March 25th, 2015

California Energy Commission
Building Energy Efficiency Standard Rulemaking - Dockets Unit
1516 Ninth Street, MS 4
Sacramento, CA 95814-5512
docket@energy.ca.gov

Robert A. Shearer, BSEE
1842 Phillips Way
Los Angeles, CA 90042-1039
(925)-640-0181
CET_BOB@roadrunner.com

Re: Docket # 15-BSTD-01

POSSIBLE UNSAFE CONDITIONS CREATED BY CODE LANGUAGE IN THE BUILDING ENERGY EFFICIENCY STANDARDS SECTION 130.1 (c) 6. And 130.1 (c) 7.

***INTRODUCTION*:**

The 2013 Building Energy Efficiency Standards require that Mandatory Shut-OFF Controls be installed under certain conditions. The requirement(s) of 130.1 (c) 6. mandate the installation of Partial OFF Occupancy Sensors in areas served by other Shut-OFF Controls. The requirements of 130.1 (c) 7. mandate the installation of Partial OFF Occupancy Sensors in areas *not served* by other Shut-OFF Controls.

A concern is that the intent of these two Code sections might be misconstrued by lighting designers, creating an unsafe condition due to the installation of these controls. The nature of these possible unsafe conditions would be that no controlled lighting would automatically activate "… when the space is typically unoccupied …" – (see Section 130.1 (c) 1. A. for the preceding verbiage).

***AN EXAMINATION OF 130.1 (c) 7.*:**

7. **Areas where partial ~~ON~~/OFF occupant sensing controls are required.**

Multi-level lighting installed in the following areas shall meet the following requirements instead of complying with Section 130.1(c)1.

A. Lighting in stairwells and common area corridors that provide access to guestrooms and dwelling units of high-rise residential buildings and hotel/motels shall be controlled with occupant sensing controls that automatically reduce lighting power by at least 50 percent when the areas are unoccupied. The occupant sensing controls shall be capable of automatically turning the lighting fully ON only in the separately controlled space, and shall be automatically activated from all designed paths of egress.

B. In parking garages, parking areas and loading and unloading areas, general lighting shall be controlled by occupant sensing controls having at least one control step between 20 percent and 50 percent of design lighting power. No more than 500 watts of rated lighting power shall be controlled together as a single zone. A reasonably uniform level of illuminance shall be achieved in accordance with the applicable requirements in TABLE 130.1-A. The occupant sensing controls shall be capable of automatically turning the lighting fully ON only in the separately controlled space, and shall be automatically activated from all designed paths of egress.

While 130.1 (c) 7. Does not actually contain flawed language and is defensible, it does not overtly state that some lighting is to be kept on in these areas under all normal circumstances.

An examination of the types of areas containing the controlled lighting should make it clear that all lighting should not be extinguished in these areas for safety reasons.

Lighting in stairwells and common area corridors that provide access to guestrooms and dwelling units

Parking garages, parking areas and loading and unloading areas

The author recommends the addition of some statement to clarify that some illumination must be provided in these areas at all times. Anecdotal evidence suggests that some lighting designers are already violating this Code section by allowing Automatic Time Switches to fully turn off lighting in guestroom corridors for a portion of "night time" hours – (and everyone knows, that's where the axe-murderer is hiding!)

***AN EXAMINATION OF 130.1 (c) 6.*:**

This Code section is more problematic: in this section a Partial OFF occupancy sensing device is used *IN ADDITION* to another Shut-OFF Control. What is lacking here is an overt statement that the mandated Partial OFF occupancy sensor must *remain capable of energizing the controlled lighting AT ALL TIMES*.

6. **Areas where partial ~~ON/~~OFF occupant sensing controls are required.**
Multi-level lighting installed in the following areas shall meet the following requirements in addition to complying with Section 130.1(c)1.

A. In aisle ways and open areas in warehouses, lighting shall be controlled with occupant sensing controls that automatically reduce lighting power by at least 50 percent when the areas are unoccupied. The occupant sensing controls shall independently control lighting in each aisle way, and shall not control lighting beyond the aisle way being controlled by the sensor.

B. In library book stack aisles 10 feet or longer that are accessible from only one end, and library book stack aisles 20 feet or longer that are accessible from both ends, lighting shall be controlled with occupant sensing controls that automatically reduce lighting power by at least 50 percent when the areas are unoccupied. The occupant sensing controls shall independently control lighting in each aisle way, and shall not control lighting beyond the aisle way being controlled by the sensor.

C. Lighting installed in corridors and stairwells shall be controlled by occupant sensing controls that separately reduce the lighting power in each space by at least 50 percent when the space is unoccupied. The occupant sensing controls shall be capable of automatically turning the lighting fully ON only in the separately controlled space, and shall be automatically activated from all designed paths of egress.

It is the opinion of the author that no safety risks are posed in these areas during "occupied hours". The safety issue arises during periods "… when the space is typically unoccupied …" – (see Section 130.1 (c) 1. A.) During these "typically unoccupied periods", 130.1 (c) 1. A. mandates that the Shut-OFF control controlling the lighting controlled in conjunction with the mandated Part OFF occupancy sensor be extinguished. Nowhere can this author find a requirement for the control mandated by 130.1 (c) 6. to remain capable of energizing some lighting in the areas of interest "… when the space is typically unoccupied …".

An example:

A stairwell, (not serving guestrooms), is controlled with an automatic time switch and a Partial OFF occupancy sensing device. During "occupied hours" the automatic time switch keeps some lighting on in the stairwell. This is the Partial OFF system described in 130.1 (c) 6. However, after "occupied hours" the automatic time switch shuts off the lighting it is controlling. If the lighting controls in the stairwell are arranged such that the automatic time switch "disables" the occupancy sensing device, upon occupancy, the stairwell will remain dark. This will force the entrant to seek out the automatic time switch override – hence causing an unsafe condition.

Additionally: An automatic time switch override does not appear to meet the definition of an Area Control under Section 130.1 (a) 1. because it does not necessarily provide "ON and OFF" functionality, depending on conditions.

Additionally: EXCEPTION to Section 130.1 (a) 1. Says lighting *may be* stipulated as emergency egress lighting under some conditions; but doesn't say it *has* to be.

Additionally: Even of an automatic time switch override is to be considered an Area Control, I haven't found a requirement to have one at "every point of egress".

In essence, a Partial OFF occupant sensing system stipulated by Section 130.1 (c) 6. Should revert to being a Partial ON occupant sensing system during periods "… when the space is typically unoccupied …".

This is NOT shown in the 2013 Nonresidential Compliance Manual illustration of Partial OFF occupant sensing operation. Only operation during "occupied hours" is detailed, behavior of this system "… when the space is typically unoccupied …" is not shown:

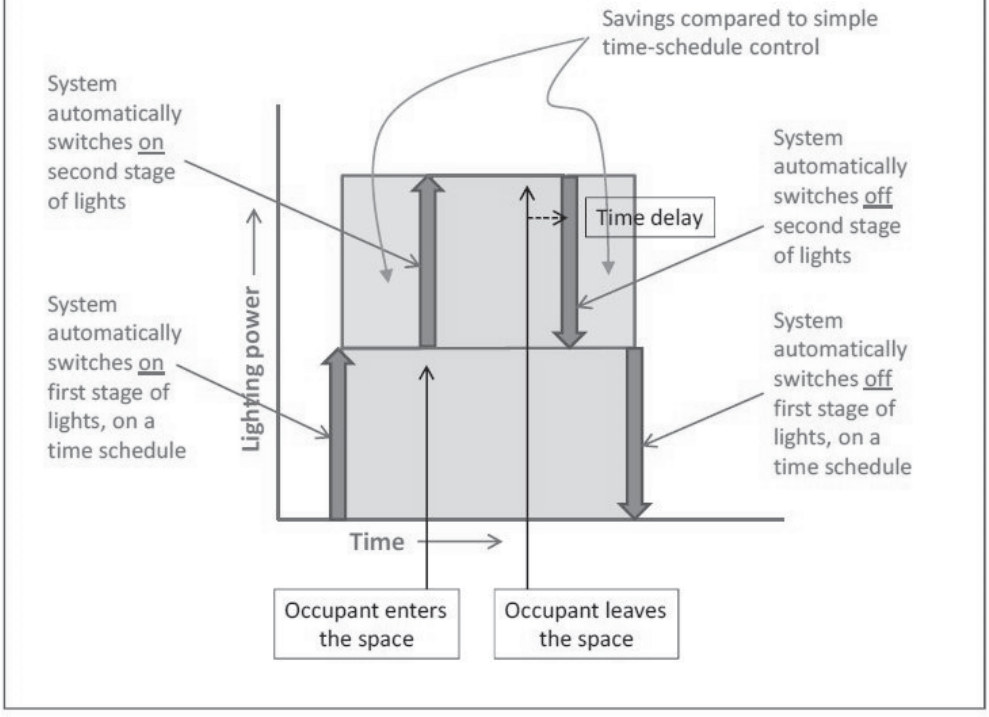

Figure 5-4 Functional Diagram for Partial-OFF Occupant Sensor

***ARGUMENT AGAINST THIS DOCUMENT*:**

“No lighting designer in his right mind would install such a thing.”

The Code does not mandate psychological or psychiatric examinations for designers working on projects falling under Part 6.

In this authors extremely limited experience examining lighting controls he has already seen things that have “set his hair on end”.

***SUMMARY*:**

It is recommended by the author that some language be inserted in Section 130.1 (c) 6. To dictate that the Partial OFF requirement revert to a Partial ON requirement in the area(s) of interest “… when the space is typically unoccupied …”. The occupant sensing control should remain capable of energizing some controlled lighting in the specified area(s) “24 hours per day/365 days per year”.

It is recommended that the term, “partial ON/OFF occupant sensing controls”, remain in the title of Section 130.1 (c) 6.

It is recommended that some language be inserted in Section 130.1 (c) 7. To infer that some lighting must remain on “24 hours per day/365 days per year”.

Thank you for considering my comments,

Robert A. Shearer, BSEE