

August 29, 2003

Meeting Notice

Tuesday
September 9, 2003

@ Saskatoon Construction Association

Speaker: Jonathan French, Johnson Controls

Topic: Introduction to
High Performance/Low Flow Fume Hoods



5:15 - 6:30 Tour of Laboratories at
Spinks Building (Meet in lobby at 110
Science Place at **5:15**)

6:30 - 6:45 Cash Bar

6:45 - 7:30 Supper

7:30 - 8:00 Chapter Meeting

8:00 - 9:00 Dinner Speaker

AMERICAN SOCIETY OF HEATING, REFRIGERATING, AND AIR-CONDITIONING ENGINEERS



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ASHRAE
Saskatoon
P.O Box 7043
Saskatoon SK
S7K 4J1

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Newsletter

Tina Boyle
Johnson Controls

Presidents Message

The summer has come and gone and once again it time for another year of ASHRAE to begin. We have speakers and tours organized for the year as well as our annual golf tournament and curling.

This year should also be a demanding one, as we are hosting the 2004 Chapters Regional Conference this coming spring. Jonathon French is the CRC chair for 2004 with various local members helping by heading up committees to make this a successful Conference. I hope all members will support us this year by coming out to the meetings and helping prepare for the CRC. If anyone hasn't volunteered to help on any of the CRC committees please do so if you can help in anyway.

I hope everyone had a great rest over the summer and is up for the challenge this year brings.

Travis Braid
2003-2004 President

Welcome Back



How big a central air conditioner would I need for a new 1200 square foot (112 square metre) house located in Calgary?

That is the wrong question to ask.

Central air conditioning in houses in most parts of Canada is needed only as a result of poor building design and operation. Canada is not Arizona or Florida. No parts of our country even approach the sustained hot weather that the Southern US experiences. Yet the advertising people would have us believe that no Canadian home is complete without air conditioning. Air conditioners are noisy and relatively expensive energy users that often create indoor air quality problems because of poor handling of the moisture that accumulates on the cold coils. Air conditioners should be unnecessary in a well designed and operated house almost anywhere in Canada.

What can be done to eliminate the need for air conditioning?

Here are Dumont's directives for defeating the need for providing air conditioning in residences.

1. ***Orient your house so that East and West facing windows are minimized.*** In most houses unshaded windows are the single largest source of undesired heat gain. West facing windows are the worst, as the sun's rays are often at almost 90 degrees to the windows on late summer afternoons. East windows have the same problem in the morning. Use South windows with overhangs to avoid direct sun hitting them in the summer. North facing windows generally receive little direct solar radiation, except for a short period around June 21st.

Every square metre of West facing unshaded window, for example, will dump about 600 watts (2000 Btu/hour) of undesired heat into your house on a sunny day. A West facing double glazed patio door with an area of 4 square metres (43 square feet) will dump 2400 watts of heat (8000 Btu/hour) into a house in the late afternoon in summer. By comparison, small window air conditioners put out only about 5000 Btu/hour.

2. ***Stop the solar heat gain before it enters the window.*** Exterior shades, exterior venetian blinds, overhangs, awnings, exterior screens, trees, your neighbour's house—all of these can serve to reduce solar heat gain. Overhangs don't work very well with east or west facing windows. See directive number 1.

3. ***Stop the solar gain after it passes through the window.*** Most west facing apartment buildings will have at least one suite with a good portion of the windows covered with aluminum foil. Aluminum is a very good reflector of heat. Other measures such as reflective film, interior shades, closed venetian blinds all help to reduce undesirable solar gains, but the best place to interrupt the solar gain is outside the window. See directive number 2.

4. ***Use a light coloured roof and light coloured exterior walls.*** In addition to lasting longer, light coloured roofs will have a lower surface temperature. The sun beating on a dark coloured roof or wall on a sunny day can raise the roof temperature by as much as 40 degrees C (72 F) on a windless day. You rarely see black cars in the tropics; many large aircraft have the top part of the fuselage painted white for the same reason. White is cool! Many mediterranean village dwellers make a point of frequently whitewashing the exterior walls of houses to limit solar gain.

5. ***Good attic insulation is a great way of limiting solar heat gain into the top part of your house.*** A 1200 square foot attic with R60 insulation will pass only about 1400 Btu/hr into the house even if the attic is 70 degrees Fahrenheit (48 degrees C) warmer than the top floor rooms of the house.

6. ***Increase the mass level in your house.*** A heavier house will not heat up as quickly as a lighter house on a hot day. An inexpensive way to get more mass into a wood frame house is to pack scrap gypsum board into the walls and ceiling cavities. If you have a concrete basement in the house, consider insulating the concrete

on the outside to take advantage of the thermal mass. The concrete basement floor should also be insulated as well. It is a great way to avoid that musty basement smell and ensure that the surface temperature is never below the dew point.

7. Choose energy efficient appliances and lights. That “free” old refrigerator in your new house likely will use two to three times as much energy as a new refrigerator. All the energy used by lights and appliances [excluding outside vented clothes dryers and exterior use] will show up as a heat load on your house. Most houses here in Saskatchewan average about 23 kilowatt-hours per day for electrical usage for lights and appliances. That amounts to an average internal heat gain of 3270 Btu/hour. Wise selection of lights and appliances, and careful appliance use could reduce that amount by one-half to two-thirds without denying you the normal comforts of home. As my mother often told me, “If you don’t make a mess, you don’t have to clean it up.” The saying works as well for heat gain as for clutter.

8. Use operable windows to provide free cooling. Almost every location in Canada will have evening temperatures that fall below 20 C (68 F). Here in Saskatchewan there was not one night last summer (2002) when the outdoor temperature did not fall below 21 C, even though the air temperature in the late afternoon reached +36 C. By opening windows once the outdoor temperature drops below room temperature you can reap free cooling. Casement (side-hinged) windows are among the best at catching prevailing winds. In the morning, close the windows to retain the “coolth” stored in the building materials.

If, and only if, the above passive measures do not keep your house in the comfort zone, choose the following low impact active devices before you consider air conditioning.

9. Use a ceiling, table or floor mounted fan to increase the air motion in the rooms you frequent. Your normal skin temperature is about 86 F (30 C). Increasing the air flow over your skin will give a cooling effect even if the air temperature is as high as 30 C. Many residents of tropical countries use this technique to keep conditions bearable.

10. Use a window mounted fan to induce air flow from outdoors into the rooms of your house once the outdoor temperature has cooled off in the evenings. Several companies including Honeywell, Holmes and Duracraft now make reversible fans suitable for mounting in windows. Some even come with an air filter to reduce the entry of dust and pollen, and some of the fans come with thermostats.

11. Use a whole house fan to rapidly change the air in your house. My aunt living in Detroit uses this technique to cool her house down in the evenings. The whole house fan is usually mounted in the ceiling of the top floor of the house and exhausts house air into the attic once the outdoor temperature has fallen. The fan moves a lot air, and serves two purposes—it brings cooler air into the house through open windows and also vents the attic to lower the temperature up there. Be warned, the whole house fans are usually quite noisy.

12. Consider the use of an evaporative cooler. Convair is one company that makes a portable unit. Every pound of water that you evaporate can absorb about 1000 BTU. I would not recommend the units in coastal area, as they will raise the relative humidity in your house too much

13. If you have honestly used all twelve of the above techniques, and your house is still not comfortable, buy a small window air conditioner.

In summary, to keep a comfortable home in warm weather, first control the heat gain sources, use thermal mass, ventilation, evaporative cooling and then, and only then, use spot air conditioning.