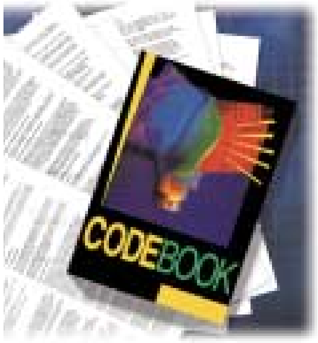

The IBC and Emergency Lighting

BY KEITH LANE, *P.E., RCDD/NTS Specialist, LC, LEED AP, Vice President Engineering, SASCO, Seattle*

This summer marked a codes changing of the guard in Washington state: As of July 1, all projects in the state obtaining building permits must now follow the International Building Code (IBC). Previously, all projects followed the Uniform Building Code (UBC). One significant difference between the two is the treatment of power for emergency lighting.

IBC 1006, "Means of Egress Illumination," more specifically, 1006.3, "Illumination Emergency Power," states the following:

The power supply for means of egress illumination shall normally be provided by the premise's electrical supply. In the event of power supply failure, an emergency electrical system shall automatically illuminate the following areas:

1) Exit access corridors, passageways and aisles in rooms and spaces that require two or more means of egress.

2) Exit access corridors and exit stairways located in buildings required to have two or more exits.

3) Exterior egress components at levels other than that of exit discharge until exit discharge is accomplished for buildings requiring two or more exits.

4) Interior exit discharge elements, as permitted in Section 1023.1, in buildings required to have two or more exits.

5) The portion of the exterior exit discharge immediately adjacent to the exit discharge doorway in buildings requiring two or more exits. Note that exit discharge is the portion of the means of egress system between the termination of the exit and a public way.

The problem with a metal-halide lighting source is that if power is interrupted—even briefly—the light will extinguish.

IBC requirements significantly affect emergency lighting on structures such as parking garages.

1006.3 requirements 3 and 5 above have the most dramatic impact on electrical distribution and lighting systems. Take the top deck of a parking garage, for example, which now falls under the requirements of IBC 1006.4 "Perfomance of Systems" and NFPA 101. The former requires an average illumination level of one footcandle and a maximum to minimum ratio of 40:1 or less. The typical parking structure does not require egress lighting to be fed from an emergency electrical system and does not require compliance with IBC 1006.4. However, if there is parking on the top of a garage, emergency lighting is now required.

The major problem here is that typical rooftop parking decks are lit with 150- to 250-watt metal-halide fixtures on 15- to 25-ft. poles. Even in the event that the garage is served by an emergency generator, a quartz re-strike will not typically provide the required emergency illumination for the parking surface. If power fails, the generator will usually sense the failure, start the engine and transfer to emergency power within six to eight seconds. Per the National Electrical Code (NEC), systems are required to transfer within 10 seconds. The problem with a metal-halide source is that if power is interrupted—even briefly—the light will extinguish. Once extinguished, lamp cool-down and re-strike time can be up to 15 minutes, a minute at the very least.

The good news is that there is a helpful technology ot meet code called an HID arc-maintenance device—an auxiliary off-line inverter that can maintain the lamp arc in metal-halide lamps to eliminate the re-strike period. The combination of an NEC 700.12-compliant emergency generator and the HID arc-maintenance device should meet the IBC provisions required for emergency illumination.

That being said, egress lighting issues become much more complicated if an emergency generator is not part of the equation. Unlike fluorescent fixtures, metal-halide fixtures cannot be equipped with individually mounted battery backup devices. There are solutions, but they are costly. One involves providing a second fluorescent lighting system with internal battery backup; another is providing a "fast transfer" centralized lighting inverter system that produces 90 minutes of battery power. For the latter solution, be aware that an arc-maintenance device must also be provided in the metal-halide fixture.

As to the former, limited mounting locations and "Dark Sky" restrictions make the installation of redundant fluorescent systems very difficult. Dark Sky, for the record, among other local energy codes, is intended to reduce light pollution and glare, and can require full cut-off luminaires that allow no light above the nadir and candela at less than 10% of the rated lumen output between 80 and 90 degrees. This essentially prohibits uplighting.

As far as centralized inverter systems are concerned, they simply require a significant footprint. There are two types of inverters to choose from: interruptible systems and fast-transfer systems. The former will typically transfer within 50 milliseconds (ms) and can be utilized for fluorescent and incandescent light sources. The latter will transfer within two ms and must be used with metal-halide light sources to prevent the arc from extinguishing. Be aware, however, that once 50 gallons of electrolytes are stored in a non-sprinkled building, or 100 gallons in a sprinkled building, NFPA Chapter 52 applies, requiring spill control, room separation and ventilation.

So much for requirement 3 of 1006.3. Requirement 5, on the other hand, defines the provisions for emergency lighting from an exit discharge to the public right-of-way. The typical wall-mounted egress light over an exit doorway will now have to provide emergency illumination to the public right-of-way. The same issues pertaining to requirement 3 also apply as the typical wall-mounted egress light is illuminated by a metal-halide light source. In this scenario, if a generator is part of the system, an arc-maintenance device would be required to ensure proper light levels within the NEC-prescribed 10-second mandate. If no generator is included, fluorescent fixtures must have internal batteries. Metal-halide fixtures must have a centralized inverter in addition to an arc-maintenance device. In either case, 90 minutes of backup is required.

A final issue with the fifth requirement of IBC 1006.3 is that the public right-of-way may be quite some distance away. If

(Continued on page 24)

Statement of Ownership, Management and Circulation

Statement of Ownership, Management, and Circulation (Required by Title 39 United States Code 3685) of Consulting-Specifying Engineer (ISSN-0892-5046), published monthly except semi-monthly in June (13 issues annually) at Highlands Ranch, CO 80129-2345 for October 1, 2004. Annual Subscription Prices: $95.90 U.S.A.; $149.50 Can.; $129.90 Mex.; $184.90 Foreign.

1. Complete Mailing Address of Known Office of Publication: Reed Business Information, 8878 S. Barrons Blvd., Highlands Ranch, CO 80129-2345.
2. Complete Mailing Address of Headquarters or General Business Office of Publisher: Reed Business Information, Division of Reed Elsevier, Inc., 360 Park Avenue South, New York, NY 10010
3. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor: Publisher, Rob Goulding; Editor, Jim Crockett; and Senior Editor, Scott Siddens, Reed Business Information, 2000 Clearwater Drive, Oak Brook, IL 60523
4. The owner is Reed Business Information, a Division of Reed Elsevier, Inc.,360 Park Avenue South, New York, NY 10010

5. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing	
A. Total Number of Copies (Net Press Run)	48,773	48,443	
B. Paid and/or Requested Circulation			
(1) Paid/Requested Outside-County Mail Subscriptions	46,324	46,329	
(2) Paid In-County Subscriptions	----	----	
(3) Sales Through Dealers, Carriers and Other Non-USPS Paid Distribution		----	----
(4) Other Classes Mailed Through the USPS		----	----
C. Total Paid and/or Requested Circulation [Sum of 5B.(1), (2), (3) and (4)]	46,324	46,329	
D. Free Distribution by Mail (Samples, complimentary and other free)			
(1) Outside-County	1,371	1,386	
(2) In-County	----	----	
(3) Other Classes Mailed Through the USPS		----	----
E. Free Distribution Outside the Mail (Carriers or other means)	158	300	
F. Total Free Distribution (Sum of 5D and 5E)	1,529	1,686	
G. Total Distribution (Sum of 5C and 5F)	47,853	48,015	
H. Copies Not distributed	919	428	
I. Total (Sum of 5G and 5H)	48,772	48,443	
J. Percent Paid and/or Requested Circulation (5C divided by 5G times 100)	96.8	96.5	

6. This statement of ownership will be printed in the October issue of this publication.
7. I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties). John Scheunemann (signed).

(Continued from page 22)

this is the case, to obtain the minimum average footcandles and uniformity ratios, additional fixtures on the exterior of the building may be required or additional emergency lighting provisions may be necessary for walkways.

It is important to be aware of the IBC code change, especially as it applies to the electrical distribution system. These changes can be costly and must be implemented from the beginning of the design phase. Not being aware of these IBC requirements will only cause more pain and expense during the plan review and construction phase of the project.

90.1 to Toughen Exterior Lighting Requirements

Eight addenda strengthening the exterior lighting requirements in standard 90.1 were approved for publication at ASHRAE's 2004 Annual Meeting this past summer in Nashville, Tenn.

According to Eric Richman, chair of the lighting subcommittee, Addendum 90.1q updates exterior lighting requirements in response to interest in placing reasonable energy limits on exterior lighting in the same manner as interior requirements. Interior lighting power density values, he said, were recently updated by addenda, based on current design criteria, recent research and up-to-date lighting equipment efficiency, while the exterior lighting was only regulated as a light source efficacy. "There was concern that exterior lighting was effectively uncontrolled by not making exterior requirements as specific as indoor requirements," Richman said. "Before, builders were allowed to use as much outdoor lighting as they liked, as long as the source was reasonably efficient."

The addendum includes a requirement that all exterior applications must have automatic controls capable of turning off lighting when there is sufficient daylight or when it's not required. A provision requiring occupancy sensor control was also approved. |cse|