Regnier Traveling Fellowship

Monthly Report: February, 2007

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Summary

It's hard to believe I'm sitting here back in the U.S. a full nine months after this international journey began. But as I look at the American sized heart attack on a plate in front of me that T.G.I. Friday's timidly offers as potato skins, it's a fact that's hard to argue. I've survived a trip covering tens of thousands of miles, and taking me to more than 40 cities in 11 countries. I've grown immeasurably from myriad challenges and opportunities encountered along the way. The Regnier Fellowship allowed me to visit and research in person, some of the most sustainable buildings being built today in Mexico and Europe. Apart from that, however, and equally significant are the cultural discoveries I made in my visits to all those countries. Gaining a first-hand perspective on the known world of a Swede, German, Spaniard, and Mexican by staying with them and soaking up as much of the modern attitude towards both the world and sustainability helped enormously in understanding their approaches to sustainable design.

February was as busy a month as October in terms of building visits and city-hopping. It was an effort to take advantage of my European location and limited time to see the places I still hadn't crossed off the list. I travelled through Spain to see projects in Madrid and Seville. I stopped over for a few nights in Paris (because you gotta see Paris). My next stop was the UK where I was busy with building visits both in England and Scotland. I finished my time in Europe with a number of nights in Dublin, ducking out of the city to see Glendalough to the south and St. Mary's Credit Union in Navan, known for it's sustainable design. After making a presentation on the travels at the ACCE's Mid Year Meeting, I'm at the Newark airport, headed home.

Madrid

A couple friends I had made in Monterrey this summer, one of them my neighbor at the time, were studying in Madrid. So I stayed a couple days with them on my way to and from Seville. From all these stories, it may seem like this trip has been full of great reunions. It has. I spent one day plodding around San Fermín Oeste, a suburb just south of Madrid with my Panamanian neighbor, Yosi, looking for a sustainable social housing apartment building that had gained national recognition for its sustainability. I wasn't able to enter the private dwellings, but did enjoy walking around it and seeing that part of the metropolitan area.

Pau Claris photo courtesy of CSCAE

Another day I traveled to the Trasluz building in the northern part of Madrid. This was another situation where despite various emails and phone calls, I received no response or offer for a building visit. So I took matters into my own hands and photographed the building from the outside. I was unable to get photos of the inside. Since then, I have been offered photos by the maintenance manager of the building and so all is not lost.

On my return from Seville, I set up a visit with the folks of the Fundación Metropoli to see their building, Eco-Box. This solar-oriented building generates half of the energy required to run it. It does this through a number of means. On the front of the building there is a substantially large panel of PV laminates generating electricity. The roof has an impressive collection of solar thermal vacuum tubes heating water for the building that runs through pipes in the concrete floor in the winter. In the summer this same hot water is converted to cold water and energy is derived in the process. This cold water then conditions the building by running through those same in-floor pipes. Other means of conditioning the building come from geothermal and a design that allows passive solar heating and ventilation.

The architect of the building, Angel de Diego, is director of the Fundación, a research and consulting organization specializing in city planning worldwide. He showed me the building, explaining both the aesthetic and functional features.

It was a very successful visit in that I was given all that information so often unavailable or denied to me: namely cost information and monitored data on the energy savings achieved by the building's systems.

Front facade of Eco-Box


Natural lighting inside the Eco-Box

Seville

My short overnight trip to Seville was great. It was jam-packed with building visits and even featured a live flamenco performance. Life may not get much better.

I arrived in the morning and after getting settled in at my hostel, I went out to find the Metropol Parasol project under construction in one of many public plazas that characterize this particularly Mexican looking city. I was disappointed to find that the project was much further behind than had been advertised in all the literature I had read on web sites. In fact, since the original construction finish date was expected in late February, 2007, I was expecting to find a site with painters and other finish workers well into their activities. So I was quite surprised to find a site with a few columns poured and little more. The sitework wasn't nearly completed. A few large steel girders had been mounted and more awaited placement, but this was still months, if not a year from being an exciting project to visit.

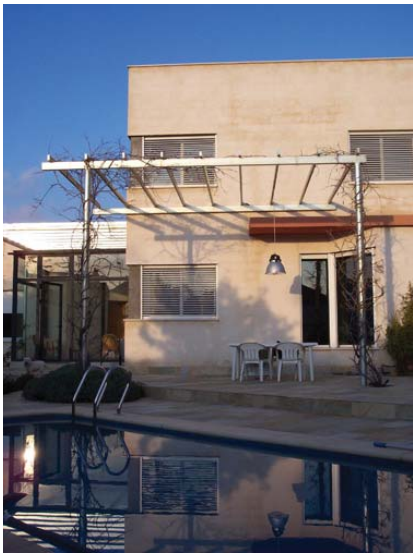

A Metropol Parasol Model in Seville

Still, the project manager on site gave me as decent a tour as could be expected under the conditions and provided me with information on the sustainably forested wood that would be used in the plywood forming the mushroom-like roof structure. He also told me where I could find a small model of the project. So I did get some idea of what the final project will look like, when the city gives them permission to put the tower cranes back up.

My next visit that evening was with architect Pablo Rico, who drove me out to a solar oriented, passively ventilated single family dwelling he designed. This house had the distinction among the other buildings I had visited of having an interior design based around Classic Feng Shui for a spiritually comforting living space.

The next day Pablo took me to a project that won national recognition for it's sustainable renovation. It was originally a building constructed for the Sevilla '92 Expo as the Pabellón Iberoamericano and was afterward adaptively redesigned to be part of the Engineering School of Seville.

Pablo worked on this project with natural lighting expert, Jose Maria Cabeza and it focused on a program of natural lighting, passive ventilation, serious insulation of building and the removal of all thermal bridges. The size of the project was impressive. A 30 million euro investment for 80,000 square meters distributed among two buildings. Software was used as a design tool in this project for natural light gains, rather than designing first and then verifying with light simulation software.



Passive house "Casa Palacios"

Pablo Rico's renovation of the Pabellón Iberoamericano

Paris

After my trip to central and southern Spain, I headed to Paris for a few nights. I wasn't able to locate or schedule any building visits for the one day I was in the city, but I visited my old roommate, Hicham, who is an architect working on a hospital project for a firm called *Design Studio*. I also got to see a lot of those places I've only seen in pictures and it really was a thrill to walk up Montmarte at night and have a glass of wine in the Quartier Latin. I was happy to find that the little French I retained from one class in college was enough to get around the city and have simple conversations.

A statue near Montmarte
(that's a toothbrush in the guy's hand)

London

I traveled around London for 4 days. I stayed with a friend in the Chelsea district and took public transportation and trains out as far as Beddington, Watford, and Maidenhead to see buildings.

The day I arrived in London, I had a meeting in Beddington to see the BedZED: Beddington Zero Energy Development project. There I took an organized tour of the project, one that I have been eager to see for the last few years and which has been famous for its local energy production concept. It was a surprise and a disappointment to learn that the biomass co-generator plant which was meant to produce most of the heat and electricity needed on site was down and hence, the development was only meeting half their energy use with renewables. However, as this is a reality, hopefully lessons learned from this development can be applied to new projects and problems avoided. The folks at BedZED were very helpful and provided information on the development and on the managing organization's environmental programs.

At the Building Research Establishment's headquarters in Watford, I visited the Millennium House. This was a house built to be both sustainable and technologically advanced. Built 10 years ago, the house was wired throughout for internet. There was a LAN built into the house controlling stereos and the washing machines were set to run when electricity prices were lowest (as self monitored from a radio station broadcasting this information).

The project also took advantage of open plan design for optimum flexibility, high insulation values and a conservatory for passive solar gains. Rainwater is collected and re-used. A grey water re-use system was implemented but had to be removed due to maintenance problems.

In Maidenhead, a public housing project, called Alpine Close, used many of the Millennium House design concepts but strove in this second and commercial endeavor to be more efficient financially. Certain features from the Millennium House were value-engineered out. However, other systems, such as a 1 kWp PV unit installed on each townhouse, were added to the Maidenhead project.

Beddington Zero Energy Development

The Millenium House; an Integer Project

Alpine Close social housing in Maidenhead

In East London, I visited a house under construction that would have a few sustainable considerations. Some of the water would be heated with a solar thermal collector on the roof and natural lighting was a big feature throughout the house. Many of the original energy saving implementations were cut for initial cost impediments. Ed, the owner, is hoping to be able to someday justify the cost of a PV installation on the roof. In the meantime, however, he's using grid electricity like everyone else on his block.

Ed Reeve's house being constructed

Inverness

I spent a few days in Edinburgh before making my way up to Inverness where I had a number of projects awaiting my visit. Once in Inverness, I rented a car because it would be a full day of travel all around and outside of the 40,000 person city and I wasn't keen on trusting buses to get me to meetings on time. In the end, it was the right choice to make. In a regular 8 hour day, I was able to get out to Findhorn, an eco-community 45 minutes south of Inverness, for a short visit, then back to visit first the Scottish Natural Heritage building, then over to the Forestry Commission's Building, off to visit the Loch Ness and hope to spot the monster, and back to the city for a visit with Una Lee, a city planner and member of the Sustainable Scotland Network. Plus I got to drive on the left side of the road.

Findhorn is an interesting community that supplies all their electricity needs on site. They have four wind turbines with a combined capacity of 750 kWp. Since they export more energy than they take from the grid, Findhorn is a plus-energy community: a net exporter of electricity. Most of the houses use bio mass (wood burning stoves) for heat. Sewage is treated with a living machine (a large greenhouse with plants and water systems that treat the sewage through a low energy, natural process).


House made from recycled whisky still wood, Findhorn

The Scottish Natural Heritage building recently won BREEAM Excellence. This rating is equivalent to LEED Platinum in the U.S. It's the highest rating a building can receive. Counting on concrete floors for a heavy thermal mass and building management software to monitor the cold water and hot water that runs in the slab heating and cooling the building, it's energy bills are much lower than a traditional building of it's size. In fact, the savings in cutting out a traditional, high capacity mechanical ventilation system allowed the architects to design a glass facade conservatory, which offers passive solar heating, natural ventilation, and light throughout the building.


Scottish Natural Heritage's ventilation and lighting conservatory

Materials were re-used, sometimes twice, and a very high percentage of construction waste was recycled during the construction phase.

From here, I went across town to the Scottish Forestry Council's new building which uses bio-mass for building heating and achieves the extremely low heating energy requirement of 12 kWh/m^2. Compare this to the "advanced" standard of housing in the Vauban district of Freiburg to meet a maximum heating load of 65 kWh/m^2 in housing. The building achieves this through good insulation, passive solar orientation and passive ventilation as well as heat recovery in the fresh air supplies. The bio-mass unit burns wood chips and uses that heat for water which is run in pipes under the floor for radiant heating. A very sustainable element of this building is the use of local, sustainably harvested materials, including Scottish Pine and granite. The pine comes from managed forests in the area and the granite does, too. Most of the wood was cut to size on site and pollution from transportation of construction materials was cut drastically.

Natural, unfinished wood is the main building material in the Scottish Forestry Commission's new building

After this meeting, I went out to see the Loch Ness. It was definitely an amazing sight. I gotta say, after all the build up from old Scottish salts at the pub the night before, I was disappointed to not see the Loch Ness Monster. Even if it was just a flash in the corner of my eye... something. But it was not to be. Nevertheless, I really gained an appreciation for the Scottish landscape out there at the loch.

The Great Loch Ness

Una Lee, of the Highland Council, told me about the incentives and suggestions being made to encourage builders to go sustainable. One of the ideas being tried out is to require developers of large housing projects to meet certain standards in regards to energy conservation. They want those players who can afford the extra costs associated with more energy efficient design to help build up a market for these materials and solutions so the prices will come down enough for small builders to be able to afford the implementation of those solutions in their projects.

Back in Edinburgh, I focused on developing my presentation for the ACCE meeting. I also wandered the city. I heard that their new parliament building is a model of sustainability but wasn't able to schedule a visit in time. I did, however, walk through the streets of Edinburgh completely in awe of the medieval architecture.

Edinburgh Castle

Dublin

I spent the last four days of my trip in Ireland, based in Dublin. While there, I saw some of the Irish countryside, visiting the church ruins at Glendalough. I also visited a few sustainable buildings. The Daintree building is located in Dublin and was designed by Solearth Architecture. The building is mixed-use with seven apartment units above office space and a café. The Solearth firm is located in the building as is the owner, Daintree Paper Co.

The Daintree building uses two kinds of insulation, hemp fiber and sheep's wool, to achieve a high U-value of 0.19 which is twice as high as the code requirement. Rainwater is harvested for toilet flushing and only organic finish materials were used inside the building. Outside, the building is clad in a naturally weather and insect resistant cedar. Aside from being oriented for passive solar gains, the building uses geo-thermal heating and solar thermal water heating. Green roofs help minimize storm water runoff.

Brian O'Brien, designer of the Daintree gave me the building tour and then recommended that I go to Navan, an hour's drive north of Dublin, to visit the St. Mary's Credit Union. I wasn't able to secure a building visit, but did take pictures on my own of the outside and was given contact information for the architect so I could follow up from the States.

St. Kevin's Church in Glendalough is over 1500 years old.

The Daintree Building, Dublin

Final Thoughts

After an incredible nine months of travel, and visits to dozens of buildings around a number of countries, I can't help but be surprised by how far we all have to go to create energy independent and emissions free buildings around the world. I was also very impressed by the fact that the most sustainable buildings I saw, across a variety of indicators, weren't the high performance, zero energy houses in Europe, but the simple adobe houses in Mexico. These houses require very little energy both in their construction and throughout their lifetime. Important neighborhood bonds are created during their construction when neighbors come together to help one another build.

Additionally, the buildings I visited were still in the vast minority of building stock. I hope the Green Building Worldwide database will do its part to motivate owners to go green. My next stop is Sydney, Australia for a job with Green Building Council of Australia. So thanks for an excellent ride and g'day, mates!

St. Mary's Credit Union, Navan