

FIELD STUDIES

TO INFORM DESIGN OF HEALTHY, HIGH-PERFORMANCE BUILDINGS

A joint project of the Tulane School of Architecture and Eskew+Dumez+Ripple



Summary Many recent building projects around New Orleans have established goals of low energy use, good occupant comfort, and excellent environmental performance. In order to document what's working and help identify what could be improved, the Tulane School of Architecture (TSA) and New Orleans-based architecture firm Eskew+Dumez+Ripple (EDR) have set up a joint research project on monitoring building performance. This team won a nationwide grant competition from the National Council of Architectural Registration Boards (NCARB) to purchase monitoring equipment, and to develop teaching tools to allow students to be trained in building monitoring and analysis. All labor on this project is donated; 100% of the grant funds have gone to the purchase of equipment.

Data We Collect Our focus is on energy use, interior environmental conditions, and occupant comfort. The interactions between these three areas provide a holistic view of how the building is performing. Specifically we collect:

- Building Information (Plans, Square footage, etc.)
- Utility data (from utility bills or read from electric and gas meters)
- Environmental data (Temperature, Relative Humidity, light etc.)
- Weather data (To compare seasonal variation in performance)
- Comfort (Interviews and surveys with building occupants)

Student Involvement Tulane architecture students in the required building science class, “Buildings, Climate, & Comfort”, work with EDR staff in collecting and analyzing data. Student teams are assigned a building for the semester and perform the following tasks:

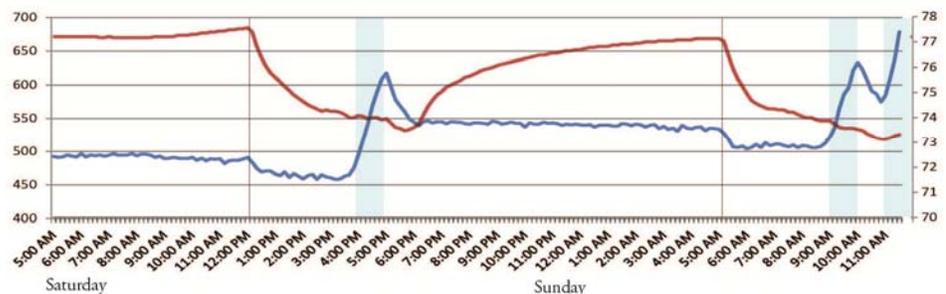
- Performing Spot measurements of temperature, humidity, light levels, etc.
- Placing data-logging sensors to monitor the environmental conditions over the course of the study period.
- Reading utility meters. (typically without entering the building)
- Conducting interviews, both in person and with internet surveys

Expectations from Owners Participating building owners / occupants provide:

- Building access. (with prior notice)
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- Occupants are asked to use the building during the study period as they normally would.

Results Once we know how a building is working, we may have the opportunity to improve its performance. At the project’s conclusion, field study reports are presented back to building owners and the lessons learned contribute back into our design work. Here are a few of our successes:

- Occupancy data collected at a university library informed a new lighting strategy that will reduce energy use by 36%.
- A church was found to be running its HVAC systems when unoccupied. We reprogrammed the thermostat to cut the total energy use in half.
- CO₂ levels were found to be abnormally high in a private home. We worked with the homeowner to fix the ventilation system.
- Surveys revealed which rooms of a university building are the most and least comfortable. This data is being used as a guide by the design team that is renovating the building.



Carbon dioxide (red) and temperature (Blue) during weekend church services.