

Vanderweil GreenNotes is a quarterly update that profiles our everyday efforts towards sustainable design and practices. Fall 2008

Featured Project: Champalimaud Foundation Research Institute

Lisbon, Portugal - Contributors: Chris Wescott, Dave Pinto and Mark Csontos

When completed in Lisbon, Portugal in 2010, the 500,000 sf institute will combine oncology research and clinical care in a single, world-class facility. In addition to research laboratories and clinical spaces, the program encompasses a vivarium, restaurant, cafeteria, conference center and an outdoor amphitheater.



As is typical for many overseas projects, Vanderweil developed the concepts and basis of design, as well as plans and specs through the DD level, and a local engineering firm did the detailed CD's. The project is seeking European LEED certification, the design team was challenged with creating

systems that will be both energy efficient and environmentally responsible.

A sample of the sustainable features inherent to the MEP design includes the following:

- Active and Passive Chilled Beams - the combination of the two types of beams provided the quantity of sensible cooling needed without having to over ventilate the spaces if only active beams were utilized.
- Daylight Dimming
- Solar Thermal – to preheat domestic hot water.

River Water Cooling - Water from the Rio Tejo river, which runs adjacent to the site, will be utilized to reject condenser water heat. A design temperature of 66°F was used for the river water and a maximum rise of 5.5°F is to be maintained between the inlet and return water temperatures, to minimize impacts on marine

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Revit's Place in Integrated Design for Green Buildings

Contributor: Patrick DeLuca

Integrated architectural-MEP solutions that go beyond LEED - for example natural lighting and natural ventilation systems, high performance air systems, and rainwater harvesting systems – are coming to the forefront in green design, and Vanderweil is pushing the envelope with these. Hand-in-hand with integrated systems, integrated design processes are now becoming important. Vanderweil has investing heavily in Revit, a 3-D BIM tool that will become the cornerstone of our integrated design process.

We have had 20 Revit licenses for a year and a half, have learned the CAD process for Revit, and have produced our first generation of Revit projects. Revit for MEP is not yet a complete product since it is lacking manufacturer's 3-D detail for their products and components. However, this doesn't mean that its too early for Revit to be useful for us and the architects we work with. On the contrary, by using it to design in 3-D we provide

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Suffield Academy: Daylighting Design

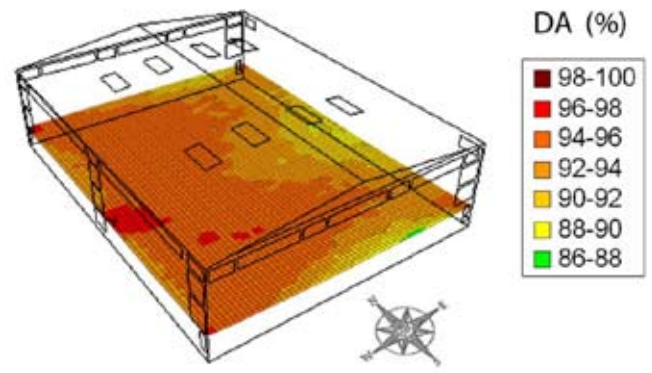
Suffield, Connecticut - Contributors: Roselin Osser, Alex Vanderweil, Gary Vanderweil and Joshua Brain

The goal of a good daylighting design is to make maximum use of daylight to replace electric light while maintaining visual comfort and managing solar gain. A variety of daylighting analysis tests were performed for the Suffield Academy Gym. Using Radiance, the most physically accurate lighting simulation engine, illuminance levels and glare presence were examined for different times of the day and year.

Calculated illuminance levels were then validated by comparison with physical measurements taken inside the gym, showing a good correlation for the sample date and time. To combat the presence of glare which would disrupt the use of the gym, the interaction between daylight and electric light was examined, as well as the use of tinted glass for skylights. Both the tinted glass and the use of electric light with daylight reduced glare by reducing contrasts within the space. Additionally, a daylight autonomy study using the software Daysim was performed.

Daylight Autonomy (DA) is defined as the percentage of working hours where the workplane would be sufficiently lit with daylight alone, calculated using solar and cloud cover data specific to the

project site. While daylight autonomy was calculated at above 90% for the whole space using clear glass skylights, the metric does not address visual comfort and should be used iteratively with glare reduction measures.



Daylight Autonomy Graph - Suffield Academy

Featured Project: Champalimaud Foundation Research Institute

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ecosystems. Mechanical equipment consists of two, 11,500 GPM submersible, mixed-flow impeller pumps (one of which is redundant), three 3,850 GPM Lakos centrifugal separators, and three equally sized plate-and-frame heat exchangers.

Innovative Run-Around Heat Recovery - In a traditional run around system there is an extra coil in the AHU, which results in a corresponding extra pressure drop. To avoid this, we used a new approach. We used a single coil for heating, heat recovery, and cooling. This means that recovery of coolness is not possible when refrigeration is needed (above 52°), since at these times the single coil is used for chilled water. However, the savings in fan energy relative to the loss of coolness recovery is strongly in favor of this approach, especially considering the first cost savings of the reduced number of coils. Because the 99.6% outside winter design temperature is 39°, plain water can be used in the piping without freezing concerns. This increases

system efficiency still further, relative to the glycol systems customarily used for heat recovery.

Dedicated Heat Recovery Chillers - Two heat recovery chillers, piped in series, are capable of simultaneously making the design chilled water and heating hot water supply temperatures of 44°F and 130°F respectively. When performing heating and cooling simultaneously, these units have a combined COP of 6.5 and function as the first stage for both chilled water and heating hot water production. Payback is less than two years for the equipment. Series piping provides a larger operating range for variable water flow through the evaporators and condensers.



Micro-Bubble & Dirt Separators - Spirovent separators were used to remove air, microbubbles, and sediment from the three hydronic systems (chilled, hot and condenser water). These remove 95+% of the air as compared to conventional separators, resulting in improved heat transfer and lower pumping energy.



Revit's Place in Integrated Design for Green Buildings

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a very important tool for coordination, including the cutting of cross sections anywhere in the project. The architect for one of the KAUST science buildings, for example, folded our 3-D mechanical drawings in with architectural and structural and performed an automatic interference check.

Vanderweil's position as one of the top 30 Green Design Firms highlights our commitment to sustainability, green design, and the integrated design process. With dozens of Vanderweil buildings attaining LEED certifications, it is clear that we must maintain our focus and further our commitment to the Green Building Initiative with an ever expanding array of design tools geared toward this effort.

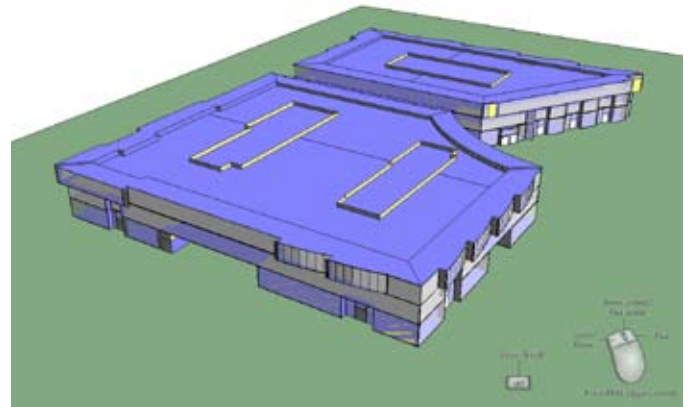
There are many software applications on the market today that allow us to identify areas of concern when considering the Green Building. Daylighting studies, thermal and energy analysis, airflow studies and more are approached with an integrated design process that is strengthened by the combined implementation of these software applications.

IES Virtual Environment and Green Building Studios are just two of the software packages used to achieve these goals and they are also two add-ons included in the Revit MEP program.

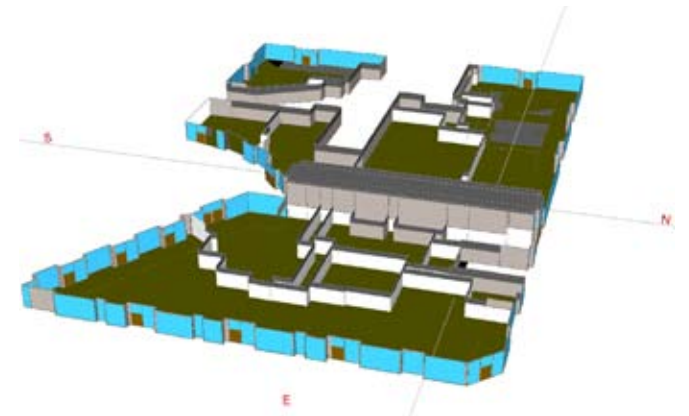
Also noted, Revit MEP works with Revit Architecture and Structure to create a 3-dimensional model that is used to create, manage and share design information more effectively, which contributes to increased productivity, reduced risk and fewer inefficiencies in building design.

Revit MEP combines all trades into a central model which aids in coordination, interference detection and creation of a single source for project documentation including plans, details and schedules that are continually updated by an internal database such that changes in any area of the model are reflected

throughout all other applicable areas of the model. The addition of the Green Building design abilities within Revit MEP will serve as a platform for continuing our established commitment towards creating a sustainable design focusing on accurate environmental analysis which leads to important energy conservation solutions.



Square 696, 99 Eye Street, NW, Washington, DC. Model Assembled in Revit, Imported into IES.



Square 696, 99 Eye Street, NW, Washington, DC. Model Assembled in Revit, Imported into GBS/eQUEST

New in the Q

The Green Design Resources folder is located: Q:\Sustainable Design and Energy

LEED 2009, Public Comment Round 2

Have your voice heard. Go to: http://communicate.usgbc.org/newsletters/USGBC_Update/0812_full.html

Building Information Modeling (BIM)

Written by AIA in 2007, "Integrated Project Delivery: A Guide" describes how design tools, team structures, and processes are changing time lines, contracts, design phases and construction. This guide will be a useful tool for all those designing in a BIM/3D environment where increased emphasis has been placed on achieving integrated design and project delivery.