

Hempcrete building and Solar thermal reincarnation

Dorje Denma Ling Shambala center, Tatamagouch, Nova Scotia.



*This is Wilber **not** parked on Bedford Ave. Malagash Harbor.*



In the woods surrounding the Shambala, the earth is very Soft with thick moss loved by the moles, owls and bears.



Building of the hempcrete shrine house

A solar thermal story

3 Exxon “Day Star” panels were originally installed In 1983 by Mrs. Ida Leibovitz in Brooklyn, NY and removed by Jessica pending the sale of her estate after her passing. Today a small part of her legacy lives on in In a place that is heaven on earth. The folks at Dorje Denma Ling know that lower energy expenses will clear more time for meditation. Summer oil bills in the dining hall alone exceeded \$600 a month.

The process of restoring the panels was difficult, especially in the rain. The panels had been moved around a lot and were also in poor condition. I was aided by the hempcrete shambala team and by taking breaks for silence.

The dining hall was ideally suited for sun exposure and easy installation. All the materials to rebuild the panels were bought locally. The solar tank and “Solar Boiler Module” are manufactured in Halifax, not far away, by Thermo Dynamics. The solar pump is powered by a 10 watt PV panel.

My own Grandmother passed away while I was in Halifax getting the equipment. Therefor this product is dedicated to the two lovely women who made the act of devotion possible, Helen Halbert and Ida Leibovitz.

Turning dog poop into gold



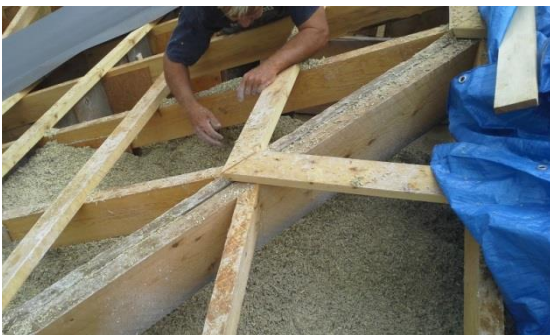
Hempcrete construction

Bails of shredded hemp are mixed 4:1 with hydrated lime and clay in this vertical shaft mixer. Water is added, while mixing, until the material has the consistency of a very dry oatmeal cookie batter. Yum.



The material is then hand packed into a removable form that is braced around the building frame. The hempcrete dries after a day into strong block that could easily withstand the blow of hammer. The interior and exterior surfaces can be coated with the surface of choice, in this case we are using plaster.

The result is an air tight, vapor permeable surface with an R value of 2.5/ inch that is a carbon negative building material. The ceiling was insulated easily by simply laying the material above the ceiling sheet rock, similar to blown in insulation. Local mass production of hemp is currently limited by federal restrictions in the US and Canada. Even with the need to import the material costs were good at \$9/ cubic foot. Dorje Denma Ling is interested in manufacturing this product for sale, perhaps in the form of custom pre cast slabs.



Solar thermal findings

A study in panel degradation



First obstacle: the frame that holds the glass on was fastened by the original manufacturer using steel screws! We had to grind off the screws. Fortunately, the galvanic principle left the aluminum frame in fine condition.

The seal between the glass and the channel in the frame was intact and appeared to be made from EPDM.

The Iso cyanic foam had been painted with white paint that was flaked off completely leaving the foam exposed to radiation that had badly deteriorated it.



Most notably, the copper "absorber plate" was mostly or completely detached from the riser tubing! It had been soldered to the absorber plate with lead solder that completely failed. There would be no heat transfer without re attaching the risers to the plate.



The most difficult part of soldering the plate on was the rain!!! It was also very difficult to keep the copper sheet flat because when the torch, however lightly, was applied, the sheet tended to bow up.



Rebuilding



1" blue insulation board was placed under the copper to bolster the deteriorated insulation. Though the temperature rating of this foam is less than those we expect to achieve, the improvement is evident.

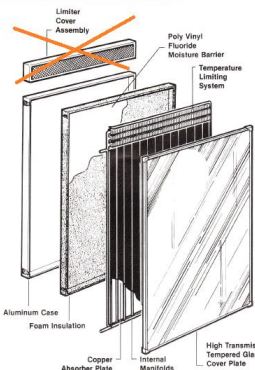
High temperature appliance paint was used to touch up the absorber plate and automotive gasket compound was used on all sealed edges and the EPDM rubber sealing strip was also re-used. The whole thing was held in place and further insulated with spray foam, the foam was painted black with latex paint.



The frame had lost its' shape during operations which presented challenges when fitting the glass back on. The aluminum frame that held the glass was screwed back onto the box with stainless steel screws.



1600 Solar Collector / TLS



Original cut sheet

Provided by Les Nelson, Western Renewables.



The system

Total budget: \$4500

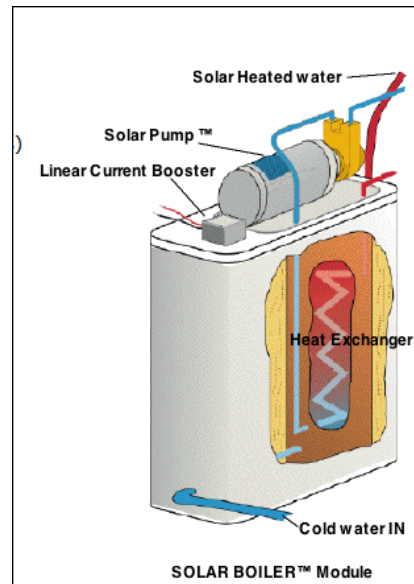


The "E Mag" pump is self-priming but it was raining on commissioning day. We manually filled the system and I am told it started right up on the next sunny day (PV powered). I am pretty sure it wasn't quite that simple but Billy had a great understanding of hydronics and knew just what to do.

The Thermodynamics heat exchanger and 12 volt pump module has two copper cylinders within. One of these is a tube in shell heat exchanger containing 3/8 tubing with 6.5 sq. ft. surface passing through it in coil form. At best, this heat exchanger will be slightly under sized. The other chamber is a pressure chamber for the heat transfer fluid (propylene glycol), it acts as a small expansion tank. One can see by the placement of an extra expansion tank that I am hopeful the heat exchanger and domestic tank will be too small. The Green Guard, 72 gallon domestic water tank is prepared to conveniently couple to the pump module with unions. DHW demand is quite high during the day at the facility, especially in the summer.

Solar heated water moves from the heat exchanger into the tank through thermo dynamic convection.

The 3/8" solar pipe connections were replaced with 1/2" connections. The fluid capacity of the solar loop is 3.5 gallons.



http://www.thermo-dynamics.com/technical_specs/solar_boiler_technical.html#Liquid_System



The heating system

The solar domestic tank pre feeds the 45 degree cold water supply to the old 120 gallon indirect tank used to heat the buildings water. The indirect tank is supplied by a 200K Btu oil boiler which also supplies the base board heat.

The commercial dishwasher uses 180 degree water, there was no mixing valve to the fixtures and there was an almost obsolete recirculation line pumping superhot water to rarely used bathrooms 24/7. These issues have also been corrected and we look forward to the upcoming oil bill and welcome your inquiries.

