Comments on the Proposed 7th Edition (2020) Florida Building Code

Bryan P. Holland – NEMA Codes and Standards

1. FBC-B: Section 467.8.3.7 has been inadvertently excluded from the draft code.I am requesting the following language be added back to Section 467 and revise the Chapter 35 Reference accordingly:

467.8.3.7 Lightning protection.
467.8.3.7.1 A lightning protection system shall be provided for all new buildings and additions in accordance with NFPA 780, Installation of Lightning Protection Systems.
467.8.3.7.2 Where additions are constructed to existing buildings, the existing building's lightning protection system, if connected to the new lightning protection system, shall be inspected and brought into compliance with current standards.
467.8.3.7.3 There shall be sure protection for all normal and emergency electrical services.
467.8.3.7.4 Additional surge protection shall be required for all low voltage and power connections to all electronic equipment in critical care areas and life safety systems and equipment such as fire alarm, nurse call and other critical systems. Protection shall be in accordance with appropriate IEEE Standards for the type of equipment protected.
467.8.3.7.5 All low-voltage systems main or branch circuits entering or exiting the structure shall have surge suppressors installed for each pair of conductors and shall have visual indication for protector failure to the maximum extent feasible.

780-17 Standard for the Installation of Lightning Protection Systems………………………449.3.15~~.1~~, 450.3.19 ~~27.1~~, 453.17.7, 467.8.3.7 ~~2703.1, 2703.3~~

Lightning protection requirements were added to Section 467 under SP7639-A1 and were approved by the Special Occupancy TAC and Commission during the 2020 Triennial First Comment Period. This language was also retianed under the 2020 Triennial Second Comment Period as affirmed by SP7639-R1 (4/15 and 5/31). No action was taken on SP7639 or Section 467 at the July 2019 Special Occupancy TAC meeting or the August 2019 Commission meeting. However, the section covering lightning protection disappeared from SP7639-R2 dated 8/21/2019. I notified staff of this error on 12/5/2019 upon publication of the first draft FBC-B. This error remains in the current draft.

The language used in 467.8.3.7 has been modifed from the orginial proposal to correlate with Sections 449.3.15 and 450.3.19. The refernced sections in Chapter 35 have been corrected to coorespond with the applicable sections of the FBC-B that contain requirements for lightning protection systems.

2. FBC-EC: Section C503.1, Exception #7 is in direct conflict with Section C503.6 as shown below:

C5031.1 Exception: The following alterations need not comply with the requirements for new construction, provided the energy use of the building is not increased: 7. Alterations that replace less than 50 percent of the luminaires in a space, provided such alterations do not increase the installed interior lighting power.	C503.6 Lighting Systems. New lighting systems that are part of the alteration shall comply with Section C405. Exception. Alterations that replace less than 10 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.

C503.6 was added to the 6th Edition (2017) FBC-EC however, we neglected to delete Exception #7 to C503.1. This oversight has been corrected in the 2018 IECC but the conflict will remain in the FBC-EC unless one or other is deleted. I am requesting Exception #7 to C503.1 be deleted to keep the FBC-EC aligned with the IECC and to meet the increased energy efficiency that was anticipated with the inclusion of C503.6 into the code.

Here is the reason statement that was provided to the ICC CECDC under CE279-16: *The Northwest Energy Codes Group, New Buildings Institute and the ICC SEHPCAC, submitted code change proposals that created the new Chapter 5 for Existing Buildings, Section C503. When the approved proposals were correlated with the existing language by ICC staff, ICC staff did not strike exception 7 of C503 as was intended by the authors - and as was made clear in testimony at the Final Action Hearings in Atlantic City, New Jersey. The exception 7 artifact now in the 2015 IECC clearly conflicts with the language in GEW-4 that is now found at C503.6 of the 2015 IECC. This proposed amendment will resolve that conflict.*

3. FBC-EC: Section C401.2, C405.5.1 Exception, Chapter 6 [CE] ASHRAE 90.1 Reference. I am requesting these three sections be revised as follows:

C401.2 Application. Commercial buildings shall comply with one of the following: 1. The requirements of ANSI/ASHRAE/IESNA 90.1, excluding section 9.4.1.1(g)~~, section 8.4.2, and section 8.4.3~~ of the standard.
C405.5 Electrical power (Mandatory). C405.5.1 Applicability. This section applies to all building power distribution systems. The provisions for electrical distribution for all sections of this code are subject to the design conditions in ASHRAE Standard 90.1. ~~Exception: Compliance with ASHRA 90.1 Sections 8.4.2, 8.4.3, and 9.4.1.1(g) are not required.~~
ANSI/ASHRAE/IESNA 90.1—2016 Energy Standard for Buildings Except Low-rise Residential Buildings, excluding section 9.4.1.1(g) ~~8.4.2, and 8.4.3~~. . . . . .C304.1,1, C304.3.1.4, C304.3.2.1, C304.3.2.2, C401.2, Table C402.1.4, C405.6.1, C406.2, C502.1, C503.1, C504.1

This action will restore the requirements for energy monitoring and automatic receptacle control that have been included in the ASHRAE 90.1 Standard since 2010 and was reaffirmed as a mandatory requirement under both C401.2 and C405.5 by DEC 2016-033. Plug and process loads account for 31% of a commercial building's enegrgy consumption and the only means to retain the energy performance of a building is to continuously monitor energy consumption levels of various energy consuming systems and compare them to previous levels. Monitoring sub-systems provides key indications when changes have been made or systems are not operating to specification, which significantly increases energy consumption.

Although commercial buildings continue to decrease their energy use through more efficient lighting, mechanical, and domestic water systems, the Miscellaneous Electrical Loads (MELs) energy segment continues to rise. More and more electrical power consuming devices are being plugged into building electrical systems. Some, such as fans, space heaters, printers, monitors, plug in lamps are left on, when spaces are unoccupied. Other devices may be left plugged in and continue to draw power even when inactive or in standby modes. This wastes energy and is counter to the energy efficiency aim of the FBC-EC.

The Annual Energy Outlook of 2015 from the US EIA, indicate that these load categories will grow from 36% of a commercial buildings energy use, to 43% over the next 15 years. This provision simply assures receptacle loads that are not needed when building occupants leave high receptacle load use areas, are automatically turned off, saving the energy that would otherwise be wasted. It requires that controlled receptacles clearly be marked as required by the NEC, to eliminate user confusion of proper use, and provides good practice exceptions where controlling receptacles would endanger safety and security, or areas of continuous operation.

Expressed safety concerns where extensive use of extension cords and plug strips would be used are unfounded. There are no documented studies validating this problem exists. Although there are no requirements for receptacle density in commercial buildings, a design professional will ensure there is an appropriate distribution of receptacles to effectively accomplish the mission of the building. There's no evidence that the distribution of receptacle outlets and controlling some of them has any adverse impact on the utility of this requirement.

Enforceability of this provision is straight forward for building departments and their inspectors. Construction drawings indicate which receptacles are controlled and which are uncontrolled. Onsite inspection will clearly show complying labelled receptacles and operation is easily varied with the shut-off controls already in place with the lighting system.

There have been a considerable number of studies over the years that share the viability and cost effectiveness of automatic receptacle control:

1. One study demonstrated effectiveness (e.g. Zhang2012) with simply payback on this type of equipment between 1.5 and 9 years for small and large offices. This considers the most comprehensive information on office plug load types, installation densities, usage patterns, and power states based on field surveys and monitoring (Kawamoto 2000, 2001; Moorefield, Frazer & Bendt 2011; Roberson 2002, 2004; Roth 2002, 2004; Sanchez 2007; Webber 2001, 2005).

2. A CASE initiative study for CA Title 24-2013 found that smaller office buildings (10,000 sqft) had an annual electrical savings of 4,900 kwh/year and a demand savings of 1.97 kW based on installed costs and utilization of lighting control system elements already installed. The simple payback was 4.2 years. For larger office buildings (175,000 sqft) the annual electrical savings were 107,000 kwh/year and a demand savings of 23.6 kW for a simple payback of 2.4 years.

3. A GSA Green Proving Ground Program study conducted in 8 buildings with monitored receptacle control found "Results underscored the effectiveness of schedule-based functionality, which reduce plug loads at workstations by 26%, even though advanced computer power management was already in place, and nearly 50% in printer room and kitchens." In the study buildings, receptacle loads averaged 21% of building energy use and monitored more than 295 devices over three different test periods to validate the findings. It found payback through timer scheduled control of kitchens of 0.7 years, printer rooms of 1.1 years and miscellaneous devices in 4.1 years. At workstations, the payback was 7.8 years.

4. A study done on "Office Space Plug Load Profiles and Energy Savings Interventions" at the University of Idaho and presented at the ACEEE summer Study in 2012 found that average savings of 0.60 kWh/SF Yr. with plug strip control interventions. This study provided guidance for utility programs to assist with development of plug load efficiency measures and was based on a more detailed report, "Plug Load Profiles" (Acker, B. et. al. 2012).

5. The DOE Better Buildings program issued a December 2015 "Decision Guides for Plug and Process Loads Controls" to help educate and guide decision processes for effective receptaclebased load control. It highlights that "Plug and Process Loads" account for 33% of the total energy consumed by commercial buildings. It sites seven decision strategies including that of integrated plug load controls with other building systems as one of the largest for energy savings across most building types for whole-building retrofit and new construction categories.

6. A study performed “Advancing the Last Frontier: Reduction of Commercial Plug Loads”• presented at the ACEEE summer study of 2016, indicated field study results demonstrating savings of 19% when deploying plug in control strategies in office workstation environments.

The investment made for the infrastructure of a building to comply with the FBC-EC is significant. The assumption that is currently made upon commissioning a facility is that energy efficiency measures will not degrade, or go out of calibration, over time and their energy consumption will not increase as time passes from the time they were commissioned. Such as assumption is completely inaccurate and any payback assumed for energy efficient infrastructure investments will be lengthened, thereby reducing the ROI and increasing the payback period. The only means to retain the energy performance of a building is to continously monitor energy consumption levels of various energy consuming systems and compare them to previous levele. Examples include, but are not limited to:

1. Increase energy consumption in HVAC system loads will point to failures in motors, drive systems, bearings, etc.

2. Degrading building envelope.

3. Configuration changes to the building that may drive increased energy consumption.

4. Increase of energy consumption from lighting loads may indicate changes in arrangement of the office spacet hat resulted in reduced lighting driving the installation of more lighting above permitted energy code levels, failure of occupant sensors, inappropriate lighting schedules, lamps that need to be replaced or cleaned, etc.

5. Monitoring plug loads will indicate when computer equipment is left on during non-working hours and use of space heaters that compromise the efficiency of the facility due to set points on the HVAC system.

The requirements in this provision save energy by continually monitoring and reporting actionable energy consumption data to building owners and operators. For large buildings, this data is further broken out by the major sub-systems (HVAC, lighting, process loads, and plus loads). There are well documented studies that demonstrates the energy savings from metering and monitoring systems. One such study is from the U.S. General Services Administration (GSA) on “Submetering Business Case: How to calculate cost-effective solutions in the building context” and can be reviewed HERE.