Loyola University – John and Kathy Schreiber Center – Quinlan School of Business

The John and Kathy Schreiber Center, located on Loyola University's Water Tower Campus, was designed to be a sustainable, high-performance new academic building serving as a dynamic new home to the Quinlan School of business. Elara's innovative design techniques used active and passive systems to effectively provide heating, cooling and ventilation for the facility.

AUTOMATED SHADING SYSTEM AND DAYLIGHT HARVESTING

Schreiber Center's most prominent architectural feature is the full-height atrium located centrally within the building, serving as a space of connectivity for building occupants while introducing air and natural light into the building's core. The solar heat gain during the cooling season is minimized by utilization of an automated motorized shading system within the ventilated double façade. When the sun is imposing a load on the south façade, the blinds are deployed to avoid direct beam radiation into the space while maximizing diffused light for daylight harvesting. The solar radiation is trapped between the two layers of energy efficient glass and naturally vented out through motorized windows at the top and bottom of the solar chimney. Any direct solar radiation in the atrium is absorbed by the chilled slab which is the primary heating for the atrium in the winter.

NATURAL VENTILATION

Schreiber Center was designed with the capability to operate in natural ventilation mode when outdoor temperature and humidity conditions are desirable. All private offices contain manually operated windows and all classrooms, public gathering spaces, the double façade, and atrium skylights are equipped with automated motorized windows. When the building is operating in natural vent mode, all motorized windows are opened and natural cross ventilation is achieved. The atrium space was designed such that operable windows transfer air from the perimeter offices and classrooms to the atrium where it is exhausted out of the building through skylights in the atrium. In this mode, fans and mechanical cooling are shut off.

DEMAND CONTROLLED VENTILATION (DCV)

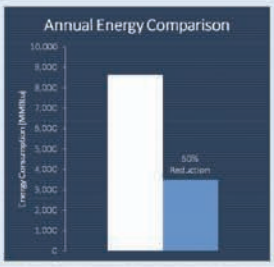
When not in natural vent mode, Schreiber Center was designed for DCV utilizing a dedicated outside air system (DOAS) with heat recovery. This system utilizes 3 variable air volume (VAV) DOAS air handling units that are each equipped with an energy recovery wheel capable of recovering 75% of the energy. The control system provides an added layer of safety by resetting the chilled water temperature if the dew point in any space approaches the supply temperature to the chilled beams and chilled ceilings to prevent condensation.

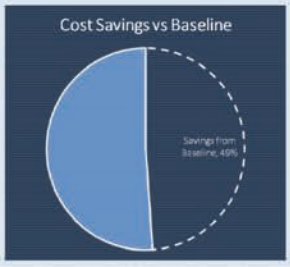
ACTIVE CHILLED BEAMS AND RADIANT CEILING PANELS

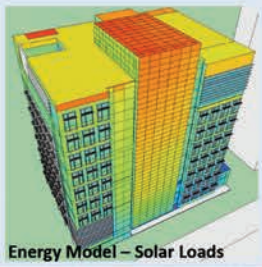
The building utilizes two different systems to provide mechanical space conditioning building – active chilled beams and radiant ceiling panels. Active chilled beams installed in offices rely on high efficiency induction nozzles to induce room air through secondary coils. The chilled beams operate with a low static pressure requirement that allows for relatively smaller sized air distribution equipment. In all classroom and multipurpose spaces, dual temperature radiant ceilings covering 80% of the ceiling surface operate using the same variable speed two-pipe distribution system utilized by the chilled beams. The radiant panels allow occupants to feel comfortable at lower temperatures in heating and higher temperatures in cooling compared to traditional air systems. By this same energy efficient design strategy, the first floor lobby and each floor of the atrium area are heated using a radiant slab.

BUILDING AUTOMATION SYSTEM (BAS)

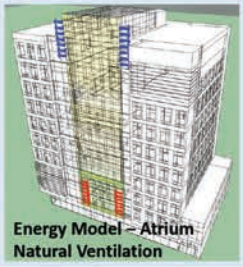
The Building Automation System (BAS) needed to be very robust to integrate all systems into an intelligent, smooth and functioning system. Schreiber Center uses a direct digital control (DDC) system to actively monitor and control all mechanical systems throughout the building. This system also controls the motorized blinds and windows in coordination with the mechanical systems. Thermostats notify occupants when windows are to be opened for natural vent mode by changing color.







Energy Model – Solar Loads



Energy Model – Atrium Natural Ventilation

NEW CONSTRUCTION

- 16 E. Pearson Street
- Built in 2015
- 10-Stories
- 120,000 sq. ft.
- Classrooms, faculty offices, multipurpose rooms, and gathering spaces
- Full-height atrium at building's center
- LEED Gold

ENERGY EFFICIENCY

- High-efficiency equipment with smart controls
- Automated shading system in atrium to minimize solar heat gain
- Natural Ventilation during optimal periods throughout the year
- Radiant panels and chilled beam units to meet sensible loads
- DCV system with energy recovery

COST EFFECTIVENESS

- Equipment selection centered on sustainable design and high energy performance
- Cost savings realized in annual energy reductions reflected in building operation
- Systems and featured installed with the intent of outperforming conventional measures in both efficiency and service life

ENVIRONMENTAL IMPACT

- High efficiency equipment and sustainable equipment minimize overall utility input to building
- Nature of design intent and operational abilities of mechanical systems significantly minimize energy costs that are otherwise present in a conventional HVAC system
- Clear reduction in amount of harmful emissions expelled into atmosphere