Alaska Building Science News

A quarterly publication of the Alaska Building Science Network and Cooperative Extension Service

Fall 2002 ***Vol. 8, issue 1***

This publication was developed and printed through support of the Alaska Housing Finance Corporation (AHFC). The opinions, findings, and conclusions expressed in this publication are those of the author(s) and not necessarily those held by AHFC.

The *Alaska Building Science News* is a joint publication of the Alaska Building Science Network and Cooperative Extension Service, Office of the Energy Specialist. It is edited by Richard D. Seifert. Any letters, opinions and responses to the articles, should be directed to Mr. Seifert either by e-mail ffrds@uaf.edu, phone (907) 474-7201, or fax at (907) 474-5139.

Alaska Building Science News' sole purpose is to bring timely building science information to Alaskans in order to improve the quality and durability of the housing stock in Alaska as well as save energy and maintenance expenses for home owners.

We hope that ABSN Newsletter will become a mainstay in your information menu in the future. If you would like to receive ABSN's newsletter electronically, please let us know by e-mail and we will save the expense of mailing it to you, cutting the trees and using the paper. This newsletter can be found on our website @ http://www.uaf.edu/coop-ext/ faculty/seifert

WOMEN IN SOLAR ENERGY (WISE)

~ as observed by Kimberly Chancey, PE

The American Solar Energy Society Conference 2002, held this June in Reno, Nevada, was a fascinating blend of manufacturer representatives, vendors, technical designers, advocates, and policy makers. Featured as part of the conference were several activities sponsored by Women In Solar Energy (WISE).

First on the agenda was a Photovoltaics (PV) Workshop directed by Marlene Brown of Sandia National Laboratory and Laurie Stone of Solar Energy International. The design and installation workshop was geared specifically for women. Participants learned system sizing, site analysis, hardware specification, and component selection. An afternoon, hands-on session demonstrated proper use of tools and safety precautions in the construction of a solar powered fountain, which was donated to a local school. The workshop was intended to provide women with a supportive learning atmosphere, and to help overcome social, political, and economic barriers that keep some women from entering technical fields.

The PV Workshop was a resounding success. Not only were technical skills enhanced but the session also built confidence among the participants.

WISE offered a "Women in Solar Forum" featuring a panel discussion. The panel members were:

- Rose McKinney James of the Nevada Task Force on Renewable Energy and Energy Efficiency
- Vircynthia Charley, an electrician with the Navajo

INSIDE THIS ISSUE

Tribal Utility Authority (NTUA)
- Reverend Sally Bingham of Episcopal Power and Light
- Judy Neimeyer Fosdick, owner of Tierra Concrete Homes

I must admit, that being female and working as an electrical engineer for the past twenty-five years, I am sensitized to many issues facing women in typically "male dominated" professions. However, I have also developed somewhat of a "get over it" attitude. The advice I typically offer both women and men asking my opinion is that doing a good job speaks for itself and always defeats prejudice.

I entered the forum a few minutes late, noticing that the room was full of about seventy-five women and three men. Reverend Bingham was delivering the message to the group, "don't cry in professional situations." Immediately, I saw all the "you've come a long way, baby" progress evaporating. I felt an intense emotional response and thought, "Don't you think we already know that? Why are you telling that to a group of women? Wouldn't that also be fine advice to deliver to a set of professional men?" I listened to the remainder of the forum with a somewhat jaded ear. Once I was able to tame my radical feminist reactions, however, I appreciated the experience of each speaker and the interchange with the audience.

It was at the Women in Solar Energy luncheon that I truly came to understand the contribution, which the WISE organization provided. The speaker was Laurie Stone of Solar Energy International. Ms. Stone shared with us her experience of bringing solar energy to many technically undeveloped societies around the world. Her message is that one critically important aspect of offering solar energy to these communities was the profound affect that it has on improving the lives of women. In these environments, it is primarily the woman's role to care for the home and family. Many of the tasks involved are labor intensive, and are significantly affected when assisted with electric power. Making these jobs easier not only allows women to be more productive and effective, but also opens the door to progress for the life and safety of themselves and their children.

The luncheon provided a most effective networking tool when each of the participants introduced herself and described her experiences and interests in the solar field. It proved an inspiring exchange for all of the participants. I was encouraged by the variety of backgrounds and the profound interest in improving technical and social issues. I look forward to continuing association and encouragement of this group.

More information about Women In Solar Energy (WISE) can be found by contacting Marlene Brown, Sandia National Labs, P.O. Box 5800, MS 0753, Albuquerque, New Mexico 87185.

BUILDING FOR A LIFESPAN: MULTI-GENERATION HOUSING

Karla Zervos, (Lifespan Home Modifications)

As Alaskans grow older our housing needs will change significantly. More than half of U.S. residents will be over age 55 by the year 2020 according to Census Bureau projections. The multi story home, which was perfect for raising a family, will ultimately become a hazard for elderly homeowners and guests. The Americans with Disabilities Act specifications can provide guidance for private residential accessibility. However, ADA applies exclusively to public or multi-family facilities and can be costly, impractical, and ineffective when applied to houses. New construction and home modifications can meet this demographic challenge in five specific ways: attention to the site and floor plans, structure, plumbing, electrical, and cabinetry. These ways can mean the difference between aging in place or relocation to perhaps a less desirable housing situation. Having the choice to stay at home as we age can be built into our homes. Most of us want that choice (see Figure 1).

SITE and FLOOR PLANS - Residential accessibility begins with the site plan. At least one entrance should have no steps, a zero threshold doorway (meaning a perfectly flat threshold), and an overhanging cover. Grading the walkway to the door at a ratio of one-inch rise for each 12 inches of

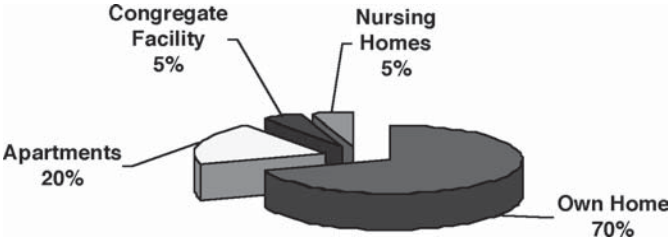

Figure 1. Senior housing preference from AARP research "Fixin' to Stay".

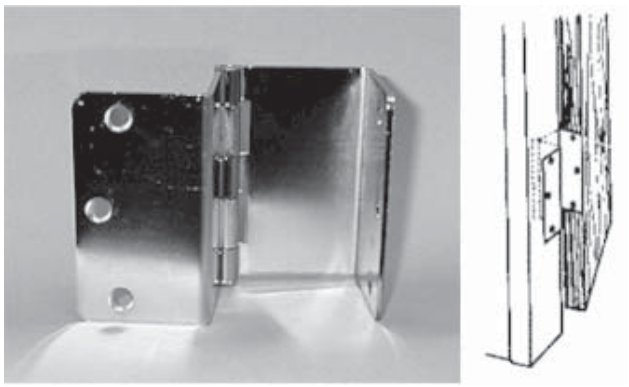

Figure 2. Offset door hinge for additional doorway space.

run is a minimum. Optimum is a one-inch rise for each 20 inches of run if the site permits. Raised edges along the walk are also recommended and can easily be accomplished with flowerbeds or other attractive landscaping. This avoids treated wood ramps and the accompanying maintenance problems created by Alaska's weather. Garage entrances can also incorporate these features. Zero threshold interiors can be accomplished by extending the logic normally applied to flooring. Start with the preferred threshold height then SUBTRACT or add the depth of floor covering(s) and sub floor materials. Concrete slabs, floor joists, plywood, and surface material thickness can be adjusted in several ways to meet at the transition between rooms or at different flooring surfaces. Front doors with a full-length window allow for additional natural light inside and improved visibility when opening the door. Casement windows beginning 36 inches from the floor can be operated or maintained with minimum effort and ensure views from seated positions. (Ed. note: Many of these suggestions of course have energy use impacts).

Floor plans should have the essential "4 on the floor" – kitchen, bathroom, living room, and bedroom located at ground level. New homes can benefit from numerous stock "accessible" floor plans available in books and on the web. The optimum hallway width is 36 to 42 inches and interior doorways should be 32 to 46 inches. Offset or "swing clear" door hinges are an inexpensive way to gain an extra 2 inches in doorways and avoid major carpentry work. (See Figure 2). Pocket doors are also a good solution for widening doorways and saving space at the same time. A five-foot turning radius is recommended as open space in each room. Stairs are the primary cause of accidents in the home and require alternatives for elderly occupants. Access to other floors of the house can be provided with stair chairs, wide tread low riser stairways, or vertical lifts, which are small residential elevators (More about lifts in the "STRUCTURE" section).

STRUCTURE – Knowing the life expectancy of building materials and products is essential to lifetime home improvement and building projects. Homeowners in their 50's planning to age in their home need to know that materials with a 25 year useful life (usually less under Alaska conditions) will mean increased maintenance, repairs, or replacement when they are in their 70's. Materials with longer life spans cost less to maintain, repair, or replace over time. Interior walls can also accommodate inexpensive adaptations later if properly framed. For example reinforcing wall studs with 2×6 blocking between the studs around tub, shower, and toilet areas allows secure grab bars to be added later without major wall demolition. Blocking in hallways, walls and on both sides of a stairway where handrails could be installed is also a good idea. Another example for multi story homes is to frame in closets stacked on top of one another on each floor. This will provide for the eventual installation of a vertical lift or residential elevator by creating a ready-made elevator shaft with the simple removal of the sub floor. (See Figure 3).

Figure 3. Two floors of stacked closets framed for future elevator shaft.

Figure 4. Modular bathroom with movable fixtures.

PLUMBING – Kitchen and bathroom sinks ideally should have flexible or slip joint drains and water lines so they can be raised or lowered to accommodate a range of users including those seated. (See Figure 4). Sink counters can be made to adjust height electronically or manually. (See "CABINETRY" section). Drains located to the rear or side are preferred over center drains because they allow more leg room under the sink for seated users. Wall mounted sinks with minimal pipe exposure are also recommended to avoid scalding and permit maximum leg room. Exposed pipes should be insulated or covered with a plate to prevent body contact and burns. Anti-scald, single-lever or electronic faucet controls are easier to adjust for temperature and volume. Toilets with adjustable height mechanisms, tall pedestal bases, and an assortment of adaptive devices are available. Tankless or in-wall toilet tanks provide scarce extra floor space in small bathrooms. Roll-in shower stalls can be created individually or within a "wet room" as well as installed as a molded unit. A removable, hand held showerhead with a minimum 5 foot hose on a slide bar accommodates people of all heights. Walk-in and soft bathtubs are also available as alternatives to conventional tubs. Anti-scald, single-lever bathtub and shower controls should be located at the opposite end from the toilet and offset so they can be easily reached without getting wet.

ELECTRICAL – Illuminated light switches located 40 to 48 inches from the floor are easiest for those with reduced vision and finger dexterity to locate and use. Stairway light switches are most useful when located at both the top and bottom of stairs. Light fixtures should be easy to keep clean and located where (long-life) bulbs can be replaced effortlessly. High watt light fixtures work best for older adults who can require three times the light to see as well as they did when they were 20. Non-glare task lighting under kitchen cabinets, around bathroom sinks, along stairways, and at other critical areas improves vision, reduces eyestrain, and prevents accidents.

Installing outlets 30 to 44 inches above the floor reduces bending and means less likelihood of tripping or unplugging appliances by pulling on cords. Extra GFCI (ground fault circuit interrupter) outlets near beds and in bath-rooms will come in

handy for future medical equipment and security devices. Switches, outlets, and other electrical controls are best located on the front of kitchen and bathroom counters so they can be reached from both seated and standing positions. The same logic applies to appliances and heating, ventilation and climate controls. For ease of maintenance, the electrical service panel should be located in a well lit, four foot square open area instead of in an inaccessible corner of the house.

CABINETRY – Countertops with contoured, color-contrasted edges are safer, limit spills, and make the edge more visible. Varying the heights of kitchen and bathroom countertops improves leverage and makes precise work possible for people of different sizes and abilities. Assorted pullout and fixed work surfaces at different heights achieve this goal. Pullout surfaces next to ovens provide a place to set heavy hot cookware. As mentioned in the earlier "PLUMBING" section adjustable sink counters prevent stooping or stretching to reach the water. Flexibly plumbed sinks and wired countertops can be moved either electronically or manually. Front mounted electric control systems are available for sinks and cooktops. Installing counters on reinforced wall brackets like those used for shelving is less convenient but still flexible. Counters and sinks attached to the arms of the shelving system can then be moved by hand to the preferred height. Open, under-counter leg room space at least 30 inches from the floor makes working from a stool or chair easier. Removable wheel mounted cabinet bases can be stored underneath counters and also double as rolling carts to transport food or other heavy items in both kitchen and bathrooms. Full extension drawers and cabinet shelving, sturdy Lazy Susans, and full-length rolling pantry shelves bring items within reach. Opening cabinets and drawers is easier for persons with arthritis or limited grasping ability if the handles are in a looped D shape. Magnetic push and release cabinet doors are even better because they eliminate the need for handles. Adjustable shelves, closet rods, and storage devices should be installed whenever possible.

These recommendations have been consolidated from experience and numerous sources on adapting houses specifically for the elderly. However, in the real world, the reasoning for a specification is often more valuable than the numbers. Compromise on the job site is inevitable and knowing WHY compromise is required will result in the best modification.

The price of these type modifications can range from no additional cost to costly. A number of federal, state and local agencies and non-profit organizations provide funding and assistance for modifications for low income and special needs groups. Reverse mortgages and long-term health care policies are also sources of funding for middle-income households not qualified for financial assistance. Homeowners can research many publications for their own options or contact specialists in senior housing modifications.

Building professionals wanting to develop expertise in this field can find extensive resources at:

— National Association of Home Builders' (NAHB) Senior Housing Council emphasizes new construction and also provides different Certified Seniors' Housing Specialist training www.build4boomers.org/

— American Association of Retired Persons www.aarp.org keywords "home modification" and "universal design".

— North Carolina State University Center for Universal Design School www.ncsu.edu/www/ncsu/design/sod5/cud/

— Center for Inclusive Design & Environmental Access School of Architecture and Planning-University at Buffalo New York www.ap.buffalo.edu/idea

— Abledata www.abledata.com keyword "architecture".

— Alaska Housing Finance Corporation Senior Housing division offered Alaskans home modifications training in May 2001 and may be a regular source of other training opportunities.

PERSIST CONSTRUCTION SYSTEMS USED IN ALASKA THIS YEAR

Most everyone in the building industry now knows that mold and moisture in walls, attics, and crawlspaces is an increasing problem in Alaska. The more we look, the more we find. One of the more radical ways some builders have decided to deal with this is by adapting a new Canadian originated building system called PERSIST. PERSIST was developed the National Research Council of Canada in the 1960s.

PERSIST is actually an acronym for Pressure- Equalized Rain Screen Insulated Structure Technique. The accompanying photos to this article will make it a bit more clear what this means. The PERSIST system tends to put everything that can decay (with wood rot for example or any structural members made out of wood) inside a vapor screen. Then the entire structural shell is insulated from the outside so that everything is kept warm and dry that might otherwise rot. This of course, leads to empty stud cavities. But it also means that the structural shell of the building can return to 2×4 studs, since they are structurally adequate. The stud bays are not thoroughly insulated. Because we live in the extreme climate of Interior Alaska, local builder, Jack Hébert (Taiga Woodcraft Construction Company), has used batt fiberglass in the empty stud walls inside and 4 inches of stryofoam insulation to ensure an adequate insulation shell for these buildings. The styrofoam is however fixed to the outside of the structural wall and sheathing.

Once the building is framed and sheathed with plywood or mostly now with OSB, all of the wall sheathing is covered with a peal and stick rubberized asphalt membrane, such as the Grace Ice and Water Shield® or, as Hébert now prefers, bituthene. This membrane serves as both the air barrier and the vapor barrier, and as a drainage barrier for water that might penetrate the skin. However in Interior Alaska where we typically only have about 10 inches of precipitation, a stucco shell which is rain shedding, probably prevents any significant moisture penetration into the wall system. Large overhangs will also help in this regard. Most builders choose to install the rigid foam in two layers with staggered joints and that is also the standard practice in the Alaskan examples we show in the photographs (see Figures 5-7).

The PERSIST system has also been recently featured in a July 2002 article in *Energy Design Update*. In that article the PERSIST system is characterized as an elegant system with these advantages:

- air leakage is extremely low.
- it's less expensive; 2×4 studs can be used instead of 2 by 6s.
- the air barrier and vapor barrier are installed in a single step. Installing the air barrier outside the sheathing is far simpler than creating an airtight layer of polyethylene or drywall, since there are no problems with intersecting partitions. Complicated roof shapes with multiple dormers and valleys and cathedral ceilings are easily accommodated without hard-to-detail air barrier systems.
- since the structure and sheathing are insulated, they stay warm. Cold surfaces where condensation might form have been eliminated by keeping them insulated and warm inside the waterproof air barrier. If there are any imperfections in the membrane insulation resulting condensation simply drains away.
- since the rubberized membrane is such an effective barrier, PERSIST works well for high humidity rooms, like indoor swimming pools or greenhouses where other methods depend on meticulous detailing. This system can easily be adapted with the well-known advantages of cold roof construction and rain screen siding installation, an issue very important in Southeast Alaska.
- polyethylene under the drywall is eliminated in this system.
- wiring and plumbing in exterior walls is easy and unhindered by insulation. There's no need to worry about electrical outlets penetrating the air barrier.
- finally the plumbing and electrical rough-in can begin as soon as the self-adhering membrane is installed.

Figure 5. Foundation damp-proofing over ICF (insulated concrete form) system used by Jack Hébert in construction of his latest PERSIST type of home construction. In this case, the below-grade water/damp-proofing is bituthene, which is very self-adhesive and a very good practical choice.

Figure 7. Roofed PERSIST home which used Grace Ice and Water Shield® as the air-vapor retarder on the exterior skin. Hébert prefers bituthene now, as its adhesion and application simplicity are both superior to Grace Ice and Water Shield®. This photo shows the structure relatively complete, with only the 4 inches of exterior expanded polystyrene insulation and stucco finish to be added.

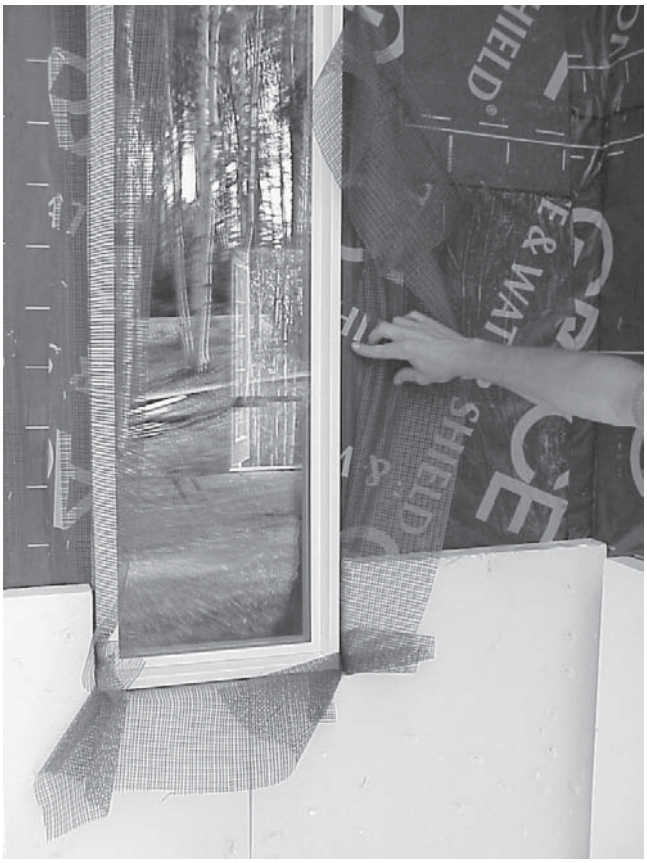

Figure 6. A window detail in a PERSIST home. PVC windows are flashed and sealed to the structural exterior sheathing. The mesh is a base for applying a final exterior finish of stucco.

Next let's look at some of the window details. As you can see in Figure 6, a PERSIST window detail can be framed on the outside of the window opening and needs to be very well sealed and flashed in the window opening. A sheath of plastic mesh base, to be used as an application surface for the finish coat of stucco, was used in the system employed by Jack Hébert. Due to the thickness of the rigid foam, windows in a PERSIST home are usually set further back from the plane of the siding than they would be in a typical building. Because of the way the PERSIST system is insulated, the window is mounted toward the inside and the bulk of the window frame sees the interior heat, and thus the window is at a more constant temperature year round. It is unwise to extend the window farther to the exterior because then you increase the water leakage potential. Jack Hébert is quoted in the *Energy Design Update* article noting another

advantage of recessing the windows on a PERSIST house, "It creates a pocket where you don't get as much wind across the face of the window."

Marquam George, another ABSN member and builder from Southeast Alaska, is also quoted in the *Energy Design Update* article. He's building two PERSIST homes with windows located conventionally in the same plane as the siding. Marquam admits that pulling the windows out away from the plane of the membrane introduces flashing complications. He intends to install his windows on "packed-out" frames assembled from 2×2s and rigid foam strips and then install the wall membrane so that it folds out over the window shims on to the window nailing flanges.

Another question for builders in Interior Alaska is how thick should the foam be? Hébert has decided on 4 inches of foam on the exterior with some additional fiberglass batting loosely installed in the interior framing. By installing it loosely, you get some additional advantage of insulation without increasing the potential for condensation at the vapor barrier surface.

In Canada, the system is typically installed with as little as 2 inches of rigid foam wall insulation. The editor agrees with Hébert and his choice to use at least 4 inches of exterior insulation. Jack has also used conventional attics insulated with R60 blown cellulose over flat ceilings. He uses PERSIST walls with 4 inches of polystyrene foam mechanically fastened to the studs with 6 inch windlock screws. Perhaps the most stellar feature of performance expectation for the PERSIST home is the high level of airtightness. PERSIST homes are often so airtight that they are nearly impossible to test with a blower door. They just don't want to be depressurized to 50 pascals.

Chris Makepeace, a certified engineering technologist at Alberta Infrastructure in Edmonton, Alberta and a proponent of PERSIST construction, is quoted as follows: "In one of the houses that we tested with a blower door, the place with the most air leakage was between the slab and the grade beam where the air had to travel through three feet of soil." That's a pretty strong advocacy statement.

Finally, there are some concerns expressed in the *Energy Design Update**article, which I think are eliminated in Hébert's case because they are mostly attributed to increased cost due to the type of roofing that is advocated in Canada. They attribute $2,500 worth of additional costs to this system, which in comparison to standard systems in Alaska is not nearly as valid. It remains to be seen how all this costs out and I hope Jack Hébert will be able to pass that information on to us as we watch this new system come into the main stream in Alaska.

Most of the defense of any higher costs are based on the fact that these homes will eliminate the potential rot caused by water intrusion. That's certainly a substantial advantage and it's hard to believe that wouldn't be a certifiable outcome of this type of construction. Makepeace also says these new homes all have problems when it starts getting fancy and you build for higher end custom homes. There are more corners and dormers and features of an architectural complexity such that you are going to see problems with water management on the exterior. But this seems to be an interesting idea even though the first time you see it, it's rather shocking to see the vapor barrier installed in the exterior of the framing!

Our photos are annotated with further details. Jack Hébert can be contacted at the website: www.cchrc.org

_____

*ENERGY DESIGN UPDATE, (2002) PERSIST Construction for Wood-Frame Homes, pages 3-6, Vol. 22, No. 7, July.

ARSENIC IN WOOD UNLIKELY TO BE THREAT

This article from the *Atlanta Constitution* was sent to me by Scott Reed, Forestry Extension Specialist at Oregon State University. Recently some Alaskans had been questioning the use of copper arsenate treated wood products, concerned about whether they were a possible carcinogen and shouldn't be used for raised bed gardens or root cellars. It appears that these concerns are unwarranted. In any case, if doubts persist, we

advise lining wood boxes made of treated wood, or root cellars with polyethylene, to prevent any possible leaching of arsenates into the soil or growing medium.

Published in the *Atlanta Constitution*

Arsenic in wood no threat, panel says (Associated Press, Friday, August 9, 2002)

Miami — Arsenic-treated wood used in playgrounds and backyard furniture does not pose a health risk to people, according to a panel of doctors appointed by the Florida Department of Health.

Their conclusion comes six months after a U.S. Environmental Protection Agency agreement to end the use of chromated copper arsenate by December 2003 in almost all the lumber used for residential projects. The chemical is a powerful pesticide used to protect lumber from decay and insect damage.

Tests have shown that the chemical can leach from wood into soil. Arsenic causes cancer in people.

But after a yearlong review of studies on the chemical, the Florida Physicians Arsenic Workgroup concluded Tuesday that children can safely play on playground equipment made with the wood.

The panel of six physicians said the amount of arsenic that can be absorbed from playground soil and CCA-treated wood ''is not significant compared to natural sources and will not result in detectable arsenic intake.''

The level ''does not appear sufficient to adversely affect the health of children or adults,'' the group said.

The physicians, including the chief epidemiologist at the state Department of Health, said that CCA-treated wood has been used since the 1960s and has never been linked to skin diseases or cancer in children exposed during recreational use.

The EPA is conducting its own evaluation of the risks of the pesticide. Officials expect that report to be completed sometime next year.

ABSN ANNUAL MEETING IN SEWARD

Presentation by Terry Brennan
Review courtesy of Jack Schmid

This year's Alaska Building Science Network annual meeting featured a daylong course on indoor air quality (IAQ) issues taught by Terry Brennan, a well-known national expert. Terry gave a stellar seminar on a very rainy July day in Seward, Alaska. Terry's easy and humorous style is always welcome in our educational events and some 30 people took the course at the Avtech Center.

Our office at the Cooperative Extension Service receives a great deal of mold related and other indoor air related questions, so the issue of how to determine what we know about, for instance, volatile organic chemical loads (including molds) in buildings was much needed. These volatiles are often caused by liquids, paints, and offgassing from these products shortly after they are applied. When a coating is used to reduce offgassing all surfaces need to be coated, not only the visible surfaces.

For those of us answering public inquiries, a vexing question is, "How do we test or should we even test for odor-related issues in houses?" Some people are more sensitive than others. We should strive to use those people who are more sensitive as harbingers. When responding to public questions, ask who is complaining the most about odor-related issues in the house.

The test that Terry recommends to identify a problem source is to place a small sample of the problem material, like a paint chip or a piece of carpet, or the compound that is suspicious in a canning jar. Close the jar with a lid for 10 to 15 minutes. Then the person who complained waft the sample by waving the hand across the top of the open jar to smell it. Be cautious when you are doing this! Sensitive people can be easily overexposed. This is a detailed strategy that we haven't recommended previously, but it certainly has positive aspects and could work for mold too.

Terry provided a technique for solving and analyzing problems, a problem-solving concept called the

IAQ triangle. Essentially three things are required for an indoor air quality problem to exist: first you need a susceptible occupant, second, you need a source, and third, you need a transport mechanism. Removing any one of the three above should eliminate the problem. This strategy is similar to how we approach radon problems. Most of these problems can be solved by inspection because you can do an inventory of the possible sources and an inventory of the transport mechanisms and usually can discern what the problem is, and how to solve it.

Another really beneficial aspect of Terry's presentation was his discussion of making contaminant measurements. Often when we get phone calls from individuals, we are asked to recommend a test to discern what type of mold, for instance, the complaining person has in their home. It's very expensive to make these contaminant measurements and very difficult and expensive to defensively interpret those measurements. Terry reiterated that it is unwise to use measurements to determine what problems are present in a home. Measurements are a poor way to spend money and they are a poor way to solve the problem.

All IAQ problems are ultimately solved by the people in the buildings. Often you have to determine what are the barriers to people taking care of their problems. Sometimes there is an emotional/psychological barrier, especially in work places. Sometimes there is simply an educational barrier. By experience, we have established in many situations that pollutant concentrations are often higher indoors than outdoors and "personal exposure can be 1.5 to 7 times more than the ambient concentrations". This is a direct quote from EPA literature.

So how might we prevent IAQ problems in homes? Terry recommends these six necessary steps:

- Understand and educate people.
- Keep the building dry, clean and pest free.
- Reduce potential sources. Don't use materials that you know are sources of volatile organic compounds (VOCs) and other harmful off-gassing materials.
- Provide exhaust ventilation for unavoidable stationary sources, such as bathrooms, hot tubs, pools, and major water sources.
- Provide dilution ventilation for unavoidable mobile or large area sources.
- The building science solution is to reduce unplanned airflows. This is the tried and true argument of making the building airtight so that airflows can be controlled.

Terry made a special effort to talk about the crawl space as A HAZARDOUS DISPOSAL SITE. We should always treat the crawl space accordingly. Wear protective clothing and a respirator to reduce the risk of dermal contact and breathing in pollutants when entering a crawlspace.

Terry also made some detailed observations that are difficult to relate in a short article. He talked about the moisture content of wood as a good average indicator of the relative humidity in a space of interest. Particularly this would be true on the underside of a floor over a crawl space. He made a very interesting observation about the use of a "track off" mat at the entry of a home, to clean shoes or take off shoes at the entry. The Japanese tradition of removing the shoes as we enter a home is catching on in Alaska and it is clearly well founded and good indoor hygiene, and prevents tracked-in dirt. We'd do well to make it easier to avoid tracking in dirt. The use of a mudroom in a design is a very wise option.

Figure 8. Scott Waterman (right) chats with ABSN Guest and IAQ expert Terry Brennan at the annual meeting and daylong seminar sponsored by the Alaskan Building Science Network, July 26th and 27th, 2002 in Seward, Alaska.

Figure 9. ABSN members and guests at the annual meeting. Shown left to right are Fina Schlosser (AHFC), back of John Woodward, Craig Moore, Conrad Zipperian, Geoff Feiler, Gorden Isaacs, Scott Waterman (AHFC). At the meeting new board officers for the next year were elected. The officers are: Conrad Zipperian, president; Phil Kaluza, vice-president; Craig Moore, secretary; and Dan Berube, Treasurer. New board members John Woodward and Cheryl Yates of the Alaska Lung Association were heartily welcomed to their new roles.

MAKING YOUR HOME "FIREWISE"

With the annual fire season in Alaska fresh in our minds, this wide-ranging information piece about wildfire protection and safety is always timely. This is from Ken Tremblay (Colorado State University) and includes a list of websites for those of you dealing with fire-related concerns.

Is your Home Protected from Wildfire Disaster? A Homeowner's Guide to Wildfire Retrofit is available as a PDF from the Institute for Business and Home Safety (www.ibhs.org). This 20 page publication considers risk factors, landscaping and building materials, and includes a wildfire protection checklist. For business owners, the site contains *Open for Business* that includes developing a strategic plan for wildfires and a number of checklists. There is also *Rebuild the Right Way After Wildfires*.

How to Make Your Home Fire Safe from the California Department of Forestry and Fire Protection (www.fire.ca.gov) is a two pager with a checklist for inside and outside the home.

Making Your Home Firewise (www.firewise.org) has suggestions for fireproofing the home and the area surrounding it. There is a walk through videostream at the site. It also has the *Firewise Construction Checklist*.

The U.S. Fire Administration has the one page *Rural Fire Prevention Checklist* (www.usfa.fema. gov) and a 16 page publication *After the Fire* that discusses how to return to normal after a fire such as the first 24 hours, insurance, valuing property, important records, and salvaging clothing, food, rugs and furniture.

The Federal Emergency Management Agency (www.fema.org) has several publications, including *Avoiding Wildfire Damage* and *Factsheet: Wildland Fires* that includes ideas regarding what homeowners should do before, during and after a fire.

The National Endowment for Financial Education (www.nefe.org) has *Are You Prepared Financially to Survive a Natural Disaster?*

The American Red Cross (www.redcross.org) has *Returning Home After a Disaster* and *Recovering Financially After a Disaster* that covers inventory, notifying creditors and employers, insurance claims, loans and grants, and tax credits.

The U.S. Safety and Inspection Service has *Keeping Food Safe During an Emergency* (www.fsis.usda.gov) that recommends what food to keep and what to discard.

CSU Cooperative Extension and Forest Service (www.ext.colostate.edu) has *Creating Wildfire-Defensible Zones*, *Forest Home Fire Safety*, *Vegetative Recovery After Wildfire* and *Soil Erosion Control After Wildfire*.

CALENDAR OF EVENTS

17th - 19th September 2002. Reliable and Affordable Energy for Rural Alaska Conference, Fairbanks. See website for further details: www.uaf.edu/adtdl

28th September, 9am to 5pm. Cold Climate Homebuilding Course for Wasilla-Palmer. Call 1(800)478-8324 for location and to reserve a place.

October 2002 is National Indoor Air Quality Awareness Month.

15th and 17th October, 6 to 9pm both nights. Introduction to Solar Energy Course, Community Schools program, six-hour curriculum hopefully utilizing the new *Alaska Solar Design Manual**, second edition as a text. Ryan Middle School, Fairbanks.

19th October, 9am to 5pm. Fairbanks Cold Climate Homebuilding Workshop fall course. Location to be determined. Watch for local ads and check our website: www.uaf.edu/coop-ext/ faculty/seifert.

23rd - 26th October. American Association of Housing Educators 2002 Annual Conference, "Housing and Community". Radisson Metrodome, Minneapolis, Minnesota.

27th - 30th October. The 2002 International Radon Symposium "Radon Professionals - Saving Lives", Reno, Nevada.

31st October - 2nd November. 2002 Alaska State Homebuilders Convention, Juneau, Baranof Hotel. November 1st and 2nd are devoted to educational classes. Information at: www.hbajuneau.com or call 907-463-5774.

Workshop Schedule for Alaska Building Science Network

Call ABSN @ 1(800) 563-9927 or (907) 562-9927, or e-mail: absn@alaska.net for information.

a solar design manual FOR ALASKA

by

RICHARD D. SEIFERT

PUBLICATION OF

COOPERATIVE EXTENSION SERVICE
University of Alaska
Fairbanks, Alaska 99775

The new updated 2nd edition of *A SOLAR DESIGN MANUAL FOR ALASKA*, is in final edit and should be available on the web in late September at www.alaskasun.org, as a downloadable pdf, and will also be available in print for cost of production. Stay tuned for release information.

Special thanks for editing and assistance on this issue goes to Colin McClung and Becky Kirchner. You polish until we shine!