NOTEBOOK

SEPTEMBER 2000

EDITED BY MARTIN HOLLADAY & JON VARA

High School Vo-Tech Programs in Decline

With changes in educational philosophy and declining student interest, building skills programs are foundering

In most areas of the country, builders are desperately looking to hire more skilled workers. But despite record demand, vocational programs in the building trades are in decline nationwide. "All the studies we see show that these programs are winding down at the public high schools for lack of interest," says Paul Plawin, director of communication at the Association for Career and Technical Education in Alexandria, Va.

At Thomas A. Edison High School in Queens, N.Y., the once thriving building trades program has been sharply curtailed. "In the late '80s, the schools started de-emphasizing the building trades," says associate principal Jack Flaherty. "We lost plumbing, we lost woodworking. Heating and air-conditioning is closed. Now, all we have left is electrical installation. But the construction industry is booming. It's ridiculous that we have cut back."

Norm Legge is the director of the Tech Center at Lyndon Institute, a high school in Lyndonville, Vt., that has had a building trades program for 45 years. "At the height of the program, in the late '70s, we had about 30 students," says Legge. "Last year we had only six."

Students in the construction trades program at Thomas Edison High School in Silver Spring, Md., build a house every year. Graduates of the program are in high demand. "Contractors call me every day to ask about hiring these kids," says instructor Ken Dudley.

Vocational education takes a back seat. At some schools, the decline in vocational education is a reflection of policy changes. In the early 1990s, the Chantilly Vocational Center in Chantilly, Va., was concerned about dropping enrollment. "We had an electrical program and

continued on next page

Fiber-Cement Roofing Shakes Crumble

Fiber-cement roofing shakes were widely marketed during the 1990s, especially in the West, as a fire-resistant substitute for wood shakes. Some manufacturers, including American Cemwood of Albany, Ore., were so confident of the durability of their fiber-cement shakes that they offered a 50-year warranty.

Within three to five years of installation though, many fiber-cement roofs — which are made from a mixture of Portland cement and wood fiber — began to deteriorate. "As time went on, they would turn to the consistency of oatmeal," says Michael Satran, a Portland, Ore., roofer. His contracting company, Interstate Roofing, installed fiber-cement shakes made by both American Cemwood and Re-Con, a Canadian manufacturer. "The shakes would crumble in your hand," says Satran. "The freeze-thaw cycles would tear them apart."

The roof is melting. Bill DeLima, a retired mining equipment manufacturer, says that the Cal-Shake fiber-cement roof on his Danville, Calif., home started to deteriorate after just five years. "If I scrape a shake with my fingers, it turns to dust," says DeLima. Larry and Marge Zaharis of San Ramon, Calif., have had similar problems with their Cal-Shake roof. "The pieces were coming down into the gutters and all over the front porch, like the roof was melting," says Marge Zaharis. "We had woodpeckers and blue jays eating it and pecking holes in it."

Carl Cash, an engineer with the consulting firm Simpson, Gumpertz and Heger in Arlington, Mass., inspected many homes with deteriorating fiber-cement shakes. "The

continued on page 3

High School Vo-Tech Programs in Decline

continued from page 1

a carpentry program," says John Wittmann, administrator at Chantilly. "But the two vocational centers were dying."

The school board assigned a task force to examine vocational education from the ground up. "The task force report said all students needed academic education instead of vocational education," said Wittmann. In response to these recommendations, the school was renamed the Chantilly Academy for Engineering and Scientific Technology.

"We had a complete paradigm shift," says Wittmann. "We changed it to a career emphasis. These are college-type programs — we are not a vocational center. But the enrollment has been dying, even with these changes."

The changes at the Chantilly school exemplify a shift in educational philosophy emphasizing academics over skills training. Dr. Charles Hopkins is the director of the National Centers for Research in Career and Technical Education at the University of Minnesota, a federally financed research center in St. Paul. "The declines have been driven by school reform, which puts more emphasis on achievement of academic skills," says Hopkins. "Most educators think you shouldn't do specific occupational training at the high school level."

Walls and a roof. Thomas Holdsworth, director of technical programs at SkillsUSA-VICA, a nonprofit organization supporting vocational students, notes that some schools may be looking to save money. "They are taking the money that would go into traditional vocational programs and putting it into computer labs," he says. "A computer lab can be cheaper than running a carpentry shop. But the problem is, you aren't getting any carpenters. The last time I checked, a computer still needs walls around it, a roof over it, and electricity running into it."

As educators have recommended that high schools stick to academic subjects, legislators have been reducing funds available for vocational education. "Over the last 10 to 20 years, the state and federal funds invested in vocational education have been declining," says Kurt Morauer, workforce development director at the National Center for Construction Education and Research in Gainesville, Fla. "It's a huge juggernaut. In some states, the push has gotten so far beyond the curve that, legislatively, there may be no hope at all for skilled-trades technical education."

Changing attitudes. Many parents look askance at the thought of their children learning the building trades. "Nobody cares that a bricklayer can make $80,000 a year," says Wittmann. "The parents all want their kids to have a college education. If the kid drops out of college, then the parents want them to get a job. But you can't sell it until the kids leave high school." Bill Wood agrees. "It's societal," he says. "We don't hold these trades in high esteem, so parents do their best to convince kids to go elsewhere than the trades."

Many vocational instructors have noted changes in students' attitudes as well. "The kids all came in wanting computers, but without a focused idea," says Flaherty. Many students shy away from outdoor work. "When they think of construction work, they think hot in the summer, cold in the winter — just tough, dirty work," says Mark Holden, executive director of Associated Builders and Contractors in Concord, N.H. "Yes, those conditions exist, but we need to do a better job helping them to see the big picture."

Pride in physical work appears to be waning. "If you [ask] kids [if they] want to sit in an air-conditioned office, looking at a TV screen all day, or if they want to be out in the hot sun putting shingles on a roof, which one do you think they choose?" Norm Legge asks rhetorically. "Someone has to tell these kids that putting shingles on a roof is satisfying."

Finding solutions. High school students are unlikely to get excited about construction work unless contractors get more involved with local schools. "The construction industry has got to lead," says Thomas Holdsworth. "I don't think they can expect people in education to say, 'We're going to change our curriculum.' "

One successful organization rising to the challenge is the Vermont Construction Careers Council, which was founded by contractors. "About four years ago, because of the shortage of good workers, a group of contractors got together to cry on each others' shoulders," says Gina Catanzarita, director of human resources at Engelberth Construction in Colchester, Vt. Now members of the new council are actively working with vocational schools. "We are making ourselves known at teacher conventions, trying to get to guidance counselors, providing job-site tours," says Catanzarita. "Our message is, 'Construction is a career, not just a job.' "

Programs that work. At some vocational schools, building trades education is going strong, bucking the national trend. Successful programs tend to be located in rural areas where blue-collar trades are less likely to be disdained, and most have enthusiastic instructors. At Peoria High School in Peoria, Ariz., the building trades program for grades 9 through 12 is thriving. "Our enrollments are up," says instructor Kevin English. "We have 150 students." Students in grades 11 and 12 take part in internships with local contractors. During the summer, most of the students have 40-hour-a-week construction jobs.

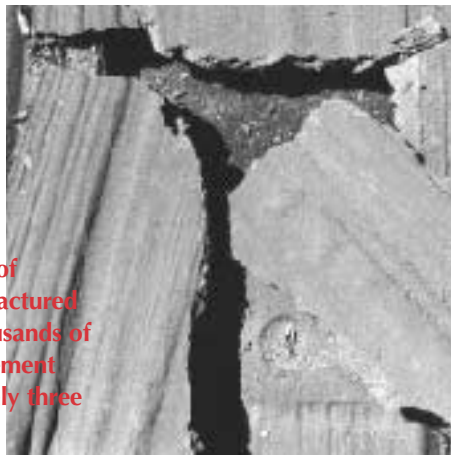
Joshua Horner, age 19, recently graduated from the Peoria High School program. "I started working on a framing crew a couple of years ago," says Horner, whose father is also a framer. "The best part is being able to do the creative framing — curved walls, bay windows, different pitches on the hip roof," he says. "I just like framing."

Fiber-Cement Roofing Shakes Crumble

continued from page 1

failures are due essentially to very high water absorption," says Cash. "Wood fiber is harmed by the alkalinity in cement. If you put wood fiber in an alkaline solution, it will lose a significant portion of its tensile strength. It will also swell more significantly than if it were not in an alkaline solution."

Class-action suit. Although problems have been reported with fiber-cement shakes made by at least three manufacturers, most of the reported failures have involved products made by American Cemwood. According to a report in the *San Francisco Examiner*, about 35,000 homes were roofed with Cemwood tiles, and as many as 100,000 homes have some type of fiber-cement roofing. By April 1998, American Cemwood was out of business, as sales of its failing fiber-cement shakes plummeted. Thousands of homeowners, complaining that their shakes were cupping, cracking, and softening, joined together in a class-action lawsuit against American Cemwood.



Fiber-cement roofing tiles, which are made of Portland cement and wood fiber, are manufactured to resemble wood shakes, tile, or slate. Thousands of homeowners have reported that the fiber-cement shakes on their roofs began deteriorating only three to five years after installation.

Eventually, Weyerhaeuser Co., Ltd., of Vancouver, B.C., stepped in to buy MacMillan-Bloedel, Ltd., the parent company of American Cemwood. On May 26, Weyerhaeuser settled the class-action suit by agreeing to establish a $105 million fund to satisfy claims. (For more information on the settlement, call 800/708-3266, or visit www.cemwoodclaims.com.)

Caveat emptor. There is a lesson to be learned from these failures, according to Carl Cash. "The fundamental problem is that there is no group of tests of any kind that predicts the performance of materials," he says. "If someone has a new material, it may be the greatest thing since sex, but unless it has a history of proper performance in the field, a prudent person will steer clear of it."

Wet or Dry, Exterior Basement Insulation Works Well

A recent Canadian study investigated whether water from heavy rains and spring thaws reduces the effectiveness of exterior basement insulation. The study, which was partly funded by insulation manufacturers, was conducted by the Institute for Research in Construction, a government agency in Ottawa.

The researchers installed five types of insulation — EPS (expanded polystyrene) Type I, EPS Type II, sprayed polyurethane foam, mineral fiberboard, and glass fiberboard — on the exterior of a poured-concrete foundation, from the footing up to the siding. By means of a grid of thermocouples, the heat loss through the basement wall was measured for two heating seasons. Periodically, the thermocouples on the exterior face of the insulation detected temperature drops associated with "water episodes." Apparently, water flowing through the soil during rainstorms and thaws cooled the thermocouples.

Surprisingly, the flowing water did not decrease the effectiveness of the insulation. All five types of insulation delivered their rated R-values, regardless of water flow.

Further investigation revealed the reason why the water flow was irrelevant. When researchers inspected the insulation at the end of the two-year study, they noticed that all five types of insulation successfully excluded water from the foundation. "The ground was silty, and the silt was carried by the water," said senior researcher Mike Swinton. "Using silty water as a tracer, we could see that water had moved into the joints between the insulation about an inch toward the concrete foundation, but the water never reached the wall. The water movement was concentrated on the outer face of the insulation, so the R-values were steady, in spite of evidence of water episodes."

A worker sprays urethane foam insulation on the exterior of a basement wall as part of a Canadian study on the effectiveness of basement insulation. Researchers looked at five types of insulation, all of which were found to perform well.

The findings raise the question of whether a basement with exterior insulation can do without a drainage mat or granular backfill. "I'm a fan of a belt-and-suspenders approach," says Swinton. "But in our particular case, we didn't go that way, and we didn't have any particular problems."

The study also investigated whether wrapping insulation in polyethylene improved performance. "There were no measurable differences in thermal performance for the insulation wrapped with poly," says Swinton. "We couldn't discern any advantage or disadvantage.

OFFCUTS

OSHA fines just took a jump in California. Bill AB 1127, a new law that took effect on January 1, 2000, increased the maximum penalty for a serious OSHA violation from $7,000 to $25,000.

A forklift raising roof trusses accidentally hit a powerline at an apartment complex in Tampa, Fla., on May 19. According to *ENR* magazine, the severed powerline sparked, igniting wood scraps. The resulting fire leveled two square blocks, causing $40 million in property damage and minor injuries to two firefighters.

Almost half of all new homes in Arkansas don't meet the state's energy code, according to a study by the Arkansas Department of Economic Development. *Energy Design Update* reported that 45% of the state's new homes don't meet the code, primarily because of oversized heating systems.

***Environmental Building News* recently sold their dot-com name for big bucks.** Hanley-Wood, a publisher of construction magazines, paid six figures to acquire the ebuild.com domain name from BuildingGreen, the publisher of *Environmental Building News.*

A Massachusetts surgeon in a rented backhoe snagged a buried natural gas line but escaped injury when the resulting explosion leveled his luxury home, *USA Today* reports. The story noted that the popularity of home-improvement shows leaves many homeowners with an exaggerated idea of their own abilities. "They are so unrealistic, it's not funny," one contractor was quoted as saying. "There's no sawdust, everybody's happy, they have clean clothes on, and there's never a problem. The reality of it is that there are 30 or 40 problems a day. There's always a problem."

Why young people don't enter the building trades. The *Denver Rocky Mountain News* reports that a teen computer prodigy is buying a million-dollar home in the city of Broomfield, enabling him to move out of his parents' house. The unnamed 19 year old is said to enjoy a six-figure income — a substantial improvement over the $30,000 he reportedly earned at age 16.

New Cement-Burn Poster

It's been said before, but with the numbers of inexperienced workers on job sites today, it can't hurt to say it again: Portland cement is highly alkaline and can cause severe and sometimes disabling burns. With a pH of about 12, in fact, wet cement is only slightly less caustic than many commercial drain cleaners. To drive that point home, the American Society of Concrete Contractors has recently released a new poster on the subject — adapted from an earlier version published by the National Ready Mixed Concrete Association — that provides information on preventing cement burns, along with some eye-opening photographs of what can happen if safe procedures aren't followed.

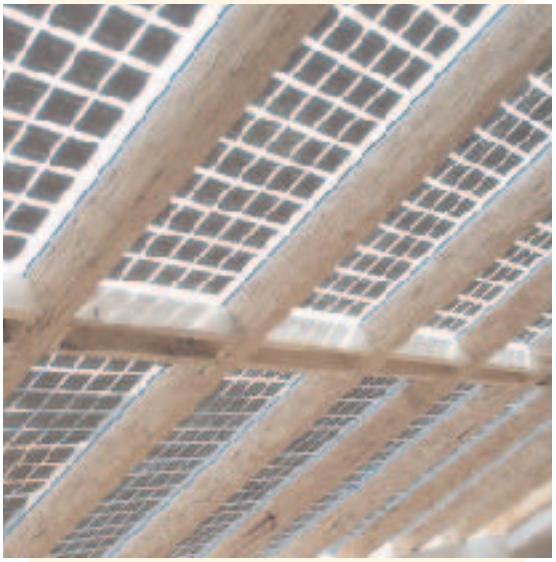
As careless or uninformed workers sometimes learn too late, Portland cement is nearly as caustic as drain cleaner. A new poster warns those at risk to wear proper protective equipment, immediately remove clothing that becomes saturated with wet concrete, and wash thoroughly to prevent injury.

Such injuries aren't particularly common, as job-site mishaps go, but they're not rare, either. The burn unit at Massachusetts General Hospital, for example, sees about 20 serious cement burns each year. According to burn surgeon Dr. John Schulz, the most insidious feature of cement burns is that victims often feel little or no pain until serious damage has already been done. Another problem, he explains, is that the hydroxyl ions in calcium hydroxide — the chemical agent that does the actual damage — are soluble in human tissue and tend to penetrate deeply. Immediate, thorough washing is essential to prevent injury. "Taking off your boot and giving your foot a quick rinse isn't enough," he says.

The 11x17-inch poster is available from the American Society of Concrete Contractors (38800 Country Club Drive, Farmington Hills, MI 48331-3411; 800/877-2753; www.ascconc.org). The cost of the poster is $11.75 each, or $8.75 for ASCC members.

Photovoltaic Glazing for Sunrooms

Saint-Gobain Glass Solar, a German company, has developed a type of translucent glazing panel with photovoltaic cells laminated into the glass. The panels, which can be used to glaze sunrooms, generate electricity while allowing filtered light into a building's interior.



A model home in Burnaby, B.C., has a room with semi-transparent sloped glazing that includes photovoltaic cells laminated into the glass.

The new glazing was recently used to dramatic effect in Home 2000, a model home built at the British Columbia Institute of Technology. The house includes panels capable of generating 2 kilowatts of electrical power. The $30,000 grid-connected photovoltaic system runs the building's electric meter backwards whenever solar production exceeds the building's electrical usage.

Faulty HVAC System Proves Deadly

A series of hvac system failures at a Roslyn Heights, N.Y., residence has been blamed for six deaths. On the morning of May 7, 2000, Dr. Andrei Kranz returned from a late shift at the hospital to find his parents, his three-year-old daughter, a live-in nanny, and two houseguests dead in bed from carbon monoxide poisoning.

The immediate cause was a flawed and poorly maintained heating and cooling system, in which both a gas furnace and the air handler for a central air-conditioning system were installed in the same basement room. The air-conditioner intake filter was clogged and its exhaust vent was closed, as was a return-air grille to the furnace room. When a chilly spring evening was followed by an oppressively hot day, someone in the house turned on the air conditioner without first shutting off the furnace. Lacking any other source of makeup air, the air conditioner sucked the furnace exhaust down the flue and ducted it throughout the house, with fatal results.

David I. Wasserman, the commissioner of buildings, safety, and inspection for the township of North Hempstead, explains that a permit had been granted for the gas furnace but not for the central air system. "All we know is that it was put in at some point after the certificate of occupancy was granted," he said. Wasserman noted that since the accident, a county task force has begun working on draft legislation to require carbon monoxide alarms in residential structures.

Persuading homeowners to take such alarms seriously, however, may be another matter. At the time of the accident, the Kranz home already had a carbon monoxide alarm — which Dr. Kranz had deactivated the previous summer to prevent what he had interpreted as "nuisance tripping." The Nassau County legislation under consideration is likely to require hard-wired alarms, which are less vulnerable to homeowner tampering than the more common battery-operated or plug-in alarms.

"Most 'false alarms' are not really false alarms," says Dr. David G. Penney, a carbon monoxide expert at Wayne State University. Although nuisance alarms have been reported in the past — including one well-publicized incident just before Christmas of 1994, when a thermal inversion set off thousands of detectors in Chicago — Penney contends that today's alarms are far less sensitive. "If the carbon monoxide level is high enough to set off the alarm, some people may already be experiencing symptoms like headache and nausea," he says. (In the Long Island case, the parents were staying at the son's home to care for their granddaughter, who was ill with what seemed to be the flu but was almost certainly an early stage of carbon monoxide poisoning.) "If I had an alarm going off in my house, I would get my hvac person in right away to evaluate," Penney said.