The Charleston Sofa Super Store Tragedy:
The Importance of Enforcing Building & Fire Safety Codes

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Certification Statement

I hereby certify that this paper constitutes my own product, that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of another.

Daniel R. Sypen
Abstract

This research document takes a historical perspective of the Charleston Sofa Superstore fire in an effort to determine how illegal building additions and other structural hazards affected the outcome of the fire. The growth of the building from a grocery store to a furniture retailer and warehouse, including all permitted and un-permitted building alterations are described. Also, there is a review of building inspection activity for the store, how the fire progressed, and legal considerations in the wake of the incident. The results of the research overwhelmingly demonstrate the need for fire service involvement in building code enforcement as well as building construction and alteration oversight.
## Index

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>5</td>
</tr>
<tr>
<td>The Incident</td>
<td>6</td>
</tr>
<tr>
<td>The Building</td>
<td>8</td>
</tr>
<tr>
<td>• Permitted Additions</td>
<td>8</td>
</tr>
<tr>
<td>• Un-permitted Additions</td>
<td>9</td>
</tr>
<tr>
<td>• History of Building Inspections</td>
<td>10</td>
</tr>
<tr>
<td>• Review of Building Features</td>
<td>11</td>
</tr>
<tr>
<td>The Fire and its Spread</td>
<td>12</td>
</tr>
<tr>
<td>Recommendations From Agencies</td>
<td>14</td>
</tr>
<tr>
<td>Legal Issues</td>
<td>15</td>
</tr>
<tr>
<td>Conclusion</td>
<td>16</td>
</tr>
<tr>
<td>References</td>
<td>19</td>
</tr>
<tr>
<td>Diagram: Original showroom plus permitted additions</td>
<td>20</td>
</tr>
<tr>
<td>Diagram: Un-permitted additions</td>
<td>21</td>
</tr>
<tr>
<td>Diagram: Direction of fire spread</td>
<td>22</td>
</tr>
</tbody>
</table>
**Introduction**

This report takes a look back at the tragic Charleston Sofa Superstore fire that occurred in June of 2007, and ultimately resulted in the loss of nine brave firefighters. Following this incident, there were many agencies that were involved in determining what it was that led to the events to occur the way they did. The results of these studies created a laundry list of items of concern that affect the operation of the Charleston South Carolina Fire Department, as well as every other Fire organization in the United States.

The focus will specifically address the affect the building had in the growth and progression of the fire, as well as the obstacles it presented to the firefighters who responded that day. The importance of building and fire code enforcement throughout all jurisdictions is clearly evident from the tragic events that occurred in Charleston.

The purpose is not to assign blame to any party, but to honor the fallen by learning from mistakes that were made, and to prevent further occurrences. Throughout the course of the paper, a historic perspective of this particular building is gained, and how it grew from a grocery store, to it's status at the time of the fire as a furniture retailer and warehouse.

A review of all the expansions that were made to the building over the course of its lifetime will be made. Some of the expansions that were made were done with proper oversight by the City of Charleston, and some were not. The sections of the building which were done without the City's oversight had a dramatic impact on the outcome of this fire.

Research was done by compiling information from reports that were issued by agencies such as NIOSH, as well as the City of Charleston Fire Review Team, which was made up of a group of experts in several fields to look into circumstances surrounding the fire and fatalities.
The conclusion of the research is that there is an overwhelming need for Fire Departments to be involved in the enforcement of fire codes during the construction of buildings, as well as throughout the life of each building within their jurisdiction.

**The Incident**

At 1907 hours on June 18th 2007, the Charleston South Carolina Fire Department was dispatched to a reported fire behind the Sofa Super Store, located at 1807 Savannah Highway.

On arrival, the Battalion Chief announced that there appeared to be a trash fire located at the back of the side of the building. Fire crews made entry into the building through the showroom, and initially found it to be clear. The crew around the back side of the building noticed that the fire was in the loading dock area and was threatening the showroom.

As crews started their suppression efforts, problems began when there was difficulty establishing a water source, and police assistance was requested to keep cars from driving over hose lines that have been laid on the ground.

Additionally, dispatch had notified command that they received a call from a civilian who stated he was trapped inside the burning building. The trapped civilian required a crew to be assigned for the rescue.

At 1929 hrs, the first radio transmission was made from a firefighter asking, "Which way out." One minute later, there was additional radio traffic from other firefighters operating in the building stating that they need help out.

Between 1931 and 1934 hours, a mayday transmission was made, and dispatch notified command that a radio from ladder-5 had the emergency button activated. Mutual aid crews are ordered to search for the missing firefighter. All the while, conditions inside the structure continue to get worse.

At 1938 hours, the Chief ordered an evacuation of the building, and an exterior attack was
initiated. At 1951 hours, the roof to the showroom of the Sofa Super Store gave way, and collapsed. The fire is not brought under control until 2200 hours.

Almost immediately following the fire, an extensive investigation occurred to determine what caused the fire at the Sofa Super Store, and what ultimately led to the deaths of the nine firefighters. Many agencies converged on the City of Charleston to conduct the investigations including: the United States Bureau of Alcohol Tobacco and Firearms, the National Institute for Occupational Safety and Health (NIOSH), the National Institute of Standards and Technology (NIST), and the South Carolina Department of Occupational Safety Administration (SC-OSHA).

Additionally, the City of Charleston formed an independent team to review the fire at the Sofa Super Store.

The independent review was composed of several experts in varying fields. Their task was to contribute their knowledge for the assessment of what lead to the incident, as well as an overview of the fire department organization, and it's procedures and policies.

J. Gordon Routely headed the group. He is a retired fire chief, and fire protection engineer, who consults for the United States Fire Administration and National Fire Protection Association. The team was called the Post Incident Assessment and Enhancement Review Team, also known as the Fire Review Team for short. The results of their investigation are contained in two documents known respectively as the Phase I report, and the more detailed Phase II report.
The Building

Permitted Additions

The Charleston Sofa Superstore was originally constructed as a 16,250 square foot grocery store sometime in the 50's or 60's. Since this time, the building had gone through numerous expansions.

It is unclear when exactly the structure changed occupancy, as the building was annexed to the City of Charleston in 1990.

Following the annex there were permits issued by the City for expansions to the structure. In 1994, there was a 7,200 square foot addition to the west side of the building, and in 1995, there was another 7,200 square foot expansion to the east side of the building. These expansions were meant to be extensions of the showroom for the furniture retailer.

Then again, in 1996, a 15,600 square foot warehouse was constructed on the south side of the property. This warehouse was connected to the back of the showroom by a 20 foot long sheet metal constructed corridor.

Construction of each of these particular additions was done with proper permits filed with the City. The additions that were done to the east and west of the original showroom were designed to utilize the concrete walls of the original structure as firewalls. In order to connect the spaces, six 8 foot wide fire doors were incorporated into the walls. The fire doors were roll down style that would be operated by fusible links. Additionally, the warehouse that was constructed on the south side of the property, had a fusible link operated roll down fire door installed where it connected to the showroom via the enclosed corridor.

Due to the fact that there were rated fire walls between the showroom areas, and the warehouse was separated by the distance of the corridor, the building code classified these as four separate structures. The original building was grandfathered from the requirements for automatic sprinklers, and
the floor areas of the additions were under the threshold for sprinkler requirements.

**Un-permitted Additions**

More additions were added to the Sofa Super Store between 1996 and 2005, however this time there were no permits issued by the City, and no oversight of the construction occurring. The location of the new additions was between the showroom and the warehouse on both sides of the corridor that was meant to separate the original buildings. On the west side of the complex, a 2,200 square foot loading dock was constructed. It was built in two phases; the first phase was constructed against the warehouse and the corridor. The next phase of the loading dock was built against the back of the west side of the showroom. A portion of the loading dock was used for what they called a staging area, where furniture that would be going out for delivery the next day was assembled. Another portion of the dock was used for longer term storage of furniture. The structure was built using a wooden frame and sheet metal skin.

On the east side of the building, opposite the new loading dock, two workshops were constructed. They were built between the warehouse, showroom, and corridor. The construction type was similar to what was used on the loading dock with a wood frame and sheet metal exterior. The workshops were used as a place where furniture was repaired as well as refinished.

The additions of the loading dock and the workshops effectively connected all of the buildings together because there now lacked the proper fire separations. The fact that the structure was realistically considered one building now that these fill in additions were built, the City of Charleston would of had to enforce the requirement that a fully automatic sprinkler system be installed due to the overall floor area. But, because the additions were done without the knowledge of City Building officials, and the additions were not reported when the fire department conducted walk throughs, the Sofa Superstore was left without this critical system in place, and the stage was set for a tragedy.
History of building inspections

Prior to 1987, the Charleston Fire Department had the responsibility for conducting annual safety inspections for commercial buildings within the City. After 1987, that responsibility was then turned over to the City of Charleston Public Service Department. The Public Service Department, at some point discontinued the practice of conducting annual fire safety inspections on commercial properties. The last recorded inspection for the Sofa Super Store was done in 1998. This inspection was conducted prior to the illegal additions of the loading dock and workshops.

The Fire Department, despite not having the responsibility for the inspections of buildings in the City, continued to conduct familiarization walk throughs. From the walk throughs, the Fire Department put together pre-fire plans and building survey sheets.

After the fire, several firefighters interviewed stated that during their walk throughs of the building, they routinely saw debris and trash stored against the exterior walls of the loading dock. Any violations that were witnessed during these walk throughs were not communicated to the City Building Officials.

The state of the building with regards to the code violations and illegal additions, is an indication of the importance of routine code inspections by a responsible entity, whether it be a building official or the fire department. The argument can be made that the fire department should have participation in the inspection process due to the vested interest for safety to the public and their personnel.

As it stands today, the Fire Inspections Division of the Public Service Department has the responsibility of conducting annual fire inspections on all commercial buildings in the City of Charleston.
**Review of Building Features**

This is a list that summarizes the history, and building features relevant to the growth of the fire, its extension, and firefighter hazards:

- 1950's or 60's (no clear date)- 16,250 square foot grocery store built at 1807 Savannah Highway
- Occupancy changed at an unknown date to a furniture retailer.
- 1994- Permitted 7,200 square foot addition to the west showroom.
  - 3 roll down fire doors and a fire wall separated the main showroom from the west addition.
- 1995- Permitted 7,200 square foot addition to the east of the showroom.
  - 3 roll down fire doors and a fire wall separated the main showroom from the east addition.
- 1996- Permitted addition of a 15,600 square foot warehouse on the south end of the property.
  - Connected to the main showroom by a 20 foot long sheet metal corridor with a roll down fire door between the showroom and warehouse.
- Between 1996 and 2005- Construction of illegal additions including 2,200 square foot loading dock and workshops. Additions void the fire separation features of the building.
- Roof constructed of lightweight steel bar joists, concealed by a drop ceiling in the showrooms.
  - The drop ceilings in the showroom created a large void space between the ceiling and the roof.
  - There were no vents or natural ventilation openings in the roof for fire gases to escape.
- During the fire investigation, several exit doors from the showroom were found locked and secured from the inside.
- Some exits were eliminated due to the illegal building additions.
The Importance of Enforcing Building & Fire Safety Codes

The Fire and Its Spread

According to official reports, the fire originated outside of the loading dock. As indicated earlier, this was one of the non permitted additions to the building. The area where the fire is believed to have begun was an area where employees were permitted to smoke. Also in this outdoor area is where furniture and packing material was left for pick up by garbage crews.

The cause of the fire is officially undetermined, however, improperly discarded smoking materials are suspected to have started the blaze.

It is believed that once the fire started on the outside of the building, it entered the loading dock area through an unprotected opening. Once the fire got inside, it spread quickly throughout the structure because of the lack of fire safety features. Inside the loading dock area was plenty of fuel for the fire to grow in size rapidly including highly combustible furniture, and improperly stored flammable liquids.

As firefighters arrived and entered the showroom, they found only a light amount of smoke. When they went through the west showroom, one of the fire officers opened a set of double doors that lead to the loading dock area. As soon as those double doors were opened into the loading dock that was involved with fire, the rush of fresh air into the fire room sucked the doors open. The doors were unable to be closed again. It now became evident to the crews that there was a well involved fire in the building. As the fire raged in the loading dock and holding area, the showroom conditions remained relatively clear. However, it is believed that even though the showroom appeared clear, it is believed that the fire was extending through the void space between the ceiling and the steel bar joist supported roof. At the same time, fire had also extended into the warehouse that was adjacent to the south side of the loading dock. The walls of the warehouse that were allowed to be constructed of sheet metal because of the structure's distance to the main showroom, now provided an easy entry point for the fire.
to extend and ignite furniture that was stored in racks just on the other side of the wall.

In perspective, official analysis of the fire illustrates the main body of fire was able to extend from the loading dock, and then throughout the building via three main avenues:

- Into the holding room by way of an 8 foot wide, non fire rated door that was open at the time of the incident; and from there into the void space above the main showroom.
- Through the gaps of the sheet metal wall of the adjacent west show room; and then into the void space of the ceiling.
- Through the adjacent sheet metal wall of the warehouse, igniting furniture stored directly on the other side.

The fire continued its path from the west showroom, to the main showroom through the spaces where the fire doors were located. On investigation of the fire, it was found that all three of the roll down fire doors between the west and main showroom failed because of field mounted ceiling support angles being fastened through the hoods of the fire doors, which inhibited them from closing. The fire doors that separated the east and main showroom worked properly, except for one which did not close all of the way because a coat rack that was in the path of the closing door that didn't allow it to fully close. There was some damage to the east showroom; however it was not as extensive as the damage to the west and main showrooms.

Once the fire got into showroom areas, it quickly spread through the ceiling voids, weakening the structural members for the roof. The amount of fire present caused the showrooms to fill with smoke and fire gases leading to full involvement of these spaces, and caused the roof to collapse.
**Recommendations from Agencies**

The period following the fire was difficult for the City of Charleston and its fire department. While dealing with the grief of losing nine firefighters, organizations such as NIOSH, ATF, USFA, and South Carolina OSHA were tasked with determining what caused the tragedy, what could have been done to prevent it, and how to prevent further occurrences in Charleston and other fire departments.

The combined recommendations of these organizations, in addition to what was noted by the independent fire review team, included changes in fire ground operations, response, uniforms, procedures, training, and building code compliance issues.

The recommendations regarding building code compliance and pre-fire plans include (from NIOSH report):

- Establish a system to facilitate the reporting of unsafe conditions or code violations to the appropriate authorities.
- Requiring the use of sprinkler systems in commercial structures, especially ones having high fuel loads and other unique life safety hazards, and establish retroactive requirements for the installation of fire sprinkler systems when additions to commercial buildings increase the fire and life safety hazards.
- Require the use of automatic ventilation systems in large commercial structures, especially ones having high fuel loads and other unique life safety hazards.
- Coordinate the collection of building information and the sharing of information between building authorities and fire department.
Legal Issues

In addition to the various agency recommendations, there was other fallout from the Sofa Superstore fire. South Carolina administers its own OSHA program that investigated the circumstances of the fire. At the conclusion of their investigation, fines were levied against Sofa Super Store and the City of Charleston.

Among all of the violations cited, the following pertained to the structure of the building:

Violations for the Sofa Superstore

- Willful violation: Exit doors locked while the building was occupied. The assessed penalty for this violation was $29,400.
- Serious violation: Failure to properly maintained fire doors. The assessed penalty for this violation was $2,500.

Violation to the City of Charleston

- Serious violation: Standard operating procedures were not developed to cover the special hazards associated with fighting and attacking a fire involving a metal truss roof. The assessed penalty for this violation was $900.

In December of 2007, the City of Charleston announced that it had reached a settlement with South Carolina-OSHA regarding the violations and fines levied against them. In recognition of the Cities efforts to improve firefighter safety by implementing the recommendations of the Fire Review Team, SC-OSHA reduced the overall fines to a total of $3,160.

In the settlement, SC-OSHA withdrew the citation against the City for failing to have a written policy about fighting fires in buildings with metal trussed roofs. SC-OSHA acknowledged that they have no regulation about metal trussed roofs, nor is there a national standard.

Charleston now claims to have the first policy in South Carolina regarding fighting fires in
buildings that are constructed with roofs supported by metal trusses.

Another legal issue was the victims' families’ lawsuits against the business. As of this date, the 
Sofa Super Store has not settled the wrongful death suits filed by the families. In the summer of 2009, 
the attorneys for the owner of the Sofa Superstore requested a Judge to include the City of Charleston 
as a defendant to the families’ lawsuits.

The Judge in this issue ruled that the City would not be named as a defendant. The Sofa Super Store 
would of had to pay out less damages to the families if the City would have been added as a 
defendant because of their immunity. The City already did pay out full benefits to the families in accordance with the workers compensation laws.

In January of 2010, four Charleston firefighters filed suit against the Sofa Superstore owner as well as the manufacturers of the furniture stored at the location. The suit alleges that the illegal modifications to the building and the highly combustible nature of the furniture are what allowed the fire to spread and result in the collapse and death of the 9 firefighters. The four firefighters are suing for compensation and punitive damages because the incident has caused them post traumatic stress as well as depression.

**Conclusion**

It's evident that the building that was the Charleston Sofa Super Store was inherently dangerous due to the lack of fire safety features incorporated into it. Many factors were relevant to the tragedy including fire ground operations, command decisions, equipment, training, and fire department response procedures, but the condition of the building, especially its growth over the years, meant that the deck was stacked against the fire department from the beginning.

The Sofa Super Store was a ticking time bomb in the City of Charleston. There is no telling
how many more structures such as this existed at the time of this fire, and how many still exist. Unfortunately, it’s not hard to imagine that improperly maintained buildings such as this exist across the Country, as fire inspections and construction review are lacking, or even worse, non existent in many municipalities.

As was stated at the beginning of this report, there is no finger of blame being pointed at anyone, whether it be the City of Charleston, or the Fire Department. It is a lesson that must be heeded in honor of those who were lost, to prevent further occurrences.

In a July 2008 article in Fire Chief Magazine, J. Gordon Routley, the head of the Fire Review Team, was asked what the most significant lessons were from their report. He answered,” First, there's code enforcement. If the building owner had gotten permits for the construction that took place, if the code had been properly enforced, if there had been a regular inspection, then the situation never would have occurred. The fire would have set off two sprinkler heads and there'd be no story to tell. We can deal with a lot of these problems just by dealing with hazards in the community”.

The code enforcement process is a constant struggle to keep up with building changes, and fire hazards that require abatement. Basic building inspections and involvement in the construction process by the fire department should not be considered a luxury, but a necessity in the fire service.

Fire Departments must strive to become more involved in their municipalities’ business community. It’s important to form a relationship with them, and to help them understand what is required by the Fire Department, and why.

Primarily, the reason for fire code enforcement is to protect the lives of everyone in the building, including visitors, employees, and the fire department.

It is also necessary because municipalities are taking on a legal risk for not enforcing the codes that are adopted in their areas.

Building construction and fire prevention is always evolving. It's important to remember that
the building is the enemy during a fire, and the fire service must fully understand the enemy if a successful operation is going to be done. All firefighters must have a firm knowledge of building construction, and how fire will attack a structure and affect foreground operations. Building pre-fire plans should be the foundation for determining whether to make an offensive attack, or take defensive measures for fires that occur in complex structures such as this.

The incident in Charleston South Carolina should be a wakeup call to the fire service. It should serve as a lesson that standards for building construction and fire prevention be the cornerstone of our mission. The lives of the public and our firefighters rely on it.
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UN-PERMITTED ADDITIONS

WORKSHOPS

LOADING DOCK

HOLDING ROOM

OFFICES

FRONT OF BUILDING

(sliding door not an exit)

(exit eliminated)

(exit eliminated)

SOFA SUPER STORE
1807 SAVANNAH HWY.
DIRECTION OF FIRE SPREAD

1. Fire started outside the building, and extended into the loading dock.

2. Fire extends into holding room via an open overhead door.

3. Fire extends into main showroom through the overhead void space between the ceiling and the roof.

4. Fire extends through sheet metal wall between loading dock and west show room.

5. Fire extends through sheet metal wall between loading dock and warehouse.

SOFA SUPER STORE
1807 SAVANNAH HWY.