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## IAN DAVID McAUSLIN, et al v. GRINNELL CORPORATION, et al: THE DEFENSE

By Richard Schulte

The litigation referred to as Ian David McAuslin, et al v. Grinnell Corporation, et al involved the fires (or fire) which destroyed a one million square foot warehouse, the McFrugal's Warehouse, in New Orleans on March 21, 1996. Previous articles on this litigation have discussed the plaintiff's experts, Dr. Craig Beyler and Richard Custer, testimony regarding the fires. This article will provide excerpts from the expert report of one of the defense experts, Richard Schulte. Excerpts from Schulte's expert report are as follows:

*"I have been retained. . .as an expert in the application and interpretation of building codes and standards and as a expert in general fire protection for the above referenced litigation.*

*The scope of my assignment in this litigation has been limited to the following:*

- a. *Determination of which codes and standards applied to the design and construction of the facility.*
- b. *Determination of whether or not smoke/heat vents were required in the facility.*
- c. *Determination of whether the building owner's use of the facility violated code provisions at the time of the fire.*
- d. *Review of provisions relating to the installation of smoke/heat vents in buildings which are provided with sprinkler protection.*
- e. *Review of provisions relating to the installation of in-rack sprinkler protection in multiple-row racks.*

*The following represent my opinions regarding the New Orleans Distribution Center (Pic 'N' Save Distribution Center) which was destroyed by fire on March 21, 1996. These opinions are subject to modification or clarification as additional information becomes available. This case remains open at the present time.*

1. *At the time the building permit application for the construction of the Pic 'N'Save Distribution Center was filed with the City of New Orleans, the building was required to comply with the 1985 edition of the Standard Building Code, as adopted and amended by the City of New Orleans, and the 1985 edition of the Life Safety Code, as adopted and amended by the State of Louisiana.*
2. *At the time the building permit application for the construction of the Pic 'N' Save Distribution Center was filed with the City of New Orleans, the building was also required to comply with the New Orleans Fire Prevention Code adopted in August, 1972.*
3. *The 1985 edition of the Standard Building Code references the 1985 edition of the Standard Fire Prevention Code. Since the City of New Orleans had already adopted another fire prevention code at the time of the adoption of the 1985 edition of the Standard Building Code, it was not the intent of the City of New Orleans to also adopt the 1985 edition of the Standard Fire Prevention Code by reference.*
4. *For purposes of applying the provisions of the 1985 edition of the Standard Building Code in the City of New Orleans at the time the building permit application was filed, any reference to the Standard Fire Prevention Code contained in the 1985 edition of the Standard Building Code would be construed to be a reference to the New Orleans Fire Prevention Code adopted in August, 1972.*
5. *The New Orleans Fire Prevention Code which was enforced at the time the building permit application was filed did not require smoke/heat vents and draft curtains to be provided in buildings which contained high-piled storage.*

*“At the time the building permit application for the construction of the Pic 'N' Save Distribution Center was filed with the City of New Orleans, the building was also required to comply with the New Orleans Fire Prevention Code adopted in August, 1972.”*

6. *Based upon the above, the 1985 edition of the Standard Building Code, as adopted and amended by the City of New Orleans, did not require that smoke/heat vents and draft curtains be installed in storage buildings which contained high-piled storage.*

7. *The 1985 edition of the Standard Building Code, as adopted and amended by the City of New Orleans, did require that smoke/heat vents and drafts [draft] curtains be installed in storage buildings in order to increase the allowable travel distance to 400 feet.*

*“Based upon the above, the 1985 edition of the Standard Building Code, as adopted and amended by the City of New Orleans, did not require that smoke/heat vents and draft curtains be installed in storage buildings which contained high-piled storage.”*

8. *A variance to the Standard Building Code to allow a travel distance of 600 feet without the installation of smoke/heat vents and draft curtains was proposed to the City of New Orleans. This proposal was approved by the City of New Orleans Board of Building Standards and Appeals.*

9. *A variance to the provisions of a building code enforced in a jurisdiction which is supported by a reference to the provisions contained in a later edition of the code does not mandate compliance with all of the provisions contained in the later edition of the code referenced by the variance, unless the approval of the variance is specifically made contingent upon compliance with all of the requirements contained in the later edition of the code.*

*“A variance to the Standard Building Code to allow a travel distance of 600 feet without the installation of smoke/heat vents and draft curtains was proposed to the City of New Orleans. This proposal was approved by the City of New Orleans Board of Building Standards and Appeals.”*

10. *The 1985 edition of the Life Safety Code, as adopted and amended by the State of Louisiana, permitted the allowable travel distance in storage buildings to be increased to 400 feet provided that sprinkler protection was installed in the building. The 1985 edition of the Life Safety Code did not require that smoke/heat vents and draft curtains be provided in order to increase the allowable travel distance to 400 feet.*

11. *A variance to the Life Safety Code to allow a travel distance of 600 feet without the installation of smoke/heat vents and draft curtains was proposed to the Louisiana State Fire Marshal's Office. This proposal was approved by the Louisiana State Fire Marshal's Office.*

*“A variance to the Life Safety Code to allow a travel distance of 600 feet without the installation of smoke/heat vents and draft curtains was proposed to the Louisiana State Fire Marshal's Office. This proposal was approved by the Louisiana State Fire Marshal's Office.”*

12. *The 1985 edition of the Standard Building Code, as adopted and amended by the City of New Orleans, required that sprinkler system installations comply with the requirements contained in NFPA 13, NFPA 231 and NFPA 231C. The 1985 edition of the Standard Building Code, as adopted and amended by the City of New Orleans, specifically referenced the 1983 edition of NFPA 13, but did not specify the editions of NFPA 231 and NFPA 231C which were referenced by the Code.*

13. *The 1985 edition of the Life Safety Code, as adopted and amended by the State of Louisiana, required that sprinkler system installations comply with the requirements contained in 1985 edition of NFPA 13. The 1985 edition of NFPA 13 references NFPA 231 and NFPA 231C.*

14. *The sprinkler system was designed and installed to comply with the sprinkler installation standards referenced by both the Standard Building Code and Life Safety Code. Sprinkler system shop drawings were submitted to the Louisiana State Fire Marshal's Office for review and approval. The Louisiana State Fire Marshal's Office approved the sprinkler system shop drawings.*

15. *The sprinkler system installation was inspected by the Louisiana State Fire Marshal's Office. The sprinkler system installation was approved by the Louisiana State Fire Marshal's Office.*
16. *The sprinkler system shop drawings were submitted to the building owner's insurance carrier for review and approval. The building owner's insurance carrier approved the sprinkler system shop drawings.*
17. *The sprinkler design/installation exceeded the minimum legal requirements contained in NFPA 13, NFPA 231 and NFPA 231C.*

[Basis: NFPA sprinkler system installation standards only require a single pump. The sprinkler systems protecting the warehouse were supplied by an electric pump which took suction from the municipal water supply and a diesel pump which took suction from a 300,000 gallon water tank.]

[Basis: Portions of the high bay section of the warehouse not provided with storage racks were intended to be utilized for staging until such time as additional rack storage capacity was needed. The staging of goods classified as Class IV commodities 12 feet or less in height would be considered to be an ordinary group 3 hazard per the 1980's versions of NFPA 13.

The design criteria utilized for the portions of the sprinkler systems protecting the staging areas in the high bay section of the warehouse was 0.45 gpm/SF applied over 2,500 SF with a 500 gpm hose stream demand utilizing high temperature large orifice sprinklers with a spacing of approximately 75 SF/sprinkler. The hydraulic calculations for this area assumed 34 sprinklers operating.

The design criteria utilized for the portions of the sprinkler systems protecting the staging areas in the high bay section of the warehouse was 0.45 gpm/SF applied over 2,500 SF with a 500 gpm hose stream demand utilizing high temperature large orifice sprinklers with a sprinkler spacing of approximately 75 SF/sprinkler. The hydraulic calculations for this area assumed 34 sprinklers operating .

At an operating pressure of 7 psi, the flow from the sprinklers (Grinnell Model C large orifice sprinklers;  $k = 8.0$ ) would be 21.1 gpm. The density which would be achieved at a 7 psi operating pressure would be 0.28 gpm/SF with at least 53 sprinklers operating. (The number of sprinklers operating was determined by multiplying the design density (0.45 gpm/SF) by the design area of operation (2,500 gpm) to determine the minimum flow which would be required for the design criteria and then dividing this aggregate flow rate by the minimum flow rate from a single sprinkler, *i.e.*,  $(0.45 \text{ gpm/SF} \times 2,500 \text{ SF})/21.1 \text{ gpm.}$ )]

18. *Appendix A in the 1995 edition of NFPA 231C indicates that smoke removal capability should be provided for use in mop-up operations. This appendix indicates that manually-operated mechanical air-handling systems can be provided for this purpose. The 1986 and 1991 editions of NFPA 231C contain similar statements regarding smoke removal capabilities for use in mop-up operations. The exhaust system provided for the warehouse was designed so that it could be used by the fire department for smoke removal purposes during mop-up operations.*

19. *The building owner's insurance carrier's underwriting standards did not require the installation of smoke/heat vents or draft curtains.*

*"The building owner's insurance carrier's underwriting standards did not require the installation of smoke/heat vents or draft curtains."*

20. *The building owner's insurance carrier insured the building without the installation of smoke/heat vents or draft curtains.*

21. *The building owner's insurance carrier's underwriting standards did not require that the building be divided by "maximum foreseeable loss" (MFL) walls.*

22. *The buildings owner's insurance carrier insured the building without the building being divided by "maximum foreseeable loss" (MFL) walls.*

*"The buildings owner's insurance carrier insured the building without the building being divided by "maximum foreseeable loss" (MFL) walls."*

23. *Given that the building design complied with the building owner's insurance carrier's standards, and that the protection provided exceeded the minimum code requirements, there was no need for Broadmoor Design Group to retain a property protection "expert" to advise Broadmoor Design Group on property protection.*
24. *One of the stipulations contained in the variances which were approved by the City of New Orleans and the Louisiana State Fire Marshal's Office indicated that aerosol containers were required to be stored in either a separate room located within the building or in a separate building. The building owner violated one of the conditions for approval of the variances by storing aerosol containers along with other goods within the warehouse.*
25. *The 1986, 1991 and 1995 editions of NFPA 231C require that in-rack sprinkler protection be installed in multiple-row racks where Class IV commodities are stored over 15 feet in height.*
26. *Compliance with NFPA 231C was mandatory for compliance with the New Orleans Building Code and the Life Safety Code, as well as the provisions of the variances negotiated with the City of New Orleans and the Louisiana State Fire Marshal's Office. The building owner violated the requirements contained in NFPA 231C when portable racks with a storage height exceeding 15 feet were installed in the configuration which existed at the point of ignition of the first fire without providing in-rack sprinkler protection.*
27. *If the building owner had installed in-rack sprinkler protection in the portable racks as required by NFPA 231C, the first fire in the building may have been controlled by the operation of the in-rack sprinklers in its initial stages or may have been extinguished by the operation of in-rack sprinklers.*

*"Given that the building design complied with the building owner's insurance carrier's standards, and that the protection provided exceeded the minimum code requirements, there was no need for Broadmoor Design Group to retain a property protection "expert" to advise Broadmoor Design Group on property protection."*

28. *If early control of the first fire by in-rack sprinklers installed in the portable racks was achieved, the area where ceiling sprinklers would have operated would have likely been limited to the vicinity of the fire.*

[Basis: *“Factory Mutual has never experienced a catastrophic loss from a fire starting in rack storage where in-rack sprinklers were provided and operated properly.” (FM Loss Prevention Data Sheet 8-33, January 1984)*

*“A fire in clothing in cartons on 16-tier, 39 feet high racks was well controlled by [the operation of] four in-rack sprinklers and one ceiling sprinkler. In-rack sprinklers were provided at four levels. Two small hoses were need to complete extinguishment. Property damage \$145,000. Business interruption \$2,000.” (FM Loss Prevention Data Sheet 8-33, January 1984)*

*“Factory Mutual has never experienced a catastrophic loss from a fire starting in rack storage where in-rack sprinklers were provided and operated properly.” (FM Loss Prevention Data Sheet 8-33, January 1984)*

*“The premier trend evolving from a survey of 147 rack storage losses is the overwhelming success in fire control which can be attributed to in-rack sprinklers. To date, Factory Mutual has not experienced a catastrophic loss in rack storage when in-rack sprinklers were installed and in service at the time of the fire.” (FM Loss Prevention Data Sheet 8-33, January 1984)*

*“The [test] data indicates that with sprinklers installed in the racks a reduction is gained in the area of fire damage and sprinkler operations, or water damage.” (NFPA 231C-1991 edition; NFPA 13-1999 edition)*

*“The premier trend evolving from a survey of 147 rack storage losses is the overwhelming success in fire control which can be attributed to in-rack sprinklers.” (FM Loss Prevention Data Sheet 8-33, January 1984)*

*“Therefore, if the goal of smaller areas of fire damage is to be achieved, sprinklers in racks should be considered.” (NFPA 231C-1991 edition; NFPA 13-1999 edition)*

*“In the 20-ft. high test series, ceiling sprinklers operated before in-rack sprinklers. In the 30-ft. high series, ceiling sprinklers operated after in-rack sprinklers. The 50 ft. high test did not operate ceiling sprinklers. They would, however, be needed if fire occurred in upper levels.” (NFPA 231C-1991 edition; NFPA 13-1999 edition)*

*“These results indicate the effect of in-rack sprinklers on storage higher than 25-ft. From the ceiling operation standpoint, expected high-heat-release-rate fire was converted to a fire with a much lower heat release rate.” (NFPA 231C-1991 edition; NFPA 13-1999 edition)*

*“An arson fire activated three ceiling and three in-rack sprinklers during the nonoperating hours of the facility. The sprinkler water flow alarms activated at the guard station, and the guard alerted the fire department. Fire department operations were limited to salvage and overhaul. Damage was limited to three pallet loads of product, about \$20,000.” (NFPA 1420-1993 Edition)*

*“Therefore, if the goal of smaller areas of fire damage is to be achieved, sprinklers in racks should be considered.” (NFPA 231C-1991 edition; NFPA 13-1999 edition)*

*“In the 20-ft. high test series, ceiling sprinklers operated before in-rack sprinklers. In the 30-ft. high series, ceiling sprinklers operated after in-rack sprinklers. The 50 ft. high test did not operate ceiling sprinklers. They would, however, be needed if fire occurred in upper levels.” (NFPA 231C-1991 edition; NFPA 13-1999 edition)*

*“The warehouse was over 500,000 ft in area. The 27 ft high storage racks contained pallets of electronic components and packaging materials. . .A maintenance employee was repairing a lift truck in the warehouse and heard a “crackling” sound. He investigated, saw fire and smoke, and saw an in-rack sprinkler in operation. A 1-1/2 in. hose line from a nearby hose station was used to attack the incipient fire. . .the plant emergency organization (PEO) responded, and the public fire department was notified. . .The fire had been controlled and fire department operations were limited to salvage and overhaul. Damage was limited to several pallets loads of product that totaled approximately \$10,000.” (NFPA 1420-1993 Edition)]*

*“. . .He investigated, saw fire and smoke, and saw an in-rack sprinkler in operation. A 1-1/2 in. hose line from a nearby hose station was used to attack the incipient fire. . .the plant emergency organization (PEO) responded, and the public fire department was notified. . .The fire had been controlled and fire department operations were limited to salvage and overhaul.”*

29. *If early control of the first fire by in-rack sprinklers installed in the portable racks was achieved, it is likely that smoke/heat vents installed in the roof of the building would not have operated.*

**[Basis:** *“The significant cooling effect of sprinkler sprays on the near-ceiling gas flow often prevented the automatic operation of vents. . .In one cartoned plastic commodity experiment, a vent did not open when the fire was ignited directly beneath it.”* **“Sprinkler, Smoke & Heat Vent, Draft Curtain Interaction-Large Scale Experiments and Model Development” (NISTIR 6196-1), September, 1998**

*“The significant cooling effect of sprinkler sprays on the near-ceiling gas flow often prevented the automatic operation of vents. . .In one cartoned plastic commodity experiment, a vent did not open when the fire was ignited directly beneath it.”*

*“In the 20-ft. high test series, ceiling sprinklers operated before in-rack sprinklers. . .The 50 ft. high test did not operate ceiling sprinklers. They would, however, be needed if fire occurred in upper levels.” (NFPA 231C-1991 edition; NFPA 13-1999 edition)]*

30. *If early control of the first fire by in-rack sprinklers installed in the portable racks was achieved, the water damage to the stock would likely have been limited to the immediate area of the fire.*

**[Basis:** See item 28.]

31. *If early control of the first fire by in-rack sprinklers installed in the portable racks was achieved, the amount of smoke damage to the stock in the building would have been significantly reduced.*

**[Basis:** See item 28.]

32. *If early control of the first fire by in-rack sprinklers installed in the portable racks was achieved, significant damage to the roof deck of the building would have been prevented.*

**[Basis:** See item 28.]

33. *If early control of the first fire by in-rack sprinklers installed in the portable racks was achieved, significant damage to the electrical system in the building may have been prevented.*

**[Basis:** See item 28.]

34. *Activation of in-rack sprinklers installed in the portable racks would have activated a sprinkler system water flow device sooner in the first fire. If a sprinkler system water flow device had been activated sooner, the fire department would have responded to the first fire sooner.*

**[Basis:** *“In the 20-ft. high test series, ceiling sprinklers operated before in-rack sprinklers. In the 30-ft. high series, ceiling sprinklers operated after in-rack sprinklers. The 50 ft. high test did not operate ceiling sprinklers. They would, however, be needed if fire occurred in upper levels.” (NFPA 231C-1991 edition; NFPA 13-1999 edition)]*

35. *Activation of in-rack sprinklers installed in the portable racks would have assisted the building employees in controlling or extinguishing the first fire prior to the arrival of the fire department.*

[Basis: See item 28.]

36. *Activation of in-rack sprinklers installed in the portable racks would have assisted the fire department in controlling and extinguishing the first fire.*

[Basis: See item 28.]

37. *The 1995 edition of NFPA 231C indicates that the hydraulic design criteria provided in the standard “are based upon the assumption that roof vents and draft curtains are not being used.” The 1986 and 1991 editions of NFPA 231C contain a similar statement.*

38. *Appendix B in the 1995 edition of NFPA 231C indicates that “the design curves are based upon the absence of roof vents or draft curtains in the building.” The 1986 and 1991 editions of NFPA 231C contain similar statements.*

39. *Appendix A in the 1995 edition of NFPA 231C indicates that “sprinkler protection installed as required in this standard is expected to protect the building occupancy without supplemental fire department activity.” The 1986 and 1991 editions of NFPA 231C contain similar statements.*

*“Appendix A in the 1995 edition of NFPA 231C indicates that “sprinkler protection installed as required in this standard is expected to protect the building occupancy without supplemental fire department activity.” The 1986 and 1991 editions of NFPA 231C contain similar statements.”*

40. *The 1991 edition of NFPA 204M, Guide for Smoke And Heat Venting, states that “a broadly accepted equivalent design basis for using both sprinklers and vents together for hazard control (e.g., property protection, life safety, water usage, obscuration, etc.) has not been universally recognized.” A similar statement is contained in the 1998 edition of NFPA 204.*

41. The 1991 edition of NFPA 204M, Guide for Smoke And Heat Venting, also states that “for occupancies that present a high challenge to sprinkler systems, concern has been raised that inclusion of automatic roof venting may be detrimental to the performance of automatic sprinklers.” A similar statement is contained in the 1998 edition of NFPA 204M.

“The 1991 edition of NFPA 204M, Guide for Smoke And Heat Venting, also states that “for occupancies that present a high challenge to sprinkler systems, concern has been raised that inclusion of automatic roof venting may be detrimental to the performance of automatic sprinklers.” A similar statement is contained in the 1998 edition of NFPA 204M.”

42. The 1991 edition of NFPA 204M, Guide for Smoke and Heat Venting, also states that “depending upon the location of the fire relative to the vents, the necessary water demand to achieve control is either increased or decreased over an unvented condition. With the fire directly under the vent, water demand is decreased. With the fire equidistant from vents, water demand is increased.” A similar statement is contained in the 1998 edition of NFPA 204.

43. The 1998 edition of NFPA 204 indicates that “large-scale fire tests [Troup 1994] indicated that the presence of curtain boards can cause increases in sprinkler operation, smoke production and fire damage (i.e., sprinklers opened well away from the fire).”

“The 1998 edition of NFPA 204 indicates that “large-scale fire tests [Troup 1994] indicated that the presence of curtain boards can cause increases in sprinkler operation, smoke production and fire damage (i.e., sprinklers opened well away from the fire).” ”

44. Given the provisions and explanatory material contained in NFPA 231C, NFPA 204M and NFPA 204 cited above, it is my opinion that installing smoke/heat vents and draft curtains in buildings which are required to comply with NFPA 231C constitutes poor engineering practice.

45. *The only practical method of protecting a “high bay” warehouse building which contains high-piled storage is with sprinkler protection. Installing smoke/heat vents and draft curtains provides no significant additional protection for a building which contains high-piled storage and which is protected by a properly designed and maintained sprinkler system.*

*“. . .it is my opinion that installing smoke/heat vents and draft curtains in buildings which are required to comply with NFPA 231C constitutes poor engineering practice.”*

46. *If the sprinkler system is adequately designed, and the protection is properly maintained, the sprinkler system will be sufficient to control the fire and the fire can be easily extinguished by the fire department without any assistance from smoke/heat vents and draft curtains.*

47. *If the sprinkler system installation is inadequately designed, or the sprinkler protection is not properly maintained, the installation of smoke/heat vents and draft curtains will not have any significant effect upon the damage resulting from a major fire occurring in the building.*

*“If the sprinkler system installation is inadequately designed, or the sprinkler protection is not properly maintained, the installation of smoke/heat vents and draft curtains will not have any significant effect upon the damage resulting from a major fire occurring in the building.”*

48. *The building owner would have been better served by properly maintaining the sprinkler protection in accordance with NFPA 231C, than by directing Broadmoor to install smoke/heat vents and draft curtains during the initial construction of the building.*

*“The decision not to install smoke/heat vents and draft curtains was based upon sound engineering judgement of the architects, engineers and property insurers for the project.”*

49. *The decision not to install smoke/heat vents and draft curtains was based upon sound engineering judgement of the architects, engineers and property insurers for the project.*
50. *If the building owner had directed Broadmoor to install smoke/heat vents and draft curtains, the building owner would have been responsible for payment of the cost of installing smoke/heat vents and drafts curtains since heat/smoke vents were not required by either the applicable building or fire prevention codes (based upon the variances to the codes which were approved). Smoke/heat vents and draft curtains were not deleted from the project for purposes of increasing Broadmoor's profit margin.*

## Discussion

The expert witnesses for the plaintiffs made the following assertions with respect to the design and construction of the McFrugal's Warehouse Building:

- Grinnell Corporation improperly designed the sprinkler system protecting the warehouse because the portion of the sprinkler system protecting the east portion of the high bay section of the warehouse (future high bay rack expansion area) was not adequate to protect any combustible loading on the floor of the building due to excessive clearance between the sprinklers and combustibles and
- The installation of in-rack sprinklers in the multi-row racks were the fire ignition occurred would not have changed the outcome of the fire and
- The warehouse was improperly designed by the design/build contractor because the building design did not include smoke/heat vents and draft curtains.

The installation of in-rack sprinklers in the multi-row racks were the fire ignition occurred would not have changed the outcome of the fire . . .

The warehouse was improperly designed by the design/build contractor because the building design did not include smoke/heat vents and draft curtains.

The basis for the opinions that the sprinkler system was improperly designed by Grinnell Corporation and that the installation of in-rack sprinklers in the multi-row racks where the fire ignition occurred would not have changed the outcome of the fire was a fire modeling analysis by Dr. Craig Beyler. The basis for the opinion that the warehouse should have been provided with smoke/heat vents and draft curtains was that a 1 million square foot high bay warehouse was a “unique risk” and, hence, required a back-up system, smoke/heat vent and draft curtain systems, in the event of sprinkler system failure.

There was really no need to resort to an “exotic” analysis to rebut the plaintiff’s experts opinions regarding this fire.

There was really no need to resort to an “exotic” analysis to rebut the plaintiff’s experts opinions regarding this fire. Buildings with “sprinkler to combustible” clearances similar to the clearances in the McFrugal’s Warehouse (roughly 50 feet from the top of storage in the multi-row racks to the underside of the roof deck) are not that uncommon-buildings which often include high ceilings include airports, shopping malls, retail stores, industrial buildings and convention centers.

Buildings with “sprinkler to combustible” clearances similar to the clearances in the McFrugal’s Warehouse (roughly 50 feet from the top of storage in the multi-row racks to the underside of the roof deck) are not that uncommon-buildings which often include high ceilings include airports, shopping malls, retail stores, industrial buildings and convention centers.

Research on the design of sprinkler systems for convention centers was done by William Webb after the destruction of McCormick Place in Chicago in January, 1967. The results of Webb’s research were published in the May 1968 issue of *Fire Technology*. Did the protection for the high bay portions of the McFrugal’s Warehouse not provided with high bay racks comply with Webb’s research findings?

As previously noted, the design criteria for the portions of the sprinkler system protecting the high bay spaces without racks was 0.45 gpm/SF applied over 2,500 square feet using high temperature large orifice sprinklers with a sprinkler spacing of 75 square feet per sprinkler. Based upon the above, this means that the system protecting the east portion of the high bay section of the warehouse should have been capable of providing a density of 0.28 gpm/SF with a minimum of 53 (or more) sprinklers operating.

Since Webb's research recommended a density of 0.20 gpm/SF for exhibit spaces in conventions centers, a density of 0.28 gpm/SF with 53 sprinklers operating should have been more than adequate to protect an ordinary group 3 hazard (as defined in 1980's versions of NFPA 13). Hence, the plaintiff's expert assertion that the sprinkler protection provided for the east portion of the high bay section of the warehouse was not adequate for a fire in any type of combustible array is in error, regardless of what Beyler's "exotic" fire modeling analysis indicated.

With respect to the assertion regarding the installation of in-rack sprinklers in the multi-row racks as required for Class IV storage 21 feet in height, the reason why this opinion was of importance is that the building owner was aware that in-rack sprinkler protection was required to protect the multi-row racks and even requested a quote from Grinnell to provide in-rack sprinkler protection for the racks. After receiving Grinnell's quote, the building owner elected not to provide the required protection for the multi-row racks.

Based upon the above, this means that the system protecting the east portion of the high bay section of the warehouse should have been capable of providing a density of 0.28 gpm/SF with 53 (or more) sprinklers operating.

Would the installation of in-rack sprinklers in the multi-row racks have had a significant effect on the course of the fire in the McFrugal's warehouse? According to both FM and NFPA, the answer to that question is affirmative, however, the facts in the case provide further evidence of the significance of in-rack sprinkler protection. Despite the fact that the only sprinkler protection provided for the multi-row racks was ceiling sprinklers located 70 feet above the floor, roughly 50 feet above the top of the storage in the multi-row racks, the New Orleans Fire Department (NOFD) was able to control the fire after 5 hours of fire fighting and was able to extinguish the fire in roughly 6-1/2 hours. Would the in-rack sprinkler protection have assisted the NOFD in its efforts? There is little doubt about that. It is even possible that the fire would have been extinguished before the NOFD arrived at the building.

Given the above, it seems that the plaintiff's experts assertion that in-rack sprinkler protection would not have had a significant impact on the fire at the McFrugal's Warehouse is, at best, nonsensical.

Even if the fire spread to the top tier of the multi-row racks above the in-rack sprinkler protection prior to the in-rack sprinklers gaining control of the fire, the size of the fire which the NOFD would have had to fight would have been significantly less. Of course, a significant reduction in the size of the fire would have made the discharge from the ceiling sprinklers more effective which again would have assisted the NOFD's fire fighting efforts.

Given the above, it seems that the plaintiff's experts assertion that in-rack sprinkler protection would not have had a significant impact on the fire at the McFrugal's Warehouse is, at best, nonsensical.

The third assertion that the McFrugal's Warehouse should have been provided with smoke/heat vents and draft curtains requires little rebuttal. Since the mid-1970's, there has been a concern that the installation of automatic smoke/heat vents may adversely affect the capability of a

sprinkler system to control a fire. As indicated above, a statement to this effect was included in both the 1991 and 1998 editions of NFPA 204M. Given this concern, it is difficult to understand how any building designer would include the installation of vents and draft curtains in the design of the McFrugal's Warehouse if such an installation were not mandatory. Since the installation of vents and draft curtains was not mandatory in this case, based upon the variance negotiated with the City of New Orleans, including vents and draft curtains in the building design could only have been considered to be poor engineering practice.

In effect, what the plaintiff's experts were asserting is that the McFrugal's Warehouse building should have been designed based upon what is considered by many in the fire protection field to be poor engineering practice.

In effect, what the plaintiff's experts were asserting is that the McFrugal's Warehouse building should have been designed based upon what is considered by many in the fire protection field to be poor engineering practice.

## Conclusion

The plaintiff's experts opinions in the McFrugal's Warehouse fire litigation were "cloaked" in a fire modeling analysis which lent some credibility to their opinions, if only because the fire modeling analysis was "exotic". Although the fire modeling analysis was "exotic", the attorneys for the defendants in the case considered Dr. Craig Beyler's fire modeling to be "junk science" and intended to file a motion to have Beyler's expert report and testimony "thrown out". Since then, Beyler's fire modeling analysis in this litigation has been discredited, but fortunately for Beyler, the case was settled out of court.

To put it bluntly, Beyler's approach in this case was to use fire modeling "to baffle them with b.s.". Given that the litigation was settled out of court, Beyler's fire modeling analysis was never put on trial, and shortly thereafter, the Society of Fire Protection Engineers (SFPE) honored Beyler with the Guise Medal award. Beyler may not have been able to baffle the defense attorney with his fire modeling, but it looks like he was able to baffle the SFPE (with his b.s.).

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