THE JOURNAL OF LIGHT CONSTRUCTION

A Builderburg Group Publication
www.jlconline.com

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The Journal of Light Construction (ISSN-1056-828X; USPS-001-659) is published monthly by Builderburg Partners, Ltd., 1025 Vermont Ave. NW, Washington, DC 20005. Periodicals-Class Postage paid at Richmond, VT, and additional mailing offices. Postmaster: Send address changes to *The Journal of Light Construction*, 932 West Main Street, Richmond, VT 05477. Copyright 1999 by Builderburg Partners, Ltd. All rights reserved.

BPA INTERNATIONAL

JLC's

Letters

Protecting Against Leaky Heat Exchanger

To the Editor:

"Using Water Heaters for Radiant Heat" (11/98) was a great article, but I have one question about heat exchangers. If the heat exchanger were to develop any leaks, it seems possible for contaminated water from the hydronic coils to leak into the drinking water side of the system. Is that really possible or am I missing something? If such a leak did occur, it might be difficult to detect until someone got sick.

A second question: With so much concern about earthquakes, how do the California building codes deal with preventing leaks in the pipes that run through the floors?

David Blatt
Corvallis, Ore.

Bill Clinton responds:

Although I have never known a flat-plate heat exchanger to leak, one must suppose it's possible and provide for it. There are two stages of protection:

First, I install systems with the pressure on the secondary (heating loop) side reduced to a cold fill of 12 psi and with a 30-psi pressure relief. Should a leak occur, flow will be from the higher-pressure potable side into the lower-pressure heating side. As pressure exceeds 30 pounds, a telltale dribble will emerge from the relief valve, serving as an alert that there is a problem. Also, the leak is flushing out the heating side, diluting possible contaminants.

Second, I never put anything toxic in the system. If antifreeze is needed in your area, be sure that what you use is nontoxic. Also put up a warning notice. If in doubt, go to a double-wall system or consider using two single-wall exchangers in series (sweet-water loop system). Or simply go back to separated systems.

As to the California codes, I know of no provisions dealing with earthquake damage to pipes running through floors. Given the plasticity of PEX tubing, it seems to me that a house would have to be practically destroyed to break heating tubes. I had one installation five miles from the epicenter of the 1989 Loma Prieta earthquake (7.0 on the Richter scale) with no problems whatsoever.

Water Heater Longevity

To the Editor:

Regarding the longevity of water heaters used for heating (*Letters*, 2/99): The research that I have seen indicates that the life of a water heater used for hydronic heat is actually longer than one used just for domestic hot water. I know of one apartment project in Champaign that has used this system (feeding baseboard convectors, not radiant floors) for more than 30 years, and there have been no complaints of shortened life.

Hank Spies
Champaign, Ill.

Staple-Up Radiant Tubing

To the Editor:

Paul Fisette's answer to the question about stained vinyl floors found in conjunction with staple-up radiant hydronic heat (*On the House*, 12/98)

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omits the fact that many builders and heating subs make the mistake of literally stapling the hydronic tubing to the underside of the subfloor.

Several hydronic tubing manufacturers' installation manuals suggest that the way to prevent damaging hot spots and resultant problems with floor coverings and occupant comfort is to suspend the tubing about 1 inch below the subfloor and insulate below the tubing with foil-faced foam sheathing held down about 2 1/2 inches below the subfloor. This allows the heat from the tubing to create a heated cavity beneath the floor, which in turn makes for even and lower temperatures on the floor surface (hopefully the desired 85˚F). You can buy plastic brackets made to suspend hydronic tubing or use 3/4-inch shims and plastic tubing straps.

Here are some rules of thumb for suspended tube heating systems:

•Maximum heat dissipation in suspended tube hydronic systems is 18 Btu/sq. ft. at your local heating design temperature. You can get more dissipation by raising water temperature, but you risk problems with floor finish materials and the structural strength of framing materials (which lose half their strength at 135˚F).

•Insulate the joist bay below the heated cavity to at least R-25 if there is unheated space below the floor, or R-11 if there is heated space below the floor. You can use foil-faced foam sheathing and batt products in combination. Insulate the rim joist to at least R-25 with foam blocks. Fit the foam sheathing tightly, or use canned foam to fill gaps between foam and framing.

•Don't try to do a suspended tube system if the total R-value for the subfloor and floor finish materials exceeds R-2. This rules out carpet of any kind unless the house is superinsulated. You may want to put a clause in your contract specifying a maximum R-value for floor coverings.

Alan Van Zuuk
Energy Technician
Delta-T Inc.
Eugene, Ore.

Avoids Steel Framing

To the Editor:

I'd like to make some observations about steel stud striping (*On The House*, 1/99). I tried a few times to incorporate steel into framing basements, back when wood prices went ballistic, but won't make that mistake again. My son almost cut a finger off because he wasn't used to working with the material — it's like playing with knives.

The author correctly mentions steel's flimsiness. This can be helped by assembling the wall units flat on the ground so that both sides of the stud can be stitch-screwed to the top and bottom rails. I've seen jobs where the back screws were left out because the wall wasn't built in a modular fashion. Using the wood blocks as shown would do nothing to increase the torsional rigidity. Wood blocking needs to be installed within the steel rails wherever wood trim is to be fastened as a nail strip. This is unnecessary with wood studs.

Putting any kind of insulation below grade is not only not cost-effective, but is looking for major problems down the road. Sooner or later, basements flood, guaranteed. If caught promptly, drywall can survive getting wet. Insulation within a closed cavity can't. Mold, mildew, and the smell can't be tolerated. Cutting the wall open is the only solution and is obviously very expensive.

Finally, I would question the wisdom of installing a vapor barrier. Sealing it would be very tough, expensive, and not effective unless the entire basement perimeter was done. It should be mentioned that any cracks should be professionally addressed before they're covered up. A vapor barrier won't stop water!

Craig Brown
Duluth, Ga.

AIA Contract Debate

To the Editor:

I believe that attorney Sid Hymes (*Legal Adviser*, 1/99) offers poor advice

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932 West Main Street
Richmond, VT 05477
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and is misleading in his characterization of AIA contracts. For instance, he warns of architects and engineers who specify "a method or means of installation" and thus "want to be in charge, but don't want the responsibility that goes with it." On the contrary, virtually every AIA contract form very clearly establishes that the "Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures."

He also suggests that contractors should not be responsible for correcting materials that fail, if those materials are specified by others. Mr. Hymes seems to be taking the farfetched position that somehow such corrections should be the responsibility of the designer who specifies them, or the owner. I could see this advice leading a contractor to say, "I'm sorry, Mr. Owner, that your plywood sheathing delaminated after last night's rainstorm. Since I installed what was specified, it is now your responsibility to get my lumberyard to replace it. Call me after you have done so and I'll come back to the job."

This is not, in my opinion, likely to increase the satisfaction of your customers.

Carl Mezoff, AIA, P.E.
Stamford, Conn.

Sid Hymes responds:

Mr. Mezoff's comments serve to highlight many of the problems with using an AIA form agreement, especially when the "damaged" party hasn't read and doesn't understand the contract.

The particular case that I discussed confirmed that the specifier of a product is liable if the item fails, in the absence of a contractual provision to the contrary. That's exactly what happened and made the case noteworthy: But for the contract language, the subcontractor would have been off the hook, and the specifier (apparently the general contractor) would have been liable for the product's failure.

When a contractor (or subcontractor) follows the plans and uses specified products, he or she normally has a defense in the event of the product's failure, as it should be. After all, why should the installer be liable if the specifier required an inappropriate or poorly designed product? Mr. Mezoff knows that he, as the designer, prepares the plans and specifications, not the contractor. And it is the AIA forms that obligate a contractor to follow those plans and specs and obtain the architect's approval before substituting one item for another.

The new AIA 201 document reaffirms that doctrine and arguably makes it worse for both the owner and the contractor, but (surprise!) not the architect. In fact, this new contract form specifically addresses those situations where the architect does specify the construction means, methods, etc., and puts the burden on the contractor to challenge those provisions (section 3.3.1).

And, yes, there are architects and engineers who want to run the project, but without the resulting responsibility and liability if the job tanks. My article was very clear that this situation might, *not would, occur and that the contractor should be wary. Again, referring to AIA 201, the contractor is obligated to submit management-type reports to the architect concerning scheduling and production. Giving these items to the architect would only make sense if the architect were involved in the construction management process. I stand by my statement and advice.*

Finally, if the designer's documents require a particular brand of floor sheathing (thereby obligating the contractor to use that particular product), then again, I disagree with Mr. Mezoff on two levels: One, providing the sheathing was installed correctly, the contractor should not be liable if it fails, and two, the specifier should pay, not the owner. This is, in plain English, the essence of the U.S. Supreme Court's decision in the Spearin case mentioned in the article.

Access to Shutoff Valves

To the Editor:

In the article "Efficient Laundry Rooms" (*By Design*, 12/98), the author recognizes the extensive damage that can be caused by a broken water hose, yet there has been no attempt to provide access to the shutoff valves that would be located behind the stackable unit. Having recently made such an installation, I resolved this problem by installing a $10 plastic access panel in the wall directly behind the water supply. By modifying the plastic housing around the supply lines, the shutoff valve is readily accessible. As water hoses can and will break, it is imperative that access to the shutoff valves be provided. To do anything less is to do your client a disservice.

Patrick J. Logan
The Logan Company
Havertown, Pa.

Newton Meets Goodyear

To the Editor:

The article "Roadworks" by Harris Hyman (*Practical Engineering*, 1/99) explained roadway design in very simple and easy-to-understand terms. I am sure the majority of readers will find it very helpful. However, there is one issue that needs clarification.

Doesn't the contact pressure have to equal the air pressure in the tires to satisfy the laws of statics? At a 30-psi tire pressure, the tire contact area will be 1000/30 = 33.3 square inches, or approximately 6x6 inches. In turn, the area of influence under an 8-inch gravel bed will be 22x22 inches, or 300 psf. This value is still less than the 500-psf soil strength, indicating that the 8-inch gravel roadway is more than adequate.

Brian Michael Juedes, P.E.
Shea Homes
Phoenix, Ariz.

Crushed Stone for Roads

To the Editor:

In the article "Roadworks" (*Practical Engineering*, 1/99), the author fails to discuss the advantages of using crushed rock for base material and topping. With crushed material, the ragged, rough edges and faces of the broken rocks have a tendency to lock together while also allowing water to move down through the material. If you use 2-inch-minus material, this also has the

fines from the crushing process, which will fill up some of the voids between the larger pieces, creating a very cohesive hard road bed. Quite often, just spreading the material with a loader or dozer will provide enough compaction. This very hard, cohesive material will also provide a very good base for paving if an asphalt topping or concrete is added later, as in the case of a driveway or parking apron in front of a garage. All public roads built today require layers of crushed material for their bases.

I question the adding of clay or organic topsoil to the mix. When these materials become wet, they become slippery. It has been my experience that when these "plastics" are added to stone and the road becomes wet, it just gets wider and thinner as it is driven on, especially with heavier loads. It's like rolling out the dough when you are making pies or pizza. Also, if clay materials are added and you live in an area where you have dry periods, the extremely fine clay particles turn to dust and blow away.

If your mix needs more fines to fill the voids, adding sand may be a better alternative than adding clay or organics. Sand is larger and the rough edges on the sand particles will grip the smooth stones better. When the cost factor is figured in, it is a case of "you get what you pay for." Clay and organics are cheaper and more available, but it will take more of them to do the job. Crushed material costs more but it usually takes less to do the job and will provide a better base for future toppings.

Ken Kristenson
Friday Harbor, Wash.
Nome, Alaska

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