Di-Thermal Roofs

Zomeworks Corporation as an extension of its Cool Cell™ work has developed Di-thermal roofs to heat and cool buildings. These are unglazed radiator/absorber that collect heat during winter days and dispose of heat summer nights. In some cases the roof both collects and rejects heat during the same 24 hours.

The Di-thermal roof allows one to do all the cooling and most of the heating in many parts of the United States.

The Di-thermal roof can be blow molded plastic, aluminum extrusion with snap in copper pipes or copper roof with copper pipe waterways.

Di-thermal roofs plumb to heat storage tanks and inner radiant heat exchangers that operate with low temperature differences.

To assure the success of Di-thermal systems the comfort of the radiant heating and cooling must be so attractive that customers might choose it for their buildings even if they had to pay high prices for the energy used to run it.

In promoting the Di-thermal roof we are betting that we can make new kinds of radiant heating and cooling systems, new kinds of roofs and find inexpensive tanks for heat storage in water.

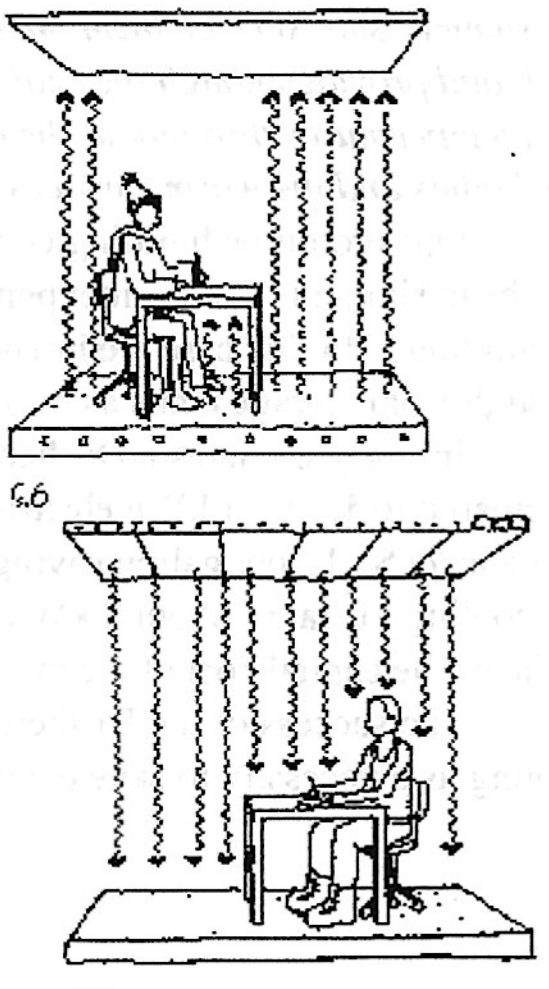
These three challenges can probably be met. Roofs that effectively collect solar heat and radiate to the night sky should be able to be constructed for the cost of a regular roof plus $3.00 per square foot.

Tanks for water storage can be installed at $1.00 per gallon or $3.00 per square foot at a thermal mass of 3 gallons per square foot. The great question is can we make an indoor radiant heating and cooling system that can work in the temperature range of the Di-thermal roof and is so comfortable the public would use them with or without natural solar heat and night sky cooling. I think we can.

Radiant slab heating is very popular yet overhead radiant systems are said to be even more comfortable.

Ed Allen discusses floor and ceiling radiant systems in this extensive quote from his book <u>How Buildings Work</u> from Oxford University Press 1995:

We will discuss these last two strategies in greater detail. Schemes for heating floors or ceilings are fairly commonplace, usually employing electric resistance wires, warm air circulating through multiple ducts, or warm water circulating through coils of pipe to warm surfaces of concrete or plaster. (Heating of walls is not usually attempted because we tend to drive nails and screws into walls for hanging pictures and shelves.) Floor systems are attractive because they warm the feet by conduction and set up convection currents that heat the air in the room quite evenly. But they have several limitations: Tables and desks, for example, cast infrared shadows that hamper the ability of the warm floor to heat hands and arms (9.6) Unless a building is well insulated, such systems are incapable of furnishing all the heat required to maintain a comfortable air temperature in a cold climate without operating at surface temperatures that are uncomfortably warm to the feet. Their efficiency is greatly reduced by rugs and carpets. They are incapable, because of the considerable thermal capacity of the floor slab, of reacting quickly to small or sudden changes in the demand for heat inside a building. And if anything goes wrong with heating wires of pipes inside the floor, repair can be messy and expensive.



Ceiling systems have few of these problems. They can run at high temperatures because people seldom come in contact with ceilings. Tearing