



## ANSI ES1.9-2020 Crowd Management

Approved by the ANSI Board of Standards Review on 06 July 2020

ES/2019-2001r4

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Published by:

ESTA  
630 Ninth Avenue, Suite 609  
New York, NY 10036 USA  
Phone: 212-244-1505  
Fax: 212-244-1502  
[standards@esta.org](mailto:standards@esta.org)  
<http://www.esta.org/>

## The ESTA Technical Standards Program

**The ESTA Technical Standards Program** was created to serve the ESTA membership and the entertainment industry in technical standards related matters. The goal of the Program is to take a leading role regarding technology within the entertainment industry by creating recommended practices and standards, monitoring standards issues around the world on behalf of our members, and improving communications and safety within the industry. ESTA works closely with the technical standards efforts of other organizations within our industry, including ESA, USITT and VPLT, as well as representing the interests of ESTA members to ANSI, ICC, UL, and the NFPA. The Technical Standards Program is accredited by the American National Standards Institute.

**The Technical Standards Council (TSC)** was established by ESTA to oversee and coordinate the Technical Standards Program. Made up of individuals experienced in standards-making work from throughout our industry, the Committee approves all projects undertaken and assigns them to the appropriate working group. The Technical Standards Committee employs a Technical Standards Manager to coordinate the work of the Committee and its working groups as well as maintain a “Standards Watch” on behalf of members. Working groups include: Control Protocols, Electrical Power, Event Safety, Floors, Fog and Smoke, Followspot Positions, Photometrics, Rigging, and Stage Lifts.

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**The Event Safety Working Group**, which authored this Standard, consists of a cross section of entertainment industry professionals representing a diversity of interests related to event production, insurance and legal matters, rigging and stage machinery for theatrical events. ESTA is committed to developing consensus-based standards and recommended practices in an open setting. Future Event Safety Working Group projects will include updating this publication as changes in technology and experience warrant, as well as developing new standards and recommended practices for the benefit of the entertainment industry.

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Jack Gallagher  
Tony Giovannetti  
Pat Grenfell  
Beverly and Tom Inglesby  
Eddie Kramer  
Jason Kyle

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Shenzhen Ifountain Technology  
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Stage Equipment & Lighting  
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Taurus Light Co. Ltd.  
Ultratec Special Effects  
Vincent Lighting Systems  
Zhuhai Shengchang Electronics Co.

LuxBalance Lighting  
Tyrone Mellon, Jr.  
Orange Pi DMX  
Lizz Pittsley  
Michael Skinner  
Studio T+L  
Terrier Marketing  
Stephen Vanciel  
Arjan van Vught

---

Memorial donor: The Estate of Ken Vannice

**Contact Information****Technical Standards Manager**

Karl G. Ruling  
ESTA  
630 Ninth Avenue, Suite 609  
New York, NY 10036  
USA  
+1-212-244-1505  
[karl.ruling@esta.org](mailto:karl.ruling@esta.org)

**Assistant Technical Standards Manager**

Richard J. Nix  
ESTA  
630 Ninth Avenue, Suite 609  
New York, NY 10036  
USA  
+1-212-244-1505  
[richard.nix@esta.org](mailto:richard.nix@esta.org)

**Technical Standards Council Chairpersons**

Mike Garl  
Mike Garl Consulting LLC  
+1-865-389-4371  
[mike@mikegarlconsulting.com](mailto:mike@mikegarlconsulting.com)

Mike Wood  
Mike Wood Consulting LLC  
+1-512-288-4916  
[mike@mikewoodconsulting.com](mailto:mike@mikewoodconsulting.com)

**Event Safety Working Group Chairperson**

Dr. Donald Cooper  
Executive Director, Event Safety Alliance  
330-414-8938  
[dcc1@neo.rr.com](mailto:dcc1@neo.rr.com)

## Acknowledgments

The Event Safety Working Group members when this document was approved by the working group on 20 May 2020 are shown below:

### Voting Membership List

Jacob Abbott; PSAV Presentation Services; P; G  
 Steven A. Adelman; Adelman Law Group, PLLC; P; G  
 Mike Aug; Chicken Scratch LLC; I; EVP  
 Jesse Barnes; Safewise Risk Management, Inc; P; G  
 Alyxzander Bear; Insomniac; P; EVP  
 Bennett Brian; Reed Rigging Inc.; P; DR  
 Christian A. Buschhoff; xEMP extra Entertainment Media Publishing oHG; P; G  
 Donald Cooper; Event Safety Alliance; P; G  
 Monique Corbeil; CITT/ICTS; P; G  
 Rebecca Cotter; City of Markham, Ontario; P; DE  
 Jeremy Dixon; Digital Sound Systems; A; DR  
 Don Earl; Earl Girls, Inc.; P; DR  
 Ethan W Gilson; Entertainment Rigging Services, LLC; P; DE  
 Sanford P. Gilzow; Shur-Rig LLC; P; DR  
 Joe Golden; Gallagher Staging & Productions; P; DE  
 Jerry Gorrell; Theatre Safety Programs; P; G  
 Randell Greenlee; VPLT; P; G  
 Robert Haycock; UC Berkeley; I; EW  
 Danielle Hernandez; Furman University; P; G  
 Dominic Housiaux; Lankey & Limey, LTD; P; EVP  
 Neil Huff; Taylor & Taylor Insurance Brokers; P; INS  
 Cedric Jackson; Screen Actors Guild - American Federation of Television & Radio Artists; P; PA  
 Janine A. Jordan; Electronic Music Alliance; P; G  
 Eric Kant; Phase01 Crowd Management; P; DE  
 Daniel H. Louis; Theta Consulting LLC; P; G  
 Richard J. Nix; Richard J. Nix; I; G  
 Kevin Pew; Digital Sound Systems; P; DR  
 Jeffrey M. Reder; Clark-Reder Engineering, Inc.; A; DE  
 Ryan Riordan; Accurate Staging, Inc.; P; DR  
 Chris Schmidt; Freeman Companies; P; DR  
 Janet Sellery; CITT/ICTS; A; G  
 Steven Serafin; The Hartford Group; P; INS  
 Keith Sklar; Actors' Equity Association; P; PA  
 Stewart Stephens; Ashford Management Group; P; G  
 Will Todd; Area Four Industries; P; EQP  
 Stephen Vanciel; IATSE Local 631; P; EW  
 Patrick Wallace; PSAV Presentation Services; A; G  
 Allen Winzler; Clark-Reder Engineering, Inc.; P; DE  
 Claire Wright; Buddy, LLC; P; EQP

### Observer Members

Brent Armstrong; Alpine Rigging & Structural Design; O; DE  
 Federico Augugliaro; Verity Studios AG; O; EQP  
 Evan Bailey; Disco Donnie Presents; O; DE  
 Justin Bennett; University of the Incarnate Word; O; EVP  
 Keith Bohn; Area Four Industries; O; EQP  
 Eric Colby; The Metropolitan Opera / Lincoln Center; O; EVP  
 Gareth Conner; Creative Conners, Inc.; O; EQP  
 Jim Digby; Event Safety Alliance; O; EVP  
 Douglas Frawley; Atomic Design; O; DE  
 Roderick van Gelder; Stage Safety pty ltd; O; DE  
 William B. Gorlin; M.G. McLaren, P.C.; O; G  
 Greg Guzzetta; Event Intelligence Group; O; EVP

Tim Hansen; Oasis Stage Werks; O; DR  
Markus Hehn; Verity Studios AG; O; EQP  
Karen Hoffman; Madison Square Garden Company; O; EVP  
Edwin S. Kramer; 1501; O; EW  
Jim Larkin; The Long Center for the Performing Arts; O; EVP  
George Long; Aggreko; O; DR  
Ross Long; I.A.T.S.E. Local 891; O; G  
Diane K. Mack; Mack Strategies, LLC.; O; G  
Franco Magliozzi; Chubb Group of Insurance Companies; O; INS  
Bruno Marx; Eventknowhow; O; EVP  
Orestes Mihaly; Production Resource Group; O; EVP  
Kurt J. Miner; Allianz Global Corporate & Specialty; O; INS  
Janine Ashley Oblak; Janine Ashley Oblak; O; EW  
Erik Ornberg; Encore Event Technologies; O; DR  
Don Parman; Actsafe; O; G  
Dana Risinger; Walmart Stores, Inc.; O; EVP  
Tim Roberts; The Event Safety Shop; O; G  
Tim Salamon; PSAV Presentation Services; O; G  
Jason Showers; Advanced Staging Productions; O; DE  
Sean Spence; Full Spectrum Security Consultants; O; DE  
Eric Stuart; Gentian Events Ltd; O; DE  
Peter Willis; Howard Eaton Lighting Ltd.; O; EQP  
Jeong Sik Yoo; Ghost LX; O; G  
Andrew Young; Andrew Young; O; EW

**Interest category codes**

DE = Designer of Events

DR = Equipment Dealer or Rental Company

EQP = Equipment Producer

EVP = Event Producer

EW = Event Worker

G = General interest

INS = Event Insurance Company

PA = Performing Artist



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## Foreword

The **Event Safety Guide** was first published by the Event Safety Alliance (“ESA”) in 2014 as a treatise which identified and explained various reasonable practices regarding special event safety. With permission from the UK Health and Safety Executive, ESA’s *Guide* was modeled after, and extensively borrowed from HSG195, *The Event Safety Guide (Second edition), A guide to health, safety and welfare at music and similar events*, often referred to as “The Purple Guide.”

In 2016, the Event Safety Working Group (ESWG) was established within ESTA’s Technical Standards Program in order to convert certain *Event Safety Guide* chapters into formally recognized, consensus-based standards that could be universally referenced across special events organizers, producers, enforcement agencies and user-groups. This document is one of those standards, intended to be used in conjunction with each other, which are used to identify reasonable care and safety at special events. Because events constantly evolve, so too will this collection of standards.

It is assumed in this Crowd Management standard that the design and implementation of processes described here are entrusted to reasonably qualified and experienced people who are knowledgeable about the circumstances of their particular event.

This standard may serve as guidance to regulatory and other enforcement authorities. Compliance with this standard, however, does not itself satisfy legal obligations or confer immunity from legal consequences in any specific circumstance.

## Introduction

### I. Context of this Standard

This standard focuses on what one should do, or may do, under various circumstances. It is guidance regarding actions. It is important to understand this guidance in the broader context of event management. That context is generally comprised of the following four elements.

- a) Risk Assessment. Event managers and staff must know their roles and how those roles fit with their professional peers, vendors, patrons, and artists. It is important, especially for events that involve more people or more complicated elements, for there to be a risk assessment for that event. From this risk assessment, event organizers can triage their risks and try to mitigate the risks that are most likely to occur or most likely to significantly impact the event.
- b) Emergency Action Plan. A careful risk assessment will lead naturally to the event organizer creating an emergency action plan to memorialize everyone’s duties and responsibilities, which will ideally articulate staff’s duties during both normal operations and if one of the foreseeable issues does arise during an event. Those duties and responsibilities should be built upon the foundation of this standard, as well as all the circumstances of each event.
- c) Training. Once there is a plan for the event, the event organizer can ensure that staff are trained to perform their tasks and carry out their responsibilities consistent with that plan. Even the best-written documents do not teach themselves – it is essential to train staff to implement the event plans and to reinforce safe work habits.
- d) Supervision. Because even the most well-trained, conscientious people are fallible, the final layer of assurance of safe practices consistent with this standard and the event’s emergency action plan is supervision. If everyone is working consistent with their training, then this will be a way to encourage continued excellence; if someone is falling behind, supervision provides a means to quickly detect and correct non-compliant or unsafe behavior.

### II. Where Do Crowd Problems Happen?

Because crowds can become the scene of mayhem before, during, or after any type of event, no one with crowd management responsibility should get too comfortable that they have the correct, final, and absolute answer to a situation. History suggests that complacency and overconfidence invite trouble.

The most significant threats have changed over time. In the first half of the twentieth century, structure fires caused the most carnage in crowded places. Notorious incidents included the 1911 Triangle Shirtwaist factory fire, the 1942 Cocoanut Grove nightclub fire, and the 1944 Hartford circus tent fire, each of which left more than 100 people dead. Nightclubs continue to be the scene of horrific fires and high casualty counts, including the Lame Horse in Russia in 2009 and Kiss in Brazil in 2013.

Sports venues have been the scene of crowd disasters as well. The infamous 1989 Hillsborough Stadium disaster in England left 96 people dead in a crowd crush; 83 people died in Guatemala in 1998 trying to enter a stadium for a World Cup qualifying match; 43 people died in an overcrowded South African stadium in 2001 when fans rushed in as the match began; in 2012, 79 people died following disturbances at an Egyptian stadium.

Tunnels have proved hazardous for large crowds. In 1990, 1,426 pilgrims died in blocked pedestrian tunnel exits leading out from Mecca during the Hajj in Saudi Arabia. In 2010, 21 people were killed and more than 500 injured trying to pass through a tunnel leading to the site of Germany's Love Parade music festival.

Blocked or insufficient exits remain a deadly contributor to many crowd disasters. In one weekend in February, 2003, 100 people died in The Station nightclub fire in Rhode Island trying to exit an over-crowded building, and 21 more people perished at the E2 nightclub in Chicago in a crush of patrons trying to reach too-narrow exit doors after someone used pepper spray on the upstairs dance floor.

These incidents are listed first so crowd managers do not exclusively focus on the current worst-case scenario, targeted violence or active shooter incidents. It is true that the two most deadly shootings in United States history (as of this writing) – the 2017 Route 91 Harvest Festival in Las Vegas, and 2016 Pulse nightclub in Orlando, Florida – both occurred at live entertainment venues. But the crowd management issues raised by these shootings, and other acts of violence in public places, are substantially similar to the issues raised throughout this standard.

The variety of crowd disasters underscores that it is both pointless and inaccurate to demonize any type of event as more inherently dangerous than others. There is some element of risk in every crowd and every place where people gather in groups. Regardless of the event, anticipated crowd, or worst-case scenario, a crowd manager should be attentive to all of the issues raised in this standard.

### **III. Duty to Have a Reasonable Crowd Management Plan**

As with any standard that covers a broad subject, one should not get lost in the details of this Crowd Management standard. The number or names of factors to be considered is less important than the event organizer's thoroughness in identifying and considering their own reasonably foreseeable risks and developing reasonable risk mitigation plans to address them.

The root of a plan that is "reasonable" is that one has a reason for one's actions – ideally a good reason. Event organizers can most effectively assess and plan to mitigate crowd management risks when they work with all relevant stakeholders during the planning process, collectively assess the risks for that event at that time for that crowd, and record the reasons for those decisions in a manner that will survive the event and help explain the decision-making process long after memories have faded and staff have moved to new jobs.

The necessity of a crowd management plan has long been memorialized in NFPA 101, Life Safety Code®, which requires event organizers to develop a Life Safety Evaluation for large venue or festival seating events. An NFPA-compliant life safety evaluation requires event organizers to consider a wide range of scenarios and hazards that may require special attention and planning.

### **IV. "Best" Practices**

There is no single "best" practice for crowd management. Once one meets the minimum legal requirements embodied in applicable statutes and regulations, there may be many reasonable ways to manage a crowd. Those choices might be different for a different event, or the same event with different weather, or where the crowd is foreseeably more or less active or made up of differing age groups. Users of this standard should find that liberating and empowering. Crowd managers must think through the circumstances of their event, take seriously open-ended questions such as "What could go wrong?" and "What new problems might a proposed solution

create?” then either (a) accept the most reasonably foreseeable risks as is, or allocate resources to (b) eliminate them entirely, (c) mitigate them as much as possible, or (d) transfer them to someone else (e.g., through contractual indemnification or insurance). This thought process is part of what makes a crowd manager’s job interesting and important every day.

## 1 Using this Crowd Management Standard

### 1.1 Scope

The scope of this standard is to (a) define “crowd management,” as distinguished from “crowd control,” (b) provide an overview of crowd management theory and vocabulary, and (c) apply these terms to certain reasonably foreseeable risks that arise during live events. The standard is intended both to identify minimum requirements and provide questions and suggestions that help event organizers make reasonable choices under the circumstances of their event.

This standard applies to anyone working in the live event industry whose job functions may include crowd management during either the ordinary course of an event or in an emergency. As used here, the live event industry includes concerts, festivals, sporting events, community celebrations, theater and film production, corporate events and activations, trade shows, and similar events, both indoors and outdoors.

Crowd management is an extensive topic which crosses multiple disciplines and practical applications. For example, this standard touches on, but does not comprehensively address, event security and incident command, which are discussed in detail in other standards. The duty to maintain a safe environment for visitors extends beyond simply reading this standard (although it is a good place to start). For event professionals whose duties entail significant or regular responsibility for public safety or emergency planning, you are strongly advised to undertake specific training or research applicable to your duties and the environment in which you perform them.

### 1.2 Purpose

The purpose of this standard is to help reduce the risk of harm to people attending events and to improve their experience in crowded places at entertainment, sports, cultural, and corporate events and experiences.

### 1.3 Equivalency

The provisions of this standard are not intended to prevent the use of any materials or to prohibit any design or method not specifically described in this standard, provided that any such alternative design or method complies with the intent of these provisions. The quality and effectiveness of all methods of work that one chooses to apply for a given event should be at least equivalent to those described in this standard. This standard is not intended to replace any applicable laws, regulations, codes, or other guidance – it supplements those authorities with the goal of improving safety.

### 1.4 Application

This document is part of a collection of standards relating to event safety. Users should consider the requirements of the complete collection in relation to the application of this standard, where such consideration is necessary to coordinate and correlate related requirements into a crowd management plan.

### 1.5 Normative References

The following documents contain requirements relating to the scope of this standard. They are provided for guidance only, unless stated otherwise in this standard. Where a specific version of a document is not given, the version applicable to the event’s state, local, or municipal jurisdiction should be used. European standards are also recommended for review, as they are useful sources of guidance where domestic national standards do not already exist.

NFPA 1, *Fire Code*®, 2018 edition

NFPA 101, *Life Safety Code*®, 2018 edition

International Fire Code

International Building Code

Sports Grounds Safety Authority, *Guide to Safety at Sports Grounds* (the “Green Guide”), 2018 edition

SGSA *Alternative Uses of Sports Grounds*

HSG154, *Managing Crowds Safely*, 2014 <http://www.hse.gov.uk/pubns/indg142.htm#intro>

Event Safety Alliance, *Event Safety Guide*, 2014

Additional reference material appears in **Section 5** at the end of this standard.

## 2 Definitions

**2.1 accessibility.** The design of devices, services, or environments to be usable by people with physical and mental disabilities or challenges, and to improve their ability to participate in the event.

**2.2 authority having jurisdiction (“AHJ”).** An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure. For live event venues, the AHJ is often a fire marshal or other local public safety official.

**2.3 crowd.** At its root, a crowd is simply a group of people assembled together. In the context of managing crowds at live events, “crowd” refers to a group of people gathered for a common event or purpose, whose presence together in that area can impact each other’s movements.

**2.4 crowd control.** The physical and coercive measures that may be required once a crowd has reached the limits of safe behavior and urgent action is needed to restore order or prevent crime or injury. Crowd control is what one tries to regain when the crowd management plan has been unsuccessful. Crowd control measures may include safety and security announcements using the public address system, warnings or ejections by security professionals, arrests by law enforcement, or postponement or cancellation of the event. Crowd control is discussed in detail in the Security standard.

**2.5 crowd management.** All measures taken in the normal process of facilitating the movement and safe enjoyment of people within confined spaces. The selection and application of crowd management techniques requires an understanding of the design and operational features of the venue as well as the characteristics of the crowd attending a given event. Crowd management is what one plans to do and then implements in order to maximize the likelihood of a safe and successful event and minimize the need for crowd control.

**2.6 crowd manager.** This standard adopts the definition of “crowd manager” set forth in the National Fire Protection Association’s *Life Safety Code*®, NFPA 101. This standard also refers to “event organizers” to mean people with crowd management responsibility. Even in jurisdictions where the *Code* has not been adopted into law, it still provides valuable guidance on the following subjects:

- a) Crowd manager roles and responsibilities;
- b) Safety and security hazards that can endanger public assembly;
- c) Crowd management techniques;
- d) Fire safety and fire safety equipment;
- e) Methods of evacuation and crowd movement;
- f) Procedures for reporting emergencies;
- g) Crowd management emergency response procedures;
- h) Paths of travel and exits, facility evacuation and emergency response procedures and, where provided, facility shelter-in-place procedures;
- i) Venue and guest services training; and
- j) Other event-specific training, as necessary.

**2.7 egress.** A continuous and unobstructed path of travel from within an event space – whether contained in a “brick and mortar” building or a “green field” outdoor space with either natural or man-made physical boundaries – to the outside or a place of safety. For example, a discussion of egress may begin from a single enclosure, such as a room in a building, and continue off the event site. Egress can also be used as a verb, referring to the process of moving people from the event space to its perimeter and beyond, including dispersing the crowd to avoid bottlenecks at public transportation, management of ride- share lines and parking lots, and separating pedestrians from vehicular traffic.

The meaning of egress and ingress in the context of crowd management is discussed more fully in Sections 3 and 4 of this standard. Factors to be considered when calculating egress capacity of an event space, including number of means of egress and whether there are corners or steps along the egress route, can be found in NFPA 101, *Life Safety Code*®. One should consult their Authority Having Jurisdiction to ensure compliance with local safety requirements.

**2.8 evacuation.** Rapid egress out of some or all of an event space in response to an unexpected situation that threatens the health or safety of patrons. A related term, “invasion,” describes moving people into buildings to protect them from an external safety hazard such as severe weather. Both types are generally necessitated by an actual or perceived emergency which makes it impossible or unrealistic to continue the event. Evacuations may vary depending on the nature of the threat and the event location: partial evacuation may be used on a large outdoor event site; phased evacuation may be most appropriate in a multi-story building; full evacuation may be required for an enclosed space. Any evacuation will require a greater degree of crowd management than a controlled and scheduled egress.

**2.9 event.** Any assembly, public or private, indoor or outdoor, which is presented to a live audience.

**2.10 ingress.** The ways people enter an event space, including site design, queuing arrangements, timing of door-opening, ticket-taking or scanning a credential, bag check, pat-downs, and use of magnetometers. For this standard, discussion of ingress should also include consideration of the foreseeable rate and timing of guest arrival, which will impact the event’s ability to manage ticket taking and security checks, as well as the process of guest assembly, such as patrons arriving from mass transit stations and parking lots, general admission ticketholders queuing up outside the doors to enter the event, and pre-event related activities such as tailgating.

**2.11 may.** Denotes an action that this standard recommends that a user consider, depending on how reasonable it is under the circumstances of a given event.

**2.12 must.** Denotes a mandatory requirement, which is used here only when referred to a standard, code, or other requirement that carries the force of law. “Must” is the preferred term in modern legal documents such as contracts. Many ANSI and ISO documents continue to use the older word “shall” for the same purpose.

**2.13 occupant load.** The total number of persons that may occupy a building, or any portion of a building, at any one time. Generally, the maximum occupant load for an event space without fixed seating is 7 square feet (0.65 square meters) per person, subject to the authority having jurisdiction making a different determination.

**2.14 hazard identification.** An identification of the potential for or actual existence of a hazard that could impact an event. Drowning, for example, might be a hazard at a waterfront event, but not on a green field. Risks that are hazardous under the circumstances of a particular event can be identified and then prioritized by answering the question, “What could go wrong?”

**2.15 risk assessment.** A systematic analysis of reasonably foreseeable threats to determine the risk for each issue identified in the hazard identification process, including the frequency, likelihood of occurrence, and the potential severity of outcome. A useful risk assessment formula is  $\text{Risk} = \text{Vulnerability} \times \text{Consequences}$ . Some disciplines, such as emergency management and occupational health and safety, may require creation of a HIRA (“Hazard Identification and Risk Assessment”). A HIRA can help allocate resources to reduce risk to an acceptable level under the circumstances. The risk assessment must be recorded and communicated in advance of the event to allow appropriate implementation of resources to prevent, mitigate, transfer, or otherwise address hazards. The risk assessment should be updated as new information relevant to crowd management becomes available.

**2.16 should.** Denotes a recommendation, as opposed to a requirement that one must do. If one determines that a recommended technique or activity is not going to be used for a particular event, this standard further recommends that the crowd manager contemporaneously document the reason for that decision for future reference.

**2.17 wayfinding.** The process of individuals taking cues from their environment to find their way as they move from an origin to a destination. Wayfinding aids may be natural, such as a particular tree or hill, or man-made, such as signs, maps, high-visibility tape on floors or walls, and illuminated exits.

### 3 The “DIME-ICE” Crowd Management Model

#### 3.1 Prior Crowd Management Models

Crowd models should not be confused with crowd simulations. A crowd *simulation* uses powerful computers to create animated sequences to show how a crowd is expected to move under specific circumstances in a particular physical environment. A crowd *model*, which is the subject of this standard, can be a simple scalable tool which requires little technology or budget, and is used to analyze the factors that can affect a crowd’s safety

or the way it behaves. This standard describes a model that can help crowd managers address the risks that may arise from both the physical environment and the behavior of the members of the crowd.

In the United States, modern crowd management theory generally begins with John J. Fruin, Ph.D, and his 1971 book, *Pedestrian Planning and Design*. Dr. Fruin’s work, featuring the “crowd dynamics factors” of Time, Space, Information, and Energy, is incorporated into the National Fire Protection Association’s *Life Safety Code*®, NFPA 101.

In the United Kingdom, Prof. G. Keith Still reformulated Fruin’s approach, creating a model for crowd safety planning focusing on three influences on crowd behavior – Design, Information, and Management of crowds, during the three phases of an event – Ingress, Circulation, and Egress. Professor Still’s “DIM- ICE” model is designed to help organizers consider how people will experience an event’s physical and social environment during both normal and emergency situations, in order to procure, assign, and deploy safety and security resources.

Although Fruin and Still both used mathematical measures of crowd flow and occupancy, they also acknowledged the fundamental importance of human psychology and agency in crowd safety.

This standard extends the DIM-ICE model to expressly add the crowd’s **expectations** to the influences on behavior that organizers should consider when creating and implementing a crowd management plan. Event attendees’ readiness to comply with design, information, and management cues is at least as important for a crowd management plan as predicting flow rates or estimating crowd density. This updated crowd management model is referred to as “DIME-ICE.”

### 3.2 DIME-ICE

DIME-ICE is a matrix for analyzing risks and managing crowds. Here is an overview of the “DIME” part of the analysis, in which event organizers should consider four ways a crowd can be influenced during an event.

- **Design** refers to the limitations on crowd capacity and movement created by the physical environment. Design also includes considerations of sightlines, access routes, accessibility needs, and how people see, hear, and participate in the event. For example, if the design of an event space may lead to dangerous crowd density because of bottlenecks where the crowd compresses as it moves forward, unexpected turns in the path of egress, or changes in terrain or lighting that might impede movement, then the event organizers should take steps to mitigate the resulting risk of slower than anticipated crowd flow or even crowd crush.
- **Information** includes all means of communicating with the crowd to help them make reasonable decisions about their safety and health. The relevant period covers the initial ticket purchase through the ticketholder’s departure at the end of the event. The means of providing information is nearly limitless. Current options may include FAQs on a web site for prospective purchasers, road signs to the event site, wayfinding signage throughout the venue, and public address announcements conveyed by bullhorn, audio, video, and social media, as well as countless others. Information should be communicated to reach all foreseeable event attendees, including people whose first language is not English and people with accessibility needs. In the context of live events, “Information” may also include briefings provided to event staff as well as written materials such as site maps, emergency plans, and daily schedules.
- **Management** systems include all processes and procedures available to inform, influence, and move people. This can include emergency plans based on a HIRA (Hazard Identification and Risk Assessment), a unified command center, easily identified guest services and security staff, and clear lines of communication and authority among event organizers and public safety officials. Management systems can also include use of equipment such as barricades or large vehicles to physically direct crowd movement.
- **Expectations** has two important facets. From the crowd’s perspective, “expectations” refers to the way people in a crowd perceive what they expect and desire. The subconscious preference for the familiar is variously referred to as “confirmation bias” (in which we recharacterize unfamiliar situations into familiar ones that confirm what we already think) or “normalcy bias” (in which we have trouble acknowledging that what we expect is no longer happening). See Section 4.4.2. The significance of crowd expectations is that most people have difficulty perceiving and reacting to situations they did not anticipate in that context.

Particularly during emergencies, an important task for crowd managers is to help event patrons understand the situation as it actually is, rather than how they expected it to be.

From the event organizer’s perspective, “expectations” can refer to anything about crowd demographics and behavior that is reasonably foreseeable, which some combination of the event promoter, venue operator, security provider, or artist could know with a reasonable amount of due diligence. When event organizers educate themselves about the expected risks of a given crowd, they can better plan to mitigate those risks.

These four influences on crowd behavior should then be applied to “ICE” analysis, assessing their effect on crowd activity before, during, and after an event.

- **Ingress** is broadly defined in this standard to begin when patrons move towards the venue’s security perimeter, including their transportation and arrival on property and participation in event-related activity such as drinking or tailgating, through the ways people enter the event space, including bag check, pat-downs, magnetometers, presenting a ticket or scanning an RFID (radio frequency identification) bracelet.

Because ingress can be comprised of so many different elements, there are potentially many crowd management issues to consider. For example, one common ingress consideration is if security guards are using hand-held magnetometer wands or patting down patrons for prohibited items, then separate lines staffed by male and female security professionals may be advisable. Similarly, organizers should consider how to accommodate groups or families, or those with accessibility needs who may not want to be separated from each other or their caregiver during this process.

- **Circulation** refers to all movements by the crowd within the event space during the event, which may include overnight activities during multi-day events.
- **Egress** means the ways to move patrons out of the venue after the event. For this standard, egress also includes actions to disperse the departing crowd to avoid bottlenecks at public transportation, ride-share lines, or parking lots, and separating pedestrians from vehicular traffic.

The DIME-ICE analysis uses two matrices of 12 boxes each. As shown in the sample below, the first matrix addresses the foreseeable crowd management issues on a “normal” day, when the event runs generally as anticipated. The second matrix addresses the same issues during a reasonably foreseeable emergency.

*Sample DIME-ICE matrix during “Normal” conditions. For illustration purposes only. Your matrix must be based on the circumstances of your event.*

NORMAL CONDITIONS	Ingress	Circulation	Egress
<b>Design</b>	<ul style="list-style-type: none"> <li>• Ensure that routes to event site separate pedestrians from vehicle traffic.</li> <li>• Ensure sufficient security search lanes to quickly move people inside the security perimeter.</li> <li>• Identify space to inspect paper and electronic tickets.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure sufficient space for patrons on concourses and access routes to comply with fire code.</li> <li>• Place barricades, staff, and signage to enable movement through designated paths in ticketed and general admission spaces.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure exit routes wide enough to accommodate the departing audience.</li> <li>• Remove entry and queue barriers during the event.</li> <li>• Confirm that egress routes are clear before end of event.</li> <li>• Prepare temporary road closures for peak departure times.</li> </ul>



<b>Information</b>	<ul style="list-style-type: none"> <li>• Provide information on event web site and social media re transportation to the venue.</li> <li>• Use colors, numbers, and/or symbols to designate parking areas.</li> <li>• Designate a separate approach route for event production traffic.</li> <li>• Create signage showing entrance for each ticket type and seating area.</li> <li>• Use variable message LED signs to maximize visibility.</li> <li>• Post event staff to offer directions.</li> </ul>	<ul style="list-style-type: none"> <li>• Have routes from audience areas to concessions, restrooms, and exits clearly marked and illuminated.</li> <li>• Prepare announcements to be made from the stage regarding the length of breaks between acts.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure exit routes are clearly marked and illuminated.</li> <li>• Identify specific routes for parking, ride-share, other public transportation.</li> <li>• Staff should pre-deploy to exit points before the event ends.</li> <li>• Link CCTV feeds from perimeter of event site to Event Operations Center.</li> <li>• Maintain direct contact with public safety and mass transit providers.</li> </ul>
<b>Management</b>	<ul style="list-style-type: none"> <li>• Position barriers and staff at public transit drop off points to prevent people crossing against traffic.</li> <li>• Provide and calibrate equipment required for patron and bag search.</li> <li>• Ensure sufficient staff to efficiently process people into the security perimeter.</li> </ul>	<ul style="list-style-type: none"> <li>• Install barriers to create one- way lanes in high-flow areas.</li> <li>• Create and manage queue lines at concession stands.</li> <li>• Limit length and control direction of lines allowed at concession stands to keep accessways open.</li> </ul>	<ul style="list-style-type: none"> <li>• Post staff to help disperse the crowd and encourage them wait for friends and family away from exits.</li> <li>• Prevent vehicle movement across pedestrian walkways.</li> <li>• Provide parking staff to direct vehicles out of lots.</li> <li>• Provide pickup places for persons with accessibility needs.</li> </ul>
<b>Expectations</b>	<ul style="list-style-type: none"> <li>• Audience may arrive early to tailgate or meet up with friends, or they might arrive late and seek to enter just before the event begins.</li> </ul>	<ul style="list-style-type: none"> <li>• The venue will be easy to navigate, have clear signage, reasonable lighting, and helpful staff.</li> <li>• Patrons can see and hear all aspects of the event, easily access concessions and restrooms.</li> </ul>	<ul style="list-style-type: none"> <li>• Exits and wayfinding aids will be at least as visible as concession signs.</li> <li>• Departing patrons can easily find ride-share and taxi lines.</li> <li>• Departing vehicles can leave parking lots without long delays.</li> </ul>

Regarding patron circulation in the DIME-ICE model, a further tool is the **RAMP analysis**, in which the crowd manager considers the crowd's Routes, Areas, Movement, and Profile. Like DIME-ICE, this is a modeling tool which requires neither big computers nor big budgets; it is a simple drawing technique using site maps and colored pens to identify where patrons tend to go on an event site, and in what numbers, in order to minimize the likelihood of dangerous congestion of standing or moving crowds, bottlenecks, or long lines. Utilization of a RAMP analysis during event planning allows site designers to expand or contract pathways to accommodate foreseeable crowd movement and determine where security and guest services staff should be posted to help manage the crowd.

- Routes are patrons' most-used paths for ingress, circulation, and egress. Depending on the site, ingress and egress routes may be a function of proximity to public transportation or parking lots; circulation routes will likely be most used near the featured attraction such as the playing field or main stage, as well as food and beverage areas, restrooms, and ancillary events. Where high-usage paths constrict, converge, cross, or contra-flow (move in opposite directions), problems are most likely.
- Areas require measuring the surface area of an event site, omitting space that is unusable, otherwise occupied, or unlikely to be occupied, then determining a maximum safe capacity for each part of the site based on a specified maximum crowd density. These measurements can be drawn onto satellite images available online or specially commissioned aerial photographs of the event site and its environs, including spaces where the crowd may line up before entry and where they are likely to go after they leave the

event. Note that most event sites will have areas of foreseeably high density (e.g., near a general admission stage), low density (paths on which people are moving), and no density at all (equipment storage). The crowd manager must ensure that even in the most densely packed areas, patrons are not dangerously overcrowded.

- Movement requires consideration of how the crowd will behave during all stages of the event, with the goal of avoiding bottlenecks even when the greatest number of people is likely to be moving. For example, during what time period will most patrons arrive? Is that tied to a particular event, such as the arrival time of a train or the beginning of an opening ceremony? Will most patrons expect to be able to visit the restroom or purchase a beverage during halftime or between acts? What age group and mobility needs do the patrons have (e.g., families with strollers will need more room to move)?
- Profile refers to the anticipated crowd demographic, including their foreseeable expectations and activities at different times during the event. For certain events, this should include Arrival and Departure profiles. Some crowds will arrive early in order to tailgate for hours beforehand, while others will foreseeably show up after an opening act has already begun. Some crowds foreseeably depart early to avoid traffic or during a dispiriting loss for their team, whereas people attending a fireworks show will generally stay to the end, after which everyone will try to leave at once. Research about the crowd's foreseeable expectations is essential to preparing a crowd management plan that is responsive to their needs at all stages of an event.

## 4 Application of the DIME-ICE Model

Following is a more detailed discussion of certain aspects of the DIME-ICE crowd management model.

### 4.1 Design

#### 4.1.1 The Configuration and Use of Space

The configuration of space, including the objects within it, can dramatically affect people's ability to move. At *The Station* nightclub in Rhode Island, for example, the club owners erected a partial wall at the entrance to prevent people sneaking in without paying, an Exit sign next to the stage was not illuminated, and other exits were blocked or not visible where most patrons were standing. These and other factors led to 100 deaths, mostly from crushing and asphyxiation when they could not get out of the burning building.

NFPA 101, *Life Safety Code*®, specifies the minimum width of egress stairs and level walking surfaces. Generally, egress stairs must provide a minimum of 0.3 inches of width per person in the venue; level areas must provide at least 0.2 inches of width per person. In addition to the required capacity, every egress area must meet absolute minimum width standards. For example, an event space whose (a) occupant load is 1,000 people, where (b) the exit is a level corridor without stairs, requires a minimum exit door width of 200 inches. If the doorways are each 36 inches wide (compliant with the Americans With Disabilities Act), then the venue would need at least six exit doors. Some building codes, such as the International Building Code ("IBC"), permit a reduction in the required egress capacity where the building is protected by an automatic sprinkler system and emergency voice/alarm communication system. NFPA 101 does not permit such reduction, reasoning that rapid evacuation may be necessary for reasons other than fires, such as real or perceived threats to crowd safety.

Crowd managers can provide more egress space for their patrons, and depending on an event's reasonably foreseeable risks, a more conservative use of space may be preferable. For example, families tend to travel slower than individuals, both because they have more gear and because they walk at the pace of the slowest member in order to leave no one behind; children may have to be coaxed into taking action; members of some cultural or geographic groups walk slower or faster than others. Applying the math, crowd managers could allocate 0.3" per person for all exit paths, or round that number up to 3 people per inch (25 mm). Doing this would increase the minimum amount of exit width for 1,000 people to 334" of total exit space. This change would yield ten 36" exits rather than the six exits in the previous example. Using a more conservative calculation is means to an end. Your risk assessment should inform the decisions you make regarding how you configure and use space. Like everything else in this standard, no one size will fit every crowd.

In addition to its configuration, the use of space and the number of people within it (the "occupant load") can significantly affect people's ability to move and feel safe. The maximum permissible density of a crowd should be based on two factors: (1) the number of people who can safely enter and occupy the space; and (2) the number of

people who can safely leave the space in light of physical restrictions such as the number of exits and their width (and the number of people and *their* width). For example, a restaurant with tables and chairs has less usable floor space and more obstructions, and therefore should have a lower maximum occupancy than a bar with an open dance floor. And people must be able to see a space or otherwise learn of its existence in order to use it – designated paths will be significantly underutilized if patrons do not know they are there.

Both the configuration and usage of space are driven by simple models comprised of mathematical descriptions of average human forms for a given event, how many of those “people” can fit into the available space, and how many can pass through a space – whether an aisle, a door, or down a set of stairs – in a given amount of time. The model should be adjusted to meet the reasonably foreseeable circumstances of a given event and crowd demographic. For example, an event that foreseeably attracts more families with strollers or people with mobility assistance devices should plan to provide more space per person for safe movement. These considerations apply to outdoor spaces as well as events in brick and mortar buildings. This is generally as complex as crowd modeling needs to be.

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- a) *Exits must be marked with signage that is either ANSI-compliant or approved by the local authority having jurisdiction.*
  - b) *To be effective, exit signs must be located and illuminated so the crowd can see them.*
  - c) *Before and periodically during an event, exits should be checked to confirm that they are unobstructed.*
  - d) *Exit pathways must comply with the applicable fire code (either NFPA 1, Fire Code, or the International Fire Code) and/or NFPA 101, Life Safety Code®, or approved by the local authority having jurisdiction.*
  - e) *The design and maximum occupancy of a space must account for its usage, including objects in the space and foreseeable activities likely to occur there.*
- 

#### **4.1.2 Design and Monitoring of General Admission Events**

In a general admission (“GA”) event, attendees may go to any part of the venue permitted by their admission pass – they are not assigned to a seat in a specific location. In order to manage a GA crowd, one must understand the event’s attractions, how patrons obtain their preferred event experience, and where in the event space they will go to achieve this.

At a concert on stage, for example, the highest occupant load is usually front of house center, where patrons are closest to the artist. A sporting event may have a designated or de facto supporters’ section, or a particularly volatile area where rival factions are seated close to each other. Even corporate activations have attractions designed to draw the greatest guest attention.

Crowd managers at general admission events should look for signs of distress and indications that the occupant load in an area is getting dangerously high. When a crowd becomes too densely packed, people can no longer extend their arms away from their sides, meaning that they have difficulty controlling their own body weight or even breathing as the entire crowd presses forward or waves side-to-side. The force of crowd movement can cause patrons to get knocked off their feet or pressed against barricades or each other, any of which can result in dangerous pressure on individuals. This is particularly dangerous for crowds with children or vulnerable people. Excessive occupant load can become hazardous with little warning, and therefore requires prompt corrective action by crowd managers.

Walking paths within or around the GA crowd should be marked with tape, paint, rope, or anything else that may be effective for a given space, illuminated to the extent appropriate for that event, and enforced by security or guest services staff as needed.

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- a) *The design of a general admission area must account for foreseeable crowd movements and activities, and the crowd management plan must include measures to release crowd pressure and to permit patrons to safely leave, pass through, or go around the GA crowd.*
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#### **4.1.3 Barricades**

The typical general admission event uses a specially designed barricade to separate the crowd from the performers. For events oriented towards a stage, such as a typical concert, the barrier line also creates a designated work area for front of house security and medical professionals, usually called “the pit.” In order to resist the horizontal force exerted by a crowd, stage barricade typically consists of a folding A-frame design in short sections which bolt together, with a footplate on which people in front of the audience stand and a step on

the other side of the upright which affords security an elevated view. Events at which the crowd is unlikely to push in a particular direction may use any barrier which provides sufficient separation between performers and patrons.

For forward-facing GA events, setting the barricade in a **T shape** extending away from the stage can divide the crowd into stage right and stage left areas. This yields several crowd management benefits.

From a crowd safety standpoint, dividing the occupant load reduces dangerous lateral movement across the front of the stage that can cause people to lose their balance and get knocked down. From a crowd management perspective, a divided barricade allows security guards to stand both in front of the crowd – in the pit between the stage and the audience – and also within the crowd. One of the difficulties of general admission crowds is that it is hard to see more than a few people deep, but a center aisle greatly increases security’s ability to perceive and react to situations farther back in the crowd.



*A rounded T-shaped barricade system*

Particularly for events with larger or more active crowds, barrier design should be considered along with other event production requirements. Where a barricade turns at a ninety-degree angle, any turns should be rounded, as shown above, in order to avoid a compressive corner from which a safe exit is more difficult. A front of stage barrier system that curves slightly into the crowd increases the crowd’s viewing area, distributes crowd pressure outward, and provides more space in the pit from which security can see and help manage the crowd.

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- a) *For forward-facing GA events, crowd managers should consider whether the foreseeable occupant load and resulting crowd sway would be mitigated by dividing the crowd using a T-shape barricade configuration.*
  - b) *In event designs with a stage and pit, crowd managers should ensure that there is sufficient space between the stage and the front of house barricade to allow a safe working area for security and any credentialed operations professionals, and that the area is large enough to fit a stretcher to evacuate people who might be injured near the stage.*
- 

#### 4.1.4 Create More Valuable Real Estate

Because some people will value comfort or sightlines or preserving their hearing more than getting close to the event, crowd managers at forward-facing general admission events can use these foreseeable characteristics to reduce the occupant load at front of house center. Assuming that most attendees want to see and hear, the organizers can provide video monitors and speakers farther back in the general admission area to increase the attractiveness of hanging out further from the front. Other resources such as food and beverage concessions and portable restrooms can be moved closer to this area.

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- a) *Because the main attraction of an event may be different for different people, event organizers should consider how to emphasize the benefits of each part of an event space, not only to make the experience more enjoyable for patrons, but also to help manage crowd circulation and occupant load.*
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#### 4.1.5 Corrals

Crowd managers can reduce the likelihood of waves or surges by creating separate admission into various corrals, and by taking steps to manage the crowd in each area at all times during the event. Patron wristbands or tickets can be used to indicate which corral each patron can enter, which enables the event organizer to limit the number of people in any given area. If the occupant load of a corral is permitted to rise too high for patrons to move freely, then barricades can impede general circulation or emergency egress. But up to that point, which will vary with each event space, the creation of more exclusive real estate within a GA event enables the promoter to charge more for tickets to corrals closest to the stage, designate accessible or family-friendly areas, or otherwise create designated admission spaces of limited occupancy within a general admission event.



*A wheelchair accessible corral at a festival*

## 4.2 Information

### 4.2.1 Foreseeable Crowd Behavior

People in a crowd often have a limited view and understanding of what is happening around them. Unless authoritative information is provided from a reliable source, attendees may act on speculation or the actions of other people nearby. Crowd managers should convey reliable information proactively, before crowd management becomes a problem. For example, the disaster at Riverfront Coliseum in Cincinnati might have been avoided had *The Who's* fans been told by guest services or security when doors would open and which ones they could use.

In an emergency, "line-of-sight" often becomes "line of flight," meaning that people tend to go places they can see most easily, even if their actions expose them to greater danger. This has happened in some active shooter situations, including the 2016 *Pulse* nightclub shooting in Orlando, Florida, where some people who might have fled to safety instead hid in a bathroom while the shooter reloaded and then resumed firing. Alternatively, many people instinctively head back the way they entered. Building and life safety codes mandate that when a main entrance is identifiable, it must be oversized to accommodate this foreseeable behavior.

In order to overcome fear, paralysis, and other unhelpful but typical human responses to emergencies, such as the tendency of families and groups to wait for their slowest member, venue operators and event organizers must plan and be prepared to activate multiple means of providing patrons with clear information they can use. These may include cutting into the artist's performance using a back of house microphone, turning up the lights to indicate that the show has been stopped and to illuminate exits, broadcasting live or pre-recorded instructions on the public address system and video monitors, posting information through major social media channels, and stationing security and guest services staff at exits and other points to lead people towards safety (as opposed to standing within the crowd and pointing to a distant exit), among other strategies discussed further below.

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- a) *When planning any form of communication with the crowd, event organizers must account for typical human responses, some of which are helpful in an emergency, some of which must be overcome in order to get people to follow new instructions under unexpected conditions.*
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#### 4.2.2 Emergency Announcements

An especially important type of information is emergency announcements to the crowd. During an emergency, everyone must get the message, but people receive information differently depending on a variety of factors. Therefore, the words that are conveyed, the person who conveys them, and the different media that are used to reach people can all be of vital importance.

**Content.** Regarding the content of emergency messaging, event organizers should prepare at least basic scripts to address the most foreseeable emergency situations that may arise under their circumstances. Typical subjects that can be scripted in advance may include a delayed opening, incoming weather and what to do about it, event postponement or cancellation and resulting ticket refund policy, or procedure for reuniting parents separated from their children.

Even in a non-emergency evacuation, the manner in which information is conveyed is important. While some brief explanation of the nature of the emergency may be desirable, the goal is to get people to move from wherever they are to someplace safer. In that sense, the reason(s) for the evacuation are much less important to convey than that IT IS ESSENTIAL TO MOVE – NOW! In a severe weather evacuation, for example, crowd managers don't want patrons second-guessing whether to follow instructions based on their own interpretation of a weather app. Patrons who have been waiting a long time may not care enough about the threat of lightning to give up their place at a general admission event, and passionate fans of the event or artist may stay until they are forced to leave, in the hope that the show will go on despite the weather. If the organizers determine that safety requires evacuating the venue, then the people conveying that message to the crowd must show, with their words, actions, and tone, that evacuation is mandatory.

**Delivery.** Identifying the person who can most effectively deliver an emergency announcement is a separate consideration. Even for the smallest events, at least one designated event organizer should have the experience, training, and knowledge of the venue, its resources, and its surroundings to deliver any live announcements that may be needed. For routine matters or certain foreseeable emergency situations (such as a person who becomes separated from their family or group), announcements that are pre-recorded in a calm, clear, authoritative voice can be played on the public address system, and these must also be posted to any video system where one exists.

For events that have an audio system with multiple microphones, it is recommended that there be two dedicated and pre-tested microphones, and/or two dedicated and pre-tested megaphones usable during a power outage.

One device should be placed backstage, and one in a separate location, preferably front of house. Emergency messages MUST be posted next to these microphones at all times, and the sound system must be tested daily. Microphones and/or megaphones allow the crowd manager to make announcements that deviate from the script if required, or if none of the pre-scripted messages applies.

Although it is not generally recommended for the reasons discussed here, another possibility for delivering emergency messages is the artist on stage. They already have the crowd's attention, so they can be persuasive. If the event organizer asks a performer to make an announcement, they should either ensure that the artist is briefed to say the right thing or have them speak alongside someone more familiar with the venue and its emergency procedures. Relying on a performer to make emergency announcements carries significant risks. An artist is unlikely to know the site or its emergency routes; because they will not have practiced the emergency announcement, they may not project an appropriate level of calm; some audience members may think that an announcement by the artist is part of the performance; and the artist's representatives are likely to want to hustle them onto buses and out of harm's way as quickly as possible. If the event organizer and artist jointly decide in advance that the artist would deliver any emergency announcements, then the logistics of doing so should be confirmed with the artist's representatives and documented before the event begins.

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- a) *The event organizer should consider how emergency messages would be delivered to the crowd, whether by pre-scripted or pre-recorded announcements or on an ad hoc basis, by the artist or event staff, using whichever resources will ensure that the largest number of people will be reached quickly.*
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### 4.2.3 Signage

Signage which uses clear language and/or easily understood symbols, and which is located where patrons can easily see it even – or especially – during an emergency, is essential for every event space. Most live events are intentionally created to draw patron attention to just a few areas (the performance space and concession areas), and they stress attendees' senses with bright lights and deep shadows, loud sounds, lots of people, and unfamiliar spaces. Add patron excitement, alcohol or other controlled substances, fear of real or imagined threats, and our built-in psychological preference for the familiar, and the foreseeable result is a crowd with limited ability to clearly perceive and decisively react to unexpected situations.

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- a) *When evaluating the effectiveness of signage related to wayfinding, exits, and essential services such as medical care, crowd managers must consider the circumstances in which patrons will experience signage during all phases of the event, including arrival and departure.*
- b) *In order for warnings to transfer the risk of engaging in dangerous activities from the event to the patron, the warning must both identify the prohibited activity or item and provide an explanation so the patron can make an informed decision about their own safety. Given the space limitations on most signs and tickets, a Frequently Asked Question (FAQ) section on the event web site can be a good place for more detailed explanations.*
- 

For these reasons, event signage, including site maps, guest codes of conduct, and lists of prohibited items and activities should be posted wherever people are reasonably likely to see it as they approach and enter the event space. Wayfinding signs directing patrons towards exits, hydration, and medical care must be large, easy to see even in the dark, located where patrons will foreseeably congregate, and mounted high enough not to be blocked by other people, fences, trees, or built structures. Here is a simple test: if vendors' signs promoting their wares are easier to see than the exits, then the exit signage should be reevaluated.

## 4.3 Management

### 4.3.1 Managing an Early Arriving Crowd

Because an event operator may have a duty to provide safe premises for their patrons as soon as the patrons arrive on site, certain pre-event accommodations may be helpful. For example, a "doorbuster" store opening or line outside the doors of a general admission event can avoid a stampede by handing waiting patrons a numbered ticket indicating the time and order in which they will be allowed to enter. This metered ingress can be supplemented by crowd management as basic as an employee with a bullhorn giving ten- and five- minute warnings and assuring patrons that everyone will get in by following instructions. Note that a countdown to doors can also have the opposite effect by building a level of excitement and anticipation that could lead to dangerous behavior. Where it is foreseeable that patrons may begin lining up outside the venue doors hours in advance, as

at some general admission events, event organizers should consider the need for protection from the elements, hydration, food, security, trash, sanitation, and information.

- a) *For events where the crowd is likely to queue up outside an attraction, crowd managers should consider a metering system, such as handing each patron in line a ticket with a number or time printed on it so they can leave and return without fear of losing their place.*
- b) *Crowd managers should also consider the health and safety needs of early-arriving patrons where it is foreseeable that patrons will queue up outside the event's security perimeter before doors open.*

#### 4.3.2 Monitoring the Crowd from Above

It is difficult to monitor a crowd from within a crowd. Patrons in a GA crowd may continue to push forward even if their peers at the front are pressed against the barricade because people at the back cannot tell what's happening ahead of them. For this reason, height above the crowd can be a useful crowd management tool, particularly for general admission crowds.

At its most basic, even the step on the inside of a barricade allows security guards to see into and over the crowd. In addition, any event space can benefit from closed-circuit television ("CCTV") cameras, which, depending on their number, placement, and technical capabilities, can provide an unobstructed view of all areas of an event site under all lighting conditions. And subject to various legal and safety concerns, cameras mounted on unmanned aerial vehicles, or drones, can provide an even more expansive over-head view of an event site. Note that because cameras can show crowd movement but not crowd energy, they are a supplement to, not a replacement for event staff providing direct input regarding the situation on the ground.



*A typical barricade with steps*

- a) *Where it would otherwise be difficult to know the safety and health conditions more than a few rows of people into a crowd, event organizers should consider ways to obtain an elevated position or locate CCTV cameras where they offer visual access further into the crowd.*

#### 4.3.3 Managing the Crowd During Severe Weather

Severe weather can obviously affect the health and safety of a crowd attending an outdoor event, and the threat of a storm can also cause sudden crowd movement. Even indoor events need a severe weather action plan to address the needs of people coming in from parking lots or public transportation or queuing up outside before doors open, as well as getting them safely outside after the event. A wet indoor lobby floor can be the hazardous result of stormy weather outside.

Unlike some other situations requiring crowd management, severe weather usually gives advance notice. The goal is to obtain weather information early enough so there is time to get the attention of everyone at the event and move them to a place of greater safety. Here are some relevant issues to consider when developing a severe weather action plan.

- a) How does one acquire an accurate weather forecast for your event location? For a variety of reasons including the curvature of the earth and transmission time from meteorologist to end user, weather apps are neither accurate enough for a specific location nor fast enough from source to cell phone to reasonably protect event workers or guests. Instead, **private weather consulting** is recommended because it puts a professional meteorologist a phone call or text message away, and their information is more likely to be accurate for the area that matters to event organizers – the place where their crowd is located.

Determine who will have final decision-making authority regarding weather-related decisions, and how to get that person the information they will need to make well-informed decisions that protect lives, then property. Consult with the event insurer to understand the criteria for event postponement or cancellation, as well as the documentation the insurer may require before accepting a weather-related claim.

- b) What is the **vulnerability** to severe weather? What are the reasonably foreseeable weather threats for that region at that time of year? What risks are presented by the foreseeable crowd demographic? What

can people do to protect themselves? How can the crowd manager provide patrons with useful information? How will patrons identify their best options?

- c) What can one do to address each vulnerability? For outdoor events, is there shelter available? How far away is it? How many people will it hold? Is it accessible for all patrons? How many minutes does it take to evacuate the venue during an event? Is there a plan for evacuating vulnerable people? Do you know the technical limitations of all temporary structures, such as the wind rating for a stage roof system, which may require moving people away even if a storm is otherwise not affecting life safety? Do you know the engineered ratings for temporary structures, tents, truss systems, and other ground supported equipment? Are people on site who can manage such structures and equipment during severe weather?
- d) Who chooses how and when to respond to severe weather? As with a plan for any emergency, the goal of a severe weather plan is action – to move the crowd, performers, and event workers out of harm’s way until the storm has passed. In order to minimize time spent debating what to do about a forecast, a weather action plan or **“trigger chart”** based on objective criteria is very useful. Event organizers should determine in advance how long it takes to evacuate the crowd or move production elements where they won’t fall down on people. Then they can work back from those required time periods to decide how long before a storm’s anticipated arrival certain measures must be taken.

An example of a severe weather trigger chart is shown here. Note that the details must be tailored by geography and function, among other factors. In Oklahoma City, for example, it might be essential to plan for tornado evacuation and shelter in place, while a trigger chart for Phoenix, Arizona might address extreme heat and flash floods. Likewise, the plan to deal with equipment from video to inflatable bouncy houses must meet the technical specifications of the specific products in use. In other words, like everything else about crowd management, the weather plan and trigger chart for an event must be reasonable for the circumstances of that event.

### Weather Action Plan

THREAT	ALERT METHOD	Field (Stage)	Parking	Marketplace	Spectator Seating	Video Production	Ticketing
SURFACE WINDS IN EXCESS OF 40 MPH or TORNADO ACTIVITY	Text, Radio, PA	Return to Buses	Return to Buses	Move Under Stadium or Inside Vehicle	Move Under Stadium or Return to Cars	Lower to Floor/Ground	Stay in Box Office
WINDS 30 MPH OR GREATER	Text, Radio, PA	Move Under Stadium	Return to Buses	Move Under Stadium	Move Under Stadium or Return to Cars	Add Bracing Cables; Prepare to Lower to Floor/Ground	Stay in Box Office
LIGHTNING W/ 8 MILES	Text, Radio, PA	Move Under Stadium	Return to Buses	Move Under Stadium	Move Under Stadium or Return to Cars	N/A	Stay in Box Office
WINDS NEARING 30 MPH	Text, Radio	Move Under Stadium	Return to Buses	Move Under Stadium	Move Under Stadium or Return to Cars	Check Rigging	Stay in Box Office
WINDS GREATER THAN 20 MPH	Text	Move Under Stadium	Return to Buses	Move Under Stadium	Move Under Stadium or Return to Cars	Check Rigging	Stay in Box Office
STORM / LIGHTNING TRACKING TOWARDS SITE W/ 20 MILES	Text	Monitor	Monitor	Monitor	Monitor	Check Rigging	Monitor
RAIN EVENT TRACKING TOWARDS SITE W/ 20 MILES	Text	Monitor	Monitor	Monitor	Monitor	N/A	Monitor
ALL CLEAR	Text, Radio, PA	WEATHER IS ALL CLEAR - RESTORE NORMAL ACTIVITIES					



- e) Is there a communications plan to transmit weather information? Once an event has received an actionable weather forecast, the next step is to communicate it quickly. A useful starting place is the United States Department of Homeland Security's Incident Command System ("ICS"). In other countries, this may be known as the Incident Management System ("IMS"). In a nutshell, ICS shows (1) how operational information flows up from the "boots on the ground" to the Incident Commander, and then (2) how the Incident Commander's instructions should be communicated through the event operational functions. ICS is scalable, meaning that it is as useful for small events as for large ones. For larger events, communications may flow most smoothly between operational functions if there is a physical Command Post in which event managers and public safety officials can work side by side and exchange information in person. For smaller events, one person may perform several operational functions while sitting by themselves on a park bench, but the functions will still exist in some form at most events.

Severe storms may be force majeure events (literally, caused by a "higher power"), but the actions that event organizers take to move crowds out of harm's way are definitely the results of human decisions. Therefore, the significance of ICS for crowd management is not that one must slavishly follow every word, but that one must plan how to communicate time-sensitive information so people can act on it in an emergency.

Communication regarding weather must begin well ahead of time, be updated at regular intervals even if the forecast has not changed, and it should be easy for the foreseeable crowd demographic to understand. Video messaging, audio announcements, security and guest services staff, social media announcements, and website updates can all be effective tools.



- a) *Even for indoor events, the crowd manager must consider vulnerability to severe weather.*
- b) *The crowd manager must evaluate the options to mitigate foreseeable weather risks.*
- c) *During the planning stage, the crowd manager should consult with equipment suppliers, public safety officials, security, production staff, meteorology, and artist representatives when determining the elements of their severe weather trigger chart.*
- d) *The crowd manager should plan how, when, and what to communicate if weather affects the event.*
- e) *The crowd manager should consider engaging a private meteorologist to obtain accurate and timely weather information for the event site in order to know when to active procedures in the trigger chart.*

#### 4.3.4 Managing the Crowd During Civil Disturbances and Acts of Targeted Violence

A civil disturbance is any threat or use of force or violence that disturbs or prevents the peaceful occurrence of an event. Although acts of targeted violence such as active shooter and vehicle ramming incidents remain uncommon relative to the vast number of events each year, each tragic loss of life also exacts a significant toll in reputational damage.

Crowd management plans typically describe how to deal with issues such as suspicious packages, bomb threats, protests and demonstrations, and increasingly, vehicular threats and active shooters. In every instance, the event organizer should work closely with local public safety officials and the event's security professionals when determining what steps to take and who will take them. For example, although some private security guards may have military or law enforcement training, no plan should assume that any part-time guard will run towards gunfire. Event production staff may know the physical layout of the venue, but unless they have been trained to help lead an emergency evacuation, they are as likely to be slowed by confirmation or normalcy bias, discussed in Section 4.4.2, as anyone else.

Crowd managers must ensure that their event space has clearly marked and illuminated exit paths available for public use. Such escape routes must be available whether the threat comes from fire, firearms, fights, or any other disturbance. Consult your local fire marshal or other authority having jurisdiction to confirm that planned escape routes are sufficient in number, location, and capacity for their intended use.

Monitoring social media both before and during an event can yield insights into planned disruptions, and public safety officials can help event organizers understand the "chatter," assess the risk, and take constructive

measures to protect patrons' health and safety. And despite the limitations of active shooter response training such as "Run, Hide, Fight" due to the conditions prevalent at many live events (e.g., mostly dark, loud, unfamiliar spaces occupied by foreseeably impaired or preoccupied attendees), it is important for organizers to have a plan and applicable training to help lead attendees to safety during a civil disturbance.

For any plan intended to mitigate the risk of a disturbance, it is important to balance the possible benefit against any negative impacts. For example, a line of public works trucks can be effective at stopping a vehicle-borne explosive device, but a driver with the keys must stay close in order to make way if an ambulance needs to enter to assist an injured patron. Since every decision has consequences, crowd managers should assess whether the benefit of mitigating an unlikely risk is worth the impact on less catastrophic but more likely occurrences.

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- a) *Event organizers must work with private security and public safety experts to provide reasonable protection for the safety and health of everyone involved in the event.*
  - b) *The event organizer must confirm that the head of each operational function understands the show-stop procedures for that event.*
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#### **4.3.5 Event Medical Care and Harm Reduction**

Certain medical issues may be reasonably foreseeable based on past similar events or the crowd demographic. Regardless whether a particular behavior or substance is prohibited at that event or even illegal, the highest priority is tending to the individual's health and safety, however they become impaired.

Many events present foreseeable health-related concerns. For example, at sporting events where people arrive early to tailgate, over-consumption of alcohol is a common enough risk that medical providers should be ready to provide intoxication-related assistance, in conjunction with security taking steps to ensure that no one drives under the influence or walks into the path of vehicles. At some events, certain drugs may be thought to enhance the experience, so a combination of medical staff and non-medical harm reduction personnel can help guests through a difficult drug reaction in a physically and emotionally safe environment. Classical music or dance performances that attract older crowds may have a greater risk of heart attacks or trip and fall injuries. Shows geared towards adolescents may have to prepare for trampling, dehydration, social anxiety, or assault.

By providing care tailored to the crowd's reasonably foreseeable behavior and expectations, medical and harm reduction personnel can help guests without endangering themselves or others at the event, and without burdening local emergency rooms with people who could have been treated on site.

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- a) *Event organizers must consider the most likely health and safety risks for their event and work with health professionals to provide reasonable care using on-site or off-site resources.*
  - b) *Organizers should consider providing first-aid training for event staff, such as CPR and how to tie a tourniquet, in order to buy time until professional medical providers can take over.*
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#### **4.3.6 Incident Reporting**

Even at events with excellent crowd management, there may be injuries, warnings, or ejections. Incident reporting is important for more than litigation protection. It can help event organizers identify safety and security trends, assess risks, and learn from one event to the next. Therefore, in proportion to the size, complexity, and frequency of an event, event organizers and their security, medical, and health and safety staff should document incidents in a manner which shows (a) who was involved, (b) what happened, (c) where the incident took place, (d) at what time, and (e) the outcome of the incident.

Incidents should be documented as soon as possible, when memories are fresh. Incident report forms should use proper nouns, be neat, and apply correct spelling and punctuation. Memories fade, but documents remember. So does video, which means that in venues with closed circuit TV cameras, footage should be reviewed, and relevant material should be preserved and merged with the incident report. Likewise, photographs, particularly of incident locations and the condition of patrons involved in incidents, are valuable to refute later claims that are inconsistent with the report. For larger events and venues, there are sophisticated incident tracking and reporting programs that integrate written reports, photos and video, automatically provide time stamps and incident locations, and compile into spreadsheets that can be compared from event to event and year to year.

By whatever means one documents incidents, the issues addressed should be consistent from one report to the next, as should the attention to detail. In a lawsuit, it is likely that every incident report from that event will be requested, and any deviation from training or reporting protocol will be scrutinized closely.

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- a) *Event organizers should consider a means of documenting any incidents that occur, both to help mitigate risks over time and to create a record that can be used if there is subsequent litigation.*
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## 4.4 Expectations

### 4.4.1 Situational Awareness

Situational awareness by event attendees, at least as the term is often used (e.g., “head on a swivel” or the admonition to “see something, say something”) is rare. Normal brain functions naturally filter out most of what we perceive, which is necessary in order to not be paralyzed by information overload. For example, a person walking down the street reading on their phone does not lack situational awareness, even if they barely notice the world around them – in that situation, their awareness is focused on their phone. Happily, crowd managers can usually count on event patrons to focus wherever the action is taking place, on the stage or playing field. Consequently, public address announcements, messages shown on video monitors, and guest services staff fanning out from the front may have a relatively easy time capturing guest attention to convey emergency messaging.

In other words, if one recalibrates what “situational awareness” means to the way most people behave during an event, the term can have considerable value for crowd management.

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- a) *In order to account for event patrons’ foreseeable situational awareness, organizers must maximize the environmental cues to first gain people’s attention before substantive messaging is delivered.*
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### 4.4.2 Confirmation Bias and Normalcy Bias

To some degree, everyone suffers from “confirmation bias” or “normalcy bias.” Therefore, a basic understanding of these terms is useful for people who would manage a crowd during any unplanned incident during an event.

Confirmation bias is the tendency of people to process new information by trying to fit it into one’s existing expectations or beliefs – we tend to perceive what we want or expect to experience. Normalcy bias is a particular type of confirmation bias that is especially applicable during emergencies – it is the tendency to deny the likelihood or existence of an unwanted occurrence. For example, normalcy bias can cause patrons who hear gunshots to first mistake them for balloons popping or fireworks, even if they know there are neither balloons nor fireworks at their event. For event organizers, normalcy bias at the planning stage can lead to complacency and insufficient preparation for even reasonably foreseeable threats.

The way people process unexpected and unwanted information tends to follow the usual bell-shaped curve. Survival psychologists refer to a “10-80-10” theory: a few people will behave relatively calmly and rationally during a crisis; the great majority will be confused enough to significantly delay or impair their reactions unless they receive help from someone else; the remaining few will panic like we see in movies. Crowd managers must help disbelieving patrons adapt to an emergency situation as it actually is, not as they wish it would be.

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- a) *To assist with an evacuation, security and guest services staff should be posted in the crowd and near exits to physically draw patrons away from danger. “Follow me” is more trustworthy than “Go there,” and leading by example supports the relationship between patrons and event staff.*
- b) *Emergency messaging should give simple guidance and be repeated frequently on every medium available, including the public address system, video monitors, bullhorns, text messaging, and social media.*
- c) *During indoor or nighttime events, house lights should be brought up, both to clearly show that the event has stopped and to make it easier for patrons to see wayfinding aids and navigate unfamiliar space.*
- d) *Vendors and other people involved in the event must be briefed regarding their responsibilities and expectations during an emergency, and they must have a means of communicating with event organizers to coordinate their actions and safely shut down their operations.*
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### 4.4.3 Prohibited Items and Behavior

Many events have rules prohibiting guests from bringing certain items into the venue, or from engaging in certain activities during the event. Some restrictions may be governed by state or local statutes, so organizers should confirm that any event policies are legal where they would be enforced. Typical prohibited items include obvious threats to public safety such as weapons and illegal drugs, and may also include objects like large signs, folding chairs, or food and drink, all depending on the policy and safety plan of the event organizer.

A venue that has a lengthy list of prohibited items may increase the need for personal searches at the point of entry, leading to slower processing speeds, longer lines, and increased staff costs. It may be the event organizer's responsibility to manage not only the crowd once they enter the venue, but also while they are queued up in line to pass through security and present their ticket as well. If the wait time is excessive or people do not understand the reason for delay, they may become frustrated, seek to cut the line, or create other forms of friction. Patron expectations should be managed by providing clear information about prohibited items and advice on arrival time in advance of the event.

Regarding language of prohibition or warning, the clarity, frequency, and location of the message all matter. Lists of prohibited items and activities should be written with words that are as specific as possible, allowing no reasonable person to claim ignorance or ambiguity. The size of the text should be large, and the use of boldface or italics should be used where emphasis is necessary. These lists should appear at every point during the guest's experience with the event, beginning with the event web site or other advertising material, through the ticket purchasing site, social media messaging, and signage at the event from the parking lots to the security line. When people are sitting at their computer, you can tell them more and reasonably expect them to read and digest it than when they are walking on a crowded sidewalk with their friends on their way to enter the venue.

The need for clear, frequent messaging applies as much to prohibited activities as prohibited items. An event organizer that prints on a sign or ticket that guests assume the risk of their own behavior does not necessarily make that true – instead, a person is more likely to have legally assumed a risk if the organizer explains the hazard so the guest must either make an informed decision or fail to read the warning at their own peril.

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- a) *Any list of prohibited items or activities must be legal where the restrictions would be enforced.*
  - b) *Warning language must be clear, frequent, and visible enough for a reasonable patron to have an opportunity to be on notice of expectations and risks at the event, and to ask questions if they wish.*
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