

Testing emergency lighting systems

Per local, state, and federal regulations, all emergency lighting systems must be routinely checked to ensure they work when needed.

By Robin Martin, Lithonia Lighting, Conyers, Ga. -- Consulting-Specifying Engineer, 4/1/2009 1:00:00 AM

Exit signs and emergency lighting are vital lifelines in crisis situations. Schools, office buildings, hotels, hospitals, apartment complexes, and virtually every other type of building rely on emergency lighting systems to protect occupants.

Unfortunately, emergency lighting equipment often is installed and forgotten. Despite numerous federal, state, and local codes requiring routine testing and documentation, mandated testing of emergency lighting units remains a “hit or miss” proposition.

James Lathrop, vice president of [Koffel Associates](#), Elkridge, Md.-based independent fire protection engineering firm, said, “Excluding healthcare and most government buildings, based on my experience I would estimate that more than 75% of the building owners/managers across the country are not testing their emergency lighting as mandated by the [NFPA 101 Life Safety Code](#).”

The Life Safety Code, which was established by NFPA nearly a century ago, sets very specific standards for the presence and routine testing of life safety equipment. Specifically, every emergency lighting fixture requires a monthly 30-sec test, as well as an annual 90-min test. Noncompliance with these testing requirements can lead to serious fines and significant liability risks.

Nonetheless, incidents as significant as the 1993 World Trade Center bombings have not altered the commitment to testing emergency lighting systems. Virtually every day emergency lighting failures affect the safety and security of building inhabitants across the country.

Knowing the codes

An abundance of codes concerning exit signs and emergency lighting have been created to protect life and property. Among the more relevant codes are NFPA 101, [NFPA 70](#), [OSHA Code of Federal Regulation](#), [International Fire Code](#), and [International Building Code](#).

All of these codes place an emphasis on the same general requirements for emergency lighting:

1. Adequate and reliable visual markings and proper illumination levels for the path of egress.
2. Routine testing and maintenance to ensure emergency lighting is operating effectively
3. Documentation of emergency lighting system testing and maintenance.

These codes and requirements were created as a result of catastrophic events where there was not enough emergency lighting or the emergency lighting system was not working properly because the end user installed it and neglected to maintain it throughout the years.

However, no matter how many codes are in place, incidents still occur. According to the U.S. Fire Administration, in 2007 more than 116,000 nonresidential structure fires were recorded, resulting in more than 100 deaths, 1,350 injuries, and \$3 billion in direct dollar loss.

And, of course, fire and smoke are not the only concerns, as power outages and rolling blackouts cost America approximately \$80 billion annually, according to a study conducted by researchers at [Lawrence Berkeley National Laboratory](#). Of this, \$57 billion (73%) is from losses in the commercial sector and \$20 billion (25%) in the industrial sector. The authors of the study estimated residential losses at \$1.5 billion, or about 2% of the total.

In short, building owners and managers have every reason to anticipate that fire, smoke, and/or power outages are likely to affect their facilities and put their emergency lighting systems to the test sooner or later.

Manual and self-diagnostic systems

Consulting engineers typically focus on ensuring that emergency lighting systems and paths of egress meet building code requirements. However, it benefits building owners/managers if consulting engineers also are familiar with the emergency lighting and exit sign testing requirements. This will ensure that buildings remain in compliance, thereby reducing risk and liability. Consulting engineers also can help select the best emergency lighting system option (manual or self-diagnostic) to reduce the time it takes to conduct ongoing testing.

Currently, there are two types of emergency lighting systems available for installation—manual and self-diagnostic. Manual testing, the most common method, is also the most timely and costly.

Accounting for the wide variety of building sizes and configurations in the United States, the industry average time needed to conduct a 30-sec emergency lighting test is 10 min. This takes into consideration the time required to secure a ladder, walk to the emergency lighting fixture, climb the ladder, push the test switch for 30 sec, climb down the ladder, document the test results, and carry the ladder to the next fixture. In this context, a building owner with 100 emergency lighting units could invest 16 hours of manpower to ensure the building is in compliance with NFPA 101 requirements.

Because the process of manual testing is so laborious, lighting manufacturers developed self-diagnostic technology that automatically tests the unit every month, checking for key component failures such as lamp, battery, or transfer fault. If a failure is detected, it is visually indicated on the fixture.

Self-diagnostic systems still require a monthly visual inspection; however, they can reduce the total amount of time it takes to remain in compliance by up to 66%. While self-diagnostic emergency lighting systems require a larger initial cash investment, they save time and money in the long run. In most cases, building owners will experience a return on their investment in less than 13 months.

The ability to establish a truly safe environment is critical. And while all the responsibility for emergency lighting safety falls on the building owner/manager, consulting engineers also can make this initiative a top priority. Emergency lighting cannot be viewed as a “cost-cutting” or “negotiable” line item. Too many lives depend on a transparent system that will be there—and working—when needed.

Author Information

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World Trade Center evacuation

On Feb. 26, 1993, a terrorist bombing occurred in the parking garage of the World Trade Center just past noon. The massive explosion killed six people, injured more than 1,000, and caused nearly \$300 million in property damages.

Inside the World Trade Center, more than 40,000 people were left to find their way out of the building without any instructions. Lights flickered, elevators were trapped between floors, and black smoke filled the buildings.

Many people inside the North Tower were forced to walk down darkened stairwells, which contained no emergency lighting, some taking two hours or more to reach safety. Because The Port Authority of New York and New Jersey is a bi-state agency, the towers were exempt from New York City building codes. Subsequent to the bombing, the Port Authority installed emergency lighting in the stairwells. It is believed that this lighting saved many lives during the events of Sept. 11, 2001.

Coast-to-coast code violations

Recent violations have unnecessarily riddled the news.

- In November 2008, two Los Angeles hotels pleaded guilty to 36 criminal fire protection misdemeanor counts for failing to keep up protection systems, including fire alarms, fire escapes, emergency lighting, and sprinklers. The owners agreed to pay \$18,000 in fines, as well as \$55,520 to cover the costs of the Los Angeles Fire Dept. investigation of the two buildings. As part of the Rosslyn agreement, the owners agreed to contribute \$15,000 to several nonprofit organizations that provide food and shelter to homeless people.
- A Texarkana, Texas, hotel was shut down in November 2008 for numerous health and safety violations, including code violations like inadequate emergency lighting, lack of proper exit signs, and no backup emergency generators.
- In October 2008, OSHA cited an East Syracuse, N.Y., automotive parts manufacturer for 65 serious violations of safety standards, including “inoperable emergency lighting.”
- In October 2008, the Bladensburg, Ohio, fire chief reported being shocked by the number of safety issues at a local elementary school. “I was especially concerned,” Nick Cockrell said, “about the emergency lighting, which is essential so you can see to evacuate the building in an emergency situation.”
- In Waldron, Alaska, Scott County jail officials were given 60 days to fix emergency lighting, emergency exits, and a broken heater, or the jail facility would be shut down.