Fraternity and Sorority House Fire Safety

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How To Manage Greek Housing Fire Sprinkler Retrofit
Agenda

- Brief Overview.
- What to Expect From Fire Services.
- Knowing What To Ask For In Bid RFP’s.
- Costs.
- Externalities.
- Economic Considerations.
- Resources For Assistance.

Brief Overview
Student Housing Fire Statistics

Between 1990 and 2000:

- Annual average 1,400 fires in on-campus dormitories and fraternity and sorority housing.
- Over 50 fire deaths occurred in on-campus dormitories and fraternity and sorority housing during this decade.
- Half of the fires and 75% of the fire deaths occurred in fraternity and sorority housing.
- Average fraternity and sorority housing property loss is $580,000 per fire.

Source: NFPA

Student Housing Fire Statistics

- Leading Cause of Fires:
  1. Arson
  2. Cooking
  3. Smoking
  4. Candles

Source: NFPA
Key Factors in Fire Deaths

- Building Materials Used in Construction
- Alcohol
- Smoking
- Physical Impairment
- Origin in Common Use Area

NIST Study

Fire Sprinklers in Combination With Smoke Detectors Could Reduce the Fire Death Rate by 82%
What to Expect From Fire Services

Chapel Hill, North Carolina
The Tragic
Phi Gamma Delta House Fire

- May 12, 1996 will be difficult for many to forget - Graduation Day - Mothers Day
- Five (5) young people died in the fire
- Fire started in a lounge/bar in the basement and spread rapidly upward trapping the occupants
- Fire Sprinklers would have saved lives
Chapel Hill Fire

- Will Change Fire Code Oversight in Greek Houses Nationwide
- Outraged Fire Service
  - Wants Strict Enforcement of Fire Codes
  - Wants End of Political Intervention
  - Wants Mandatory Fire Sprinkler Law
  - Wants Right of Immediate Closure of a House for Overcrowding
  - Echoing NIST Study Statistics

From The Fire Service

- Expect A Fire Code Mandate, Specifically Fire Sprinkler Retrofit
- Short Compliance Timeframe
- After Hours Occupancy Load Checks
One of the Leaders of Our Nation’s Fire Service Fraternity and Sorority Fire Safety Movement

Dan Jones
Fire Chief
Chapel Hill, NC

Also Promoting Greek Housing Fire Safety

Bonnie Woodruff
Knowing What To Ask For in Bid RFP’s

NFPA 13 ?
NFPA 13R ?
NFPA 13D ?

National Design Standards

- National Fire Protection Association
  - NFPA-13, Commercial Fire Sprinkler Design Standards.
  - NFPA-13D, Dwelling Fire Sprinkler Design Standards. (One- and Two-family)
NFPA 13

Sprinklers are not required in bathrooms that are within dwelling units if:

- Less than 55 sq. ft. in area.
- Walls and Ceilings of noncombustible or limited combustible material.
- 15 Minute thermal barrier behind fixtures.

NFPA 13

Sprinklers are not required in clothes closets, linen closets, and pantries within dwelling units if:

- Area does not exceed 24 sq. ft.
- Least dimension does not exceed 3 ft.
- Walls and ceilings of non-combustible or limited combustible material.
NFPA 13

- Other than the qualified exceptions for bathrooms and closets, every other area must be protected including unoccupied concealed spaces such as attics.
- Attic sprinklers require unique pressure and flows and typically cause upgrade of water connection to street main.
- Avoid attic sprinklers – can increase cost of system by 20-50%.

NFPA 13R

Sprinklers shall be installed in all areas except:

- Bathrooms not exceeding 55 sq. ft.
- Clothes closets, linen closets and pantries not exceeding 24 sq. ft. & least dimension 3 ft.
- Open porches, balconies, corridors and stairs
- Attics, penthouses, equipment rooms, crawl spaces, floor/ceiling spaces, elevator shafts and concealed spaces.
NFPA 13D

Sprinklers shall be installed in all areas except:
- Bathrooms less than 55 sq. ft.
- Clothes closets, linen closets and pantries less than 24 sq. ft. least dimension 3 ft.
- Garages, carports and attached porches
- Attics, crawl spaces and concealed spaces
- Entrance foyers (if a second exit is provided)

Water Supply Options

- Street Main
  - Domestic Water Line
Domestic Water Line
Serves Both Domestic System
and Fire Sprinkler System

Water Supply Options

- Street Main
- Pump and Tank

Domestic Water Line
Sprinkler System
Domestic System
Check Valve
Customer Control Valve
Water Meter
Street Main

Water Storage Tank
Pressure Gage
Check Valve
Fire Pump
To Fire Sprinkler System
Water Supply Options

- Street Main
- Pump and Tank
- Pressure Tank

Water Supply Options

- Street Main
- Pump and Tank
- Pressure Tank
- Pressurized Tank
Water Supply

- Ask contractor to list water supply costs in bid documents.
- Water storage tank is a viable option if distance from water main is lengthy or roads must be breached. Ask contractor for water supply option.
- Underground piping, backflow prevention, and tap fees can be over 40% of total costs.

Cross Connection Protection

- Intended to protect drinking water from contamination via backflow.
- Some water purveyors require Reduced Pressure Zone backflow preventers.
- Double Check Valve is the highest level of cross-connection protection needed for Greek housing.
Sprinkler Selection

- Standard Spray Sprinklers.
- Quick Response Sprinklers.
- And Residential Quick Response Sprinklers.
- You Want **Residential Quick Response Sprinklers**!

Sprinkler 1 = 18 gpm
2 Sprinklers $13 + 13 = 26$ GPM

Costs
Retrofit Costs

- NFPA 13 – $3.25 - $5.00+ per sq. ft.
- NFPA 13R - $1.75 – 3.50 per sq.ft.
- NFPA 13D - $1.25 - $2.50 per sq. ft.
- Varies by region.

Fire Official and Sprinkler Designs

- Often Wants More Stringent Standard.
- Often Lacks Authority to Require More Stringent Standard.
- 95%+ Of Greek Housing, NFPA 13R is the Proper Low Cost Design Standard To Use.
- NFPA 13R limited to no more than 4-stories in height.
The Code Dilemma

- Code changes every three years.
- A 30 year old house witnesses 10 code revisions and may need major renovation to meet today’s code.
- All model building and fire codes allow exceptions to code requirements in Fire Sprinkler protected buildings.
- Some fire officials refuse to allow exceptions even though code allowed.

Alternative Solutions

Understanding the Fire Code Game Plan
Acceptable Alternatives May Be Used To Offset Non-Compliance With A Prescriptive Code Requirement Provided The Alternative Solution Provides The Same or Greater Level Of Fire Safety As The Prescriptive Code Requirement. The Alternative May Not Be A Basic Code Requirement

Alternative Solutions – Example 1

- Exit Access Corridor Width Too Narrow
  - Not Feasible To Correct
- Code Requirement Intended To Ensure Timely Egress Of The Occupants Before Fire Makes Exiting Untenable
- Alternative Must Deal With Exiting or Fire Suppression
Exit Access Corridor Width

- **Not Acceptable Alternatives:**
  - Smoke Detection
    - Basic Code Requirement
    - Does Not Suppress Fire
  - Space Non-Use Agreements
    - Not Enforceable

- **Acceptable Alternatives**
  - Additional Exits
    - Limit Travel Distance
  - Fire Suppression System
    - Automatic Fire Sprinkler
    - Automatic Chemical System
Alternative Solutions – Example 2

Exit Remoteness w/o sprinklers
1/2 the diagonal distance

Exit Remoteness with sprinklers
1/4 the diagonal distance

NFPA 101A

- NIST Developed Performance Codes
- Quantifies The Level Of Life Safety Required By Prescriptive Codes
- Provides Tables And Charts To Establish A Fire Safety Evaluation For A Property
- Can Be Used To Select Best Alternative Solution
NFPA 101A

- Can Be Used To Validate Literal Non-Compliance With Prescriptive Code Requirements
- Has been Court Tested
- Chapter 6, Section 3, May Apply To A Property That Was Originally Built As An Apartment or Boarding House

Investigate alternative code allowances before spending money on a fire sprinkler system and other construction features.

Fire code official may not know the alternative code allowances for fire sprinklers.
Contractor Overhead

- Most contractor’s business environment is established to do commercial installations.
- Accordingly, higher prices reflective of commercially driven overhead.
- Seek contractors who have established a Residential Division.

Contractor Workforce

- Some Greek Housing fire sprinkler retrofit being done under a “when workforce available” agreement.
- Much lower cost.
- Longer period of construction debris.
Aesthetics

- Fire sprinkler contractors typically install pipe, not drywall.
- Understand scope of work bid by contractor and visualize the end product.
- Sprinklers can be concealed behind crown molding.
- Drop ceiling may be required.

Externalities

Those issue external from the fire sprinkler system that impact cost.
Externalities Impacting Costs

- Tap Fees
- Impact Fees
- Permit Fees
- Assessment Fees
- Plans Review Fees

Economic Considerations
Economic Considerations

- Don’t expect government to pay.
- Some states establishing a low interest loan but money pool insufficient to meet needs.
- Many Greek organizations using typical fundraising strategies.
- Some fraternities using insurance rate reduction.

Economic Considerations

- Insurance
- Income Tax
- Liability Avoidance
- Business Interruption
- Life Safety Code
Insurance

- Rates Set By ISO or By State Insurance Department
- Rates Are Used As The Benchmark For That Building By All Member Insurance Companies

ISO Sample Rates/$100 Insured

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<th>Building</th>
<th>No Sprkler</th>
<th>Sprklered</th>
<th>%Change</th>
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Source: ISO
### ISO Sample Rates/$100 Insured

#### Content Rates

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Source: ISO

### Insurance Rates

- **Fraternity House Rates Expected to Be:**
  - **Non Sprinklered**
    - **.694** Per $100 Insured Value
  - **Sprinklered**
    - **.450** Per $100 Insured Value

Source: James R. Favor & Co.
Actual Insurance Data
Chi Psi Fraternity, Berkeley, CA

- Source: James R. Favor & Co.
- Insured Valve - $1,500,000
- Non-Sprinklered Rate $10,404
- Sprinklered Rate $  6,750
  - Savings $  3,654

Actual Insurance Data
Chi Psi Fraternity, Berkeley, CA

- Annual Insurance Savings - $3,654
- Sprinkler Cost Actual
  - $1.75/sq.ft. - $19,500
- Insurance Payback - 5.33 Years
- Expect sorority insurance payback to be at least double the time frame because sorority fire risk is much less than fraternity risk!
Income Tax

- Depreciation Allowance for Value of System - 27.5 Years
- Interest On A Loan
- Qualified Rehabilitation Tax Credit
  - Pre 1936
  - Historic Registry
  - 20% Tax Credit

Liability Avoidance

- Reasonable Level of Care.
- Shotgun Litigation.
- Typical $1 Million liability per life lost in a fire.
**Business Interruption**

- Fraternity and Sorority Housing should be viewed as a business.
- Vast majority of companies that suffer major fires never open its doors again
- Fire sprinklers limit fire damage to small area

**Life Safety Code**

- Exceptions For Fire Sprinklers Greater Than Any Other Construction Feature
- Sprinklers Make Compliance With Future Editions More Likely
Resources For Assistance

- NFSA
  - Technical assistance.
  - Regional response.
  - Mitigating conflicts.
  - Contractor directory.
Retrofit Fire Sprinklers

The Right Thing To Do

Thank You