Miscellany

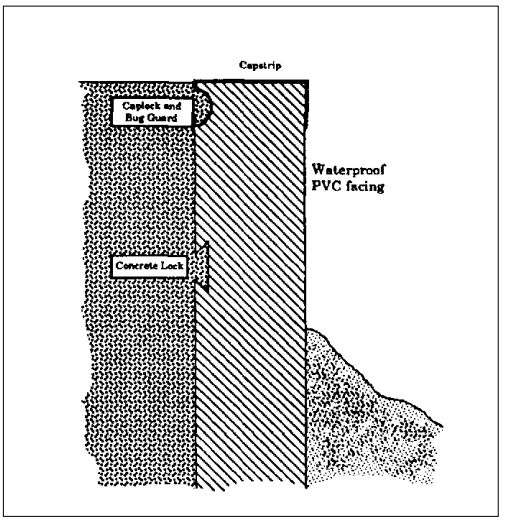
One-Step Foundation Insulation Introduced

To insulate a foundation on the exterior normally involves many steps. After the forms are stripped, the foam insulation must be cut, fit, and fastened either mechanically or with an approved glue. Then — if the material survives the beating it usually takes during construction and backfilling — it must be covered and flashed to protect it from the weather, ultraviolet light, and physical damage.

But a new product from Gentrex Corporation promises to change all that. The core, Dow Styrofoam SM, is covered with a special PVC facing, and functions both as the concrete form, and the perimeter insulation material. With System 150, you dig the trench, install the insulated concrete forms and pour the concrete. And that's all. According to the company, you can start framing as soon as the concrete is firm enough to walk on. The inner face of the form has a dovetailed groove so that the concrete and form "lock" together, once the concrete is set.

If the system works as claimed, it should save time and money over conventional methods. It should also save energy — the system has an R-Value of 7.5. In addition, its manufacturer claims the system can be used to waterproof basements, and that its built-in "bug guard" will keep termites out. The system's outer PVC facing protects the foam insulation from damage. You can leave the facing as is, or you can paint it, stucco it, or brick over it. It comes with capstrip, connection joints, and corner joints made of exterior-grade rigid PVC — so joints and corners are neat.

According to Gentrex, you can save money overall using the system, when compared to standard forming plus insulation added later. The net cost per linear foot of the Gentrex product is $8.09 according to the manufacturer, as opposed to $9.76 for the conventional system. For more information about the product contact Gentrex at 104 East Avenue K-4, Suite B, Lancaster, CA 93535; or call 800/426-8394 (outside Calif.); 800/426-8394 (in Calif.). ■



This cross-section of Gentrex's System 150 shows several features of the innovative forming system. Note the concrete locks on the back of the form and the screed cap. The wet concrete enters the locks and permanently attaches the foam form to the foundation.

Make sense to you? It does to us, but unfortunately the company that used to make this two-wheeler has gone out of business. a two-wheel wheelbarrow may look odd at first, but users say it provides more stability for heavy loads.

A Wheelbarrow is a Wheelbarrow is a Wheelbarrow…

Not all wheelbarrows are the same. Here are some tips for finding a wheelbarrow that will last longer, and not wear you down:

- Plastic trays are lighter, do not rust, do not dent, and are easy to clean. They also cost more, usually about $20. Some say, however, that plastic is not stiff enough to hold the concrete without bulging.
- If you choose a steel tray, choose the seamless steel type made of 16- or 17-gauge steel with a steel rod or wire rolled into the lip of the tray for reinforcement. They cost the same as the old-fashioned type, but don't have seams and corners to catch tools on.
- Whether the tray is plastic or steel, make sure it has a rounded nose for more controlled pouring. And check the bolt heads that fasten the tray to the undercarriage to see if shovels will catch on them.
- Typically, wheelbarrows for contractors should have trays with heaped load capacities from 4 1/2 to 6 cubic feet.
- One-piece wood handles are preferred, but steel handles are available if fire resistance is necessary. However the steel type costs more, rusts, and its paint chips off. They also don't have the comfortable feeling of wood. If you do get wood, make sure it's hardwood. Legs should be heavy-gauge steel, connected by wide crossbars. And steel pads fastened to the bottoms of the legs can help reduce wear on the legs. The front of the tray should be supported by steel braces, and the steel nosepiece must be strong enough to carry the load when the tray is tipped.
- If you are handling very heavy loads, which you are if you are working with concrete, a wheelbarrow with two wheels will provide more stability, allow fewer spills, and make pushing easier.
- Whether the wheelbarrow has one wheel or two, make sure every wheel has ball bearings and — if you can trust yourself or your crew to grease the bearing regularly — pick a wheelbarrow with wheels that have grease fittings for this purpose.
- Several types of tires are available: tubeless, tires with tubes, 2-ply, 4-ply foam-filled, and solid rubber. Tubeless are less expensive but harder to repair. Wheelbarrow tires typically have small ribbed treads, but there are 4-ply tires with deep knobby treads that provide better puncture resistance. Foam-filled tires, which won't leak, go flat, or change with temperature, can be used in remote places where air is not readily available. And solid rubber tires, designed for use in steel mills, can lose chunks of rubber, and keep on working.
- Finally, no matter which species of wheelbarrow you go for, make sure you test drive it. Fill it with concrete, sand, or gravel, and see how it handles. Check to make sure most of the load rides on the wheel not on your arms. Excerpted from *Concrete Construction*, 426 South Westgate, Addison, IL 60101; 312/543-0870. ■

If pushing a manual model seems like too much work, you may want to check out the motorized wheelbarrows available. The Lil' Hustler pictured above can carry and dump over 1,200 lbs. It features a 5 to 7 horsepower engine to drive the wheels and a simple release mechanism for easy dumping. For more information, contact LCS Technologies, 10942 Tacoma Ave., Cleveland, OH 44108; 216/421-2062. Another company, WheelBurro, offers a wheelbarrow with less horsepower, but with the appeal of interchangeable trays (a flatbed, and a dumpbed). For information, contact HP WheelBurroCo., 8791 Bluejay Lane, Salt Lake City, UT 84121; or call 801/943-0152.

Office Space Glut Predicted

Office space construction activity over the next ten years needs to average about half of the actual construction in the last ten, according to a recent report written by David L. Birch. Birch, director of the Program on Neighborhood and Regional Change at the Massachusetts Institute of Technology (MIT), says that this construction cutback is necessary to establish a healthy 6-percent vacancy rate.

In the study, Birch has forecast a decreasing need for new office space after examining the recent experiences of 7.2 million businesses, estimating their growth and translating that growth into office terms.

Birch warns that continued speculation on unneeded buildings will produce a worse glut than the one that existed in 1985. "Vacancy rates as high as 35 percent and 40 percent-or worse-could result," he added. The report estimates, for example, that by continuing to build unneeded space at the current rate, Phoenix would end up skyrocketing to a 46 percent vacancy rate on its primary office market in 1995. Denver would stand at 27 percent, Dallas at 28 percent, Houston at 34 percent, and Austin at 36 percent. As these numbers indicate, the need to curb construction rates will not be evenly distributed across the country. If overbuilding continues at 1975 to 1985 levels, the report projects vacancy rates of 12.4 percent and 12.3 percent in the New England and Mid-Atlantic regions, respectively, but as much as 33.7 percent in the Mountain region.

"Clearly, the speculative fever of the past 10 years must cool down if the investors who fueled it are to avoid significant losses on these investments," Birch said.

To order "America's Office Needs: 1985-1995," contact Arthur Anderson & Co., co-sponsor for the report, at 69 West Washington St., Suite 2143, Chicago, IL 60602. ■

Study Profiles U.S. Architects

U.S. architecture is dominated by small firms, according to the most comprehensive study ever conducted by the American Institute of Architects (AIA). Some 29 percent of AIA's 15,000 member-owned firms are sole practitioners. Another 33 percent have only one to four employees; and 22 percent have five to nine.

The average revenue of an AIA firm was $381,000 in 1986. Of the $7.3 billion collected that year in architectural fees, architects kept $5.5 billion and passed along the rest to consultants, primarily engineers.

Architects bid competitively on only 25 percent of the work they obtained. The rest was taken on the basis of a negotiated bid with a client who had already selected them. Most architects (35 percent) worked for a fixed fee; 22 percent took a percentage of construction costs; and 21 percent worked for an hourly fee.

The largest share of revenue (16 percent) came from office design; 12 percent was from educational institutions, followed by health care, multifamily housing, commercial interiors, retail, and single-family housing — each of which accounted for 8 to 10 percent. Among one-person firms, however, single-family housing accounted for a third of revenues.

Salaries, too, varied depending on the size of the firm. Sole practitioners earned on average about $41,000 in 1986, while principals of large firms earned over $88,000.

Liability insurance ate up almost 6 percent of a firm's annual gross revenues. Only 51 percent of firms, however, have liability insurance. Many of the smaller firms have "gone bare." One reason is that liability insurance costs smaller firms almost four times that of larger firms as a percentage of revenue. Interestingly, 16 percent of firms with insurance had claims filed against them in 1986, compared to only 5 percent for architects without insurance.

The full study is available for $195 from the AIA Bookstore, 1735 New York Ave., Washington, D.C. 20006. ■

College Boom for Builders

While housing starts are beginning to slow down in some parts of the country, college towns are experiencing unprecedented housing construction booms.

As unlikely as it may seem, the cause of the boom is not a growing student population, but the exploding population of American retirees. Retirees by the thousands are now eschewing the sedentary life of traditional retirement villages in the U.S. South and Southwest in favor of the more active cultural environment of college and university communities. Towns such as Eugene, Ore.; Madison, Wisc.; Bloomington, Ind.; Amherst and Williamstown, Mass.; Bennington and Burlington, Vt.; Hanover, N.H., and dozens of others are all feeling the effect.

The price of housing in these college towns is being driven up by the retirees, who tend to be wealthier, more cosmopolitan men and women, who have found their old suburban communities too sterile once their children have left and nearby cities too costly. College and university towns offer retirees all the cultural advantages of major cities — at a fraction of the cost. Housing, parking, food and clothing, and other costs of living are also far lower than in major cities, and such communities generally boast a stable, middle-class population, low crime rates, and excellent medical care.

Builders and developers in these areas are experiencing the benefits of this trend. A few minutes from the campus of Pennsylvania State University, developers are putting up two continuing-care retirement villages and 400 town-house and low-rise apartment condominium complexes for retirees. In Amherst, Mass., a developer is putting up 50 semi-detached two and three-bedroom homes ranging in price from $143,000 to $188,000. Older faculty members — mostly "empty nesters" — from nearby colleges have already bought some of the units after selling their homes.

Some of these college-town developments make direct connections between the campus and the retiree. Bermuda Village, located seven miles from Wake Forest University, N.C. has 168 condominium apartments, and offers projects such as "adopt a student nights," in which retirees act as hosts for out-of-state and foreign students. In another program, retired attorneys serve as jurors in mock trials at the law school. In nearby Durham, N.C., the Duke Institute for Learning and Retirement offers a special program for people 50 or older. A $95 annual fee entitles members to take any of the 30 special courses at Duke University, use the swimming pool, audit courses at special rates, and receive discounts for cultural events.

The trend is not without negative effects. Younger and less affluent consumers are having a harder time finding affordable housing in college towns. Despite that, Dartmouth President James O. Freedman believes that the trend "speaks well for the change in the sense of values of some Americans, considering it was only recently that retirement to the golf courses of Sarasota and Scottsdale had been considered to be the ideal." ■

— Harlow Unger

Shallow Foundations Promoted

The old dictum, "Build on footings below the frost line," no longer applies — at least not in Norway, Sweden, and Finland, where over 70 percent of the houses and light-commercial buildings are now built on slabs with shallow footings.

The shallow foundation systems save from $1,000 to $1,500 per home compared with a conventional slab, according to Dick Morris of the NAHB National Research Corp., which has studied the new systems for a couple of years now.

There are several variations, but all are based on using foam insulation to keep frost from penetrating below the thickened slab edge or shallow footing. The heat used to keep the soil from freezing can come from inside the house or from the earth, itself.

One type of system relies primarily on heat from the house to keep the sub-soil frost-free. In Norway, the code requires that these buildings be kept at 65°F, except for one three-week period each winter when it can be set back to 41°F (for the family vacation). In this configuration, the foam goes down the shallow stem wall, and out slightly beyond the edge of the slab. Although insulation on the outside of the wall is more effective, it is more prone to damage. So it is usually put on the inside. (See illustration).

Other designs work off heat from the ground and can be used for unheated buildings such as garages. Here the insulation goes under the foundation and footings. In colder climates, the insulation must be thicker and must go on the outside of the foundation as well. Because the foundation bears on the foam in many of the designs, high-density foam such as extruded polystyrene must be used.

All shallow foundations must be well drained. All require a 4-inch gravel layer under the slab and walls. Some use drains as well, but this is not commonly done in Scandinavia.

Over the past 30 years, over a million buildings have been built this way, according to Morris of NAHB. The first major residential development was 1,100 homes built in Oslo, Norway in 1970. The few problems that have occurred have been blamed on errors made by individual designers or contractors.

In Finland, last winter was the worst in 100 years — a lot of rain in December to wet the soil followed by a protracted spell of -30°F. Fewer than one percent of the foundations had problems, according to Morris. And these were mostly due to frost adhering to the outside of the foundation and lifting. From now on, a thin layer of foam will go on the outside to prevent this problem by acting as an isolation joint.

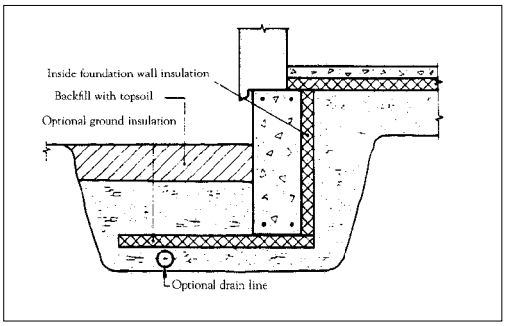
Shallow foundations similar to the Scandinavian designs were introduced to Canada in 1967, when J.J. Hamilton at the National Research Council of Canada demonstrated how slab edge and horizontal perimeter insulation could prevent frost heave in a heated building. In Canada today, where basement construction remains prevalent, shallow foundations are used most frequently in garages and walk-out basements.

But the technique may have difficulty winning the approval of code inspectors in the U.S. Although the BOCA code permits non-standard foundations "otherwise protected from frost," it doesn't specify what is acceptable. That leaves it up to local officials, who may not be open to above-frost-line footings.

If the concept does win the favor of the code inspector, it could save builders money. If a shallow foundation were allowable in Pittsburgh, for example, where the frost line is at 3 feet, the builder could save three courses of block — or an estimated $720, according to NAHB. In Boston, where the frost line is 48 inches, a builder would save five courses or $1,200, plus the cost of the extra excavation.

The Norwegian foundation design manual has been translated and edited by Morris. The manual is available for $10 from the NAHB National Research Center, 400 Prince Georges Center Boulevard, Upper Marlboro, MD 20772-8731; 301/249-4000.

Dow Chemical is also promoting the concept and claims to have patented their version of the technique. For information on the Dow system, contact Linda Druskins, Dow Chemical, 2020 Dow Center, Midland, MI 48640; 517/637-9180. ■



Over 70 percent of the houses and light-commercial buildings in Norway, Sweden, and Denmark are now built on slabs with shallow footings (left), according to NAHB researcher Dick Morris, who recently toured the Scandinavian countries. In Norway, the insulation usually goes on the inside of the frost wall (diagram above), where it needs no protective coating.

Builders Can Warranty Against Expansive Soil Damage

More than two-thirds of the nation's land contains some sort of active soil condition. (See "Know Thy Dirt" in "Failed Footings and Buckled Walls," this issue, for a map showing locations of this type of soil.) Expansive soil changes its volume markedly with varying moisture content and the result can be structural damage. According to a report by Home Buyers Warranty Program, damage due to expansive soil amounts to $2.5 billion each year. Home Buyers is one of the two major warranty programs that builders are using to protect themselves from claims due to this type of damage. The other is Home Owners Warranty (most widely known as HOW).

In some states where soil problems are prevalent, builders are now required by law to offer some type of protection. Both New Jersey and Montgomery County, Maryland mandate builder enrollment in state- or county-approved insurance programs, and builders are required to warranty against structural damage for all new homes. Some states have implied-warranty laws, such as Texas, but do not require they be insurance-backed. But even when laws are not in place, builders are turning to these two programs.

According to Janice Butler, a representative of Home Buyers Warranty, a warranty against expansive soil damage can save money. Her firm reports that the average cost of a claim for structural damage due to expansive soil in active-soil states is $5,000. In states without active soil, the average cost is an estimated $3,500. The average cost to the builder for a Home Buyer's Warranty is $1.55 per $1,000 value of the home. For a $100,000 home, the cost for 10 years' protection would be $155. There's another benefit to the builder. Tim Ealey (a contractor from Providence, Rhode Island) has been involved with the Home Buyers program since 1980, and says "it's a great marketing tool."

But to participate in these warranty programs, the builder needs to meet strict standards. The Home Owners Warranty program (HOW) for example, requires references from several homeowners and suppliers, as well as other credentials — and a $200 non-refundable fee. And Home Buyers Warranty reports that only 33 percent of builders who apply for their warranty program are accepted without special conditions.

Home Buyers Warranty has just come out with a 15-year warranty. In addition, its warranty coverage starts from the day of closing. Home Owner's warranty is for 10 years, and is limited during the first two years after the home is built. For more information about Home Buyers Warranty, call 404/728-0210 or 800/241-4969. For information about Home Owners Warranty: 202/246-4600; 800/241-9260 in the New England Region. ■

Soil with a high clay content often swells when wet and shrinks when dry. This difference in volume between wet and dry conditions — up to 50% — can cause damage like this.

New Foundation Manual

Many of your questions on foundation insulation should be answered in a new manual due out in February 1988 from Oak Ridge National Laboratory. The manual, tentatively called the *Building Foundation Design Manual* will cover "not only energy, but also waterproofing, structural design, termites, radon, and other concerns," according to the program's manager Jeff Christian. According to Christian, the book offers solutions that balance energy efficiency with these sometimes competing needs.

The manual's energy recommendations, some of which are shown below in the chart, are based on 30-year life-cycle costing. Simple payback on the recommended measures ranges from 7 to 10 years. The insulation levels, says Christian, are likely to be incorporated into the new ASHRAE energy standard 90.2, and are being considered by the major model building codes as well.

In addition to giving practical advice, the manual offers an extensive analysis of how basements lose heat. A shorter, more practical version geared specifically to builders should be out by next summer. Both manuals, say Christian, are based on the best available information today, and reflect the input from a number of sources including research labs, product suppliers, and NAHB. Still, says Christian, much more research is needed, particularly in the areas of crawl spaces and slabs.

The manual (ORNL/SUB/86-72142/1) including over 200 illustrations and graphics is available from the Superintendent of Documents, Government Printing Office, Washington D.C. 20402-9325; 202/783-3238. Or direct comments and questions to Jeff Christian at Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, TN 37831-6092. ■

Optimum Insulation Levels
From Draft of Building Foundation Design Handbook***

	Deep Basement		Shallow Basement		Crawl Wall		Slab	
	Medium**	High**	Medium*	High**	Medium	High**	Medium	High*
Minneapolis	R-15	R-20	R-15	R-20	R-10	R-20	R-5	R-10
Boston	R-10	R-15	R-10	R-15	R-5*	R-5*	R-5	R-10
Atlanta	R-5	R-10	R-10	R-10	R-5	R-5	R-5	R-5

* Down inside wall and 4 feet out from perimeter of crawl space wall 4 feet.

** Medium energy price (gas heat $.561/therm and electric cooling $0.076/kwh) high energy price (gas heat $.842/therm, $0.114/kwh).

*** Based on 30 year life cycle cost analysis used in handbook.

Quote *of the* Month

"Don't be surprised if within a few years, Sears & Roebuck is in the business of designing, selling, and financing new homes from showrooms around the country. So if you expect to stay in this business, you'd better make a point of understanding your market." This was spoken by John Schleimer, of Market Directions, of Sacramento, Cal., at the Housing for the 90s conference last November in Tacoma, Wash.

From What We Gather

Remodelers' biggest problems are a shortage of skilled labor, competition from unqualified remodelers, high cost of workers' comp and other insurance, and the image of the industry, according to a recent NAHB survey of 260 remodelers.

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Still, the outlook is rosy for remodelers in 1988. Most industry analysts predict remodeling sales will exceed $100 billion, up from about $96 billion in 1987. New home construction will be down around 10 percent.

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The strength of the remodeling market will carry kitchen-and bath contractors, predicts the National Kitchen and Bath Association. For kitchens, NKBA sees an 11-percent increase in remodeling and a 10 percent decrease in new construction, resulting in a net 5-percent increase. Bathrooms will see the same decline in new construction, but a 14-percent rise in remodeling.

Heat your house with a refrigerator? That's the point of an R&D effort by the Canadian Electrical Assn. to recover waste heat from this universal device. Allan Associates of Toronto is developing the prototype of the HVAC refrigerator.

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Wood heating is alive and well and hasn't changed much since 1982, according to a survey by the U.S. Dept. of Energy. The average wood-burner is 35 to 44 years old, earns more than $35,000, lives in the suburbs, and burns 4.2 cords a year — saving about $180 in heating costs. Most use wood heating as a secondary source, generating less than one-third of their heat. Many use fireplaces, however, which do not save on heating costs.

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Non-wood exterior doors dominate the new home market with 63 percent of the sales. But in remodeling and renovation, wood doors get the biggest share with 57 percent.

Stair Builder Videos

They might not be your first pick for Saturday-night entertainment. But they can help you get started in mastering the complex art of stair assembly. Two videos, produced by hardwood stair-parts companies, present easy-to-understand instructions on computing the individual rises, headroom, and other dimensions needed to craft a working stair. And both provide step-by-step assembly instructions. *Stair Clinic II*, from Visador has a company engineer walk you through each step. The tape is not for sale, but sales reps and distributors for the company have copies that you can borrow. Contact Visador (Marion Division, 1000 Industrial Road, Marion, VA 25354; 409-384-2564) for the name of the distributor nearest you.

The Colonial Stair and Woodwork Company's video, *Treasures in Hardwood*, is actually two tapes. The first is a 15-minute commercial for the company, and a visual glossary of terms. The second is a color-coded and indexed step-by-step discussion of stairbuilding. It's spiffier than the Visador tape, and contains a lot more information, but its underlying marketing thrust is more obvious, and the combined length may be a little long for the average guy (70 minutes). The tapes are available VHS or BETA at $54.95 each. The company reports that in the two years the tape has been available, it has distributed 1,000 tapes, about 100 of these to educators at vocational tech and architectural schools. For more information contact The Colonial Stair & Woodwork Co. (P.O. Box 38, Jeffersonville, Ohio 43128; 614/426-6326). ■

Skills You Won't Find in the Yellow Pages

Anyone in the rehab business knows how hard it is to find plasterers, carpenters, metalworkers and other craftspeople qualified to work on restoration projects. But rehabbers in Vermont and New Hampshire now have access to a list of more than fifty individuals and firms that specialize in preservation, restoration, and rehabilitation projects.

The list, called *The Directory of Twin State Building Craftspeople*, is compiled by the Preservation Institute for the Building Crafts, located in Windsor, Vermont. Each listing contains detailed information on the individual or firm, including years of experience, geographical area served, special skills, and preservation philosophy. Entries are selected on the basis of "before" and "after" photographs of their work, a questionnaire, and references. Those wishing to use the Directory should contact the Preservation Institute (P.O. Box 1777, Windsor, VT 05089; 802-674-6752) with specifics on the project and skill(s) needed. The service costs a nominal $5 per request to cover postage and handling; although members of Historic Windsor, Inc. (a parent organization of the Institute) have free and unlimited access to the Directory. ■