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Book Review

DOOMED TO RE-REPEAT HISTORY: THE TRIANGLE FIRE, THE WORLD TRADE CENTER ATTACK, AND THE IMPORTANCE OF STRONG BUILDING CODES

BY GREGORY M. STEIN*

David Von Drehle, *Triangle: The Fire That Changed America* (2003).

Jim Dwyer and Kevin Flynn, *102 Minutes: The Untold Story of the Fight to Survive Inside the Twin Towers* (2005).

Imagine this: You are a member of a commission charged with recommending changes to the building code of a densely-packed urban city, say New York. Your recommendation is that high-rise office buildings are overly safe. Rather than dedicating so much rentable space to fire stairs, rather than requiring costly fireproof masonry construction, the city should relax its codes. The odds of a tragedy in which the heightened protection makes any difference are tiny, building owners will earn more money, and there will be a net economic gain to the community.

You might think that no one in the immediate post-September 11 world would dream of offering such a recommendation.[1] The

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[1] Actually, they would. *See* Eric Lipton, *City Reshaping Building Codes to U.S. Model*, N.Y. TIMES, May 17, 2004, at A1. Lipton notes that "one of the most disputed parts of the International Building Code. [proposed for adoption in New York City] would allow developers of many new buildings to use less fireproofing than is now required—a change that would save developers considerable sums of money." *Id. See also infra* notes 128-31 and accompanying text.

memory of the World Trade Center attack[2] is too fresh in everyone's minds. The vivid images of people jumping from high floors are too intense; the photos of uniformed firefighters stoically trudging up stairwells while evacuating office workers step aside to let them pass too recent. Such a suggestion would be decried as a naked attempt to profit by placing people at unacceptable risk.

Now imagine this: Roughly sixty years have gone by, and there have been no major building disasters since 2001. The building industry argues, with decades of recent history to back it up, that buildings are excessively safe and that the number of tragedies in which the excess safety has mattered has proved to be low, and perhaps zero. Spirited dissent from the few remaining old fogies who have personal recollections of 2001 sounds as antiquated as memories of Pearl Harbor do to most of us alive today. It has not happened in so long, it probably will not happen again.

That, more or less, is what happened in New York in 1968. Fifty-seven years after the Triangle Waist Company fire, in which 146 people trapped in the upper floors of an unsafe building burned, jumped, or fell from a collapsed fire escape to their deaths, New York City relaxed its safety rules for high-rise buildings. Technology had changed. Firefighting skills had improved. High-rise fires could be restricted to a few stories, and in most cases people could move a floor or two away from the danger and wait safely for emergency responders to complete their jobs.

The 1993 terrorist attack on the World Trade Center, coming a quarter-century after these changes became effective, seemed to prove the point: A bomb deliberately placed in the underground parking garage of the complex had caused an enormous blast followed by an intense fire, six deaths and over 1,000 injuries,

[2] This Review refers to the events that occurred in New York on September 11, 2001, as an attack, in the singular, although two different groups of men flew two different airplanes into two different buildings. The question of whether these events constituted one attack or two is of major importance to the buildings' owner and insurers. *See 9/11 Insurance Cases Appealed*, NEWSDAY, Mar. 8, 2006, at A14. This article reports that appeals are still pending in the dispute over $3.5 billion in insurance coverage and that some relevant insurers appear to be bound by a form that treats the destruction of the World Trade Center as one event while nine companies are bound by a different form that treats the attack as two distinct events. *Id.*

$300 million in property damage, and tremendous inconvenience, but the deaths had resulted directly from the explosion itself.[3] An investigation led to some improvements in emergency evacuation plans, but the buildings continued to operate with only minor modifications.[4]

In his outstanding historical account, *Triangle: The Fire That Changed America*,[5] David Von Drehle makes the cogent case that building-safety laws matter. And in their equally outstanding retelling of the 2001 World Trade Center attack from the perspective of those trapped inside the burning buildings, *102 Minutes: The Untold Story of the Fight to Survive Inside the Twin Towers*,[6] Jim Dwyer and Kevin Flynn argue explicitly that we have forgotten this lesson and are doomed to re-learn it the hard way yet again. The Triangle fire may have "changed America," but it may not have changed America enough.

Neither book focuses solely on safety laws. *Triangle* seeks to place the 1911 fire in the context of its era, devoting considerable attention to the immigration patterns of the times that caused very young Eastern European Jewish women and Italian women to spend six days every week toiling for low wages under difficult working conditions. Von Drehle describes early attempts at unionization and the often violent consequences of these mostly failed efforts. And he devotes much attention to the post-fire trial and acquittal of the two owners of the Triangle factory.

Dwyer and Flynn take less of a historical approach and more of a journalistic one, spending much of their time recounting individual stories of heroism, luck, coincidence, and tragedy. Relying primarily on interviews with survivors and with friends

[3] THE 9/11 COMMISSION REPORT: FINAL REPORT OF THE NATIONAL COMMISSION ON TERRORIST ATTACKS UPON THE UNITED STATES 279-80 (W.W. Norton & Co. 2004) [hereinafter 9/11 COMMISSION REPORT]. The *9/11 Commission Report* notes, "The [1993] explosion killed six people, injured about 1,000 more, and exposed vulnerabilities in the World Trade Center's and the city's emergency preparedness." *Id.* at 280. *See also* NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, FINAL REPORT ON THE COLLAPSE OF THE WORLD TRADE CENTER TOWERS 91 (2005), *available at* http://wtc.nist.gov/NISTNCSTAR1CollapseofTowers.pdf [hereinafter NIST FINAL REPORT] (estimating that 1993 World Trade Center bombing caused $300 million in damage).

[4] 9/11 COMMISSION REPORT, *supra* note 3, at 278-81.

[5] DAVID VON DREHLE, TRIANGLE: THE FIRE THAT CHANGED AMERICA (2003) [hereinafter TRIANGLE].

[6] JIM DWYER & KEVIN FLYNN, 102 MINUTES: THE UNTOLD STORY OF THE FIGHT TO SURVIVE INSIDE THE TWIN TOWERS (2005) [hereinafter 102 MINUTES].

and family of those who perished, *102 Minutes* follows 352 building occupants and rescuers from the time the first plane hit until the time the second building collapsed, in an effort to re-create the confusion, tension, and terror experienced by those in the buildings who survived the initial impacts. The authors also devote considerable attention to the petty rivalries among the different groups of emergency services workers—particularly the terrible relationship between New York's fire and police departments—and how the resulting lack of coordination may have cost more than two hundred firefighters their lives.

Despite these differences in approach and style, the similarities between the two books and the parallels between the two events they portray are remarkable. In each case, we are introduced to the normal and ordinarily non-lethal financial incentives and pressures that cause developers to squeeze the maximum amount of rentable space onto each expensive square foot of urban land. We come to understand the competing stresses on city bureaucrats charged with drafting and enforcing safety rules for high-rise buildings. We are treated to careful descriptions of the structures that inevitably result from these economic forces and safety rules. And we then watch in horror as an unlikely but not inconceivable pair of worst-case scenarios unfold, two miles and ninety years apart.[7]

I. TRIANGLE

Triangle is structured like a tragedy in three acts. The first portion of the book, containing four chapters, sets the tone by guiding the contemporary reader through the social history of New York in the early 1900s. We are apt to think of factories of

[7] As terrible as the Triangle fire and the World Trade Center attack were, it actually is somewhat of an overstatement to call either tragedy a "worst-case scenario." The Triangle fire engulfed only the top three floors of a ten-story building; even on those floors, approximately 370 of the 510 in occupancy escaped alive. TRIANGLE, *supra* note 5, at building sketches following 180. In the collapses of the two World Trade Center towers, more than 15,000 of the estimated 17,400 people inside the buildings at the time of the first impact managed to escape alive. Moreover, the buildings were unusually empty because September 11 happened to be both the day of a local primary election and the first day of school, causing many workers to arrive late to the office. At peak occupancy, the two towers would have held a total of about 40,000 occupants, and 14,000 of them might have died because of the buildings' inadequate egress capacity. NIST FINAL REPORT, *supra* note 3, at xxxviii-xxxix.

this era as "sweatshops," but sweatshops were already becoming obsolete by this time. Tenement sweatshops were an early form of outsourcing, with manufacturers farming work out to independent contractors who would then cram a handful of recent immigrant laborers into their homes. Over time, the bosses would "sweat" their workers for more and more output at lower and lower pay—the average work week may have been eighty-four hours.[8] These sweatshops were dispersed and atomized.

But by the early 1900s, the garment industry was consolidating. Improvements in building techniques allowed for the construction of much larger loft spaces than before, while the increasing crowding in lower Manhattan demanded that more and more floors be stacked on top of one another. At the same time, equipment was becoming more mechanized and clothing more standardized. Between 1901 and 1911, 800 loft buildings, most of them unexceptional, were completed in Manhattan, or roughly three every two weeks.[9] The Triangle Waist Company was an early example of this more modern production structure, in which hundreds of workers were crammed into large factory spaces, often on floors higher than the fire-safety equipment of the time could reach.[10]

This consolidation of the workplace also set the stage for the organization of workers into unions. Von Drehle spends a large portion of this first act tracing the early efforts of garment workers to bargain collectively for improved pay and working conditions. More generally, he describes the progressive movement, which supported women's suffrage, consumer protection, and trade unions.[11] A huge and still growing number of Eastern European Jews had arrived in New York, and these immigrants had no intention of returning to the pogroms of Russia.[12] They were firmly committed to their new homeland, became citizens and candidates for office, and were more and

8 TRIANGLE, *supra* note 5, at 38-41.
9 *Id.* at 47.
10 *Id.* at 48.
11 *Id.* at 20.
12 *See id.* at 94-96 (describing impact of pogroms on Jewish immigration patterns).

more active in political causes, generally on the left.[13] Members of New York's more established society, including Alva Smith Vanderbilt Belmont and Anne Morgan (daughter of J. Pierpont Morgan), began championing progressive causes,[14] and New York's Tammany Hall political machine quickly sensed which way the political winds were blowing. Meanwhile, the owners of the Triangle factory were among the most anti-union in Manhattan.[15]

The central section of the book describes the tragedy itself. In the first of two chapters, the author provides a vivid and detailed minute-by-minute description of the very brief fire, illustrating how a small spark, probably from a cigarette, quickly became a three-story inferno that killed 146 people in the span of just a few minutes. The second of these chapters focuses on the effects of a particular miscommunication between workers on two floors that led to a three-minute delay in spreading the alarm to the ninth floor. This one lapse probably led to many preventable deaths.

Throughout this section, Von Drehle highlights how building design and death toll were intimately linked, as each worker, under extraordinary stress, saw her range of available options becoming narrower and narrower until the only choice left for most was whether to jump from the ninth floor to avoid an even worse fate. Von Drehle focuses on individual workers trapped in different portions of the eighth, ninth, and tenth stories, highlighting how location, timing, and luck determined the destinies of different pockets of trapped workers and even different workers within each group: "The sheer speed of it must be kept in mind. All the crucial things that happened inside the factory that awful afternoon—the heroics, the terror, the tragedy, the strokes of fortune both saving and deadly—transpired in a handful of minutes and in the presence of a hideously voracious fire."[16]

Von Drehle emphasizes certain characteristics of the building and its occupants in this section describing the fire. Given each employer's unrelenting need for healthy bodies and the new

[13] *Id.* at 30.
[14] *Id.* at 66-74.
[15] *Id.* at 4.
[16] *Id.* at 126.

immigrants' hunger for work, it was common for employees to recommend their friends and relatives for jobs at their own places of employment. As a result, many manufacturing plants, including the Triangle factory, hired numerous members of the same family. The owners of the Triangle factory had even hired several of their own relatives.[17]

More ominous were the specific properties of the Asch Building—the top three floors of which contained the Triangle factory—that increased the death toll. A partition on the eighth floor, "designed in such a way that only one employee could pass through at a time," was meant "to prevent theft of lace or fabric or waists,"[18] but ended up slowing egress from the factory floor. A door on the ninth floor was kept locked, apparently for the same reason.[19] "[S]tairway doors in the Asch Building were designed to swing inward, because the stairway landings were too narrow to accommodate outward-swinging doors,"[20] but panicked workers piled against the doors, making them impossible to open. Stairways were only thirty-three inches wide; one policeman had to press himself against a wall to allow terrified factory workers to flee.[21] The factory's innovative bins for collecting cloth scraps, designed to keep the factory tidy, effectively consolidated the kindling, transforming what was initially a small blaze into a far more explosive conflagration than it might have been in an older, messier operation.[22]

Worse still were those elements of the building specifically designed for fire safety that actually increased the risk to the occupants. The building had been built with two stairways plus a fire escape.[23] The fire escape, a "sorry apparatus,"[24] was too flimsy to bear the weight of fleeing employees and would eventually tear away from the building and collapse,[25] killing about two dozen workers.[26] Those few who were fortunate

17 *Id.* at 116-17.
18 *Id.* at 119.
19 *Id.* at 159.
20 *Id.* at 123.
21 *Id.* at 125.
22 *Id.* at 138.
23 *Id.* at 117-18.
24 *Id.* at 127.
25 *Id.* at 147-48.
26 *Id.* at 167.

enough to make their way safely down this fire escape discovered that it had released them at a basement skylight at the bottom of an airshaft completely surrounded by the Asch building and two of its neighbors, with no access to the street, as burning debris started to filter its way down toward them.[27] The city had never confirmed that promised corrections to this obvious design flaw were made.[28]

When the fire escape pulled away from the building because of the weight of the people on it,[29] some workers were impaled on a fence at the bottom, while others, already burning, fell through the skylight at the base and set off smaller fires in the basement.[30] Within minutes, this airshaft had become a chimney, drawing the fire up to the ninth and tenth floors of the Triangle factory.[31] Those lucky escapees who did manage to find their way down to the lobby were forced to wait there, because if they walked out onto the sidewalk, they risked being hit by co-workers jumping or falling from upper-story windows.[32] For those plunging to the sidewalk, "the world . . . came to a sudden end."[33]

Even those who managed to make their way to the roof found that they were trapped.[34] The two structures abutting the burning Asch building both were considerably taller than their neighbor, and the fleeing workers had no way up.[35] Fortunately, a New York University law professor who was teaching a class in one of these buildings heard the commotion and directed his students to the roof of their own building, where they were lucky to find two ladders that they used to evacuate the workers to the neighboring structure.[36]

Inferior building design undoubtedly increased the total death toll, but the outcome for individual workers often was a question of fortune. Within eleven minutes of the start of the fire, and

27 *Id.* at 147-48.
28 *Id.* at 147.
29 *Id.* at 148.
30 *Id.*
31 *Id.* at 137.
32 *Id.* at 128.
33 *Id.* at 138.
34 *Id.* at 136.
35 *Id.*
36 *Id.*

only six minutes after it reached the deadly ninth floor, viable escape routes had been reduced to two, and these would last no more than another ninety seconds.[37] "To survive at this point required decisiveness, a sudden burst of action, and good luck, which was a vanishing commodity."[38] Von Drehle proceeds to illustrate this point by tracing the movements of Ida Nelson, Katie Weiner, and Fannie Lansner, three women who found themselves standing together as the fire worsened.[39] Nelson followed a small group moving toward the roof and lived.[40] Weiner leaped into a packed elevator and rode to safety on the heads of the women standing beneath her in the car.[41] "Having made neither choice, Fannie Lansner was doomed."[42] In short, Triangle workers "survived thanks to a short head start, or a seat assignment near an exit, or by following the right mad rush in one direction or another—or by ignoring the wrong rush. They survived by acting a bit more quickly, or boldly, or brutally."[43] They most certainly did not survive because of the building's safety elements or the training provided by their bosses or their bosses' landlord.

The third act of the book, somewhat anti-climactic to read, describes the aftermath of the fire, including the difficult task of identifying the many badly burned bodies (six of which were never identified) and the trial of the owners. But Von Drehle's most noteworthy point, and the observation that may tie the Triangle fire most closely to events in the New York of the following century, is his comparison of the Triangle fire to prior disasters. "Many times before, a disaster was followed by a predictable train of consequences: shock, then outrage, then resolve, all leading to lip service dwindling into forgetfulness."[44]

37 *Id.* at 149.

38 *Id.*

39 *Id.* at 150-52.

40 *Id.* at 151-52.

41 *Id.*

42 *Id.* at 152. The World Trade Center attack demonstrated similar randomness, of course. *See* KENNETH R. FEINBERG, WHAT IS LIFE WORTH? THE UNPRECEDENTED EFFORT TO COMPENSATE THE VICTIMS OF 9/11, at 171 (2006) (reflecting that "[w]hoever is pulling the strings, whatever cosmic force is making the call, it's clear to me that life and death can turn on the most innocuous events . . . . The random nature of who lives and who dies was a common thread throughout the life of the 9/11 fund.").

43 TRIANGLE, *supra* note 5, at 153.

44 *Id.* at 172.

"Relief donations," "mass meetings," and "emotional speeches" do not always translate into useful and productive reform.[45] What, observers of the time wondered, would be the legacy of the Triangle fire?

Seen in light of these prior events, the aftermath of the Triangle fire turned out better than contemporary critics might have feared. Some local newspapers called for strengthened building codes. New York's governor established a powerful Factory Investigating Commission; this group ultimately proposed fifteen new labor and safety laws, eight of which were enacted.[46] The following year, reformers in the legislature managed to push through more than two dozen more, mandating such features as automatic sprinklers in high-rises, fire drills in larger factories, and fire doors that were left unlocked and that swung outward.[47] Business interests objected vociferously, but their arguments would not be heard until long after emotions in the City had cooled. The politically astute response of the Democratic Party to the disaster aided in cementing its status as the party of urban liberals, a role that would help propel Franklin Roosevelt into the White House. The building still stands, now owned by New York University and filled with science laboratories.[48]

II. 102 MINUTES

Unlike *Triangle*'s three-act structure, *102 Minutes* focuses more directly on the drama of the central act. Published less than four years after the World Trade Center attack and aimed at an audience that lived through the event, the book need not re-create lost context for the reader. And with the local, national, and international repercussions still unfolding, it would be premature for the authors to reach any conclusive judgments about the long-term effects of the disaster. Dwyer and Flynn focus almost exclusively on the 102 minutes during which those

45 *Id.* at 173.

46 *Id.* at 212-14.

47 *Id.* at 215.

48 *Id.* at 327; *see also* NYU TODAY, *NYU's Brown Building is Named a New York City Landmark*, Apr. 21, 2003, http://www.nyu.edu/nyutoday/archives/16/08/PageOneStories/BrownBuilding.html.

still alive in the buildings sought to flee, remain, or rescue others. Given the longer duration of these fires, the larger number of people inside the buildings at the time, and the much larger area affected, Dwyer and Flynn can easily expand this central act to book length.

They do so in gripping and terrifying style, with hundreds of accounts of survivors and witnesses from which to choose. Painfully typical is the description of Judy Feeney, who receives a seemingly routine phone call from her son, Garth, and asks him what is new. He replies, "'Mom, I'm not calling to chat . . . . I'm in the World Trade Center and it's been hit by a plane.'" His mother, already watching the television coverage of the attack but not previously aware that her son was attending a meeting at Windows on the World, says, "'Please tell me you are below it,'" but Garth responds, "'No, I'm above it. I'm on the top floor.'"[49] Even if Dwyer and Flynn had achieved nothing beyond personalizing and memorializing some of the victims in this way, their accomplishment would be noteworthy.

The authors' approach generally is chronological, rotating the narrative among different people still inside the buildings and tracing their actions as the 102 minutes tick away. By proceeding in this fashion, they can convey the high level of confusion during this compressed time span. Few of those struggling to survive knew what was going on outside of their immediate physical environment. This fact is not surprising when the authors describe the fates of various civilians but is inexplicable and infuriating when they track the progress of emergency services providers.

Interspersed throughout Dwyer and Flynn's account is a bluntly stated awareness of how institutional decisions made long before September 11 had outcome-determinative effects for many building occupants. In their discussion of rescuers, particularly those from the police and fire departments, they emphasize how entrenched views, habits, and procedures ended up reducing the odds of survival, particularly for firefighters. "[I]nstitutional prerogatives and customs and obstinacy had blanketed [Fire Battalion Chief Joseph Pfeifer] and his

49 102 MINUTES, *supra* note 6, at 37.

colleagues in a thick fog of ignorance."[50] The concept of situational awareness, invaluable in rapidly unfolding emergencies and well known to military planners and some other fire departments, had not yet penetrated the FDNY.[51] Thus Chief Pfeifer

> knew less than the people he was trying to rescue. They were being briefed on the phone by family and friends who were watching TV. He had no TV and the fire chiefs were getting only snatches of information from colleagues who walked outside and craned their heads, trying to fathom what was happening 1,200 feet in the sky.[52]

As the authors note, "The people fighting the two worst building fires in the nation's history had no video monitors. No radio communications with other agencies. No way to get reports from police helicopters and only a limited ability to communicate among themselves."[53] And although the Police Department "had installed [radio] boosters in 350 locations across the city to amplify their signals," the FDNY "had only a handful of boosters in place."[54]

Interdepartmental rivalries and incompatibilities exacerbated these problems. The two groups of rescuers "did not like each other."[55] In the past, "fistfights [had] broke[n] out at rescue scenes. . . . [The] two agencies didn't train together often or well. They couldn't talk to each other by radio because their frequencies did not match. And they didn't share equipment."[56] During the rescue effort, police helicopters took off without firefighters aboard, leaving the fire chiefs with little idea what was going on above them even as the police officers provided regular reports to their superiors.[57] The last joint police-and-fire disaster drill at the World Trade Center had taken place in 1982,

50 *Id.* at 214-15.
51 *Id.* at 53.
52 *Id.*
53 *Id.* at 215.
54 *Id.* at 54. The difference in the number of radio boosters did not merely reflect outmoded customs: Police officers often needed to contact dispatchers in distant locations while firefighters more frequently communicated with colleagues just a few feet away. *Id.* at 54-55.
55 *Id.* at 57.
56 *Id.*
57 *Id.* at 57-58.

in response to an aircraft near-miss unrelated to terrorism.[58] Fire dispatchers had to dial 911 if they wished to reach police dispatchers.[59]

Deficiencies that before September 11 seemed to be little worse than technological glitches or turf wars may have cost as many as 200 firefighters their lives. The authors conclude that there were roughly that many firefighters in the lowest forty floors of the north tower when it fell.[60] If these firefighters had immediately begun to evacuate the north tower when the south tower gave way, they would have had about half an hour "to go down no more than thirty or forty flights of stairs, and many people did, including eighty-nine-year-old Moe Lipson."[61] But poor communications prevented most of these rescuers from knowing that the other building had collapsed.

Surviving firefighters stated that they were unaware of the seriousness of the danger in these final minutes[62] even though police helicopter pilots broadcast at least four radio warnings predicting the building's imminent failure, with one describing a collapse as "'inevitable'" and another stating "'I don't think this has too much longer to go.'"[63] For "twenty-nine minutes and twenty-six seconds . . . [the FDNY was on] notice that total calamity was not only possible but also imminent."[64] The firefighters, meanwhile, continued their rescue efforts in a doomed, nearly empty building from which almost all of the approximately 6,000 civilians below the crash zone had already escaped.[65] Approximately 100 firefighters were seen resting and

58 *Id.* at 59.

59 *Id.* at 202; *see also* 9/11 COMMISSION REPORT, *supra* note 3, at 321-22 (outlining lack of coordination among first responders); Jim Dwyer, *New Release Of 9/11 Tapes: More Loss And Confusion*, N.Y. TIMES, Aug. 17, 2006, at B1 (detailing lack of coordination between police department and fire department regarding use of police helicopters).

60 102 MINUTES, *supra* note 6, at 251.

61 *Id.* at 250. The elderly Mr. Lipson descended by stairs from the 88th floor and had reached the 27th floor when the other tower collapsed. *Id.*

62 *Id.* at 251-52.

63 *Id.* at 223; *see also id.* at 227, 250 (predicting failure of building).

64 *Id.* at xxii.

65 *Id.* at 250-52. The authors are particularly critical of then-Mayor Rudolph Giuliani's subsequent testimony about this failure. The former mayor implied that the firefighters had worked on despite their awareness of the danger and intimated that statements to the contrary amounted to questions about their bravery. Without suggesting that the firefighters were not courageous, Dwyer and Flynn argue that the only way to improve the outcome of future rescue efforts is to learn from the failures of

catching their breath on the nineteenth floor shortly before the second building fell.[66]

Even more frustrating than their discussion of institutional failures among the various groups of rescuers is Dwyer and Flynn's acknowledgment of how construction and safety decisions made as far back as the 1960s had negative consequences that would not become fully apparent until the buildings were tested on September 11. To begin with, New York City's building code had been relaxed in 1968 at the insistence of the real estate industry and over the objections of the Fire Department.[67] Moreover, as a bi-state agency, the Port Authority of New York and New Jersey was not bound by even this weakened code when it built the World Trade Center, although it claimed to have complied voluntarily.[68] This compliance must have been grudging, however, as the Port Authority did not abide by other New York City fire safety laws—also not binding on the Port Authority—until after an industry challenge to these other laws had failed.[69] As a result, the towers nearly were constructed without fire sprinklers.[70]

To be financially viable, the towers needed floors with large expanses of space that were not divided by support columns.[71] This challenge was met with the innovative use of lightweight floors that both supported and were supported by the exterior walls of the building.[72] The use of this new, untested construction method, however, meant that no one had experience in fireproofing a structure of this type, and "[b]oth the architect and

September 11. They draw comparisons to drownings during the D-Day landing and note that a frank acknowledgment of problems with the landing boats saved lives later in World War II. *Id.*

66 *See id.* at 226-27, 243. The *9/11 Commission Report* presents a more nuanced version of these events, suggesting that some firefighters did evacuate the north tower upon the collapse of the south tower, while others who remained did so for reasons that, in retrospect, seem understandable. For instance, some firefighters were attempting to locate colleagues who had strayed from their group, others were making their way out of the building slowly because they were assisting non-ambulatory civilians, and some who were off-duty when they reported did not have their radios with them. Some fire personnel who successfully descended to the lobby reascended to help evacuate other firefighters. 9/11 COMMISSION REPORT, *supra* note 3, at 307-08.

67 102 MINUTES, *supra* note 6, at 25.

68 *Id.*

69 *Id.* at 25-26.

70 *Id.*

71 *Id.* at 67.

72 *Id.*

the structural engineer for the project refused to vouch for the ability of the floors to withstand fire."[73] There is no evidence that anyone ever conducted tests to determine whether these elements of the structure were safe, even though such tests were required by the city codes with which the Port Authority claimed it would comply.[74] Shortly after the buildings opened, an arsonist set numerous small fires that caused several floors to buckle; no tests were conducted after this event either.[75]

There were other indications that the Port Authority and the Fire Department had reservations about the buildings' safety long before the 2001 attack. The Port Authority refused to allow Windows on the World to run a gas line up the North Tower, apparently out of concern for the effects that an uncontrolled gas fire might have on the structure of the building.[76] During the course of litigation between the Port Authority and one of its suppliers over the use of asbestos in the buildings, "[e]xpert witnesses reported that hunks of the fireproofing, whether asbestos based or not, had fallen off the steel, leaving it exposed. In some cases, they said, it appeared never to have been applied at all."[77] Following the resolution of this asbestos litigation, the Port Authority decided to triple the thickness of the fireproofing that had been sprayed on initially, which had been arbitrarily set at one-half inch without testing and now was arbitrarily set at one-and-one-half inches without testing.[78] To minimize

[73] *Id.*

[74] *Id.* at 67-68.

[75] *Id.* at 67.

[76] *Id.* at 68.

[77] *Id.*

[78] *See id.* at 68-69. Inadequate fireproofing seems to have been a principal cause of the buildings' collapse. *See* NIST FINAL REPORT, *supra* note 3, at xxxvii (concluding that "the towers withstood the impacts and would have remained standing were it not for the dislodged insulation (fireproofing) and the subsequent multi-floor fires"). The NIST report also notes that the South Tower collapsed more quickly than the North Tower in part because "there were early and persistent fires on the east side of the building, where the aircraft had extensively dislodged insulation from the structural steel." *Id.* at xxxviii. This section of the report concludes that the towers would not have collapsed had there been only minimal dislodging of the insulation. *Id.* at xxxviii, 149.

See also id. at 132 (noting that in tests, "uninsulated, it took just 13 min for the steel surface temperatures [from a tower column] to reach 600° C, in the range where substantial loss of strength occurs. When insulated with 1 1/8 in. of [spray-on fireproofing], the same column had not reached that temperature in 10 hours"); *id.* at 154 (concluding that dislodging of fireproofing, rather than pre-impact thickness and condition of fireproofing, led to collapse of buildings).

disruption to tenants, however, this change was phased in only as tenants renovated their space.[79] Just thirty-one of the floors in the two towers had been upgraded by September 11.[80] When an employee of one of the Center's tenants, Terence McCormick, began working in the building, his father, then a chief in the FDNY, "had implored him to find a job elsewhere. Chief McCormick believed that the towers were among the most dangerous buildings in the city."[81]

Those caught in the buildings confronted additional design problems. Occupants could descend from upper floors either by elevator or by stairs. Although each building contained ninety-nine elevators, only two—one for passengers and one for freight—ran from the top of the building to the bottom.[82] The buildings lacked the special refuge elevators that had become standard in newer skyscrapers, designed to function even during emergencies to help rescuers ascend and disabled occupants descend.[83] Safety resistors had been installed following the 1993 attack, to comply with updated code requirements that were sensibly designed to prevent the doors from opening if an elevator car stopped more than four inches from a landing. Elevator mechanics at the complex had found this feature, designed to avoid more routine accidents, to be too unforgiving.[84] Expert mechanics were needed to override these resistors, but on September 11, all of the buildings' mechanics quite reasonably evacuated after the second tower was attacked, leaving those

79 102 MINUTES, *supra* note 6, at 68-69.

80 *See* JOHN L. GROSS & THERESE P. MCALLISTER, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, STRUCTURAL FIRE RESPONSE AND PROBABLE COLLAPSE SEQUENCE OF THE WORLD TRADE CENTER TOWERS lxxi (2005), *available at* http://wtc.nist.gov/NISTNCSTAR1-6.pdf (describing upgrading of fire protection on certain floors).

81 102 MINUTES, *supra* note 6, at 119.

82 *Id.* at 75; *see also* 9/11 COMMISSION REPORT, *supra* note 3, at 278-79. Because of the great height of the buildings, most of the elevators covered spans of only thirty or forty floors, a design pattern that reduced the amount of potentially rentable space that had to be dedicated to elevator shafts. 102 MINUTES, *supra* note 6, at 75. Passengers routinely took express elevators to the sky lobbies on the 44th and 78th floors, where they would transfer to local elevators. *Id.*; *see* 9/11 COMMISSION REPORT, *supra* note 3, at 278. On a typical day, there were at least 450,000 "passenger movements" by elevator. *See* ANGUS KRESS GILLESPIE, TWIN TOWERS: THE LIFE OF NEW YORK CITY'S WORLD TRADE CENTER 206 (1999).

83 102 MINUTES, *supra* note 6, at 178.

84 *Id.* at 159.

trapped in the elevators to attempt to pry the doors open from the inside.[85]

The towers, like many lesser high-rises, were built under the assumption that there would never be an occasion in which all occupants would need to vacate at once. The theory was that the evacuation of such a huge complex would be more hazardous than having occupants remain on unimpaired floors, and the chaotic uncontrolled emptying of the buildings after the 1993 bombing supported that belief.[86] As a result, the number, width, and placement of the emergency stairways were insufficient to evacuate full buildings, or even partly full buildings, in their entirety.[87] The Empire State Building, completed in 1931 under the more demanding standards required by an earlier code, has nine stairwells at its broad base and six that run the entire height of the building, one of which serves as an air-locked fire tower that is supposed to be more impervious to smoke.[88] Each of the 1,350-foot tall World Trade Center towers, with slightly greater height, nearly double the rentable square footage, and the capacity for about 33% more occupants, had only three stairwells throughout—the same number as would have been required for a seventy-five-foot building—and no fire tower.[89] All three of these stairwells were bunched together in the least rentable space in the core of the building.[90] Two of the three stairwells in each building went only as far down as the mezzanine, a feature that one fire chief had described as "'a major building design flaw'" in a report commissioned after the 1993 bombing.[91] Those leaving the building via these stairways then had to reach street level by escalator.

85 *Id.* at 160-62.

86 *Id.* at 64-65. Major fire departments and the insurance industry supported the building industry in this belief. *Id.* at 65. The *9/11 Commission Report* notes, "The Port Authority acknowledges that it had no protocol for rescuing people trapped above a fire in the towers." 9/11 COMMISSION REPORT, *supra* note 3, at 281.

87 *See* 102 MINUTES, *supra* note 6, at 65 (noting that, at the time of the attack, two design groups were arguing for even narrower fire stairways, a change that would have added thousands of rentable square feet to buildings as large as the World Trade Center towers).

88 *Id.* at 109.

89 *Id.* at 109-10.

90 *Id.* at 109-10, 112.

91 *Id.* at 117 (quoting a report written by Chief Donald Burns).

III. THE EBB AND FLOW OF BUILDING CODES

Building codes are a broad category of laws and regulations designed to establish minimum health and safety standards for the physical structure of buildings. They cover a wide range of construction matters, ranging from structural loads to construction materials to building system installations to safety devices.[92] Building codes have been traced back at least as far as the Code of Hammurabi.[93] Early American building restrictions included 1625 rules in New Amsterdam pertaining to roof types, locations, and coverings, and 1630 prohibitions on wooden chimneys and thatched roofs in Boston.[94] New York adopted the nation's first building code in 1850.[95] Several trade organizations began promulgating building codes during the first part of the twentieth century, and different codes garnered acceptance in different regions of the United States. The Building Officials Conference of America (BOCA) published its Basic Building Code in 1950, which was widely adopted in the Northeast and Midwest.[96] But large cities, facing unique construction issues and distinctive political pressures, began to develop their own codes, an approach that New York City followed when it adopted its new code in 1968,[97] the year in which construction of the World Trade Center began.

92 CHARLES S. RHYNE, SURVEY OF THE LAW OF BUILDING CODES 4 (1960); *see also id.* at 61 ("Stated simply, a building code is a set of rules to keep people from getting hurt."); Sara C. Galvan, Note, *Rehabilitating Rehab Through State Building Codes*, 115 YALE L.J. 1744, 1746 (2006) (observing that codes "create incentives to build certain types of structures, they establish economic biases toward particular materials and construction methods, and they impact urban layouts"); Lipton, *supra* note 1, at A1 (describing codes as "the city's DNA, shaping its appearance and its workings").

93 *See, e.g.*, ROBERT C. ELLICKSON & VICKI L. BEEN, LAND USE CONTROLS: CASES AND MATERIALS 444 (3d ed. 2005) (citing MARTHA T. ROTH, LAW COLLECTIONS FROM MESOPOTAMIA AND ASIA MINOR 125 (1995)) (quoting provisions from the Code of Hammurabi that provide certain remedies for a homeowner against the builder); MASONRY: THE VOICE OF THE MASON CONTRACTOR, *Building Codes*, July 2003, http://www.masonrymagazine.com/7-03/air1sb.html (tracing building codes back approximately 4,000 years). The Code of Hammurabi had some real teeth to it, providing for the death penalty for certain violations. ELLICKSON & BEEN, *supra*.

94 *See* RICHARD L. SANDERSON, CODES AND CODE ADMINISTRATION: AN INTRODUCTION TO BUILDING REGULATIONS IN THE UNITED STATES 6-7 (1969) (describing and discussing these two early building laws).

95 ELLICKSON & BEEN, *supra* note 93, at 447.

96 SANDERSON, *supra* note 94, at 9.

97 *Id.* at 9-10.

The wisdom of a building code provision, like that of any other health and safety measure, involves balancing the costs of enacting and enforcing it against the benefits to be gained from it.[98] The costs of a building code measure include both the expense of constructing or retrofitting a structure to comply with the law and the income that is lost over time as a result of implementing the law. For example, if a city were to increase the minimum required width for fire stairs in new buildings, the cost of this law to the builder of a new structure would be equal to the sum of the cost of constructing and maintaining wider fire stairs (minus the cost of constructing and maintaining whatever else would have occupied that space) and the discounted present value of all rental income lost because of the floor area that now must be dedicated to fire stairs rather than to rentable office space. The benefit of this change would be equal to the statistical value of all lives saved, injuries avoided, and property damage averted in that structure, multiplied by the likelihood of these tragedies occurring at all, plus the "reassurance factor" enjoyed by building occupants aware that they are working in a safer building.

For many possible building code provisions, it is far easier to calculate the costs than the benefits. A builder can determine the additional price of building wider fire stairs and estimate the price of maintaining them,[99] and can calculate how much extra space will need to be devoted to these wider stairs and forecast the discounted present value of what that space might rent for over the useful life of the building. The benefits—harms avoided—are much harder to estimate. No one knows the likelihood of a natural or human-caused disaster, and planners can only guess how much death, personal injury, or property

[98] The classic statement of this rule was offered by Judge Learned Hand in United States v. Carroll Towing Co., 159 F.2d 169, 173 (2d Cir. 1947) (L. Hand, J.) (stating that "if the probability be called P; the injury, L; and the burden, B; liability depends upon whether B is less than L multiplied by P: i.e., whether B < PL."); *see also* Conway v. O'Brien, 111 F.2d 611, 612 (2d Cir. 1940) (L. Hand, J.) (observing, "The degree of care demanded of a person by an occasion is the resultant of three factors: the likelihood that his conduct will injure others, taken with the seriousness of the injury if it happens, and balanced against the interest which he must sacrifice to avoid the risk.").

[99] *See, e.g.*, Jim Dwyer & Eric Lipton, *3-Year Federal Study of 9/11 Urges Rules for Safer Towers*, N.Y. TIMES, June 22, 2005, at A1 (estimating that development costs would increase by two to five percent if one recommended set of post-9/11 changes were implemented).

damage will result from any such disaster. And these numbers are moving targets that we continuously update to factor in all events that have occurred in the past, particularly in the recent past: The odds of a major terrorist attack on an office building surely seemed higher on September 12, 2001 than they had forty-eight hours earlier. There also are intangible costs and benefits to consider, and these can be extremely difficult to quantify. A building that is markedly safer may give its occupants a greater sense of ease, as just noted, or it may constantly remind them of their vulnerability.[100] It may be more or less comfortable, more or less attractive, more or less rentable.

Costs and benefits do not exist independently and can affect each other synergistically. Terrorists might choose to attack poorly protected buildings because they are easy targets, or they might select heavily fortified structures—particularly iconic or symbolically significant ones such as embassies—in the belief that a successful attack on a fortress demonstrates their strength and will be more demoralizing to victims and to the general public. In addition, the cost-benefit calculus is constantly shifting. It is widely believed that the rash of airline hijackings several decades ago abated at least in part because airplanes were redesigned so that hijackers could no longer parachute safely from an airborne passenger plane. Building costs increase after natural disasters, as labor and materials become relatively scarce and people react—and sometimes overreact—to the hurricane or tsunami that is freshest in their minds.[101] Similarly, as an event fades from memory, the temptation is to argue that some restrictions enacted in response to it should be relaxed, that the benefits of building code changes were overstated in the

100 *See, e.g.*, David W. Dunlap & Glenn Collins, *In Revised Design, Freedom Tower Sheds Its Look of Bulky Armor*, N.Y. TIMES, June 29, 2006, at B1 (describing earlier versions of plan as "'a fortress,'" "monolithic," "a 'concrete bunker,'" and "'more intimidating than inviting'").

101 *See, e.g.*, Christine Jolls & Cass R. Sunstein, *Debiasing Through Law*, 35 J. LEG. STUD. 199, 203-04 (2006) (noting, "According to the availability heuristic . . . , the probability of an event is estimated after an assessment of how easily examples of the event can be called to mind. . . . [A]vailability bias might be said to arise when the availability heuristic leads people to make predictable errors in assessing probabilities. . . .").

emotional aftermath of the tragedy. And different types of structures merit different levels of protection.[102]

Remember also that building professionals usually are the only people who spend much time thinking about building codes. Unless there has been a recent disaster, it is unlikely that citizens will lobby their local government representatives to strengthen building codes for greater worker safety or that a candidate will run on a pro-building-code platform. Those in building-related trades, however, may well lobby those same representatives on a regular basis to weaken codes as a means of reducing construction and operating costs. Their efforts may be sufficient to outweigh counter-arguments from the small number of customary opponents, such as building and fire officials.[103]

The combined effect of these factors suggests that the strength of building codes can be expected to swing like a pendulum, with local governments beefing up codes dramatically in response to the outcry that follows a major tragedy and then weakening them gradually as that disaster recedes in the rearview mirror. Immediately after a crisis, the perceived benefits of a strengthened code, which will have become newly evident to the general public, will exceed the perceived costs, which had always been apparent to those in the building industry.[104] As time passes uneventfully, the public turns its focus elsewhere and the balance of pressure on public officials slowly shifts the other way. This pattern of reform and relaxation based on perceived costs

102 *See* Eric Lipton, *Investigation Of Towers' Fall Is Criticized*, N.Y. TIMES, Oct. 27, 2005, at B1 ("'Why on earth would you expect the Landmark Center on Six Forks Road in Raleigh to have the same standards, preparation against terrorist attack, as [Chicago's] John Hancock Center would have?' asked Representative Brad Miller . . . . 'It has got to be a balance of cost against risk.'").

103 *See, e.g., id.* (quoting a letter from The Building Owners and Managers Association International, representing the real estate industry, to Representative Sherwood Boehlert, chair of the House Science Committee, stating, "'This recommendation is just too costly to implement . . . . How many building collapses have there been, ever?'"); Eric Lipton & Jim Dwyer, *Time for Drastic Changes in Tall Buildings? Experts Disagree*, N.Y. TIMES, June 24, 2005, at B1 (noting that firefighters are rarely involved in the process of updating codes); *see also* SANDERSON, *supra* note 94, at 31 ("The degree of influence of one group may adversely affect the welfare of another and it is necessary to exercise constant knowledgeable vigilance to protect the best interest of the general public.").

104 There can be resistance to strengthening codes even immediately after a disaster. "Historically, major revisions in building codes have often followed catastrophes or spectacular fires . . . . Even so, the debate over code changes often drags on for years, as groups with competing interests attempt to influence the process, debating costs and benefits." Lipton & Dwyer, *supra* note 103, at B1.

and benefits seems to be common no matter what the actual costs and benefits are, to the extent these actual components can even be calculated. That is why Boston banned wooden chimneys and thatched roofs in 1630[105] and why the New York State legislature, spurred by reformers such as Frances Perkins, passed numerous building safety laws in response to the Triangle fire.[106]

The code amendments that were enacted in response to the Triangle fire meant that buildings would be more expensive to build, and they met with predictable objections from the real estate industry at the time. One Factory Investigating Commission member who represented real estate interests referred to the "'infinitesimal proportion of the population'" killed in factory fires. He was shouted down by a union representative who noted, "'They were human souls. It was a hundred percent for them.'"[107] The public reaction following this immense tragedy was sufficiently prolonged and deep that the reformers were able to see many of their recommended policies implemented.

But the same real estate interests that cannot block the passage of code amendments in the wake of a tragedy can attempt to undo them later. As time passes without further incidents, it begins to appear as though the initial response miscalculated the cost-benefit ratio. Building industry representatives may emphasize how excessively strong codes are leading to wasteful overspending on safety, while the earlier supporters of these stronger codes may cease to focus on this issue.

New York's code revision process, which began in 1962, came in response to building industry arguments that the 1938 code was obsolete. Why waste space—which is to say money—on "outsize-seeming safety requirements" or "artifacts of an earlier, more plodding age" that are "an imprudent and uneconomical

105 SANDERSON, *supra* note 94, at 6.

106 TRIANGLE, *supra* note 5, at 212-17; *see also* Julia Vitullo-Martin, *Thinking about Building Codes*, THE MANHATTAN INSTITUTE'S CENTER FOR RETHINKING DEVELOPMENT, Nov. 2004, http://www.manhattan-institute.org/email/crd_newsletter11-04.html (describing New York's building code, in an article arguing for reform, as "a reactive document, with its most important modifications occurring after a catastrophe, such as a deadly fire or building collapse, or following economic hardship, such as the Great Depression."); *supra* notes 44-48 and accompanying text.

107 TRIANGLE, *supra* note 5, at 216.

regulation of business"?[108] New York's 1968 building code was less protective of building tenants than some of the post-Triangle reforms it replaced because the perceptions of costs and benefits had changed since the Triangle fire.

Before the new code was even adopted, the Port Authority—which was not bound to follow city laws—announced that it nonetheless would abide by the revised rules.[109] The Authority implied that this discretionary safety consciousness was innovative and forward-looking, but by volunteering to comply with the newer code rather than with the older one, it also was saving on construction costs.[110] A councilman noted that if the Pan Am building had been built in accordance with the newer code, its owners "would have had 2 percent more rentable space on each floor. That was worth about $1.8 million annually in 1968."[111]

One of the reasons New York was able to build the world's two tallest buildings during the early 1970s was that new construction methods coupled with these relaxed code restrictions made structures of this type economically feasible for the first time ever.[112] "As it happened, the World Trade Center was planned at a moment of radical transformation in the construction of tall buildings, and its owner, the Port Authority, availed itself of those changes in spectacular fashion."[113] By the time New York City revised its building code, more than half a century had passed since the Triangle fire, and certain safety measures were viewed as "the wasteful legacies of a bygone era that lacked modern fireproofing techniques."[114]

108 102 MINUTES, *supra* note 6, at 105, 108.

109 The *NIST Final Report* concludes that the buildings generally complied with the then-applicable New York City Building Code and that any minor deviations had little effect on the outcome for the buildings and their occupants. NIST FINAL REPORT, *supra* note 3, at xl.

110 102 MINUTES, *supra* note 6, at 105.

111 *Id.* at 107.

112 The buildings were also exceptionally lightweight. "In essence, [each] building is an egg-crate construction that is about 95 percent air, explaining why the rubble after the collapse was only a few stories high." Thomas W. Eagar & Christopher Musso, *Why Did the World Trade Center Collapse? Science, Engineering, and Speculation*, JOM, Dec. 2001, at 8, 8, *available at* http://www.tms.org/pubs/journals/JOM/0112/Eagar/Eagar-0112.html.

113 102 MINUTES, *supra* note 6, at 103.

114 *Id.* at 254.

These cost savings, of course, came with a hidden price tag of their own, in the form of reduced safety benefits. The new code relaxed fire protection measures on the theory that the old rules were overly safety-conscious.[115] Under the new code, buildings would need fewer fire stairs and no fire towers, and the original plans for the World Trade Center, which included fire towers, were modified to eliminate them.[116] The fire stairs that remained could be located closer together in the building core, far from the more valuable window space that tenants coveted. Fire ratings for columns and floors would be reduced. New, less costly materials could be used.

It is difficult to know whether these code amendments were a sensible reflection of changed technology or a simple cave-in to the economic interests of the real estate industry by those charged with protecting the public. Dwyer and Flynn make a compelling case that the latter view is correct. The most persistent theme throughout *102 Minutes* is that the 1,500 people who survived the initial attacks yet were unable to escape the buildings "were trapped by circumstances that had been the subject of debates that began before the first shovelful of earth was turned."[117] The authors raise this point in the book's introduction and emphasize it throughout, including in the book's closing pages, where they remark that the fate of these victims "was sealed nearly four decades earlier, when the stairways were clustered in the core of the building, and fire stairs were eliminated as a wasteful use of valuable space."[118] The benefits of

115 *Id.* at 106.

116 *See* H.S. LEW ET AL., NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, FEDERAL BUILDING AND FIRE SAFETY INVESTIGATION OF THE WORLD TRADE CENTER DISASTER: DESIGN, CONSTRUCTION AND MAINTENANCE OF STRUCTURAL AND LIFE SAFETY SYSTEMS 199 (2005), *available at* http://wtc.nist.gov/NISTNCSTAR1-1.pdf (reprinting 1965 letter from Port Authority Planning Division Chief Malcolm P. Levy to building architect Minoru Yamasaki in which author instructs that in light of the Port Authority's decision to comply with a draft of the new building code, "the tower core should be redesigned to eliminate the fire towers and to take advantage of the more lenient provisions regarding exit stairs").

See also id. at 153-54 (listing elements of towers that complied with newer code but not older one, including elimination of fire tower, reduction in number of fire stairs from six to three, reduction in width of doors leading to fire stairs, allowing all stairs to exit through a lobby rather than through an enclosed fire corridor, reduction in fire rating of shaft walls from three hours to two, and others).

117 102 MINUTES, *supra* note 6, at xxiii.

118 *Id.* at 243.

safety provisions seemed more tenuous as the Triangle fire faded from memory, while technological advances suggested that builders could attain a comparable or superior level of safety at lower cost. As a result, "[a]t the start of the twenty-first century, young men and women in the prime of their days [would], once again, leap[] from windows to escape the heat of a tall building."[119]

The 9/11 Commission paints a less negative view of the outcome for the people inside the two towers that were built and upgraded under the post-Triangle building code. The Commission notes that between 16,400 and 18,800 civilians were in the towers when the first plane hit.[120] Aside from first responders, security personnel, volunteers who entered the building after the impacts, and those on board the airplanes, no more than 2,152 people died at the complex.[121] Out of this number, nearly 95% of those whose position at the time of impact can be determined were located above the respective impact zones.[122] Only 110 civilians, just 5.36% of those who died, were located below the crash sites.[123] Moreover, the successful evacuation of so many people was aided by building upgrades and training procedures implemented after the 1993 attacks. "Stairwells remained lit near unaffected floors; some tenants relied on procedures learned in fire drills to help them to safety . . . . Rudimentary improvements, . . . such as the addition of glow strips to the handrails and stairs, were credited by some as the reason for their survival."[124] Most of those below the crash were able to evacuate in less than an hour; the 1993 evacuation took four hours.[125] In short, if you were below the crash site in your building at the time of impact, you probably lived, but if you

119 *Id.* at 254-55; *see also* FEINBERG, *supra* note 42, at 101 (quoting victim's widow as stating, "I want to sue the architects and the builders of the World Trade Center, who constructed buildings that did not even meet New York City Building Codes, buildings that were so flawed in their design and structure that they crumbled to dust as the world watched.").

120 9/11 COMMISSION REPORT, *supra* note 3, at 316.

121 *Id.*

122 *Id.*

123 *Id.*

124 *Id.*

125 *Id.*

were above it, you probably died.[126] Given the force of the impacts and the catastrophic damage each airplane caused to the floors it struck, the 9/11 Commission implies that the buildings performed fairly well.

These two views may not be incompatible. The 9/11 Commission's focus on those below the crash sites suggests that the buildings stood long enough for nearly all of them to escape. Dwyer and Flynn, by contrast, argue that the buildings' design ensured that those above the crash sites never had a chance, and that more reliable communications and better evacuation procedures might have saved many of the rescuers who entered the buildings after the impacts. Perhaps the combined lesson of these two investigations is that we should focus our attention on those elements of the 1968 code that were ineffective and demand reexamination.[127]

New York City is in the process of overhauling its building code more extensively than it has ever been modified in the past. The September 11 attack is only part of the reason for this rewriting; the project also is motivated by a desire on the part of the building industry to persuade New York to adopt a standard code that conforms to the rules in effect in other parts of the country. While "[a]dopting a so-called model code is expected to save New York builders tens of millions of dollars," some of the proposed language is less demanding than that of the code it will replace.[128] There is general agreement that reform is long overdue, but different constituencies disagree as to precisely what changes are merited. Critics of some of the proposals note that fire safety might actually be reduced and argue that a one-

126 *Id.* at 281.

127 *See* Eagar & Musso, *supra* note 112, at 11 ("It would be impractical to design buildings to withstand the fuel load induced by a burning commercial airliner. Instead of saving the building, engineers and officials should focus on saving the lives of those inside by designing better safety and evacuation systems.").

128 Lipton, *supra* note 1, at A1 (noting that adoption of model code will save New York builders millions of dollars because model code is less stringent); *but see The American Institute of Architects New York Chapter Supports Adoption of the International Building Code*, http://www.aiany.org/chapter/statements/ibc_testimony.pdf (last visited Mar. 14, 2007) (discussing the adoption of a model code and stating that "[c]urrent New York City regulations that are more stringent than the national code will be incorporated into the new Code. These include the recently-adopted changes based on specific response to the World Trade Center Disaster . . . .").

size-fits-all code is poorly suited to an unusually dense city.[129] Supporters argue that overprotective codes deter needed development.[130] The city's building commissioner states simply that "'it's up to us to balance safety and economic development.'"[131]

CONCLUSION

Bad things happen, and even if it were possible to prevent bad things from happening, the costs of doing so sometimes will exceed the overall benefit. *The New York Times Magazine* offered a brief article several years ago illustrating the costs and benefits of making commercial airliners more accident-proof.[132] While some of the suggested measures seem both inexpensive and wise, others are ridiculously excessive, and the costs of implementing them undoubtedly would persuade many to travel in their far more dangerous automobiles.[133] One commentator has argued that stricter airport security measures may reduce the frequency of terrorist attacks, but that the attacks that do occur will be far more severe.[134] And some tragedies, whether induced by human action or natural conditions, simply result from the confluence of a series of unlikely events all occurring at once. If the Triangle workers had received an extra three minutes to evacuate, as they might have, many more would have survived. If the hijacked planes had struck the towers at

129 *See* Sewell Chan, *Sept. 11 Has Spurred Only Modest Changes in City and National Building Codes*, N.Y. TIMES, Sept. 9, 2006, at B1 (noting that "9/11 has not been a turning point for code revision, in the way past disasters were—like the Triangle Shirtwaist fire of 1911.").

130 *See* Julia Vitullo-Martin, *Building Code Blues: Will New York be Left Behind?*, THE MANHATTAN INSTITUTE'S CENTER FOR RETHINKING DEVELOPMENT, Jan. 2005, http://www.manhattan-institute.org/email/crd_newsletter01-05.html (arguing that "New York City has routinely victimized itself with its own sense of exceptionalism" and that unions and corrupt officials are the primary beneficiaries of the existing code).

131 Lipton, *supra* note 1, at A1 (quoting Patricia J. Lancaster).

132 Adam Bryant, *The Safest Plane*, N.Y. TIMES MAG., July 20, 1997, at 36.

133 *Id.* at 36-38 (contrasting, for example, installing ground-proximity warning systems, which would cost thirty-five cents per ticket, with installing anti-missile systems on each jet, which would cost $29.41 per ticket, and noting industry rule of thumb that the number of passengers drops by 1% with each 1% increase in ticket prices).

134 Malcolm Gladwell, *Safety in the Skies*, NEW YORKER, Oct. 1, 2001, at 50 ("This is the great paradox of law enforcement. The better we are at preventing and solving the crimes before us, the more audacious criminals become. . . . When you get very good at cracking down on ordinary hijacking . . . what you are left with is extraordinary hijacking.").

different angles or on different floors, more people might have escaped or one or both buildings could still be standing. So we are destined to live with some level of risk, either because it is unavoidable at any price or because it is unavoidable at any affordable price.

If we make certain safety precautions optional, then buildings will be in a position to compete with each other on safety, just as they compete on other building features. This would likely place some workers in less safe condition than others, because their employers choose not to pay extra to protect them. If we mandate these same precautions, however, then every buyer or tenant will be forced to pay for these protections. These owners or occupants then would pass the cost of these protections forward through the economic system into the prices of their goods and services, and the cost would be further diffused throughout society. Everything would become a bit more expensive, as we pay for partially danger-proofing ourselves. This safer city, however, would have to compete with other localities in the United States and elsewhere that may mandate a lower standard. And we constantly restrike this balance: "Though the risk of death in the American workplace has been cut to one-thirtieth of what it was in 1911, there are still some shops and factories that would be instantly recognizable to . . . the Triangle dead."[135] Perhaps the best we can hope for is that we remain aware of the tradeoffs involved and make our decisions after a thorough discussion of what we gain and what we lose.[136]

Most people would prefer not to live and work in bunkers, and developers do not want to raise prices and build nothing else. At the same time, while most of us will never be the victim of a terrorist attack, a fire, or a hurricane, no one wishes to feel overly vulnerable. We must balance these factors and many others and decide how much safety we are willing to pay for. As we continue to make these assessments, it is critically important

135 TRIANGLE, *supra* note 5, at 267.

136 *Cf.* Kevin Baker, *On 9/11, Before the Horrible Became the Unimaginable*, N.Y. TIMES, Jan. 21, 2005, at E41 (reviewing *102 Minutes* and concluding, "Yet if this brilliant and troubling book gives us any indication, we will probably be just as unprepared the next time.").

that we not let our judgment be clouded by fading memories or one-sided lobbying any more than we do by overreaction. We do not wish to look back fifty years from now and wonder why we did not make adequate changes after the World Trade Center attack, or why we slowly undid the changes we made. It may not be sensible to build the perfect building, but we certainly have learned that some protections are worth the price. It is up to us to decide how much we are willing to pay to live in a sensibly safer world.