

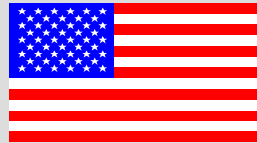
Article 708

COPS

Critical Operations Power Systems

Thomas R. Childers, PhD, CMS, CET

(adjusted presentation PPT with Case Study pictures removed)



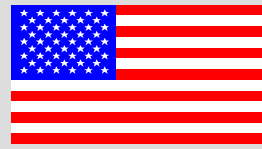
U.S. DoE Laboratory Meeting
Golden, CO – U.S.A.
28-31 July 2008



The Mission of Underwriters Laboratories

“ ... [To] add to the public’s knowledge and understanding of the hazards of various materials, devices, products, equipment, construction, methods, and systems affecting life and property; and to provide information tending to reduce or prevent bodily injury, loss of life, and property damage from such hazards.”

**G.L. Maatman, Chairman of the Board of Trustees,
Underwriters Laboratories Inc. (UL) May, 2002 Address
A Not-for-Profit Public Safety U.S. Corporation Founded
in 1894**





Agenda

- New Article 708
- Intent & Potential
- Supporting Standards
- Case Study / Possible Laboratory Implementation



Article 708, pg 609: COPS

- A. Work by the NEC's TCC-assigned Task Group on Emergency & Standby Power Systems for Homeland Security
- B. Mission to identify minimum requirements that address needed levels of integrity and quality for power sources, power distribution, and signaling systems required due to threats, acts of terrorism, natural and / or manmade disasters
- C. Article 708: Parts I through V, pgs 609-614



Five Parts w / Two Supporting Annexes

- I. General: Scope, 708.1
 - II. Circuit Wiring & Equipment, pg 610
 - III. Power Sources & Connection, pg 612
 - IV. Overcurrent Protection, pg 613
 - V. System Performance & Analysis, pg 614
- Annex F: RE, pg 774
 - Annex G: Supervisory Control & Data Acquisition (SCADA), pg 776



Scope, Intent & Applicability

- Those systems classed as “critical” by municipal, state, federal or other governing agency having jurisdiction OR by facility engineering documentation establishing the necessity for such
- Vital infrastructure facilities that, if destroyed or incapacitated, disrupt national security, the economy, public health / safety; and where enhanced electrical infrastructure for continuity of operation has been deemed necessary by governmental authority
- See Annexes F & G for guidance information
 - F = Availability / Reliability
 - G = SCADA (Supervisory Control & Data Acquisition System)

Supporting Guidance Documents

2. NFPA 1600

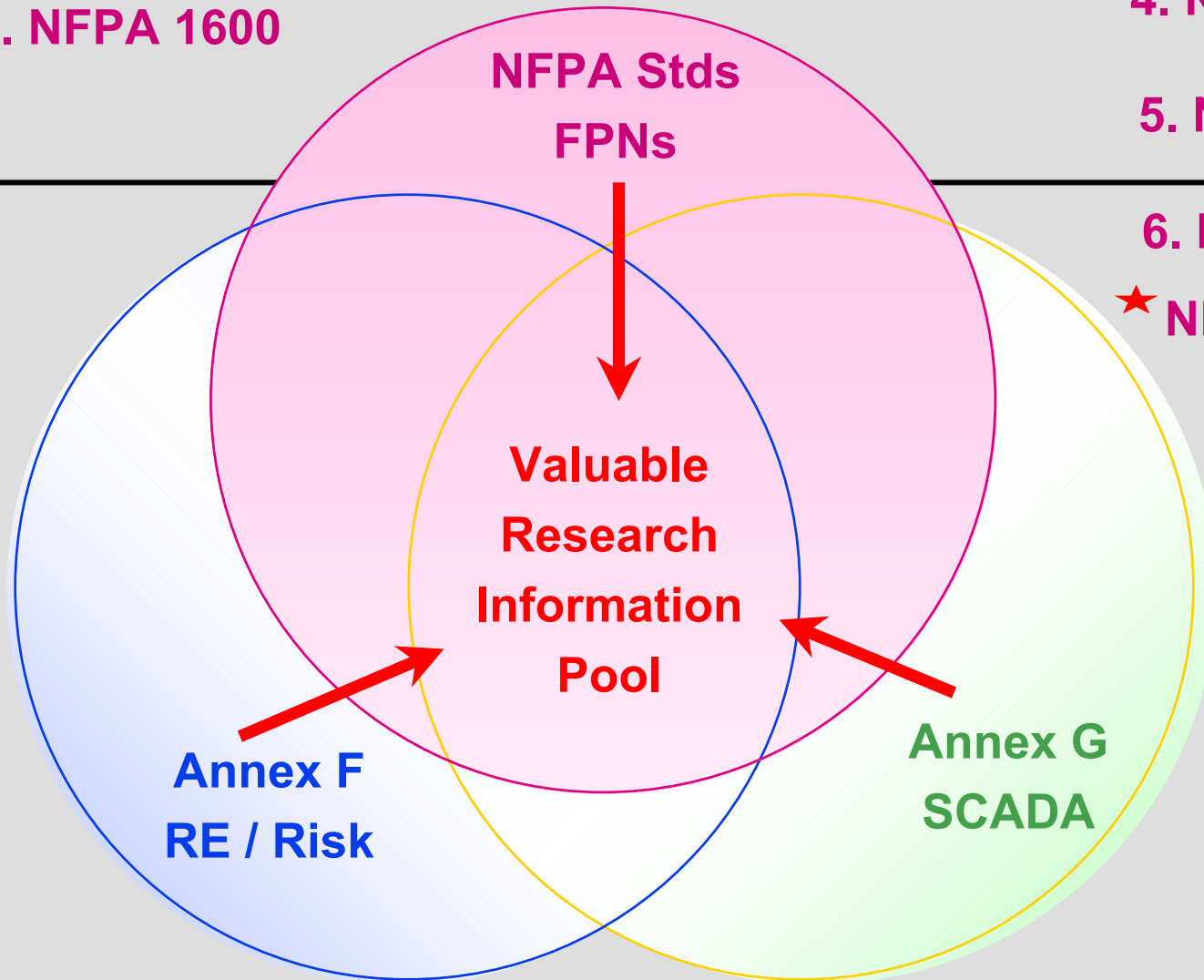
3. NFPA 110

4. NFPA 99

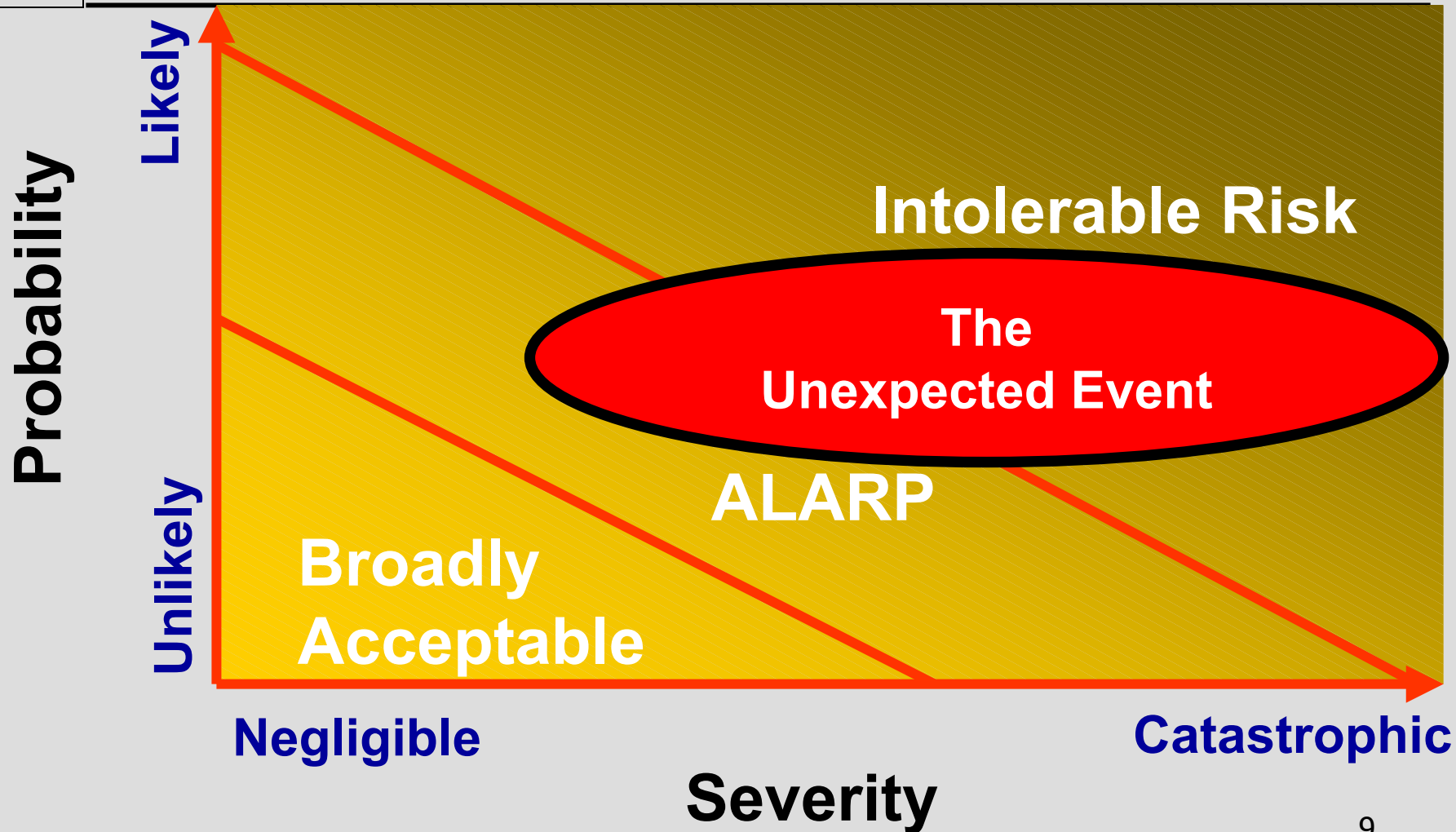
5. NFPA 101

6. NFPA 730

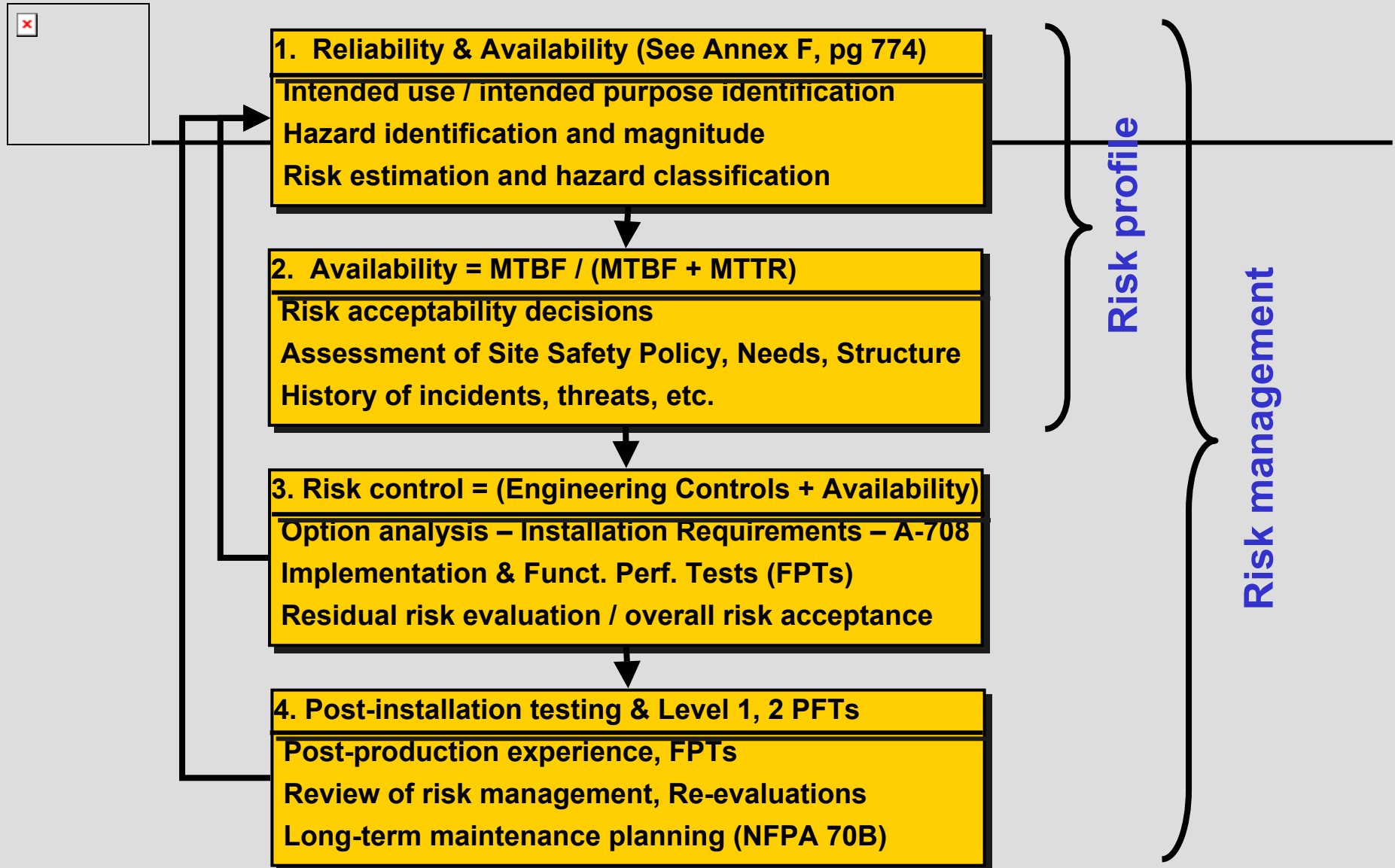
★ NFPA 70B



RM Concept, pg 774



Reliability





ANSI / NFPA 1600, 4th Edition, 2007


- NFPA formed a Disaster Management Committee in 1991
- 1st Ed of NFPA 1600 titled, *Recommended Practice for Disaster Management*, was issued in 1995
- 2004 Edition included significant “disaster recovery” reference information in Annexes B through D (FEMA, etc.)
- 2007 Edition expands conceptual framework for disaster / emergency management and business continuity programs
- 2007 added “prevention” to the four core conceptual areas of mitigation, preparedness, response and recovery



Organization of 1600 – 5 Chapters


- I. Administration (Scope, Purpose & Application)
- II. Referenced Resources (NFPA publications)
- III. Definitions (Business Continuity, Mitigation, IMS, etc)
- IV. Program Management
- V. Program Elements (Laws, Risk, Incident / Mitigation)
 - Annex A: Explanatory Material
 - Annex B: D / EM & BC References
 - Annex C: Additional Resources, FEMA, DHS, etc
 - Annex D: EM Accreditation Programs / Certification
 - Annex E: Incident Management Systems
 - Annex F: Info References, e.g., topics & standards


Identifying COPS Locations


 **Clarion**
Reducing Risk, Protecting People

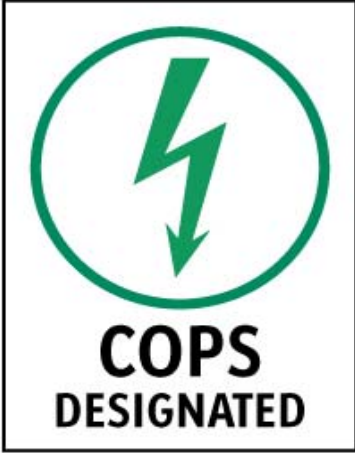
Proposal for COPS Designation Signs
(Intended for interior and exterior use)


Option 1 Option 2 Option 3






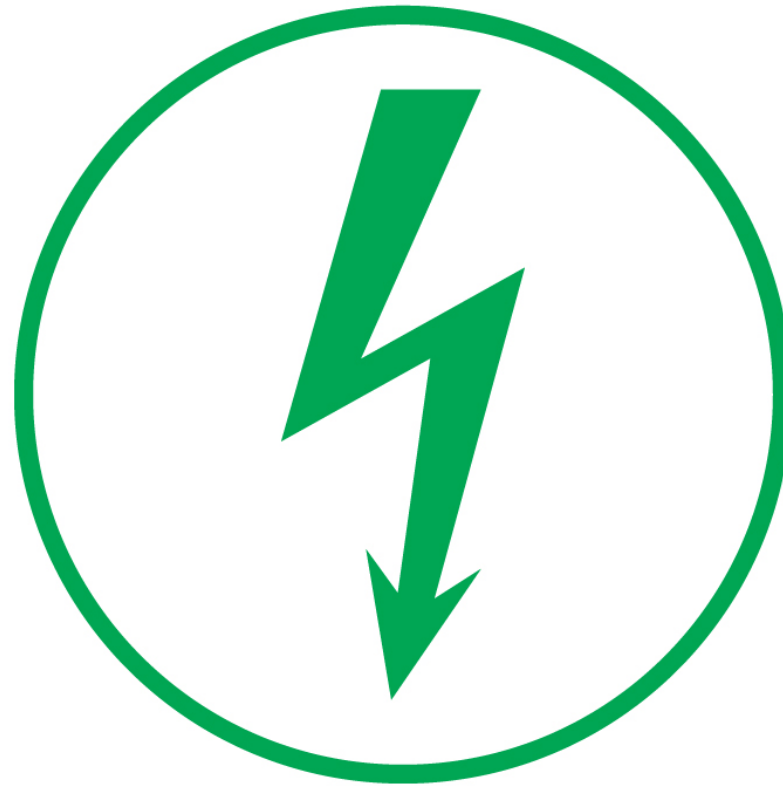
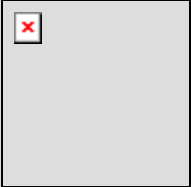



**COPS
DESIGNATED**

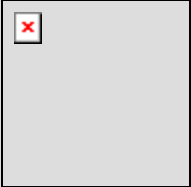

**COPS
DESIGNATED**


**COPS
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7-12-08/1



SLAC/COPS



SANDIA LAB/COPS

Clarion www.clarionsafety.com No. COPS-185

The sign is green with white icons. It features a lightning bolt in a circle, a running person, and a building with a lightning bolt in a circle.



Summary

1. Use supporting documents / standards to the fullest
2. Assess the situation based on the need and capability to reliably perform the task
3. Use RE / Risk principles early in the COPS design
4. Use the Code in supporting the requirements of Article 708
5. Test, re-test and test again; establish a maintenance plan for this special system



Special Bibliography

- U.S. Army Corps of Engineers Power Security Enhancement Series TN 5-698 (1-6)
- FEMA 426 – Ref. Manual To Mitigate Terrorist Attacks Against Buildings
- IEEE Gold Book: Recommended Practice for the Design of I & C Power Systems
- TM 5-698-4: FMECA for C4ISR Facilities
- ANSI / NFPA 70: *The National Electrical Code*, 51st Edition
- ANSI / NFPA 1600 & Supporting NFPA Publications