Far from the Madding Crowd: A Statutory Solution to Crowd Crush

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"The future belongs to crowds."
—Don DeLillo[1]

Crowd-related injuries and deaths occur with surprising frequency in the United States. In recent years, crowd members in the United States have sustained significant injuries and even fatalities at concerts, sporting events, "doorbuster" sales, nightclubs, and large festivals. While some of these incidents have prompted victims to file negligence suits against event organizers and venue owners, common law has proven to be ineffective at addressing "crowd crush." Indeed, courts have repeatedly held for defendants in these cases, making a series of scientific and legal errors in their analysis and providing little incentive for organizers and owners to improve their crowd management practices. Additionally, ad hoc crowd management efforts on the part of a few concerned promoters and venues have done little to reduce the risk of crowd-related injuries in cities and states as a whole.

This Article argues that state and local adoption of crowd management statutes is the only remaining solution that can effectively reduce the number of crowd crush injuries and fatalities in the United States each year. Because there are currently no such laws in this country, this Article proposes a model statute that draws upon fundamental principles of crowd science in requiring event organizers and venue owners to take a series of simple steps before and during large gatherings that will drastically reduce the likelihood of crowd crush.

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1. DON DELILLO, MAO II 16 (1991).

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INTRODUCTION

In the early morning hours of November 28, 2008, over 2000 people gathered outside of the front entrance of a Wal-Mart in Valley Stream, New York.[2] Even though the sun had not yet risen and the store was not due to open for several hours, the force of the anxious and enthusiastic

2. Robert D. McFadden & Angela Macropoulos, *Wal-Mart Employee Trampled to Death*, N.Y. TIMES (Nov. 28, 2008), http://www.nytimes.com/2008/11/29/business/29walmart.html?fta=y.

crowd—which stretched all the way back across the large parking lot—began to push members at the front up against the sliding-glass double doors of the store.[3] Despite the pleas of the local police officers who had responded to the scene, the crowd continued to press forward, and the doors at the front entrance began to bow inward from the weight of the crowd.[4] Some workers inside tried to reinforce the doors by pushing back, but their efforts were fruitless.[5]

Suddenly, the glass doors shattered, a metal portion of the doorframe crumpled inward like an accordion, and the crowd surged into the store, rushing to secure the Black Friday sale items that the store had heavily advertised over the prior weeks.[6] Jdimytai Damour, a temporary Wal-Mart employee hired for the holiday season, was thrown backward onto the tile floor and trampled by some number of the thousands of people who streamed in through the front doors.[7] He did not survive.[8] A subsequent autopsy revealed "the trampling caused the thirty-four-year-old employee to die of asphyxiation."[9]

Though Mr. Damour was the only fatality that resulted from the incident, four other people were hurt in the stampede and treated at the hospital, including a twenty-eight-year-old woman who was eight months pregnant.[10] Their injuries ranged "from a broken ankle to complaints of pain . . . ."[11] Three other shoppers reported experiencing "harassment" during the stampede to the police.[12] All of the injuries and complaints appear to have originated from the crowd's initial surge through the front entryway of the store.

In the aftermath of the incident, the general public—and some of the shoppers themselves—were quick to place the blame for Mr. Damour's death squarely on the members of the crowd.[13] "One of them, Kimberly Cribbs of Queens, said the crowd had acted like 'savages.' Shoppers behaved badly even as the store was being cleared, she recalled."[14] Another wrote to the *New York Times* to condemn the

3. *Id.*
4. *Id.*
5. *Id.*
6. *Id.*; Victoria C. Dawson, *Who Is Responsible When You Shop Until You Drop: An Impact on the Use of the Aggressive Marketing Schemes of Black Friday Through Enterprise Liability Concepts*, 50 SANTA CLARA L. REV. 747, 762–63 (2010).
7. McFadden & Macropoulos, *supra* note 2.
8. Dawson, *supra* note 6, at 762.
9. *Id.* at 763.
10. McFadden & Macropoulos, *supra* note 2.
11. Dawson, *supra* note 6, at 763.
12. *Id.*
13. *See id.* at 794.
14. McFadden & Macropoulos, *supra* note 2.

"barbarians who rushed the door."[15] Yet another referred to the crowd members as "a bunch of animals."[16]

What was missing from those early reactions, however, was an understanding of crowd science: a branch of physics dedicated to understanding the physical dynamics of large groups of people moving through physical space. What crowd science reveals about the Wal-Mart crowd crush—and the thousands of other crowd crushes like it that occur every year—is something far different than the commentators would have had the general public believe: The crowd members themselves were *not* responsible for their actions. They likely had no ability to control their own movements and were instead *propelled* through the entryway of the store by the force of the crowd behind them.

Crowd science also supplies another surprising and legally relevant fact about incidents like this one: they are foreseeable and almost entirely preventable with even minimal preparation. Crowd science, therefore, would suggest that the blame for Mr. Damour's death lies not on the crowd members who trampled him, but on Wal-Mart's negligence in attracting a large crowd to their store while simultaneously doing nothing to prevent a crowd crush from occurring. Indeed, as discussed at length below, Wal-Mart is virtually the *only* entity that could have taken effective preparations to prevent a crowd crush, not the employees working the Black Friday sale, not local law enforcement officers, and certainly not the crowd members themselves.

The law, however, does not require Wal-Mart—or any other store, venue, or event promoter—to prepare a crowd management plan. Despite the tremendous risks of injury and death posed by large crowds, the United States currently does not have a single law in any jurisdiction—state, local, or federal—requiring any entity to engage in significant crowd management preparations, even when planning a large event. While most states and municipalities *have* passed statutes requiring event planners to provide ample trash receptacles, have an ambulance on site, and keep event sounds below a particular decibel level, not one statute requires event planners to have a crowd management plan, to ensure safe and proper ingress and egress routes for event attendees, or to arrange event seating and standing areas in a manner that minimizes the risk of stampedes.

As a result, crowd crush incidents are surprisingly common in the United States[17] and have been for almost one hundred years.[18] Indeed,

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15. Michael Pravica, Letter to the Editor, *A Black Friday Sale Shouldn't Make Us Barbarians* N.Y. TIMES (Dec. 1, 2008), http://www.nytimes.com/2008/12/02/opinion/l02walmart.html?_r=0.

16. Angel13, comment to *On Long Island, Black Friday Crowd Kills Wal-Mart Employee*, SILIVE (Nov. 28, 2008), http://www.silive.com/news/index.ssf/2008/11/on_long_island_black_friday_cr.html (last visited Nov. 7, 2016).

one crowd scientist estimates that the United States is responsible for thirty-seven percent of the concert-related crowd injuries that occur each year worldwide.[19] In the last several years, for instance, crowd crushes have occurred at concerts by Beyoncé,[20] Eminem,[21] and less famous acts.[22] Crowd crushes have also occurred in other situations: at "doorbuster" sales,[23] sporting events,[24] and in and around large transportation venues.[25] Such incidents, moreover, seem to be increasing over time[26] as the population increases and our public venues grow in size to accommodate larger masses.[27]

Up to this point, the United States has relied on common law, mostly through negligence lawsuits, to address its crowd crush issues and compensate victims. As I detail at length in my earlier work, however, common law has proven to be a remarkably poor vehicle for doing so.

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17. *See* Lawrence M. Friedman & Joseph Thompson, *Total Disaster and Total Justice: Responses to Man-Made Tragedy*, 53 DEPAUL L. REV. 251, 276 (2003).

18. *See id.*

19. *A Trust Betrayed: Safety Became the Twelfth Victim*, CROWD MGMT. STRATEGIES, http://www.crowdsafe.com/cafe/who20.html (last visited Nov. 7, 2016).

20. Eliana Dockterman, *Beyoncé Sued by Fans 'Trampled' at Concert*, TIME (Apr. 2, 2014), http://time.com/46879/fans-sue-beyonce-after-being-trampled-before-concert/.

21. Tanika White, *30 Hurt in Concert Crush at Washington Stadium*, BALT. SUN (May 26, 2002), http://articles.baltimoresun.com/2002-05-26/news/0205260206_1_eminem-fans-crush.

22. *See* ASSOC. PRESS, *Arizona Concert Stampede Leaves Two Minors Critical—and Dozens Injured—After Crowd Rushed the Stage During Reggae Show*, DAILY MAIL (Sept. 27, 2015, 3:53 AM), http://www.dailymail.co.uk/news/article-3250654/Concert-goers-injured-crowd-rushes-stage-festival.html; *Electric Daisy Carnival: More than 100 Hospitalized During LA Festival*, HUFFINGTON POST (June 28, 2010, 4:50 PM), http://www.huffingtonpost.com/2010/06/28/electric-daisy-carnival-m_n_627717.html.

23. Dawson, *supra* note 6, at 749, 764.

24. *See, e.g.*, P. SCRATON ET AL., NO LAST RIGHTS: THE DENIAL OF JUSTICE AND THE PROMULGATION OF MYTH IN THE AFTERMATH OF THE HILLSBOROUGH DISASTER (1995); Cynthia Schuster, *20 Years Later, Lessons Still Relevant from Camp Randall Stampede*, WIS. PUB. RADIO (Oct. 25, 2013, 2:00 AM), http://www.wpr.org/20-years-later-lessons-still-relevant-camp-randall-stampede; Joseph Berger, *The Crush at City College; An Inquiry Spreads Blame for Deaths at a New York Gym*, N.Y. TIMES (Jan. 16, 1992), http://www.nytimes.com/1992/01/16/nyregion/the-crush-at-city-college-an-inquiry-spreads-blame-for-deaths-at-a-new-york-gym.html.

25. Alexopoulos v. Metro. Transp. Auth., 838 N.Y.S.2d 50 (N.Y. App. Div. 2007).

26. *See, e.g.*, G. KEITH STILL, INTRODUCTION TO CROWD SCIENCE 1 (2014) ("Around the world, event organisers are planning increasingly large, challenging events while also trying to minimize expenditure, recoup costs and maximise profits. With larger events comes the potential for larger incidents, and, sadly, we are seeing an increase in crowd-related incidents around the world."); Luke Ellis, Note, *Talking About My Generation: Assumption of Risk and the Rights of Injured Concert Fans in the Twenty-First Century*, 80 TEX. L. REV. 607, 608 (2002) ("The number of concert-goers seriously injured or killed at concerts in recent years has increased drastically."); James L. Curtis et al., *Holiday Shopping and Crowd Management Safety Guidelines for Retailers*, ENVTL. & SAFETY L. UPDATE (Nov. 13, 2012), http://www.environmentalsafetyupdate.com/osha-compliance/holiday-shopping-and-crowd-management-safety-guidelines-for-retailers ("Holiday shopping is increasingly becoming associated with violence and hazards.").

27. *See* JOHN J. FRUIN, THE CAUSES AND PREVENTION OF CROWD DISASTERS 1 (2002), http://www.crowdsafe.com/fruincauses.pdf ("A major sporting or entertainment event can attract 70,000 avid fans. Large transportation terminals such as New York Grand Central Terminal and Pennsylvania Station accommodate 200,000 passengers each weekday.").

Existing crowd crush jurisprudence presents significant issues, including: (1) it relies on assumptions about crowd dynamics that contravene basic principles of crowd science; (2) it strongly disadvantages plaintiffs; and, (3) it has done "nothing to either incentivize or require venue owners or events managers to employ even simple crowd management techniques" because the success rate for plaintiffs has been so low.[28] As a result, crowd crushes continue to occur in the United States in growing numbers.

This Article argues that a statutory response to crowd crush is the most appropriate and effective way to reduce the number of crowd-related injuries and deaths in the United States each year and to ensure that mass gatherings remain safe for participants. Given the common law's failure to address this issue adequately, states and municipalities should pass statutes that require event organizers and venue owners to undertake certain basic crowd management preparations in advance of events likely to attract large numbers of people. This Article concludes with a proposal for a model crowd control statute designed to address these issues.

Part I of this Article examines crowd crush in the United States, discussing some of the most prominent crowd incidents in U.S. history, and analyzing how often it occurs. Part II provides a brief overview of the basic principles of crowd science and what they teach us about preventing crowd-related injuries and deaths. Part III analyzes why the common law has failed to prevent crowd crush incidents thus far and why it is unlikely to do so in the future. Part IV addresses the *ad hoc* approaches both governments and event organizers have taken in response to the problems of crowd crush and why they, too, have had limited success in combating crowd incidents. Part V examines what crowd science suggests effective crowd management and crowd control entails. Finally, in Part VI, I propose a statutory response to the problem and provide a model statute designed for states and municipalities interested in reducing crowd-related risks within their borders.

I. Crowd Crush in the United States

The United States has a long and somewhat storied history with crowd crush. While a close investigation of local news reports throughout the country reveals that crowd-related injuries occur with great frequency, they tend to do so on a smaller scale, with only small numbers of individuals sustaining minor to moderate injuries.[29] Over the last one

28. *See* Tracy Hresko Pearl, *Crowd Crush: How the Law Leaves American Crowds Unprotected*, 104 Ky. L.J. 1, 5 (2015).

29. *See* Fruin, *supra* note 27, at 1 ("The lethal potential of crowds is illustrated by descriptions of major crowd incidents. This sampling shows that crowd incidents occur in a wide variety of venues and

hundred years, however, this steady stream of smaller crowd incidents has been punctuated with horrific crowd disasters that have shocked the public and captured national attention for some time before falling off of the proverbial radar and being replaced with other news stories. A quick look at some of the most prominent ones, however, demonstrates how long the United States has experienced such disasters:

- **Cocoanut Grove:** In 1942, a fire at the Cocoanut Grove nightclub in Boston, Massachusetts caused a crowd crush that killed 492 people.[30] Most of the exits on the premises were locked, so patrons were forced to attempt to exit through the revolving door at the front entrance, which was not designed to handle a mass exodus.[31] The door jammed while bodies piled up as the crowd continued to attempt to flee.[32]

- **The Who Concert:** In 1979, eleven people were killed in a crowd crush that occurred outside of a rock concert by The Who in Cincinnati, Ohio.[33] Managers of the venue opened only two doors into the venue even though 8000 people were gathered outside still waiting to enter.[34] When the warm-up band began to play, many in the crowd believed the concert had begun and began to push toward the two entrances.[35] People died due to asphyxiation from the pressure of the crowd around them and due to injuries sustained from being trampled.[36]

- **City College:** In 1991, a crowd crush killed nine people and injured countless others at the City College of New York. Over 5000 people showed up to attend a celebrity basketball game organized by rap promoter and artist Sean "Puff Daddy" Combs.[37] Only one entrance into the venue was open, and the large crowd was forced to navigate a small interior vestibule, a second set of doors, a narrow stairwell, and then a single door into the gym.[38] As the crowd surged through these bottlenecks, individuals were trapped at the bottom of the stairwell and suffocated to death.[39]

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different circumstances. Minor incidents resulting in crowd induced falls and other injuries occur much more frequently.").

30. Jack Thomas, *The Cocoanut Grove Inferno*, BOS. GLOBE (Nov. 22, 1992), https://web.archive.org/web/20030222001324/http://www.boston.com/news/daily/21/archives_cocoanut_112292.html.

31. *Id.*

32. *Id.*

33. FRUIN, *supra* note 27, at 3; *see also* Berger, *supra* note 24.

34. FRUIN, *supra* note 27, at 3.

35. *Id.*

36. *Id.*

37. Berger, *supra* note 24.

38. MILTON MOLLEN, "A FAILURE OF RESPONSIBILITY": REPORT TO MAYOR DAVID N. DINKINS ON THE DECEMBER 28, 1991 TRAGEDY AT CITY COLLEGE OF NEW YORK 25 (1992). After the situation in and around the 138th Street entrance became desperate, officials opened one additional entrance—the 136th Street entrance—but that, too, became quickly overwhelmed by the large number of people attempting to enter the facility. *Id.* at 29–30.

39. *Id.* at 42.

- **Camp Randall:** In 1993, a crowd crush hospitalized over seventy people at Camp Randall Stadium in Madison, Wisconsin.[40] After the University of Wisconsin football team beat their rivals, the University of Michigan, during a critical game, thousands of fans attempted to storm the field, but were met with a chain-link fence at the bottom of the student section of the stadium.[41] The barrier caused a crush at the front of the crowd that then "rippled back into the stands."[42]

- **E2:** In 2003, a crowd crush killed twenty-one people and injured countless others at a nightclub in Chicago, Illinois.[43] After a fight broke out on the dance floor and a security guard discharged pepper spray, a large crowd tried to flee the club.[44] The crowd obstructed all but one of the club's three exits, so the entire crowd was forced to descend a narrow front stairwell in order to leave through the club's main entrance.[45] Tragically, the front door at the bottom of the stairwell failed to open, and crowd members became trapped in the stairwell, suffocating to death as individuals at the back of the crowd—who were unaware of what was happening at the front—continued to push forward to escape the pepper spray.[46] One report notes that by the end of the crush, a pile of bodies more than six feet high had accumulated immediately inside the front entrance.[47]

- **Great White Concert:** Three days after the tragedy at the E2 nightclub, similar circumstances killed 100 people and injured over 200 at a Great White concert at The Station nightclub in West Warwick, Rhode Island.[48] After a fire broke out on stage, the crowd of more than 400 people attempted to exit, but two of the four exits were locked, while another possible exit—the stage door—was blocked by venue security.[49] The vast majority of the crowd, therefore, was forced to attempt to exit through the front door, creating a deadly bottleneck.[50]

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40. Gil Fried & Robert Metchick, Case Study, *Camp Randall Memorial Stadium Case Study: University of Wisconsin—October 30, 1993*, 15 J. LEGAL ASPECTS SPORT 139, 140 (2005).

41. *Wisconsin Victory Celebration Turns Dangerous*, N.Y. TIMES (Oct. 31, 1993), http://www.nytimes.com/1993/10/31/sports/college-football-wisconsin-victory-celebration-turns-dangerous.html.

42. *Id.*

43. *Fifth Anniversary of the E2 Nightclub Tragedy; All but Forgotten in Chicago?*, CROWD MGMT. STRATEGIES, http://www.crowdsafe.com/new.asp?ID=1934 (last updated Aug. 11, 2016).

44. *E2 Nightclub Tragedy 9th Anniversary: It's Not over Until It's over*, CROWD MGMT. STRATEGIES, http://www.crowdsafe.com/new.asp?ID=2128 (last updated Aug. 11, 2016).

45. *Id.*

46. *Id.*

47. Eric Herman, *Some Laughed in E2 Stampede: Patrons Did Not Know They Were Shoving Others to Their Deaths*, CHI. SUN-TIMES (Jan. 19, 2007), https://www.highbeam.com/doc/1P2-3708982.html.

48. *Great White Concert Tragedy: Tenth Anniversary*, CROWD MGMT. STRATEGIES, http://www.crowdsafe.com/new.asp?ID=2195 (last updated Aug. 11, 2016).

49. Pat Pemberton, *The Great White Nightclub Fire: Ten Years Later*, ROLLING STONE (July 15, 2013), http://www.rollingstone.com/music/news/the-great-white-nightclub-fire-ten-years-later-20130715.

50. *Id.*

- **Electric Daisy Music Festival:** In 2010, "[m]ore than 200 people were injured and more than 100 were taken to hospitals during a two-day electronic music festival and rave at the Los Angeles Memorial Coliseum and Exposition Park."[51] Large numbers of festival attendees became "trapped in a narrow passageway as they attempted to move from the bleachers to the VIP section on the field,"[52] as shocking video footage of the incident reveals.[53]

As noted in the introduction to Part I of this Article, these are only some of the most prominent crowd crush incidents in recent U.S. history. Most incidents are either not reported or, if they are, receive little attention from the general public. Indeed, one scholar estimates that only one out of every ten crowd injuries associated with "doorbuster sales" is reported.[54] Another notes that "the vast number of concert injuries . . . go unreported" because of "the inadequate measures used to gather concert-injury information."[55] No government agency or non-governmental organization currently monitors crowd-related injuries in the United States, and the press has seemed disinclined to report on anything other than the most extreme crowd disasters.

In the absence of such reporting, crowd scientists have a difficult time estimating how many crowd-related injuries occur in the United States each year. The worldwide numbers, however, are instructive. One study calculated that, in the ten-year period between 1992 and 2002, there were 232 deaths and over 66,000 injuries in crowd crush incidents worldwide.[56] Another crowd expert estimates that between 20,000 and 40,000 people seek medical attention for crowd-related injuries each year.[57] If the United States accounts for only a small portion of those injuries—and, with one scholar calculating that thirty-seven percent of all concert injuries occur in this country,[58] a "small portion" might be unduly conservative—it seems both fair and cautious to estimate that several thousand crowd-related injuries occur in the United States annually.

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51. *Electric Daisy Carnival*, *supra* note 22.

52. *Electric Daisy Carnival Stampede Sends 114 to Hospital*, INSIDE EDITION (June 29, 2010, 2:00 PM), http://www.insideedition.com/headlines/857-electric-daisy-carnival-stampede-sends-114-to-hospital.

53. *People Crushed During the Electric Daisy Carnival*, YOUTUBE (July 4, 2010), https://www.youtube.com/watch?v=nbYtfh27r6Q.

54. Dawson, *supra* note 6, at 764.

55. Ellis, *supra* note 26, at 608.

56. Steven A. Adelman, *Won't Get Fooled Again*, 40 TRIAL 18, 18 (2004).

57. ELEVENTH ROCK CONCERT SAFETY SURVEY: 20 DIE AT CONCERTS AND FESTIVALS IN 2002, CROWD MGMT. STRATEGIES 1 (2003).

58. *See A Trust Betrayed*, *supra* note 19.

II. Crowd Science & Preventing Crowd Crush

Crowd science is the branch of physics that seeks to understand the movement and behavior of crowds—"a crowd being defined as a large number of persons collected into a somewhat compact body without order."[59] Over the last twenty-five years, using a combination of case studies and computer simulation and modeling techniques, crowd scientists have acquired a strong understanding of how crowd "risks develop into incidents and how incidents can escalate into disasters . . . ."[60] In the process, they have also developed "real-world, practical techniques and methodologies" to reduce those risks and enhance crowd safety.[61] These findings are encouraging, as they have shown that "many crowd disasters could have been avoided by simple advance planning and management techniques," rather than complex, expensive, or time-consuming efforts.[62] They also show that certain basic scientific principles are key to understanding the root causes of crowd crushes.

A. Crowd Density

The key to understanding crowd incidents lies in understanding crowd density: the number of people per square meter in a given crowd.[63] Crowd density "is an extremely good predictor of the likelihood of crowd crush injuries or death occurring in a given crowd."[64] Low crowd densities—those below roughly five people per square meter—are low-risk from a crowd management perspective.[65] At those densities, there is virtually no likelihood of a crowd-related injury or death occurring because individuals can move about freely and without making physical contact with other crowd members.[66] However, at high crowd densities—those above roughly five people per square meter—individuals lose the ability to move freely, crowd members are in almost constant contact with others around them, and the risk of injury or death increases dramatically.[67] One crowd scientist notes:

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59. Je'Anna Lanza Abbott & Morgan W. Geddie, *Event and Venue Management: Minimizing Liability Through Effective Crowd Management Techniques*, 6 Event Mgmt. 259, 260 (2001).

60. Still, *supra* note 26, at 2–3.

61. *Id.* at xv.

62. Fruin, *supra* note 27, at 9.

63. *See, e.g.*, Mehdi Moussaïd et al., *How Simple Rules Determine Pedestrian Behavior and Crowd Disasters*, 108 Proc. Nat'l Acad. Sci. U.S. Am. 6884, 6885 (2011); Dirk Helbing et al., *Crowd Turbulence: The Physics of Crowd Disasters*, Fifth Int'l Conf. on Nonlinear Mechanics (Shanghai) 967–68 (2007); Ris S. C. Lee & Roger L. Hughes, *Exploring Trampling and Crushing in a Crowd*, 131 J. Transp. Engineering 575, 581 (2005); Fruin, *supra* note 27.

64. Pearl, *supra* note 28, at 6.

65. *See* Lee & Hughes, *supra* note 63, at 576.

66. *See* Dirk Oberhagemann, Technical Report: Static and Dynamic Crowd Densities at Major Public Events 11–15 (1st ed. 2012).

67. *See* Lee & Hughes, *supra* note 63, at 576; Helbing et al., *supra* note 63, at 967.

> When crowd density equals the plan area of the human body [(the amount of space a single person typically occupies)], individual control is lost, as one becomes an involuntary part of the mass. At occupancies of about 7 persons per square meter the crowd becomes almost a fluid mass. Shock waves can be propagated through the mass sufficient to lift people off of their feet and propel them distances of 3 m (10 ft) or more. People may be literally lifted out of their shoes, and have clothing torn off. Intense crowd pressures, exacerbated by anxiety, make it difficult to breathe. The heat and thermal insulation of surrounding bodies cause some to be weakened and faint. Access to those who fall is impossible. Removal of those in distress can only be accomplished by lifting them up and passing them overhead to the exterior of the crowd.[68]

Indeed, when analyzing high-density crowds, scientists use "[p]hysics based models like particle, gas and fluid dynamics methods . . . to model movements of [crowd members] . . . ."[69] One scientist explains that "[p]eople caught in a crowd crush behave as a liquid. No individual can control his or her movement or assist others close by."[70] In essence, the crowd itself takes on a life of its own and the individuals caught within it are at its mercy.

The forces exerted by high-density crowds in these kinds of situations can be fatal, exerting more than 1000 pounds of pressure at a time on individual crowd members.[71] The most common cause of death in these situations is compressive asphyxiation, a phenomenon in which the life is literally squeezed out of a person by the pressure of the crowd members around them.[72] Death from trampling is also a possibility.[73]

Therefore, effective crowd management is almost synonymous with effective management of crowd density.[74] Ensuring that crowds do not reach a density above five people per square meter can virtually eliminate the risks of crowd-related fatalities and injuries.[75] This requires event planners and venue owners to pay close attention to the physical space in which crowds may move or gather.[76]

B. Physical Space

There are two kinds of physical spaces that are relevant from a crowd science and crowd management perspective: (1) the spaces through which

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68. Fruin, *supra* note 27, at 4.

69. Soo Chin Pin et al., *Applying TRIZ Principles in Crowd Management*, 49 Safety Sci. 286, 287 (2011).

70. Adelman, *supra* note 56, at 19.

71. Fruin, *supra* note 27, at 5.

72. Lee & Hughes, *supra* note 63, at 575.

73. *Id.*

74. *See* John J. Fruin, *Crowd Dynamics and Auditorium Management*, Crowd Safety & Risk Analysis (2015), http://www.gksill.com/Support/crowd-flow/fruin/Fruin3.html.

75. *See* Lee & Hughes, *supra* note 63, at 576.

76. *See infra* Part I.B.

crowds must *move*, and (2) the spaces in which crowds may *assemble* for some period of time. Within the first category—"movement spaces"—are areas such as entryways and exits, hallways and corridors, and stairways and escalators. Crowds move through these kinds of spaces on an almost entirely transient basis. We do not expect large numbers of crowd members to stop and linger in these areas, as there is little reason to do so. They are designed almost entirely for pedestrian travel.

The second category of physical spaces—"assembly spaces"—are those in which we would expect a crowd to linger or settle: the stands in a sporting venue, the floor of a stadium during a rock concert, or the large grassy field in front of a stage at a festival. Crowds move toward these spaces at the beginning of an event, spend the bulk of the event within them, and then exit them following the event's conclusion. Whereas constant crowd movement marks the first category of spaces, crowds tend to be more static in this second category.

The differences between these two types of spaces are significant from a crowd management perspective because they pose substantially different risks and issues.

1. Movement Spaces & Bottlenecks

The biggest risk to a crowd in movement spaces are "bottlenecks," which are areas that require a moving crowd to compress itself inward to traverse a given space. As I note in my earlier writing about crowd crush:

> Problematic physical spaces that may result in bottleneck phenomena include narrow hallways and stairwells, insufficient numbers of entrances and exits, the use of escalators (which force crowds to funnel themselves into the narrow entryways onto escalator steps), and corridors that require crowds to make tight turns. They may also include smaller and more temporary features of a facility: barricades, holiday decorations, trashcans, concession tables, artistic sculptures, or even random pieces of trash or debris that a crowd must move around. As one crowd expert notes, even "[m]inor design deficiencies that present no apparent problems under normal traffic conditions can be accentuated in crowds, potentially triggering more dangerous, 'domino effect' accidents."[77]

Bottlenecks are dangerous because they dramatically increase the likelihood that a crowd will reach a high density and experience a crowd crush.[78] Worse, bottleneck crushes can intensify quickly, heightening the number of injuries and fatalities, because although only "a portion of the crowd [may be] slowed and compressed at a precarious location, the crowd behind it 'continues to press ahead because it has no knowledge of

77. Pearl, *supra* note 28, at 10 (quoting John J. Fruin, *Crowd Dynamics and Auditorium Management*, CROWD SAFETY & RISK ANALYSIS (Mar. 1, 2015, 2:42 PM), http://www.gkstill.com/Support/crowd-flow/fruin/Fruin3.html).

78. Moussaïd et al., *supra* note 63, at 6886; Fruin, *supra* note 74.

what conditions are at the bottleneck.'"[79] Pressure from behind the bottleneck increases the pressure the crowd exerts on the portion of the crowd tightly packed in at the bottleneck, causing more injuries and fatalities.

2. *Assembly Spaces & Festival Seating*

Festival seating is a high-risk configuration in assembly spaces that drastically increases the risk of crowd-related injuries and death. Festival seating, utilized frequently at concert venues and other large festivals or events, can take one of two forms:

> (1) festival "seating" in which the entire event is standing room only, and there are either no or only a limited number of reserved seats for attendees; and (2) general admission seating, in which there are seats available for crowd members but most or all of them are unreserved. In both of these arrangements, valuable space within a given venue is "up for grabs."[80]

Although entertainers typically like the use of festival seating—many acts, like U2, will not agree to perform at venues that do not permit it[81]—both types of "seating" are risky from a crowd control perspective for two reasons.[82] First, due to the absence of assigned seats, crowd members are forced to "compet[e] for favorable seats or standing positions close to entertainers," creating a "rush to obtain some highly valued objective."[83] As a result, high-density crowds may assemble *outside* of the venue well before the official start of the program with the hopes of being at the front of the line when the doors open so that crowd members can maximize their chances of obtaining their desired location once inside.[84] This precise phenomenon occurred immediately before the deadly Who concert crowd crush that occurred in Cincinnati.[85]

Second, once inside the venue and (loosely) situated, a crowd crush can occur when crowd members toward the back of the festival seating zone push forward toward the source of the entertainment once the

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79. Pearl, *supra* note 28, at 9.

80. *Id.* at 11; *see also About The Who Concert Tragedy Task Force Report*, CROWD MGMT. STRATEGIES, http://www.crowdsafe.com/taskrpt/ (last visited Nov. 7, 2016).

81. Adelman, *supra* note 56, at 19.

82. *Id.*; FRUIN, *supra* note 27, at 4.

83. FRUIN, *supra* note 27, at 4.

84. *See generally* Ellis, *supra* note 26 (discussing the increasing numbers of concert-related injuries and deaths); Adelman, *supra* note 56, at 18 (describing the phenomenon of crowds converging to find seats during events with festival seating).

85. *About The Who Concert Tragedy*, *supra* note 80 ("For more than 14,000 fans—out of approximately 18,500 the only viewing options inside the [venue] were festival seating . . . or general admission. . . . That is why thousands of loyal Who fans came to the concert hours early to stand in the chilled wintry evening. They knew that the best concert viewing positions would be up for grabs once the doors opened. Anticipation ran high as the friendly crowd amassed.").

performance or festival has begun.[86] This pressure from the back of the crowd causes the density at the front of the crowd to increase rapidly, potentially reaching dangerous levels and injuring or killing those at the very front. For instance, ten to twelve people were injured and nine people were hospitalized—including two juveniles with life-threatening injuries—in September 2015, after a festival seating crowd pushed toward the stage at a music festival.[87] Witnesses reported that the crowd surged forward when the reggae band Rebelution began its set and that "people who were at the front of the stage had trouble breathing."[88] Two women at the front of the crowd collapsed "after apparently suffering seizures."[89]

Thus, despite the entertainment industry's continued push for festival seating, it remains a risky way to configure audiences at concerts and festivals.[90] Indeed, most crowd science experts believe that the use of festival seating is "the principal culprit in most crowd crush cases,"[91] and "[o]ne estimate suggests that ninety percent of all concert injuries occur at festival-seating and general-admission concerts."[92]

III. The Failure of Common Law

Due to the absence of statutory law pertaining to crowd management in the United States, when an individual is injured by crowd crush they (or their estate) must rely on a common law cause of action if they wish to seek legal recourse.[93] In virtually every case their cause of action is negligence, and the plaintiff's primary assertion is that the defendants breached their duty to implement adequate crowd control measures.[94] The defendants usually include some combination of "the owner and operator of the venue in which the crowd crush injury occurred, the promoter or producer of any event occurring on the

86. *See* Thomas D. Selz et al., 2 Entertainment Law 3d: Legal Concepts and Business Practices § 10:36, Westlaw (database updated Dec. 2015) ("More often than not, the fans choose to get as close to the performers on stage as possible. This can result in the crowd attempting to get closer to the stage, crushing the fans towards the front of the crowd.").

87. *Several Concert-Goers Injured After Crowd Rushes Stage at Arizona Festival*, Fox News (Sept. 27, 2015), http://www.foxnews.com/us/2015/09/27/several-concert-goers-injured-after-crowd-rushes-stage-at-arizona-festival.html.

88. *Id.*

89. *Id.*

90. Nat'l Fire Prot. Ass'n, Life Safety Code Handbook § A.3.3.188.1 (Ron Cote & Gregory E. Harrington eds., 9th ed. 2003) (suggesting that festival seating at live entertainment events should be "expected to result in overcrowding and high audience density that may compromise public safety").

91. Adelman, *supra* note 56, at 18.

92. Ellis, *supra* note 26, at 611 (internal citation omitted).

93. Adelman, *supra* note 56, at 19.

94. *See* Louis R. Frumer & Melvin I. Friedman, Personal Injury—Actions, Defenses, Damages § 42.01 (rev. ed. 2016).

premises at the time, the security company on duty during the incident, and/or the performer on stage" at the time of the crush.[95]

Duty is typically easy for plaintiffs to establish in these cases because "[u]nder 'traditional premises liability law,' those who enter venues as paying customers or audience members (*e.g.* concertgoers, sports spectators, etc.) are considered invitees to whom a duty of reasonable care is owed."[96] The most contentious components of the litigation usually revolve around the remaining elements of negligence: breach and causation.[97]

As I discuss at length in my earlier work about crowd crush, however, "[d]espite the frequency with which crowd crush injuries occur, the jurisprudence surrounding liability for these injuries is remarkably sparse and inconsistent."[98] Despite decades of crowd crush litigation, common law in this area of torts remains underdeveloped,[99] with courts taking a mostly *ad hoc* approach to these cases.[100] Instead of relying on crowd science and crowd scientists as expert witnesses, courts have instead largely "us[ed] a combination of conventional wisdom about crowds and general principles of tort law to rule on liability."[101] Relying on conventional wisdom and general principles of tort law has resulted in confusion in the law and some unresolved issues in crowd crush litigation, including whether crowd crushes are foreseeable;[102] whether the acts of individual crowd members are intervening, superseding causes of plaintiffs' injuries;[103] and whether individuals assume the risk of injury

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95. *See* Pearl, *supra* note 28, at 17.

96. *Id.*

97. *See infra* notes 117–124.

98. Pearl, *supra* note 28, at 15 n.124 ("The inconsistencies between the individual negligence cases—with sufficient cohesiveness among the plaintiffs and injuries derived out of the same type of event or course of conduct by the retailers—all resulted in different outcomes under the negligence regime."); *see also* Ellis, *supra* note 26, at 609; FRUMER & FRIEDMAN, *supra* note 94 ("Courts in Illinois and New York have reached the same result on similar facts. This view is not unanimous, however, as the courts of other states have denied liability on analogous facts." (quoting Victoria C. Dawson, *Who Is Responsible When You Shop Until You Drop: An Impact on the Use of the Aggressive Marketing Schemes of Black Friday Through Enterprise Liability Concepts*, 50 SANTA CLARA L. REV. 747, 808–09 (2010))).

99. Ellis, *supra* note 26, at 609.

100. FRUMER & FRIEDMAN, *supra* note 94, § 42.01(3)(b) ("Cases of injury caused by a panicking crowd demonstrate how often crowd control matters are decided on their facts.").

101. Pearl, *supra* note 28, at 15.

102. *Compare* Rotz v. City of New York, 532 N.Y.S.2d 245, 247 (N.Y. App. Div. 1988) ("Our point of departure with the IAS Court is its summary determination that the danger here was not foreseeable and that, as a matter of law, the injuries to plaintiff were caused by an unforeseeable, intervening event."), *with* Haley v. May Dept. Stores Co., 287 S.W.2d 366, 368 (Mo. Ct. App. 1956) ("But even if the crowd did become unruly after plaintiff boarded the escalator, defendant cannot be held to have been negligent in failing to anticipate such conduct.").

103. *Compare Rotz*, 532 N.Y.S.2d at 249 (referencing a lower court opinion which found that acts of individual crowd members were intervening, superseding causes of plaintiff's crowd crush injuries), *with* Myers v. Kansas City Junior Orpheum Co., 73 S.W.2d 313, 321 (Mo. App. 1934) ("The plaintiff's

when they enter a crowd,[104] among other issues.[105] As argued in my earlier work, "[c]rowd science arguably provides extremely clear and straightforward answers to these questions in most cases and yet . . . this body of science has been almost entirely overlooked by courts in the United States."[106]

Crowd crush litigation is not only marked by underdevelopment and confusion, but it is also marked by a significant amount of precedent that runs contrary to available crowd science.[107] Four mistakes, in particular, are worth discussing.[108] Each will be addressed in the following four Subparts.

A. Capacity Errors

First, courts in crowd crush cases are prone to look at compliance with set capacity numbers instead of crowd density estimates in assessing whether a venue was dangerously overcrowded.[109] While there is an "appealing logic" to this approach in analyzing liability in these cases, capacity numbers are only a weak stand-in for the scientifically relevant inquiry in crowd crush cases: Whether the crowd reached a high-risk density prior to the plaintiff's injury.[110] Indeed, while evidence that a venue had grossly exceeded its set capacity number may be persuasive evidence that the crowd within the given venue was at a high density, the converse is not also true. Under-capacity venues may, in fact, experience

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testimony, in its entirety, is not open to the construction that she was pushed over the rope, not by the pressure of the crowd, but merely by one or two persons who began pushing in an effort to get next to the door into the theater or auditorium proper. But even if the pressure against plaintiff was by the pushing of two or more, yet if that was the result of the pressure of the congested crowd in the roped-off space, it would not exculpate defendant, since those coming directly in contact with plaintiff under those circumstances could be regarded as merely an intervening, though not an independent, cause.").

104. *Compare* Rossman v. K-Mart Corp., 701 F. Supp. 1127, 1132 (M.D. Pa. 1988), *aff'd*, 866 F.2d 1413 (3d Cir. 1988) ("While Mrs. Rossman became part of a crowd that ultimately became testy and unruly, there is no evidence that she subjectively knew that K Mart Corporation would fail to take proper precautions to control the crowd, or to provide a reasonably safe method for distribution of the dolls. Nor could Mrs. Rossman have anticipated that K Mart employees would take actions that would cause the unruly crowd to stampede."), *with* Klish v. Alaskan Amusement Co., 109 P.2d 75, 76 (Kan. 1941) ("Crowds are common at theaters and other places of amusement. That there may be some jostling in such crowds is inevitable. That someone may fall and sustain injury, or cause injury to others, always is a possibility. These conditions are so common that those who attend such places are presumed to know of them.").

105. Pearl, *supra* note 28, at 17.

106. *Id.* at 16–17.

107. *See id.* at 19–38.

108. *See generally id.* (discussing these mistakes in-depth). This Subpart draws heavily on my prior work on this topic, *Crowd Crush: How the Law Leaves American Crowds Unprotected.* For a more extended discussion of this topic found in that piece, see *id.* at 20–23.

109. *Id.*

110. *Id.* at 20.

crowd crushes, and have certainly experienced such in the past.[111] Crowd crush in under-capacity venues occurs because under-capacity crowds may still reach high densities in and around bottlenecks or near locations of value within the venue like the stage, concession stands, or restrooms.[112]

B. Demographic Analysis Errors

Second, courts have also had a tendency to look closely at the demographic characteristics of crowd members in assessing liability in crowd crush cases. While courts have not been as explicit about their reasoning behind this approach, the theory seems to be that crowd-related injuries and deaths are more foreseeable amongst certain types of crowds than others.[113] As with the mistake surrounding reliance on capacity numbers, there is an attractive logic behind this approach, although it too is scientifically problematic. The physical space within a given venue, as well as the use of festival seating, appear to be overwhelmingly more predictive of high-risk densities developing within a given crowd.[114] Additionally, once a high-risk density develops, the demographics of individual crowd members become almost entirely irrelevant as crowd members lose the ability to control their movements or the movements of those around them.[115] In those situations, no crowd member of *any* demographic persuasion is likely to be able to increase or decrease the risk of injury or death to himself or anyone else around him.[116]

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111. *See, e.g.*, Custini v. Radio City Prods., LLC, No. 604084/2006, slip op. at 2–4 (N.Y. Sup. Ct. July 27, 2009) (ruling on liability in a crowd crush at an under-capacity Radio City Music Hall); White, *supra* note 21 (describing a crowd crush at an under-capacity Eminem concert at RFK Stadium); *Complaints of 'Crush' at Fintona Country Music Concert*, BBC News (Nov. 4, 2013), http://www.bbc.com/news/uk-northern-ireland-foyle-west-24801333 (describing a crowd crush at an under-capacity venue in County Tyrone, Ireland).

112. *See* Custini v. Radio City Prods., LLC, No. 604084/06, slip op. at 3–4 (N.Y. App. Div. July 27, 2009); Selz et al., *supra* note 86.

113. *See* Heenan v. Comcast Spectacor & Spectrum Arena Ltd. P'ship, No. 00980, 2006 Phila. Ct. Com. Pl. LEXIS 138, at *10 (Pa. C. P. Mar. 6, 2006), *aff'd*, 915 A.2d 155 (Pa. Super. Ct. 2006); Phoenix Amusement Co. v. White, 208 S.W.2d 64, 66 (Ky. 1948); Prettyman v. Trenton Transp. Co., 73 Pa. Super. 353, 358 (Pa. Super. Ct. 1920); Adelman, *supra* note 56, at 19.

114. *See supra* notes 109–112.

115. Adelman, *supra* note 56, at 19; Helbing et al., *supra* note 63, at 967; Fruin, *supra* note 27, at 2–3.

116. *See* Pin et al., *supra* note 69, at 287.

C. Causation Errors

Third, courts have also erroneously ruled that crowd members themselves, rather than venue owners or event organizers, were the cause of crowd crush injuries.[117] This mistake is not particularly surprising in light of the common tropes used in media reports and commentary following crowd crushes: that crowd members behaved like "barbarians,"[118] or "animals,"[119] or were otherwise the root cause of the disaster.[120] Again, however, physical space configurations like bottlenecks and festival seating, rather than crowd members, are the most likely causes of high-density crowd situations that are likely to cause injury or death.[121] Moreover, once crowds reach high densities, the ability of individual crowd members to volitionally cause *anything* to happen is almost entirely absent.[122] Thus, placing liability on individual crowd members makes little sense.

D. Assumption of the Risk Errors

Fourth, courts have mistakenly found that crowd crush victims impliedly assumed the risk of injury.[123] Courts in a significant number of cases have ruled that individuals who "freely [become] part of [a] crowd . . . assume[] the risk of the hazard it produce[s]."[124] One court explained:

> Crowds are common at theaters and other places of amusement. That there may be some jostling in such crowds is inevitable. That someone may fall and sustain injury, or cause injury to others, always is a possibility. These conditions are so common that those who attend such places are presumed to know of them.[125]

Crowd science, however, exposes the error in this type of legal reasoning by "demonstrat[ing] that the risks of crowd crush injuries are neither (a) inherent in crowds nor (b) obvious to individuals joining a crowd, the two theories behind a successful implied assumption of the

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117. *See* Glatfelter v. Delta Air Lines Inc., 558 S.E.2d 793, 796–97 (Ga. Ct. App. 2002); Rotz v. City of New York, 532 N.Y.S.2d 245 (N.Y. App. Div. 1988).

118. Pravica, *supra* note 15.

119. Berger, *supra* note 24, at 1.

120. *See* McFadden & Macropoulos, *supra* note 2.

121. *See supra* notes 77–92.

122. *See* Pin et al., *supra* note 69, at 287.

123. *See* Little v. Butner, 348 P.2d 1022, 1030 (Kan. 1960) (citing Klish v. Alaskan Amusement Co., 109 P.2d 75 (Kan. 1941)); George v. Ayesh, 295 P.2d 660, 662 (Kan. 1956); Glenn v. Montgomery Ward & Co., 163 P.2d 427, 431 (Kan. 1945); Hickey v. Fox-Ozark Theatres Corp., 131 P.2d 671, 674 (Kan. 1942); Snyder v. Salwen, 177 A. 789, 790 (Pa. 1935); Rincon v. Berg Co., 60 S.W.2d 811, 812–14 (Tex. Civ. App. 1933); Fenasci v. S. H. Kress & Co., 134 So. 779, 781 (La. Ct. App. 1931); F. W. Woolworth & Co. v. Conboy, 170 F. 934, 936 (8th Cir. 1909).

124. *Little*, 348 P.2d at 1030 (citing Klish v. Alaskan Amusement Co., 109 P.2d 75, 75 (Kan. 1941)); *Hickey*, 131 P.2d at 674; *Glenn*, 163 P.2d at 427; *George*, 295 P.2d at 662; *F. W. Woolworth & Co.*, 170 F. at 936; *Fenasci*, 134 So. at 781; *Snyder*, 177 A. at 790; *Rincon*, 60 S.W.2d at 812–14.

125. Klish v. Alaskan Amusement Co., 109 P.2d 75, 76 (Kan. 1941).

risk defense."[126] To begin with, crowds with a density below five people per meter have an extremely low risk of injury or death associated with them.[127] An individual joining one of these types of crowds is assuming minimal risk of crowd crush injury.[128] Additionally, because crowd crush injuries are eminently preventable, individuals should not have to assume the risk of injury when attending sporting events, concerts, and other large events.[129] Indeed, unlike other activities in which courts have found that individuals assume a risk of injury—baseball game spectatorship, for example, where the risk of getting hit by a ball is "a customary part of the sport"[130]—getting injured by a crowd is neither customary nor so likely that individuals would (or should) anticipate injury.[131]

E. Consequences

The underdevelopment of the law in this area along with the common mistakes courts tend to make in these cases have combined to create two extremely troubling situations. First, because courts have been willing to find that: (1) crowd members themselves were the cause of a crush; and (2) crowd members assumed the risk of said crush; and/or (3) that crushes are unforeseeable in situations in which a venue is below its official capacity, the common law does virtually nothing to incentivize event organizers and venue owners to take preventative measures against crowd crush injuries and deaths. Moreover, these are the *only* parties that can effectively take such measures:

> [B]oth the lack of communication between the fronts and backs of crowds and the extremely limited ability of crowd members to influence the events around them mean that crowd members themselves cannot protect crowds as a whole from reaching high-risk densities. The preventative measures that owners and managers should take, moreover, need not be expensive or sophisticated. Basic precautions such as opening more entrance and exit doors, removing physical objects that could create bottlenecks from within the venue, and eliminating the use of festival or general admission seating arrangements can go a tremendously long way in reducing, if not eliminating, the chances of a crowd crush occurring.[132]

However, because courts have been so unwilling to find that these parties breached their duty of due care in crowd crush cases, there is little risk of liability for owners and managers that do nothing to manage the crowds on their premises.[133] This minimal risk of liability, in turn, does

126. Pearl, *supra* note 28, at 35.

127. Oberhagemann, *supra* note 66, at 13; Lee & Hughes, *supra* note 63, at 576.

128. *See* Oberhagemann, *supra* note 66, at 11–12; Lee & Hughes, *supra* note 63, at 576.

129. *See* Fruin, *supra* note 74.

130. Adelman, *supra* note 56, at 22 (quoting Gallagher v. Cleveland Browns Football Co., 638 N.E.2d 1082, 1089 (Ohio Ct. App. 1994)).

131. *Id.*

132. Pearl, *supra* note 28, at 44.

133. *Id.* at 19.

nothing to decrease the chances of future crowd injuries and deaths. Discussing the risks posed by Black Friday sales and other "doorbuster sale" events, for instance, one scholar observes:

> No lawsuit has been able to impact safety measures, nor curtail or abolish the aggressive marketing schemes associated with Black Friday. No single plaintiff or claimant has been able to penetrate the entire retail industry and the related trade associations, which adhere to what is essentially a dangerous industry-wide practice. Shoppers continue to drop, and are even killed, as a result of the industry-wide Black Friday marketing practice.[134]

These risks, moreover, may increase over time as venues are built to better accommodate larger and larger crowds and factors like population growth and better marketing of events increase event turnout.

Second, the underdeveloped and error-laden jurisprudence surrounding crowd crush in this country makes it overly difficult for plaintiffs to recover.[135] As discussed in the introduction to Part III of this Article, these errors often occur in court analysis of two of the most difficult elements of negligence to prove in mass-injury situations: breach and proximate causation.[136] And, even if the plaintiff manages to prove his prima facie case, the court may find that he assumed the risk of injury.[137] Further compounding the difficulties confronting plaintiffs, the defendants are often extremely wealthy and powerful: large venues, wealthy performers, and other "media behemoths that can spend lavishly to defend their policies."[138]

These issues almost always compel plaintiffs to settle, which in turn "perpetuates a cycle that contributes to the law's underdevelopment in this area. Because there is an absence of concrete law, parties feel pressured to settle rather than take their chances at trial. And because most cases never reach trial, courts miss the opportunity to establish guiding precedent."[139]

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134. Dawson, *supra* note 6, at 751.
135. *See* Pearl, *supra* note 28, at 16; Ellis, *supra* note 26, at 624.
136. *See* all sources cited *supra* note 117.
137. *See* all sources cited *supra* note 123.
138. Adelman, *supra* note 56, at 18.
139. Ellis, *supra* note 26, at 609.

IV. *Ad Hoc* Approaches to Crowd Crush

Much like reliance on the tort system, *ad hoc* approaches to crowd crush have been similarly unavailing in significantly reducing the risk of crowd crush both in the United States and abroad.[140] Several of these approaches are of particular note.

A. Municipal Festival Seating Bans

One jurisdiction in the United States experimented with, and then ultimately abandoned, an outright ban on the use of festival and general admission seating. In 1979, in the wake of the tragic Who concert crush, the city of Cincinnati passed City Ordinance No. 582-1979 which banned the use of festival seating and general admission seating "in all theaters, arenas, operas, concert halls and other places of assembly when the seating capacity of the facility is 2,000 or more."[141] However, the ordinance exempted high school and college athletic events, religious events, and business expositions consisting of stationary exhibits from the ban.[142] The statute also established consistent policies for door openings prior to show time and authorized police to use emergency powers at major events if necessary.[143]

From a crowd science perspective, banning the use of festival or general admission seating is an exceptionally wise choice. As discussed previously, this type of crowd arrangement is incredibly dangerous, so much so that the National Fire Protection Administration has stated that "festival seating at live entertainment events *should be expected* to result in overcrowding and high audience density that may compromise public safety."[144] Similarly, "[l]eading authorities have named festival seating the principal culprit in most crowd crush cases."[145] One scholar estimates "that ninety percent of all concert injuries occur at festival-seating and general-admission concerts."[146] The banning of festival seating, therefore, should be expected to dramatically reduce the risk of crowd crush.[147] Indeed, it appears from the absence of media reports or litigation that Cincinnati did not experience another episode of crowd crush after it enacted its festival seating ban in 1979.

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140. *See infra* notes 141–194.

141. Cincinnati, Ohio, Mun. Code § 865-29 (1979).

142. *Id.*

143. James Henke, *Cincinnati Curbs Festival Seating in Wake of Who Disaster*, Rolling Stone (Feb. 7, 1980), http://www.rollingstone.com/music/news/cincinnati-curbs-festival-seating-in-wake-of-who-disaster-19800207.

144. Adelman, *supra* note 56, at 18 (emphasis added).

145. *Id.*

146. Ellis, *supra* note 26, at 611.

147. Helbing et al., *supra* note 63, at 967.

Unfortunately, in the absence of a broader and more overarching state or municipal crowd control scheme, outright bans on practices such as festival seating appear to be incredibly susceptible to industry pressure, particularly lobbying efforts on the part of the entertainment industry.[148] Festival seating is an appealing practice in this industry because it allows performers to "maximize profits and minimize costs" by packing as many people as possible into one venue.[149] Thus, despite the huge risks posed by festival seating, industry representatives continue to pressure venues to allow it.[150]

Industry pressure is precisely what caused Cincinnati to revoke its festival seating ban. In 2004, despite continued evidence that festival seating was continuing to cause crowd-related injuries and deaths at concerts and other public gatherings both in other parts of the United States and worldwide, the city "lifted its 23-year ban on festival seating at the insistence of mainstream rock-and-roll icon Bruce Springsteen."[151] One report explains:

> Inspired by the band U2—which sells out stadiums and arenas around the world and will not sign a contract with any venue unless it permits festival seating—Springsteen decided he could raise his performances to new heights if more of his fans were closer to him. He "really liked the energy, liked the vibe" at a U2 show, explained the general manager of the Cincinnati arena where Springsteen performed.[152]

Accordingly, Springsteen refused to perform in Cincinnati unless and until it repealed its ban.[153] Therefore, on August 4, 2004, the city passed an emergency ordinance repealing the festival seating ban.[154] The ordinance stated that it was "an emergency measure necessary for the immediate preservation of the public peace, welfare and safety" of the city, and that the festival seating ban was no longer needed because another city ordinance required venue owners and event planners to obtain public assembly permits before holding a public assembly.[155] That section of the city code permits festival seating but requires doors to be open for such events at least ninety minutes before their publicized start. However, it says nothing about crowd safety once the crowd is assembled.[156]

When performers pressure venues to permit festival seating, they place their personal preferences and economic motivations above the

148. Adelman, *supra* note 56, at 22.
149. *See* Abbott & Geddie, *supra* note 59, at 260.
150. *See* Adelman, *supra* note 56, at 18–19.
151. *Id.* at 19.
152. *Id.*
153. *Id.*
154. CINCINNATI, OHIO, MUN. CODE § 883-3 (2004).
155. *Id.*
156. *Id.*

safety of fans, and yet this trade-off is typically ignored, downplayed, or justified with weak explanations or excuses. For example:

> A typical comment [defending festival seating] comes from the editor of a concert industry magazine, defending U2's use of festival seating by saying that it is a problem only for some bands: "If there is a band that can pull off festival seating safely, it is U2. Their crowd isn't going to be as volatile as, say, a Red Hot Chili Peppers crowd.[157]

This, of course, is a scientifically unsupportable statement for reasons previously discussed: Once a crowd reaches a high density, the relevance of the demographic characteristics of its members—whether they are U2 or Red Hot Chili Peppers fans—drops to virtually zero.[158] Yet, these justifications, tortured explanations, and excuses continue to convince venues to permit festival seating at concerts. Venues have little hope of booking big name acts if they do not.[159]

Similarly, industry trade groups have done virtually nothing to support local governments in their (very limited) efforts to make large gatherings safer. The International Association of Auditorium Mangers ("IAAM"), for instance, represents tens of thousands of "managers and senior executives from auditoriums, arenas, convention centers, exhibit halls, stadiums, performing arts centers, university complexes, and amphitheaters."[160] In the aftermath of the Who concert crush, the organization pledged "to undertake a comprehensive study on crowd behavior and management for the purposes of developing guidelines for the facility-management professionals and related organizations."[161] IAAM never fulfilled that promise:

> Quietly, and behind the scene, the IAAM retreated from its bold visions and abandoned its pledges. Instead of working toward industry standards, or producing a definitive crowd management study, IAAM detoured to a lower road and began sponsoring well choreographed conferences and seminars that steered away from discussions addressing "comprehensive" safety studies and standards.[162]

The IAAM's failure to act on this issue, combined with pressure from performers and the entertainment industry to maintain unsafe crowd management practices, have kept outright bans on practices like festival seating either out of the attention of lawmakers and/or incredibly unpopular. Those municipalities who attempt to enact such bans—in the absence of a more comprehensive and thoughtful crowd management

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157. Adelman, *supra* note 56, at 19.

158. *See supra* notes 64–76.

159. *See* Adelman, *supra* note 56, at 18.

160. *About Us*, INT'L ASS'N OF VENUE MANAGERS, http://www.iavm.org/about-us (last visited Nov. 7, 2016).

161. *The IAAM Press Release*, CROWD MGMT. STRATEGIES, http://www.crowdsafe.com/cafe/iaam_press_release.html (last visited Nov. 7, 2016).

162. *A Trust Betrayed*, *supra* note 19.

scheme—are likely to face tremendous pressure to reconsider from some of the country's most popular performers or risk limiting the types of acts the locale can attract.[163]

As will be argued later in this Article, state-based comprehensive crowd management schemes are likely to be significantly more effective than municipal bans on particularly problematic venue practices.[164] More comprehensive schemes can target and address greater numbers of crowd risks. Festival seating, for instance, may only be one of multiple significant crowd risks at an event such that a festival seating ban would only partially decrease the overall risk of crowd crush. Moreover, when passed by states rather than cities or municipalities, such crowd control schemes are likely to be more successful at withstanding industry pressure over time.[165] Bruce Springsteen risks little by boycotting a single city that has banned festival seating. He is significantly less likely, however, to boycott performing in an entire state. Thus, any threats he might make to do so would be significantly less credible.

B. Location-Specific Renovations

When either a particularly large crowd crush or multiple crowd crushes have occurred in a single location over time, venue owners or local governments have sometimes undertaken crowd safety-oriented renovations of that particular space.[166] For instance, Jamarat Bridge, a stop on the Hajj, the religious pilgrimage to Mecca that occurs in Saudi Arabia each year, has been the site of a truly stunning number of crowd crush injuries over the years: 1426 fatalities in 1990, 270 in 1994, 180 in 1998, 244 in 2004, and 360 in 2006, to name just a few.[167]

Originally, the bridge had two levels. Individuals participating in the pilgrimage would enter one of the levels and then pause on the bridge to participate in a ritualistic stoning of the Jamarat, a stone pillar, "as a sign of obedience to God."[168] This stoning is one of the duties of the Hajj and is thus critical to each of the pilgrims participating.[169] As the number of pilgrims on the annual Hajj increased over time, however, the bridge became insufficient to handle the crowd flow, increasing crowd density on each of the two levels and causing crowd crushes.[170] In 2006, therefore,

163. *See* Adelman, *supra* note 56, at 19–20.

164. *See infra* notes 165–195.

165. *See id.*

166. *See infra* notes 167–183.

167. Alex Olorenshaw et al., *Hajj Pilgrimage Stampede: A Visual Guide to the Fatal Crush near Mecca*, Guardian (Sept. 24, 2015, 11:37 AM), http://www.theguardian.com/world/ng-interactive/2015/sep/24/hajj-pilgrimage-stampede-visual-guide-fatal-crush-mecca.

168. *The Jamarat Bridge Project: An Exceptional Achievement of Crowd Control*, King Abdul Aziz Pub. Lib., http://www.kapl-hajj.org/jamarat_bridge.php (last visited Nov. 7, 2016).

169. *Id.*

170. *See id.*

the government of the Kingdom of Saudi Arabia decided to demolish the existing bridge and build "a new multilevel structure capable of accommodating greater numbers of pilgrims and thereby facilitating stoning of the pillars in a safe and effective manner."[171]

The resulting bridge now has five rather than two levels. In addition, "[t]o facilitate movement, the bridge has 12 entrances and 12 exits, distributed among all four directions, in addition to emergency exits."[172] There are also surveillance cameras that assist authorities in determining areas within the crowd where "fast intervention and provision of emergency medical assistance is necessary."[173] These renovations allow the bridge to now accommodate 300,000 pilgrims per hour.[174]

Similarly, after a massive crowd crush occurred at the Camp Randall Stadium in Madison, Wisconsin in October 1993, which was described in Part I of this Article, the University of Wisconsin renovated the facility to reduce the likelihood that a similar crush would occur in the future.[175] That crush, which was the result of spectators attempting to storm the field, left dozens and dozens seriously injured or hospitalized.[176] Consequently, the university made a number of changes in the days and months following the tragedy: The stadium railings were rebuilt with breakaway gates, another aisle was added in the student section, and the chain link fence that had caused the crush was removed.[177]

While certainly a helpful first step in reducing the risks of crowd crush, location-specific renovations are also limited solutions at best for several reasons. First, location-specific renovations are necessarily static, improving only some limited portion of physical space(s). Crowds, however, are dynamic, moving *through* spaces and changing quite rapidly over time.[178] Indeed, when a venue or event attracts a large crowd, the crowd does not materialize instantaneously at that venue and then disappear from it once the event is over. Instead, we would reasonably expect—and practical experience shows—that the areas *around* the venues also experience the presence of crowds before, during, and after the event. Thus, improvements to one given area of a venue or perhaps even the entire venue itself can only partially reduce the risk of crowd crush. For example, despite the significant renovations to Jamarat Bridge,

171. *Id.*
172. *Id.*
173. *Id.*
174. *Id.*
175. Dan Simmons, *Camp Randall Crush Remembered as Frightening Call for Stadium Changes*, WIS. ST. J. (Oct. 30, 2013), http://host.madison.com/wsj/news/local/education/university/camp-randall-crush-remembered-as-frightening-call-for-stadium-changes/article_63d894c2-f3ca-5207-bee53c6577cc31de.html.
176. *Wisconsin Victory Celebration Turns Dangerous*, *supra* note 41.
177. Simmons, *supra* note 175.
178. *See* G. Keith Still, *Visualising Risk Assessment for Crowd Safety*, 2 INT'L CTR. SPORT SECURITY J. 1, http://icss-journal.newsdeskmedia.com/visualising-risk-assessment-for-crowd-safety (last visited Nov. 7, 2016).

a devastating crowd crush occurred in September 2015 and killed more than 700 people at this same phase of the Hajj.[179] This time, the crowd crush did not occur on the bridge itself but "on streets which lead to the bridge, as two massive lines of pilgrims converged on each other at right angles."[180] A more comprehensive crowd management scheme beyond simply renovating Jamarat Bridge itself is clearly needed to reduce the risk associated with this portion of the Hajj.

Second, in the absence of a more comprehensive crowd management scheme, crowds may still reach high densities in spite of any renovations of the physical venue, and thus crowd crush injuries may still occur. Even in situations in which renovations are specifically designed to accommodate large crowds, they may be insufficient. As previously discussed, high-density crowds are capable of exerting significant amounts of pressure, and have even bent steel guardrails on occasion;[181] indicating that even the most careful of physical renovations may be inadequate. This was the case with the renovations at the Camp Randall Stadium just discussed: In 2010, after another significant football victory, a startlingly similar crowd crush occurred in spite of the changes the university had made to the stadium.[182] As students rushed the field, fans in three separate sections of the stadium "had visible difficulties moving and, in some cases, breathing when fans from the upper levels of the sections compressed the lower levels."[183] Some people, moreover, were "pinned against the fence line," mirroring what had happened in the 1993 crowd crush.[184]

Thus, physical renovations of venues are, at best, only limited solutions to the problem of crowd crush. Even when thoughtfully planned and executed, they are necessarily limited to the specific physical space in which they are made and are ill suited to fully accommodate the dynamic and ever-changing nature of crowds.

C. Event-Specific Reforms

Despite the lack of statutory law prescribing crowd management activities, some event organizers in the United States have taken it upon themselves to employ crowd scientists and consultants to minimize the risk of crowd crush at their events. For example, the organizers of South by Southwest (commonly referred to as "SXSW"), an Austin, Texas-based festival dedicated to "celebrat[ing] the convergence of the interactive,

179. Christine Jeavans, *Hajj: Jamarat Bridge, a Deadly Pinch Point*, BBC News (Sept. 25, 2015), http://www.bbc.com/news/world-middle-east-34361122.

180. *Id.*

181. Fruin, *supra* note 27, at 5.

182. Ryan Rainey & Jen Zettel, *Students Rush Field, Memories of 1993 Crush Fizzle*, Badger Herald (Oct. 17, 2010), https://badgerherald.com/news/2010/10/17/students-rush-field/.

183. *Id.*

184. *Id.*

film, and music industries"[185] hired preeminent crowd scientist, Professor G. Keith Still, to teach festival organizers and local first responders the most important principles of crowd management and safety.[186] The Walt Disney Corporation takes it one step further and employs full-time staff members at its parks to monitor and react to crowd issues in real time.[187]

While event-specific reforms are arguably the *most* effective and comprehensive type of non-governmental, *ad hoc* crowd management efforts, often involving the use of multiple methods of keeping crowd densities low, such reforms do not offer a sufficient response to the problem of crowd crush in the United States as a whole or even within smaller jurisdictions. First, these types of reforms necessarily rely upon venue owners and event organizers to be proactive about crowd control. Because event-specific reforms are both forward-looking—designed to reduce the likelihood of crowd-related injuries and deaths at future dates—and impose some element of cost on the entity making them, venue owners and event managers must have concerns about crowd crush motivating such reforms. We would not expect, for instance, venues or events that do not attract crowds to engage in crowd management reforms. What practical experience shows, however, is that one of two things is typically true if a venue owner or event planner is taking proactive steps to minimize the risk of crowd crush: (1) the venue has already experienced a crowd safety issue, or (2) the venue has a specific business interest in keeping crowds well-managed.

On the one hand, SXSW only employed the services of a crowd management expert after disaster struck at their March 2014 festival: a suspected drunk driver "crashed through a barrier and into a street crowded with festival attendees . . . ."[188] Four people were killed and over twenty more were injured.[189] That tragedy seemingly inspired festival organizers to take crowd control and crowd safety much more seriously

185. *About SXSW*, SXSW, LLC, http://www.sxsw.com/about (last visited Nov. 7, 2016).

186. STILL, *supra* note 26, at 240.

187. *See, e.g.*, Hugo Martin, *Disneyland Prepares for Crush of Visitors During 60th Anniversary Celebration*, L.A. TIMES (May 19, 2015, 5:00 AM), http://www.latimes.com/business/la-fi-disneyland-crowds-20150519-story.html ("Disneyland has formed a team of three managers to oversee guest flow. The managers will keep in contact with workers throughout the park via radios to react to choke points and gridlock."); Brooks Barnes, *Disney Tackles Major Theme Park Problem: Lines*, N.Y. TIMES (Dec. 27. 2010), http://www.nytimes.com/2010/12/28/business/media/28disney.html?_r=0 ("[Disney] has spent the last year outfitting an underground, nerve center to address that most low-tech of problems, the wait. Located under Cinderella Castle, the new center uses video cameras, computer programs, digital park maps and other whiz-bang tools to spot gridlock before it forms and deploy countermeasures in real time. In one corner, employees watch flat-screen televisions that depict various attractions in green, yellow and red outlines, with the colors representing wait-time gradations.").

188. ASSOC. PRESS, *4th Person Dead from SXSW Crash*, N.Y. POST (Mar. 27, 2014, 6:51 PM), http://nypost.com/2014/03/27/4th-person-dead-from-sxsw-crash/.

189. *Id.*

going forward and to enact measures to keep crowd density low in order to avoid mass injury or death crises in the future.[190]

Disney, on the other hand, has a strong business incentive to keep crowds well managed:

> To handle over 30 million annual visitors—many of them during this busiest time of year for the megaresort—Disney World long ago turned the art of crowd control into a science. But the putative Happiest Place on Earth has decided it must figure out how to quicken the pace even more. A cultural shift toward impatience—fed by video games and smartphones—is demanding it, park managers say. To stay relevant to the entertain-me-right-this-second generation, Disney must evolve.[191]

Long lines, dense crowds, and unhappy visitors are harmful to Disney's proverbial bottom line both in the moment and going forward. Visitors who are spending long periods of time standing in line or stuck in the middle of crowds are not spending money on concessions or souvenirs in those moments, and if the Disney parks garner the reputation of being overcrowded, unmanageable, or unsafe, ticket sales would almost certainly drop.[192] Disney admitted as much in a 2010 *New York Times* article:

> The primary goal of the [crowd control] command center, as stated by Disney, is to make guests happier—because to increase revenue in its $10.7 billion theme park business, which includes resorts in Paris and Hong Kong, Disney needs its current customers to return more often. "Giving our guests faster and better access to the fun," said Thomas O. Staggs, chairman of Walt Disney Parks and Resorts, "is at the heart of our investment in technology." Disney also wants to raise per-capita spending. "If we can also increase the average number of shop or restaurant visits, that's a huge win for us," Mr. Holmes said.[193]

Disney, therefore, has a strong business incentive to keep crowds flowing smoothly, quickly, and safely on a day-to-day basis.

Other event organizers, however, may have little incentive to engage in crowd management reforms. Those that have not yet experienced crowd-related injuries or deaths may not harbor any concerns about these issues. As previously discussed, this is particularly because the likelihood of being found liable under common law for any injuries that do occur in the future seems so low.[194] Additionally, unlike Disney and its amusement parks, most event organizers have very little financial incentive to keep crowd densities low and may, in fact, have the opposite incentive. Unlike the Disney parks, where dense crowds usually mean long lines for attractions and thus diminished guest satisfaction, for

190. *See* STILL, *supra* note 26, at 240.
191. Barnes, *supra* note 187.
192. *See id.*
193. *Id.*
194. *See* Pearl, *supra* note 28, at 1; Ellis, *supra* note 26, at 624.

concert, musical festival, and sports event planners, dense crowds usually mean large ticket sales and higher profits.

Second, since event-specific reforms are discretionary on the part of event organizers, they are not a reliable method of reducing the risk of crowd crush across an entire state or municipality. SXSW, for instance, is an Austin-based event, and yet there is currently no indication that its event reforms have inspired similar changes on the part of other event organizers in the area, despite the fact that Austin is purportedly the "Live Music Capital of the World," hosting more live music events per capita than anywhere else.[195]

Thus, given the failure of both common law and *ad hoc* crowd management measures to mitigate the risk of crowd-related injuries and deaths in any significant way in the United States, as well as the evidence that crowd crush incidents continue to occur and may even be increasing within our borders, a statutory response is warranted.

V. A Statutory Response

Currently, the United States lacks any statutory law that directly pertains to crowd management.[196] While most states and municipalities typically have fire code regulations that contain requirements or restrictions relating to entrances, exits, and official venue capacity numbers (and may otherwise set venue standards that loosely relate to crowd management), these codes have been largely ineffective at preventing crowd crush. Indeed, existing statutes that do apply to public gatherings are concerned with public sanitation and health rather than crowd safety.[197]

For example, West Virginia Health and Safety Code section 751.004 requires event promoters to file a "permit application" with the judge of the county in which a "mass gathering will be held."[198] That application must include, among other things, the maximum number of persons the promoter will allow to attend the gathering, "a description of each step the promoter has taken to ensure that minimum standards of sanitation and health will be maintained "during the mass gathering," a description of traffic control preparations being taken, and assurances that adequate medical and nursing care will be provided at the event.[199] The statute says nothing, however, about crowd management. Similarly, Oregon's mass

195. *Live Music Capital of the World*, Austin Relocation Guide, http://www.austinrelocationguide.com/2012/Live-Music-Capital-of-the-World/ (last updated Aug. 25, 2016).

196. *See* Ellis, *supra* note 26, at 629.

197. *See, e.g.*, Ind. Code Ann. § 16-41-22 (2012); Me. Rev. Stat. Ann. tit. 22, § 1602 (2011); N.C. Gen. Stat. § 130A-254 (2013); Nev. Rev. Stat. § 244.3545 (2013); Or. Rev. Stat. § 433.760 (2013); Tex. Health & Safety Code Ann. § 751.004 (West 2012); Wyo. Stat. Ann. § 35-15-108 (West 2013).

198. Health & Safety Code § 751.004(a).

199. *Id.* § 751.004(b).

gathering statute requires the Oregon Health Authority to promulgate rules related to adequate water supplies, toilet facilities, refuse storage and disposal, food, emergency medical facilities, fire protection, and security and traffic control at mass gatherings but requires no rule promulgation around issues of crowd management and control.[200]

Even the few U.S. statutes that purport to be about "crowd control" are designed neither to prevent nor even address crowd-related injuries and deaths. Instead, these statutes are concerned with *public order* injuries—injuries arising from riots, fights, and other forms of lawlessness. New York's crowd control statute, for instance, requires operators of places of public assembly to "establish a plan to be used for the purposes of crowd control in the event of a riot."[201] While certainly matters of public concern that warrant advance preparation, these types of injuries are distinct from crowd crush injuries because they arise, for example, from drunkenness, drug use, other forms of antisocial conduct, and civil unrest, rather than from high crowd densities. Further, these "crowd control" statutes either do not define "crowd control" or mandate only that police be on hand at mass gatherings to provide crowd protection and policing. They do not require event organizers to utilize more scientific crowd management techniques before or during an event.[202] Indeed, because police "crowd control" training appears to be overwhelmingly geared toward prevention of public order injuries, police officers are not well situated to reduce the risk of crowd crush. Accordingly, existing "crowd control" statutes are insufficient to reduce the risk of crowd crush.

Given what we understand about crowds from the body of crowd science that has arisen over the last few decades, a comprehensive and effective statute should address and require two distinct types of crowd safety activities: (1) the creation of crowd management plans in advance of an event, and (2) the use of crowd control measures during an event. Though closely interrelated, these two modalities require two different types of planning and action:

> [Crowd management] includes the facilitation, employment, and movement of crowds, while [crowd control] comprises steps taken once a crowd (or sections of it) has begun to behave in a disorderly or dangerous manner. Crowd management procedures involve planning an event, training employees, forming scenarios, and collecting data. Crowd control techniques include creating situation models and decision-making processes needed for the successful direction of equipment and manpower under a unified command.[203]

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200. OR. REV. STAT. § 433.760 (2013).

201. N.Y. LAB. LAW § 475(b)(2) (McKinney 2009).

202. *See, e.g.*, WASH. REV. CODE § 70.108.040(b) (2011); N.C. GEN. STAT. § 130A-257(3) (2013); CAL. BUS. & PROF. CODE § 21669.1(f) (2008).

203. Abbott & Geddie, *supra* note 59, at 259.

In short, crowd management involves advance planning to minimize the risk of crowd crush *before* a crowd has gathered, and crowd control involves crisis management if and when an assembled crowd begins to exhibit signs that a crush may be or already is in the process of occurring.[204] Ideally, if the crowd management phase is sufficient, there should be little need for crowd control measures. This is, by far, the preferable scenario. One notable crowd scientist points out that "once a situation escalates from crowd management to crowd control, officials often have a real problem on their hands."[205] He explains further, "[i]t's like trying to push an egg back into a chicken . . . . It's going to hurt, the chicken's going to end up squawking, and something's going to break."[206]

A. Crowd Management Plans

Given the importance of advance planning in ensuring crowd safety, a comprehensive and effective crowd management statute should require the preparation of a crowd management plan in advance of events that are likely to draw crowds in order to protect employees from crowd-related injuries.[207] In the wake of the Wal-Mart crowd crush, for instance, the Occupational Safety and Health Administration ("OSHA") sent a letter to the CEOs of fourteen major retail companies, urging the development of crowd management plans prior to future events in order to protect employees from crowd-related injuries.[208] Other crowd experts are also in agreement that crowd management plans are an important factor in reducing the risk of crowd crush.[209] In fact, one expert concludes that "the *primary* factor in assuring a safe and comfortable environment for large crowds is the planning for their management."[210]

These crowd management plans, in turn, should consider and account for four distinct elements of an upcoming event and any risks

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204. *See id.*

205. Erin Blakemore, *What If the Pope's Mass Turns into Mass Chaos? A Crowd Management Scientist Weighs in*, Wash. Post (Sept. 22, 2015), https://www.washingtonpost.com/news/speaking-ofscience/wp/2015/09/22/what-if-the-popes-mass-turns-into-mass-chaos-a-crowd-management-scientist-weighs-in/.

206. *Id.*

207. David Michaels, *Crowd Management Is Something to Be Grateful for*, U.S. Dep't of Lab. Blog (Nov. 19, 2012), http://social.dol.gov/blog/crowd-management-is-something-to-be-grateful-for/; *see also* G. Keith Still, *Crowd Simulation: For the Trained Eye*, 2 Int'l Ctr. for Sport Security J. 76, 76 (2014) ("Crowd safety has always been the reason for developing safety concepts and robust crowd-management plans for places of public assembly.").

208. Curtis et al., *supra* note 26.

209. *See, e.g.*, Crowd Management: Report of the Task Force on Crowd Control and Safety, City of Cincinnati 12 (1980) ("As the task force sought information on crowds and public safety, it became increasingly clear that the primary factor in assuring a safe and comfortable environment for large crowds is the planning for their management. There is considerable emphasis in this report on crowd management planning and implementation because the Task Force believes that it is the key to providing safe events in Cincinnati.").

210. *Id.* (emphasis added).

that may be implicit therein: "Routes, Areas, Movement, and Profile of the crowd"[211] ("RAMP"). The use of this RAMP analysis is strongly advocated by noted crowd science professor G. Keith Still as a "methodical, systematic and rigorous" method of "captur[ing] specific event information, compar[ing] and contrast[ing] different events and develop[ing] a clearer understanding of the dynamics of [crowd] risk prior to, during, and post event."[212] Each portion of the four-part analysis is designed to identify and address different sources of potential risk.[213]

1. Routes: Ingress, Egress & Circulation

First, venue owners and event organizers should consider the likely crowd routes involved with an event. Routes are "the directions the crowds take to get to the [event] site, move around the site and leave the site (under both normal and emergency situations) and are thus typically referred to as ingress, egress, or circulation routes."[214] A strong understanding of the routes a given crowd will travel is a vital component of an adequate and comprehensive crowd management plan because a significant number of the crushes that have occurred in recent decades have taken place in and around ingress and circulation issues. The Who concert tragedy in Cincinnati, for instance, occurred on the ingress route into the concert arena,[215] as did the more recent Beyoncé crowd crush.[216] The Hillsborough soccer stadium crowd crush that killed ninety-six people in 1989 in the United Kingdom also occurred during ingress into the stadium.[217] And, as previously discussed at length, the recent Hajj crowd crush occurred during crowd circulation through one particular portion of the pilgrimage.[218]

Advance planning can significantly reduce the likelihood of route-related crushes.[219] For instance, if event planners can determine which routes are most likely to be taken by event attendees, they can determine the routes most likely to experience crushing and take preventative measures accordingly, such as reducing bottlenecks along the route or opening more entry or exit points in order to accommodate more people. Professor G. Keith Still explains:

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211. STILL, *supra* note 26, at 152.
212. *Id.*
213. *See id.* at 122–36.
214. *Id.* at 122.
215. Adelman, *supra* note 56, at 18.
216. Dockterman, *supra* note 20.
217. LORD JUSTICE TAYLOR, THE HILLSBOROUGH STADIUM DISASTER: INTERIM REPORT 11 (1989).
218. Jeavans, *supra* note 179.
219. *See* STILL, *supra* note 26, at 122–26.

> For example, an emergency along the [ ] route [in which 80% of the crowd is expected to travel] could give us some difficulty if we stop the crowds along that route, it could quickly build up into a high-density crowd. . . . Clearly, the route with 80% of the crowd has less resilience and less space to handle an incident (such as a medical emergency). This can indicate that we need to provide different levels of management, monitoring and first responders proportionately.[220]

Similarly, careful consideration of circulation routes both during and after the event can help event planners reduce the risk of crowd incidents. Routes between an arena and its exits, or between seating areas and restrooms or concessions, can be sources of crowd-related injuries and deaths and thus warrant careful planning.[221] For example, a crowd crush occurred at Radio City Music Hall in and around a concession stand after large portions of a crowd left the main theater after a show cancellation.[222] Planning for mid- and post-event crowd movements can thus also significantly eliminate crowd-related risks.

This sort of planning need not be particularly sophisticated or time-consuming. Professor Still recommends something as simple as drawing a map of the event location and its surrounding areas on paper and marking likely crowd routes. He concludes that "[b]y systematically mapping ingress, circulation and egress under both normal and emergency situations, and using low-cost materials and a little bit of time to think through the site, [planners] will focus [their] attention on the time, location, severity and duration of crowd-related risks" and be able to respond appropriately to these risks in advance of the event.[223]

2. *Area(s) Crowds Will Occupy*

Second, venue owners and event organizers should consider the areas crowds will occupy during a given gathering or event, the likely crowd densities (low, medium, or high) of those areas, and the "risks on site relating to those locations."[224] Owners and organizers should further distinguish between areas in which the crowd will be static (not moving) and those in which the crowd will be dynamic (moving). For example, "static areas would be front-of-stage at a concert, queuing spaces, bars and so forth. Dynamic areas would be circulating corridors, entry points and the like."[225] A static area might attract a crowd of a higher density than a dynamic one but raise fewer concerns about crowd crush because the crowd is standing still as opposed to attempting to travel through the

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220. *Id.* at 125.

221. *See id.* at 126.

222. Custini v. Radio City Prods., LLC, No. 604084/06, slip op. at 3–4 (N.Y. App. Div. July 27, 2009).

223. STILL, *supra* note 26, at 126.

224. *Id.* at 128.

225. *Id.*

area. A dynamic area, however, may be more prone to bottlenecks, and thus need to stay at a lower crowd density point to minimize the risk of crushing. By identifying these areas and the crowd density levels that they (1) are likely to attract; and (2) need to maintain to remain safe, event organizers and staff can identify early warning signs of crowd crush at the event itself when, for instance, they notice "higher than expected density in unanticipated locations."[226]

Again, this need not be an involved or time-consuming process. Simply mapping out the event by hand "provides a valuable insight about use and utilization of an event space."[227] Organizers can "see where crowds move, where they do not move, where congestion and queuing can occur, and where the moving (dynamic) areas may overlap the queuing (static) areas and lead to congestion."[228] Knowing these features in advance of an event, in turn, allows needed crowd safety measures to be taken before the crowd's arrival.

3. Movement of the Crowd over Time

Third, venue owners and event organizers should consider the likely movements of the crowd before, during, and after the event. Movement "is the rate of passage through the various parts of the system, such as the rate at which crowds are processed through a ticket or search area" and is expressed in terms of "flow rates," which indicate how many people are expected to move through a given location over a given time period.[229] Assessment of flow rates in advance of an event or gathering can reduce the risk of bottlenecks (and thus crowd crush) by identifying venue locations in which "the crowd can flow *towards* the narrowest point on that route more quickly than it can flow *through* that point," and giving venue owners and event planners an opportunity to mitigate those risks in advance of the event.[230] This is a critical component of crowd management given the risk that bottlenecks pose in a given venue:

> If the rate of the arriving crowds exceeds the rate at which they can enter, a queue will develop. If that queue develops too quickly, the space will become overcrowded and, if left unchecked, can be fatal. The same principle applies to all parts of a system in which crowds move into, move around or exit an event. If the number of people arriving at any part of a system exceeds the throughput of that part of the system, the risk of overcrowding, crushing and subsequent injury increases over time.[231]

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226. *Id.*
227. *Id.* at 129.
228. *Id.*
229. *Id.* at 122, 130.
230. *Id.* at 131.
231. Still, *supra* note 178, at 50.

Reducing such bottlenecks need not be expensive or complex. There are several key ways of doing so. Opening multiple entry and exit points for crowd members throughout a given venue reduces the flow rate at each point.[232] This principle may be counterintuitive at first: Event managers and venue owners often *purposely* lock down all access points except one or two based on the theory that doing so will make it easier to control the crowd and enhance security.[233] A prominent crowd management expert, however, explains why that theory is flawed:

> The efficient movement of ticket holders is critical in preventing crowds from gathering outside a facility. Limiting entrances and using fewer doors, or opening and closing doors to control crowd movement are very dangerous practices. They only serve to increase anxiety in a crowd and make it more difficult to manage. It is much more effective to separate people . . . [by] the proper ratio of ticket takers and doors to patrons. Dispersing entering crowds through multi-entrances is particularly effective in processing people efficiently into a facility.[234]

Dispersing entryways and exits lowers crowd density both at those access points and amongst the crowd as a whole, significantly reducing the risk of crowd crush.[235] Similarly, clearly marking passageways to entry and exit points and ensuring direct lines of access to them eliminates ingress- and egress-related bottlenecks. One scholar advises: "Well-designed auditoriums characteristically have direct lines of patron flow and clear lines of sight. Circuitous and narrow passageways, 'dogleg' routes, obscured doorways and stairs, and ambiguous pathways create confusion, and in an emergency flight response situation, have the potential for disaster."[236] Poorly designed venues, however, utilize "confusing and irregular pathway choices,"[237] which can slow down the rate of ingress and egress and increase crowd density.[238]

Lastly, in situations in which multiple entry and exit points either do not exist, cannot be created, or cannot be utilized for some reason, event planners and venue owners can utilize time-based strategies to reduce the risk of crowd crushes occurring at bottlenecks within a given space.[239] For example, the popular King Tut exhibit tour that traveled the world utilized "time-of-arrival ticket[s]," which "regulate[d] patron arrivals by

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232. FRUIN, *supra* note 27, at 8 ("Arrangements that result in unbalanced use of egress or ingress routes, dead ends, or similar confusing and irregular pathway choices, are not acceptable. Dispersed and equally balanced ingress and egress points are preferred over a single centralized location. The influence of external facilities on the volume and direction of movement must be considered.").

233. *See* Teresa Anderson, *Unmasking the Secrets of Mardi Gras Security*, 39 SECURITY MGMT. 40 (1995).

234. CROWD MANAGEMENT, *supra* note 209, at 22–23.

235. *See* Fruin, *supra* note 74.

236. *Id.*

237. FRUIN, *supra* note 27, at 8.

238. *See* CROWD MANAGEMENT, *supra* note 209.

239. FRUIN, *supra* note 27.

spreading them over a longer time period."[240] The airline industry utilizes a similar type of approach to safely manage the aircraft boarding process: grouped seating. Instead of allowing all passengers to attempt to board the plane all at once—a situation rife with the possibility of crowd crush given the large numbers of people that must traverse the narrow jet way and the (typically) small single entrance onto the plane—passengers are divided into smaller groups and then staggered with regard to their permissible entry time onto the plane.

4. Profile of the Crowd

Fourth, venue owners and event organizers should consider the profile of the crowd that is likely to attend a given event: "their age/demographic, mix (male/female ratio), family group and others, and any intelligence that may assist in the management of the crowd."[241] While, as discussed above, the demographics of a crowd have virtually no impact on the likelihood of a crowd crush once a crowd has reached a high density, crowd profile characteristics may be relevant to event preparations and crowd management strategies.[242] A crowd profile, for instance, can reveal important information, such as that a given performers' fans "are known to arrive very early for events and camp out on the streets" or that male restrooms will be in higher demand than female restrooms.[243]

Much like the other three factors involved in the RAMP analysis, creating a crowd profile should be a fairly easy task in most circumstances. Event organizers and venue owners can scour "fan-based websites and discussion forums, media reports and reviews of previous events."[244] Additionally, "performers (or agents) may also provide information that could be relevant to management styles."[245]

In sum, crowd management plans are an effective and reasonable method of significantly reducing the risk of crowd crush at large gatherings, and thus, crowd management statutes should require their preparation in advance of an event.[246] Mandating that event organizers or venue owners prepare such plans requires them to consider many elements critical to crowd safety that they might not otherwise consider, either because of simple ignorance about crowd dynamics or because they lack the inclination to do so. Additionally, mandating that crowd

240. Fruin, *supra* note 74.
241. STILL, *supra* note 26, at 122.
242. *See supra* Part III.B.
243. *See* STILL, *supra* note 26, at 132.
244. *Id.*
245. *Id.*
246. FRUIN, *supra* note 27, at 9 ("The crowd incident model and its derivative guidelines show that many crowd disasters could have been avoided by simple advance planning and management techniques.").

management plans be filed with local governmental authorities and be available to members of the general public allows law enforcement officers and citizens to "know the levels of crowd management to expect" at a given event, and to plan or respond accordingly.[247]

B. Crowd Control Measures

Although, in theory, adequate and comprehensive crowd management plans should eliminate the risk of crowd crush, event organizers and venue owners should also be statutorily-mandated to enact real-time crowd control measures if and when a given crowd on the premises begins to exhibit signs that its density is moving toward high-risk levels. These measures entail preparation to both monitor crowds in real time and deploy effective and efficient mitigation techniques to any growing risk of crowd crush.

1. Real-Time Monitoring

Crowd experts are in agreement that "[c]onstant monitoring of crowd behavior is necessary for good crowd management."[248] Because crowd crushes can develop extremely quickly, "[a] proactive type of management is required, anticipating and resolving problems before they occur, rather than reacting when it could be too late."[249] Accordingly:

> Real time information about the status of crowd conditions in large assembly spaces is critical. A centralized crowd management and communications center should be set up for this purpose. The ideal center would provide a maximum view of the venue, supplemented by video camera access to blind spaces, pressure points, and major movement pathways. Full communications coordination should be provided between all venue staff, local police, fire, and emergency medical services, and any on-site radio or television media. Radio frequencies, telephone numbers, and similar communications information and related procedures should be in a printed form distributed to all staff.[250]

Such real-time monitoring gives venue and event staff the ability to respond quickly and alleviate any crowd pressure points that arise. In these types of situations, for instance, staff could make real-time decisions that entrances and exits be "opened earlier or closed later than originally

247. Crowd Management, *supra* note 209, at 27.

248. Fruin, *supra* note 27, at 6; Richard Giulianotti, *In Place of Barriers: Mobility and Security at Major Events*, 2 Int'l Ctr. Sport Security J. 24, 28 (2014) ("Over the past two decades or so, in most Western European countries there has been an increasing focus on the mobile monitoring and surveillance of sport crowds, for example in tracking such crowds by using plain-clothes police officers, cars and helicopters, and also by using CCTV cameras that are arranged throughout city centres.").

249. Fruin, *supra* note 27, at 6.

250. *Id.*

planned to reduce the possibility of overcrowding."[251] These preemptive actions, in turn, greatly enhance crowd safety.[252]

This real-time monitoring can be highly sophisticated, using sensor-enabled entry points or computer vision technologies to calculate the number of people moving through a given space.[253] It can also be as simple as using closed-circuit cameras or posting event staff to monitor the movements and state of the crowd.[254] Indeed, while sophisticated density calculations are clearly very helpful to crowd monitoring, simple rules of thumb can serve as useful stand-ins for more precise numbers. Professor Still, for instance, notes that when all crowd members are physically touching (such as standing shoulder-to-shoulder or pressed up against one another), crowd density "must be above safe limits."[255] A human monitor would be able to detect this density easily.

2. *Communication*

Event organizers and venue owners also need a reliable method of communicating both with the crowd and with event staff and law enforcement during events. With regard to communicating with the crowd itself, "the need to ensure effective communication to them from the controlling agencies is clear. The requirement for good quality public address systems which can be accessed by those coordinating either the control or the rescue function is imperative."[256] People in crowds "usually have very poor sources of information" as to what is happening around them.[257] Consequently, "unless authoritative information is received from a reliable source," crowd members "will act on the speculations of others nearby. If there is a perception of danger, the human flight response can cause the sudden type of movement that unleashes the massed energy of the crowd."[258] Crowd scientists theorize, for example, that "quick communication" during severe crowd crushes such as the one that occurred at the Hillsborough soccer stadium could have reduced the number of casualties.[259]

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251. Abbott & Geddie, *supra* note 59, at 265.

252. Helbing et al., *supra* note 63, at 969. "Crowd turbulence is potentially life-threatening and experienced in hundreds of crowd-intensive events each year. Determining warning signs in advance of crowd disasters [ ] will enable anticipative crowd control measures. This can significantly enhance crowd safety in the future." *Id.*

253. Pin et al., *supra* note 69, at 289.

254. *See* Giulianotti, *supra* note 248, at 28.

255. E-mail from G. Keith Still, Professor of Crowd Science, Manchester Metro. Univ., to Tracy H. Pearl, Assoc. Professor of Law, Tex. Tech Univ. Sch. of Law (Feb. 17, 2015, 11:43 AM) (on file with author).

256. Dominic Elliott & Denis Smith, *Football Stadia Disasters in the United Kingdom: Learning from Tragedy?*, 7 INDUS. & ENVTL CRISIS Q. 205, 224–25 (1993).

257. *See* Helbing et al., *supra* note 63, at 967.

258. Fruin, *supra* note 74.

259. *Id.*

Communication between event organizers, event staff, law enforcement, and even performers must also be consistent and reliable to reduce the risk of crowd crush. Without a centralized method of communication, these entities may also have a difficult time discerning what is happening with the crowd as a whole and may thus react either too slowly to rising risks of crowd crush or react in a manner that may actually *enhance* that risk. For example, during the Who concert crush, law enforcement officers who were on site failed to perceive the deadliness of the situation in and among the crowd and resisted efforts on the part of crowd members who attempted to alleviate some of the pressure of the growing crush:

> Although most patrons who were interviewed defined the efforts to get through the doors as flights to safety, police officers and security guards continued to see them as gate-crashing efforts after the surge had begun. For instance, two officers reported trying to secure a door . . . forced open by gate-crashers . . . , but a 27-year-old male patron described in detail how the door was opened from the inside by two men trying to prevent injury to "two young girls [who] had been banging on that door for 20 minutes . . . ." Similarly, a couple referred to a friend who, once inside, "tried to shove open some more doors with his foot and immediately two ushers came up, one of them grabbed him, shoved him back in line and told him to either get in line or get back out. He then began to beg and plead with the usher, he said, 'people are getting hurt, people were down' . . . ." The actual motives of those trying to open the doors are not as relevant as the fact that definitions of the situation differed markedly among patrons, police, and Coliseum workers.[260]

Similarly, after a deadly June 2000 crowd crush at a Pearl Jam concert in Roskilde, Denmark, during which nine people died, band members "maintain[ed] that if they had just been made aware of what was happening sooner, lives could have been saved" by stopping their performance.[261] Indeed, "[n]o one from festival security or the organizational side could seem to agree on how long it took to communicate the situation in the mosh pit [where the crush was occurring] to the stage, and why it took as long as it did."[262] Thus, having a reliable method of communication with law enforcement officers, event staff, and performers, and conveying real-time information to these parties enables them to react quickly and appropriately to potential crowd crush situations and mitigate the risk of injury or death.[263]

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260. Norris R. Johnson, *Panic at "The Who Concert Stampede": An Empirical Assessment*, 34 SOC. PROBS. 362, 369–70 (1987).

261. Ryan O'Connell, *Fifteen Years Later, How the Roskilde Tragedy Changed Pearl Jam Forever*, UPROXX (June 30, 2015), http://uproxx.com/music/pearl-jam-roskilde/ (internal citations omitted).

262. *Id.*

263. FRUIN, *supra* note 27, at 9 ("Reliable real-time communication between those responsible for crowd management, and authoritative communication with the crowd, are also critical elements in defusing a potentially lethal crowd incident. These strategies are also the least costly means of preventing crowd disasters.").

C. Festival Seating Ban

Any comprehensive and effective crowd management statute should also contain a ban on festival seating, much like the one passed (and later repealed) by the City of Cincinnati.[264] As discussed at length, festival seating is the culprit behind a significant number of crowd crushes in the United States and drastically increases the risk of injury and death to crowd members.[265] Moreover, there does not appear to be any way of utilizing true festival seating arrangements safely at large gatherings. Instead, as previously quoted, such crowd configurations "should be '*expected* to result in overcrowding and high audience density that may compromise public safety.'"[266] Given its history and the tremendous risk that it poses, an outright ban on festival seating is warranted.

While performers and other entertainment industry officials may strongly oppose such a ban, arguing that it necessarily limits ticket sales and reduces the "energy" level at shows,[267] there are other crowd configurations available that can achieve much of the same things without creating nearly as much risk. At the annual New Year's Eve celebration in Times Square, for instance, crowd members are segregated into pens, each holding a set number of people.[268] While, like festival seating, these pens are standing-room-only, they are markedly safer than festival seating for several reasons: (1) they prevent the crowd as a whole from reaching a high-risk density; (2) they eliminate the ability of dangerous shockwaves to ripple through the crowd; and (3) they make it significantly easier for event staff and law enforcement officers to monitor and control the activities of crowd members.[269] Use of pens allows event organizers to place nearly the same number of people in a given space, but eliminates the risk of crowd crush. Banning the use of festival seating will necessitate using these safer methods of crowd management and control.

VI. A Model Statute

This final Part now sets forth the following model crowd management and control statute—incorporating all of the elements set out above—that cities, counties, or states could enact as a significant first step toward enhancing crowd safety and minimizing the risk of crowd crush:

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264. Adelman, *supra* note 56, at 19–20.

265. *Id.* at 18.

266. *Id.*

267. *See id.* at 19–20.

268. Assoc. Press, *New York Police: New Year's Eve Party in Times Square Will Be Safest Place in the World*, Fox News (Dec. 29, 2015), http://www.foxnews.com/us/2015/12/29/new-york-police-new-year-eve-celebration-in-times-square-will-be-safest-place.html.

269. *See* John Seabrook, *Crush Point: When Large Crowds Assemble, Is There a Way to Keep Them Safe?*, New Yorker (Feb. 7, 2011), http://www.newyorker.com/magazine/2011/02/07/crush-point.

§ XXX. Crowd Management & Crowd Control

(a) As used in this section:[270]

(1) "Live entertainment performance" means any live musical performance, any live dramatic performance, any live speech, and any live variety show with respect to which the primary intent of the audience can be construed to be viewing the performers. A "live entertainment performance" does not include any form of entertainment with respect to which the holder of a ticket routinely participates in amusements as well as views performers.

(2) "Concert" means a musical performance of which the primary component is a presentation by persons singing or playing musical instruments, that is intended by its organizers mainly, but not necessarily exclusively, for the listening enjoyment of the audience, and that is held in a facility. A "concert" does not include any performance in which music is merely a part of the presentation in which acting, dancing, a motion picture, an athletic event, an exhibition, or a speech is the primary attraction.

(3) "Live athletic event" means any live event involving physical exertion and athletic skill that is governed by a set of rules or customs and often undertaken competitively, or any live event involving the hosting of a sports competition intended to be viewed by spectators, and that is held in a facility. A "live athletic event" does not include any sports competition to which the holder of a ticket is also routinely a competitor in the sports competition.

(4) "Doorbuster sale" means any live, in-store promotional event in which a retailer is using a limited-time-only or limited-stock-only marketing or sales strategy to attract a high volume of customers into a store during an anticipated period of less than twenty-four hours.

(5) "Facility" means any structure that has a roof or partial roof or that has walls that wholly surround the area on all sides, including, but not limited to, a stadium, hall, arena, armory, auditorium, ballroom, exhibition hall, convention center, or music hall.

(b) Except as otherwise provided in this section, event organizers, promoters, or managers (hereinafter referred to as "event organizers") hosting an actual or anticipated live entertainment performance, concert, live athletic event, or doorbuster sale (hereinafter collectively referred to as "event') of five hundred (500) or more persons shall file with the local government a crowd management plan in writing at least fifteen (15) days in advance of such assembly.[271] The crowd management plan shall contain and disclose the following information:

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270. This definition section is closely modeled after the excellent definition section in an Ohio statute regarding safety at live entertainment performances. OHIO REV. CODE ANN. § 2917.40 (LexisNexis 2011).

271. The proper authority to which a crowd management plan should be filed (for instance, county commission, state department of public health & safety, etc.) will necessarily vary depending on the political entity enacting the statute. I have inserted "local government" here as a placeholder.

(1) Identification of the applicant; identification of any other person, persons, or entity responsible for organizing, holding, or managing the event; a description of the event; the location of the event and a description of the property; the identification of the owner of the property on which the event will be held; the estimated maximum number of persons reasonably expected to be in attendance at any time; the dates and times that the event will be held; the maximum number of persons which the applicant shall permit to assemble at the event at any time;

(2) The likely ingress and egress routes crowds will take before and after the event, and the likely circulation routes that the crowd will travel during the event; any obstructions or bottlenecks likely to impede crowd flow along these routes; the steps taken by event organizers to eliminate or mitigate those obstructions;

(3) The areas crowds will occupy during the event, including the main entertainment venue, areas around concessions, restrooms, lobbies, and parking lots, and the likely crowd densities (low, medium, or high) of those areas; the risks on site relating to those locations; the steps taken by event organizers to eliminate or mitigate those risks;

(4) The flow rate at which crowds can be expected to pass through entrances and exits, ticket booths and security areas, and other critical areas of the venue, and whether that flow rate can safely and efficiently accommodate the number of crowd members anticipated to attend;

(5) The profile of the crowd expected to attend the event, including age and demographic information, male to female ratio, and other characteristics that may impact the crowd's movement and behavior during the event, as well as what preparations are being taken by event staff to accommodate these characteristics where appropriate;

(6) The ways in which event organizers will monitor crowds both within and immediately outside the facility on a real-time basis; and

(7) The methods by which event organizers intend to communicate with the crowd, with event staff, with local law enforcement, and with performers on a real-time basis before, during, and after the event.

(c) Except as otherwise provided in this section, festival or general admission seating wherein persons are admitted without assigning them a particular reserved seat is hereby prohibited at any live entertainment, concert, or live athletic event involving an anticipated crowd of five hundred (500) or more persons[272] unless festival or general admission seating is limited to designated and confined pens to each of which no more than one hundred (100) persons may be admitted at a given time.

(d) This section shall not apply to high school affiliated live entertainment or live athletic events, religious events sponsored by bona fide religious organizations, nor to events where the sponsor has applied for and received a specific exemption from one or all of the provisions of this section.[273]

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272. This section is modeled closely upon Cincinnati's prior ban on festival seating. CINCINNATI, OHIO, MUN. CODE § 865-29 (1979).

273. *See id.*

Conclusion

Crowd crush continues to be a surprisingly common occurrence in the United States. Year after year, what crowd scientists estimate to be thousands of people are injured or killed by crowd forces at concerts, festivals, sporting events, doorbuster sales, and other large gatherings. Fortunately, crowd scientists understand extremely well both what causes crowd crushes and what can prevent them from occurring. Studies of crowd dynamics have repeatedly demonstrated that crowd density is the single best predictor of crowd-related injuries and deaths, and that physical space and spectator configurations such as bottlenecks and festival seating significantly increase the likelihood that a given crowd will reach a high-risk density.

Unfortunately, neither common law nor statutory law have required or even incentivized event organizers and venue owners to take any actions to manage crowds effectively. Court that have ruled on the common law claims arising out of crowd crush incidents have repeatedly made a series of scientific and legal errors that make it overly difficult for crowd crush victims or their estates to win these cases. These errors include assessing breach solely in the context of compliance with set capacity numbers, ascribing an unwarranted amount of significance to crowd demographics, and viewing crowd members themselves as intervening, superseding causes of a plaintiff's injuries. Furthermore, the lack of any comprehensive statutory law in the United States pertaining to crowd management or control has left plaintiffs with common law claims as the *only* possible causes of action available for recovery.

Ad hoc approaches to preventing crowd crush have been similarly unavailing. Industry pressure has caused statutory bans on festival seating to be repealed. Venue renovations have offered only enhanced crowd safety on a very limited, localized basis. And event-specific reforms, though commendable, are unlikely to be adopted by the vast majority of venues or other events hosting large gatherings. Indeed, "the extent to which crowd control and crowd management are presently factored into the overall event process is debatable."[274] Event organizers and venue owners are faced with strong temptations "to ignore dangers and underestimate challenges in their efforts to maximize profits and minimize costs."[275]

In light of these failures, states or municipalities should enact statutory crowd control laws. These laws should require event organizers and venue owners to do both of the following: (1) prepare and file crowd management plans prior to a large gathering that assess crowd routes, areas, movements, and profiles; and (2) provide adequate and efficient

274. Abbott & Geddie, *supra* note 59, at 260.
275. *Id.*

crowd control during large gatherings by both monitoring crowds in real-time and communicating with the crowd, event staff, law enforcement, and performers. Such basic steps will go a long way toward drastically reducing the thousands of preventable crowd crush injuries and deaths that occur each year in this country.