#4189

Construction Practices: 'Pulse' builder survey results

Richard Kadulski

Energy Efficiency and Air Quality awareness is increasing among new home buyers

Home buyers have become more aware of the importance of energy efficiency in recent years. Over half the builders surveyed across Canada indicated that buyers are more aware of energy efficiency issues now than they were a year ago - almost 90% are more aware than five years ago.

Consumer awareness of ventilation and air quality issues has also increased significantly. Over half the builders indicated that buyers are more aware of these issues than they were a year ago; over three quarters are more aware than five years ago. There were no significant regional differences in increased public awareness of either energy efficiency or air quality.

Builders are responding. Almost half indicated that someone in their firm had attended an R-2000 training seminar (but there's still the other half that haven't!). The lowest attendance was in Quebec (29%) and Ontario (51%). In other provinces it was 64 - 100% of respondents. Of those who took an R2000 course, 70% indicated that they had changed the way they build houses as a result of the training.

The impact of R-2000

The R-2000 program has encouraged changes in construction practices. The spread of R-2000 technology is reflected in the use of higher insulation levels than are called for by codes or that is normal practice, sealing of joints, and attention to air and vapour retarders as well as air tight drywall techniques combined with mechanical ventilation systems.

Of the builders who changed the way they build houses as a result of R-2000 training, virtually all now build tighter houses than in the past. Increased insulation and mechanical ventilation were other significant changes as a result of the R-2000 course.

Over three quarters of all builders include above-code insulation in ceilings, attics and walls; two thirds use more insulation in basements.

Many builders have adopted other techniques to improve the quality of new housing. Acoustical sealing of vapour barrier joints, sealing of penetrations and electrical boxes, the use of air barriers and the "air tight drywall" approach all were used mostly or all the time by more than half the builders. In addition, almost 90% of these builders indicated that they now placed a greater emphasis on "quality" in their advertising.

Common building techniques

Framing

B.C: Standard 2x4 framing is still common. Sometimes 2x4 with insulated sheathing is used. 2x6 framing is used by about 1/3 of builders surveyed.

Prairies: Reflecting a harsher climate, most builders use 2x6 framing, occasionally with insulated sheathing. Double wall construction is sometimes used in Saskatchewan and Manitoba by a small minority of builders.

Ontario: A surprisingly large number (over 1/3) still use 2x4 framing always or mostly. (In Toronto, most construction is 2x4). A smaller proportion use 2x6 or 2x6 with insulated sheathing.

Quebec: 2x6 or 2x6 with insulated sheathing is used mostly. A small portion (less than 10%) build with 2x4.

Atlantic: Virtually everyone builds with 2x6 or 2x6 with insulated sheathing.

Insulation

Above code levels of insulation for walls, ceiling and basement are used in all areas. Only in Saskatchewan are basements not insulated over code. (However, what standard insulation levels are is not stated). The National Building Code does not set out insulation standards, but some local jurisdictions do. Reference to code insulation levels would more likely be to the conventional practice in each region.

Airtight Construction Practices

Most builders in all regions use 6 mil poly for airtightness, with acoustical sealant on joints.

The airtight drywall approach (ADA) is not yet regularly used in all areas. In B.C. 54% never use it, 32% sometimes, only 13% always or mostly. In Alberta 68% never use it, only 24% always or mostly. (Yet Alberta has financed much research, development and monitoring of ADA). In Saskatchewan 53% use ADA always or mostly; in Manitoba 31% always use ADA, 69% never; in Ontario 55% never use it, 32% always or sometimes. Quebec has the highest penetration of ADA users with 59% always or sometimes using ADA. New Brunswick and Nova Scotia have a fairly even distribution between those who use it and those who never use it.

These results are interesting as they seem to be at odds with your editor's perceptions. They may also reflect on the attitudes that building inspectors take, as not all accept ADA readily. Recently in B.C. there has been an upsurge in interest in ADA as an alternative to the code requirement for 6 mil poly.

Testing For Airtightness

Only in Quebec, New Brunswick and Nova Scotia do a significant portion of builders test houses for air tightness.

Windows

Double glazed windows are the norm in all parts of the country. Triple glazed windows are standard in many Manitoba and Saskatchewan homes. In other areas it's an option. Low-e or Low-e with gas fill is an option for many, although over 1/3 do not offer this as a option.

Furnaces and Water heaters

Only ¼ of builders offer higher efficiency furnaces and water heaters as standard - most offer them as options. Heat pumps are offered as options by most.

Ventilation:
(Heat recovery ventilators)

Most builders in Atlantic Canada offer HRV's in their base price. In Quebec 65% offer HRV's as an option (but 16% don't offer them). In Ontario, only 6% offer HRV's while 40% offer them as an option, but the majority (54%) do not offer HRV's at all.

On the prairies the majority offer HRV's as options, but 39% in Alberta and 30% in Manitoba do not offer them at all. In B.C. 26% include HRV's in the base price, for 62% it's an option, and 12% do not offer them.

The 6th **Pulse** *survey of the building industry was sponsored by Fiberglas Canada in association with the Canadian Home Builders Association. It was undertaken in January, 1990 across Canada. 583 builders and renovators responded.*

The survey was designed and tabulated by Clayton Research Associates,

Letters to the Editor

Re: Frozen HRV's
(Solplan Review No. 31)

During the past five years I have been responsible for the installation of over 800 Heat Recovery Ventilators in the residential market. As every unit we install is supplied with a "FOR SERVICE CALL" sticker, we receive a call when something goes wrong.

We have experienced some frozen cores over the years and our testing has shown that there are two major reasons for core freeze up.

Occasionally on models with a damper motor, it fails to close off the cold air entering the HRV from outside and allow warm air to defrost ice. The HRV manufacturer cannot really be blamed for this as the damper motors are purchased from outside suppliers and installed in the HRV's. We must note that our current major supplier recognized this "weak link" and has gone to great lengths to have this motor upgraded. We now have many new motors in service without any replacement necessary for the last five very cold months. I congratulate our HRV manufacturer for their efforts. I see this as a major step towards perfection.

Secondly, the major cause for core freeze up is due to the low temperatures that homeowners choose to maintain in the basement even though they have a "damper style" HRV. When the HRV is activated into a defrost cycle, warm house air is drawn into a defrost port and this "warm" air melts any ice on the core. The air needs to be warm to defrost. If homeowners choose not to keep the basement above 60°F there are other measures that can be taken to achieve a proper defrost.

Typically the basements in this area are kept at a temperature of 41-50°F. Our testing shows that there is not enough energy in this air to effectively defrost in a normal defrost mode. A simple modification corrects this.

My experience shows that these problems are not limited to any one particular manufacturer of HRV's. As far as damper motors are concerned, I know of more than one HRV manufacturer that uses the same damper motor for defrost purposes. Therefore, it is unlikely that core freeze up due to damper motor failure could be limited to any one particular HRV manufacturer.

Greg Barber, President
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Bedford, NS

I read with interest your article about problems with HRV's freezing up and your request for information on this subject. I am a project officer with the Dept. of Public Works in Cambridge Bay, NT (200 miles north of the Arctic Circle on Victoria Island). We have been experiencing terrible problems with lack of fresh air in our newer staff housing and newer buildings in general. As a result we launched a three year program to investigate the practicalities of using HRV's in the arctic. Up to now it has been the general opinion that HRV's don't work in the arctic because they always freeze up.

Our program consists of comparing a plastic heat exchange core HRV with an aluminum HRV core unit. We installed one VanEE 2000 Plus in Cambridge Bay, one Lifebreath 300 DCS in Coppermine and one Lifebreath 195 DCS in Pelly Bay (which has the highest energy costs in North America). After two years of observations and field adjustments we have drawn several conclusions. They are:

1. All units freeze up to some degree by the time they go on defrost cycle. How well they defrost given the same inlet temperature of defrost air supply is a function of how efficient the heat transfer core is. The aluminum core machines have always been able to melt all the ice out of their heat exchange cores in the time allotted for the defrost cycle. The plastic core machines can only melt about 90% of the ice build up. As a result the ice slowly builds up until the heat exchange cores are completely blocked off, which takes about three weeks at -45°C.

2. It is very critical to get warm defrost air. By mounting HRV's close to boiler or furnace rooms and by