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# HUNZINGER CONSTRUCTION UNIVERSITY A PLATINUM SHOWCASE FOR EDUCATION

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## INTRODUCTION

*Hunzinger Construction University (HCU) was founded in 2000 to provide quality continuing education and field training for Hunzinger Construction employees and outside guests. In August 2008, Hunzinger Construction University and its leaders were awarded the Green Educator of the Year Award from Wisconsin Builder Magazine.*

*The University organizes over 70 continuing education opportunities per year and continues to expand its offerings. Classes offered cover topics such as sustainability, green building and the LEED® Rating System, safety, business acumen, construction materials and new products, design and construction methods, health and wellness, crisis management, first-aid and CPR, cooperation and conflict management, self improvement, financial management, business writing and presentation skills, time management, situational leadership, jobsite productivity and delivering persuasive presentations.*

*Due to the growth of HCU and the need to expand Hunzinger Construction Company’s yard, warehouse, and office space, an adjacent property was purchased to create a stand-alone training facility to host educational workshops and events, and address the needs of our corporate office.*

*After obtaining the first LEED-CI Gold certification in Wisconsin, 12th in the United States for the renovation of Hunzinger Construction’s Corporate Headquarters in 2007, Hunzinger made the decision to approach the HCU renovation as a LEED-CI Platinum project. The new facility was awarded the first Platinum LEED-CI certification in Wisconsin, 8th in the United States and 9th in the World by the United States Green Building Council in March 2008.*

## PROJECT OVERVIEW

The acquisition of an existing vacant service center directly east of Hunzinger Construction’s Corporate Office presented a unique opportunity to the project team. The team was challenged by the CEO to build on the success of the USGBC Gold Certification received for the renovation of our corporate office, and explore the following questions and meet the identified goals:

1. How can we use the new renovation project to further our corporate cultural shift toward being a more responsible and sustainable Construction Manager and General Contractor?
2. How can the team maximize its efforts to meet or exceed the USGBC Gold certification already obtained for Hunzinger’s Corporate Office?
3. The new facility itself should be a showcase of sustainability, demonstrate how an existing

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building can be recycled, act as a model for education, and provide a platform for other organizations to learn.

4. The new facility must provide a new training center for Hunzinger Construction University and efficiently expand Hunzinger's yard, warehouse, and office space.

The design team used the answers to these questions and the identified goals as the catalyst to develop the final configuration and design solution for Hunzinger Construction University. The office wing of the center was completely renovated and reconfigured as a large multi-purpose training room for Hunzinger Construction University. Two smaller rooms were designed to accommodate offices or break-out rooms. A skylight was added to increase the natural light in the main room, reduce the amount of artificial light required, and improve the ambience of the space. A new glass entry was added as well to supplement the natural light entering the space. The new high efficiency rooftop unit and direct/indirect lighting was laid out to accommodate large group meetings or future systems furniture layouts. New ADA accessible toilet rooms utilizing dual flush toilets and water saving lavatories were sized to accommodate both the assembly and office uses.

The completed project is a clean, modern, energy efficient space and serves as the training center for all safety, continuing education, and sustainability training seminars, including in-house and outside trainers. The flexible infrastructure is also being

Multi-purpose training room for Hunzinger Construction University.



used as a community meeting center for service and professional organizations, as well as the Spring "Green Building Conference" that hosted National Speakers and a "Green Fair" of sustainability exhibitors, including Johnson Controls, The University of WI-Milwaukee School Of Architecture and Urban Planning, Focus On Energy and other sustainability suppliers and vendors.

The neutral color scheme, open concept, two-level lighting, networked audio-visual system, and WI-FI connection to the Internet all combine to allow the users to experience a Platinum certified sustainable space without exceptionally unique design characteristics or high cost.

## PROJECT DETAILS

### *Sustainable Sites*

Even though the existing facility was not a LEED certified building, we were still able to achieve points for some of its inherent qualities as is or with minor modifications. A full point was available since we had no permanent irrigation system, satisfying requirements SS Credits 1H and 1G—Water Efficient Irrigation.

A few simple site modifications granted another 2 points in the area of Alternative Transportation. SS Credit 3.2—Bicycle Storage & Changing Rooms was achieved due to the adjacent corporate office's showers and changing rooms, which are within 200' of HCU, and the addition of a bicycle storage rack. By designating carpool and hybrid parking spaces in the existing parking lot we were also able to achieve SS Credit 3.3—Parking Availability.

### *Water Efficiency*

Following the office remodel, HCU now uses 42% less water than baseline fixture performance requirements of the Energy Policy Act of 1992. This equates to a water savings of over 7,700 gallons of water annually. The water efficiency increase for HCU achieved 2 points. Water conservation fixtures used in the building include the following:

#### **Fixture: Dual Flush Water Closet**

Dual flush toilets that could be used with the existing drain and water supplies were used for water conservation. The 1.6GPF/0.9GPF water closet gives the user options to maximize water conservation depending upon the use. The dual flush provides adequate water to maintain a sanitary condition.

Used: Toto Aquia Dual Flush Toilet 1.6GPF/0.9GPF Model #CTS414M

#### **Fixture: Waterless Urinal**

The water free urinal selected can save up to 40,000 gallons of water per unit per year. The design of the fixture allows for hands-free operation, and the biodegradable sealant liquid used to control odors creates a hygienic atmosphere, which requires minimal care.

Used: Sloan Water Free Urinal Model #WES-1000

#### **Fixture: Lavatory Faucet**

The touchless technology used by the Eco-Power® sensor faucet we selected is not new; however, this special faucet does have something the others don't. This unit does not require electrical wiring from a power source. It uses batteries! The hydro-powered turbine charges the battery during usage eliminating the battery replacement up to 10 years. The faucet also has a 10-second spray time, which uses less than 0.17 gallons per cycle.

Used: Toto Self-Generating EcoPower System Sensor Faucet Model #TEL3GSC-10

#### **Fixture: Water Heater**

In an effort to reduce energy costs for the building we were able to adjust the water temperature for the water heater from 130° to 110°. This temperature is still within range of code requirements and will save energy and utility costs.

### *Energy & Atmosphere*

Buildings consume almost 70% of all the electricity produced in the United States, according to the U.S. Department of Energy. Generation of this electricity from fossil fuels negatively effects the environment in a number of ways. LEED certified buildings reduce the amount of electricity required by operating more efficiently. The Energy & Atmosphere category addresses the building's electricity usage and requires the following three items to be addressed: correct installation and operation of energy related systems, building energy performance, and ozone layer depletion.

Hunzinger Construction hired a Commissioning Authority to verify that the building's energy related systems were installed, calibrated, and operating as intended to ensure maximum efficiency. Furthermore, HCU has been designed to exceed the mandatory provisions as listed in ASHRAE 90.1-2004. This standard includes energy requirements that address building envelope, HVAC, plumbing, and lighting. All CFC-based refrigerants were removed and replaced with refrigerants that have zero Ozone Depletion Potential (ODP) such that global climate change is not affected.

### **Optimize Energy Performance**

The rooftop unit installed includes an economizer and a zoned ductwork system. The economizer allows the unit to utilize “free-cooling” during the shoulder months of the year (late spring and early fall). Each perimeter exposure and every office was provided with a zone such that the cycling of the heating and cooling is minimized. Carbon dioxide sensors were also installed to reduce the amount of fresh air being provided to the space when there are no occupants present. Reducing the amount of fresh air provided to the space directly results in less electricity required for air conditioning and less natural gas required for heating. The rooftop unit is controlled by a programmable thermostat that allows the unit to go into a night setback mode. This allows the unit to reduce, if not eliminate, its energy usage during the unoccupied times of the building.

### **Optimize Energy Performance— Lighting Power**

To optimize the energy performance for the lighting power, the designers opted to replace all the lighting fixtures with efficient fixtures. By replacing all the fixtures, HCU has achieved greater than a 34% reduction in lighting power density below the standard required by ANSI/ASHRAE/IESNA 90.1-2004. PDI98 LiteControl Fixtures, which utilize Lutron ECO10 dimming ballasts, were selected for HCU.

### **Optimize Energy Performance, Lighting Controls**

The lighting controls for our remodel consist of several layers. These layers provide an efficient method of delivering light to the various spaces of the project and are described as follows:

1. Local Dual Level Switching
2. Local Automatic Shut-Off
3. Local Photo-Sensing Step-Down Dimming

#### *Local Dual Level Switching*

The light fixtures throughout the private office and open office spaces have the abil-

ity to be reduced to 50% power via a step-dimming ballast, controlled by two single-pole light switches. When either one of the light switches is engaged, the light fixture is at 50% power. Engaging the second light switch while the first is engaged brings the light fixtures to 100% power (unless there is a photo sensor in the control circuit. See photo-sensing control feature).

#### *Local Automatic Shut-Off*

The private offices, restrooms, workrooms, and open office areas utilize a local occupancy sensor. The Wattstopper CX100 is installed in the private offices and workrooms while the Wattstopper W1000A is installed in the restrooms. These devices provide an immediate shutdown of local light fixtures upon sensing an unoccupied space for a set amount of time. The occupancy sensor is wired ahead of the local wall light switches to assure a shutdown of light fixtures, even if the occupant forgets to turn off the lights manually via the wall switches.

#### *Local Photo-Sensing Step-Down Dimming*

The main open office area utilizes a Lutron Grafik Eye 3000, which is an auto daylight lighting control system. The system incorporates a programmable dimming controller, photo sensors, and Lutron fluorescent dimming ballast. Lighting levels for the area can be set at desired levels. The system senses the available sunlight coming through windows and skylight and adjusts levels accordingly. At night and overcast days the system has preset scenes and lighting levels to further reduce energy usage.

### **Green Power**

Hunzinger Construction has enrolled this project in the WE Energies Energy for Tomorrow renewable energy program. Energy for Tomorrow allows customers to have We Energies produce or purchase renewable energy at 50% of the electric use of the building and replacing equal amounts of electric generation from traditional sources.

## Material & Resources

Beyond simply meeting the prerequisite of a recycling area for this renovation project, we set out to create a recycling area that would assist all of our projects in diverting construction waste from local landfills. While the actual amount of waste generated by this project would not be that great, we could have a greater effect on recycling efforts by locating dumpsters in our yard designated for sorted goods such as concrete, wood, and metals. We would still be responsible for diverting over 85% of construction waste from the landfill by utilizing manufacturer's recycling programs for the carpet and sorting the remaining materials for proper recycling.

This project tried to avoid using any virgin materials for construction. Over 57% of the materials used on the project were salvaged, refurbished, or reused materials. The materials that were purchased new had a total of over 23% recycled content in them and over 46% of those materials were manufactured within 500 miles of the project.

Rapidly renewable materials were incorporated into the project. Over 10% of the materials were made from plants that are typically harvested within a ten-year cycle or shorter. Over 51% of the wood-based materials and products used on the project were certified in accordance with the Forest Stewardship Council's (FSC) principles and criteria.

### Construction Waste Management

Prior to construction, guidelines were established on the key materials that would be mandatory for recycling and salvage. Based on the guidelines set, a Construction Waste Management Plan was implemented focusing on reduction, reuse, and recycling. This process resulted in 7.05 tons of construction waste (85% of total) being diverted from the landfill.

### Resource Reuse

A goal for the team was to reuse as many resources as possible including materials not only from this project, but from past and present Hunzinger Construction projects as well. Examples of resources refurbished and reused from this project include: metal railings, door frames, carpeting, hardware, oak trim, wainscoting, and toilet accessories. In addition, an

aluminum entry door was relocated from the warehouse to the main office, and a window was also relocated to another area.

The carpeting and skylights were recovered from an existing project and installed at our office, thus diverting it from being sent to a landfill. In total, this project utilized salvaged, refurbished, or reused materials and products (excluding furniture and furnishings), for which the typical replacement value is equivalent to 57% of the total material cost for this project.

### Recycled Content

Overall the level of recycled content, both post-consumer and post-industrial, in the construction materials we selected, is 23.25%. Some examples of the recycled content are: Caribbean GlasBac Tile Carpeting Interface-Flor (0% post-consumer, 44% pre-consumer), Caper Chairs by Herman Miller (15% post-consumer, 6% pre-consumer), CLT Tables by Herman Miller (8% post-consumer, 60% pre-consumer), and sheetrock brand gypsum panel by USG (5% post-consumer, 94% pre-consumer).

### Rapidly Renewable Materials

To meet the intent of rapidly renewable materials and to reduce the depletion of finite raw materials and long-cycle renewable materials we incorporated the following items:

- Durodesign cork flooring is composed of 100% pre-consumer recycled waste from the wine-stopper industry. Cork is a rapidly renewable resource harvested every seven to nine years. The cork oak tree is not harmed by the harvesting of its bark and regenerates a new bark layer.
- Dakota Burl Bio-fiber wall panels are a unique material that utilizes a bio-based technology and exhibits the beauty and elegance of traditional burl woods. Dakota Burl is manufactured from a rapidly renewable agricultural fiber by-product and is 84% renewable.
- Linoleum flooring by Armstrong has 36% renewable material incorporated into the product.

### Certified Wood

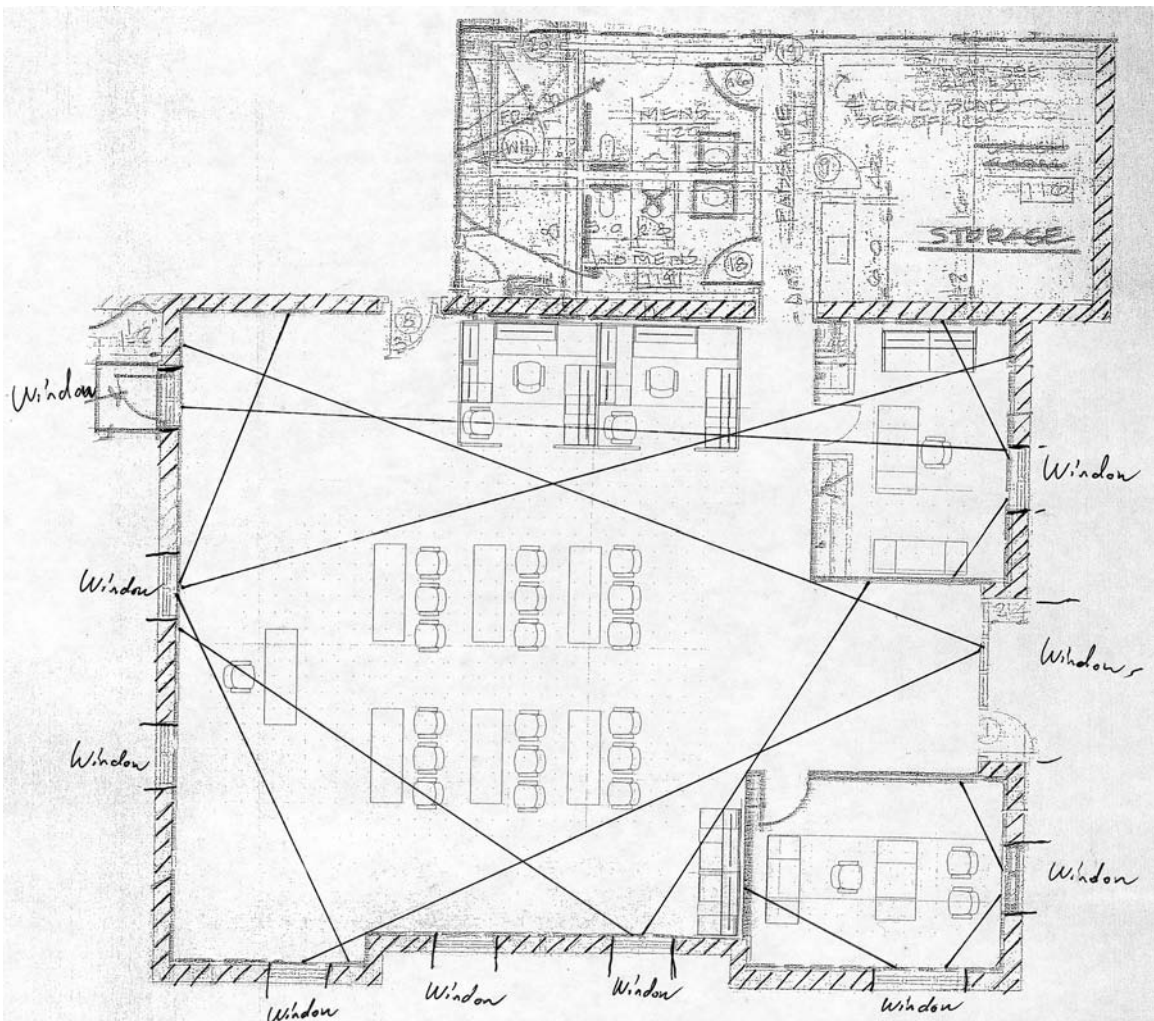
The Forestry Stewardship Council (FSC) has established international forest management standards to assure that forestry practices are environmentally responsible, socially beneficial, and economically viable. To receive credit for this point, over 50% of the wood-based materials and products used on the project must meet this standard. To meet the standard, this project used Algoma Hardwood doors in which 85% of the doors (by weight) are made up of certified wood meeting the standards of FSC.

### Indoor Environmental Quality

Millions of people suffer from symptoms created from poor indoor air quality. The Indoor Environmental Quality category addresses the air quality of a building and requires the following items to be addressed: performance of the ventilating system and tobacco smoke control.

ASHRAE 62.1-2004, Ventilation for Acceptable Indoor Air Quality, outlines acceptable IAQ levels such that adverse health effects are eliminated. The HVAC contractor, Total Mechanical, was responsible for a design that met the minimum Indoor Air Quality prerequisites as well as followed an IAQ Manage-

**FIGURE 1.** Daylight Views.



ment plan during construction. Total Mechanical exceeded the requirements of this standard by more than 30% to provide the occupants with superior indoor air quality. To guarantee second-hand smoke is not a nuisance, Hunzinger Construction has implemented a no smoking policy within the building and on the entire site. The building automation system will alarm the occupants if the fresh air provided to the building is less than designed. The occupant can then notify the mechanical contractor to adjust the fresh air intake such that the HVAC unit continues to provide the correct amount of fresh air to the building.

After construction and before occupancy the ventilation system continuously provided 100% outside air to the space for nine days to help eliminate the indoor air quality problems that can result from the renovation process. Even though low-emitting paints, carpets, and sealants were specified for use in the project, this process is still required.

The building's thermal environment has been designed to comply with ASHRAE 55-2004, Thermal Environmental Conditions for Human Occupancy. The Trane Trace 700 load program was utilized to calculate the required equipment sizing in order to achieve optimal thermal comfort. Additionally, a thermal comfort survey has been written and will be

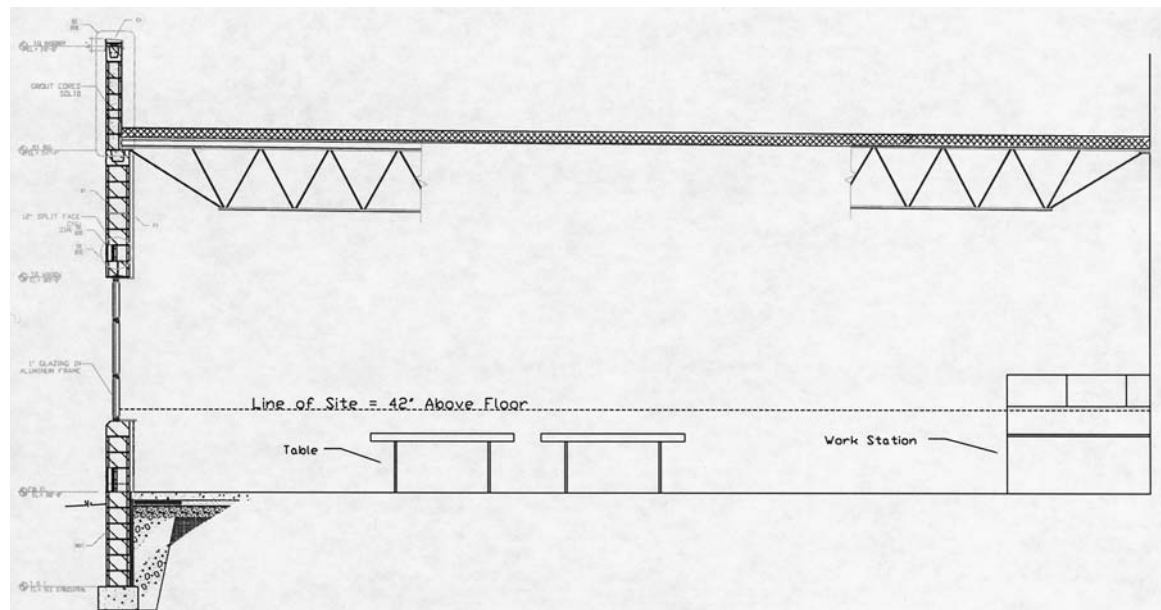
completed by the building's occupants such that adjustments can be made to improve thermal comfort.

To further provide occupant comfort, added controllability of the lighting system was addressed. The introduction of VAV boxes increased the number of zones from 2 to 18, allowing temperature control in each private office and smaller segments of the open offices. The existing skylights, along with the demolition of some private offices, allowed increased daylight and views.

### Daylight and Views

Daylighting and views provide building occupants a connection with the outdoors with the introduction of natural light into the regularly occupied spaces of the building. Through the use of sidelighting-vision glazing with a visible light transmittance ( $T_{vis}$ ) factor of .74 and toplighting-horizontal skylights with a visible light transmittance of .80, the project was able to have a daylight factor of over 2% in over 91% of the regularly occupied spaces. Also, the building occupants in over 90% of the regularly occupied spaces will have direct lines of site to perimeter glazing (between 2'6" and 7'6") from a seated position 42" above the floor.

**FIGURE 2.** Daylight Views.



## **CONCLUSION**

Hunzinger Construction Company maintains a common mission and belief that sustainability is not only achievable at all budget levels, but also that our staff of over 30 LEED® Accredited Professionals will maintain a culture to consistently re-educate ourselves and share our experiences, passion, and enthusiasm for these innovative techniques with those interested in lessening their environmental impact.

The green building industry has come a long way from simple recycling programs and the development of more stringent building and energy codes. It is by accepting these mandates further, as LEED® Accredited Professionals, that our network of ambassadors for the United States Green Building Council (USGBC) and the LEED® Rating System are able to prove our mutual desire to build and maintain a more sustainable world.