Association of
Licensed Architects

$6.00
Volume 19, No. 1
Spring 2015

Licensed Architect

What's Inside:

ALA
One East Northwest Hwy, Suite 200
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2015 ALA DESIGN AWARDS Program

PURPOSE

To give professional recognition to excellence in design by selecting award recipients whose work exhibits the creative and aesthetic characteristics deemed relevant by their peers and associates and to foster adoption of this quality by the general public.

Projects of all sizes are encouraged to enter.

ELIGIBILITY

All submittal must be completed works designed by ALA members.

AWARDS

Entries will be judged on their own merits based on:

- Program Solution
- Site and Space Planning
- Overall Design Solution
- Construction System and Details

Certificates will be presented in order that the Firm, Owner, Contractor and Developer may be recipients. The following awards will be issued:

- Presidential Award (1)
- Gold Medal Award
- Silver Medal Award
- Award of Merit

CATEGORIES

Entries shall be labeled in one of the following categories:

1. Residential I - Single Family Homes
2. Residential II - Multi Family Homes, Apts
3. Commercial/Industrial
4. Renovation
5. Institutional
6. Religious
7. Unbuilt Design
8. Interior Architecture

JURY/JUDGING

The panel of five jurors will be composed of architects and other design professionals such as college professors, journalists, interior designers, etc. It will meet shortly after the submission deadline to evaluate and select the building projects to receive awards.

SUBMITTALS

Boards and accompanying material must be received at ALA Headquarters by close of business on August 21, 2015

AWARD WINNING

Award recipients will be requested to furnish additional photos or electronic version for press releases and to display their entries at the Awards Banquet.

Certificates will be presented to applicants at the 2015 Awards Dinner on November 6, 2015 at the Medinah Country Club in Medinah, IL. Clients are invited to attend along with entrants and guests.

Association of Licensed Architects

SUBMISSION OF INTENT

The attached Declaration of Intent must be completed and returned with payment postmarked no later than **July 24, 2015** to:

ALA Headquarters
1 E. Northwest Hwy. Ste 200 Palatine, IL 60067

Entry fees must accompany each entry as described below:
ALA members: $125.00 for first entry; each additional entry: **$100.00**

Non-ALA Members: $280.00 for the first entry (includes a one year ALA Membership) each additional entry: **$100.00**

DEADLINES

Declaration of Intent: **July 24, 2015**
Submission of Entries: **August 21, 2015**

***2014 Presidential Award Winner:**
Dyson Siegrist Janzen Architects, Inc.
Project: University High School,
Fresno, CA

Online Registration and Entry Requirements available at **www.alatoday.org.** Click on "Awards" tab.
Questions: contact Lisa Brooks at 847-382-0630 or email Lisa@alatoday.org

2015 ALA Buyer's Guide 23

On the Cover

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ALA THE PRESIDENT'S LETTER

As we welcome the warmer and sunnier weather, there are many wonderful upcoming events on the ALA calendar. The Chicago Architectural Boat Cruise is Wednesday June 17th. This is always a fantastic event so make your reservations soon - before it sells out! Also coming up is the ALA Golf Outing and our Midwest Architecture Conference and Trade Show on October 6th. Start preparing your submission to the Design Awards program. Intent to submit is due July 24th. Projects of all sizes are encouraged to enter. The Banquet returns to the Medina Country Club in November.

This is the Annual Buyer's Guide issue of Licensed Architect. Keep this issue handy all year so you can use the services of the Affiliate Members who so generously support our association. Also in this issue we feature interior/cool spaces of three firms. In addition are our popular contributed articles on Legal, Code, Insurance, ADA and an article by Jean Leathers on 'Social Media for Architects'.

I would like to welcome two new chapters to the Association of Licensed Architects: Indiana (Jeffrey Stoner, President), and Northeast Ohio (Bob Davidson, President). Russ Peterson is our new President in Minnesota, and Bill Watkins is serving as interim President of the Missouri Chapter. Welcome to all of our new members and many thanks to those who have stepped up to manage all of our chapters. Speaking of membership, thanks to the hard work of the ALA Staff - we are on track to push our membership to a record high by year end! Help push ALA over the top and earn credit towards your next year's dues by enlisting your peers and potential affiliates to join. They will thank you and you will be helping the Association.

Have a happy, safe and prosperous summer!

Jeffrey Budgell

Jeffrey N. Budgell, FALA, LEED AP
President

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The Narrowing Scope of Copyright Protection for Architects

by Shawn E. Goodman,
Sabo & Zahn, Attorneys at Law

In the past few years, some courts have been making it increasingly difficult for architects to win copyright infringement cases. There appears to be skepticism about what is original and, therefore, what is entitled to protection.

To review, a work is given copyright protection from the moment it is put into a tangible form. For instance, when the architect draws some lines on a piece of paper, this expression is automatically given copyright protection. A mere idea is given no copyright protection until put into a tangible form, such as a drawing. The drawing is the expression of the idea and is given copyright protection unless the drawing is not original. If the architect merely sketches what someone else has already drawn, the element of originality is missing and there is no protection.

One of the elements of a copyright action is "copying." If you have not copied someone's work, you have not infringed. Because direct copying is often difficult to prove, courts have come up with a method of proof that consists of two elements: access and substantial similarity. To have a chance of prevailing, you must show that the defendant had access to your work, e.g., the defendant's client was also your client and had copies of your drawings, and also that the defendant's work is substantially similar to yours. Courts have recently made it more challenging for plaintiff architects to win these cases by limiting how much of their designs actually enjoy copyright protection.

Nova Design Build v. Grace Hotels involved the construction of a Holiday Inn Express.[1] The defendant, Grace Hotels, hired the plaintiff, Nova, to provide architectural services. The contract provided that the drawings would be Nova's intellectual property, but Grace could use them for bidding, permitting, and construction as long as Nova was paid in full.

Nova based its work on Holiday Inn Express prototype drawings. Nova added on to the prototype, including adding different pool, laundry, and exercise areas, different door and closet placements, a larger meeting area, and even an entire extra floor.

Grace and Nova fell out before construction started. Nova demanded $28,000, but eventually accepted $18,000, and Grace went forward with the construction using Nova's plans. Nova, meanwhile, registered its copyright and sued Grace for copyright infringement.

Grace won in front of the trial court on the basis that Nova had not complied with the copyright registration requirements by failing to submit actual copies of its original design when registering the copyright. Nova's offices, it seems, were broken into and its computers stolen before it registered the copyright, causing Nova to try replicating its CAD files by referring to hard copies of the drawings because the stolen computers contained the only copies of the final design.

The federal appellate court upheld the grant of summary judgment in favor of Grace, but on an altogether different ground.[2] It found that, while Nova did have a valid copyright, that copyright was not infringed. For a copyright to be infringed, the plaintiff must identify the protectible elements in its work and, secondly, show that those specific elements were copied. In order for the elements to be protectible, they must possess "originality," meaning they were "independently created and possess at least some minimal degree of creativity." Again, Nova's design was based on the Holiday Inn Express prototype. Nova sought protection for the additions it made to the prototype: the larger meeting area, the extra floor, etc. However, the court on appeal held that these added features just simply were not enough to warrant copyright protection. They were "devoid of originality" because the additional floor was the same as the floor layout in the prototype and the other added features originated from Grace, not Nova. As the aspects of the architect's design that went beyond the prototype were insufficiently original to qualify for copyright protection, the claim for copyright infringement failed.

In Zalewski v. Cicero Builder Dev., the plaintiff architect, James Zalewski, gave the defendant builders licenses to use several of his colonial home designs.[3] Zalewski alleged that after the license expired, the builders hired a different design firm to make use of Zalewski's designs, then marketed those customized designs without Zalewski's permission. He accused the defendants of copying the overall shape, size, and silhouette of his designs, and the placement

(continued on page 32)

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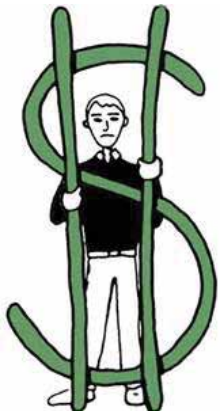

FIGURES DON'T LIE, LIARS FIGURE!

by Kelly P. Reynolds
ALA Code Consultant

With today's information age, we are flooded with statistics and poll numbers. Somewhere in all that info is the truth. But how do we find it? Why is it hidden from us? Let's examine some facts and myths about codes.

1. Building codes are bad for business. The fact is, good codes result in a safe community. Most companies don't want to open a business in a city that has no code enforcement. Without codes, there is blight, crime, decaying buildings and higher insurance rates. Good code enforcement pays!

2. New home construction uses better materials than in the past.
New materials yes, better materials - - ??? More combustible construction materials, such as plastics, increase the fire load of a house. And what about glue-laminated wood? Under fire conditions, it fails and collapses at a faster rate than solid trusses and beams.

3. Fire sprinklers are too expensive. This is another myth brought on by architects and engineers with little or no experience with the sprinkler industry. The fact is that with fire sprinklers, most buildings can have a reduced construction cost (lesser construction type = lower cost of materials), better design options (larger building areas, non-rated walls and corridors, increased occupancy loads) and of course, lower insurance premiums. A sprinkler system costs less per sq. ft. than the wall-to-wall carpeting being installed and will last much longer. Sprinkler work is a buyer's market now. Do your homework and save money.

4. Fire sprinklers cause water damage. Compare the water damage from a fire sprinkler system to that of the fire department using 200 - 250 gpm hoses when they enter your building. Now that is water damage. Insurance companies would rather pay for water damage from sprinklers than from fire fighting, overhaul and cleanup.

5. Why do we have to update our codes? Are they broken? Many communities think that once they have adopted the I-Codes, all is well. However, construction technology changes rapidly as do the codes every three years. Not keeping current on code adoptions results in your community not having the most current codes and can also influence its insurance costs for your citizens.

6. ANSI, NFPA, OSHA AND UL product approvals. These organizations DO NOT APPROVE any products or systems. If a product is marked "Approved" by any of these agencies, they are wrong. UL is the only testing lab that "lists" products and systems, FM (Factory Mutual) does approve certain products and systems because they are an insurer. Manufacturers are responsible for verifying that they comply with the standards. And beware of some stores selling discount construction equipment. Some of their electrical tools are not UL or ETL listed. If someone is injured with a non-listed tool, you could be liable.

Finally, if in doubt of some claim, question the facts. You may be in a hurry to get an answer, but on the witness stand the other side has all the time in the world to ask you the tough questions.

If you have any questions, just call me at 1-800-950-2633.

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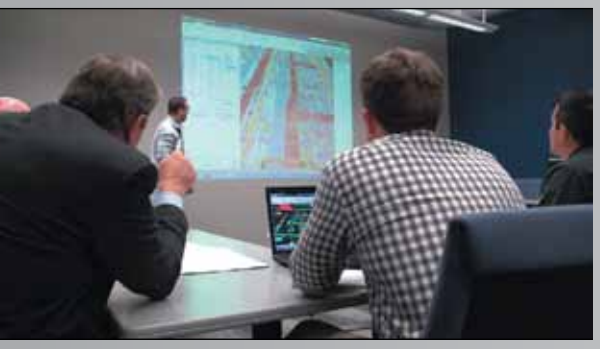

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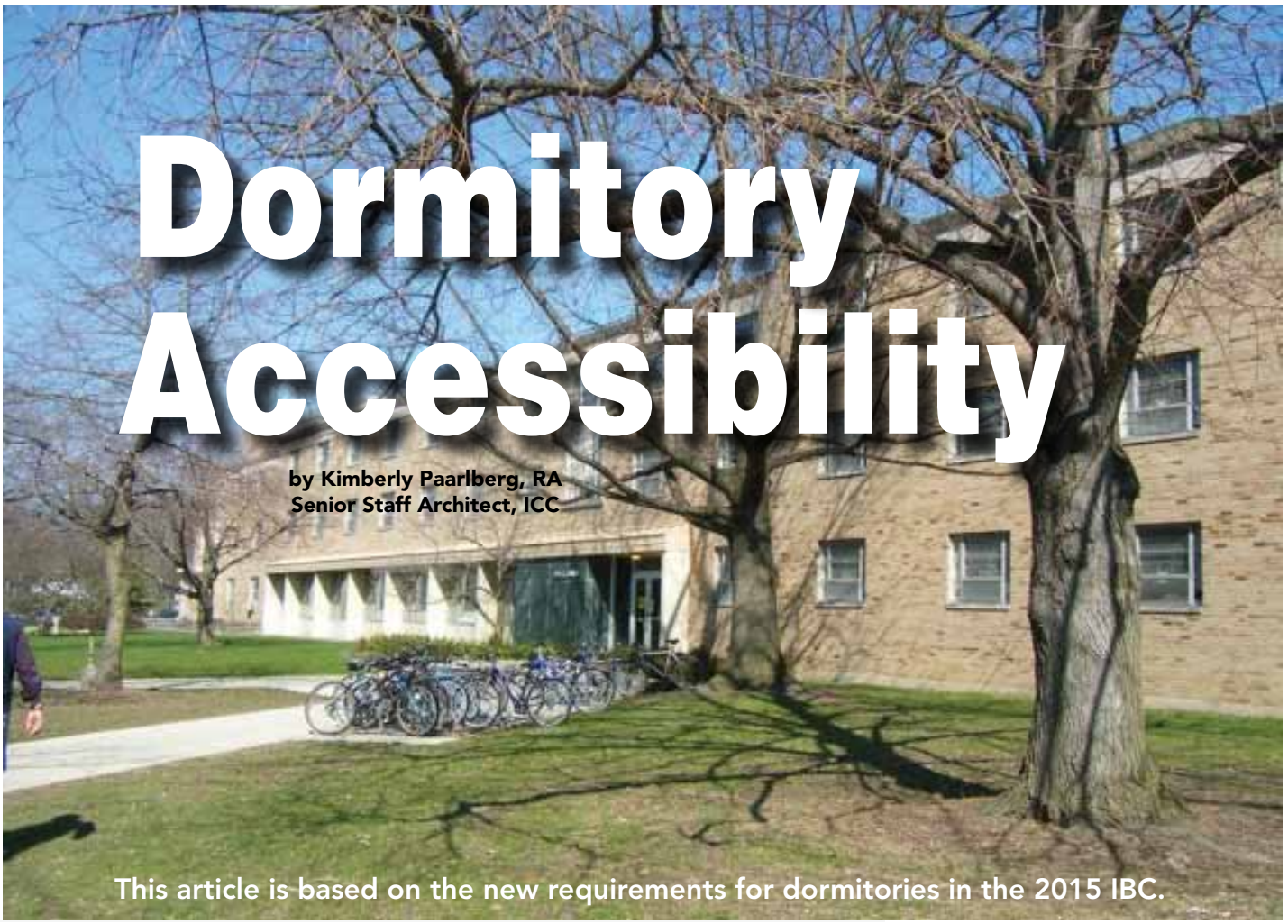

Dormitory Accessibility

by Kimberly Paarlberg, RA
Senior Staff Architect, ICC

This article is based on the new requirements for dormitories in the 2015 IBC.

My daughter is leaving for college next year. As a result, I am learning a lot more about the new style of dormitory living, which is very different from when I was in school.

The style of dormitories that predominated when I was in college included a long corridor with rooms down both sides. Each room was a study area/bedroom for two or three students. There was a large common bathroom at one end of the hall and a common study lounge.

While this style of dormitories still exists, many colleges and universities are renovating their old dorms, or building new ones in suite styles. This is typically two to four single- or double- occupant bedrooms with a shared bathroom and living space. Some suites also include kitchenettes. This configuration is similar to a dwelling unit, but not quite. While the roommates might treat the area as an apartment, the universities still administer them like the old dorm rooms - assigning students to each bedroom in the suite.

There are many code questions associated with these types of set-ups, such as: What walls should be rated for separation, both between units and the corridors? What is the correct placement for smoke detectors, audible and visible alarms? How should these units be counted to determine accessibility requirements?

This discussion will be limited to the accessibility provisions for this type of dormitory configuration.

ACCESSIBLE ROUTES

Shared spaces on the site: Multi-building complexes may have a common cafeteria, pool and exercise area, central mail rooms, convenience stores, walking paths and other amenities for the residents and their guests. An accessible route must be provided to the facilities on the site, as well as those within a building.

Shared spaces in the building: In facilities with shared spaces, all spaces available for use by the general public or by residents of Accessible and Type B units must be accessible. Common examples include shared study areas, laundry facilities, music practice rooms, or computer rooms. If shared spaces are limited to certain units (e.g., shared bathroom in a dormitory suite), the shared space must be accessible to the same degree as required for the associated units (IBC Section 1107.3).

Accessible route between floors: When the Department of Justice adopted the 2010 ADA Standard for Accessible Design, officials added a requirement that all dormitories that serve educational facilities have an elevator. This is why

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Introduction to

Featured Architects

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CORDOGAN CLARK & ASSOCIATES

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Cordogan Clark & Associates is committed to creating better environments. We are an innovative full-service planning, architecture, engineering, and construction management firm with broad experience in academic, institutional, commercial, and residential projects. Our firm includes more than 50 professionals with a deep knowledge of architecture, a strong legacy of design innovation and excellence, and highly qualified in the management of complex projects. We have extensive experience in the technical development of building systems and make interdisciplinary design excellence the keystone of our firm culture. We are passionate about our work, inspired by our clients, and committed to providing exceptional service through imaginative, integrated, and sustainable design and construction solutions.

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Aurora University John C. Dunham STEM Partnership School, Aurora:

The recently completed John C. Dunham STEM Partnership School at Aurora University is a new educational model that results from the collaboration between University officials, school district leaders, teachers, nonprofits, local businesses, and legislators.

The building's design includes eight grade-school classrooms, an open forum where classes can work together, and six labs that will be shared by University and STEM school students. Classrooms feature generous natural light and much of the piping, plumbing, insulation, and shelving is exposed so students can learn how they work. A rooftop garden and a greenhouse, as well as the school's boiler room and data center, are enclosed with glass so that students can peer in. It was recently awarded LEED Platinum.

Photography by Steinkamp Photography

Northern Illinois University Fay-Cooper Cole Hall Renovation:

The newly renovated and expanded Fay-Cooper Cole Hall transforms a 1960s-era building into a collaborative learning environment. It features a state-of-the-art lecture hall, a new home for the NIU Anthropology Museum, and a computer laboratory.

This is an especially interesting project because it uses architecture as an integral part of the University's healing process: To help erase the memory of the tragic shooting that occurred at this building. The facility's rebirth also carries a symbolic meaning for the NIU community. University Provost Raymond Alden called the newly renovated building "a symbol of our vision for the future and a campus crown jewel."

Westhaven Park Development, Chicago:

Westhaven Park was Chicago's first mixed-use affordable ownership / market rate hi-rise development. This highly sustainable Transit Oriented Design (TOD) was constructed using an innovative system of panelized concrete walls and structure. A featured element of the green design is the dramatic planted cornice overhanging the entrance, and trellises above the upper balconies. The building is easily accessible to public transit, several parks, schools, and social services.

Photography by Steinkamp Photography

The Richard and Gina Santori Public Library of Aurora:

The new 92,000 square-foot library features a flexible design and the latest technology that will easily adapt to meet future needs. It provides expanded public space for children and youth services, meeting rooms, and quiet study rooms. It also serves as a space for cultural endeavors such as art, humanities, performances, and historical exhibits. It is a new destination point for culture and entertainment, as well as a gathering point for the Aurora community. It is also a digital network hub whose integrated technology systems enhance the community's other current branch libraries.

The new Main Library features a Teen Center and The LIFE ("Learning in an Informal and Fun Environment") Development Center with focuses on science, math, and technology. The Teen Center provides tablets, educational software, music and broadcasting equipment, and other emerging technologies to help students excel in both school and life.

The Library is registered with USGBC for LEED Certification. Cordogan Clark & Associates provided comprehensive architectural and engineering services.

Wuxi Mixed-Use Complex, China:

This multi-use Hotel, Retail, and Apartment complex unites sustainable design and functional efficiency with four key elements of traditional Chinese architecture that are repositioned here for the 21st Century. These elements are: Layering, Texture, Infiltration, and Decoration. The tower's elevation expresses the carefully planned functions within. Its base features the main entrance and retail. Above those are the hotel functions, while at the upper half of the tower are residential condominiums. In the tower and lower buildings, the playful reflections on water, integral to much traditional architecture in Wuxi, is rendered architecturally with contemporary materials such as terracotta screens, corteen steel, and copper panels.

MAWR

ARCHITECTURE + INTERIOR DESIGN

Mawr Design, Inc. is an Indianapolis-based architecture, interior, & design/build firm. Founded in the early 2000's by father/daughter duo, Whittney (Beechy) Parkinson and John Beechy. The two initiated this family firm to better capitalize on each other's abilities (John-structure & Whittney-design). The collaboration of the two has resulted in a varied portfolio that includes hundreds of projects ranging from governmental, education, hospitality, church and high-end residential across the midwest.

The mission at MAWR from the beginning was to diversify ourselves beyond that of a niche firm. However, regardless the project scope, our ability to identify and connect with the client early in the design process has always remained the same. Being a design + build firm allows us to make a seemingly complex process streamlined and fluid for our clientele. Our focus in design has been, and continues to be, that of transforming the way people work and live, by blurring the lines between the two.

BEL AIR

This 12,000 sf event space facilitates community driven events, private parties, seminars, etc. The building sits adjacent to the owner's existing popular Italian restaurant. The design for this facility was greatly inspired by the owners and their heritage, but also that of the community. The building naturally drew parallels to Italian character, accompanied with an industrial flare, solely derived from the surround community.

Projected for a Spring 2015 opening.

815 Capitol

An existing warehouse that sits in the heart of downtown Indianapolis. This current project is an approx. 24,000 sf space that will take shape in winter of 2015. The interior renovation, and re-façade of this building speaks directly to its revitalized industrial counterparts, adjacent on the city block. This building will facilitate private businesses, restaurants, and retail.

RESTAURANT

This restaurant (Pizzology) is located in Indianapolis's historically popular restaurant and bar scene on Mass Ave. It was the beneficiary of an interior restoration that took place in a 3,000 sf, early 1900's mock of a flat iron. Exposing and restoring floor to ceiling glass allowed light to pour into every angle of this airy space. The design was derived from much of the restaurant's popular branding, as well as a "less is more" theory that allowed the architecture alone to sing.

MASTER BATH

This master bath was designed as a space for total and utter serenity. The natural light that pours in through oversized windows plays well off the stark white walls, allowing natural materials to contrast and stand out. The aesthetic of this home was modern farmhouse, allowing us to pull simple rustic character from lap board façade of the walls, contrasting again with more modern elements found in lighting and finishes.

KITCHEN

This residential kitchen was intentionally designed for an energetic family of 7. Expansive views, and an open adjacent layout to living/dining space, allows easy access for the family to converse with one another. The home was built in a more rule plot on the outskirts of the city, naturally taking on a modern farmhouse aesthetic. The industrial custom transoms, and light fixtures, juxtaposed with more modern elements, resulted in this well-balanced space.

LIVING ROOM

This living space was designed with the intention to create a very neutral and serene backdrop. The custom cast concrete fireplace was a play on scale. Custom stained built-ins allow light to flood in the outdoor space oriented in western light. Metal transoms in the doorways allow for natural light to spill into the next room. This open floor plan, permits direct view of prairie-like acreage as well as an adjacent kitchen and dining space.

Established in 1987 with offices in Cleveland and New York, Vocon creates distinctive, productive work environments for private and public sector clients across the globe through the delivery of full-scale architectural project capabilities including architecture, interior design, branding, graphic design, workplace strategy and change communications. Licensed in all 50 states, our mission is to transform the built environment, thus helping our clients improve their business performance while enabling them to attract, excite and retain exceptional talent. Some of the largest organizations worldwide are Vocon clients including KeyBank, Goodyear, Willis, PwC, Jones Day, Nestle, UBS, Colgate-Palmolive, FirstEnergy and Citigroup.

Photography: Jim Maguire

Sam Schwartz Engineering

Vocon designed a new office space for Sam Schwartz Engineering, bringing the traffic engineering firm's field to life by incorporating traffic elements throughout. The mimicked transit design included a reception desk made from railroad ties, various street signs and traffic lights to signal conference room occupancy.

Photography: 51 Art Studio

Zashin & Rich

Zashin & Rich disengages the preconceived notions of a law firm's appearance by celebrating music and Cleveland history. The new space incorporates unexpected elements such as a neon yellow and pink café, burned cypress walls for an edgy vibe, graffiti walls painted by local artists and photography of rock legends.

Photography: Jim Maguire

(continued from page 14)

dormitories cannot use IBC Section 1107.4, Exception 4. While other types of congregate residences - such as fraternities, sororities or boarding houses - are required to have Accessible units (IBC Section 1107.6.3.2.1), they can provide their required public and shared areas, Accessible units and Type B units on the 1st floor.

Because dormitories require elevators, all other units in the dormitory must meet Type B unit criteria. Basically, dormitories no longer have any exceptions for Type B units.

COUNTING UNITS/DISTRIBUTION

The criteria for congregate living facilities, such as dormitories (IBC Section 1107.6.2.3) states the number of bedrooms, not suites or beds, should be counted to determine the number of units, and thus the number of Accessible units. If the units are in suites, only one bedroom in each suite can count toward the number of Accessible units. Any shared spaces in the suite would have to be constructed to the same level as the Accessible units. For example, if a two-bedroom suite shares a bathroom, that bathroom must comply with the Accessible unit criteria. If both bedrooms within the suite are Type B units, the bathroom can meet Type B unit requirements for either Option A or Option B bathrooms.

Often dormitories can be a group of buildings, or the dormitory could be divided based on male/female, study floors or other types of unique areas. Suites are being built in a variety of styles - typically with two, three or four bedrooms, a shared living space and one or two bathrooms. University or college officials also may want to consider a new trend: different floors serving as different "living communities." Officials set up such "living communities" to allow for students with like interests or studies to live together on the same floor or area in a multi-story or multi-building dormitory complex. This provides students with a group of people with similar interests with whom they can interact - thus creating a friendly environment. So that students with disabilities also can have the same ability to choose from a variety of options under the ADA and the Rehabilitation Act, colleges need to consider providing Accessible units in all living options offered.

"As another group of students prepare to roll out to college, it is important the dormitories awaiting them provide equal access for all students."

EXISTING BUILDINGS BEING ALTERED

When dwelling or sleeping units are being altered or added, the number of Accessible units required is based only on the units being altered or added (IEBC Sections 410.8.6, 705.1.7 and 1105.2), not on the total number of units on the site. In addition, if Accessible or Type A units are already provided on the site, the total number of Accessible units on the site is not required to exceed new construction requirements (IEBC Sections 410.3 and 705.1.13).

Starting in the 2012 IBC, Type B units are required when a building undergoes major alterations greater than 50 percent of the building or Level 3 alterations (IEBC Sections 410.6 Exception 4, 410.8.8, 906.2 and 1012.8). Basically, what is altered has to meet Type B requirements. However, the additional accessible route requirements typical for alterations are not required (IEBC Sections 410.4.2, Exception, 410.7 Exception 5, 705.2 Exception 5, 1012.8 Exception).

For dormitories, this brings about a question not currently answered in the codes: If a dormitory undergoes a Level 3 alteration, without the extra accessible route requirements for Type B units, would an elevator have to be added? If there is no elevator, then would Type B units be required on the upper levels? It would seem logical, since this new requirement is based on Department of Justice (DOJ) regulations and not FHA, that at least an evaluation of the route to any Accessible units would be required, and possibly some improvements to that accessible route. Without elevator service, Type B units would not be required by FHA.

Additions are required to meet new construction requirements for the number of Accessible and Type B units (IEBC Sections 410.5, 410.8.7, 410.8.9, 1105.2, 1105.4).

CONCLUSION

As another group of students prepare to roll out to college, it is important the dormitories awaiting them provide equal access for all students. After all, this is where they will be living, socializing and, hopefully, studying!

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CONTRIBUTED ARTICLE

Second Chances: The Repair of Older Wood Trusses

by Timothy M. Crowe, ALA, SE, PE
Wiss, Janney, Elstner Associates, Inc.

Timber structures, when properly constructed and cared for, have lasted centuries. However, a lack of material understanding leading to inappropriate maintenance can be detrimental to these assemblies. Timber truss evaluations require a methodical approach that considers the truss and its relationship to the entire building. This article reviews approaches to the non-destructive investigation and evaluation of timber trusses. Two case studies are briefly presented that illustrate repairs for a decayed Howe truss and the remediation a partially collapsed bow string truss.

Investigation of existing timber trusses

Methods available to professionals evaluating existing wood trusses include destructive and non-destructive approaches. The actual methods required for individual structural evaluations will vary depending upon the project objectives. The architect or engineer who is in responsible charge of these tasks needs to ensure that the approach selected will provide an accurate assessment of the truss. Valuable information can be obtained regarding the truss structure by visual examination and non-intrusive means. The Second Chance article, "Evaluating Timber Structures," included in Licensed Architect, volume 18, no. 1, should be referenced for additional discussion regarding wood material assessment. Additional nonintrusive approaches for the evaluation of wood trusses are listed below:

- Review documentation of original construction and/or later repairs. The age of the structure provides insight on codes and criteria that may have been used in the truss design. Gaining an understanding of past treatments can be crucial in understanding the existing structure.
- Visual inspection to identify the geometry of the truss (type of truss), bracing elements, and load paths within the truss and into the supporting structure.
- Review of building envelope enclosure and moisture shedding characteristics and details.
- Identify member sizes, connections, and splice locations; review supports, load paths, and lateral bracing. Examine the condition of connections (number, location, and spacing of splices, bolts, plates, etc.).
- Review characteristics and condition of wood elements (e.g., knots, checks, splits, slopes of grain).
- Identify displaced or detached elements, support conditions, and moisture and insect damage.
- Structural analysis and modeling to assess anticipated member stress levels and adequacy of total structure.

Non-destructive examination of wood can assist in understanding material properties, presence of decay, and underlying conditions that are not visually apparent. "Non-destructive" examination is defined here as the evaluation of a member or material in a manner such that it shall remain in service upon completion. Since non-destructive techniques may require minor damage to portions of the members, they should be used with appropriate discretion and scrutiny. Some examples of these methods are as follows:

- Small hand tools such as probes, awls, or screwdrivers are useful to measure depths of checks or splits, and to review the member for soundness or possible decay by probing the member or performing a pick test to identify incipient decay.
- Levels, plumb bobs, and string lines are useful in assessing the alignment, lateral displacement, or buckling of members.
- Tape measures, laser measuring devices, inclinometers, and calipers are useful for recording member geometry. Redundant information can be helpful for analysis modeling, and it should be noted that the recorded dimensions are that of the loaded or partially loaded structure.
- Moisture meters and hygrometers are used to check the relative humidity of the environment and of the wood. Wood, a hygroscopic material, will absorb moisture from the atmosphere until it reaches its equilibrium moisture content (EMC). Resistance moisture meters calibrated for the wood species should have insulated probes that can penetrate at least 20 percent of the member to obtain representative EMC readings.
- Resistance drilling can be used to assess underlying decay or damage in larger members. This method uses a smaller drilling needle (approximately 1/8 inch in diameter), inserted 12 or more inches into a member. Drilling energy is monitored to help identify areas of underlying decay.

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Better Understanding Your Additional Insureds

by Tom Harkins and Bob Stanton, Willis A&E

So what exactly does it mean to name your client as an additional insured on your various insurance policies? The short answer is you are exposing your insurance policies to each and every client where you have agreed to do so; meaning your clients can file a claim to your insurance carrier.

Consider the following claim example:

Your firm is hired by a Client who also hires the Contractor, and you have agreed to name your Client as an additional insured under the general liability insurance policy. An employee of the Contractor is injured at the jobsite and sues your Client as well as your firm for damages. Because your Client has been named under your general liability policy as an additional insured, they tender the claim to your general liability carrier. Your firm files a claim with your professional liability insurance policy. You next all go to court for a pre-trial settlement conference in front of a judge who asks for an initial offer from your Client and from you. Both potential settlements and defense are coming from your insurance companies. You have a claim where you had no responsibility for the damages caused yet you must pay two deductibles (general and professional liability) as well as two policies that will most likely increase in pricing at renewal.

How can you avoid the above claim happening to your firm?

We have long advocated getting your firm named as an additional insured, on a primary and non-contributory basis, on the General Contractor's general liability (GL) policy. Our position is that by doing so, you can tender a claim for jobsite accidents to the contractor's GL policy under the theory that the contractor is the responsible party for the means and methods by which the work is being performed, as well as the responsible party for any incident arising out of their duties and obligations on the project-including jobsite injuries. Will your Client's General Contractor push back by saying this is not available? They may push back, but know that it is available so if your Client wants to be named under your general liability policy they should want to make this a contractual requirement of the Contractor.

Why is your general liability policy involved even though you were not responsible for the jobsite injury?

The duty to defend is broader than the duty to indemnify. This means that even though the damages may not be recoverable under the policy, the insurance carrier may still be required to defend an insured, or additional insured in a related litigation. This does not mean that the duty to defend will always exist on any litigation. It simply means the umbrella of what triggers a duty to defend is much bigger that the umbrella over the duty to indemnify.

Who should be an Additional Insured under your general liability policy?

Contractors, (unless they are your client) and attorneys will not be added as additional insureds by the carriers. Reference is commonly made to "agents, affiliates, assigns, members, representatives" when referring to additional insureds. We believe that this is an excessively broad range of additional insureds which can be expanded post-loss to a point where you owe defenses to anyone and everyone on the project. Therefore, there should be a caveat that the additional insureds be "named or identified" at the time the contract is being negotiated, and the words "agents, affiliates, members" be deleted. There have been questions asked regarding naming lenders as additional insured. Frequently, the lender's status as an additional insured is one of the requirements to meet the funding obligations. Therefore, options are limited.

What does it mean when they ask for CG ISO forms?

You must consult with your insurance broker to determine if these forms are available. The CG ISO are predominantly contractor-based forms, so the vast majority of design firms do not have access to ISO forms. Most architect and engineer firms insurance is written on a Business Owner's Policy (BOPs) specifically tailored for design professionals. Therefore, when there is a request for an ISO CG 001 General Liability, it should be understood that most design firms don't have these forms, and could technically be construed as non-conforming to the contract requirements even though the coverages being sought are addressed either in the BOPs or Professional Liability policies. This non-compliance issue becomes particularly problematic when a request is made for the CG ISO 2010 (11/85 & 10/01) and the CG ISO 2037 (10/01) Additional Insured forms. These have "arising out of" language which the Business Owner's Policy does not possess, and very few insurance carriers have an "equivalent." The (7/04) versions of these same forms have "in whole or in part" language which is more palatable to more insurance carriers, but contractor's brokers are challenging many of the equivalent provided by BOPs insurance carriers. Whenever you see these addressed in your contract, I would add the phrase, "or equivalent, if available at no additional cost." Remember, if you agree to provide an insurance endorsement that is not available to your firm you will be in breach of contract and your client does not have to pay for your services.

Not all insurance requirement demands of your client can be met and you must consult with your insurance professional to determine if the requirement is obtainable and at what cost.

Willis A&E is exclusively dedicated to providing insurance and risk management solutions to Architects and Engineers.

Financial Management - Beyond Intuition

Part Two: Profit Planning

by Rena M. Klein, FAIA

Can you actually plan to make a profit?

As we discussed in Part 1 of this article (Licensed Architect Volume 18, No. 4 - Winter 2014), financial management involves tracking key financial indicators pertinent to firm financial health and using the information to forecast likely future performance. In Part 2 we will discuss how to calculate billing rates to ensure that your projects at least have a chance at profitability. In addition, you will find out how expense budgets and net revenue forecasts can help you make strategic business decisions, even in an unpredictable economic environment.

Billing Rates and Profit Planning

Now we come to the really exciting information about how to plan for profitability on projects. Profitability depends on the relationship between your break-even ratio and the billing rate charged to clients. This is expressed as a billing multiple, which is the factor that is multiplied times the hourly cost rate of an employee (or owner) to determine the amount charged per hour to a client (billing rate). It makes no difference if you charge clients on a fixed fee or hourly basis. The effort still needs to be tracked on an hourly basis to know where you are in relation to a project budget.

Your billing multiple must be greater than your break-even ratio if you want to make a profit. You can calculate the break-even hourly rate for each staff member (and owner) by multiplying their hourly cost rate (cost rate = salary ÷ 2080 hours for full time) times the firm's break-even ratio.

Example:

- RK's Full-time Salary: $70,000
- Cost Rate: $33.65/hr ($70,000 ÷ 2080 hours)
- You know the firm's break-even ratio is 2.80
- RK's break-even billing rate: $33.65 times 2.80 = $94.22/hour, round up to $95/hr.

This is how much you must charge hourly for RKs work, simply to break even. Now, to add a profit factor, you divide the break-even billing rate by the complement of your profit goal. So, if your profit goal is 20% then:

- RK's billing rate with 20% profit factor: $94.22 ÷ .80 = $117.77/hour, round up to $120/hr.

- RK's billing multiple: $120 ÷ $33.65 = 3.56

This means, to make a 20% profit on RK's work, RK's billing rate must be 3.5 times RK's hourly cost rate.

To help you to build in profit when estimating fees for a project proposal, consider the following process:

1. Figure the fee bottom-up, based on the hours and staff needed for the effort. Price the fee based on break-even billing rates to determine the absolute bottom line – the fee you must obtain to simply break-even on the project.

2. Refigure the fee at the billing rates that include a 20% profit. This will give you a total fee amount that includes a reasonable profit. This is not meant to replace a contingency, it is meant to give you a fee that will result in a reasonable profit.

3. Compare each fee total to the market value of the services from the client's point of view, or any other top-down metric, such as a reasonable percentage of the estimated construction costs.

This process will give you information you need to decide on a competitive fee that is likely to earn you some profit. It can also prevent you from proposing fees that won't even allow you to cover your overhead and salary expense on the job. If you decide to take on a job that you know is a money loser, there should be a very good reason.

Budgets and Revenue Forecasting

For the last piece of the financial management puzzle, it would be helpful if we all had a crystal ball that allows us to peer into the future. Lacking that tool, we have to rely on trends from past performance to give us a clue about what might happen in the future.

For expense budgets, this is fairly straightforward. Most overhead expenses stay fairly stable year to year, with the notable exception of healthcare costs. Overhead costs tend to go up in sudden steps, rather than in a smooth linear fashion. Growing the firm to a point where an office move is required is an example of a stair-step change in overhead and a firm in transition may have a harder time forecasting its overhead expenses. The best practice is to start with an expense budget that is divided into fixed expenses – those that are the same month-to-month and variable expenses – those that change each month due to discretion and changing operational needs of the firm.

"Profitability depends on the relationship between your break-even ratio and the billing rate charged to clients."

"Your billing multiple must be greater than your break-even ratio if you want to make a profit."

Revenue forecasting can be equally simple, although less reliable and predictable. Start with jobs under contract, deduct any amounts that will be going to outside consultants, and note the amount remaining yet unbilled. The total is known as your "backlog."

Then add up your "prospects" – the total amount of proposals outstanding, minus any amount that will go to outside consultants. Last, consider any possible "suspects," – proposals outstanding with a slim chance of success, conversations that may lead to a project, etc., and try to estimate the value of these possibilities.

To arrive at the net revenue forecast, each total is adjusted to reflect likely outcomes based on common sense and historical firm data, if available. Typically the revenue forecast is calculated as follows: [backlog x 90%] + [prospects x 50%] + [suspects x 10%]. You can set up a spreadsheet to track your revenue forecast as jobs are completed, prospects become backlog and new prospects and suspects emerge.

It is good practice to prepare an annual budget with the net revenue forecast and a list of operating expenses that is as complete as possible. With historical data, you can develop a budget that outlines expenses by the month and then compare it to actual expenses as the year progresses. Doing this will help you make decisions about issues such as how much to spend on marketing and business development or discretionary benefits for staff, and it will provide a host of other information to help you run your firm smarter.

Financial management can be done quickly and effectively once tools are in place to automate many of its processes. It is possible to set up dashboards and spreadsheet tools to track key financial indicators. Electronic time sheets that sync with spreadsheet software are easily available. And software products such as BillQuick and Ajera by Axium (recently acquired by Deltek) may also be an option, especially for firms approaching 15 people in size.

Financial management, along with clarity of purpose and a sound marketing plan, is critical to a creating a successful practice.

About the Author
Rena M. Klein, FAIA is the author of The Architect's Guide to Small Firm Management (Wiley, 2010) and principal of RM Klein Consulting, a firm that specializes in helping small firm owners run their firms better.

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of stairs, closets, windows, rooms, and other architectural features. The federal appellate court hearing the appeal, the Second Circuit, in upholding the district court's entry of summary judgment against the plaintiff, took up the question of whether the elements of Zalewski's that were copied also were protected by copyright law. In the end, the Second Circuit held that only *unprotected* elements were copied:

> *[T]he designs' shared footprint and general layout are in keeping with the colonial style. There are only so many ways to arrange four bedrooms upstairs and a kitchen, dining room, living room, and study downstairs. Beyond these similarities, Plaintiff's and Defendants' layouts are different in many ways. The exact placement and sizes of doors, closets, and countertops often differ as do the arrangements of rooms.*

The Second Circuit also noted that other design features, e.g., those attributable to engineering necessity, existing structures on the site, topography, and building codes, get no protection in copyright. Neither do "scènes-à-faire" in architecture, elements indispensable or standard in the treatment of a certain genre or topic. For example, high-rise office buildings, neoclassical government buildings, and, yes, colonial houses, are recognized styles that include standard elements not protected by copyright. The same is true for design features used to satisfy market expectations.

Even though the defendants' designs were very similar to his own, that was not enough. The similarity and the substantial evidence of copying proved just that: copying at most, not wrongful copying. Many of the features were a function of standard house design and consumer expectations. Zalewski was not entitled to copyright protection for counters against kitchen walls, a fireplace in the middle of an exterior wall, or a closet in each bedroom. The overall footprint of the house and the room sizes were "design parameters" dictated by the lot and by consumer preferences, not by the architect. Most of the similarities, the appellate court decided, were simply features of homes, or at least colonial homes. Zalewski designed a colonial house, was bound by the conventions of colonial houses, and could not assert a copyright in those conventions.

Importantly, Zalewski did not try to distinguish the aspects of his designs original to him as opposed to those dictated by the form in which he worked. Also, the court noted subtle differences in the works, including in the paneling, doors, and shutters. These differences were significant considering how limited was Zalewski's copyright protection in light of the constraints dictated by a colonial design: "Although he undoubtedly spent many hours on his designs, and although there is certainly something of Plaintiff's own expression in his work, as long as the Plaintiff adhered to a pre-existing style his original contribution was slight – his copyright very thin."

"One of the elements of a copyright action is "copying." If you have not copied someone's work, you have not infringed."

Most recently, the trial court in Buttner v. RD Palmer Enters. followed Zalewski and shot down another architect attempting to recover in copyright.[4] The project involved in Buttner was different: "Plaintiff was contracted to design a new building, or an addition to the existing building, for what amounted to essentially a combined Dunkin' Donuts, convenience store, and gas station." The owner who had hired the architect, at some point after his one-year contract with the architect expired, "ceased engagement" with him and hired a different firm to complete the project. That firm then prepared a set of plans based on the original architect's plans.

In denying the plaintiff relief in copyright, the court in Buttner laid out a list of fully seven "unprotectible elements of architectural works" gleaned both from the Zalewski opinion and from the Code of Federal Regulations. It then painstakingly went through all of the various elements alleged to have been copied, before determining that nearly every single one fell into one of the categories that do not enjoy copyright protection: "As Plaintiff has failed to demonstrate improper appropriation of the arrangement, selection, and coordination in the Buttner Plans, under the guidelines set forth in Zalewski . . . and the CFR [Code of Federal Regulations], the Court finds that Plaintiff has shown at most copying, but not wrongful copying . . . . Accordingly, Palmer and Rich and Gardner are entitled to summary judgment on Plaintiff's copyright infringement claims." [5]

The trilogy of cases discussed above, involving a large commercial design, residential designs, and a smaller commercial design, respectively, holds some important lessons. Proving infringement whenever the project in question would be considered "standard" could be an extremely high hurdle to overcome, and very careful consideration and investigation should be undertaken before pursuing copyright damages. There must be an extensive and thorough analysis of what can be considered original and which of those original elements were copied or copied and modified. The architect claiming infringement must be able to prove those aspects of the design that are truly original to the architect, and not dictated by convention, codes, or anything else. On the other hand, works that are more novel or creative have an extra layer of protection and, if copied, it likely would be much easier to convince a court that an infringement has taken place.

1 Nova Design Build v. Grace Hotels, 652 F.3d 814 (7th Cir. 2011).

2 Our firm represented another of the defendants before the district court, a professional design firm not involved in the appeal.

3 Zalewski v. Cicero Builder Dev., 754 F.3d 95 (2d Cir. 2014)

4 Buttner v. RD Palmer Enters., No. 5:13-CV-0342 (LEK/ATB), 2015 WL 1472084 (N.D.N.Y. 2015).

5 The Buttner decision has been appealed to the same federal appellate court that issued the Zalewski opinion: the Second Circuit. That appeal was docketed in April 2015, and remains pending.

6 Keys To Harnessing Social Media for Architects

How To Create and Distribute Meaningful Content

by Jean Leathers

My first exposure to social media came through my personal life. My nieces and nephews invited me to become friends on Facebook. Then friends from the past reached out. Relatives and friendships I'd formed in my professional life became connections.

At first it was novel. I enjoyed the photos of band camp, weddings, sunsets and dogs. But there were people who posted every greasy burger and brew they consumed, and those obsessed with how far they ran, posting their actual maps. I'd find myself muttering under my breath, "Who cares?"

And that is exactly the question we each need to ask as the world of social media further inveigles its way into the realm of business communications. If you choose to participate in social media, the crux is to create content that is helpful, educational and meaningful to share with the audience you're trying to reach.

Some of you are probably asking the question, "Do I have to participate in social media?" The answer to that is no. For your architectural practice to succeed, you don't have to jump on the Twitter, Houzz, LinkedIn, or other social media bandwagons; however, participating can help to promote your business, elevate you as a thought leader, and pull business to your firm. So it's worth considering.

What Content Is Meaningful? Or How To Pass the "Who Cares?" Test

The same kind of self-focused content that shows up in personal social media can easily be found in the business world. For example, recently I saw a post in a LinkedIn Group by a business development fellow from an engineering company that said, "It's confirmed. My training presentation ranked number one at the such-and-such conference." I'm probably not the only person who has an allergic reaction to self-adulation. It's a little like saying, "I have integrity. No really, you can trust me." Something just rings hollow about it. So please note, it's better not to post than to post something that is self-promotional or self-congratulatory.

So what constitutes meaningful content? Contributions that benefit others, particularly your existing or potential clients, teaming partners, employees, referral sources and friends of your firm. A variety of things fall into this category:

- Educational information
- Links to resources
- Announcements about upcoming events they may benefit by attending
- Congratulations to others about their successes
- Recommendations for books, videos, podcasts, blogs
- Support for local charities, professional associations, fund raisers
- Information that can be forwarded to enrich discussions

The easiest way to create content that works is to ask yourself as you're creating it, "Will this be helpful or interesting to the audience I want to share it with?" Focus on being of help to others and your content will fall in line.

The 6 Keys To Effective Social Media Marketing for Architects

As you create strategies for promoting your architectural practice through social media, be sure to address the following six key components to ensure a successful campaign:

1. **Position**: What part of the market space are we trying to claim?
2. **Audience**: Whom are we trying to communicate with?
3. **Message**: What message are we trying to get across?
4. **Channels**: Which channels does my audience plug into?
5. **Packaging**: How do we package our commutations for each channel?
6. **Sender**: Who is the right person to communicate this message?

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6 Keys To Harnessing Social Media for Architects

To illustrate these points, let's work with two examples: a sole practitioner architect with a specific niche, and a small generalist firm.

Sole Proprietor Architect with Specific Niche | **Small Architectural Firm with Variety of Clients**

1. Position

Participation in social media should enhance the position you want to claim in the market space. This requires clarity about who you are, what you do, for whom and to what benefit.

POSITION: FAMILY OWNED CABIN RENOVATION, RESTORATION AND PRESERVATION

An independent architect I met had dedicated her practice to helping owners of rustic cabins in Northern Michigan to renovate and retain the heritage of cabins that were often owned by the same family for several generations. Some were transformed from seasonal vacation properties to year-round living quarters. Others were expanded and enhanced with amenities.

POSITION: BENEFITS CLIENTS RECEIVE FROM THE ARCHITECTURE WE DESIGN

A small firm I worked with in Montana had a great generalist practice. Their portfolio includes residential, developer-driven commercial, sophisticated health care facilities, higher education and more. The firm positioned around the benefits that clients received by working through their design process: architecture that promotes well-being, strengthens community, and inspires.

2. Audience

Who are you trying to reach? City planners, hospital administrators, single-family homeowners? Spend some time defining your target audience.

AUDIENCE: OWNERS OF CABINS IN NORTHERN MICHIGAN

1. Owners who live in the cabins year-round
2. Owners whose cabins are vacation properties
3. Family members of cabins that have been in the family for generations

AUDIENCE: VARIETY OF CLIENT AND PROJECT TYPES, MOSTLY LOCAL

A partial list includes:

1. Business owners
2. Civic leaders
3. Healthcare administrators
4. School Officials
5. Academic leaders and administrators
6. Homeowners

3. Message

What can you share with your audience that would be helpful to them?

MESSAGE: KEEP MEMORIES; UPGRADE AMENITIES; EXPAND, LIVE YEAR-ROUND

Share information about how properties can be restored to keep cherished memories alive while renovating, adding to, and enhancing the cabin. Perhaps share how those used as seasonal vacation properties can be upgraded for year-round occupancy.

MESSAGES: FIND THE COMMON DENOMINATOR AMONG PROJECT AND CLIENT TYPES

One example of a message that could be shared across all firm's clients is information and education about achieving sustainable design success.

4. Channels

How can you reach your audience via social media? Think about where they might go online to get information, or where they might share photos of places and experiences.

CHANNELS: WHERE DO OWNERS OF CABINS IN NORTHERN MICHIGAN GATHER ONLINE?

1. Year-round occupants: local community Facebook page, community associations like Kiwanis or Rotary
2. Out of town vacation property owners: Northern Michigan tourism, Facebook for local events
3. Family member: Northern Michigan tourism, Facebook for local events

CHOOSE SOCIAL MEDIA CHANNELS SPECIFIC TO EACH AUDIENCE

1. Business owners: Local media outlets, Chamber of Commerce, Rotary, Elks, City and County, Developer Forums
2. Civic leaders: City and County, Schools, Community Forums, State
3. Healthcare administrators: Healthcare publication sites, blogs and feeds, healthcare conference sites, healthcare accreditation, certification, licensure, registration sites
4. Academic leaders and administrators: Society for College and University Planning, local university website and feeds, Chronicle of Higher Education
5. Schools: School Board, local community forums, City and County
6. Homeowners: City and county, community forums, neighborhood associations, local clubs and organizations

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Association of Licensed Architects
Continuing Education

Navigating Wall Assembly Fire Testing

NFPA 285 primer addresses burning questions about this important test

Sponsored by DuPont Building Innovations | By Barbara Horwitz-Bennett

Photo courtesy of Dupont Building Innovations

Now subject to NFPA 285 testing per the International Building Code, foam plastic insulation, combustible exterior claddings, and water-resistive barriers must demonstrate limited fire propagation.

Learning Objectives:

After reading this article, you will:

1. Recognize the impact of NFPA 285 test requirements in the context of the International Building Code.
2. Apply the NFPA 285 components and parameters for successful test performance.
3. Identify combustible components in a noncombustible wall assembly that requires NFPA 285 testing.
4. Design building envelope systems that are NFPA 285 compliant.

From the popularity of building certification programs to net-zero energy building initiatives to the active building enclosure movement, expectations continue to increase for building performance, facility life, and occupant health and safety. Because two of the most critical aspects of high-performance buildings are air/water tightness and the enclosure's thermal performance, the necessity of using more insulation, and high-quality air/water barrier and flashing materials, will continue to increase as the industry trends toward highly energy-efficient building envelopes.

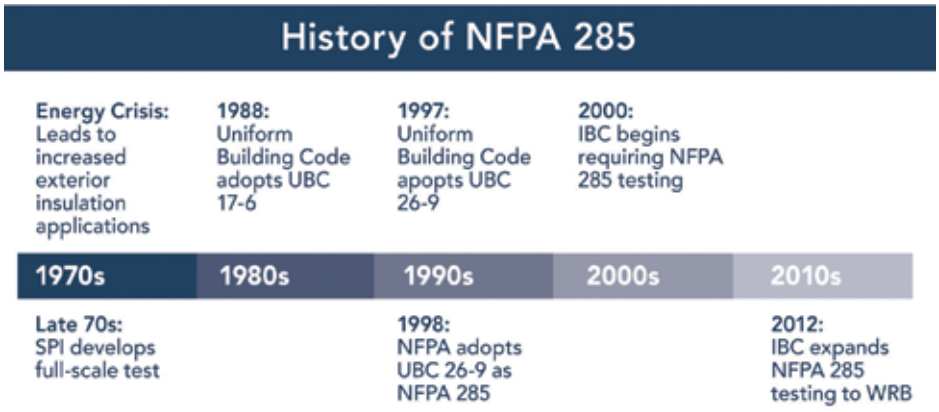
While market demand for insulations, dedicated air and water barriers, and other combustible envelope materials are at an all-time high, a little-known code-required fire test standard called National Fire Protection Association (NFPA) 285 has suddenly been cast into the spotlight. Truth be told, this Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components has been around for a couple of decades, but its relevance has significantly increased with additional combustible components included in more recent International Building Code (IBC) updates.

Consequently, it behooves architects to fully understand the history, relevance, and application of this important standard.

THE HISTORY OF NFPA 285

Dating back to the 1970 energy crisis, the plastics industry began encouraging the building industry to start using foam plastic insulation on exterior walls to increase energy efficiency. However, four of the five types of construction listed in the building codes had noncombustible requirements, so the proposal was outright rejected.

Not willing to give up so quickly, the Society of the Plastics Industry (SPI) sat down with code and fire officials and asked what it would take to convince them that putting foam insulation in the walls would not present a fire hazard. The



From its official adoption to the Uniform Building Code in 1988 to the 2012 International Building Code, fire testing is required for combustible components in wall assemblies.

Source: DuPont Building Innovations

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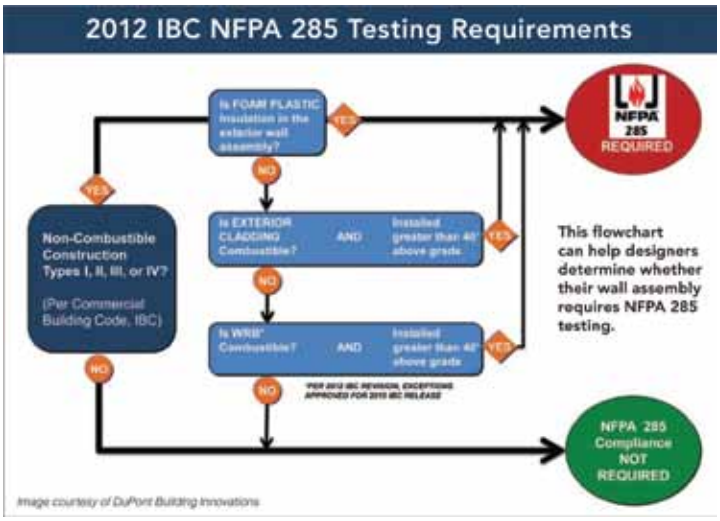
officials then responded with a challenge.

"The plastics group was charged to design a test which would show that if a wall was fully burning, that the flames would not travel a significant distance, vertically or laterally, because of the foam plastic," explains Jesse J. Beitel, a senior scientist/principal with the Baltimore-based fire protection engineering and code consulting firm Hughes Associates. "That's how the first, two-story outdoor test was developed, but it still took another eight years before the codes adopted it."

Finally, in 1988, the Uniform Building Code (UBC) adopted the test method and allowed the use of foam plastics on the exterior walls of all construction types based upon the successful performance of several foam plastic insulated wall systems.

"However, it was an expensive test, plus one was at the mercy of the weather, so the plastics industry went about reducing the scale of the test and moving it indoors," he continues. "That test was then adopted in the UBC in 1992."

The test was then submitted to the NFPA Committee on Fire Tests and, in 1998, was published as the NFPA 285 fire test method that is used today.



BEYOND FOAM PLASTIC

While the original push was to include foam plastic insulation in exterior walls, more recently, combustible exterior claddings and water-resistive barriers (WRB) have been incorporated into the codes. In particular, the International Building Code included exterior insulation finishing systems (EIFS) in 2000, metal composite materials (MCM) in 2003, fiber-reinforced plastics (FRP) in 2009, and high-pressure laminates (HPL) in 2012, as combustible components within noncombustible wall assemblies requiring NFPA 285 testing.

Also, in 2012, the IBC added WRBs as components requiring testing before their use would be permitted in Type I, II, III, and IV buildings over 40 feet above grade (see sidebar "International Building Code Construction Categories" on the next page). This provision was recently added in as testing discovered that assemblies which passed NFPA 285, later failed with the addition of a WRB.

It seems that these newer developments were, in part, driven by increasing concerns about life safety issues in high-rise structures. For example, according to NFPA research, from 2005 to 2009, an estimated 15,700 annually reported fires in high-rise buildings resulted in an average of 53 civilian deaths, 546 civilian injuries, and $235 million in direct property damage per year.

In addition, a number of building fires in the U.S. and China in 2010 proved that a small ignition source can rapidly spread to engulf the entire exterior of a building. Of course, this is particularly dangerous in high-rise buildings with limited rescue and evacuation capabilities.

Although the process of states adopting the latest version of the IBC will take time, and often states and local jurisdictions choose not to adopt the model code in its entirety, but rather use it as a basis for developing their codes, experts anticipate that the issue of designing and specifying NFPA 285-compliant wall assemblies is becoming more critical.

BUYER BEWARE

While some manufacturers and associations have been quite proactive in terms of testing their wall assemblies in-house to ensure NFPA 285 compliance, other products have only begun showing up in wall assemblies in recent years and have not been tested together with many component variations.

"So now NFPA 285 is rearing its ugly head for some, and architects are frustrated that they can't always design wall assemblies the way they want to as not all products pass this test," points out Beitel.

Furthermore, Tracy (Golinveaux) Vecchiarelli, associate fire protection engineer, National Fire Protection Association, Quincy, Massachusetts, points out that NFPA 285 is a full assembly test. "This means that all of the wall components need to be tested together and then the entire assembly is given credit for passing the test. However, the individual components of the wall cannot be considered 'compliant' just because they were part of a tested assembly," she explains.

Consequently, NFPA 285 is proving to be quite a source of confusion among architects.

Earlier versions of the IBC contained ambiguous language, so it appeared that most construction types were exempted from NFPA 285, explains Richard Keleher, AIA, CSI, LEED AP, senior architect, Thompson & Lichtner, Cambridge, Massachusetts. But now that the language in the IBC has been clarified, and NFPA 285 compliance is anticipated to be more fully applied and enforced, architects have been taken by surprise. "In fact, in my 45 years of professional practice. I have not seen a single issue that has given architects such uncertainty," he states.

Offering his perspective, David W. Altenhofen, AIA, East Coast director, The Façade Group, Philadelphia, notes that for decades, so many buildings have been constructed, without question, with foam plastic insulation in the cavity behind brick veneer.

"As the construction industry incorporated more and more drained cavity rain screen wall systems with veneers of metal panels, aluminum composite materials, terra cotta, etc., it was a natural transition to just keep using the foam plastic insulation in the cavity," he says. "At the same time, code officials did not seem to be aware of the NFPA 285 requirements and weren't challenging architects. Now the industry is on a steep learning curve to catch up."

PASSING NFPA 285

Of course, the first step in dealing with NFPA 285 is determining if, in fact, the specified assembly requires testing. For starters, the noncombustible components in the wall assembly—including the base wall structure, interior drywall, and exterior sheathing—are not test triggers, but they must be considered as part of the complete wall assembly. This is because the noncombustible members can influence the overall results by interacting with the combustible components in the test.

"The key thing to keep in mind is that the NFPA 285 test is not a material test. The intention of the test is to assess the fire performance of a specific wall assembly, as a system," explains Jason Martin, P.E., commercial building technical R&D leader, DuPont Building Innovations, Richmond, Virginia.

However, it's the foam plastic insulation on buildings of any height, other than con-

struction type V, and air and water barriers and combustible claddings—EIFS, MCM, FRP, and HPL—on buildings taller than 40 feet above grade, which are categorized as construction types I-IV, that will subject an assembly to NFPA 285 testing.

Incidentally, it's important to note that the 2012 IBC also prescribes that these components meet the following ASTM requirements:

- Flame Spread Index ≤ 25 (ASTM E84)
- Smoke Development Index ≤ 450 (ASTM E84)
- Maintain assembly fire rating (ASTM E119/UL 263)

In terms of the NFPA 285 test itself, Vecchiarelli explains, "the intent of the test is to evaluate the fire propagation characteristics of exterior non-load-bearing wall assemblies. The two-story test involves two burners, one placed inside the first-story test room, and the other in a first-story window opening.

IBC CONSTRUCTION CATEGORIES

The International Building Code divides construction materials into five types as follows:

Type V: Combustible Construction
Structural elements, exterior walls, and interior walls are made from any materials permitted by code. Wood-based framing and sheathing is common.

Type IV: Heavy Timber Construction
Exterior walls consist of noncombustible materials and the interior building elements are solid or laminated wood without concealed spaces. Wood members have minimum dimensions for Heavy Timber classification.

Type III: Noncombustible Exterior
Exterior walls are made from noncombustible materials and the interior building elements are constructed with any material permitted by code. Steel studs, fire-retardant-treated (FRT) wood framing, and gypsum sheathing are common.

Type II: Noncombustible Exterior & Components
Exterior walls, floors, and roof are composed of noncombustible materials. Steel, masonry, and cementitious products are common.

Type I: Noncombustible Materials and Structure
All exterior and structural components require fire-rated assemblies. Fire-protected steel and concrete assemblies are common.

"The test runs for 35 minutes," she continues. "Test results include flame propagation measurements, thermo-couple temperatures, and observations made during the test."

In order to pass the test, the wall assembly may not allow any flame propagation to the second-story room and none of the thermocouples, which are placed throughout the wall assembly, can exceed 1,000°F. Externally, the flames cannot propagate 10 feet above the top of the window, nor can they travel more than 5 feet laterally from the centerline of the window.

Some of the thermocouples are placed on the exterior wall surface, while others are positioned in the wall cavity air space or insulation, or both. Additional thermocouples are positioned in the insulation or the stud cavity, or both. As for the test specimen itself, the minimum height is 18 feet and the minimum width runs 13 feet, 4 inches.

COMBUSTIBLE COMPONENTS IN A NONCOMBUSTIBLE WALL ASSEMBLY

While noncombustible cladding—including brick, masonry, stone, terra cotta, concrete, cementitious stucco, fiber cement boards and panels—do not alone trigger NFPA 285 testing, they are generally heavier, more expensive materials.

Taking a closer look at combustible cladding types, MCM cladding systems are available in open and closed joint systems and run between 3 millimeters and 25 millimeters in panel thickness. Factory bonded with a metal face and plastic core, the full system is made up of joints, a substructure, and an attachment mechanism. Because different manufacturers utilize different core materials, it's important to note that fire performance characteristics will vary. And even if the product looks the same as an NFPA 285-tested MCM and bears a similar product name, if a different core material is utilized, that specific product requires a separate NFPA 285 test within the wall assembly configuration.

Using MCM below 40 feet, while not triggering an NFPA 285 test, is limited to 10 percent of the wall area when the building separation is less than 5 feet. MCM cladding use above 40 feet, but below 75 feet, may not require an NFPA 285 assembly test, depending on a complex assessment of: installation area, panel sizes, horizontal and vertical separations, presence of a whole-building sprinkler system, building separation distance, and whether the cladding self-ignites below 650°F, per ASTM D1929.

EIFS systems are regulated by the IBC under foam plastic requirements, and must meet ASTM E2568, which includes, but is not limited to, accelerated weathering, freeze/thaw, salt spray resistance, tensile bond adhesion, water penetration, and resistance testing.

Like EIFS, FRPs and MCMs with foam cores must also comply with IBC foam plastic requirements. When FRPs are installed in a condition not requiring an NFPA 285 assembly test, the cladding's flame spread index must be no more than 200, per ASTM E84, and prescribed cavity fireblocking is required. In this case, FRPs—which are composite materials made from reinforcing fibers impregnated with a polymer, molded into the desired shape and laminated onto a wood or plastic core—are limited to 10 percent of the surface area when the building separation is less than 10 feet.

HPLs also come as open and closed joint systems and run between 4 millimeters and 15 millimeters in panel thickness. In conditions not requiring an NFPA 285 assembly test, they are limited to a 10 percent area when the building separation is less than 5 feet, and similar to MCMs, the different core materials which different products are made from will have varying fire performance characteristics. HPLs are decorative exterior grade panels with cellulose fibrous material bonded with a thermosetting resin by a high-pressure process.

One noted exception for HPLs with regards to NFPA 285 is the cladding is allowed to rise up to 50 feet in areas of 300 square feet or less, per 4-foot vertical separation, and does not require NFPA 285 testing as long as the cladding doesn't self-ignite below 650°F, per ASTM D1929.

As for air and water barriers, referred to in the IBC as WRBs, generally all product types are considered combustible including: building wraps, self-adhered building wraps, self-adhered membranes, and fluid-applied membranes. Although the 2012 IBC does require that all WRBs go through testing, significant revisions and exceptions, based on material properties and fuel load potential, have been included in the 2015 IBC.

Because WRBs are a new NFPA 285 assembly test trigger in 2012, this means that the vast majority of products have not been tested. And although some manufacturers may claim that they have an NFPA 285 test report, buyer beware that the product may have only passed one test in one specific wall assembly configuration, which significantly limits designers.

It's also important to keep in mind that WRBs can be installed both under the insulation and over the insulation, and each positioning of the barrier requires a separate test.

For example, specifiers often choose to place the barrier under the insulation in order to increase the product's durability and longevity because it is protected by the foam. Also, in cases where the finish system is applied directly to the outside of the foam, the WRB must be located under the insulation. One other advantage to this approach is the specifier's ability to provide a drainage plane behind the foam for better moisture/ condensation management.

This diagram shows the testing structure for NFPA 285.

Image courtesy of DuPont Building Innovations

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On the other hand, some reasons why the architects may choose to install mechanically fastened building wraps over the exterior insulation are: ease of installation, lack of blind penetrations behind the insulation, and the protection of the insulation seams from air/water exposure. Also, when fluid-applied or self-adhered membrane products are installed on the exterior face of the continuous insulation, it is important that they have adequate adhesion to the surface of the insulation and that the insulation facer is sufficiently bonded to the insulation.

As mentioned, insulation levels in building enclosures have been steadily rising thanks to the green building movement and the energy codes. For example, in the 2012 IECC and ASHRAE 90.1 2012, the mandated use of continuous insulation (c.i.) increased for every climate zone. Insulation is considered continuous when it is installed on the exterior side of the base wall in order to reduce the effect of thermal bridging on the overall R-value of the wall assembly.

With ample studies effectively showing the extent to which thermal bridges compromise R-values by providing a means of high heat flow conductance through the building envelope, this has helped spur the newer c.i. requirements. To avoid de-rated R-values of between 40 percent and 60 percent, insulation must continuously run across all structural members without thermal bridges, outside of fasteners and service openings.

Putting things into perspective, Meyer points out that this new code development essentially eliminates the "choice" of whether or not to use continuous insulation and virtually mandates foam on exterior walls.

Although there are insulation alternatives to foam, and some specifiers are opting to go with these materials in an attempt to avoid NFPA 285, at the same time, they are compromising on the higher thermal performance of foam.

For instance, mineral wool has a nominal R-value of about 4 per inch of material, and the type of foam plastic insulation recommended for exterior walls, namely extruded polystyrene, has an R-value of 5. For an even higher R-value, polyisocyanurate insulation is rated at 5.6 per inch.

The benefit of mineral wool insulation is that it is noncombustible and will not prompt a NFPA 285 test. In addition to noncombustibility, mineral wool differs from foam plastics due to its high vapor permeability. This directly increases the wall's ability to dry out if water gets into the wall assembly through a penetration leak or condensation from air transported moisture.

Essentially, the increasing use of exterior continuous insulation contributes to the growing complexity of designing exterior wall systems. Thickness, permeability, and location of the insulation in the wall assembly have an effect on how it responds to thermal air and moisture loads. There is no one single perfect wall design. The building science aspects of material properties, their locations in the wall assembly, the attachment methods, assembly performance requirements, constructability, and climate conditions must all be considered in a high performance building envelope.

DESIGNING NFPA 285-COMPLIANT BUILDING ENVELOPE SYSTEMS

Another wrinkle in the NFPA 285 testing process is the fact that only three laboratories are currently equipped to do the testing. These include Intertek and Southwest Research Institute, both in San Antonio, Texas, and Architectural Testing in York, Pennsylvania. So not only does the cost of $50,000 to $60,000 per test (*Journal of Building Enclosure Design,* Summer 2012) quickly add up, but the standard lead time of 8 to 10 weeks can delay a project's design and construction schedule.

Fortunately, a fourth testing facility should be coming on line within the year, which may speed things up, although concrete and masonry systems will still require a 4- to 6-week curing time.

At one point, NFPA looked at trying to reduce the scale of the test to reduce the cost and lead time, but such an undertaking would have required a significant investment of time, money and resources, so that work was set aside, according to Beitel.

As mentioned, every configuration requires a separate test. So even if a specific WRB, cladding and insulation type were to pass the test, if the designer decides to swap out even one of the components, an entirely new test must be conducted.

For example, there are many types of foam plastics and performance varies, explains Beitel.

"Based upon the wall assembly you put them into, some will pass and some will fail. That is the problem that the architects perceive they have. They want to use a given foam with a given veneer, but it has to pass the test.

"None of the foams have a perfect track record and that's the confusing part here," he adds.

In some cases, manufacturers who have tested various combinations of their products in wall assemblies, can be very helpful. So specifying a specific wall assembly which has already been tested by the manufacturer will obviously spare the architect the time and money for testing, which can amount to a savings of thousands of dollars, according to Vecchiarelli.

However, this means that every element of the wall assembly must be exactly the same as when it was tested and this, in turn, forces wall assemblies into a proprietary status, rendering them unbiddable. Consequently, to get around this, architects must now design their walls with multiple 285-compliant assemblies in mind.

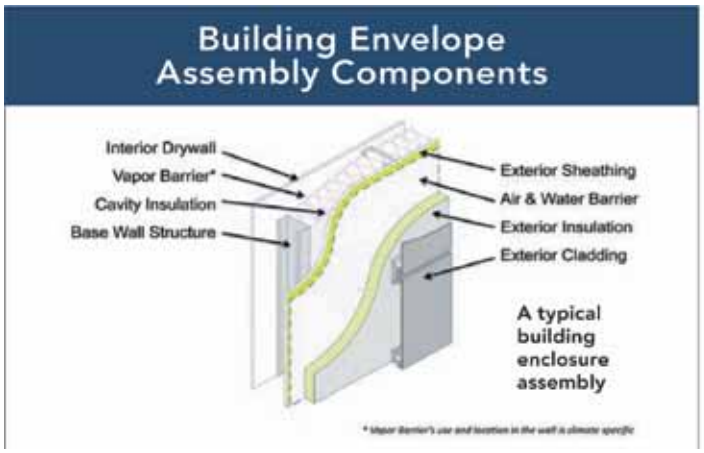
Making the situation even more complicated, NFPA 285 test results are owned exclusively by the manufacturer and at present, there is no catalog of compliant assemblies that architects can reference.

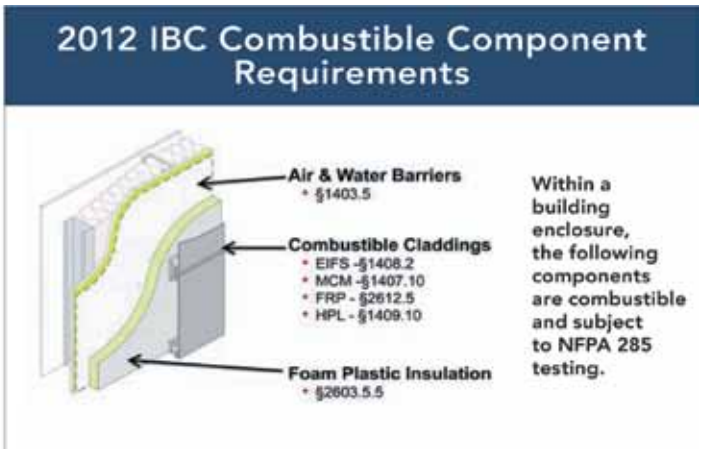
"In fact, some manufacturers are not publishing their information in this regard for fear of their competitors copying them," notes Keleher. "This makes it exceedingly difficult to find compliant assemblies that suit individual projects."

Recognizing this complexity, some initial efforts are being made to compile a database of 285 fire-tested assemblies. Meanwhile some proactive material manufactures are trying to offer a large selection of compliant assemblies that use their products for designers to choose from.

"This is what the architects need at the end of the day," affirms Beitel. "How soon and how that will come about, I don't know as it is not a simple process, but the construction industry understands that we have to get that together."

One tool which architects can potentially use is an engineering judgment analysis letter furnished by a reputable code expert. This involves bringing in such a consultant and inquiring as to whether individual products which passed NFPA 285 in separate tests, could be combined together in one assembly and not officially require testing, based upon the expert's opinion that the new combination would theoretically pro-





vide acceptable life safety levels.

"It is possible and reasonable to make such judgments," notes Beitel. "For example, if a steel stud gypsum wall was tested and passed, and now the architect wants to put it on a concrete masonry unit, the code officials would probably accept this."

At the same time, such an engineering analysis must come from a consultant who is intimately familiar with the 285 test and is knowledgeable in the field. And secondly, the onus lies on the architect and consultant to convince the local AHJs that the NFPA 285 test can be bypassed in this instance.

"This can save a considerable amount of money over a custom 285 test. Of course, if a full test is going to be required, fire safety consultants are essential to get to approval without experimenting with the materials too much," adds Altenhofen.

Since the legal responsibility doesn't fall on the code officials, but rather the consultant and the party who commissioned the consultant, the AHJs are often willing to consider such well-founded exemptions, or specific exemptions which will be included in future versions of the IBC, such as the WRB exemptions in the 2015 IBC.

Other than recruiting the services of such a consultant, as mentioned, architects don't have the benefit of a "cheat sheet" at this time and are really being forced to do their homework. At the same time, some manufacturers are more progressive than others in providing specifiers with such a chart instructing how to build a NFPA 285

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Impact of Thermal Building
on Effective Installed R-Value for Steel-Framed Walls

Actual Cavity Depth. inch	Rated R-Value	Effective R-Value
3.5 in. depth	R-11	R-5.5
	R-13	R-6.0
	R-15	R-6.4
6.0 in. depth	R-19	R-7.1
	R-21	R-7.4
3.5 in. depth	R-11	R-6.6
	R-13	R-7.2
	R-15	R-7.8
6.0 in. depth	R-19	R8.6
	R-21	R 9.0

Because thermal bridging so significantly compromises the effective installed R-value in wall assemblies, continuous insulation code requirements have come about.

IBC FIRE-RELATED TEST AND REPORTS

In addition to the NFPA 285 wall assembly test, relevant combustible components must also pass a series of material tests, per the International Building Code.

"It is important to understand how material tests differ from assembly tests, how they are performed and how they are required by code," says Benjamin Meyer, science architect, DuPont Building Innovations, Richmond, Virginia.

While, in many cases, the manufacturers take care of these tests, architects need to be familiar with the various ASTM tests and double check that a given product is compliant.

ASTM E84 - Surface Burning Characteristics

Comparatively measures product surface flame spread and smoke density. Products are then classified as A, B, or C based upon their flame spread index, with Class A offering the lowest flame spread levels. It's important to note that this test does not measure heat transmission, determine an assembly's flame spread behavior, nor classify a material as noncombustible.

ASTM E1354 - Come Calorimeter Test

A small sample specimen is taken and measured for heat of combustion, mass loss rate, time to sustained flaming, and smoke production. The test applies to various categories of products and is not limited to representing a single fire scenario.

ICC ES Reports

These evaluation reports are used to help determine if a building is code compliant and helps agencies enforce building regulations. Manufacturers also use these reports to provide that their products meet code requirements and warrant regulatory approval. This is particularly important for new and innovative products.

ASTM E119/UL 263/IBC 703.2

Provides assembly measurement of the transmission of heat and hot gases while determining the load carrying ability during the test exposure. The test does not simulate scalability or fire behavior between building elements such as floor-wall or wall-wall connections. Nor does it measure the generation and movement of smoke through the assembly, generation of toxic gases, or flame spread over the surface.

NFPA 268 - Radiant Ignitibility of Assemblies.

NFPA 268 tests for ignition of an exterior wall assembly by exposing it to a specified radiant heat influx for 20 minutes. The test is not used to evaluate a wall assembly's fire endurance, surface flame spread, or the effect of fires originating from within the building, exterior wall assembly, or at the openings.

(continued from page 39)

compliant wall assembly based upon their testing data.

Case in point, Beitel was recently called in on a project where half of a 22-story high rise was already erected and the team discovered that the wall assembly hadn't been tested and there was some question as to whether it would pass. Consequently, the wall had to be tested on site, and failed, so it had to be taken down, re-designed, and reconstructed.

While a lot of EIFS have passed NFPA 285, Altenhofen points out that there are some coated foam plastic trim and accent products that look like EIFS, but may not comply with NFPA 285.

As for FRPs and HPLs, he recommends carefully evaluating the plastic panel products because they are often organic based, making them more prone to combustion.

Altenhofen has also observed polyisocyanurate insulation as typically being less flammable than extruded or expanded polystyrene, but the product has some other performance issues that require evaluation.

Although the IBC was not willing to fully exempt WRBs from NFPA 285, the following exceptions were included in the 2015 IBC:
If the WRB is the only combustible wall component and the wall has a noncombustible covering.
Windows and doors, and flashing around windows and doors are excluded.
If the WRB is the only combustible wall component and the following test parameters are met:
ASTM E84 Product Test:
▸ Flame spread index of 25 or less
▸ Smoke-developed index of 450
ASTM E1354 (Cone Calorimeter) Product Test:
▸ Incident radiant heat flux of 50 kW/m²
▸ Effective Heat of Combustion of less than 18 MJ/kg
▸ Peak Heat Release Rate less than 150 kW/m²
▸ Total Heat Release of less than 20 MJ/m²

"You have to think about what you're doing beforehand and have your ducks in a row to make sure you have a compliant wall system," emphasizes Beitel.

This involves going back to the manufacturers and asking for information about specific products. Granted, some companies may be more forthcoming with information then others, so it may be in the best interest of architects to work with manufacturers who are willing to help them navigate the NFPA 285 situation.

"Architects need to talk to the manufacturers; that's the best advice I can give," states Beitel. "If they can't provide information or don't want to provide it, it may be necessary to use other products." Offering a few general guidelines with regards to different cladding and insulation types, Keleher has observed that MCMs are having the most difficulty passing NFPA 285, and so far, asphalt-based WRBs haven't been able to pass, although some interpretations are allowing asphalt-based flashings.

"The tried and true 40 mil modified asphalt air barrier sheets and similar spray applied products, unfortunately, are some of the less likely products to be included in NFPA compliant assemblies as they add a substantial fuel load," says Altenhofen.

DESIGNING WITHOUT NFPA 285

As noted earlier, if a wall assembly is designed without foam plastics and is less than 40 feet above grade, then NFPA 285 testing is not required. In addition, NFPA 285 compliance is not required for Type V Combustible Wall construction as the IBC gives prescriptive requirements instead. Previously, NFPA 285 compliance was not required for a wall of any height, comprised entirely of noncombustible materials, but the recent addition of the WRB trigger to the 2012 IBC has put a logistical hold on this option.

In terms of the WRB exceptions coming up in the 2015 IBC, although this code version won't be adopted for some time—in fact, as late as 2018 in some jurisdictions—the document is available for reference at this time and some local authorities may choose to implement it, particularly those who are approached by the National Institute of Building Science and the Building Enclosure Technology and Environment Council—with support from the American Institute of Architects—who are actively lobbying the IBC and local AHJs that wall assemblies can be built to acceptable life safety standards without the full requirements of NFPA 285.

In particular, the group proposed changes to the foam insulation and WRB sections of NFPA 285 for the 2015 IBC. Although the foam proposals were rejected, the group achieved partial success with WRBs.

The specific claim made by NIBS/BETEC in the WRB proposal reads as follows:

There are materials that are available, tried and tested by long-term proven history of performance as weather barriers that are not able to meet the standards in this test. Section 1403.2 of the IBC requires weather-resistive barriers while Section 1403.5 requires them to be tested to a standard if they contain a combustible water resistive barrier that many materials that are traditionally used and have proven their value can't meet.

Section 2603.5 establishes requirements for protection and testing of combustible water resistive barriers that include foam plastic insulation, so Section 1403.5 is not necessary for those products. Given that 75% of construction litigation relates to water leakage suggests that this paragraph should be deleted or we are likely to face significant problems in the future with the failure of exterior water barriers.

A NEW REALITY

Although NIBS and BETEC are planning to continue lobbying the IBC, and it will take time until all the local AHJs update their codes to incorporate the 2012 IBC, or at least base their next commercial building code on the latest IBC, the fact remains that the construction industry is entering a new NFPA 285 reality. These stringent fire protection provisions coupled with stricter energy codes are anticipated to shake things up in terms of the way wall assemblies will be specified moving forward.

Tasked with this challenge, architects will need to be knowledgeable about the standard, how it works, when it is applied, and when it can be avoided. Meanwhile, manufacturers who want their products to be specified will have to work as an ally to designers by taking on the onus of testing, where possible, and openly furnish architects with test-compliant information.

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Association of Licensed Architects
Continuing Education

Navigating Wall Assembly Fire Testing

by Barbara Horowitz-Bennett

Learning Objectives:

1. Recognize the impact of NFPA 285 test requirements in the context of the International Building Code.
2. Apply the NFPA 285 components and parameters for successful test performance.
3. Identify combustible components in a noncombustible wall assembly that requires NFPA 285 testing.
4. Design building envelope systems that are NFPA 285 compliant.

Program Title:

Navigating Wall Assembly Fire Testing

ALA/AIA/CEP Credit: This article qualifies for 1.0 LU/HSW of State Required Learning Units and may qualify for other LU requirements. (Valid through June 2017)

Instructions:

- Read the article using the learning objectives provided.
- Answer the questions.
- Fill in your contact information.
- Sign the certification.
- Submit questions with answers, contact information and payment to ALA by mail or fax to receive credit.

QUIZ QUESTIONS

1. Who developed the first test for flame propagation of foam insulation in exterior walls?
   a. National Fire Protection Association
   b. Uniform Building Code
   c. Society of the Plastics Industry
   d. International Building Code

2. Which exterior cladding type is considered noncombustible?
   a. Exterior insulation finishing systems
   b. Fiber cement boards
   c. Fiber-reinforced plastics
   d. High-pressure laminates

3. Exterior walls are potentially subject to NFPA 285 testing once a building exceeds _____ above grade.
   a. 40 feet b. 50 feet
   c. 100 feet d. 200 feet

4. For how long is the wall assembly exposed to two directed flames during the NFPA 285 test?
   a. 20 minutes b. 30 minutes
   c. 35 minutes d. 45 minutes

5. For which material will the 2015 IBC include significant revisions and exceptions to NFPA 285 testing?
   a. Foam insulation
   b. Metal composite materials
   c. Water-resistive barriers
   d. none of the above

6. Which insulation type offers the highest R-value per inch of material?
   a. Polyisocyanurate
   b. Extruded polystyrene
   c. Mineral wool
   d. all of the above

7. When planning to perform the NFPA 285 test at a qualified testing facility, how much time should be allotted?
   a. 4 to 6 weeks
   b. 8 to 10 weeks
   c. 6 months
   d. 1 year

8. Once a specific configuration of an exterior cladding type, foam insulation type, and water-resistive barrier passed NFPA 285, it's acceptable to swap out the foam insulation for another type without needing to re-test.
   a. True
   b. False

9. What is an engineering judgment letter?
   a. A letter written by the Authority Having Jurisdiction to enforce NFPA 285
   b. A letter written by a building products manufacturer stating that their product passed NFPA 285
   c. A letter written by the International Building Council code committee explaining the parameters of NFPA 285
   d. A letter written by an expert consultant vouching for the life safety level of a specific wall assembly in lieu of NFPA 285 testing

10. Which construction type NEVER requires NFPA 285 compliance?
    a. Type V - Combustible Construction
    b. Type III - Noncombustible Exterior
    c. Type II - Noncombustible Exterior and Components
    d. Type I - Noncombustible Materials and Structure

Contact Information: _____

Last Name: _____

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AIA # if applicable: _____

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Signature: _____ Date: _____

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- Additional drilling procedures can be used to probe the wood, check soundness, depth of decay, or insect damage. With plug cutters, samples can be extracted and studied to identify wood species, density characteristics, and incipient decay.
- Metal detectors and x-ray techniques can also be useful to identify embedded metal connections and components.
- Low frequency ultrasonic measuring devices can be used to determine the uniformity of the wood member density. This can be useful in identifying wood decay, insect damage, or splitting that is not exposed on the surface.

Case Study 1:
Historic Theater Building in Porter County, Indiana

The theater building, constructed in 1893, is a two-story brick masonry structure with a series of Howe trusses that span approximately 45 feet between exterior masonry walls. The walls are constructed with cavities comprised of two double-wythe

Figure 1.
Partial view of Howe Truss in1894 theater building.

assemblies headers tied across a 2 inch wide air space. Masonry piers are located at the exterior walls at the truss support locations. During roofing repair work, localized masonry deterioration was observed by the contractor and design architect in the vicinity of a truss support, and was attributed to water leaks within a built-in box gutter system. The owner required a review of the masonry conditions and a repair approach to restore proper roof support. When the deteriorated masonry was removed, advanced decay of the wood truss bearing and weakened connections of the truss to the wall were revealed. Improperly installed roofing along the gutter in the past was determined to have been contributing to the water infiltration.

Figure 2. Decayed wood at end of truss bottom chord that was supported at masonry wall. Note temporary shoring and loss of material from 2x12s.

Figure 3. Partial view of Howe Truss repair at bottom chord and rebuilt masonry support.

The temporary shoring systems were detailed such that there was not a need to fill the entire theater with shoring, as would have been the case with a more conventional approach. Rather, a customized steel bracket, secured to the interior face of the masonry wall, was designed to support the truss. During further investigation after installation of the temporary shoring, the exposed truss end was found to be crushed locally, with decay extending several inches into the building. The built-up bottom chord and top chord connections were otherwise intact. Truss geometry and member sizes were recorded for analysis and assessment of member stresses. An epoxy repair solution was employed for this condition. Epoxies can be used to consolidate weakened wood material and thus restore compressive strengths to decayed members. They also help to reduce the wood's vulnerability to decay, as the epoxy reduces its propensity to absorb moisture, as well as affecting the wood such that it is less supportive of decay fungi. Supplemental field applied borate or copper treatments may be considered, to provide enhanced decay resistance performance. Epoxies, however, are not effective by themselves at restoring shear and tensile strength of wood members, consequently the end of the epoxy repaired steel truss was further reinforced with steel plates that were designed and detailed to transfer member reactions within the truss to the supporting masonry. Images of the deteriorated and repaired truss can be seen in Figures 1 through 3.

Case Study 2: Bowstring Truss Collapse, Skokie, Illinois

Three bow string roof trusses in a single-story retail building original constructed circa 1950 partially collapsed, leading to an emergency investigation of the roof structure. The damaged trusses were provided with emergency shoring to permit access to the store and maintain retail operations. The store structure has masonry walls and steel columns that support six bow string trusses that span 100 feet. The perimeter walls extend above the roof to form a continuous parapet. The trusses have curved glue-laminated (glulam) double top chords (2-1/2 by 13 inches), solid wood web members (4 by 6 and 6 by 6 inches nominal), and double solid sawn bottom chords (3 by 12 inches nominal). Tongue and groove roof decking was supported by 2 by 12 in. rafters spaced 16 inches on center.

The building and roof structure was inspected from the interior and exterior. Truss geometry and distress conditions were recorded and wood samples were obtained for analysis, which identified the wood material as Douglas fir. The inspection revealed bottom

Figure 4. Partial view of Bowstring truss with 1950s retail building.

chord failures at splice locations and numerous split web members that had failed as a result of secondary effects. The top chords remained intact. Exterior walls and columns were laterally displaced and required supplemental shoring. The inspection also revealed that a second ceiling had been suspended from the roof structure and mechanical units had been added to the roof at some time after original construction. The trusses were computer modeled, revealing anticipated stress levels within the bottom chord that would exceed code prescribed allowable in excess of 100 percent (more than double than the presumed allowable stresses).

Figure 5. View of failed tension connection at truss bottom chord

These analysis results were not unexpected, based on the author's experience with these trusses. Wood bowstring trusses constructed prior to 1960 have a well-documented history of problems, as trusses of this vintage were designed under different criteria than today. In particular, predicted allowable tensile stresses considered at the time were not conservative, as they were generally based bending stress capacities. Testing performed on trusses of this type in the 1970s revealed that actual factors of safety were significantly lower than desired. In addition, building codes prior to the late 1970s did not include provisions for unbalanced snow loading that exacerbated the expected performance of these systems when subjected to current code prescribed loads. These trusses perform best when loads are uniform, as forces within the web members remain relatively low. Unbalanced loads dramatically increases web forces, and the nature of the eccentric connections introduces bending stresses in the chords. When buildings with this type of truss system have weight added from roofing layers, ceiling loads, and roof insulation, these additional loads can be significant. Also, the addition of insulation can increase snow accumulation which can further increase the loads experienced by the structure. These seemingly minor modifications can result in significantly high member stresses and failures.

Figure 6. Partial view of truss repair. Note tie-rod connections

The collapse was attributed to excessive stresses within the bottom chords of the trusses and cumulative damage that occurred over time that contributed to the row tear-out failure of the bolted connection at the bottom chord splice. Repairs were needed to address deficiencies in web members, connections, and bottom chords. The trusses were lifted up into their original position and damaged bottom chords were replaced with new glulam members. Damaged web members were replaced. Web connections were reinforced with steel straps installed around the bottom chord at connections and clamps installed to reinforce top chord connection locations. Damaged bottom chord members were also replaced with new glulam members. Anticipated excessive stresses within the bottom chords were resolved by reinforcing the repaired bottom chord with post tensioned steel tie rods that extend from end to end of the trusses. Partial views of these repairs are shown in Figures 4 through 6. The entire truss-reinforcing project was performed from the building's interior during off-hours to maintain retail operations during repairs.

Summary

The evaluation of wood trusses requires a methodical approach that considers the wood material, geometry, and its relationship to the building. These structures must be assessed on a case by case basis by a professional familiar with timber construction and carefully consider what the building history and behavior are indicating about the structure to diagnose the system and develop a successful repair.

Tim Crowe is an Architect and Structural Engineer with Wiss Janney Elstner Associates, Inc. (WJE) in Northbrook, Illinois, with over 25 years of experience in the design, investigation, and repair of archaic and contemporary building structures. He can be reached at tcrowe@wje.com.

(continued from page 34)

6 Keys To Harnessing Social Media for Architects

5. Packaging

Each social media channel has its own type of communications package. What kind of information (text, photo, video, etc.) and how much is appropriate for each platform?

PACKAGING: IDEAS FOR PACKAGING YOUR POSTINGS FOR VARIOUS CHANNELS

- On Houzz you can post photographs of completed projects.
- Twitter gives you 140 characters to share a renovation idea, amenity upgrade, a link to an article or website.
- LinkedIn can give you access to groups such as Chamber of Commerce, Rotary, or City and County groups. Owners may gather here. Post an article or link to an article on cost-effective renovations.
- Facebook may have pages for local festivals, tourism, or owners of projects you've worked on. Post a quote from an owner with before and after renovation photos.
- Offer a webcast on ways to reclaim your cabin, or move from seasonal to year-round living. Use social media to send out a link to attend the webcast.

PACKAGING: IDEAS FOR PACKAGING YOUR POSTINGS FOR VARIOUS CHANNELS

- Post information about how you met sustainability goals on a project with a local business in the LinkedIn group for your community. If that group doesn't exist yet, start it.
- Post images of new homes on Houzz featuring sustainable ideas that were incorporated, windows, materials, fixtures.
- Create content about ways higher education facilities are incorporating recycled materials in new facilities. Cite examples from your work. Post this on your website, then tweet a link to the article and post a link in a LinkedIn forum on higher education construction.

6. Sender

Who is the right person to send the message?

SENDER: OWNER / ARCHITECT

Of course, in this example there's only one choice: owner/architect.

SENDER: DIFFERENT PER AUDIENCE

Send the message from the person whose expertise you are trying to establish or promote. It's likely that you'll have different senders for different audiences.

As you can see, mapping out the key components to your campaign helps to clarify your communications. Creating meaningful content that is focused on helping others will ensure that you pass the "Who cares?" test. Finding the right channels and packaging your content to fit those channels means your message has the best chance of being received.

If you're new to social media, as an initial step, consider taking off the onus of posting content and simply sign up to see what's happening. Learn how various platforms work. Explore channels of social media to observe what's being talked about, who's doing the talking, and what catches your attention.

For those already engaged in social media communications, keep refining your content, defining your audience, exploring channels and evaluating your results. Social media is a constantly changing game, but addressing the six key components will help to ensure that your content is meaningful and reaching your intended audience regardless of the channel.

Jean Leathers is president of Practice Clarity, a consultancy dedicated exclusively to helping architects build business.

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- Evening seminar starts after the social
- All seminars are 1.0 LU
- Keynote is 1.25 LU

Our Keynote Speaker:

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- Arc Imaging Resources
- ARDEX Americas
- Atlas Restoration, LLC
- cfiFOAM Inc.
- Chicago Plastering Institute / Cement Mason Union 502
- Chicago Regional Council of Carpenters
- Cook County Lumber
- CPI Daylighting, Inc.
- Custom Building Products
- Doors For Builders Inc.
- EHLS/To The Top Home Elevators
- FastenMaster
- GRAPHISOFT
- Henry Company
- Hoover Treated Wood Products, Inc.
- Advantech and ZIP System / Huber Engineered Woods
- Icynene Corp.
- IKO Sales Inc.
- Illinois Brick Company
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- Indiana Limestone Company
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- Konica Minolta Business Solutions USA, Inc.
- LP Building Products
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- Major Industries, Inc.
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- Northfield, an OLDCASTLE Company
- Oldcastle Building Envelope
- Panda Windows & Doors
- Parksite / DuPont Tyvek
- PCI of Illinois and Wisconsin
- Pella EFCO Commercial Solutions
- Pilkington North America--NSG Group
- Rauch Clay Sales Corporation
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- Shaw Contract Group
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- SJ Mallein Co.
- SPEC MIX Chicago/Quikrete
- TOTO USA, Inc.
- Trim-Tex Drywall Products
- Trus Joist - A Weyerhaeuser Company
- Tubelite Inc.
- USG
- USI Midwest / All Risks Ltd
- WaterFurnace International

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Questions:
Call ALA at 847-382-0630

ALA BOARD NEWS

Indiana:

The ALA Indiana Chapter was formed this year and their first meeting was held on March 11 in Carmel.

Board members (l to r): Howard Smiley, Membership Development; Scott Hazlett, Vice President; Jeffrey Stoner, President; Bruce Everetts, Secretary; and Craig Alwine of Indiana Limestone, Affiliate Director. Please see the ALA website at alatoday.org for program information.

The Illinois and Wisconsin Chapter Boards held a joint meeting hosted by **The Hezner Corporation**.

(L to R) Jeff Budgell, ALA National President; Mike Coan, Illinois President; David "Koz" Koscielniak, Wisconsin President; and Kurt Hezner, Director ALA National and Vice President Illinois Board

ILLINOIS NEWS

January: Jim Zahn, Sabo & Zahn, Attorneys at Law, was the moderator for a panel discussion on "Charging Clients". Thank you to our panelists: **Kurt Hezner, The Hezner Corporation; Pam Hutter, Hutter Architects, Ltd.; David Koscielniak, Koz-i-tec-ture; Patricia Saldana Natke, UrbanWorks, Ltd.; and Fred Wilson, Morgante Wilson Architects.**

April: Over 30 Architects and students toured **The Schweikher House** in Schaumburg with a lecture on historic preservation by **Susan Benjamin** of Benjamin Historic Certifications.

Richard Piccolo, President of the Building and Fire Code Academy, presented a program in **February** on Chapter 9 of the IBC; and in **March** a seminar in **Bloomington/Normal** on Select 2015 I- Code Updates. Thank you Rich for presenting a double-header this year!

April Dinner Meeting: Over 50 architects enjoyed tasting local beers at Emmett's Ale House in Palatine with a two-part program on Concrete: Preventing Foundation Failures and Moisture Issues in Concrete Slabs. The program was sponsored by **Atlas Restoration.**

March Program: Sarah Flock, Bob Kudder and Ken Lies of Raths, Raths and Johnson presented on "Thermal Bridging and Moisture Control" at The Glen Club in Glenview.

May Program: Doug Gamble, Accessibility Specialist for the Capital Development Board, spoke to over 150 architects in Chicago on ADA rules and updates.

MISSOURI NEWS

"No Architect Left Behind Series" - Season VII

Join ALA for its Annual Continuing Education Series.

Upcoming Events:

June 9: Charging Clients Panel Discussion
Moderator: James Zahn, Sabo & Zahn, Attorneys at Law

August 11: Geothermal Technology for the Design Professional
Presenter: Fred Newell, WaterFurnace

September 15: Tour - CityArchRiver 2015 Project

October 13: Building Envelope: Air Leakage and Moisture Mitigation

December 8: Chapter 9 of the IBC

ALA Missouri presents its 2015 Continuing Education Series. This series allows architects to acquire 12 Learning Units per year in 6 convenient sessions. The sessions are scheduled every other month over an extended two-hour lunch period. A boxed lunch is included. All seminars are held at the Masonry Institute of St. Louis, 1429 Big Bend Blvd., St. Louis, MO 63117.

Join us for these upcoming chapter events. Registration and more information on these and future programs are available on the ALA website at www.alatoday.org

WISCONSIN NEWS

Jay Kratz of **Icynene** spoke on the applications of Spray Polyurethane Foam Insulation at the May Wisconsin Chapter meeting.

Upcoming Events:

Wednesday, August 5:
Copyright Claims for Architectural Designs
Presenter: Josh Levy, Whyte Hirschboeck Dudek S.C.

Thursday, October 15:
Geothermal Technology for the Design Professional
Presenter: Scott Niesen, WaterFurnace

Thursday, December 10:
Design Build Panel Discussion

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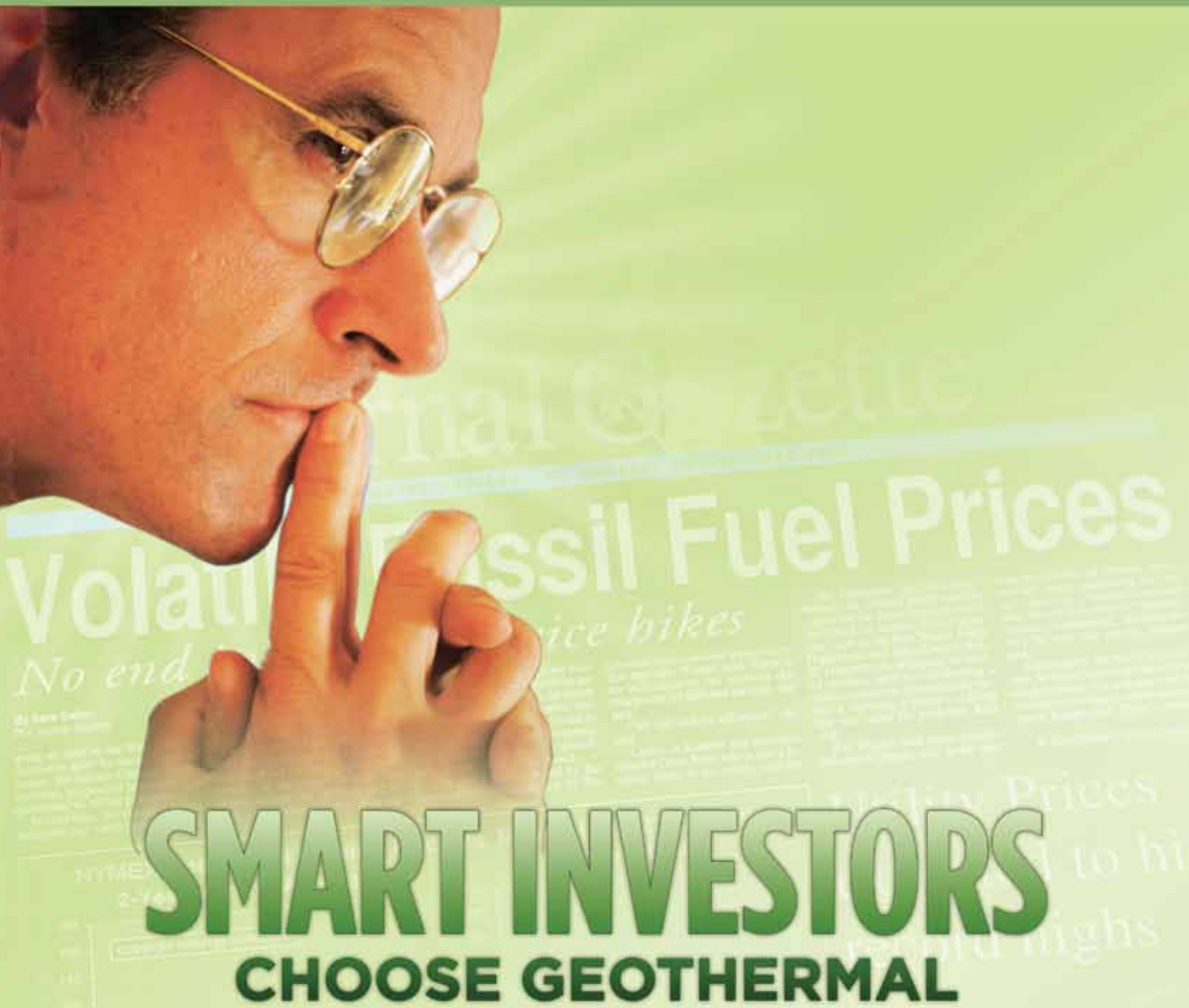

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