TIMBER FRAMERS GUILD

Hotel Roanoke, Roanoke, Virginia
November 9–12, 2006

Timber Framers Guild

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Cover image by Audi Pauliukonis, Guild member and New Hampshire tattoo artist.
 Produced by Susan Witter. Printed on recycled paper.

Safe Work Practices

Will Beemer

Timber Framers Guild, Becket, Mass.

The Timber Framers Guild training curriculum has been in development for a few years now, and has thus far produced an outline of almost 100 skills related to our craft, including a list of the learning tasks, content, and goals for each that should be taught to achieve competency in that skill. TFG members can download the outline at *www.tfguild.org/members/curriculum.html*.

In 2005, the Guild's Curriculum Committee and the joint boards of the Guild and the Timber Frame Business Council (TFBC) decided to develop course material in the first of the 16 sections of the curriculum: Safe Work Practices. These courses, each 1–2 hours long, will be offered for the first time at a pre-conference workshop in Roanoke, and they will include a goals assessment test and a certificate upon successful completion.

The Safe Work Practices section consists of five modules, each of which is taught in a separate course. These five modules are:

1. Shop Safety
2. Site Safety
3. Personal Safety
4. First Aid
5. Hazardous Materials

(Since module 4, First Aid, is specified to be completed through a certificate-granting program such as Red Cross or St. John's Ambulance, it will not be part of the Roanoke program.)

The Shop Safety Course will identify the legislation, rules, and regulations that govern timber framing shops, including Occupational Safety and Health Administration (OSHA) requirements. It will also identify shop hazards such as electrical, fire, dust, machinery, and storage and moving of materials. We will describe the purpose, composition, and duties of a safety committee. We'll explain general shop safety rules, good practice, and how to build a culture of shop safety. Recommended first aid facilities and equipment will be described, as well as the procedures for reporting an accident or injury and requirements for recordkeeping.

The Site Safety Course will identify the legislation, rules, and regulations that govern timber framing sites, including OSHA requirements and those that apply to shoring, scaffolds, ladders, and other access equipment. Site hazards will be identified, some of which are the same as in a shop. Additional site hazards include falling from heights, inclement weather, unprotected edges of platforms, and those related to working in a remote location. We will also describe the first aid and welfare facilities required on the jobsite, general safety rules, and planning for a safe raising.

The Personal Safety Course will identify and describe personal protection equipment (PPE), including eye, hearing, head, skin, foot, back, fall and respiratory protection, cold and wet weather gear, and the rules and regulations that apply to such equipment. We will also describe and demonstrate the basic body mechanics for safe lifting and moving of heavy objects.

The Hazardous Materials Course will identify common controlled products used in timber framing shops, including glues, fuel, preservatives, finishes, and special considerations regarding salvaged materials. We will demonstrate the use of Material Safety Data Sheets (MSDS) and how they can be used to identify appropriate PPE,

storage, and handling of these materials. Good practice and pertinent rules, regulations and legislation will also be covered.

Courses will be offered in the sequence listed above, with the Shop Safety and Site Safety courses probably lasting 1–2 hours and the Personal Safety and Hazardous Materials courses lasting 30 minutes to an hour. Each course will be given in a PowerPoint presentation format consisting of 50–100 slides and accompanied by a student manual for each participant that includes the course content in written form. At the end of each course, there will a written multiple-choice test and practical exam to assess the learners' retention of the material.

This course format was selected because of its efficiency and ease of distribution and administration at shops that wish to convey this information to their employees in house. After peer review and further refinement of the material and presentation, it's anticipated that future pre-conference workshops will primarily focus on "training the trainers" to deliver the courses. This training will include suggested activities and materials to bolster the PowerPoint portion of the course.

During the main conference presentation Safety Curriculum Update, we will summarize the content of the Safe Work Practices section and describe the resources and strategies used to develop it. These methods will be placed in context with the next big step in the growth of the TFG training curriculum: finding and hiring the people who will write the other 90-plus modules.

The Icing on the Cake—Natural Finishes

Making and Applying Your Own Clay-Based Paints

PRE-CONFERENCE WORKSHOP

Janell Kapoor

Kleiwerks International, Asheville, N.C.

Conventional paints, sealants, finishes, waxes, polishes, solvents, and adhesives all contain volatile organic compounds that threaten human health, create indoor air pollution, and add toxins to rivers, streams and soils. We are building boxes of poison and it's our choice to do so, or not.

Mediterranean chalky blue, soft buttery yellows, deep Georgia red, polished mica marble—there are many ways to describe the look and feel of natural finishes on your walls.

Through lecture, demonstration, samples and hands-on practice, learn how to make your own beautiful, totally eco-friendly, customized clay-based paints. The ingredients are basic: clay, sand, mica, flour, and water. Making and applying clay-based paint is simple and easy, yet the final effect is high-end gourmet and has a noticeably different feel: naturally closer to the earth.

Kleiwerks International

Whether you are finishing a conventional wall system, or earth and straw walls, you will gain the tools in this workshop to create your own healthful organic paints. Indigenous on-site materials, as well as ingredients bought at the store, can both be used. In this workshop, we will make and apply various mixes while learning the nuances of natural paints (and casein washes).

Clay-based finishes are easy, affordable, non-toxic and incredibly durable. Get your walls to look just as you want them—the perfect match for your timber-frame structure. You'll even go home with samples to get you rolling!

Thinking Tangentially

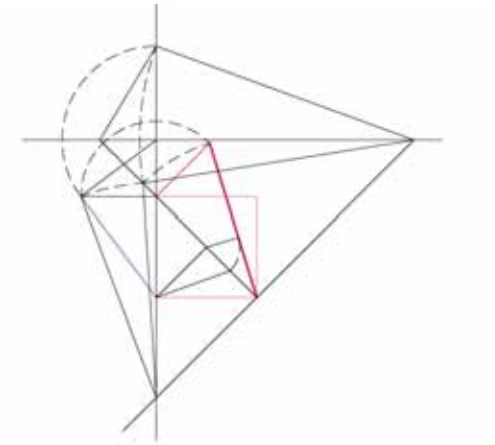
Curtis Milton

Monolithic Building Services, Jackson, N.H.

This progression is a small part of what we're going to cover in this workshop on drafting techniques to develop known shapes into solutions for the unknown intersections contained in a complex roof structure. Couple this skill with very basic math, and you will have all the proportions, lengths, and angles needed to lay out most roof systems.

Remember: getting there is the challenge.

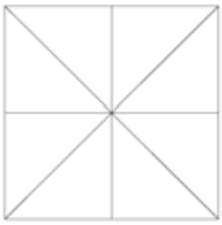
1. This drawing represents most of the angles needed to lay out a hip rafter. This is the end point we are trying to reach.



2. This is a hip roof in plan view.

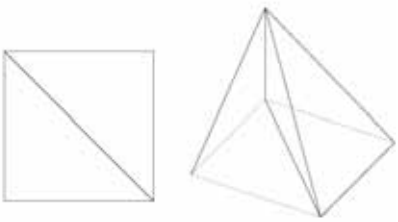
3. The same roof, in an isometric view.

4. Plan view of roof showing hip rafters, common rafters, and eave.

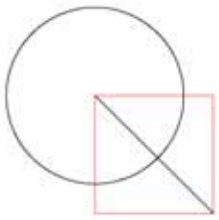


5. Remove one section of the roof.

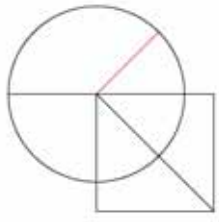
6. We call this section the kernel, shown here in plan and isometric view.



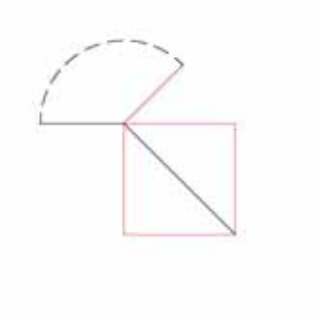
7. The drawing exercise begins with the plan view kernel, showing eave length, hip run, and common rafter run. Now draw a circle with the radius equal to the common rise of the roof.



8. Next draw two lines the length of the common rise. One is square to the hip run, and the other is square to the common run.

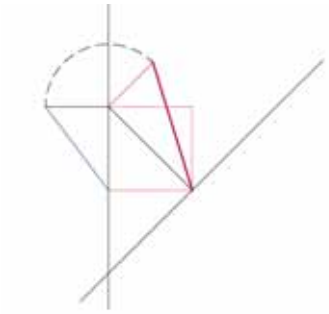


9. The circle representing common rise can be trimmed to the common rise lines. The dotted line will be retained and graphically shows lines of equal length.

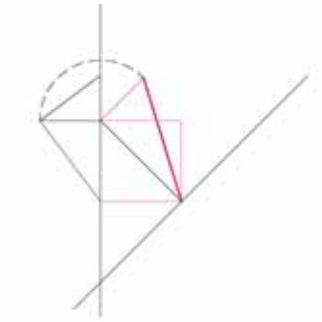


10. Lines can now be drawn that are the hip rafter length and the common rafter length. The angles shown are the respective plumb and level cuts of the hip and common rafters. Drawn to scale, lengths could be measured. Simple math can solve the lengths and ratios.

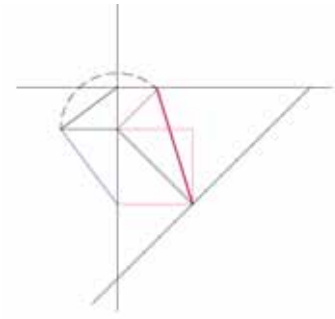
11. Now draw a line square to the hip rafter run and a line that extends the common rafter run in both directions. The line square to the hip run is the tangent.



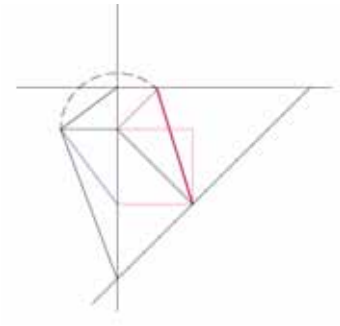
12. By drawing a line from the intersection of the common rise and the common rafter length (square to the common rafter length) to the extended common rafter run, we establish the edge of a plane that could be the face of a purlin or a rafter tail cut square to roof pitch.



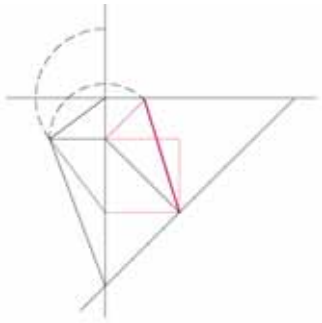
13. Draw a line square to the common rafter run through the intersection of the purlin face line and the common rafter run extension. This line represents an edge of the plane that falls on the face of the purlin (timber set square to the roof pitch).



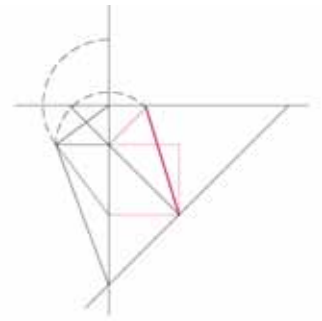
14. Connect the common rise/common rafter length point to the intersection of the common rafter run extension and the tangent line. The angle drawn is found on the face of a plumb ridge or header at the intersection with the tangent plane. This angle is found where the bottom of the hip enters the ridge or header.



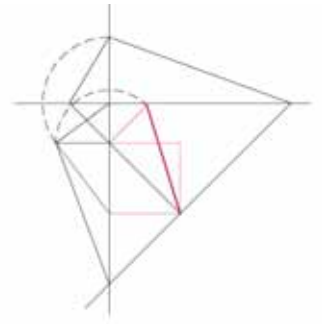
15. Rotate the length of the purlin edge onto the common rafter run extension beyond the purlin edge line. The dotted line graphically represents lengths as equal.



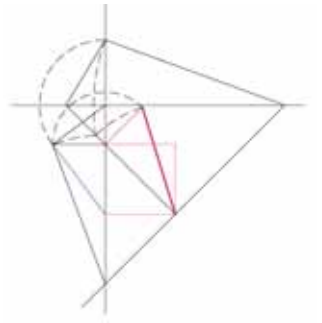
16. Extend the run of the hip rafter until it intersects the line representing the bottom on the purlin face. This line represents the centerline (or edge) of the hip rafter extending to the purlin edge (bottom edge) in plan view.



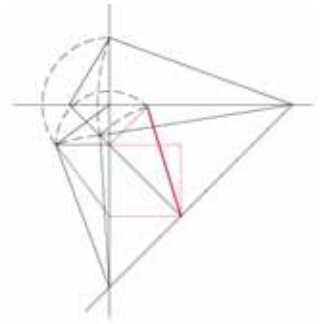
17. Draw a line from the intersection of the tangent and purlin edge line to the purlin face length as located on the common rafter run extension line. From this point, draw another line to the intersection of the purlin edge line and hip rafter run extension. This triangle contains the angles found on the face of a purlin as intersected by a hip rafter and the square-to-the-common-rafter fascia cut for a hip rafter.



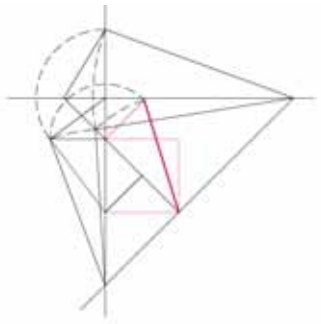
18. Notice the convergence of the various lengths on the hip rafter run extension line.



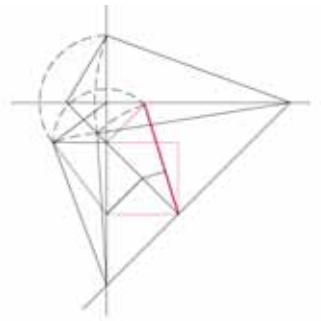
19. Connecting the points as shown develops hip rafter to ridge/header layouts to the left of the hip rafter run and hip rafter to purlin layouts on the right of the hip rafter run.



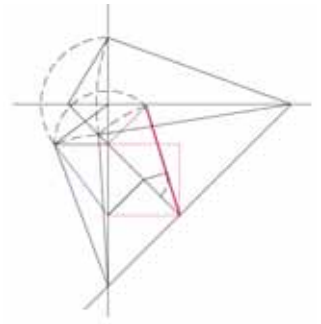
20. To develop the backing angle, draw a line square to the hip rafter run from the intersection of the common rafter run and the eave line.



21. From this point, draw a line square to the hip rafter length.

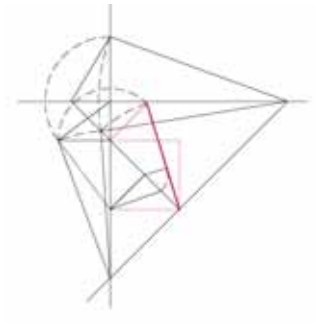


22. Transfer this length to the hip rafter run.



23. Connect the points as shown.

You have now developed the backing angle.



Waste Materials = Building Materials:

How to Incorporate Recycling and Reuse into Design Principles for Buildings

PRE-CONFERENCE WORKSHOP

Patti Southard and Kinley Deller

King County Solid Waste, Seattle, Wash.

This workshop covers a broad range of recycling strategies for the building industry. Outlined in the workshop is the exploration of three main topics: the Cradle to Cradle philosophy, Design for Disassembly, and The Green Material Maze.

Waste = Buildings

It is possible for an industrial system that "takes, makes, and wastes" to become a creator of goods and services that generate ecological, social, and economic value. We will look at manufacturing tools from the Leadership in Energy and Environmental Design (LEED) program and enjoy an eco-charrette to brainstorm potential solutions for jobsite waste plus long term recycling strategies. Information based on the famous Cradle to Cradle theory by McDonough and Braungart will also be presented. As part of brainstorming, we'll examine individual projects.

photos The REStore

Disassembly in motion: what went down must come up.

Manufacturers from the Pacific Northwest region are examples of what your own communities can do to develop usable materials from recycled waste. Find out how King County's LinkUp program (*www.metrokc.gov/dnrp/swd/linkup/*) built partnerships to expand markets for recycled materials.

Kris Beatty

Truck loaded with Urban Hardwoods' salvage wood.

Design for Disassembly

This enlightening presentation explores the darker, rarely discussed sides of a building's life-cycle: death and rebirth, thereby opening the discussion on what can be done to extend a building's useable life and facilitate the use of components after its demise. Through design guidance for assembly and disassembly, we'll identify the adaptability of building types,

basic construction types, systems, materials, and connections.

We'll explore dismantling techniques, modularity, and design, thinking through examples of natural building such as Japanese temple architecture. We'll consider a range of case studies, from the Bensonwood Open-Built® Systems to a King County deconstruction initiative.

Methods for harvesting these materials in order to maintain their highest values will be addressed. This will lead us to the usual beginning of the building life cycle, the design process. We'll think of design with an eye toward planning the new building to facilitate repair, adaptation, and conversion; and we'll continue designing for dismantling and reuse at the end of its long, useful life. You'll find out what worked, what did not, and what we learned. You will gain an understanding of Design for Disassembly, tips for urban sourcing of framing timbers, and a greater appreciation for the music of Led Zeppelin in the form of a special DVD look at a deconstructed project.

The systematic deconstruction of the wooden warehouses on Harbor Island owned by the King County Solid Waste Division was completed by Grayhawk Construction in 134 days with a bid that came in at $13,872 below the county engineer's estimate.

Over 90 percent of the building was salvaged for reuse or recycled. Of all the materials removed from the site, roughly 21.5 % (by weight) was removed to be sold by the contractor as reusable building materials and another 70 % were recycled to be processed and turned into new resources.

photos these pages Kinley Deller

Careful removal of a beam from the second floor of a 1905 warehouse.

20-ft. 16x24-in. timbers stacked neatly at the deconstruction site.

Salvaged items include beams, rafters, car decking, and posts. There is a good chance that the majority of the salvaged materials will end up being incorporated into a single new building. A 30-page-plus guide, *Design for Disassembly*, will be provided.

The Green Material Maze

Here we'll explore examples of how building materials are changing, from manufacturing culture and environmental stewardship to "up cycling" and "closed loop" products. We will look at how to choose the right recycled or recycled-content material for your projects.

We'll review several different certification systems including Cradle to Cradle, Scientific Certification Systems, Green Seal, and Greenguard. Examples of how to use these products for prescriptive programs like Built Green or LEED will also be provided.

Post-beam junction in a 1905 warehouse.

Deconstruction in progress showing roof framing and decking in a 1905 warehouse.

Timber Engineering

PRE-CONFERENCE WORKSHOP

This workshop is directed to structural engineers who design and engineer timber frame structures.

Jim DeStefano: Engineering of Timber Joinery

The design of timber joinery is as much art as science. The geometry of a joint must be carefully configured to interlock the connected timbers and transfer structural forces through mated bearing surfaces. In cutting a joint, material must be strategically removed from each timber in a manner that does not unduly weaken the timbers. The joint must also be configured so that it remains tight when the timbers dry and shrink. As if these structural challenges were not enough, the connection must also be aesthetically pleasing.

Buddy Showalter: The National Design Specification®

AF&PA/American Wood Council, Washington, D.C.

The *NDS®) for Wood Construction* is the nationally recognized standard of practice for structural lumber, glued-laminated timber, timber poles and piles, prefabricated wood I-joists, structural composite lumber, wood structural panels, and structural connections. The 2005 *NDS* was developed as a dual format specification incorporating design provisions for both allowable stress design (ASD) and load and resistance factor design (LRFD).

American Wood Council's Wood Design Standards Committee (WDSC) guided it through the ANSI consensus process over the course of two and a half years. The WDSC includes a balance of engineers and technical representatives from industry, academia, and other interested parties such as structural engineers, builders, and researchers.

The *NDS* is adopted in all model building codes in the U.S. and is used to design wood structures worldwide. The standard is updated every four to five years to coincide with the model building code change cycle.

For more information, see *www.awc.org/standards/nds.html*.

Dick Schmidt: Draft Specification for Timber Framing

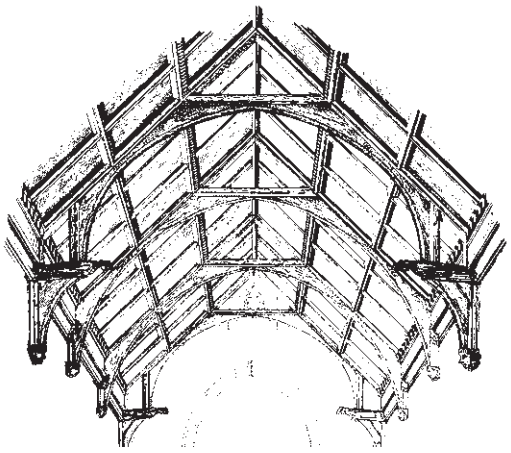
The Timber Framers Guild and the Timber Frame Business Council jointly sponsored development of a draft specification for timber frame design. The draft specification addresses engineering issues such member sizing, connections, and design for lateral loads. The specification, containing both mandatory rules and commentary, was written as a supplement to the *NDS* and is intended for use by qualified design professionals. Development of the draft document provided the opportunity to formalize what we know about timber frame design and to identify the gaps in our understanding of structural behavior. Hence, additional research in selected areas is needed. In addition, refinement of the draft specification into a consensus standard is needed before it will be regarded by code officials as a governing document for the timber frame industry.

Ed Levin: Hammer-Beam Roofs

For reasons best addressed by historians, technical advances like central heating and the truss roof were late in coming to the British Isles. While the former has yet to achieve complete dominance, the true roof truss, which had long enjoyed a European vogue, finally established a firm presence in England in the mid-1660s in the buildings of Sir Christopher Wren, notably the Sheldonian Theatre at Oxford.

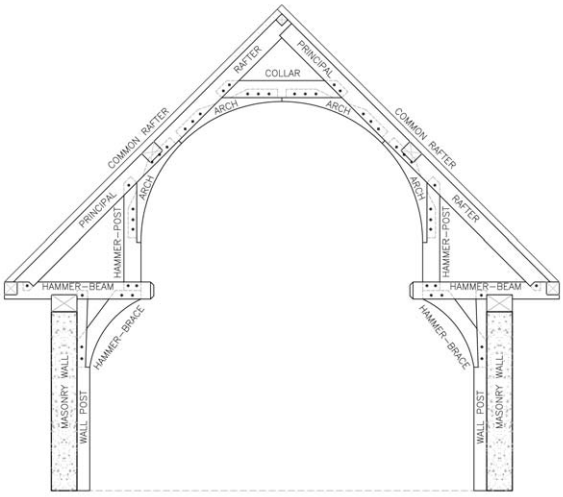
This insularity of English construction certainly prolonged the life of the prominent medieval method of carrying long span roofs over masonry walls, that is, the hammer-beam. Indeed, phoenix-like, hammer-beams survive into to modern era, having enjoyed revivals around both the beginning and the end of the 20th century. Today we carelessly refer to hammer-beam trusses, but they aren't trusses, strictly speaking. Clearly loading a hammer-beam frame results in far more significant bending moments than seen in classical truss types.

In this session, a reluctant hammer-beam designer and builder looks at the evolution and devolution of hammer-beam roofs; the how and why; and the good, the bad, and the ugly.



from *The Open Timber Roofs of the Middle Ages*, by Raphael and J. Arthur Brandon

Roof over nave, Little Welnetham Church, Suffolk.



Ed Levin

Gerakaras blacksmith shop, section at hammer-beam.

Ben Brungraber: Truss Joinery and Cambering

Ben will present and discuss his accumulated collection of Industrial Age heavy timber truss details. These serve as a basis for discussion of the issues to be confronted and strategies to be deployed when detailing heavy timber trusses. Many details are illustrated with slides.

Jim DeStefano: The Role of the Specialty Structural Engineer

The structural engineering services for a timber frame project are often performed on a design-build basis by an engineer engaged by the timber framer. In this capacity, the engineer is a specialty structural engineer (SSE). There may or may not be a structural engineer of record (SER) who is responsible for the entire structure including the foundations and other structural elements.

In theory, the SSE is only responsible for the structural adequacy of the timber frame. In reality, the SSE may become liable for deficiencies in other structural building elements that were engineered by others, or often by nobody.

Not So Big—The First Step in Sustainability for Home, Community and Life

FEATURED SPEAKER

Sarah Susanka

Susanka Studios, Raleigh, N.C.

Why is it that everything today is super-sized—even supposedly "green" houses, which often come in packages more suited to a small army than an environmentally sensitive couple? With all of that square footage and all of those purchased goods, what are we really looking for?

Sarah Susanka has some insights to share about the roots of all our fervent consuming, and about what we can do to help our customers and clients find the sense of home they're really looking for. Not So Big is fast becoming the first step in sustainability, with "right" sizing and inspiring design at its core.

In her six-book Not So Big House series, Sarah has described the basic toolbox of ideas that can help anyone turn their house into home, whether they're starting from scratch, adding on, or remodeling. Her two most recent books, *Inside the Not So Big House* and *Outside the Not So Big House*, describe the micro scale of home design—the details that make a house personal, and the crafting of the surroundings of a house to make it part of a singular and integrated whole.

We'll also be given a sneak preview into the next issue on Sarah's horizon: *The Not So Big Life*. In this new book to be released by Random House in May of next year, she tackles the need for the rebalancing of our lives as well, which must go hand in hand with the rebalancing of our homes. Just as we've seen houses get progressively bigger over the past few decades, we've also seen our lives get progressively busier and increasingly overwhelming as we try to keep up with the message generating capabilities of our many electronic gizmos. It's time to look this issue in the eyes and recognize that we need a new way of engaging our lives. This comes not by quitting or dropping out, but by observing what it is that really makes us feel at home in our lives. The only sustainable solution is a Not So Big one, and it applies just as much to our lives as to our homes.

A Place for Trades: Cultural Change in the 21st Century

FEATURED SPEAKER

Rudy Christian

Christian and Son, Burbank, Ohio

Few among us are unaware of the cultural divisions that exist between our own society and that of our parents or grandparents. The story of the bricklayer or the taxi driver who worked six days a week and took on part time work so that his son or daughter could go to college and "do better" than he did is indelibly etched on our group memory, but have you ever taken the time to really think about what it means? How many of us have ever really considered where the carpenter or plasterer might belong in the rich historic palette of the built environment that we have inherited from our forefathers?

During this presentation we will look not only at how the hand of the master can be found when we unlock the time capsule of historic architecture, but also at the forms buildings and even cities took on when the skills of the builder were what powered the wheels of progress.

Today, the demand for skilled tradespeople to do conservation work is rapidly outpacing the supply of them in the workplace. A recent study in England produced an extensive report, *Traditional Building Craft Skills: Assessing the Need, Meeting the Challenge*, which clearly delineates this shortfall of qualified tradespeople in Great Britain. In 2005, the World Monuments Fund created a task force to document and tabulate the same information for the United States with the goal of publishing a similar report. In Sweden, a group of concerned individuals in the province of Dalarna, including representatives from the Ministry of Trade and the Ministry of Commerce, are planning a conference in 2007 that will connect traditional tradespeople from northern Europe and the United States in an effort to shine a light on the current state of the trades. We will look into the origins and infrastructure of these initiatives as well as their relationships to one another and the influence they are having on the educational opportunities available to students of the trades today and tomorrow.

As developing countries in the world today become part of our global economy, changes in their culture become unavoidable, but when we look back at the birth and growth of our own culture and economy, we have an opportunity to realize the effect of that change in both our personal and our professional lives. Much of it is good and has resulted in significant gains in personal wealth and leisure time, but how much has that change resulted in the loss of skills that have for generations been handed down from master to apprentice, father to son, and mother to daughter, and how often do we even consider the consequences? During this session, we will investigate just how this process has affected our society and built environment and look at the indicators of the same process occurring throughout the world. In the last two decades, an awareness of the importance of conserving the knowledge and practice of the traditional trades has produced communities like the Timber Framers Guild and the Preservation Trades Network, and the example set by these organizations has not gone unnoticed. We will take a minute to look at the international outreach of these organizations and investigate the potential influence this outreach has. Whether or not the existence of these entities represents the beginning of a period of change in the fabric of our culture is a matter of opinion, but it is an idea which might open doors to an exciting and wonderful new world in which there is once again an elevated place for trades.

What Kind of Leader are You?

Maureen Blackwell
New Growth Coaching & Consulting, Castleton, Va.

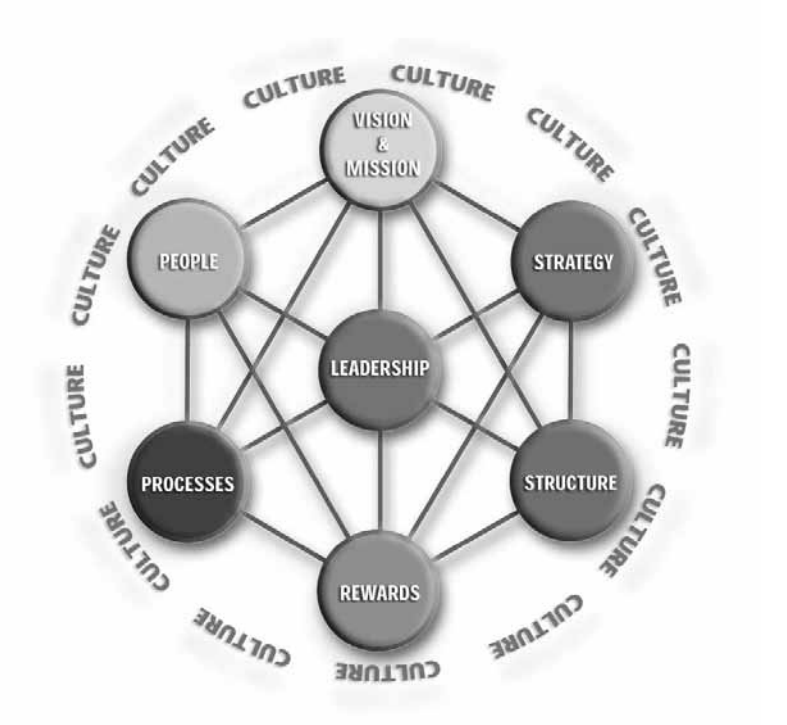


image courtesy Bogda & Associates

You are all leaders and demonstrate leadership, whether you manage a large organization, own and run a business, or are part of a work team. Leadership is at the very heart of your organization. Understanding and enhancing your leadership skills (especially your coaching skills) can improve your performance as a leader and help you support your team more effectively. Being an effective leader means understanding your own leadership style(s). Although all leaders favor a certain style, it is possible to learn new leadership styles to expand your repertoire as a leader. Do you use a commanding or a democratic style? When is it important to use an affiliate leadership style? Perhaps you are a leader who is more comfortable with a visionary, pacesetting, or coaching style. In this session, we will define leadership and leadership styles and understand the significance that your style has on your team or organization climate. We will examine when each style is most effective. Since working effectively as a team is critical to your business success, we'll discuss the impact these styles have on your team and how you can hone your leadership skills to enhance your team's performance.

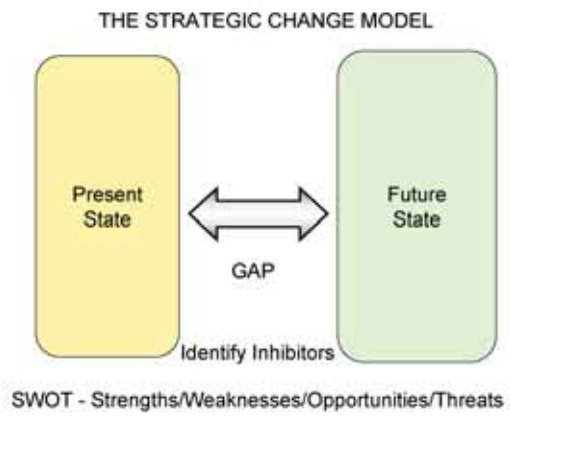
We'll also discuss what noted author Daniel Goleman, in his groundbreaking work, *Emotional Intelligence*, describes as the "ideal leader." Goleman refers to emotional intelligence as a "powerful combination of self-management skills and the ability to work with others." You will learn the emotional intelligence skills that distinguish the outstanding leader from the adequate and discover how to raise your own personal emotional quotient. Since these emotional intelligence characteristics are found in the coaching leadership style, we'll explore coaching skills in more depth than the other leadership styles. Coaching includes listening, intuition, curiosity, action earning, and self-management.

Planning for Strategic Change

Maureen Blackwell

New Growth Coaching & Consulting, Castleton, Va.

Change is a constant in life and in any business environment. Examples of this are all around us, from the advent of new technologies (cell phones, iPods, and voice recognition) to the organization of work (virtual assistants, working from home, and web conferencing). Keeping pace with change or even getting ahead of the curve is a challenge that involves good planning, a desire to embrace the future, and clarity about your company and personal goals. In this session, we will discuss a strategic change model that participants can use to understand the current state of their business, imagine the future, and build a bridge between the two.



This process begins by understanding the current state of your business. As part of this analysis, we'll discuss the importance of having a vision and a mission for your company, including a clear understanding of your organization's values and culture. We will examine key elements of a strategic plan, including people, organization, and processes, using a basic five-step planning model. We'll then complete a Strengths/Weaknesses/Opportunities/Threats (SWOT) analysis for your business.

With this as a foundation, you will learn the importance of defining the *future* state of your business using the same key elements—vision, mission, people, organization, and processes. The next step in the model is to define the gap between your present and future states. Defining this gap will help business owners determine where you need to focus your efforts to move the organization forward. This gap is bridged through a strategic plan: defining specific goal and actions that you and your team will take and when you will take them. This plan could include changes in your organizational model, the addition of new staff or a facility, or an investment in a new marketing campaign. At this stage, it's important to step back and consider the inhibitors to reaching the future state. Key inhibitors might include lack of expertise or staff, inadequate capital funding, a limited target market, or a lack of organization functions to support a new model. We'll also discuss reasons why people resist change, from comfort with the status quo to having an unclear picture of the future, and learn strategies to overcome this resistance.

The development of a strategic change plan identifies specific actions that you and your team will take as well as when you will complete them. This plan is a living entity that needs to be merged into the business culture and not become a static, one-time event. The best way to accomplish this is by involving your entire team—employees, key customers, and suppliers—in the process. Communicating your vision/mission and key elements of your strategic plan—or the entire plan—is a great way to build loyalty, increase productivity, and gain employee motivation and buy-in. Get input from your customers on what has worked and what didn't work in their relationship with your business, and make that information an input to your strategic plan. During this process, leaders and managers need to "model the way" by taking responsibility for their own action items and completing them on time. This will be a signal to the entire organization that you, the leader, are serious about making a change. Managers, team leaders, and team members will benefit from this workshop by learning a process to manage change in a strategic and proactive way.

Preservation and Repair Techniques of Historic Timber Frames

Dan Boyle

Preservation Timber Framing, South Berwick, Maine

Old timber frame buildings. Few things seem to stir people like a picture of an old barn in a rural setting. However, the buildings we see in glossy coffee table books are few. The majority of early timber frame buildings are in various states of disrepair; even so, many older buildings have damage that can be repaired. Damage can result from poor original design, exposure to weather due to neglected maintenance, and previous renovations. Many of these buildings can be repaired without large disruptions for the occupants of the buildings. It requires some creative thinking, but it is not impossible.

When repairing an old building, it is useful to proceed in these steps:

First, do an initial survey and documentation. Ask yourself, why has the owner called you? What has happened over the years to get the building to this condition? What type of building is it? All of these questions can be answered quickly, and they are the foundation of your restoration plan. Once you've done this, formulate a work plan. By proceeding in a logical progression, you can limit unpleasant surprises. Start repairs in the order in which the building was built—foundation, sills, walls, roof, sheathing, and trim. At each element, make an assessment: repair or replace? (Having a background in historic preservation, I believe repairing a piece of historic fabric is preferable to replacement. Examples will be shown of traditional repair techniques.)

Second, stabilize the building. Charging into a new project can be exciting, but be cautious. Many times, the frame pieces that were designed to carry the major loads are no longer doing their job. The question then becomes: what is taking the weight? Examples will be shown of how to identify point loads, lift buildings, stabilize, and rig safely.

Third, make appropriate repairs. Analyze each element of the frame as to the part it plays. Look at each piece and determine what it was designed to do, both individually and as part of the whole. Once you reach an understanding as to how each piece functions, you can plan a repair. Take care to determine whether the piece failed due to overstress or deterioration. When working with old barns, access to frame elements is usually easy. Old houses can be more challenging. You can access parts of the house frame without damage to finished spaces, but it can take more time. Repairing a barn is exciting for an owner; ripping into a house can be traumatic for a homeowner.

Finally, in addition to appropriate repairs, design a preservation plan. To prevent further loss, implement a list of maintenance procedures. One key element to this checklist of maintenance items should address the financial aspects of preservation. In many cases, much of the damage could have been prevented if simple steps had been taken earlier to keep Mother Nature out.

A typical fix for a rotten post bottom.
Dan Boyle

Two projects: Medieval Human-Powered Crane and the Gwozdzeic Synagogue Bimah

Rick and Laura Brown

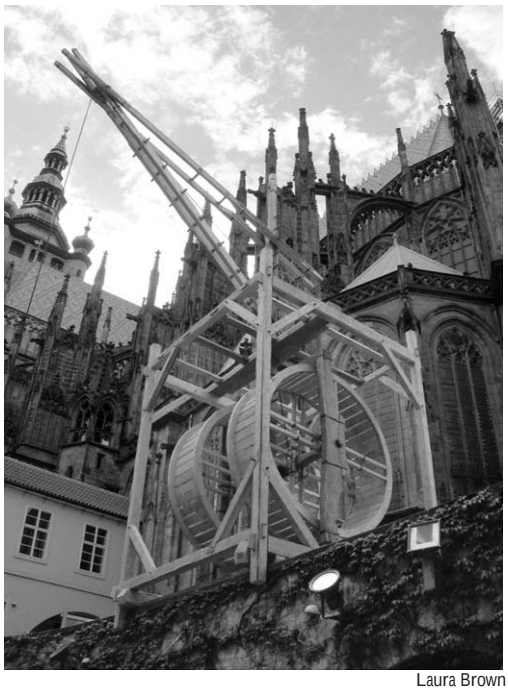
Handshouse Studio, Norwell, Mass.

The presentation will be divided into two distinct projects. First we'll consider the making of a 14th-century medieval human-powered crane at Prague Castle, in conjunction with the 2006 Crown of Bohemia Exhibition as a learn-by-doing educational experience, Prague, Czech Republic. Then we'll look at the making of a replica bimah from the destroyed 18th-century Gwozdzeic Synagogue (Poland) as a learn- by-doing educational experience, at Handshouse Studio, 2006.

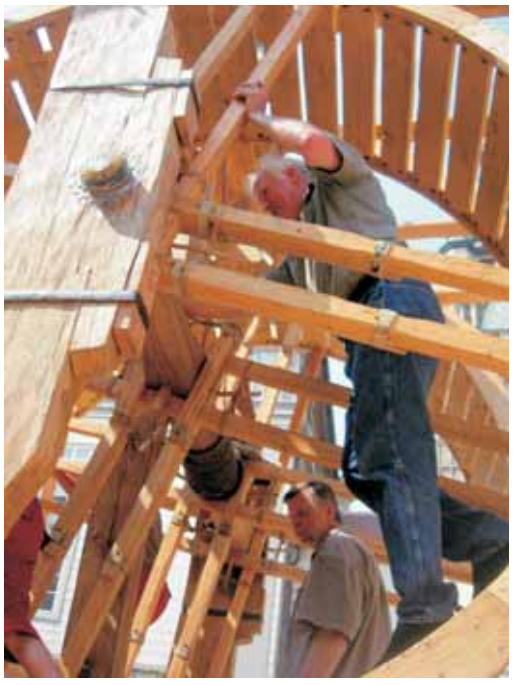
Human-Powered Crane

The human-powered crane project was organized by engineer Vit Mlazovsky and historic carpenter Petr Ruzieka (presenters at the 2004 Guild Western Conference in Estes Park, Colorado). An introduction will describe the origin of the crane and source materials for replication. Contemporary drawings will be presented, as well as a brief explanation of medieval drawing techniques. Viewers will be guided through images of the medieval tools and techniques used during construction. Examples of joinery, tools, materials, and techniques will be presented.

We'll give a basic discussion of the structural principles of the crane as well as the method of raising the crane and how it functions. We possess much visual material on human powered cranes used throughout Europe, in the form of significant artistic paintings, biblical manuscripts, etchings, and city maps. Most of what we now know of these cranes comes to us from study of these artifacts. However, little is known about how the cranes were actually used for building construction. Some speculative examples will be presented for discussion with the audience.



Laura Brown



Vit Mlazovsky

Rick Brown (in jeans) with Peter Ruzieka inside the treadwheel of the crane.

Bimah for the Gwozdziec Synagogue

We will begin with a discussion of the parent of the bimah, the Lost Wooden Synagogues of Poland, an attempt to create worldwide support for the full-scale replication of a 17th-century synagogue on Polish soil. The Gwozdzeic Bimah replication project is one of a number of projects Handshouse Studio has organized to study and popularize the subject.

The bimah and the ark are the two main objects located within the main prayer hall of the synagogue. A typical 17th-century wooden bimah found in Eastern Europe, especially in synagogues in the outlying villages and towns, was a raised platform placed in the center of the prayer hall, where the sacred Torah would be read during religious services. These elaborately decorated and painted structures demonstrated extraordinary skill and craft in wood.

This presentation will include methods used to study the limited materials that remain in order to determine appropriate materials, joinery, tools, and techniques and will show examples of spring pole lathe turning, panel carving techniques, timber frame joinery, low relief panel construction, steam bending, blacksmithing, and more. The Gwozdzeic bimah is a feast for the eyes of any architect, design professional, carpenter, furniture maker, or mere lover of tools and techniques.

The crown of the bimah replica, under construction in the Handshouse workshop.

Cary Wolinsky

The finished bimah replica.

Beyond the Beam:

The Role of the Timber Frame as Part of a Resource and Energy Efficient Green Building

NATURAL BUILDING

Tim Callahan

Think Green Building, Asheville, N.C.

As one of the oldest of building disciplines and methods, timber framing enjoys a unique and honorable place in the history of human habitation. This presentation explores their role in the context of green building practices.

We'll examine images of early Norse structures to mid-19th-century European buildings to appreciate the evolution of early wall and roof systems. Traditional American structures will show us the development of local vernacular timber frame structures from the Piedmont to the prairie. We'll explore the birth of an art form spawned by a scarcity of resources in Japan, evident in traditional Japanese timber frames. Then we'll take a look at the modern American frame in the last 30 years: where we were and where we are now.

We begin with the principle that timber frames do have a place in the future of construction and the natural building market in much of the United States. In looking at their role within a sustainable modern construction context, we will differentiate between natural and green building methods, with an emphasis on appropriate resource use and technologies.

We believe that by looking beyond the beam to all of the parts of a building that create and constitute a healthful and functioning human environment, the long-term viability of this craft can be ensured.

By synthesizing ancient and modern methods of building, it is possible to create buildings that transcend the trend of modern architecture toward waste and impersonality. We will explore the use of simple design tools that enable us to integrate timber frames as part of a functioning whole. The choice of natural and green materials as part of the palette will be examined, as will detailing techniques and relevant code issues.

The outcome of this method is often that timbers are usefully employed in more numerous structures, though not as extensively in each one, as is typically now the case.

The Financial Benchmarks Dashboard: Your GPS to More Profit and Cash

BUSINESS

Barbara Carper

Business Resource Services, Inc., Seattle

This session reviews the basics of financial benchmarking and explains how financial benchmarking, and specifically the iLumen Dashboard, can help you set goals and streamline monitoring your financial performance.

The Timber Frame Business Council (*www.timberframe.org*) has recently kicked off an important project to develop reliable benchmarks for the timber frame industry. Participating timber framers can easily upload their data to the completely confidential database and access 20 critical financial matrices for their company on a special Dashboard powered by iLumen, an Atlanta information technology firm. Using a specially developed timber frame case study, we'll demonstrate effective benchmarking, including the use of the iLumen Dashboard and Benchmarking systems. We'll identify best practices for using monthly and yearly benchmarking to streamline your management process. This includes identifying the most critical financial matrices for a company and setting thresholds to automatically warn you when you fall short of important goals.

This session is appropriate for participants in the benchmarking project and for any other company owners or managers who would like some tips for setting and achieving realistic, measurable financial goals.

Break-Even Analysis: Your Power Tool For Building Profitability

Barbara Carper

Business Resource Services, Inc., Seattle

Here's a chance to practice break-even analysis as a hands-on tool to understand the cost structure of a business. We'll perform some "what-if?" analysis to show the real power behind the tool.

Suppose someone could take a financially simple document like a profit and loss income statement and turn it into a powerful, strategic decision-making tool that would increase the effectiveness of business owners and managers alike? That's exactly the focus of this session. The goal is to help you understand and manage the interrelationship of cost, volume, and profit.

Come learn to identify and manage the impact of changes in the cost structure, pricing choices, and expansion plans by dividing costs into "fixed" and "variable," as opposed to the format traditionally used by accountants. Be introduced to the distinctive "cup diagram" that illustrates the way money flows through a company. Understand how break-even analysis functions as both an operating tool—identifying the key drivers of profitability—and also as a strategic tool—evaluating the impact of pricing decisions, expansion plans, and cost restructuring. Come find answers to questions such as:

If I expand, how much will I need in sales to cover the costs?

If I hire a new employee, what increase in sales must occur to cover the costs?

What do my sales have to be if I want to earn a specific profit?

If I buy a new piece of equipment, what will I need in sales to cover the costs?

Break-even analysis is the power tool to make short work of finding the answers. Come learn to master the most practical financial tool available to business owners today.

Deconstruction and Design for Disassembly: Beginning at the End

Kinley Deller and Patti Southard

King County Green Building Program, Seattle

This enlightening presentation will explore the darker and rarely discussed sides of a building's life-cycle—death and rebirth—thereby opening the discussion on what can be done to extend a building's useable life and facilitate the use of a building's components after its demise.

We will begin by looking at a number of buildings that were recently taken down and examine both the factors that led to their demise and how the components of those buildings could have best been used once removed from the building. Methods for harvesting these materials in order to maintain their highest values will be addressed. This will lead us to the usual beginning of the building life-cycle—the design process—but with an eye toward planning the new building to facilitate the repair, adaptation, and conversion of the building during its life. Then we'll consider the dismantling and reuse of the building at the end of its life.

The RE Store

Disassembly in action.

This latter portion of the presentation will cover the principles, methods, and materials of design for disassembly with an examination of the adaptability of building types and basic construction types, systems, materials and connections. Dismantling techniques, modularity, and design thinking will be developed through a number of historic and modern examples.

You will take away from the presentation an understanding of design for disassembly principles, a knowledge of urban sourcing of framing timbers, and a greater appreciation for the music of Led Zeppelin.

King County Green Building Program

Warehouse beams.

Building Green with Timber Frames

Jim DeStefano

DeStefano Associates, Fairfield, Conn.

Sustainable design is not a new idea, just a new name. In the 1970s, environmentally responsible and energy efficient building technology was a new idea. Exciting technologies such as solar energy emerged, and there was active experimentation in alternative building technologies such as the revival of the ancient craft of timber framing. This movement was not embraced by the mainstream building professions at the time, but was generally dismissed as a hippie movement (sort of like ending the war or eating healthy food).

Through the next two decades, environmentally responsible behavior became politically incorrect. Environmental activists were branded "tree huggers" and environmental consultants limited their activities to assisting clients in dealing with regulatory agencies. There were some advancements in energy conservation motivated by building owners' desire to save operating expenses, but these efforts were tempered by low energy prices. Throughout this dark period, timber framers continued to carry the torch of environmentally responsible building.

As the 21st century dawned, architects and builders rediscovered the idea of environmentally responsible design and christened it with the name "sustainable" or sometimes "green." Many still think this is just a fad and if we wait awhile it will pass and we can get back to doing things the way they have always been done. But sustainable design is an idea that has come of age and, like rock and roll, it is here to stay.

In many respects, timber framing is a far greener method of building than the more common light frame wood construction method. When combined with structural insulated panels (SIPs), timber frame buildings are one of the most energy efficient structures ever developed. But there is more to building green than this. It starts with site planning and touches every step in construction up to the final coat of paint.

Green building systems that complement a timber frame will be discussed, including insulated concrete forms (ICFs), geothermal heating and cooling, SIPs, and natural building materials such as wood, stone, copper, and hand-forged iron.

Wood Behavior: Good, Bad, and Ugly

Jim DeStefano

DeStefano Associates, Fairfield, Conn.

Unlike steel, brick, or concrete, wood is an organic structural material harvested from living organisms. Each tree, timber, and board is different from all others and exhibits its own unique personality and behavior. Like people, timber will often exhibit good behavior, sometimes bad behavior, and occasionally ugly behavior. That is what gives timber frames their charm and makes timber a challenging and exciting material to build with.

To get to know timber, you must understand its personality, its strengths, and its shortcomings.

Structural Properties

An understanding of the structural properties of timber is crucial when designing and building a timber frame. The most important structural property is strength: bending strength, shear strength, tensile strength, and compressive strength. These strength properties are very different along different axes of a timber and vary widely within a specific wood species and grade. Strength also changes with changes in moisture content and with time.

Stiffness is also an important structural property. All structures deform and deflect under load. In a well designed structure, these deflections are not perceptible to the occupants. If careful consideration is not given to stiffness, the structure may sag under load or shake in the wind: ugly behavior.

Dimensional Stability

Timbers change size and shape when they dry. Timber frames are often cut from green timbers. As the timbers dry and season, joints can open up and fail if the dimensional changes have not been allowed for.

Durability

Wood is vulnerable to decay and insect attack. Some species are rugged and naturally resistant to decay, while others must be sheltered from the elements. Wood is also vulnerable to fire.

Workability

Some woods are easy to work with, while others can be difficult. Wood can be worked with hand or power tools, shaped into curves by steaming, and laminated with adhesives.

Appearance

Frames are built of timber so that people can enjoy their beauty. Some of the characteristics of a timber such as knots and checks that contribute to bad structural behavior are often the same characteristics that contribute to the charm and beauty of the finished frame. As with fine furniture, people can admire the variations in color and grain as well as the elegant lines of a timber structure. If timber had the uniformity, predictability, and bland personality of structural steel, there would be nothing special about a timber frame.

Special Issues Unique to Engineering Timber Structures

David C. Fischetti, P.E.

DCF Engineering, Cary, North Carolina

There are many issues unique to engineering timber structures. The anisotropic (exhibiting properties with different values when measured in different directions) structure of wood is a unique characteristic that affects all of the design values as well as its response to moisture changes. Although timber design has been made more complicated in recent years, the *National Design Specification for Wood Construction*, published by the American Forest & Paper Association, has not addressed basic issues faced by structural engineers and designers engaged in designing traditional timber structures or in reviewing historic structures. Apparent inconsistencies in some tabulated design values in *NDS* are not explained sufficiently to allow the designer to exercise reasonable judgment.

Some recent advances in timber structures and connection design are not reflected in the *NDS*. The *Timber Design Manual* of the American Institute of Timber Construction was revised in 2005 with the unfortunate removal of some useful sections not found elsewhere while referring to *NDS* for tables of design values. Shear plate and split ring connectors are products of the 1930s that are completely foreign to many general contractors and timber framers practicing today. At the same time, steel knife plate connections with smooth dowels and connectors such as the Timberlinx™ connector are not presented, although the yield limit equations in Chapter 11, Dowel-Type Fasteners, can be applied with some difficulty.

Timber designers are divided into several camps. There are engineers and designers with a wealth of knowledge and experience in designing glued laminated timber structures. The timber frame industry contains many people skilled in designing traditional timber structures and associated connections. It is the lack of information regarding traditional connections that keeps many glulam engineers from embracing the design of traditional timber framed structures. Then, there are many designers and engineers who feel comfortable designing residential and small commercial projects consisting of dimensional lumber, plywood, pre-fabricated wood trusses, and laminated veneer lumber headers and other engineered timber products. Unfortunately, they may lack the ability, or the confidence, to practice in the realm of heavy timber, glued, laminated, or solid.

To design heavy timber structures, we must first determine what species, grades, sizes, and lengths of timber are available. A project might be a building or a covered bridge; it might involve restoration or new construction; it may require site work or be totally shop fabricated. As designers, we often have to direct a general contractor to timber framers who have experience with a particular type of project. Often we have to direct general contractors to suppliers of certain connectors and to manufacturers of various treatments to resist fire or decay.

Engineers, timber framers, and others need to become proactive in insisting that these issues be addressed by our industry associations. It is through education and research that we will learn more about the intricacies of designing with this sometimes simple, sometimes complex building material.

Straw Bale Enclosure Systems for the Timber Frame Structure

Chris Fox

Fox's Natural Building Company, Canal Fulton, Ohio

Timber-framed structures have been around for thousands of years and have proven the test of time for their structural integrity. Over the years, various methods have been used to enclose such structures. These enclosure methods tend to reflect both the era and the region of the structure. In the present era of building, the timber frame structure is still being used and is being enclosed using many different methods.

I would like to discuss one method which provides very good thermal properties. It uses an agricultural byproduct and earthen materials to create a healthful, beautiful space. A straw bale enclosure system for a timber frame structure is achieved by stacking common wheat, oat, rye, or barley straw in a running bond. These bales are securely fastened to the frame and all window and door openings in order to create a rigid wall system. This wall is then coated with an earthen plaster material on both the interior and exterior of the building in order to protect the straw bales from the elements, insects, rodents, and fire.

I will discuss details of how this enclosure system is integrated into a timber frame structure. We will start with the foundation and work our way up throughout the wall system, discussing all of the pertinent components that must be integrated into any wall system of a residential structure. We will cover in detail: foundation integration, electrical components, plumbing components, windows and doors, and methods of fastening and working with straw bale as a material. Once all the nuts and bolts of the bale work are covered, we will talk about natural plasters. We'll discuss their properties, ingredients, and functions.

After covering all the technical components of the system, we will go into a little detail about the building science behind the system as a whole. And, last but not least, I would also like to touch upon the environmental and social aspects of building with such methods as timber frames and straw bale enclosures.

Interior Environments: Designing with Natural and Sustainable Materials

Mary Golden

Gaiatecture Design Studio, Honeoye Falls, N.Y.

The intent of this presentation is to offer an exploration of the interior environment and the multitude of choices we have to finish our timber frame buildings. Although timber frames are essentially natural structures, whether hand-cut or CNC-manufactured, the finishes we use to complete the interiors typically are nowhere near natural or even healthful. When designing for a healthy interior environment, indoor air quality and sufficient daylighting must be considered. In our discussion, we will review these topics and how our interior finish choices affect the health of the building's interior.

After exploring the essential components that make up good interior design, we will venture into a discussion of product choices for finishes and fixtures. We will compare and contrast traditional materials and green alternatives. A special emphasis will be placed upon natural materials.

Many may not be familiar with natural materials, as they tend to be more of a vernacular product than a mass-produced commodity. This however, is changing. As part of our discussion, we will review the types of natural finishes that are available on a mass scale and discuss the means for finding local natural materials and finishes.

We will conclude with a pictorial review of completed timber frame homes showcasing interior environments that complement the natural beauty of the structure. Questions and discussion are welcome throughout the presentation, and additional time will be allotted following the talk for broader questions and related topics.

Awesome Earthen Buildings From Around the World

Janell Kapoor

Kleiworks International, Asheville, N.C.

Today's standard building practices are neither accessible nor affordable for the majority of the world's population. They are also not sustainable for the living systems of the planet. Fortunately, natural building offers solutions to these problems. Natural building refers to a number of construction methods using local clay, sand, straw, stone, bamboo, and other abundant and recycled materials. Because natural building is easy to learn, it empowers people to reclaim their dignity and basic human right to healthful, affordable, ecologically-sound, and beautiful shelter. Coupled with permaculture, whole-systems design, and renewable energy, natural building provides accessible long-term solutions to today's building crisis—solutions that will last for generations.

In this slide show, Janell Kapoor, founding director of Kleiwerks International*, will share her first-hand experience of natural building with grassroots communities from around the world. Packed with beautiful images of earthen buildings from Thailand, India, Africa, the United States, New Zealand, and Argentina, her presentation includes:

Kleiwerks International

- a brief history of age-old indigenous structures
- modern examples of natural construction
- grassroots community empowerment
- effective strategies for social change
- movements toward re-villaging

Humans have a deep connection to their built environment, to the natural world, and to each other. Natural building works with this basic premise. It is as much about enhancing these relationships as it is about building structures. In this presentation, the symbiosis between community empowerment and natural building is exemplified through success stories and firsthand accounts. The power of locally-generated, regional activist networks will be highlighted. Whole communities coming together to create sustainable epicenters of activity will be shown.

The guiding principles of natural building make a lot of sense in a world where not much does. It is through a conscious choosing of how we create our built environment that we may have a profound impact on our every day, as well as a long-lasting ecological and social shift—a shift that uplifts the human spirit while bringing us back to earth.

*Kleiwerks International is a non-profit organization dedicated to empowering communities through natural building and whole-systems solutions.

The CCC's Heavy Timber Work: 1930s and Today

Chris Koehn

Top Ridge Timber Frame Homes, Inc., Sheboygan, Wisc.

Bob Pasquill

U.S. Forest Service, Montgomery, Ala.

During the height of the Great Depression in 1933, President Franklin D. Roosevelt created the Civilian Conservation Corps (CCC) as a means to address unemployment and the need for better management of the nation's natural resources. Junior enrollees, 18 to 25, and Veteran enrollees, veterans of the First World War and Spanish American War, spent the next nine years rebuilding our nation's manpower and natural resources. The legacy of this program can be found in National Forests, National Parks, State Parks, private forests, and farmer's fields all across the country. Using hardly any heavy equipment, and relying on the strength of teamwork, the CCC enrollees built many large timber structures, including administration buildings, recreation facilities, picnic shelters, and bridges. The hand-hewn and hand-peeled logs that went into these structures were part of the overall strategy of CCC construction: use local materials and have the structure blend into the landscape.

1938, USDA Forest Service

Built in 1938 by a "C" (colored) company, the Horn Mountain shelter is exemplary of the CCC's techniques and strategies. Located in the Talladega National Forest, at the very southern tip of the Appalachians, the shelter had fallen into disrepair over the years. The vagaries of time, combined with an unpredictable, unstructured, and slow moving funding structure for maintaining these once proud structures, had nearly condemned the Horn Mountain shelter. Bob Pasquill, archeologist for the Forest Service in Alabama, is an avid CCC historian. He has interviewed over 100 surviving CCC members and is writing two books on the subject. In the fall of 2005 he crossed paths with Chris Koehn, Guild member and itinerant timber framer. Chris had expressed interest in doing some CCC restoration; his name was eventually passed along to Bob, who jumped at the chance to employ Chris to lead the shelter restoration.

photos this page Bob Pasquill

During January and February of 2006 the shelter was disassembled, inventoried and evaluated; replacement logs and timbers were harvested, sawn and hewn and joined to the remaining frame; and the rebuilt frame was erected on Horn Mountain with the help of the U.S. Forest Service. Much was learned about how the CCC worked during the process. It became clear, for example, that scribing was the primary layout system.

Joinery was kept rudimentary but effective. 1-in.-diameter round iron bar was hand-forged into spikes and used to secure rafters to plates and plates to post tops. Despite large wind loads and exposure to the elements on top of Horn Mountain, these techniques weathered well for nearly 80 years.

The effort to restore the Horn Mountain shelter was successful due in large part to the tenacity of a core group committed to seeing the work through. Funding to do this kind of work is available, but the hurdles can be high and the path is not always clear. Part of the difficulty comes in that there is no one country-wide governing body concerned with the well being of these structures. They are located in many jurisdictional entities. State Historical Preservation Offices (SHPOs) seem to be the primary gatekeepers for work on CCC structures. They often have original plans as well. Team building, understanding the funding and permitting process as well as ownership chain—and doing one's homework—are all parts of a successful CCC restoration.

Complaints, Gripes, and Claims

Bruce Lindsay

Evergreen Specialties, Ltd., North Vancouver, B.C.

Sailing is a lot like standing in a cold shower tearing up $50 bills.

Timber claims not properly handled are a lot like sailing. If you are sailing under shortened sail in a strong wind, trying to claw off a lee shore, you know how helpless someone can feel when they don't have the skills, information, and knowledge to settle claims.

Imagine the following scenario. The truck rolls into your yard, job site, or homeowner's lot, tarps come off, screams are emitted, and your forklift driver comes running into your office. "Boss, you better get out here and take a look at this."

As you stroll out to the truck, a realization comes over you . . .

This product has some serious problems. As you get closer and closer, the story gets worse and worse. You start shaking with rage. You pick up your clip board that you have thrown across the yard, straighten your hair (what's left of it), put on your hat, and recover from your initial shock, anger, and threats of dire consequences to all involved.

What should you do next?

Nancy (Scout) Wilkins had an anecdote as part of her talk on customer complaints at the Guelph Bridge Eastern conference some years ago. As I recall, she described a problem with damage to the homeowner's living room. After lots of avoidance and worry, the company manager asked the salesman, "Have you asked the homeowner what she feels would be a good solution?" The result was simple, easy, and surprisingly inexpensive.

Everyone dreads the phone call to the lumber supplier (or timber framer). But what should you be doing to move towards a positive outcome for all involved?

We cannot change the wind, but we can adjust our sails.

How can you salvage this with the least amount of pain, expense, and lost time? How are you going to deal with the problem in a logical, thoughtful, professional manner? What are the consequences of using the shout and holler system of handling claims? What proactive strategies can you learn to make sure that you don't get claims in the future?

If you don't know how to answer these questions, you may be losing customers and suppliers. You may not be doing business with certain markets, products, customers, or suppliers because you are terrified of dealing with problems, complaints, or claims.

Claims in similar instances can be costly, frustrating, and unendingly miserable. They can keep you up late at night worrying, cause you to agree to solutions that you feel are unfair, and lose customers and future sales.

If you understand how to approach customers or suppliers when there is an unexpected problem, then you will be able to avoid the frustration and expense involved.

In the next 90 minutes, you will be shown some bad timbers, learn how to document and professionally present a claim to suppliers, and explore how to respond to a claim from your customers.

After the session, you will be empowered to do properly deal with claims. You will learn that:

1. Any claim should be resolved in fewer than five phone calls in fewer than five days. An example will be shown of a Gripe & Claim Report that lists briefly on one page in point form all the details of the claim, a timeline of when the supplier was notified, what supporting info like bills of lading or photos were provided, and finally how the complaint was resolved.

2. Types of claims discussed will be Freight, Grade, Manufacturing, Moisture, Market, and Tally Claims. We will go over a couple of case studies of tales of heartache and disaster and audience members will be asked to bring their own war stories to use as case studies for discussion.

3. Almost any claim could have been avoided in the first place with an understanding of Terms of Sale and proper documentation and forms for Purchase Orders, Order Confirmations, Order Changes, Freight Claims, Notice of Claim, Gripe & Claim Advice, and Full and Final Settlement.

4. Grading rules can be condensed into 6 to 8 pages that any lumber buyer can understand. For example, a term like "Occasional" ("Occasional piece may have wane") is defined as 10 percent. Clients, buyers, and sellers need to know that "Dense" WCLB Para# 204-c in certain circumstances could be 4 rings per in., depending on the amount of summerwood present. So you need to know the subtleties of the grading rules and how to avoid pitfalls. When you specify "Dense Rate of Growth," make sure that you and your client are on the same page and learn how to clarify these points before the order is confirmed rather than after the truck has shipped, as so often happens.

If you are buying or selling lumber, sooner or later you're going to have an unhappy customer claiming that the raw material, manufactured product, or service is not okay.

If you don't empower yourself now to handle customer problems, you could be destined to feel like you are sailing (defined as: Going nowhere, slowly, at great expense).

Designing for Insulated Panels

Paul Malko

Foard Panel, W. Chesterfield, N.H.

Insulated panels are an energy efficient enclosure system that is easily applied to timber frames. Panels can be incorporated into most any building project. However, there are opportunities to save everyone time and money if certain design details are considered early on. Additionally, there are many details and techniques for ensuring a long and healthful life for the structure and people within it.

Everett Yelton

Create a secondary drainage plane prior to siding. The primary drainage plane (the siding itself) sheds most of the rainwater. Some water, however, always gets through the siding, so it is a good idea to have a space under the siding (provided here by the "home slicker") to allow that water to drain away.

remaining photos Lisa Ford

A properly foamed roof maximizes thermal performance.

Learn the simple steps to wiring your panel home.

The focus of this presentation is to quickly cover the basic insulated-panel-over-timber-frame building technology and spend most of the session sharing our favorite methods and details to create an enclosure system to match the quality and performance of the frame.

By way of defining insulated panels, we'll survey panel types, capabilities and limits, and component materials (skin, core, and adhesive). We'll discuss how to choose the right panel type for your application, taking into consideration thermal performance, interior finish options, overhang options, and cost effectiveness. Then we'll get into frame and building design details that use panels more efficiently and allow for an easier installation.

We'll consider hybrid systems: how load-bearing timbers and load bearing panels interact in one structure. We'll look at insulated panel roofs with alternative wall systems (straw bale, straw/clay, wood chip/clay, and so on). We'll analyze some case studies of failures to find out what happened and why.

Then we hope to spend lots of time talking building science and best practices for panel joinery, building design, cold roofs, rain screens, window flashing, and ventilation.

Prevent worst case scenarios by applying good building science.

Children's Discovery Workshop

Stephen Morrison

MoreSun Custom Woodworking, Mountain Rest, S.C.

When you find your brain and your butt getting sore from sitting through all those conference presentations, please find time to join the kids, big and small, for the Children's Discovery Workshop. In two days, using only hand tools, the children will transform a pile of timbers into a playground structure that is a variation on the Vancouver Island project. It will include a climbing wall, a playhouse, monkey bars, and a slide.

Any and all involvement is encouraged, young and old: come watch, teach, work, or learn, whatever suits you best. You will find that, when you pass on your knowledge and inspiration to the children, it will be their enthusiasm that rekindles your own passion. If you're not in the timber framing mood, we will also be looking for help watching the youngest ones. We look forward to seeing you. Don't forget to loosen up those purse strings, as we will auction off the fruits of our labors at the Saturday night auction.

Sandy Koness

The Children's Discovery Workshop in Parksville.

Rigging Basics

Grigg Mullen

Virginia Military Institute, Lexington, Virginia

Rigging at its most basic is the process of safely moving some object from where you don't want it to where you do want it. In the particular case of timber framing, that generally means taking a stack of timbers lying flat on the deck and turning them into a completed frame standing proudly in the air.

First, you have to know what you are lifting. How do you estimate the weight of a bent, or any other item to be lifted? How is that load going to balance when you go to lift it? What do you do to keep it from sagging like a dead fish? It is entirely possible to accidentally turn the load upside down by lifting in the wrong place.

Secondly, there has to be some "skyhook" to provide a place to lift from. The skyhook is the attachment point for the rigging used to lift whatever the load may be. It can be as simple as a shade tree or as complex as a 160-ton crane. Whatever its form, the skyhook has to be strong enough to safely carry the loads involved.

Finally, the rigging connects the load to the skyhook. Again, the rigging has to be of sufficient strength to make the connection safely. Typically, slings are used to connect a load to a crane. Sizing the slings is reasonably straightforward. For a hand raising, the problem gets more complex as block, tackle, and rope are introduced into the lifting system. More decisions have to be made about the appropriate size of the various pieces.

Veteran Voices: The Making of an Industry

Jonathan Orpin

New Energy Works Timberframers and Pioneer Millworks, Rochester, N.Y.

The Concept of Veteran Voices

Veteran Voices is slated to become a regular feature of our conferences to highlight and share some of the experiences of company owners and managers who have helped build this industry. The hour and a half seminar will be split into three general sections, with room for the timber framer's typical innovation and sidebars.

The first section is a short historical narrative. Part "down memory lane," part "do you see yourself in this picture?," it is an opportunity to review the progress and process of this company's trail to today. What can we learn from another's journey? What might we do similarly or differently? Why was a particular route chosen and how might this apply to you? This section was inspired by two Western Conference seminars given by Tedd Benson, one at Fort Worden in 1990 and the other just last year in Oregon. In examining our histories, we examine our futures.

The second section is a sharing of one particular area of management, practice, or policy that has been developed and worked through by this particular company. Topics might range from job costing to recruitment, from a marketing program to training. Most companies have a few real gems that have been instrumental in their success. The sharing of these practices is in keeping with 20 years of timber framers helping timber framers.

The third section is open discussion. This is a chance to ask anything, talk about anything, and learn through yourself, your presenter, and even others in the audience. No questions are out of bounds (although the presenter can duck the toughest!). Material can be what has already been discussed and shared, your own goals and directions, or anything else that makes the last third of this seminar valuable to your growth.

This section is inspired by John Abrams' recent seminar in Vermont, in which he started out simply, with "okay, what do you want to talk about?" and from which ensued good stuff.

Jonathan's Voice

Our current Veteran Voice will be Jonathan Orpin, founder of New Energy Works Timberframers and Pioneer Millworks. He has served on the board of the Guild (Treasurer, 1992), the Business Council (President, 2000 and 2001), and he currently serves on various community boards. New Energy Works was started in the early 80s and Pioneer Millworks in the late 80s. Together they employ approximately 80 people.

This section of the Veteran Voice seminar will examine the tools developed at New Energy Works to complete and track the budgeting process year after year, of which Jonathan writes:

Am I the only one who thinks that the yearly budgeting process can be fascinating, helpful, and even fun? I hope not. I really can't imagine where we would be today without it. It is an invaluable teaching and informational tool to me and my other managers, and, because we share all our company numbers in a formal setting each year, all the members of our companies.

We use it for four main duties:

1. It helps us to understand what it will take to be profitable in the upcoming year.
2. It shows how we did last year.
3. It acts as a tool throughout the year to gauge our progress.
4. It helps us to discipline our spending by giving us general guidelines.

To do all of this, we must first understand the bones of budgeting, which over the last ten years has become known in the company as "Jonathan's Famous Business Equation." Simply put, it is:

Sales Revenue = Cost of Goods Sold + (not so) Fixed Overhead + Net profit

where

Costs of Goods Sold is labor plus labor overhead, materials, subs, freight and other

Fixed Overhead is rent, interest, marketing, office expense, insurances, depreciation and more

Net Profit is the stuff with which taxes are paid, capital budgets are wrought, investments are returned, and cash for rainy days is available.

We use this formula to determine how much we need to sell each year to maintain our overhead, buy new equipment, keep our staff, and pay ourselves properly. Of course, it also acts as a series of reality checks and balances. For instance, if the projected fixed overhead, plus profit goals and the hard costs of goods sold implies either a sales figure that we don't think we could achieve or such a large amount of work that we know we couldn't handle it, then this mechanism forces us to re-examine our overhead, or our hard costs, or perhaps even our profit goals. And back and forth, back and forth until we can make a reasonable equation balance.

Doing this year after year begins to pay off. It is normal to expect and plan for a certain amount of growth. However, to plan on huge sales gains just because you think you can is not always a reason in itself to grow too quickly. Is the overhead there to support the new business activity level? Did you have another time in your history that suggests this level of growth? Was it fun? Did you end up with the profit you hoped for? If not, why not, and what might be different this time?

Breaking the true costs of overhead into their component parts also forces us to examine our business plan for the upcoming year without all the work of doing a complete new and formal plan each year. If your rent is going to double because you finally are moving into your new shop, what specifically does this mean to your required revenue goals? Or try this one on: If it's time to back down from the day-to-day company management, or at least

you'd like to consider not working so hard within a few years, how does a new manager's salary and expenses affect the company's profitability? What will it take for you to have some breathing room?

Budgeting is a tool for all of this, and more. For instance, we have multiple activity centers at New Energy Works, like design, timber framing, construction, and so on. They share the same administrative overhead yet are required to show a profit as a contribution to the overall community good. We use an overhead allocation table to assign a percentage of each overhead line item to each group. For instance, the timber framers, who use not only a solid amount of office and design studio but a large percentage of shop space, will obviously pay a much greater percentage of rent than the design group. Less obvious, our office manager-secretary-receptionist needs to allocate her salary among our different groups, and that is done by simply establishing how much of her time goes to each. Breaking things into simple bites allows us to be more accurate in our allocations, while acknowledging that there is no perfect number. Our goal at the end of the budgeting process is that each group leader will feel that he or she is getting a reasonable deal. For instance, if the bookkeeping department costs are $100,000 per year, and the architectural department is allocated a 10 percent cost burden, is the resulting $10,000 a reasonable value for these architects to be charged for their bookkeeping needs? What would they pay if they were adrift on their own, looking for a bookkeeper at the nearest strip mall?

Aging is a Myth

Ed Shure

Timmerhus, Inc., Boulder, Colo.

Aging is a myth . . . well, those little hairs that have started growing out of weird new places are real, but at least the concept that as we age, we necessarily become stiff, is a myth.

It is almost universal to have chronically sore, painful muscles from our late 20s onward. Our systems respond to daily stress with specific muscular reflexes which, when habituated, become impossible to voluntarily relax. This creates a state of stiffness known as sensory-motor amnesia, and is what we mistakenly think of as growing older.

The good news is that sensory-motor amnesia can be avoided, and even reversed. Here's the deal:

We all know that our large muscle groups such as the biceps and abdominals (the "mobilizers") are responsible for strength and speed. However, posture and balance are achieved through the actions of hundreds of small muscles known as "stabilizer" muscles.

Unlike the mobilizers, which are less fatigue resistant but better for short burst and high loads, stabilizers have extremely high endurance. When you are effectively using these muscles around the jobsite, they will contract immediately before a movement is initiated and activate at a low level throughout the day.

There are four core stabilizer muscles that together form a flexible corset that support the spine, stabilizing the low back and thus protecting your spine from damaging forces during movement.

In a healthy system, each component does its part to distribute weight, absorb shock, and transfer loads to the ground. But without conditioned stabilizer muscles, even simple movements like pulling, walking, and running, go unsupported and leave you at risk for injuries.

These muscles do not "come back" after an injury. They need to be specifically retrained, and without them our bodies will make up new, less-effective ways to stabilize, including holding the breath, engaging the more superficial stomach muscles, and tightening the butt, all leading to chronic low back and pelvis pain.

Developing good stabilizers is tricky because traditional weight exercises that isolate and develop large muscles neither exercise or train the stabilizers. Sounds depressing, but stabilizers are both challenged and stimulated by an unstable environment. The retraining work grows on you, and they will come back.

At Roanoke, I will introduce the basics of training core muscles and the use of good body mechanics on the job site. This workshop will be a dynamic experience: we will use floor exercises and tools of the trade in real-life situations to learn how to prevent injuries and preserve our bodies.

photo Alena Shure

Filling the Void: Insulation Alternatives for Timber Frames

Clarke Snell

Think Green Building, Marshall, N.C.

Straw bale, cob, clay-slip straw, and cordwood are just a few of the many natural wall infill systems that work very well in combination with timber frames. In this talk, I'll compare and contrast a variety of these methods to help you decide which approach, if any, is right for your next project.

Insulation 101

One of the central jobs of a building designed for human habitation is to create an inside with a different temperature from the outside, also known as the great outdoors. Since heat always seeks cool, the main task in this context is to slow the movement of heat. Insulation is a general term used to refer to a material placed to slow the movement of heat either into or out of a building.

Heat can move by three different mechanisms: radiation, convection, and conduction. Radiation is slowed by reflecting heat. Convection is slowed by creating a tight seal that prevents air movement. Conduction is slowed by placing materials that force heat to move through a complex circuitous route around many small air pockets. Generally speaking, radiation and convection are most effectively reduced by applied skins (shingles, plaster, radiant barriers). Conduction, on the other hand, is best reduced by placing a large volume of material around the living space of a building.

Timber Frames and Insulation

There is a great deal of crossover among building systems when it comes to slowing radiation and convection. The same light-colored tile roof that both reflects and emits solar radiation effectively can grace both a simple cob eco-cottage and a 10,000-sq.-ft. stick-framed McMansion. Similarly, plaster coatings, careful window detailing, and other convection prevention strategies perform basically the same function on a SIP wall as on a straw bale wall. It's in the application of insulation against conduction where open structural systems like timber frames distinguish themselves. Why? Because from the point of view of conduction, the best structural system is one that creates large expanses of open space to accommodate variable thicknesses of light, airy insulation to slow conductive heat loss. Since they allow for the roof to be in place before the wall volume is filled, timber frames also create a protected work environment for those insulation materials that can't get wet.

photo Clarke Snell

Slowing three kinds of heat movement. A variety of materials works together to create an integrated insulation system in this straw bale wall. The bales themselves are thick and airy, thus slowing heat conduction. On top of the bales is a layer of earth plaster with chopped straw reinforcement which seals the wall against convective heat loss. The final coat of white lime plaster helps reflect the sun's heat, thus slowing radiant heat transfer into the building.

Natural Insulation Against Conduction

"Natural" is a malleable word. To me it describes a continuum, with "most natural" being anything that just exists (rocks, water, old growth trees), "least natural" being those things that are the most synthesized by human technologies, and every real-world building material fitting somewhere in between. Building materials labeled as "natural" are those that require the least amount of energy and ecosystem disruption to produce, harvest, manipulate, and transport.

Natural insulation materials against conduction are usually locally harvested and most often have a high cellulose (plant fiber) content. In other words, there is no universal natural insulation per se, but only a case-by-case regional and local assessment of available materials. Some popular examples are straw bales, straw mixed with soil (cob, adobe, and clay-slip straw), and cordwood. In many situations, recycled newspaper (cellulose) insulation might be arguably the most natural material available.

Material	Description	Insulation against conduction	Advantages	Disadvantages
Straw bale	baled skeletal stalks left over from grain harvesting	excellent	structural modular annually renewable waste product fire resistant	difficult water detailing in wet climates difficult connection surface for shelves, etc.
Cob	clay soil, sand, and straw molded by hand into wall	poor	incredibly strong easily shaped fire proof adjustable thickness	labor intensive not enough resistance to heat conduction in some climates
Adobe	sun-dried bricks made of cob	poor	strong can make and store before construction fire proof	same as cob
Clay-slip straw	straw held together with clay slurry	good (my guess)	adjustable thickness light weight fire resistant	needs formwork messy limited support of interior build-out (shelves, etc.)
Cordwood	un-milled, air-dried wood cut to length (firewood) and laid in mortar	good	integrated skin (no interior or exterior finish) adjustable width	open wood end-grain exposed to water
Commercial cellulose	recycled newspapers with borax	very good	adjustable thickness quick installation	needs permanent box enclosure installation very dusty comes in plastic bags

Timber Frames and Natural Insulation Wall Infill Systems: A Case Study

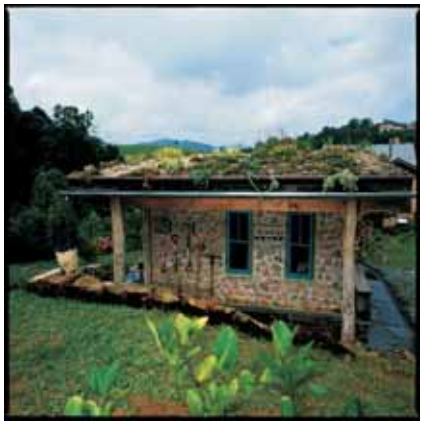
In order to compare a variety of infill systems, Tim Callahan and I built a small post and beam cottage and filled its walls with five different natural infill materials. Far from being simply demonstration, we placed our materials for specific reasons that played on the strengths and minimized the weaknesses of each material. We live in a wet climate (western North Carolina mountains) with cold winters and hot summers. Here's what we came up with:

North wall

Straw bales deliver the best overall R-value by far of any natural insulation material. That fact made bales a good choice for our north wall. A trade-off here was that this is a gable end with a 2-ft. overhang, so this wall is not completely protected from rainfall. Careful water detailing make us confident that the wall will perform well for many, many years.

East wall

We live in a forested area, so cordwood construction makes sense here. As part of our passive solar design, we have large east and west porch overhangs for cooling. We chose to place cordwood as our east wall infill where it will be well protected from rain and snow.



Clarke Snell

West wall

We chose a modified stick-frame with cellulose insulation infill for the west wall. We did this partly to show how conventional framing techniques can be improved upon, but also to take advantage of the ease with which wood framing accepts shelving, plumbing, and other connections. All of our conduit, shelving, and other major connections are concentrated on this wall.

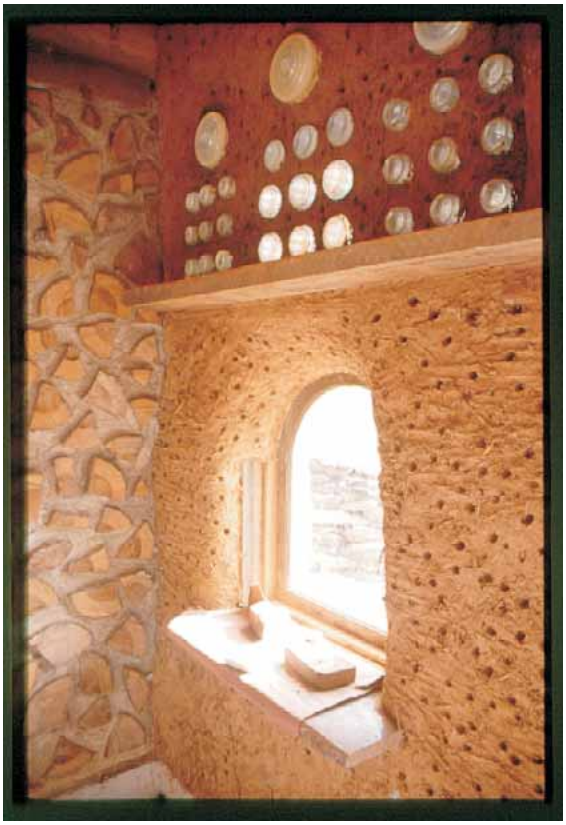
South wall

I love the look and feel of cob, but I feel that it is a marginal material for our climate due to its poor resistance to conduction. However, by using cob to infill our southern wall, we utilized its thermal mass to collect low winter sun as part of a passive solar design. This, in effect, creates a dynamic form of insulation and allows us to take advantage of the beauty of cob in our climate.

Summary

Timber frames are well matched to natural wall infill systems because they: (1) get out of the way to let the insulation do its thing, (2) provide a roof to protect delicate materials from rain during installation, and (3) allow for flexible infill design that can accommodate a variety of infill materials in the same building.

Strength without volume. Here, a cob wall intersects a cordwood wall in a small post and beam structure. With the frame in place and a roof overhead, these walls were built in the dry without stress. The wide space between structural members accommodates these materials very efficiently . . . don't try this in a conventionally stick-framed structure!



Solar and Alternative Energy

Bryan Walsh

Solar Connexion, Blacksburg, Virginia

Interested in a sustainable energy system that will last decades, have minimal maintenance, be completely quiet, and be exceptionally reliable? This informal presentation will include a Q&A session with an introduction to converting sunlight into electricity. Come and ask direct questions about this exciting technology. Bryan is a qualified, experienced solar professional, and you can benefit from his practical, hands-on experience covering photovoltaic (PV) panels, controllers, batteries, inverters, and more.

Popular discussion topics include differently structured systems, both residential and commercial. Different types of equipment are used to build integrated PV systems versus standard frame PV systems. Points of practicality will be discussed as well as system maintenance.

Bryan is a certified photovoltaic installer through North American Board of Certified Energy Practitioners (NABCEP) and the Virginia Alternative Energy Specialist program. NABCEP installers are required to specify, configure, install, inspect, and maintain solar electric systems. Photovoltaic systems are designed to meet the performance and reliability needs of each customer, comply with all safety codes, and incorporate quality craftsmanship.

Possible topics for discussion include:

- up front and ongoing costs
- working safely with PV systems
- conducting a site survey and assessment
- selecting a system design
- adapting the mechanical design
- adapting the electrical design
- installing subsystems and components at the site
- performing a system checkout and inspection
- maintaining and troubleshooting a system
- tax credits.

About the Presenters

Will Beemer (Safe Work Practices)

Will Beemer has been Co-Executive Director of the Timber Framers Guild in charge of Education and Operations since 1999. He served on the Guild's Board of Directors, 1992–99, and is also Director of the Heartwood School in Washington, Massachusetts. *will@tfguild.org, 413/623-9926.*

Maureen Blackwell (What Kind of Leader are You?, Planning for Strategic Change)

Maureen Blackwell brings 25 years of corporate leadership and training experience to her second career as a personal and business coach. She is a graduate of The Coaches Training Institute, certified to teach The Enneagram in Business, and is a member of the International Coaches Federation and the International Enneagram Association. (The Enneagram, a geometric figure that maps out nine distinct patterns of thinking, feeling, and acting, is a synthesis of many ancient spiritual and religiuous traditions.)

During her 25-year-plus tenure at IBM, she held management positions in product planning, manufacturing and development, finance, marketing, human resources, and training. Maureen provides coaching and consulting to organizations and individuals on the subjects of emotional intelligence, The Enneagram, strategic planning, culture change, and life transition planning. *mqblackw3@hughes.net, 540/937-3941.*

Dan Boyle (Preservation and Repair Techniques of Historic Timber Frames)

Dan Boyle joined Preservation Timber Framing in 1996. Since that time, he has been involved in the documentation and preservation of traditionally framed houses, barns, and churches in southern Maine, New Hampshire, and northern Massachusetts. These buildings have ranged from museum houses to small farm outbuildings and everything in between. Throughout the years, he has enjoyed working on the job site and with the property owners to preserve as much of the historic fabric of the building as possible. Dan graduated from the University of New Hampshire with a Bachelor of Science in Forestry. He lives in South Berwick, Maine, with his wife, Sarah, and their son, Caleb. *supperbucket@comcast.net, 207/384-5652 .*

Rick Brown and Laura Brown (Medieval Human-Powered Crane and Gwozdzeic Synagogue Bimah)

Guild members Rick and Laura are trained sculptors, educators, co-founders of Handshouse Studio, and members of the faculty at Massachusetts College of Art in Boston. Rick is a full professor in the 3-D department there and president of Handshouse Studio. Laura is a faculty member in the 3-D department, a TFG board member, and director of Handshouse Studio.

Handshouse Studio, Inc., is a non-profit educational organization that crosses the boundaries of conventional learning and creates projects that energize history through the reconstruction of large historical objects. Through the intensive investigation of a single object, doors open to a wide range of related subjects usually studied independently. Handshouse collaborates with educational organizations and offers faculty and students the opportunity to work with scholars, educators, historians, architects, engineers, anthropologists, archeologists, artists, craftsmen, and builders.

Handshouse has reached large audiences through exhibitions, publications in magazines such as *National Geographic*, *Archeology Today*, *Smithsonian*, *Fine Homebuilding*, *Timber Framing*, and *South Shore Living*, and has collaborated with PBS's NOVA, Discovery Channel, England's Channel 4, France's Channel 5, and BBC.

www.handshouse.org, 781/826-7314.

Ben Brungraber (Truss Joinery and Cambering)

Ben Brungraber, Ph.D., P.E., reports that, after 20 great and rewarding years, he has left Benson Woodworking in order to establish and maintain his own circus. He and his partner, Mack Magee, have been intimately involved in all aspects of five of the largest timber framing companies over the past decades. They offer timber frame engineering services through their new firm xtabi Engineered Timber. Ben's education and career have long focused on connecting heavy timbers to one another in pleasing and reliable ways. Ben has restored timber trusses spanning 220 ft., helped to design ones up to 140 ft., and has sold and built ones longer than 70 ft. And he still sleeps well at night. Ben can be reached in many ways, but as he starts his newest enterprise, his cell phone might be the most reliable. *603/381-3810.*

Tim Callahan (Beyond the Beam: The Role of the Timber Frame as Part of a Resource and Energy Efficient Green Building)

Tim Callahan is a timber framer, boat builder, and green design consultant living in Asheville, N.C. His work with timber frames began with "the Boys in the Beamery" in Alstead, New Hampshire, in 1979. He is the co-author, with Clarke Snell, of the recently released book, *Building Green*.

tim@thinkgreenbuilding.com, 828/777-3662.

Barbara Carper ((The Financial Benchmarks Dashboard, Break-Even Analysis)

Barbara Carper, of Business Resource Services, designed and produced the 2003 Financial Benchmarking study for the Log Homes Council and Timber Frame Business Council. Barb combines the management and teaching skills of a seasoned business advisor with the technical knowledge of a CPA. She has worked with business owners and managers across the U.S., Canada, and Australia, providing them with practical tools and techniques to achieve greater control over the financial future of their companies. *bcarper@brs-seattle.com, 206/282-3888.*

Rudy Christian (A Place for Trades: Cultural Change in the 21st Century)

Rudy Christian has been timber framing for more than 25 years. His company, Christian & Son, Inc. in Burbank, Ohio, includes his wife, Laura, and their son, Carson. They currently specialize in historic timber conservation and adaptive re-use of timber buildings. *rchristian@planexus.com, 330/624-7282.*

Chris Dancey (Natural Building Track Forum)

Chris Dancey has coordinated the Natural Building Track for Guild conferences since 2003. Chris and her husband Wil Dancey have been experimenting with hemp hurd chips since the material first became available in 1998. Now they have the first home in Ontario with industrial hemp and lime infill walls (non-load-bearing) that have been approved by both an engineer and the local building official. Chris also manages communication for Dietrich's North America. *dancey@amtelecom.net, 519/773-5273.*

Chris Dancey

This industrial hemp test plot, on Chris Dancey's certified organic farm, is part of major research by Gordon Scheifele and Doug Young for the University of Guelph and Ridgetown Agricultural College. Chris wanted to advance the knowledge base for others and learn more about growing hemp in Ontario. Next year she hopes to grow up to 50 acres of industrial hemp for grain. She may also process the hurd (core hemp fiber in the center of the stem) for HempChips, used in the walls in her home.

Kinley Deller (Waste Materials = Building Materials)

Kinley Deller is a Waste Reduction Specialist for the King County Green Building Program, housed within the King County Department of Natural Resources and Parks in Washington State. Kinley manages the Construction Works program, which provides construction waste reduction and recycling assistance to construction project managers, contractors, architects, and developers in King County. Building on eight years' experience in the waste reduction field, Kinley has been working tirelessly over the past year and a half to promote deconstruction as a key waste reduction option and has provided assistance on several projects, both governmental and private, to further this effort. *kinley.deller@metrokc.gov, 206/296-4434.*

Jim DeStefano

Jim DeStefano, P.E., A.I.A., is a structural engineer, woodworker, and architect with DeStefano Associates, located in Fairfield, Connecticut. Jim is the chair and a founder of the Timber Frame Engineering Council (TFEC).

jimd@destefanoassociates.com, 203/254-7131.

David Fischetti (Special Issues Unique to Engineering Timber Structures)

David C. Fischetti is internationally known in the field of historic preservation and conservation engineering. A Registered Professional Engineer in 18 states, he has 37 years of structural design experience including extensive work with glued laminated timber and timber frame structures. He has evaluated and designed repairs to covered bridges in Massachusetts, Missouri, New York, New Hampshire, Vermont, Pennsylvania, Kentucky, and North Carolina. *office@dcfengineeringinc.com, 919/467-3853.*

Christopher Fox
(Straw Bale Enclosure Systems for the Timber Frame Structure, Natural Building Forum)

Christopher Fox earned a bachelor's degree in environmental biology and a master's degree in industrial engineering. Combining his passions for both the environment and building, he began his own company, Chris Fox Construction Services, LLC. Today, he works as Fox Natural Building (FNB), a company whose focus is on the construction of timber frame buildings with natural enclosure systems. The mission of FNB is to construct homes and other structures in the most sustainable, practical way, using natural, local materials.

Fox's work can be seen in Ohio, Pennsylvania, and Indiana, among other places. His company focuses on detail to produce high-quality homes and other structures that are beautiful and ornate. Aside from his building work, Fox offers other services such as custom milling, green remodeling, and workshop facilitation. FNB always seeks opportunities to use alternative, more healthful methods of production, such as running the company vehicle on waste vegetable oil and machinery on biodiesel. *buildgreen@earthlink.net, 216/225-0753.*

Mary Golden (Interior Environments: Designing with Natural and Sustainable Materials)

Mary Golden, eco-designer, Gaiatecture Design Studio, brings her experience of integrating natural and green building systems for residential, retail, restaurant and interior design projects to her clients. Through Gaiatecture Design, Mary facilitates local and national sustainable design practicum and lecture series. The most extensive education project facilitated was the 2004 Natural Building Colloquium–East, a week-long natural building and sustainable living educational forum, drawing national and international innovators in the fields of natural building, sustainable energy systems and permaculture to New York State. Mary is also an adjunct professor at Monroe Community College's Interior Design Program. *gaiatecture@hotmail.com, www.gaiatecture.com, 585/624-5836.*

Janell Kapoor (Natural Plaster Finishes, Awesome Earthen Buildings from Around the World)

Founding Director of Kleiwerks International and the Ashevillage Institute, Janell Kapoor has forged lasting connections with natural builders throughout the world, connections that now form the basis of ongoing community projects and programs worldwide. Janell is an expert earthen builder, international activist, and community organizer. She is dedicated to getting the word out about how easy, affordable, and natural it can be to house ourselves. Since 1997, Janell has shared the joy and art of earthen building with people from over 30 countries.

janell@kleiwerks.org, 828/279-1955.

Chris Koehn (The CCC's Heavy Timber Work: 1930s and Today)

Chris Koehn has managed Guild projects and children's workshops. Having been a Guild member since the late 1980s, he's spent the bulk of the intervening years designing, selling, and building timber framed homes in his native Wisconsin.

For the past two years, Chris has become a journeyman in a quasi-traditional sense, traveling around North America, visiting timber frame shops and projects with his family in tow, learning a lot about our craft and business and teaching a little too.

timberguides@koehn.com, 920/46-3906.

Ed Levin (Hammerbeam Roof Trusses)

In 1969, Boston native Ed Levin graduated from Dartmouth College and got his start in timber framing dismantling an early 19th-century barn in Norwich, Vermont. He raised his first new frame in 1971, and for the next decade and a half he operated a small timber frame business in Canaan, New Hampshire, before embarking on his present career as a frame designer.

Ed is a contributing editor of the journal *Timber Framing*, writes extensively on joinery and engineering, participates in many Guild projects, and does pioneering work in historic reproduction, curved framing, and compound joinery. In addition to residential construction, Ed frequently works on public spaces including school buildings, theatres, women's shelters, ski lodges, and covered bridges. An increasing proportion of his practice is focused on the preservation of historic structures, along with an ongoing sideline working on historic replicas, so far featuring 17th-century house frames, wooden synagogues, church bell frames, medieval siege engines and cranes, wind and water mills, and an 18th-century wooden submarine.

Ed's work can be found throughout North America and beyond. He is proud to be a founder and member of the Timber Framers Guild. He and his family make their home in Hanover, New Hampshire.

elevin@valley.net, 603/643-2002.

Bruce Lindsay (Complaints, Gripes, and Claims)

Bruce Lindsay started dealing with customers at the ripe old age of 16 as a porter on a cruise ship that ran the coast between Vancouver and Skagway, Alaska. At 19, he moved into the commercial salmon industry when he ran a combined salmon-buying barge, store, fuel station, and not-so-secret-liquor bootleg operation in a quiet bay at the mouth of Esperanza Inlet on the northeast corner of Nootka Island. For eight summers, this financed his journey through academia at the University of British Columbia.

Through an interesting coincidence and a series of events, Bruce started in Tahsis Sawmill on the west coast of Vancouver Island in 1973, and over the subsequent years he worked as a laborer, machine operator, lumber grader, and supervisor in various mills, lumber yards, remanufacturing plants, and lumber trading operations. He started his own lumber sales company in 1990 and continues to provide specialized lumber products to various domestic and international clients.

brucelindsay@shaw.ca, 604/988-8574.

Paul Malko (Designing for Insulated Panels)

Paul has a B.S. in mechanical engineering from Northeastern University. He has worked as an engineer and project manager at Foard Panel for three years, specializing in structural issues and thermal performance.

paul@foardpanel.com, 800/644-8885.

Curtis Milton

Curtis Milton, a carpenter and builder with a wide range of experience, has taught for the Guild at Rocky Mountain Workshops, Palomar College, and the Heartwood School. He has presented on compound joinery, the steel square, builders' math, and more at Guild conferences, workshops, and rendezvous. He has participated in many Guild events as a volunteer, instructor, and project manager. A Guild member since 1987, he is currently fulfilling his second term on the Board of Directors and is serving the membership as the Guild's treasurer. His long term goals for the Guild include more educational opportunities, curriculum development, and a formal apprenticeship program. Curtis founded Monolithic Building Services in 1988 and continues to work on challenging projects at home and nationwide with some of the most talented and demanding individuals, teams, and companies in the industry. *milton@ncia.net, 603/387-6770.*

Stephen Morrison (Children's Discovery Workshop)

Stephen is owner of MoreSun Custom Woodworking, Inc., a solar-powered timber frame shop in Mt. Rest, South Carolina, and father of two aspiring timber framers. *steve@moresundesigns.com, 864/647-1669.*

Grigg Mullen (Rigging Basics)

Grigg Mullen began his rigging career at age 14 with the Pioneering merit badge in Boy Scouts. He has since progressed to teaching civil engineering at VMI, helping with numerous oddball rigging projects (ballistas, obelisks….), and teaching rigging for the Guild. *mullenwg@vmi.edu, 540/464-7331.*

Jonathan Orpin (Veteran Voices)

Jonathan Orpin is founder of New Energy Works Timberframers and Pioneer Millworks. He has served on the board of the Guild (Treasurer, 1992) and the Business Council (President, 2000 and 2001), and currently serves on various community boards. *jonathan@newenergyworks.com, 585/924-3860.*

Bob Pasquill (The CCC's Heavy Timber Work: 1930s and Today)

Born in New Hampshire, Bob graduated from the University of New Hampshire in 1980 with a degree in anthropology. He has worked for the U.S. Forest Service in South Carolina and Alabama for 25 years.

Since April 2001, Bob has given programs on the CCC in Alabama, Mississippi, and South Carolina, and in November 2003 he was the keynote speaker for the National Association of CCC Alumni National Reunion in Sebring, Florida. He is writing two books about the CCC in Alabama and a third book about the Tuskegee Land Utilization Project in Macon County, another New Deal Program. *bpasquill@fs.fed.us, 334/832-4470.*

Dick Schmidt (Draft Specification for Timber Framing)

Dick Schmidt, P.E., Ph.D., is the Associate Dean of the College of Engineering at the University of Wyoming.

schmidt@uwyo.edu, 307/766-5211.

John "Buddy" Showalter (NDS for Wood Construction)

Mr. Showalter joined the American Forest & Paper Association staff in 1992, and he serves as Director of Technical Media for the American Wood Council (AWC). He is a graduate of Virginia Tech with a B.S. in Agricultural Engineering. Responsibilities at AWC include development of design tools like the *Allowable Stress Design (ASD) Manual for Engineered Wood Construction*, which includes the *National Design Specification for Wood Construction (NDS)* and other technical media. He also serves as the editorial board chairman for *Wood Design Focus*, published by the Forest Products Society, and he serves on the editorial board for *Structure* magazine, published jointly by NCSEA, ASCE/SEI, and CASE. *buddy_showalter@afandpa.org, 202/463-2769.*

Ed Shure (Aging is a Myth)

In 1958, Ed's big sister convinced him that he could fly, and the ensuing jump from the roof of the family garage resulted in two cracked vertebrae, a concussion, and various lacerations. In 1973, there was a 70-m.p.h. head-on with a garbage truck. As luck would have it, he was in the proper frame of mind to roll with it. 1975 (and 2000) brought torn medial collateral ligaments. Other than a climbing fall, and two or three motorcycle wrecks, things were pretty mellow for a decade or so beginning in 1976. In 1987, Ed was hit in the head by an errant crane ball, which sent him flying off the top plate. In August of 1988, the back end of a logging truck collapsed, pinning his leg to the ground. But every cloud really does have a silver lining . . . he got to experience the entire summer Olympics from the comfort of his own living room! Ed wants you to know that (while this tragic litany might explain a few things to those who know him) he has been working on development of core strength for about six years now, and he doesn't feel that bad. *ed@timmerhusinc.com, 303/449-1336.*

Clarke Snell (Filling the Void: Insulation Alternatives for Timber Frames)

Clarke Snell is the author of two books on alternatives to conventional construction methods: *The Good House Book: A Common-Sense Guide to Alternative Homebuilding* and, with Tim Callahan, *Building Green: A Complete How-to Guide to Alternative Building Methods*. Together, he and Tim run Think Green Building, a nimble design, consulting, education, and building group. *clarke@thinkgreenbuilding.com, 828/230-9857.*

Patricia C. Southard (Waste Materials = Building Materials)

Project-Program Manager in King County, Southard is in her ninth year in the sustainable building industry and has recently joined the green building team at the King County Solid Waste Division. At King County, Southard manages programs for creating new wood markets from sustainable resources and also provides technical assistance for the County's LEED initiative. She ran her own mixed-media art business featuring environmentally friendly finishes and recycled materials. Southard has developed workshops for Evergreen State College, American Institute of Architects, International Interior Design Association, Timber Framers Guild, and several design and real estate associations.

Southard studied Environmental Sciences at Stockton State College and Liberal Arts at the University of Montana. *patti.southard@metrokc.gov, 206/296-8480.*

Sarah Susanka, FAIA

Sarah Susanka is an architect, bestselling author, and cultural visionary who is leading a movement that is redefining the American home. Her "build better, not bigger" approach to residential architecture has been embraced by homeowners, architects, and builders across the country. Her Not So Big philosophy has sparked an international dialogue that has been covered by the national media, including The Oprah Show, Charlie Rose, *USA Today*, and *The Wall Street Journal*.

Susanka is a registered architect, a member of the College of Fellows of the American Institute of Architects, and a certified interior designer. *www.NotSoBigHouse.com.*

Bryan Walsh (Solar and Alternative Energy)

Bryan Walsh is a certified photovoltaic contractor who has been in the electrical service industry since 1987. Bryan started his solar career as Moonlightsolar when he bought his first shipment of panels in 1993. Prior to that, he maintained existing systems as a certified electrician. With many years of residential troubleshooting experience, the transition to photovoltaic contractor was easy!

Bryan now operates as Solar Connexion, in Blacksburg, Va. Solar Connexion offers consulting on a variety of environmentally friendly services, as well as photovoltaic and electrical contracting services. Bryan is a NABCEP and AES certified photovoltaic installer. *bwalsh@moonlightsolar.com, 540/961-5120.*

Notes

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And to these individuals:

Audi Pauliukonis for the T-shirt artwork; Stephen Morrison for coordinating the Children's Workshop; Chris Dancey for coordinating the Natural Building Track; Jim DeStefano for coordinating the Engineering Workshop and shepherding the new Timber Frame Engineering Council; David Blackwell, our new conference coordinator; Randy Churchill for running the slide show; Sandy Bennett; Charlotte Cooper; and Bill Devereaux.

Timber Framers Guild
PO Box 60 • Becket, MA 01223
888/453-0879 • *www.tfguild.org*