Grainger Engineering Library, #324

Building Gross Sq.Ft.: 126,838

Simple Payback: 2.6 YRS

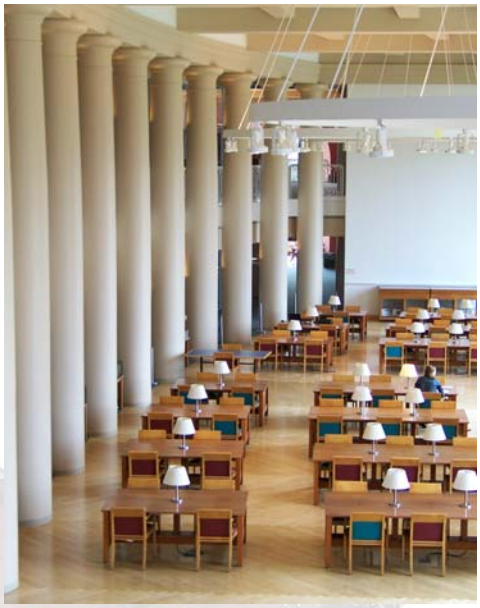
Retrocommissioned: Apr-Jul 2011

Annual Energy Avoidance: 14%

(Based on one year's non-normalized data)

Principal Building Use: Open Study Areas, Computer Labs

Facility Contact: Barbara Bolser



Building & Occupant Overview

The Grainger Engineering Library is the main study area and meeting place for engineering related resources and engineering students for the Champaign-Urbana campus. The building was originally built in 1994 and since then HVAC controls upgrades have taken place. Grainger is scheduled open 24hours/5 days, and closes minimally on weekends during regular semester times. A total of four air handling units serve the entire building with conditioned air. Cooling is provided by means of a steam absorber and a screw chiller totaling 450 tons. The heat in the building is provided by a combination steam and hydronic system. Building controls are Siemens Modular and 24pt Compact controllers.

The facility's total metered energy for the previous year was 56,380 MMBTU.

Post RCx Energy Use Intensity (EUI) & Cost Index (ECI)

E.U.I.	E.C.I. #1	E.C.I. #2*
384.2 kBTU / Sq.Ft.	$6.60 / Sq.Ft.	$858.82 / person

** ~975 PEOPLE OCCUPY THE BUILDING ON A GIVEN DAY*

Retrocommissioning Specifics & Results

The air handling units (AHUs) providing air conditioning were maintaining space conditions 24/7/365. The primary energy conservation method was to visit each VAV box in the building and re-balance the system to its' current requirements. This allowed a reduction in the VAV minimums, therefore reducing unnecessary reheat through the building. The other issue addressed by this box-by-box visit was building pressurization issues. Currently, the building will maintain a slight positive pressurization during all modes of operation, which had been an issue for several years. Leaking reheat valves were replaced, as well as faulty pneumatic controllers.

The addition of DDC controls to both heat exchanger systems, as well as VFD's to the radiation system, gave more opportunities for savings. Temperature resets were implemented on both systems based on return water temperature. The radiation system had a DP transmitter installed to deliver only the required amount of water to the system, instead of pumping water unnecessarily.

Project Highlights

- Total building balance was performed, reducing minimal flows through VAVs across the board
- DDC controls were added and commissioned for all four AHU's and two HX's
- Several dampers were repaired throughout the building, including return, outside, relief, and make-up air dampers
- Several reheat valves and VAV controllers were replaced to correct VAV operation
- Blown diaphragms on all steam valves serving heat exchangers were replaced

November 9, 2012