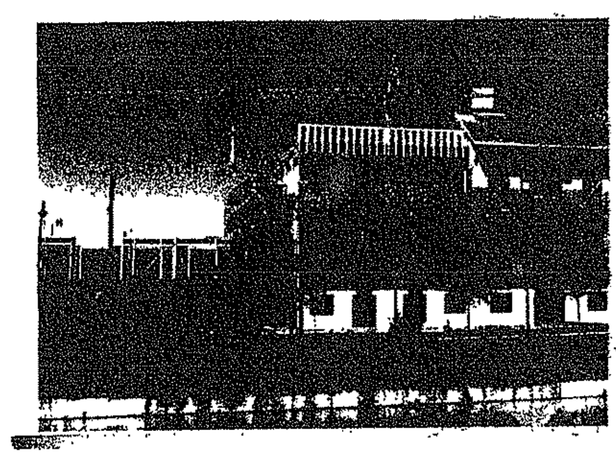
The 2005 NDS describes both the ASD and LRFD design methods, and shows design examples using both approaches.

CONVENTIONAL LIGHT-FRAME CONSTRUCTION
Section 2308 of the IBC covers conventional light-frame construction. This methodology describes design and construction techniques that use typical configurations and methods, which do not require calculation of loads or analysis by a design professional; they are based on commonly accepted engineering practice and experience.

The IBC section on conventional light-frame construction defines those situations in which prescriptive requirements apply. It also contains requirements for lateral bracing and continuous load paths, and includes engineered span tables for joists and rafters and for girders and headers.



The award-winning Atlantic Station development in Atlanta includes more than two million square feet of wood-frame structures. Architects relied on wood's versatility, not only to vary external elevations and add visual interest but to achieve the dual objectives of high density and cost-effectiveness. Contractors used plywood and OSB floor and roof sheathing, glulam and laminated veneer lumber (LVL) beams and other wood products in the $2 billion project, which included office, retail, condominium, loft and apartment structures.



Source: APA – The Engineered Wood Association

The IBC and its Impact on Wood Construction

Building designers may not be aware of the increased opportunities for wood-frame construction under the IBC, as compared with that allowed under previous codes. IBC provisions offer a number of advantages for wood use in a wide range of non-residential applications.

WOOD ALLOWED FOR TYPE III CONSTRUCTION

Chapter 6 of the IBC covers classification of buildings in terms of type of construction. Section 602.3 stipulates that Type III construction is that in which the exterior walls are of noncombustible materials and the interior building elements may be of any material permitted by code. The IBC permits the use of fire retardant-treated wood framing complying with Section 2303.2 within exterior wall assemblies with a two-hour rating or less, allowing increased use of wood for commercial construction.

USE GROUP SEPARATION AND FIRE WALLS

Under the IBC, designers can use a fire-rated wall to separate a building into two smaller fire areas, neither of which exceeds threshold values that require sprinkler installation. Codes do not consider this rated wall a fire wall separating buildings, but rather a fire separation assembly separating the building into fire areas.

In addition, the IBC allows fire walls of combustible material in buildings of Type V construction, allowing designers to divide the structure into separate buildings, each subject to its own height and area limits.

Under the National Fire Protection Association's NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls and Fire Barrier Walls,* designers may build a two-hour rated fire wall using two contiguous one-hour fire resistance-rated assemblies. Many wood-frame assemblies are capable of achieving the one-hour rating, which offers many opportunities for commercial building designs using wood-frame construction.

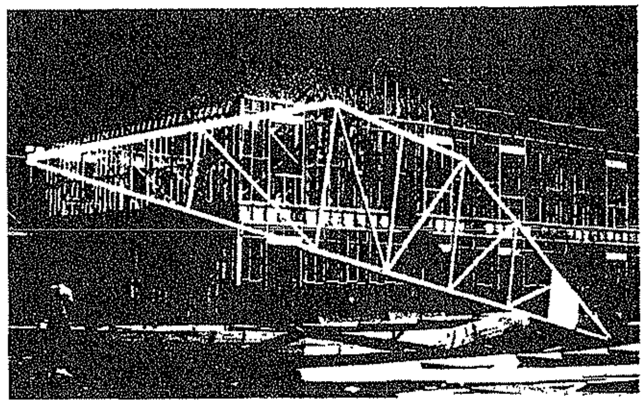
UNLIMITED AREAS

Depending on the building's end use, Section 507 of the IBC *(Unlimited Area Buildings)* permits wood buildings of unlimited area when there is a 60-foot spatial separation between the property line and the building, and when the structure is sprinklered and constructed as a Type III building.

If the structure lacks a full 60-foot-wide open perimeter but would otherwise be permitted unlimited area, the building designer can gain increased area for widths from 30-foot separation up to 60-foot separation. In fact, buildings with as little as 20-foot fire separation will be given credit for open perimeter under the IBC.

LARGER SINGLE-STORY AND MULTI-STORY SPRINKLERED BUILDINGS

According to IBC Section 506.3 *(Automatic Sprinkler System Increase),* when a building is equipped throughout with an



approved automatic sprinkler system in accordance with Section 903.3.1.1, designers may increase the area limitation set forth in Table 503 of the IBC by an additional 200 percent for multi-story buildings and an additional 300 percent for single-story buildings. This allowance offers building designers tremendous advantages for wood-frame construction.

Note also Section 504.2, which allows buildings equipped with an automatic sprinkler system to have an increase in height of 20 feet and permits an increase by one story in addition to the above area increases. This may not be done, however, if the sprinkler system was added to decrease the fire rating of an interior wall by one hour (Table 601, Footnote e). Building designers can add sprinklers for increasing heights and areas or for decreasing fire ratings, but not for both at the same time.

FIRE RESISTANCE RATINGS

Section 704.5 of the IBC permits asymmetrically tested fire resistance-rated wall assemblies (tested from the inside only) when the distance from the structure to the property line is at least five feet. This creates new possibilities for exterior wood cladding and interior wood finish work.

If the building designer does not sprinkler the structure for height and area increases, fire resistive requirements can be reduced by one hour, but to not less than one hour for all construction elements except exterior walls.

Major source documents for dimension lumber fire-endurance assemblies include:

- *ASD/LRFD Manual for Engineered Wood Construction, Chapter M16,* AF&PA
- *DCA 3 – Fire Rated Wood Floor and Wall Assemblies,* AF&PA
- *Fire Resistance Directory,* Underwriters Laboratories, Inc. (UL)

Information related to plated trusses, which must be built in accordance with Truss Plate Institute (TPI) standards, can be found in the *Metal Plate Connected Wood Truss Handbook,* Section 17, *Fire Performance of Trusses* and Section 18, *Sound Transmission and Fire Resistance Rated Truss Assemblies.*

Design and construction professionals should also check with their local building department for ordinances that are specific to the jurisdiction.

Design Tools

Approved as an American National Standard with the designation *ANSI/AF&PA NDS-2005*, the 2005 NDS serves as a dual format specification incorporating design provisions for both Allowable Stress Design and Load and Resistance Factor Design. The NDS is adopted by all model building codes in the U.S. and serves as a valuable tool to design wood structures worldwide.

OTHER RESOURCES AVAILABLE

The American Wood Council (AWC) offers several online calculators:

- The *Allowable Heights and Areas Calculator* demonstrates the degree of freedom allowed in wood construction by providing a general summary of allowable wood uses, including building height and area requirements. The web-based calculator determines maximum heights and areas for buildings of various occupancies and fire protection, based on 2006 IBC provisions for combustible Construction Types III through V.
- The *Connection Calculator* provides users with a tool to calculate capacities for single bolts, nails, lag screws and wood screws per the 2005 NDS. The calculator can determine both lateral (single and double shear) and withdrawal capacities. Analysis of wood-to-wood, wood-to-concrete and wood-to-steel connections is also possible.
- The *Maximum Span Calculator for Joists & Rafters* performs span computations for all species and grades of commercially available softwood and hardwood lumber as found in the NDS. The tool determines joists and rafter spans for common loading conditions. A *Span Options Calculator* even allows users to select multiple species and grades for comparison purposes.

Span tables for structural use panels are available from APA – The Engineered Wood Association (APA) and for joists and rafters from the Canadian Wood Council (CWC), Southern Pine Council (SPC) and Western Wood Products Association (WWPA). CAD details are available from APA, AWC and CWC.

Other tools include a free, subscription-based *Online Lumber Technical Guide* offered by the WWPA, featuring detailed engineering and design information for Western lumber. WWPA also offers the *Lumber Design Suite* and *Lumber DesignEasy* programs, which help design professionals calculate horizontal framing (beams and joists), vertical framing (posts and studs) and wood-to-wood shear connections.

The AWC and CWC also offer *WoodWorks* software for wood design, including seismic and wind loads, structural designs and connection details.

American Forest & Paper Association / American Wood Council, www.awc.org

- *Commentary on the International Building Code (IBC); Chapter 23 – Wood*
- *The International Building Code and Its Impact on Wood-Frame Design and Construction*
- *The International Building Code and International Residential Code and Their Impact on Wood-Frame Design and Construction*
- *LRFD versus ASD for Wood Design*
- *International Building Code: More Options with Greater Opportunity for Wood-Frame Design*
- *Structural Wood Design Using ASD and LRFD*
- *Wood Use Provisions in the 1999 SBC and 2000 IBC*
- *Wood Use Provisions in the 1999 BOCA NBC and 2000 IBC*
- *Wood Use Provisions in the 1997 UBC and 2000 IBC*

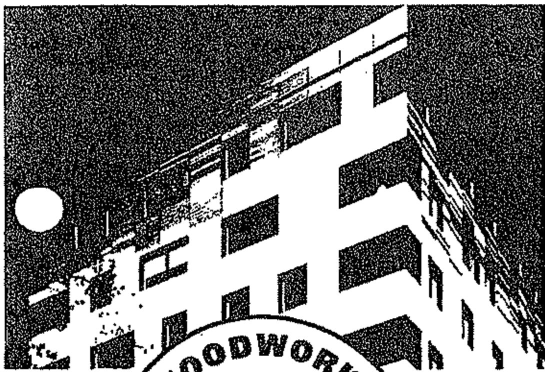
Southern Pine Council, www.southernpine.com

- *Southern Pine Use Guide*

Materials are also available via the WoodWorks Web site, in the sections titled *Key Issues/Building Codes* and *Publications and Resources*, www.woodworks.org

WoodWorks is an initiative of the Wood Products Council, which includes all of the major North American wood associations.

Photo credit: APA—The Engineered Wood Association (p.1 top), Forestry Innovation Investment (p.1 bottom), APA (p.2), Southern Forest Products Association (p. 3)



WOODWORKS FOR NON-RESIDENTIAL CONSTRUCTION

A number of design solutions allow non-residential building designers and contractors to use wood in fire-resistant-rated construction. Their goals are to safeguard public health and safety, prevent the spread of fire and smoke within a building, stop fire from spreading from one building to another, and prevent or delay collapse of the building while occupants escape. Wood-frame construction has a proven safety and performance record in all of these aspects of fire-resistance-rated construction.

Proper fire protection can increase the allowable size of wood-frame buildings. In fact, the International Building Code (IBC) allows larger wood-frame structures than designers may think possible.

The IBC allows designers to increase the allowable size of wood-frame buildings through larger floor areas and building heights with sprinkler systems and use of open spaces around the building. By using sprinklers and fire-resistance-rated wood wall and floor/ceiling assemblies, allowable area can be increased dramatically or an additional floor can be added. Open frontage around the building also allows increased building size. For some building types, provisions in the IBC allow for unlimited building area when an automatic sprinkler system and minimum setbacks are provided.

Materials and assemblies used for fire-resistance-rated construction and separation of adjacent spaces are covered in Chapter 7 of the IBC.

Fire Protection and Building Size

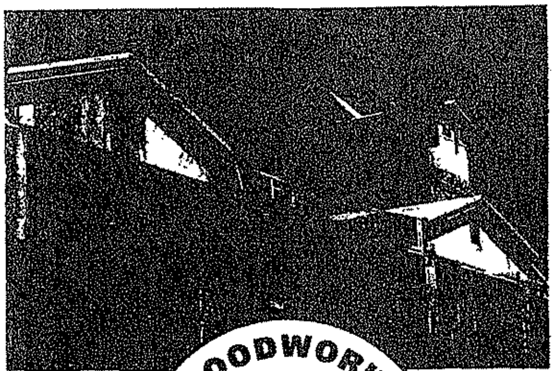
Among the techniques used to increase allowable building size, designers may add sprinklers, break up the area with fire-resistance-rated walls, increase property line setbacks and/or specify a building assembly with more fire resistance.

For most building occupancies, sprinklers allow an area increase of 200 percent for multi-story buildings and 300 percent for single-story structures. Type III buildings can be up to five stories when sprinklers are included. In addition, open frontage allows an increase of 75 percent to the baseline tabulated area.

If designers use fire-retardant-treated (FRT) wood in exterior bearing walls, Type V structures can be increased to over 50,000 and Type III structures can be more than 100,000 square feet per floor.

Designers can use IBC Section 507, unlimited building size provisions, to gain further advantage.

- For example, the allowable area of a two-story Group B, F, M or S building is unlimited when the building is equipped throughout with an automatic sprinkler system, and surrounded and adjoined by open space of at least 60 feet.
- The IBC includes additional provisions for one-story buildings. One-story Group B, F, M or S buildings or one-story Group A-4 buildings (except Type V construction) allow unlimited size when a 60-foot spatial separation to the property line is provided and the building is sprinklered. Additional exceptions apply; they are listed in Section 507.3 of the 2006 IBC.



Wood Design & Building Series

WOODWORKS FOR NON-RESIDENTIAL CONSTRUCTION

When designing a wood-frame building to resist high winds and other lateral loads, design engineers use sheathing products such as wood structural panels, structural fiberboard, particleboard and board sheathing to create diaphragms and shear walls that transfer the loads into the foundation. Or, they use rigid frame construction to transfer the lateral loads. Regardless of the option chosen, wood-frame construction makes it easy to design strong, durable buildings that meet code requirements and ensure reliable performance under high winds.

Wood's Advantage Under Wind Loads

Wood has a number of inherent characteristics that make it ideal for non-residential buildings in areas prone to high wind:

- When structural wood panels such as plywood and oriented strand board (OSB) are properly attached to lumber framing members, they form some of the most solid and stable roof, floor and wall systems available. These materials are also used to form the diaphragms and shear walls necessary to resist high wind loads.
- Wood is able to resist higher stresses when the load is applied for a short time; this feature enhances its performance in high wind events, which are typically of short duration.
- Wood diaphragm design enables designers to create durable structures that can resist high wind and seismic loads for little or no extra cost.
- Panelized wood roof systems are ideal for large, low-slope non-residential buildings because they can be erected quickly and improve the quality of construction.

Design Standards for Wind Loading

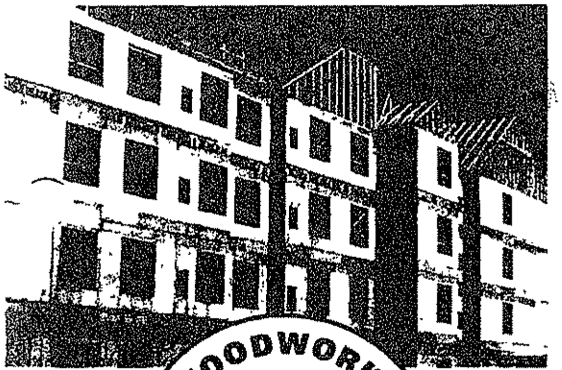
Section 2305 of the *International Building Code (IBC), General Design Requirements for Lateral-force Resisting Systems* covers code requirements for structures using wood shear walls and diaphragms to resist wind and other lateral loads.

The Conventional Light-Frame Construction provisions in Chapter 23 (Section 2308) of the IBC govern buildings under both wind and seismic loading. Provisions apply if the building meets all requirements of Section 2308.2.

When wind speeds or limitations exceed those permitted by Section 2308, the shear wall and diaphragm design must conform to Section 1609 of the IBC, which specifies wind loads as set forth in the American Society of Civil Engineers' (ASCE) *Minimum Design Loads for Buildings and Other Structures* (ASCE-7).

In addition to ASCE-7, *ANSI/AF&PA Special Design Provisions for Wind and Seismic Standard with Commentary (Wind and Seismic)* is a referenced standard. *Wind and Seismic* covers materials, design and construction of wood members, fasteners and assemblies to resist wind and seismic forces.

Engineering design of wood structures to resist wind or seismic forces can use either Allowable Stress Design (ASD) or Load and Resistance Factor Design (LRFD) methodologies. *Wind and Seismic* contains criteria for proportioning, design and detailing of engineered wood systems, members, and connections in lateral force resisting systems. The standard also provides nominal shear capacities of diaphragms and shear walls for reference assemblies.



WOODWORKS FOR NON-RESIDENTIAL CONSTRUCTION

Years of research and building code development have proven that wood-frame construction can be configured to meet or exceed the most demanding earthquake design requirements. The key is understanding the effects of lateral loads on wood framing systems, and how construction detailing and fasteners affect the ultimate performance of a structure.

There are over three million earthquakes each year, but most are too small to be felt. They can occur anywhere; however, the likelihood of earthquakes strong enough to threaten buildings is especially high in certain areas. In North America, where wood-frame construction is common, loss of life due to earthquakes has been relatively low compared to other regions. As design and building professionals look increasingly to wood-frame construction for office, retail, school and other non-residential applications, it is reassuring to know that the same basic technology that has provided residential construction the ability to survive earthquakes can be applied to larger buildings.

Earthquake Effects on Buildings

It is well known that the west coast of the United States has a high likelihood of earthquakes. In fact, more than 40 of the 50 states are at some risk from damage caused by seismic forces.

The type of seismic ground motion at a building site depends on a number of factors, including:

- Distance of the building from the earthquake's epicenter
- Magnitude of the earthquake
- Depth of the earthquake's focus, and
- Soil conditions at the building site

Earthquakes affect buildings differently depending on the type of ground motions and characteristics of the building structure. If the ground motion is strong enough, it will move a building's foundation. However, inertia tends to keep the upper stories in their original position, causing the building to distort (*Figure 1*). Since inertial forces are greater when objects are heavier, earthquake forces are greater in heavier buildings. Higher ground accelerations also create more stress in a structure.

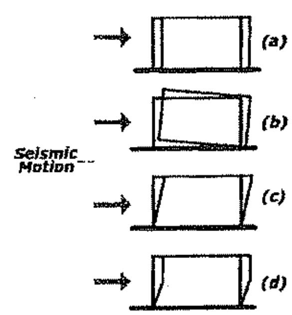
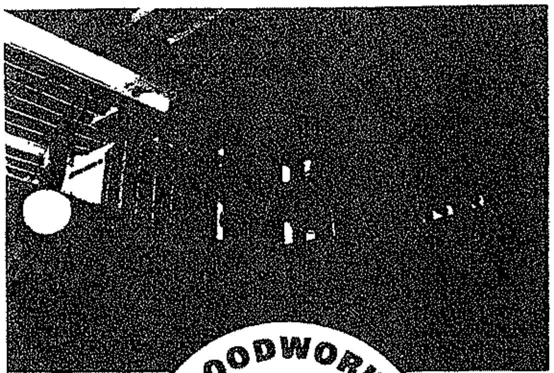


Figure 1



WOODWORKS FOR NON-RESIDENTIAL CONSTRUCTION

WOOD DESIGN & BUILDING SERIES

The world is full of examples of ancient, wood-frame buildings that remain structurally sound—and, in fact, extended service life is one of the key advantages wood offers as a non-residential building material. With proper design and construction, wood-frame buildings resist damage from moisture, insects and other organisms, and provide decades of service equivalent to other building types. This bulletin outlines some of the recommended practices that architects, engineers, contractors and others can use to create long-lasting wood structures. They all begin with good design.

Wood's Service Life Advantages

Design and building professionals select structural framing materials based on a number of factors, including cost, availability, ease of construction, thermal performance, aesthetics, design versatility and service life, which is the measure of how long a product is expected to perform under defined environmental conditions. As with other materials, wood can deteriorate if used inappropriately. However, with proper design detailing, good construction techniques and adequate building maintenance, wood structures can deliver many decades of reliable service.

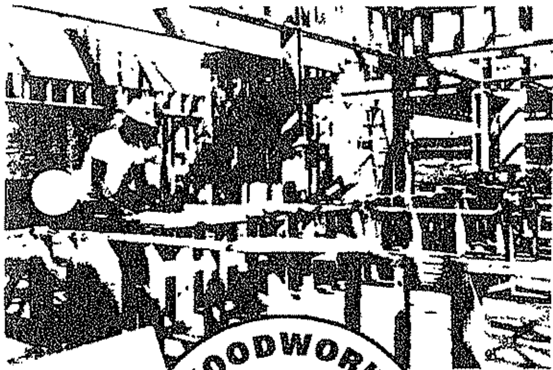
There are many applications where the natural durability properties of wood make it the material of choice. For example, wood is resistant to high relative humidity and to many of the chemicals and conditions that adversely affect steel and concrete, such as corrosive salts, dilute acids, industrial stack gases and sea air. Because of its resistance to these factors, building professionals often use wood for specific non-residential structural applications such as cooling towers and industrial buildings used for chemical storage.

Potential Hazards and Methods of Protection

Under proper conditions, wood provides excellent, lasting performance. However, it also faces several potential threats to service life, including fungal activity and insect damage—which can be avoided in numerous ways. Section 2304.11 of the *International Building Code (IBC)* addresses protection against decay and termites. This section provides requirements for non-residential construction applications, such as wood used above ground (e.g., for framing, decks, stairs, etc.), as well as other applications.

There are four recommended methods to protect wood-frame structures against durability hazards and thus provide maximum service life for the building. All require proper design and construction:

1. **Control moisture** using design techniques to avoid decay.
2. Provide effective **control of termites and other insects**.
3. Use **durable materials** such as pressure treated or naturally durable species of wood where appropriate.
4. Provide **quality assurance** during design and construction and throughout the building's service life using appropriate maintenance practices.



WOODWORKS FOR NON-RESIDENTIAL CONSTRUCTION

Wood's unique natural properties offer a number of benefits, including design flexibility, ease of installation and durability. As a result, design and building professionals are increasingly using wood products, not only for homes, but for a wide range of commercial, institutional and other non-residential applications.

Wood is a renewable building material whose structural properties vary by species, natural growth characteristics and manufacturing practices.

Design values for most species and grades of visually graded structural lumber products are determined in accordance with ASTM standards—including D 1990 – *Establishing Allowable Properties for Visually Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens*, D 245 – *Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber*, and D 2555 – *Establishing Clear Wood Strength Values*—which consider the effects of strength reducing characteristics, size, load duration, safety and other influencing factors. The applicable standards are based on results of tests conducted in cooperation with the USDA Forest Products Laboratory.

Design Values for Wood Construction, a supplement to the *ANSI/AF&PA National Design Specification® for Wood Construction (NDS®)* provides these lumber design values, which are recognized by the model building codes.

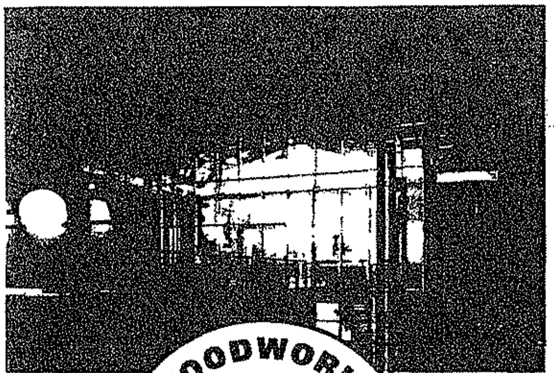
THERE ARE SIX PUBLISHED LUMBER DESIGN VALUES:

Bending (F_b) – When loads are applied, structural members bend, producing tension in the fibers along the face farthest from the applied load, and compression in the fibers along the face nearest to the applied load. These induced stresses are designated as "extreme fiber stress in bending" (F_b). Single member F_b design values are used in design where the strength of an individual piece, such as a beam, may be solely responsible for carrying a specific design load. Repetitive member F_b design values are used in design when three or more load sharing members, such as joists, rafters, or studs, are spaced no more than 24 inches apart and are joined by flooring, sheathing or other load-distributing elements. Repetitive member stresses are also used where three or more pieces are adjacent, such as decking and built-up beams.

Shear Parallel to Grain (Fv) – Shear parallel to grain, or horizontal shear stresses, tend to slide wood fibers over each other horizontally. High applied shear stresses most often limit design in short, heavily-loaded, deep beams. Increasing a beam's cross-section decreases its applied shear stresses.

Compression Perpendicular to Grain (Fc-perp) – Where a joist, beam or similar wood member bears on supports, the load tends to compress the fibers. The bearing area must be sufficient in size to prevent crushing perpendicular to the grain (e.g., a sill plate with studs bearing down on it).

Compression Parallel to Grain (Fc) – In many parts of a structure, members transfer loads from end to end compressing the fibers. Examples include studs, posts, columns and struts. Applied stresses from this type of loading are generally considered consistent across the entire cross-section of the member, and the fibers are uniformly stressed parallel to the grain along the full length of the member.



Wood Design & Building Series

Whether you're designing a structure to achieve green building certification, adhere to new energy or climate change legislation, or simply set it apart as superior, wood can help to achieve your sustainability objectives.

Sustainability and the Built Environment

Much of the current activity related to green building is driven by the fact that buildings account for approximately 39 percent of total US energy consumption and contribute 38 percent of its carbon dioxide emissions. As such, there is a growing awareness that design and building professionals have an opportunity—and a responsibility—to help address climate change and other issues through sustainable construction.

In this context, wood has many attributes that make it an obvious choice. It grows naturally, using energy from the sun, and is the only major building material that's renewable, re-usable and sustainable. When considered over its life cycle, wood outperforms both steel and concrete in terms of embodied energy, air and water pollution, and other environmental impacts. It contributes to a building's energy efficiency and indoor air quality, and has an important role to play in the fight against climate change.

North American Forests: A Sustainable Resource

Some people are surprised to learn that North America has roughly the same amount of forested land now as it did 100 years ago,* and that illegal logging, which has a tremendous negative impact in tropical countries, is not an issue here. Over the past 50 years, less than 2 percent of the standing tree inventory in the United States was harvested each year, while net tree growth was 3 percent. In Canada, where most forests are publicly owned, less than 1/2 of 1 percent of the managed forest is harvested annually, and the law requires all areas to be promptly regenerated.

Wood is also the only building material that has third party-certification programs in place to verify that the products being sold have come from a sustainably managed resource. Sustainable forest certification is a voluntary tool that allows forest companies to demonstrate the sustainability of their practices by having them independently assessed against a standard that goes beyond regulatory requirements and takes into consideration environmental, economic and social values.

It's also an integral part of most green building rating systems. The Green Globes® system, for example, gives points for lumber and timber panel products certified through the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), American Tree Farm System (ATFS), and Canadian Standards Association's Sustainable Forest Management Standard (CSA). The Leadership in Energy and Environmental Design (LEED®) system recognizes timber certified through FSC, though consideration is being given to including other systems.

**The State of America's Forests, Society of American Foresters, 2007*

AFFIDAVIT OF SERVICE BY MAIL

RE: In the matter of R. Arlen Heathman,
PROFESSIONAL ENGINEER
License Number 16177

STATE OF MINNESOTA)
) ss.
COUNTY OF RAMSEY)

Lynette DuFresne, being first duly sworn, deposes and says:

That at the City of St. Paul, County of Ramsey and State of Minnesota, on this the 14th day of December, 2010, she served the attached **Order To Lift Suspension of License**, by depositing in the United States mail at said city and state, a true and correct copy thereof, properly enveloped, with first class and certified postage prepaid, and addressed to:

Mr. Daniel Doda
Doda & McGeeney, P.A.
421 1st Avenue South West Suite 301W
Rochester, Minnesota 55902

CERTIFIED MAIL
Return Receipt Requested
7010 0780 0001 5886 1862

Lynette DuFresne
Lynette DuFresne

Subscribed and sworn to before me on this the 14th day of December, 2010.

Sheri L. Lindemann
(Notary Public)

SHERI L LINDEMANN
NOTARY PUBLIC
MINNESOTA
My Commission Expires Jan. 31 2015