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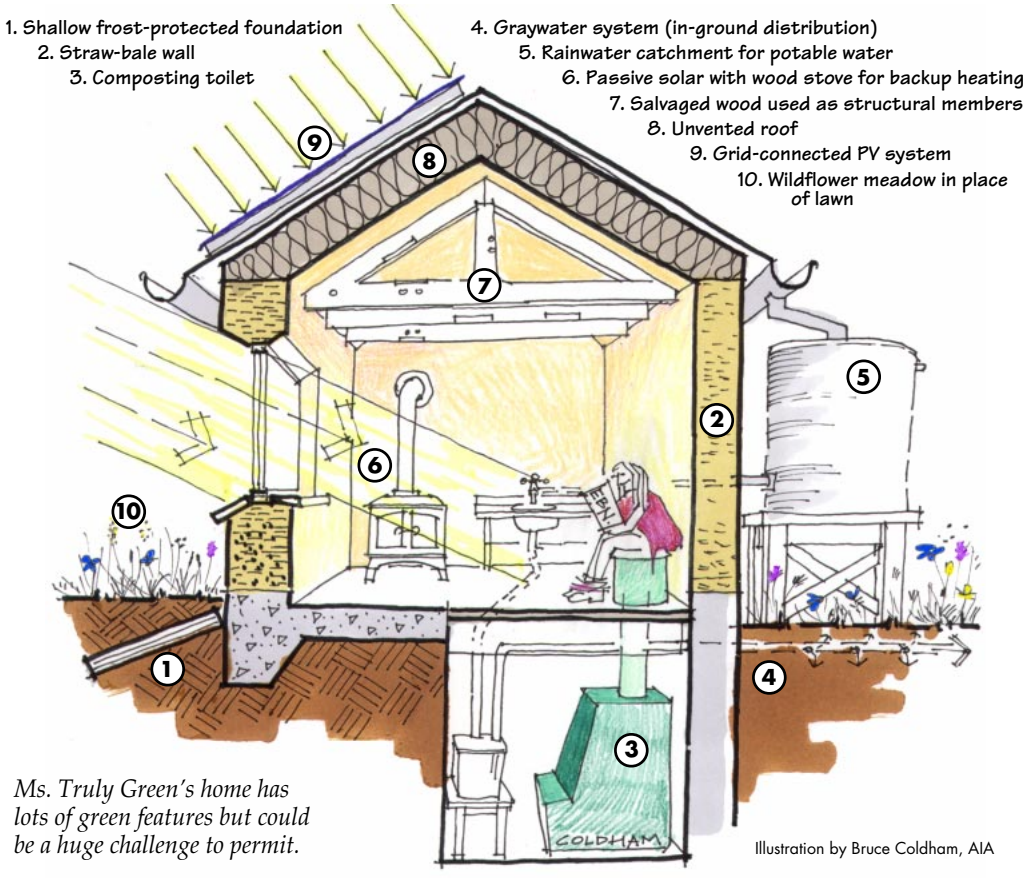
Sustainability and Building Codes

SHALLOW FROST-PROTECTED FOUNdation, straw-bale walls, composting toilet, graywater system, rainwater harvesting…. An impressive array of green building features! From the foundation to the roof, these are exemplary systems and materials. But there is another commonality to these features: each represents a potential—if not likely—regulatory challenge. It can be frustrating to have the knowledge and skills required for building green, yet lack the approvals to do it.

This article takes an in-depth look at the inherent but largely unrecognized relationship between sustainability and building codes, and efforts under way to change this relationship. It also presents a process for professionals to use in gaining approvals for alternative designs, systems, and materials within the existing regulatory framework. A sampling of code success stories demonstrates what is possible when this process is employed.

Though it is beyond the scope of this article, the issue of regulatory hurdles with green building is not restricted to buildings and building codes; a new approach is needed as well for the larger-scale issues of land development, zoning, and planning. *(continued on page 8)*



Ms. Truly Green's home has lots of green features but could be a huge challenge to permit.

Illustration by Bruce Coldham, AIA

In This Issue:

Quote of the month:

"We need to think about the responsibilities for our collective safety; especially the welfare of future generations who, it's worth noting, are unable to represent their interests."

Bob Fowler
on building codes
(page 2)

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From the Editors

Bob Fowler: A Codes and Sustainability Champion

Over the years, *EBN* has often touched on building regulation, but we've never done a feature article on building codes. Given the influence of building codes on the environmental performance of building, the topic is overdue. For this month's feature, we team up with long-time *EBN* friend and supporter, David Eisenberg, who recently joined our Advisory Board. Through the Development Center for Appropriate Technology (DCAT), David has worked to expand the context of building regulation—to address the environmental consequences of code requirements.

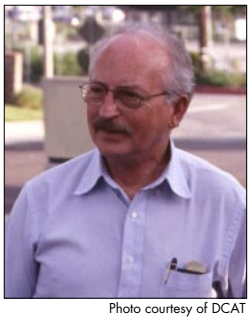


Photo courtesy of DCAT

Bob Fowler will be missed.

One of DCAT's strengths has been developing relationships with key organizations and leaders in the building regulation field. Standing out among those leaders was Bob Fowler, FAIA, P.E. and the Chief Building Official for the City of Pasadena, California. Bob was a former Chairman of the International Conference of Building Officials (ICBO) and founding Chairman of the International Code Council (ICC). One of the most highly respected building officials in the U.S., Bob had teamed with David several years ago in championing the cause of sustainability in building regulation. We are deeply saddened to report that while we were preparing this feature, Bob was tragically killed in a motorcycle accident while on vacation in Montana.

Bob Fowler set a great example of how building officials and their departments can serve their communities, not just by ensuring that buildings are safely constructed but also by facilitating creative solutions that are more economical and environmentally responsible. The Paseo Colorado mall redevelopment in Pasadena (see profile, page 9) demonstrates what is possible when a building department led by a visionary like Fowler serves as a true resource to its community—including the design, construction, and development sectors.

In an interview with Fowler and Eisenberg entitled "An Alternative Future for Building Regulation" in the January/February 2000 issue of *Building Standards* (ICBO's magazine), Fowler shared his vision and willingness to rethink his ideas and provide leadership based on his changing convictions. He began by describing how exposure to DCAT's message forced him to reconsider many of his assumptions about building codes and regulations: "Safety is very important, but we need to think about the responsibilities for our collective safety; especially the welfare of future generations who, it's worth noting, are unable to represent their interests.… At some point, we will have to develop criteria for the environmental performance of buildings, similar to energy-efficiency requirements.… Our great-grandchildren will thank us." (The complete interview can be found at www.dcat.net.)

We still have a long way to go in making building regulation more supportive of sustainability. Moving forward with these efforts will be harder without Bob Fowler's help, but buoyed by his spirit—and with David's hard work and commitment—we can collectively accomplish a great deal. – *Alex Wilson*

Sustainability and Building Codes *(continued from page 1)*

A Brief History of Building Codes

Building codes have long been used by societies to protect individual and general welfare, and to hold practitioners accountable for their work. As long ago as 1750 B.C., Hammurabi, the Babylonian king of Mesopotamia, created his famous Code of Laws covering a wide range of public and private matters. Number 229 of this Code states: "If a builder build a house for someone, and does not construct it properly, and the house which he built fall in and kill its owner, then that builder shall be put to death." This type of "performance" code must certainly have had an impact on quality of construction, but it very likely stifled innovation!

There were many intermediate steps on the way to our present codes. In 1189 A.D., the city of London adopted regulations for the construction of common walls, rights to light access, drainage, and safe egress in case of fire. Historically, fire has been the most common concern driving interest in building regulations. Early in the Colonial period of the U.S., concern about fire resulted in a ban on wood chimneys and thatch roofs. In 1860 the City of New York appointed a Superintendent of Building and provided staff for code enforcement. In 1867, the Tenement House Act was enacted to regulate conditions in existing buildings, covering such things as fire escapes, ventilation, water supply, toilets, and stair railings. In 1905, the National Board of Fire Underwriters, an insurance industry group, wrote the first National Building Code.

This code led to the formation of organizations for building code officials and the next stage of code development in the U.S. By 1940, three model code organizations were established: the Building Officials and Code Administrators International, Inc. (BOCA) in the northeastern U.S., which produced the National Building Code; the International Conference of Building Officials (ICBO) covering the western half of the U.S., which produced the Uniform Building Code; and the Southern Building Code Congress International (SBCCI) in the southeastern U.S., which published the Standard Building Code. Reflecting regional differences and different code philosophies, the three model codes also embodied variations that have made code compli-

Furbish-Bathon Straw-Bale Home
Pasadena, Maryland

The Furbish-Bathon residence in Anne Arundel County, Maryland has straw-bale walls, combined domestic hot water/radiant heating floor system, salvaged cast iron columns, and a composting toilet system, each requiring code approval. The owner-architect, working with local and national consultants as well as sympathetic local officials, supplied the local building department with more than 100 pages of supporting documentation for the alternative systems, responding in writing to *all* concerns raised. Meeting well before construction with the local chief building inspector proved valuable for specific construction details such as securing wiring boxes directly to the straw bales and eliminating the vapor barrier. After being warned that conventional building permits could take from 3 to 18 months, the code approval process proved to be a surprising 5 months for this project.

The porch on this straw-bale house has a green (vegetated) roof.

Photos: Michael Furbish

Wiring for the first floor (shown at right) was run along the surface of—or within—bales before stuccoing (above).

Paseo Colorado Project
Pasadena, California

The Paseo Colorado mixed-use development is 570,000 ft^2 (53,000 m^2) of retail space and 400 rental apartments in a revitalized area of downtown Pasadena, California. The only way to achieve the City's Civic Center Task Force redevelopment goals—historic restoration of the open-air mercantile street and "urban district" mixed-use—was to design residential stories "light" enough to bear on the existing retail structures. An innovative performance-based code approach allowed a fire-safety engineering firm to model and design a cost-effective, alternative light-gauge steel frame structure that satisfied the builder, the building owner, and the intent of the code.

Photos: Ehrenkrantz Eckstut & Kuhn

A Densglass Fireguard wall will provide 3-hour separation between the theater and Block C housing.

This view of the Fountain Court area shows the start of light-frame residential construction above existing retail spaces.

The Paseo Colorado project covers several city blocks in downtown Pasadena, California, occupying most of the center of the photo above.

ance difficult for designers, builders, and manufacturers working across different code-enforcement areas.

Efforts to harmonize the three codes, initially through the Council of American Building Officials (CABO) and more recently by its successor, the International Code Council (ICC), have now resulted in the creation of a single national building code—or family of codes. The ICC codes (including the International Building Code, International Residential Code, and "International" versions of the Mechanical, Plumbing, Fire, and Energy Conservation codes) are replacing the BOCA, SBCCI, ICBO, and CABO codes, which are no longer being maintained. Instead, these groups now support and maintain the ICC codes, the first full edition of which was published in 2000. (Recently, the NFPA dealt a blow to this consolidation effort when it split from the ICC process and began developing its own building code to compete with the International family of codes.)

An important new development in the ICC process is creation of the International Performance Code (IPC). This code differs from the other International codes in that it is based on stating what must be accomplished, rather than describing in detail what must be done and how to do it. While the more typical *prescriptive* approach is straightforward and relatively easy to implement for both builder and code official (because everyone knows what must be done), it can also be confining and thus limit innovation.

Though new to the U.S., the experience of other countries using performance codes has shown that they are viable. The greater flexibility provided by performance requirements is both liberating and problematic. The added freedom comes at a price because the performance approach requires that the proposed designs, materials, or methods be supported by calculation, test results, or other demonstrations of adequate performance. That often means more engineering services, testing, and time—both for designer and plan reviewer. It adds a burden for the building department because building officials must be able to analyze the project rather than just making sure it conforms to common practices with which they are familiar.

Building Codes in Action

One might assume that the creation of a single family of codes would bring about complete consolidation of building codes across the U.S., but for several reasons this is not the case. First, unlike in many countries where code adoption takes place at the national level, in the U.S. it occurs at the local, county, or state level. Codes derive their legal authority

from their enactment as laws, ordinances, or statutes. While it appears likely that most U.S. jurisdictions will eventually employ the ICC system, in most cases each jurisdiction makes its own determination of which codes and which versions of those codes it will adopt. Some jurisdictions are still without any building codes.

Complicating the matter further, nearly all jurisdictions reserve—and often exercise—the right to add to or amend the codes they adopt. Local amendments may be in response to conditions such as high winds, wildfires, or earthquakes, and additions often include appendix chapters for traditional or regional building approaches—for example, adobe and rammed-earth in the southwestern United States.

At the other end of the spectrum, state or federal government can, as public policy, pass legislation or develop programs that either directly or indirectly supersede local codes. Two examples are the low-flow toilet requirements included in the 1992 Energy Policy Act (see *EBN* Vol. 2, No. 1) and the recent code requirement by the city of Frisco, Texas that all new homes be EPA ENERGY STAR-compliant (see *EBN* Vol. 10, No. 6).

Just as important as the process by which codes are adopted is the process by which building codes are developed, changed, and enforced. Few people are aware that the building code development and code change processes are open to the public. Anyone—a business, interest group, or individual—can propose changes to the codes. On an annual basis, all filed proposals go through the same process—committee review, scheduled hearing, and voting. This process results in many changes to codes every year. Typically, supplements are published annually and then consolidated into a new edition of the code every three years.

At the other end of the process are local building officials who have the authority, granted by provisions in the codes, to approve alternative designs, materials, and methods of construction as long as they are deemed adequate to meet the intent of the building code. All codes have such provisions for dealing with building practices, materials, and systems not specifically addressed in the code. Understanding how to use this process can be of enormous benefit when proposing alternatives to standard practice.

The Case for Integrating Sustainability into the Codes

A key to shifting the building regulatory system towards greater acceptance of more sustainable, alternative approaches is to create a context in which those alternatives can be seen both as positive and as representing a reduction of risk, rather than an increase in risk. That requires developing awareness of the inherent risk in the status quo: what is likely to happen or is already happening if we maintain our current practices. To see the risk requires shifting from the details of the codes to the larger context and intent of the codes—understanding how current practice jeopardizes the public welfare that the regulatory system was established to protect.

Historically, building codes were developed as a reaction to disasters and building failures. They derived

Why Alternative Systems Pose a Challenge to Building Officials

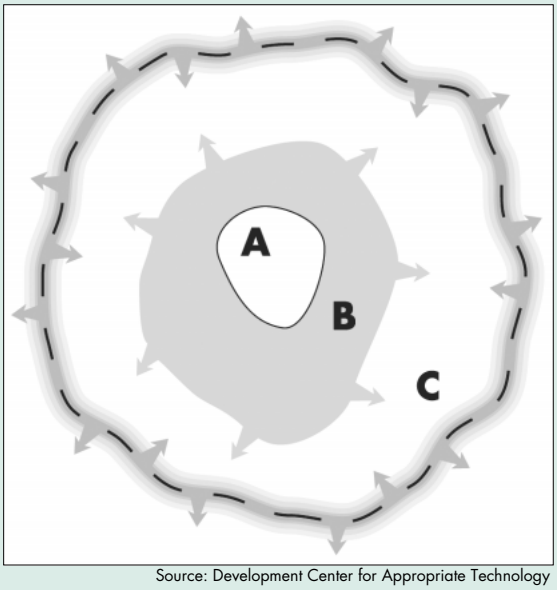
If the codes have provisions for the use of new and nonconventional building systems, methods, and materials, why is it so hard to get a green dream home or innovative commercial building approved? There are several reasons for this.

- **The perception of risk** – Avoiding risk is a primary function of the building official's job. However, for him or her, risk is not limited to unsafe structures. It also includes anything that might be viewed as added risk for the jurisdiction. What is unfamiliar often represents the unknown—and the potential for increased risk.
- **The burden of the process** – Any company or business interest seeking formal code approval for a new or alternative building material, product, or system must go through a long process. Extensive and costly testing, development, and evaluations are a prerequisite for entering the code development process. Even mainstream industries, such as the steel industry in its support for residential steel framing systems, have found this process daunting. Meanwhile, during the long interim, building departments are rarely knowledgeable enough about the new or alternative approach to facilitate approvals.
- **Time limitations** – Building departments tend to be minimally staffed generally and understaffed during boom cycles. Thus, they often have limited time to deal with conventional plans, much less unusual ones. Reviewing and approving alternative approaches requires more time, attention, and documentation than is required with conventional plans.
- **Information limitations** – Building officials typically have less basis on which to judge the adequacy of a proposed new design, material, or method. Building department staff rarely have the opportunity for training on the alternative approaches and thus may find it difficult to determine what qualifies as safe practice. The problem with nonproprietary building materials, such as many of the traditional materials now classified as "alternative" (adobe, rammed-earth, or straw-bale), is that they are nonindustrial or semi-industrial and nonproprietary. There are seldom private or public funds for the research, testing, and development work needed for such alternative materials to gain code acceptance.
- **The status quo** – It's human nature to take comfort in what is familiar and in the uniformity and interchangeability of known industrial building systems and materials. There will always be some level of resistance to whatever is different or new.

A = Sphere of Concern

B = Sphere of Responsibility

C = Sphere of Consequence



Source: Development Center for Appropriate Technology

Building codes could be envisioned as representing a ***sphere of concern (A)***: what must be attended to in order to protect people from the built environment. This sphere of concern isn't the whole picture, however, because in meeting the requirements of the sphere of concern, a much larger ***sphere of consequence (C)*** is created. This sphere of consequence is larger because it contains both intended and unintended outcomes; all the upstream and downstream impacts which flow from meeting the requirements set by the codes. The sphere of consequence creates a ***sphere of responsibility (B)***, which is also larger than the sphere of concern, since we are responsible for what happens as a result of what we require people to do. Thus, the challenge and the task is to expand our awareness and concern to encompass as much as we can of the larger spheres of consequence and responsibility.

their authority from a societal expectation that the public must be protected from these threats. This led to a focus on the protection of people in and around buildings and secondarily on protection of property. Over time, this focus has become ever more detailed and has expanded into nearly every aspect of buildings and their components and systems. It is no surprise that this focus, combined with our slow awakening to the scope and magnitude of the environmental impacts of the building industry, has resulted in a lack of concern for impacts that occur *away* from the actual building site, impacts that are cumulative or difficult to measure (such as climate impacts or the health effects of indoor air quality or toxicity of materials), or that extend into the future.

The idea of addressing such aggregated impacts through codes, though relatively new, has precedents in such areas as sewage systems, building energy codes, and water-efficiency requirements. Building energy codes provide a valuable, though still somewhat controversial, precedent for incorporating into building codes the larger, more distant, and cumulative consequences of buildings. It has been argued that energy-efficiency is not a safety issue and therefore has no place in the building codes. "I thought that [insulation requirements in building codes] was the dumbest idea I'd ever heard and that it had no place in the codes," admitted Bob Fowler in an interview in *Building Standards* (see page 2). Good arguments were made for minimum insulation requirements for buildings exposed to extreme temperatures as part of the concern for health and safety of the occupants or users of buildings, and thus they were developed. But it took a combination of economic, environmental, health, and even national security issues to finally propel building energy codes into existence and widespread adoption. "Looking back," reflected Fowler in the same interview, "I see that the energy-efficiency requirements set a very important precedent for our learning to take responsibility for the full range of the consequences of our buildings. We now need to continue that learning process and open our eyes and our minds to the work of creating sustainable buildings."

The larger, ecologically based risks to public welfare must eventually be seen as risks that demand responsibility for protecting public welfare as much as structural integrity, fire safety, or means of egress. The current regulatory system requires a high degree of safety and certainty in each building project, while ignoring the unintended role it plays in encouraging the depletion of natural resources and the demise of the natural systems upon which everyone's health, safety, and survival ultimately depend.

It is not difficult to find evidence to support concerns about the environmental impacts of the built environment (see *EBN* feature Vol. 10, No. 5).

- Over 40% of the material resources entering the global economy today are related to the building industry.
- Modern buildings use tremendous quantities of energy—in the United States (with less than 5% of the world's population) buildings alone account for a staggering 10% of *global* energy use.

Such statistics are all the more remarkable when one realizes that only about 2 billion of the world's more than 6 billion people live and work in resource-consumptive buildings—the sort of buildings described by modern building codes. The rest of the world's people today live in earthen buildings (adobe, rammed- or puddled-earth, cob, wattle-and-daub) or other types of indigenous buildings, shelters made of scavenged materials, or no buildings at

all. Yet all over the world modern building methods, with their greater impacts and resource consumption, are replacing traditional—and often far more sustainable—ways of building. It is important not to romanticize indigenous buildings or dismiss the very real problems that are often associated with them (poor earthquake resistance, lack of insulation, etc.), but to recognize the value and viability of simple, low-tech materials and building methods when used wisely. At the same time, modern materials and building systems must be viewed with the same critical eye, acknowledging their real costs and impacts, not just their benefits. With projections of the world's population reaching at least 8 or 9 billion this century and with the needed development and construction that must accompany such growth, these issues cannot be ignored much longer.

This global perspective is the basis for DCAT's work to bring a context of sustainability into the codes. Achieving that goal depends first on developing awareness of the need for change and then facilitating that change. DCAT started with the premise that it cannot be more important to protect individual people in and around specific buildings than to protect all of us collectively, including future generations, on this specific planet.

In using this approach, DCAT acknowledges that, in practical terms, there are many things in the realm of unintended consequences that are not only unknown but unknowable in the timeframe in which decisions must be made. While this makes it difficult to deal with these unknown risks, the goal of codes is to minimize risks to the public, not create absolute guarantees of safety. By acknowledging the existence and magnitude of these larger risks, it becomes possible to make decisions about building safety in a much more comprehensive and responsible manner.

Checklist for Gaining Approval for Alternative Designs, Materials, and Methods of Construction

PLANNING AND PREPARING FOR THE APPROVAL PROCESS

Start early. The first rule is to recognize that getting approval is a process. Identify as many of the nonstandard aspects of the project as early as possible, giving yourself and the building department a long lead time to address these. No one, building officials included, likes to be hurried or pressured. Your perfectly innocent sense of urgency may be interpreted as a suspect need for rushed approvals. They will need time to digest and respond to the material you present in support of the alternatives you are proposing; expect a number of exchanges as questions or concerns are raised.

Gather information about the jurisdiction and applicable codes. Learn what you can about the jurisdiction in which the project is located. Familiarize yourself with local permit process requirements and the current codes and standards that will apply to your project, including the sections related to the alternative approaches that will be included in the project.

Gather information about the specific alternatives. Identify potential areas of concern for each alternative being proposed and then research and collect relevant information. Try to obtain the best reference materials—technical reports, test results, books, authoritative publications, videos, and documentation of the successful use (and approval) of the alternative in other places. Look for both historic and recent precedents for their use and approval. Supporting material should be as regionally, climatically, seismically, or generally similar to the local circumstances as possible. It is not uncommon for building officials to discount supporting information if it is from regions with significantly different conditions.

Find and enlist the help of allies and sources of expertise. Seek out and, when necessary, engage knowledgeable experts and resource people, including sympathetic code officials, to support your position. Use networking to find others who have previously gone through an approval process for the alternatives you are proposing. The Internet and e-mail discussion groups can be a big help here. Involving people with the right expertise or prior experience in addressing anticipated problem areas can help you develop the rationale for what you are proposing, often shortening the approval process.

ENGAGING WITH THE BUILDING OR PLANNING DEPARTMENT

Take the high road. Before your first interaction with the building department, remember that attitude accounts for a lot—if you begin the process expecting a fight, you will most likely find one. Start instead with the idea that you share common goals. Consider the building department to be a resource, rather than an adversary. By openly acknowledging the extra effort required to deal with alternatives, and the time constraints and responsibilities building officials face, you will demonstrate an appreciation for their process. Maintain a cooperative, open-minded and positive attitude, acknowledging also that they have the authority to approve alternatives that meet the intent of the code.

Pay attention to the relationships. Since this is partly a process of creating trust, both in your design or approach and in your willingness to meet the intent of the code, having a good relationship with the building department can be a big help. Lacking such a relationship does not doom the effort to failure, but it certainly can lengthen the process. If there is some bad history, a liaison with someone who has a good working relationship with the department can help. When there are disputes, respectfully stand your ground while giving careful consideration to the building official's point of view. If changing the system is part of your goal, remember that being a pioneer includes a level of responsibility for those who may follow; try not to make their path even more difficult.

Meet and share information with the building officials. When the project is well enough defined to discuss it, arrange an initial meeting to informally discuss the project and proposed alternatives. Try to include the decision makers and any sympathetic officials or inspectors you may have identified. Bring copies of your resource materials to leave with the code officials. Allow enough time for them to read and absorb what you have provided. Actually purchasing resource materials for the building department, rather than lending them, is a relatively small investment that demonstrates the seriousness of your commitment and your expectation of a successful outcome. These materials may streamline future permit applications and may also create sustainability or alternative material advocates within the department.

Get specific feedback from the building official. Expect questions, objections, and issues to be raised about the proposed alternatives, both during (or following) the initial meeting and again when the plans are submitted for approval. Always try to get these in writing. When that is not possible, such as in a meeting, attempt to list or restate their concerns and objections to verify your understanding of them. This makes it much easier for you to be responsive to your building officials' concerns. Follow meetings with a letter describing your understanding of what was discussed and agreed upon and asking for acknowledgment.

RESOLVING CONFLICTS AND SPECIFIC ISSUES

Address concerns and objections with reasonable and factual responses. This is often a repeat of the initial steps to provide information, with a progressively narrower focus on specific issues. Demonstrate that you understand and respect both the merits and limitations of the proposed alternative, and that what you plan to do is safe, reasonable, and meets the intent of the code. This is an area where the influence of another code official familiar with the proposed alternative—and supportive of it—can be of enormous benefit. Sometimes it will be necessary to involve an engineer or other design professional at this stage to provide needed support for your position.

Network with others who have had similar experiences. When specific objections are not satisfied by the information that you have gathered and supplied to the building department, there are often lessons to be learned from the experiences of others who have gone through the process before. Whether through the Internet or other avenues, seek out knowledgeable organizations, groups and individuals and study their successful approaches. The most valuable of these are often the experienced building officials who have approved and worked with the materials or methods in question, or who are open-minded and receptive to alternatives.

Show perseverance and patience. One of the ways to demonstrate that you are serious, that you're in it for the long haul, is through persistence. There is a fine line between perseverance and pestering. However, when you believe that what you are proposing to do is appropriate and meets the intent of the code, you should be able to pursue approval through all the legal means are available to you. It is often important for the building department to understand that you will not be easily discouraged. It can be useful to have others who are contemplating doing what you are proposing to make inquiries at the building department about the alternatives you are proposing, so that the building department knows that you are not alone in your interest.

CLOSING STRATEGIES

Pursue your remaining options. If you don't get cooperation or can't get the approvals you seek, there are several options to choose from.

- **Hold-harmless legal document(s).** A strategy that has sometimes been effective is to offer the jurisdiction a letter or legal document that holds them harmless and absolves them from all responsibility for the alternative materials and methods used. This approach has sometimes been used in conjunction with the issuance of an "experimental permit" whereby the jurisdiction maintains the right to inspect the structure at specified intervals over a period of years, to learn about the viability of an alternative approach without setting an open-ended precedent for approving the alternative.
- **Reminder of registered architect's or licensed engineer's assumed responsibility.** In projects for which an architect or an engineer has stamped the plans, the argument can be raised that they have already taken legal responsibility for the design when they placed their professional seal on the plans. This is a fact that is often ignored by building departments. When the building department demands a change in the design, it might be putting responsibility for the changed design on the jurisdiction, since it, rather than the design professional, is determining how the building is to be built.
- **The local appeals process.** At the request of any denied applicant, the codes provide for an appeal process in which the building department must convene an appeals board meeting. A selected group of local or regional building professionals hears the applicant's request and supportive testimony, as well as that from the building department, and makes a ruling on whether to back or overrule the decision of the building official. Occasionally, building officials will request this process and join the applicant in support of the alternative in order to set a precedent and have wider backing for the decision. If, at any time, your application or appeal is referred to a higher level of code authority, be certain that your information resources and documentation is also provided to ensure that the case you made at the local level is also made at the higher level.
- **Political pressure.** As a last resort, political pressure can be applied either through the jurisdiction's elected officials or through media attention with a story in the paper or on television or radio. Because these are public policy issues involving public agencies, they are inherently political processes. Publicity and political pressure can be effective tools to gain your immediate goals, sometimes even long-term change, but they should be pursued very carefully, because they can also result in lingering resentment and long-term resistance.

Acknowledge your partners and share what you have learned. If your efforts are rewarded by success, be sure to celebrate! But also take the time to acknowledge and thank the building department and any cooperative officials. This paves the way for more success in the future. And finally, if you were helped by others, let them know about your success and, if you are able, be willing to share the lessons you learned with others.

DCAT also promotes the idea that the goals of those seeking sustainable solutions to building and the goals of code officials are shared: we *all* want safe buildings. This alignment has resulted in excellent relationships with some of the leaders in the building codes community (such as the relationship with the late Bob Fowler—see page 2). These relationships are further enhanced by providing good information about alternatives, developing workshops and educational resources for code officials, and developing constructive strategies to assist people seeking code approval for alternative approaches.

Evidence of the success of this strategy can be seen in the relationship DCAT has developed with ICBO. With DCAT's assistance, *Building Standards* (ICBO's magazine) published two issues (Sept/Oct 1998 and Jan/Feb 2000, which can both be found on the ICBO Web site through a link from www.dcat.net) featuring alternative building materials, and a third is in the works for the January/February 2002 issue. *Building Standards* also recently authorized the creation of a regular column on sustainable building for the magazine. In addition, ICBO assisted in the development and promotion of DCAT's Web-based survey on green building and building codes, and recently became a member of the U.S. Green Building Council.

Such relationships with leaders in the building codes community are important, but creating similar relationships locally and regionally is required in order to achieve the needed changes. That can only happen through the engagement of the environmental design and building community in a proactive, constructive partnership with their building code officials, based on a very real, mutual interest in creating safe buildings. Then the definition of public health, safety, and welfare related to buildings can be expanded to include this larger set of responsibilities.

Guidelines for the Building Professional

As mentioned earlier in this article, the groundwork for working with your local building code officials on the use of alternative building designs, materials, and systems has been laid out in the code. Sections 104.11 and 104.11.1 of the IBC detail the specific authority given to the building official to evaluate any alternative material, design, or method with respect to the intent of the code and to specify tests and accept test results in support of these alternatives. (See www.dcat.net for the full text of these provisions in the IBC and IRC.)

The Checklist on pages 12–13 of this issue will help you gain approval for alternative designs, materials, and methods of construction—and help you achieve a productive working relationship with your building officials, which is needed if we are to make regulations more supportive of sustainability.

Where Do We Go from Here?

There is much more to this topic than can be covered in a relatively short article. Together with DCAT, *EBN* is developing a special report on building codes and standards that will address, in much greater detail and scope, the realities and possibilities for the future of building regulation.

There are several opportunities for immediate engagement, however. First, the environmental design and construction community must become actively engaged in writing code-change proposals and encouraging funding, research, and testing to support those changes. Additionally, standards-development activities, such as those in ASTM and ASHRAE, often result in requirements less than satisfactory in terms of the environment. The green building community needs to share their direct experience in contending with the realities of those standards by participating more fully in the standards-development process.

It is also time for the environmental

Island Cohousing

Martha's Vineyard, Massachusetts

In order for the South Mountain Company to move forward with this combined cohousing/single business development on Martha's Vineyard in Massachusetts, ten separate zoning restrictions needed to be overcome. The result is a cohousing neighborhood of 16 single-family homes, a "common house," and other communally owned facilities on 29 acres (12 ha); and offices, workshops, and storage facilities for a design-build firm on an adjoining 6 acres (2.5 ha). Today, because of the zoning changes enacted as a result of this project, an identical project would be in full compliance. Key features include clustered housing, composting toilets, 13-foot-wide (4 m) roads with porous paving, and graywater systems for both the cohousing and the design/build firm headquarters.

Photos and rendering by South Mountain Company

Island Cohousing's 16 homes and common house are tightly clustered on a small portion of the 29-acre (12 ha) site (see rendering above).

Creative detailing, such as shown on the staircase at left, gives the small houses unique character.

South Mountain Company relocated its offices and wood storage yard (see far left) on an adjacent 6-acre (2.5 ha) lot as part of the project.

design and construction community to seek representation on relevant building code development committees. The ICC code development process is now opening up representation on their committees to the public and industry. Organizations such as The American Institute of Architects Committee on the Environment (AIA-COTE), U.S. Green Building Council (USGBC), Sustainable Building Industry Council (SBIC), Energy and Environmental Building Association (EEBA), and New Buildings Institute need to come together and focus on how to gain such representation. Other interest groups are well organized and funded to represent their interests; the green building community needs to take responsibility for bringing about changes, rather than simply lamenting the status quo.

Finally, local green building programs provide an ideal forum for education and exchange about alternative designs, materials, and methods and the building codes. Local code officials could be brought into these programs to share their existing skills and experience as well as for their education and enlightenment. Everyone would benefit from such an exchange.

– David Eisenberg & Peter Yost

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International Code Council (ICC)
www.intlcode.org

International Conference of Building Officials (ICBO)
www.icbo.org

Southern Building Code Congress International (SBCCI)
www.sbcci.org

National Fire Protection Association
www.nfpa.org

Local Code: The Constitution of a City at 42 N Latitude by Michael Sorkin, Princeton Architectural Press, 1993 *(This book presents a unique and thought-provoking approach to an integrated building and development code.)*

"Sustainability in the Buildings Industry: How ASTM Standards Are Addressing the Trend" by Ruth Heikkinen, *Standardization News*, August 2001, viewable online through a link from www.dcat.net

From the Library

LEED Reference Guide

by Paladino Consulting, June 2001. U.S. Green Building Council (USGBC), 1015 18th Street, NW, Suite 805, Washington, DC 20036; 202/828-7422, www.usgbc.org. Paperback and downloadable PDF files, 288 pages, currently available only as part of the LEED Reference Package: $400, $250 for USGBC members, $200 for LEED workshop participants.

The USGBC has just released the final edition of its *LEED™ 2.0 Reference Guide*, developed with funding support from the U.S. Department of Energy as part of a comprehensive "Reference Package" to support those seeking certification under its LEED Green Building Rating System (see *EBN* Vol. 9, No. 6). This final version replaces an "Unofficial Draft Version" of the *Reference Guide* that has been in distribution since August 2000, and it represents a major improvement. The balance of the Reference Package consists largely of materials that are either available for free from the Council Web site (the Rating System itself, the Study Guide for the LEED Accreditation Exam), or are provided in a "Welcome Packet" to those who register projects for certification (a template for completing the LEED Application and spreadsheets for calculating the various credits).

The *Reference Guide* is no longer merely a tool for those seeking to learn their way through the Rating System; it is now a valuable reference in its own right. It features overviews on the issues behind each credit and brief case studies illustrating many of the strategies. The credit descriptions are accompanied by lists of other credits with potential synergies, and the narrative includes discussion of economic implications and societal benefits of each credit. These fact-sheet-type overviews are well written and useful.

Much of the *Guide*, however, is still devoted to explaining and demonstrating the calculation methods and documentation requirements for the credits, and it does so in great detail. This aspect of the *Guide* reflects the increasing maturity of the Rating System as a whole. Errors and oversights in the implementation of credits that existed a year ago have largely been addressed—most notably with the inclusion of a new LEED Energy Modeling Protocol to address problems with the calculation methodology required by the ASHRAE 90.1 Standard. While these LEED implementation issues are steadily improving, there are still areas that will necessarily remain rough until they can be refined in future versions of the Rating System.

Green building professionals who are not currently using LEED may have a hard time justifying the cost of the *Guide*, given the other high-quality resources currently available. For those actively pursuing LEED certification, however, this text is definitely a good investment. – *NM*