PSPA

WORLD

CONGRESS

2010

EVERGLOW®

CODE LANGUAGE

AFFECTING THE USE OF

PHOTOLUMINESCENT SIGNS & MARKINGS

IN THE

US AND CANADA

Charles V. Barlow

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Model Codes & Local Codes

- IBC – Int'l Building Code (model, new)
- IFC – Int'l Fire Code (model, existing)
- NFPA 101 – Life Safety Code (all)

- NBC – National Building Code of Canada
- NFC – National Fire Code of Canada

- NYC, Port Authority, NY State (local)
- Some areas do not have any codes

Model Codes & Local Codes

- MODEL Building & Fire Codes form the basis for development of LOCAL Building & Fire Codes
- Local Building & Fire Codes directly affect the market for photoluminescent signs and markings.
- Building Codes generally affect new construction and renovations. Fire Codes affect the maintenance of existing structures.

Model Codes & Local Codes

- US – the predominant building & fire codes are the IBC and IFC.
- Canada has National Codes – NBC & NFC.
- When adopted at the local or provincial level, with any changes made at the local level, codes have the force of law.
- When called out by local codes, standards are critical to performance and market opportunities. UL & ASTM dominate.

Model Codes & Local Codes

- US – codes are generally updated on a 3-year cycle.
- Canada – the NBC & NFC are generally updated on a 5-year cycle.
- Local fire codes, affecting existing buildings, give building owners time to make required upgrades. We anticipate owners of high rise buildings will have 1-3 years to add photoluminescent exit path markings to their exit stairs.

Model Codes & Local Codes

- The AHJ – Authority Having Jurisdiction – interprets code language at the local level.
- The AHJ can authorize, not generally compel, the use of stricter code language from newer model codes.
- The AHJ can be very local – in NYC there are multiple entities which have jurisdiction. The Port Authority (subways & airports) can override the Dept of Buildings.

Model Codes & Local Codes

- The Port Authority was the AHJ for the construction of the NYC World Trade Center.
- On a military base, the ranking officer is generally the AHJ.
- The AHJ is generally the building or fire code inspector. Or, his supervisor.
- The AHJ can be wrong. His decisions can be successfully appealed.
- OSHA is not the AHJ.

Public & Commercial Buildings

- US – federal buildings, and those buildings built with federal money, must meet the local building codes and NFPA 101.
- US – commercial buildings are generally built to meet local codes.
- US - model codes may take several years to be adopted at the local level. Local codes may be based on model codes that are several years old.

Public & Commercial Buildings

- Canada – federal buildings will generally be built to the language of the most recent NBC.
- Canada – provincial construction – will follow the NBC within 12 months of adoption at the federal level.
- Canada – provincial language can exceed the requirements of the NBC.
- There is similarity between US and Canadian building codes and standards.

Photoluminescence

- Accepted by most code authorities in the US and Canada as a supplement to or replacement for electrical EXIT signs
- Ideally suited for exit path markings; must be used with electrical emergency lighting
- Maximum life safety is achieved by redundancy - combining electrical and photoluminescent (non-electrical) emergency lighting systems.

Photoluminescence

- **1 foot-candle:** a) the amount of illumination (overhead lighting) necessary to recognize a one dollar bill on the floor; b) the minimum illumination required by code when measured at floor level. UL1994, ASTM E2072 & E2073.
- **5 foot-candles:** a) the amount of illumination necessary to read a newspaper held at arms length; b) the minimum amount of illumination required by code on the face of a photoluminescent exit sign. UL924.

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Emergency Lighting Technology

- **The real question:** is non-electrical lighting technology a valid emergency lighting source?
- Code officials and model code language are now reflecting the belief that electrical emergency lighting is not sufficient.
- **Model code language now specifies (non-electrical) luminous exit path markings for high rise buildings.**

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Emergency Lighting Technology

1. Electrical - LED, Electroluminescent, Fluorescent, Incandescent
2. Non-Electrical- **Photoluminescent**, Radioluminescent, Chemiluminescent

✓ Only **photoluminescent** technology is code compliant and non-radioactive.

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Emergency Lighting Technology

1. Must operate reliably and effectively.
2. Evacuations take place in:

   a) Normal (electrical) lighting levels.

   b) Emergency (electrical) lighting levels.

   c) Without (electrical) lighting. Only (non-electrical) emergency lighting is operating.

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Recent Code Changes

- **New York City Building Code** now requires photoluminescent exit path markings in high rise buildings
- **California Building Code** now requires either floor level exit signs or exit path markings
- **IBC/IFC 2009 (the Int'l Building/Fire Code is a model code, new & existing buildings)** now requires non-electrical egress markings
- **IBC & NFPA 101** have specific code language accepting photoluminescent exit signs and they can be used instead of electrical signs
- **NBC 2010 (Canada, new buildings)** appears that it will soon require a change in exit sign design and will specifically accept photoluminescent signs; it may also require exit path markings

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EXIT Sign Sales

1. Electrical – 100,000,000 +
2. Radioluminescent – 2,000,000
3. Photoluminescent – 1,000,000

✓ Radioluminescent signs are being replaced by local mandate because of the radioactive component and concerns they are not properly recycled.

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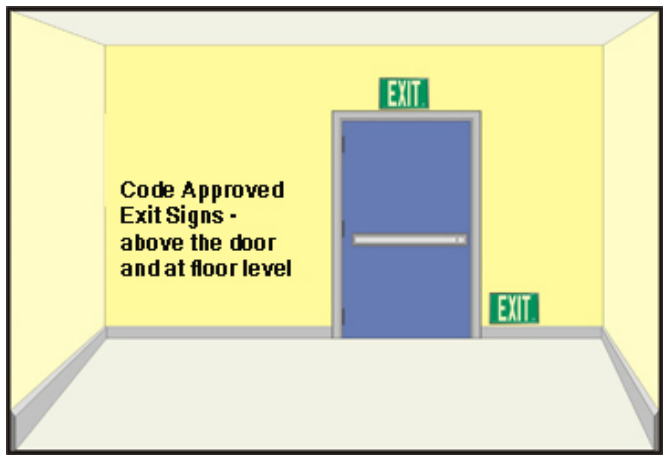
Photoluminescent Exit Signs

- Code approved exit signs
- NBC, IBC, IFC, NFPA 101, Local Codes
- Tested to UL924, internally illuminated



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Photoluminescent Exit Signs

2009 IBC, IFC & 2009 Life Safety Code

- All exit signs used to mark exit doors must be approved. Photoluminescent exit signs are internally illuminated.
- All approved exit signs must be tested and evaluated to the UL 924 performance.
- Exit signs must be so maintained that they will continue to operate for not less than 90 minutes after an electrical power failure.

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NBC 1995

for Canada

- Existing Signs –
  EXIT or SORTIE.
- NBC requires RED exit signs.
- CSA C860 governs electrical exit signs.
- ULC ORD-C924 governs non-electrical exit signs.

NBC 2010

for Canada

- New exit sign design.

- NBC language might make photoluminescent exit signs impractical for use in Canada.
- PL exit signs are defined to be externally illuminated; must be illuminated when the bldg is occupied.

NBC 2010

for Canada

- PL exit sign performance requirements
- Language does not directly address in current NBC or C860
- UL924, ULC/ORD-C924, or UL902M (new) and Egress Symbol
- Observation visibility of 30, 60 or 120 minutes

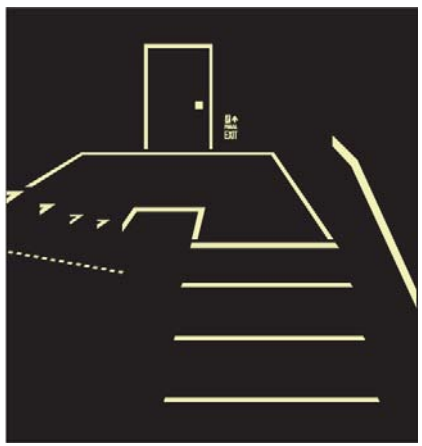
Photoluminescent Exit Signs

US & Canada - 2010

- Exit signs must be continually illuminated.
- Photoluminescent exit signs must have a minimum of 5 ft-candles of illumination on the sign face, even if the building is not occupied.
- Problematic with new lighting technology and new energy efficiency code language.

Photoluminescent Exit Path Markings

- Code approved exit path markings
- IBC, IFC, NFPA 101
- Tested to UL1994, ASTM E2072 or E2073



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Photoluminescent Exit Path Markings

- There are more than 1,500 high rise buildings in NYC which require continuous stair markings and signs.
- There are more than 10,000 high rise buildings in the US and Canada that require continuous stair markings.
- Signage requirements in most of the US are not as strenuous as in NYC.

IBC, IFC & NFPA 101 - 2009

- IBC and IFC (2009) mandates (non-electrical) Luminous Egress Path Markings in most new and existing high rise buildings. NFPA 101 (2009) issued similar guidelines, not mandates.
- Includes signs & markings using photoluminescent and radioluminescent technologies.
- If adopted by the various local jurisdictions around the United States in this current form, owners of most existing and new high rise buildings will be required to install NON-ELECTRICAL markings and signs. Many of these signs and markings will be photoluminescent.

IBC, IFC & NFPA 101 - 2009

- Requires continuous markings on
  - stair nosings
  - handrails
  - perimeter of corridors and landings
  - obstacles in the egress path.
- Door hardware & frames on final exit doors.
- New & existing high rise buildings.

IBC, IFC & NFPA 101 - 2009

- **1006.1 Illumination required.** The *means of egress*, including the *exit discharge*, shall be illuminated at all times the building space served by the *means of egress* is occupied.
- **1006.2 Illumination level.** The *means of egress* illumination level shall not be less than 1 foot-candle (11 lux) at the walking surface.

IBC, IFC & NFPA 101 - 2009

- **1024.4 Self-luminous and photoluminescent.** Luminous egress path markings shall be permitted to be made of any material, including paint, provided that an electrical charge is not required to maintain the required luminance. Such materials shall include, but are not limited to, *self-luminous* materials and *photoluminescent* materials. Materials shall comply with either:

1. UL 1994; or
2. ASTM E 2072, except that the charging source shall be 1 foot-candle (11 lux) of fluorescent illumination for 60 minutes, and the minimum luminance shall be 30 millicandelas per square meter at 10 minutes and 5 millicandelas per square meter after 90 minutes.
3. NFPA 101 allows the AHJ to determine a suitable other performance standard.

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NBC 2010

for Canada

- There is no Canadian equivalent to UL1994 – Luminous Egress Path Marking Systems
- New UL (Canada) standard being developed for photoluminescent signs & markings – UL902M.

Other Codes & Standards

- OSHA – requires exits to be adequately and appropriately marked and lighted. OSHA compliance is generally assured with compliance to NFPA 101.
- UFC – Unified Facilities Criteria (DoD)
  - Tritium exit signs prohibited
  - PL exit signs must have fluorescent lighting while building is occupied

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Other Codes & Standards

- FAA – allows photoluminescent aisle markings in airplanes. Requires interior lighting to charge for 60 minutes prior to use by crew or passengers.
- SOLAS 2010, IMO – allows PL escape markings on passenger ships and other marine vessels. Requires PL signage for emergency equipment. New and existing vessels.

Other Codes & Standards

- APTA – American Public Transportation Association – allows PL signage and escape markings on passenger trains.

Question

Will (non-electrical) photoluminescent emergency lighting eventually be allowed to replace all electrical emergency lighting?

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