



**ANALYSIS OF PROPOSED AMENDMENT TO
STATE FIRE PREVENTION CODE TO MANDATE
THE INSTALLATION OF FIRE SUPPRESSION
SYSTEMS IN HIGH-RISE RESIDENTIAL BUILDINGS**

Prepared on behalf of
New Jersey Apartment Association



DECEMBER 17, 2007

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

ANALYSIS OF PROPOSED AMENDMENT

- I. Background Regarding Rule Proposal 3**
- II. Analysis of Existing Fire Safety Code 5**
- III. State-wide Statistics Regarding Fire-Related Deaths and Injuries 7**
- IV. Implementation Costs 10**
- V. Automatic Fire Suppression Systems Are Not Fully Reliable 13**
- VI. Comparison of Other Governmental Action in this Area 14**
 - A. City of Philadelphia 14**
 - B. New York City 15**
 - C. City of Chicago 16**
- VII. Conclusion 17**

APPENDIX

- Resume of Stephen F Finkelman, P.E. 19**
- References 20**

EXECUTIVE SUMMARY

The New Jersey Apartment Association (“NJAA”) retained CMX to assess the impact the amendments proposed by the Department of Community Affairs (“DCA”) to revise the State Uniform Fire Code (39 N.J.R. 3908(a)) would have on existing high-rise residential apartment buildings. Specifically, DCA has proposed to amend N.J.A.C. 5:70-4.17 to require existing high-rise buildings of Group B (business or office) and Group R-2 (residential) to be equipped with approved automatic fire suppression systems (better known as fire sprinkler systems) in accordance with the Uniform Construction Code. DCA states in general terms that this amendment is intended address the risk these buildings present during a fire to its occupants and firefighters. However, the rule proposal indicates DCA only conducted a cursory analysis of the social and economic impacts associated with the implementation of this rule, and thus the support provided by DCA in connection with this rule proposal is not instructive.

In light of the fact that there does not appear to be much in the form of empirical data provided by DCA to support this rule proposal, NJAA requested CMX to provide a report that describes how this rule proposal will be implemented, including an analysis of the costs associated with installing fire suppression systems in existing high-rise apartment buildings in the State. From an economic standpoint, it is clear that the impact of this rule proposal will be substantial, and the ultimate cost will be borne by those who live in these high-rise residential buildings. Specifically, it is anticipated this rule proposal may result in an increase of \$200 to \$400 per month in rent (or \$2400 to \$4800 per year), thereby increasing the amount of income the average renter must dedicate to rent to burdensome and unaffordable levels approaching 50% of an average renter’s total income (median annual income of renters in New Jersey is \$37,662). Since there is no provision providing for public funding to defray the costs associated with implementing this rule, from an economic standpoint, it is difficult to associate any positive impact with this rule proposal.

NJAA also asked us to determine, from a public safety standpoint, what added benefits would be realized upon implementation. After a review of existing public safety standards, it is clear that existing fire safety standards more than adequately address the risk associated with fires in high-rise apartment buildings. Indeed, there is no mention by DCA in its rule proposal suggesting otherwise. And, there is no indication that DCA considered that high-rise apartment buildings are constructed in a way to contain fires so to avoid the risk of serious injury and death from such fires. It is also clear

that fire sprinklers are not always reliable, especially in a residential setting, and are generally installed to minimize property damage caused by a fire rather than safeguarding lives. Therefore, it is unlikely that fire sprinkler systems will make high-rise residential buildings in New Jersey safer than they already are if they are in compliance with existing fire safety standards.

Since the added benefit of having high-rise apartment complexes retrofitted with fire sprinklers to address the risk associated with fires in those buildings does not outweigh the social and economic impact to the community at large and the tenants of such buildings, the rule proposal should be withdrawn. Instead, it would be more beneficial from a public safety and economic standpoint if DCA focused its efforts on ensuring full compliance with its existing fire safety codes. Thus, it is the opinion of this author, to a reasonable degree of engineering certainty, that the adoption of the proposed amendment N.J.A.C. 5:70-4.17 should be removed from the proposed amendments to the Uniform Fire Code N.J.A.C. 5:70.

ANALYSIS OF PROPOSED AMENDMENT

I. Background of Rule Proposal

On September 17, 2007, DCA issued a rule proposal (39 N.J.R. 3908(a)) with the stated intent to update Subchapter 3 of the Uniform Fire Code (N.J.A.C. 5:70-3), the State Fire Prevention Code. Specifically, DCA proposes replacing the 1996 BOCA Fire Prevention Code with the 2006 International Fire Code (“IFC”), retain provisions of the current Fire Prevention Code and eliminate any conflicts with the Uniform Construction Code, N.J.A.C. 5:23. DCA dedicated over a 100 pages to implement this task. However, in approximately 3 pages, DCA proposes its most substantial change to a single provision of the Uniform Fire Code, but to Subchapter 4, hereinafter referred to as the “Fire Safety Code” (N.J.A.C. 5:70-4). In particular, DCA proposes to amend N.J.A.C. 5:70-4.17(b) to add the following underscored language:

All high rise buildings of Use Groups M and R-1 shall be equipped throughout with an approved automatic fire suppression system installed in accordance with the New Jersey Uniform Construction Code. By the fourth anniversary of the effective date of the rule, all high rise buildings of Use Group B and R-2 shall be equipped throughout with an approved automatic fire suppression system installed in accordance with the New Jersey Uniform Construction Code.

DCA described its rationale for the amendment to N.J.A.C. 5:70-4.17(b) as follows:

It has long been known that high rise buildings represent a special hazard in that escape, rescue and firefighter operations are hampered by the height of the building. Recent fire losses in other states highlight the risks presented by high-rise fires.

In the “Social Impact” statement accompanying the rule proposal, DCA states as follows:

The Department anticipates that the proposed amendments would have a positive solid impact by enhancing fire safety. Adoption and enforcement of the most current fire prevention requirements will ensure that existing buildings are maintained in safe condition. This benefits all of the State’s citizens. The proposed rule requiring suppression systems in highrise buildings will protect the occupants of highrise office and apartment buildings, and the firefighters who response to fires in those buildings.

While DCA acknowledges the cost associated with this rule change “may be significant,” it fails to indicate whether it conducted any particular economic analysis in reaching that conclusion. In its “Economic Impact” statement, DCA notes as follows:

The Department anticipates that the proposed amendments would have an economic impact on some existing buildings in the State. The cost will depend on the use of the building, whether it currently is in compliance with the applicable provisions of the State Fire

Prevention Code and what new requirements are proposed for that use. The State Fire Prevention Code establishes requirements for the safe maintenance of existing buildings. These are not retrofit requirements. However, repairs to existing fire safety systems may be necessary to comply. And where a system cannot be repaired, replacement may be necessary. The requirement for safe maintenance of existing buildings is not new with these proposed amendments. The proposed amendments update the existing requirements of the State Fire Prevention Code. The Summary above itemizes the proposed changes.

The cost to retrofit existing highrise office and residential buildings *may be significant*. The fact that all highrise buildings already are required to have wet standpipes in place serves to mitigate that cost in that these standpipes will serve as sprinkler system risers. There will be an additional cost for fire pumps, where necessary, and for enhancements to the building's existing alarm system. The cost may vary greatly based on the configuration of the building, the availability of adequate water pressure, the presence of a partial sprinkler system in the building and other factors. However, it is the Department's position that, because this is a life safety issues, the cost is well justified.

DCA also acknowledges in the rule proposal that federal law does not require the proposed revisions to the State Fire Safety Code.

There are a number of genuine and valid factors that were not considered by DCA prior to proposing the rule change to N.J.A.C. 5:70-4.17(b). For instance, there is no indication that DCA conducted an economic analysis of this rule proposal on high-rise residential buildings constructed prior to 1987 (the Code was amended in 1987 to require the installation of fire suppression systems in high-rise apartment buildings constructed thereafter see 19 N.J.R.1024(a) & 10 N.J.R.1720 (b)) beyond the blanket statement that the costs "may be significant." Further, there does not appear to be any indication that an analysis of the impact this rule proposal would have on owners of office buildings as compared to residential buildings. Nor is there any indication that DCA considered all of the possible social impacts resulting from this rule proposal. Finally, DCA's rule proposal does not indicate that it considered existing safety standards in its analysis before determining fire suppression systems would be necessary to address the safety risks associated with fires in high-rise residential buildings. The following report considers all of those factors, as well as some additional factors, in order to highlight for the Department the actual impact the proposed amendment to N.J.A.C. 5:70-4.17(b) would have on high-rise apartment complexes.

II. Analysis of Existing Fire Safety Code

In order to determine whether the installation of fire suppression systems is necessary to address the public safety risk associated with fires in high-rise residential buildings, an analysis of existing fire safety codes is required. Indeed, existing structures must be in compliance with state and local fire safety regulations (26 N.J.R. 4258(a) and 27 N.J.R. 878(b)). The following fire safety codes contained in the Fire Safety Code are intended to address the public safety risks associated with fires in high-rise residential buildings:

- Existing Fire Sprinkler Requirements: The Code requires that certain areas of Group R-2 structures are equipped with fire sprinkler systems; for instance, accessory spaces of Use Group A-3 which exceed 12,000 square feet and any windowless basement or windowless story below the seventh story (please note, however, that windowless basements not exceeding 3,000 square feet are exempt if they are equipped with a supervised automatic fire alarm system). (N.J.A.C. 5:70-4.7 (f) & (h)).
- Wet Standpipe Requirements: The Code requires the installation of wet standpipe systems in those structures where the building is used for human occupancy more than six stories above grade. (N.J.A.C. 5:70-4.8).
- Automatic Fire Alarm Systems: The Code requires the installation of automatic fire alarm systems in all interior common spaces, and imposes certain requirements on the type of fire alarm system in apartment buildings of six stories or more. Further, the Code includes additional requirements regarding the location of fire alarm system (so that they are heard above all other sounds). Residential units must install single-station smoke detectors. (N.J.A.C. 5:70-4-9).
- Manual Fire Alarm Systems: The Code imposes an additional requirements on buildings three or more stories in height with an occupancy of 25 or more. In those buildings, manual fire alarm systems are required. (N.J.A.C. 5:70-4.10).
- Means of Egress Requirements: The Code thoroughly addresses means of egress and imposes certain safety conditions based upon the occupancy rates of the structure; the existence of fire suppression systems and exits in the basements of structures; the character of the structure, such as the height and type; and, the distance of travel to exits. The Code also imposes standards regarding the illumination of all means of egress in such buildings, which includes an additional requirement that sufficient backup power is in place to ensure all means of egress are properly illuminated in an emergency. The Code further requires that all means of egress doorways which open onto a passageway at grade or exit stair doors are equipped with self closing or automatic closing devices. The Code further regulates dwelling unit corridor doors (shall be at least 1 3/8 inch solid core wood with approved closers). (N.J.A.C. 5:70-4-11).
- Sealing of Transoms and other openings: All transoms in R-2 apartment buildings shall be either glazed with ¼ inch wire glass set in metal frames and permanently secured in the closed position or sealed with materials consistent with the corridor construction. Any other sash, grill or opening in a corridor, and any window in a corridor not opening to the outside air, shall be sealed with materials consistent with the corridor construction. (N.J.A.C. 5:70-4.11 (o))
- Standards for Interior Finishes: Must comply with Code's flame spread ratings in order to best prevent spreading of fire. (N.J.A.C. 5:70-4.12)

- Stairway Standards: All interior stairways and other vertical openings shall be enclosed with approved assemblies having various fire resistive ratings and approved opening protection. Stairways connecting six or more stories shall have a fire resistive rating of not less than two hours. (N.J.A.C. 5:70-4.13).
- Fire Safety Information: Information signs shall be provided at each floor landing in all interior stairways more than three stories in height designating that floor level above the floor of discharge. Additional signs shall be provided at all elevator lobby call stations on all floors which indicate to use stairways in case of fire and not to use elevators. (N.J.A.C. 5:70-4.14).
- Smoke Barrier Requirements: In buildings without automatic fire suppression systems, all elevator landings on every floor above the main lobby floor are required to install smoke barrier systems. (N.J.A.C. 5:70-4.15).
- Air & Exhaust System Standards: Each re-circulating air or exhaust system which serves more than one floor shall be equipped with approved smoke and heat detection devices in accordance with the UCC. The devices shall stop the fan(s) automatically and shall be the manual reset type. Automatic shut down is not required when the system is part of an approved smoke removal or control system. (N.J.A.C. 5:70-4.17 (d)).
- Elevator Requirements: All elevators shall be equipped with emergency control devices and automatic recall systems. (N.J.A.C. 5:70-4.17 (e)).
- Inspection Authority: Fire and building code officials are required to inspect buildings located within their jurisdiction to ensure compliance with the code. (N.J.A.C. 5:70-4.4).

In addition to all of the aforementioned safety code requirements, high-rise residential buildings are constructed in such a way to avoid the spread of fires (constructed mostly of concrete, steel and other masonry material) so to contain fires within the perimeter of the dwelling unit and between floors. Thus, the risk associated with fires in these buildings is more than adequately addressed by existing safety code requirements and related construction code requirements. Generally, fires are contained in their area of origin in high-rise buildings. Existing code standards also ensure early warning/detection of fires in high-rise buildings, thereby allowing occupants to evacuate safely during a fire.

Since DCA has provided no evidence that the added requirement of a fire suppression system in all existing high-rise residential buildings will enhance existing safety standards in place intended to protect occupants of high-rise apartment complexes during a fire, or even firefighters who are involved in fighting those fires, there is no need from a fire-safety standpoint to adopt the proposed rule and require the installation of fire suppression systems in residential high-rise structures.

III. State-wide Statistics Regarding Fire-Related Deaths and Injuries

While the DCA proposal indicates a need to address the risk of injury to occupants of high-rise buildings and firefighters who must fight those fires, it lacks any analysis of available statistics regarding deaths and injuries in the State resulting from fires. A review of available studies of fire incidents reveal that there is no public safety threat that justifies the immediate adoption of the rule proposal to amend N.J.A.C. 5:70-4.17 to require the installation of fire suppression systems in existing high rise buildings.

For instance, between 2004 and 2006, the National Fire Incident Reporting System (“NFIRS”) prepared a study summarizing the State’s experience with fire during those years. As a result, it became apparent that during that three-year span:

- o Only four people died as a result of a fire in a high-rise residential buildings (one of those deaths occurred in a building that contained a fire-sprinkler system); and
- o 106 people died from injuries that occurred in single-family homes, accounting for approximately 73% of the total for all deaths occurring in residential dwellings in the State.

The NFIRS statistics make clear that people living in single-family homes are more at risk for death or serious injury resulting from a fire than those living in high-rise residential apartment buildings. Yet, nowhere in DCA’s rule proposal does the Department propose how it intends to address that risk, nor does it explain why it is requiring the installation of sprinkler systems in high-rise apartment complexes as opposed to single-family residential homes. In light of these statistics, a more thorough analysis is required.

The NFIRS studies reveal the following regarding fire-related injuries in residential structures in New Jersey in 2004, 2005 and 2006:

**Total Serious Injuries (including deaths)
Resulting From New Jersey Residential Fires**

	2004	2005	2006
Single-Family	257	301	298
Low-Rise [1-2 stories]	35	27	38
Mid-Rise [3-6 stories]	21	52	44
High-Rise [7+ stories]	17	12	12
Multi-Family [type unreported]	78	82	20
Total [all residential]	413	474	412

Residential Fire Deaths in New Jersey

	2004	2005	2006
Single-Family	32	34	40
Low-Rise [1-2 stories]	3	4	2
Mid-Rise [3-6 stories]	1	4	5
High-Rise [7+ stories]	1	2	1
Multi-Family [type unreported]	10	6	0
Total [all residential]	47	50	48

Source: NFIRS data provided by New Jersey Division of Fire Safety. Data provided 9/27/2007.

Based on the data prepared by NFIRS, the following is undisputed that there were only 41 reported serious injuries that occurred in connection with a fire in a high-rise residential building, four of which resulted in a death. In particular, the following facts are not in dispute:

- Only 3% of serious injuries that occurred in New Jersey between 2004 and 2005 in a residential setting occurred in connection with a fire in high-rise residential buildings.
- 12 of the 41 serious injuries occurred in high-rise buildings with fire sprinklers
- 28 of the 41 injuries occurred in high-rise buildings without fire sprinklers.
- The four deaths in high-rise residential buildings in New Jersey over a three year span of time constituted only 2.7% of the total of fire-related deaths in New Jersey - out of those four unfortunate deaths, one of them as a result of a fire in a high-rise building that was equipped with a fire sprinkler system.
- 106 people in single-family homes died between 2004 and 2006, accounting for 73% of the total deaths caused by fire in New Jersey.

The conclusion from all available data is clear: occupants in single-family homes are at a greater risk of injury than those in high-rise buildings in the case of a fire. However, the rule proposal does not propose any measures to address this known risk. Indeed, the following chart emphasizes the risk of serious injury resulting from a fire is greater in nearly every other residential setting than in a high-rise building.

Casualties	w/ Sprinklers	w/o Sprinklers	Undetermined	Total
Single Family	1	728	127	856
Multi Family Low-Rise	1	98	1	100
Multi Family Mid-Rise	7	103	7	117
Multi Family High-Rise	12	28	1	41
Multi Family Undetermined	13	88	79	79
Total All Residential	34	1045	215	1294

Source: NFIRS data provided by New Jersey Division of Fire Safety. Data provided 9/27/2007.

As to the risk posed to firefighters, the Division of Fire Safety investigated 10 fire incidents that occurred in the State between 2002 and 2007, which resulted in a death or serious injury to a firefighter. The conclusions included report prepared as a result of that investigation (as required by N.J.S.A. 52:27D-25d) note the following:

- Nine of the ten fires reported occurred in single-family home. The other incident occurred in a 3-story apartment structure.
- A total of 20 firefighters were seriously injured, 7 of which died as a result of their injuries.
- **None of those deaths or injuries occurred in connection with fighting a fire in a high-rise apartment building.**

The statistics clearly demonstrate that occupants of single-family homes are more at risk for injury in the case of fire than those in high-rise residential structures. It appears that existing fire code standards, which are more rigid in the case of high-rise structures than all other residential structures, addresses the risk associated with fires in high-rise residential structures. Therefore, there does not appear to be any compelling reason for DCA to adopt the proposed rule, which will be applicable to existing high-rise buildings only, especially where the statistics prove that the risk of death or serious injury in the case of fire is more serious in the case of single-family residential structures.

IV. Implementation Costs

While DCA notes in its rule proposal that the cost associated with installing automatic fire suppression systems within existing high-rise buildings will be “significant” and “would have an economic impact on some existing buildings in the State,” there is no indication that DCA conducted a thorough analysis of the costs. Instead, DCA indicates that “because this is a life safety issue, the cost is well justified.” Furthermore, it is apparent through information given to the NJAA, and later made public to DCA’s Codes Advisory Council, that the Department relied upon a cursory, and incomplete cost estimate produced by the very groups who stand to gain directly from the passage of this requirement - a consortium of the sprinkler manufactures and sprinkler fitters (Local Union 696). In the absence of specific information regarding the implementation costs, NJAA retained CMX to provide an opinion as to what would be required to implement this proposal.

The retrofitting existing high-rise apartment buildings that do not contain automatic fire suppression systems would be a complex construction project. Walls will need to be demolished and rebuilt; specific equipment and material will need to be purchased; various contractors will need to be retained for each job; replacement and/or upgrades of existing fire safety apparatus will be required, including fire alarm control panels; coordination with local municipalities is required to ensure proper water supply and installation of necessary water pumps. The following costs would be included in every single construction job to ensure compliance with DCA’s recent rule proposal:

- General contractor and subcontractor costs;
- Material costs;
- Permitting and related fees;
- Temporary protection;
- Selective demolition of existing walls and structure;
- Cutting and patching of existing walls and structure;
- Construction and installation of soffits when needed;
- Plaster, drywall and masonry repair;
- Fire stopping;
- Final cleaning;
- Labor costs;
- Moving or relocation of tenants;
- Miscellaneous painting to damaged walls, floors and ceilings;
- Lead paint and asbestos removal;
- Professional fees;
- Unknown conditions.

The New Jersey Fire Sprinkler Advisory Board, an entity that would surely benefit from the adoption of the proposed rule, has prepared a preliminary cost estimate for the implementation of DCA’s rule proposal, dated June 26, 2007. The report identifies 624 high-rise buildings in the State

that lack complete sprinkler protection, of which 48.1% are residential high-rise buildings (a total of 300 buildings at 51,701,410 square feet). The report indicates that the cost to retrofit all existing high rise buildings in the State of New Jersey would range between **\$447,261,094 and \$546,652,448** (the cost to retrofit residential buildings in the State, the cost is estimated by the Board to be **\$327,475,542** or \$6.33 per square foot). While these numbers appear shocking on their face, there are incomplete and their use to determine the actual implementation costs is limited. Indeed, the estimate prepared by the New Jersey Fire Sprinkler Board did not consider costs associated with asbestos removal, lead paint removal, concealing piping in walls, installation of soffits or any other related above-the-ceiling work. It also did not include painting costs nor take into account whether local municipalities will provide adequate water supply to allow the systems to work properly. Therefore, the \$6.33/sq. ft. figure is incomplete, but still staggering enough to show how further review of the rule proposal is necessary prior to considering its adoption.

When the other factors mentioned in the above-referenced list are included in the cost estimate analysis, the cost to retrofit an existing residential building escalates to somewhere between \$25 and \$35 per square foot, for a total cost statewide of **\$1.32 billion to \$1.85 billion.**¹ This number is consistent with the actual cost of an automatic fire suppression system projects that have occurred in the region (approximately \$2.5 million per building). It is reasonable to presume that the construction costs will continue to escalate in the future. It is my conclusion that the cost per unit to install an automatic fire suppression system in high-rise buildings constructed prior to 1987 will be approximately \$25,000 per unit, which, if amortized between five and ten years, will result in a rent increase of between \$200 to \$400 per month.

DCA's proposal makes no mention of these specific cost estimates in its proposal. Nor does it identify the areas of the State that will be hardest hit by this rule proposal. In fact, most high-rise apartment complexes are located within the cities of this State, a majority of which are located within Bergen, Essex and Hudson Counties (see NJAA Housing Impact Statement, attached hereto). Research shows that the median annual income among those who rent in New Jersey is \$37,662, and that more than 30% of their total income is dedicated toward rental payments. However, upon

¹ In addition to the costs noted above there are ongoing costs not included, such as maintenance costs, clean up costs after an accidental sprinkler head discharge and annual testing and certifications costs.

implementation of the proposed rule, the amount income the average renter in New Jersey will dedicate to rent will increase to burdensome and unaffordable levels approaching 50% of an average renter's total income.

Also absent from DCA's rule proposal is any consideration as to how this will impact buildings subject to rent control. Nor is there a discussion of the potential impact on subsidized affordable high-rise residential buildings in this State, despite the fact that the production, maintenance, and oversight of subsidized (or assisted) housing is a key mission of the DCA. There should have been a thorough analysis of the costs that would be imposed on low-income residents and those who finance low-income housing, such as the State Home Mortgage Finance Authority and the federal Department of Housing and Urban Development, to determine whether subsidization of this retrofit provision is necessary. It cannot be avoided that implementation of this rule decrease the amount of affordable units available to citizens in this State in need of affordable housing, which will directly impact the Governor's goal of creating 100,000 new units of affordable housing within the next decade. Indeed, if funding agencies are unable to increase their subsidies to cover the increases in cost, the contract and deed restrictions for many of these agencies are nullified, thereby causing a loss in affordable housing.

Furthermore, this rule proposal does not take into account the impact (and any related costs) the installation of automatic sprinkler systems would have on the older public water systems and related utility infrastructure. Such costs are incalculable at this point.

It is clear that the substantial economic impact associated with implementing this proposal, as well as the related social costs, far outweigh the fire safety risks with these buildings. Thus, DCA should withdraw its proposal to amend N.J.A.C. 5:70-4.17 to require the installation of automatic fire suppression systems.

V. **Automatic Fire Suppression Systems Are Not Fully Reliable**

The National Fire Protection Association (NFPA) and its members have produced various reports analyzing the operational reliability of automatic fire sprinklers over the years. After considering the probability that the system and/or the system's components will operate as intended when needed, NFPA has concluded that automatic fire suppression systems are reliable only 87% to 89% of the time.² The reports also note that automatic sprinkler systems are designed to control fires, not necessarily to extinguish fires. Indeed, only 20% of fires in apartment buildings were actually extinguished by an automatic sprinkler system between 1988 and 1998. The studies also reveal that automatic sprinkler systems are considered by building insurance underwriters as a means to limit property damage claims rather than address occupant safety.

Additionally, residential settings are not perfectly amenable to sprinklers. The placement of furniture (e.g. coat racks, clothing, curtains) may obstruct the spray of the sprinkler head limiting its effectiveness. Since the operational reliability of fire sprinkler systems in a residential setting is not absolute, and are instead primarily intended to assist in a reduction of property loss caused by a fire in a high-rise apartment building, there is no evidence to suggest that the installation of automatic sprinkler systems in existing high-rise apartment complexes is absolutely necessary to address any compelling risk or threat associated with fires in high-rise residential structures. Other means of protection, such as early warning and compliance with existing safety codes, provide more protection for the occupants of a high-rise apartment complex.

² Based on its ten-year study of 50,000 fires in apartment buildings between 1989 to 1999, NFPA concluded that the system worked 87.6% of the time. It considered 8770 fires in 1999, and found the systems to work 89.2% of the time.

VI. Comparison of Other Governmental Action in this Area

The rule proposal indicates that there have been “recent fire losses in other states” that justifies the adoption of a rule to require all existing high-rise buildings in the State of New Jersey to be retrofitted with fire suppression systems. However, DCA does not mention what States it was referring to. And, DCA does not also indicate whether it considered how other governmental entities have addressed this issue.

The Cities of Philadelphia, New York and Chicago have each decided against mandating the installation of sprinkler systems in existing high-rise apartment complexes located within their jurisdiction. Instead, the governing bodies of Philadelphia, New York and Chicago favor compliance with fire safety code requirements that address the risk associated with fires in high-rises rather than impose substantial economic and social costs on their communities. Each of those cities provide an accurate means of comparison in light of their close proximity to New Jersey (Philadelphia and New York) and because many of the buildings located in those cities are similar to the high-rise apartment complexes located in the cities of New Jersey.

A. City of Philadelphia

The City of Philadelphia has over the past few years reviewed and modified their Fire Code (Subcode “F” - Title 4 of The Philadelphia Code) to include requirements for existing high-rise residential buildings.³ When deciding whether the installation of fire sprinklers in high-rise buildings was necessary, Philadelphia exempted existing high-rise Group R-2 occupancies that have been occupied without change in use since December 1991 so long as the following fire safety requirements are met (similar to those required in New Jersey):

- Fire sprinklers are required in basements of high-rise apartment buildings if the basement openings and storage areas for trash and combustibles require additional protection (F-930.6.5);
- Class 1 standpipes are to be installed in all buildings (F-905.1);
- Portable fire extinguishers are to be installed under certain conditions (F-906.2);
- Manual fire alarm system and automatic fire detection system requirements for common areas, corridors and basements (F-907);
- Single station smoke alarm requirements for each dwelling unit (F-907.3.2);

³ The 2007 Philadelphia Fire Code incorporates the 2006 International Fire Code with amendments and is a joint product of both the Philadelphia Fire Department and the Philadelphia Department of Licenses and Inspections.

- Strict standards for fire alarm system (F-907);
- Fire Department connections shall be visible to approaching fire apparatus or indicated with signage as specified (F-912.2.2);
- Fire protection information and related signage to be posted (F-912.4);
- Standards for elevators (i.e., elevator recall system is required and one elevator must be made available to firefighters) (F-607);
- Implementation of an emergency planning and preparedness plan (Chapter 4);
- Annual fire safety drills (F-405);
- Regular testing of the fire safety systems (F-915);
- Instillation of smoke barriers (Chapter 7); and
- Strict means of egress requirements are provided (Chapter 10).

Thus, Philadelphia has opted in favor of strict compliance with existing fire safety codes rather than mandating retrofitting of all high-rise apartment complexes located within its city.

B. New York City

Similarly, New York City has decided against requiring high-rise residential buildings to be retrofitted with automatic sprinkler systems. Instead, New York's Building Code (Title 27 of the Administrative Code of New York City, updated through October 2007) indicates that all high-rise office buildings are to install fire sprinkler systems by 2019, but existing residential high-rise buildings are exempt from this requirement with the exception of basements, cellars and other locations below grade. It is not until an owner of an existing highrise residential building decides to conduct major construction project that installation of a fire sprinkler system may be required. For instance, if four or more dwelling units of an existing residential building are altered, and the alterations take place on an entire floor, or the value of the alterations within any twelve month period exceed fifty percent of the building value, New York City's Building Code requires the installation of automatic fire sprinkler systems. Cf. N.J.A.C. 5:23-6.1. This rule requirement makes a lot of sense because it is at this time - when an existing high rise building is undergoing construction - that the costs associated with retrofitting the building is more cost efficient. And, the City of New York has required additional safety upgrades in high-rise residential buildings, such as standpipes and fire alarm systems. The City also imposes strict means of egress requirements, which are similar to those of New Jersey.

C. City of Chicago

The City of Chicago took an alternate approach to provide a reasonable balance between safety and the economic and social costs of mandating the installation of automatic fire suppression systems in existing non-sprinklered high-rise buildings. To address the risk associated with fires in existing high-rise apartment buildings, in December 2004, Chicago instituted an ordinance pursuant to Section 13:196-205 of the City's Building Code, to provide as follows:

- Evacuation plans for all high-rise buildings, electronically filed with the City's 911 center;
- Prohibiting locked stairway doors against re-entry, except for automatic and manual unlocking systems, in all buildings with stairways serving four or more stories;
- Voice communication systems for occupant notification and fire department communication in most high-rise buildings;
- Automatic sprinkler protection for commercial high-rise buildings, other than "landmark" buildings;
- Life Safety Evaluations (LSE) to verify a minimum level of fire safety in high-rise buildings without sprinkler systems⁴;
- Modification of materials and installation criteria to allow more economical installations and encourage fire protection improvements; and,
- Requirement for a minimum one-hour fire resistive stairway enclosure in residential buildings.

Like Philadelphia and New York City, Chicago has decided against mandating the retrofitting of all existing high-rise apartment buildings within its jurisdiction, and instead requires strict compliance with building code and related fire safety code to address the risk of death and injury associated with fires in high-rise apartment complexes. The safety codes emphasize the importance of containment, early warning and safe evacuation. The LSE is an additional requirement, to be prepared by a licensed professional, to identify whether any remedial action is required to bring the building into conformance with City's fire safety codes and regulations. If the building cannot be brought into compliance through alterations, then an automatic fire suppression system must be added. Chicago also provides tax incentives to encourage the implementation of additional fire safety precautions that are taken in existing high rise apartment buildings. The City of Chicago model

⁴ Chicago mandates a LSE for both residential (non-transient) and office/commercial (transient) buildings, and have devised specific LSE requirements based upon type of occupancy. In general, the LSE measures the ability to contain a fire within its place of origin, means of egress, notification and overall fire safety of a building.

therefore provides an alternative means of compliance to encourage improvements in existing residential high-rise building occupants without mandating the installation of costly automatic fire suppression systems.

VII. Conclusion

After a review of the rule proposal and available data regarding fire suppression systems, it is not in the public interest from a fire safety standpoint to adopt the proposed amendment to N.J.A.C. 5:70-4.17 and require all existing apartment buildings within the State of New Jersey without fire sprinkler systems to be retrofitted with such systems. Thus, DCA should withdraw the portion of the rule proposal to amend N.J.A.C. 5:70-4.17.

A. Economic Impact: DCA's rule proposal does not include an economic analysis of the costs associated with implementing this rule regulation. However, it is uncontested that the construction costs associated with implementing this regulation are staggering. To implement this regulation, it will cost between **\$1.32 billion to \$1.85 billion** statewide. This is not a cost that cannot be borne by renters in this State without imposing significant hardship to them, and is of such significance that it cannot be absorbed by housing providers along. Thus, tenant rents are likely to increase between \$200 to \$400 per month. Since the annual income of an average renter in this State is only \$31,000, an increase of up to \$4800 per year in renters' budgets would be unduly burdensome. It is also clear that municipalities will be affected by this regulation, especially if their public utility infrastructure is unable to deal with this burden associated with implementing this rule proposal, but there is no mention of that impact in DCA's rule proposal. And, the rule proposal fails to take into account the impact this will have on affordable housing apartment complexes. While the State and DCA have passed a number of mandates to improve availability and access to safe, decent and affordable housing in this State to maximize social and economic opportunity for its citizens, the social and economic cost associated with implementing the proposed rule will simply undermine all of those measures. DCA should therefore exercise caution before proposing to pass this cost to those who can least afford it in this State.

B. Social Impact: DCA does not indicate whether it fully considered the social impact associated with implementing this regulation. For instance, DCA did not take into account costs associated with relocating residents during the construction phase of this project. Nor did DCA take

into account the demographics of those likely to be impacted during the implementation phase. Most of the high-rise apartment buildings in this State that would need to be retrofitted to come into compliance with this rule are located in the various cities of this State. Most renters in our cities already dedicate a third of their income toward rent; upon the adoption and implementation of this rule, they would then be required to dedicate half of their income toward their rental payments.

C. Safety Risks in High-Rise Apartment Buildings: DCA failed to consider existing safety codes and regulations that are in place to address the risk associated with fires in high-rise apartment buildings. Additionally, DCA failed to take into account studies that show deaths and injuries are more likely to occur in single-family homes (67%) rather than high-rise apartment buildings (3%). It appears, therefore, that existing fire safety code requirements address the risk associated with high-rise residential buildings. There is no evidence to suggest that fire suppression systems would result in a decrease in fire-related deaths and injuries in high-rise residential buildings. Instead, available data suggests that existing fire safety codes provide equivalent degree of protection to occupants of high-rise residential buildings.

D. Summary: In light of the astronomical economic and burdensome social costs associated with requiring existing high-rise apartment buildings to install fire suppression systems, and the small risk of fire-related deaths and injuries in such buildings, DCA should decide against adopting the proposed rule and instead ensure compliance of existing safety standards by high-rise residential building owners.

RESUME OF STEPHEN F. FINKLEMAN, P.E.



STEPHEN F. FINKELMAN, P.E.

Education

M.B.A. - (coursework) - Information Sciences, Temple University, 1979

B.S. - Mechanical Engineering, Temple University, 1974

A.S. - Engineering Technology, Temple University, 1968

Professional Registrations

P.E. - PA (#PE024995E), NJ (#24GE03005800), NY (#064769), DE (#5257), WV (#009566), MD (#13878), NV (#007561), IL (#62 046030), VT (#018-0005665), MN (#20812), ID (#5248), DC (#749009133), MA (#35620), MO (#024126), CA (#29162), SC (#16289), UT (#94-270569-2202)

Professional Affiliations

National Society of Professional Engineers, Member

Pennsylvania Society of Professional Engineers, Member

American Society of Heating, Refrigeration & Air Conditioning Engineers, Member

American Society of Plumbing Engineers, Member

National Fire Protection Association, Member

American Arbitration Association, Member/Construction Industry Arbitration Panel

Summary of Experience

Mr. Finkelman, a Department Manager in the firm's MEP Department, has 40 years of experience in the engineering and construction field. He has held positions as a consultant, forensic engineer, fire protection engineer, manager of a fortune 100 corporation's corporate design and engineering department, financial manager and executive administration officer of a consulting engineering and construction firm, vice president of a consulting mechanical and electrical engineering firm, and project manager for engineering design for an agency of the federal government. He has administered, designed and engineered projects in the commercial, health care, public, industrial, educational, hotel, casino, residential, energy, environmental and pharmaceutical fields. He serves as a construction industry arbitration panel member for the American Arbitration Association, helping to adjudicate construction project claims. He has been instrumental in the design, engineering and testing of alternate energy conservation systems for demonstration and practical applications, such as ground source geothermal systems, thermal ice storage systems, solar domestic hot water systems and energy recovery systems and leads the Department's fire protection design and engineering. He is involved in mentoring young and engineers in HVAC, plumbing and fire protection design.

REFERENCES

Division of Fire Safety Proposed Amendments to N.J.A.C. 5:70, Uniform Fire Code.

N.J.A.C. 5:70 Uniform Fire Code, Chapter 4.

N.J.A.C. 5:23 Uniform Construction Code

Reliability of Automatic Sprinkler Systems by William E. Koffel, P.E., 2005.

New Jersey Fire Division of Safety, Firefighter Fatality and Serious Injury Reports

NFIRS Fire Deaths and Casualty Data for New Jersey, 204, 2005 and 2006.

New Jersey Division of Fire Safety, Fires in New Jersey 2001 to 2003.

New Jersey Division of Fire Safety, Fires in New Jersey 2004 and 2005.

USFA/NFDC Fires in the United States 1995-2004.

NJFSAB High-Rise Building Fire Sprinkler Protection Cost/Impact Report, June 26,
2007.

NJAA Housing Impact of Sprinkler Regulations (copy attached hereto)

The City of Philadelphia 2007 Fire Code

Building Code of the City of New York

City of Chicago, Department of Buildings, Rules and Regulations for the inspection of
Buildings and Preparation of Life Safety Evaluation Reports