

## CASE STUDY: University lighting system commissioned

Ohio Northern University's 105,000-square-foot, \$30 million, three-story James Lehr Kennedy Engineering Building was completed in fall 2019. The new facility in Ada, Ohio, allows more engineering student enrollment, increases laboratory space and encourages student-faculty collaboration. Student input resulted in an abundance of natural daylight in the new building. The facility has daylighting harvest sensors, vacancy sensors and high-efficacy LED lighting. The building is seeking U.S. Green Building Council LEED-NC v3 certification.

The commissioning of the occupancy sensors was done post-occupancy to allow the occupancy sensors with self-adapting technology to adjust to the use of the building. This usually takes about a week for the sensors to automatically adjust to the use of the rooms and spaces.

The commissioning authority found issues with some of the installed occupancy sensors. These ceiling-mounted sensors were not installed where there are shown on the construction drawings. This led to sensors not performing as designed and resulted in the room occupants "waving their arms" to keep the artificial lighting on.

Figure 4 shows a private office, Room 109D, with the ceiling-mounted occupancy sensor labeled "OS3" in the room. The sensor is placed too far away from the desk to detect minor motion such as the occupant using a computer while seated at her desk. The sensor also is placed too close

**Figure 4: A partial first-floor lighting plan showing the case study private office with design location of occupancy sensor and actual installed location of sensor. Courtesy: Metro CD Engineering**

to the door and can result in the lighting in her office to turn on when people walk past the door, but do not enter the office.

The incorrect location of the occupancy sensor has resulted in the lighting in the room to turn off while the occupant is completing tasks at her desk. The occupant has tried waving her arms, but the lighting remained off. The sensor's self-adapting technology usually recalibrates the sensitivity of the sensor when it detects someone waving their arms, but in this case, since her seated position was not within the sensor's minor movement coverage, the sensor could not keep the lights on.

The occupancy sensor is being relocated where shown on Figure 4 and this should fix the issue of the lights turning off when the occupant is working at her desk.

It is critical that the design engineer show the occupancy sensors in the correct location.

Most sensor manufacturers will provide no-cost evaluations of an engineer's design to ensure major and minor coverage motions are correct. The installing contractor should be instructed before construction to ensure the sensors are installed where shown on the construction drawings to eliminate sensor issues. The commissioning authority needs to ensure the design intent of the occupancy sensors is met during the commissioning process.

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