

CLEARING UP FIRE SYSTEM NUISANCES

MHEC Loss Control Workshop

March 10, 2017



Midwestern Higher Education Compact

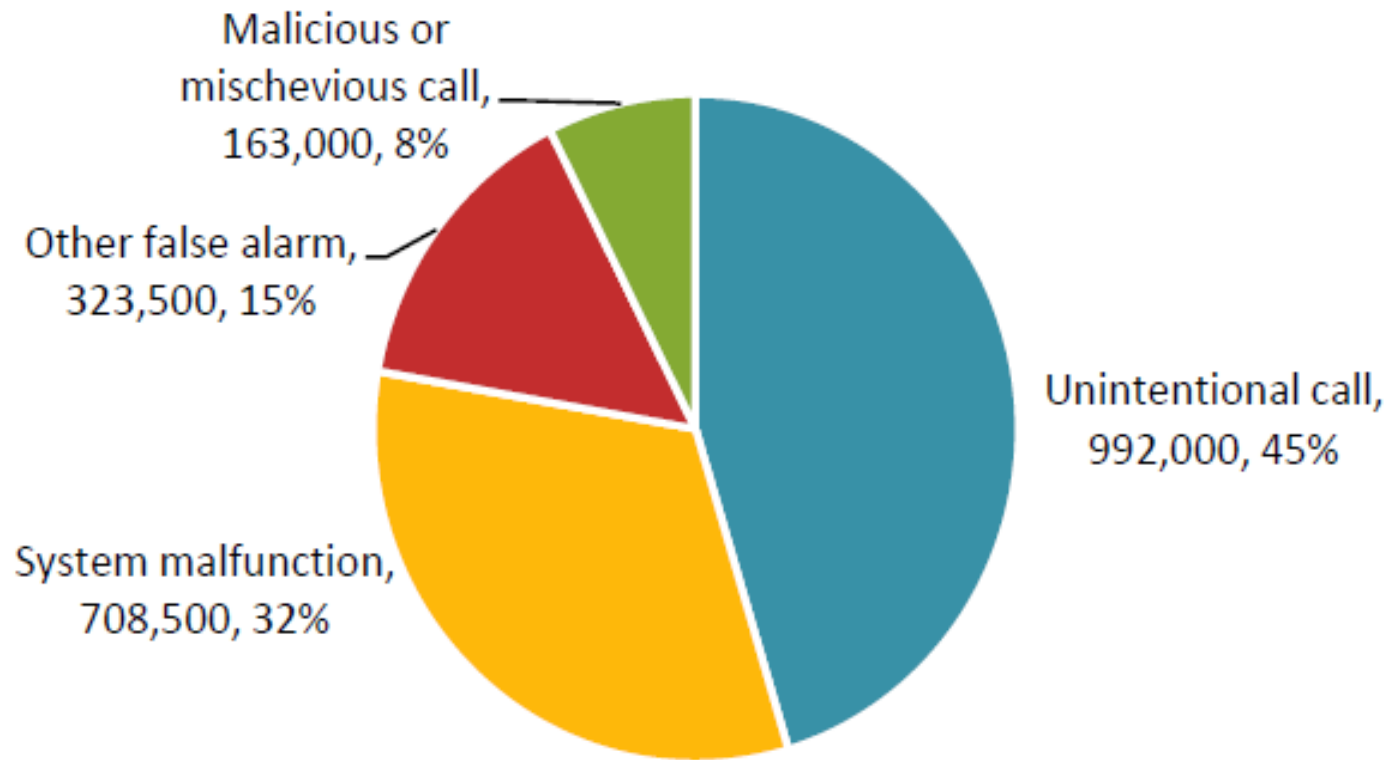
Jared Stolin
Property Risk Consultant
Marsh Risk Consulting

Agenda

- Design, Installation, Maintenance
- Devices
- Freeze Precautions
- Corrosion
- Sprinkler Heads
- MHEC Procedures for Impairments and Plan Reviews
- Open Discussion

False Alarms Report

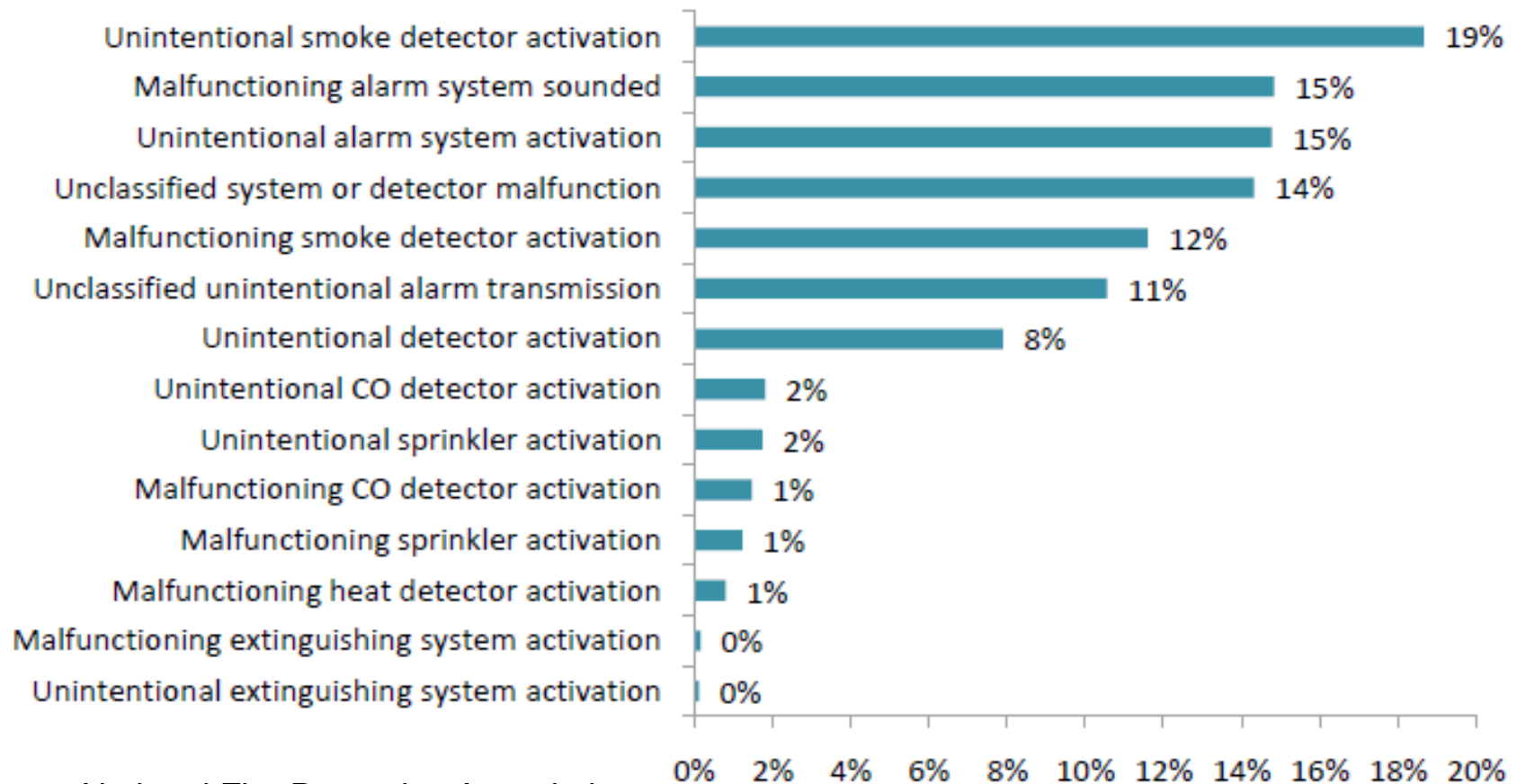
Figure 2. False Alarms Reported to U.S. Local Fire Departments in 2010



Source: National Fire Protection Association

False Alarms Report

Figure 4. Fire Department Responses in 2003 to False Alarms from Malfunctioning or Unintentional Activation of Fire Protection Equipment, by Incident Type



Source: National Fire Protection Association

Minimizing False Automatic Fire Alarms

- Plan Design – Qualifications of Designer
- Plan Review – Marsh and GRC, NFPA or FM Global Standards
- System Installation – Qualification of Installers
- Proper Inspection and Maintenance – Owner Responsibility, Qualification of Inspectors

Smoke Detectors

Causes of false trips in smoke detectors:

- Excess dust collection
- Dust liberation— particularly during periods of renovation or construction
- Heating equipment - elements can burn off dust causing smoke detection trips
- Hot Work (welding/soldering/brazing) common source of particle of combustion
- Cooking Equipment



Figure 1
Ionization Detector.



Figure 2
Photoelectric Detector.

Smoke Detectors

To Prevent false alarms:

- Regular cleaning of HVAC systems and ducts
- Inspection/clean HVAC systems prior to winter use
- Temporarily disable the system (impairment) during work activities where nuisance detection is possible
- Limit the use of portable heating equipment
- Replace old detectors, cleaning of detectors, replace type of detector if there is one more suitable for space



Manual Pull Stations

To prevent nuisance trips:

- Provide protective covers (malicious activations are harder to stop because the release must be accessible)
- Revisit codes to see if certain pull alarms are needed in all areas



Alarms Panel Supervisory Signals

- Supervisory (trouble) signals
 - Tamper Switch
 - Loss of Power Supply
 - Pump running
 - Low air (pre-action system)
- Can be isolated, bypassed, or disabled
- Too often the condition is left unchecked



Sprinkler Systems Freeze Prevention

MHEC Property Loss Claims:

- July 2013 – January 2017
- 40% of the total claims are 'Freeze' or 'Pipe Break'
- ~21% of Total Gross Loss Estimate

Sprinkler Systems Freeze Prevention

Some building spaces seem to have a greater exposure to freezing. They include:

- Attics
- Stairwells
- Lobby vestibules
- Elevator penthouses
- Above ceiling spaces
- Fire pump rooms and houses
- Dry pipe valve closets

Sprinkler Systems Freeze Protection – Wet Systems

- Ensure all areas can maintain 40 F, NFPA codes and standards use 40 F as the threshold for an adequate building temperature.
- Consider Electronic low building temperature supervision for areas of wet pipe systems that aren't normally occupied or have history of freeze

Sprinkler Systems Freeze Protection – Dry Systems

Trapped Water:

- Improper pitch
- Missing low point drains
- Low point drains not opened after flow testing



Verify your contractors is looking for adequate slope and low-point drains locations during testing/inspection

NFPA 13

8.16.2.3.2 In preaction systems, branch lines shall be pitched at least 1/2 in. per 10 ft, and mains shall be pitched at least 1/4 in. per 10 ft.

8.16.2.4.1* Provisions shall be made to properly drain all parts of the system.

Sprinkler System Cold Weather Checklist

Before the cold weather season begins, have qualified persons conduct inspection and maintenance actions including:

- Heating systems – Provide annual service
- Air-handling units – Verify dampers work and fans are controlled by thermostat for automatic shutdown in the event of freezing temperatures
- Non-freeze fire protection systems – Check air sources, air pressure levels, low point drains,
- Antifreeze solution in accordance with NFPA 25
- Insulating systems protecting water filled pipe – Verify coverings are intact
- Building envelope – Verify windows and doors are functional, weather tight, and in good repair
- Fire alarm systems – Check building low temperature and sprinkler system air pressure supervisory devices in accordance with NFPA 25 and NFPA 72
- Consider replacing wet-pipe sprinklers with non-freeze type systems in areas that are difficult to heat.



Cold Weather Precautions and Planning

MHEC Property Risk Control Standard

Section 5: Cold Weather Precautions and Planning

Appendix 5: Cold Weather Precautions Checklist

Master Property Program
Property Risk Control Standards
Version 1; January, 2015



SECTION C — FIRE PROTECTION SYSTEMS

	Prepare a cold weather plan which includes promptly clearing snow from roads, drives, access ways, fire pump houses, fire hydrants, sprinkler control valves/valve pits, hose houses, explosion relief vents and smoke/heat vents.
	Shut off, drain and properly tag any wet standpipes with piping located in inadequately heated areas.
	Drain and inspect dry pipe, pre-action and deluge piping, including pilot lines, for proper pitch.
	Service low points drains and remove any excessive priming water.
	Insulate valve enclosures and heat to at least 40°F.
	Test non-freeze (anti-freeze) sprinkler systems for proper solution concentration for temperatures anticipated.
	Ensure that sprinklers in the immediate vicinity of steam pipes, unit heaters, and other heating devices have the correct temperature rating.
	Ensure that portable and wheeled fire extinguishers exposed to freezing temperatures are designed for such service; if not, relocate them to heated enclosures.
	Fully service automotive fire apparatus
	Convert wet pipe sprinkler systems in inadequately heated buildings, or portions of buildings, to dry pipe or pre-action systems or provide adequate heat. Special attention should be given to sprinklers near windows, doors, passage ways between buildings, in attics, in crawl spaces, and similar areas.

SECTION D — WATER SUPPLIES

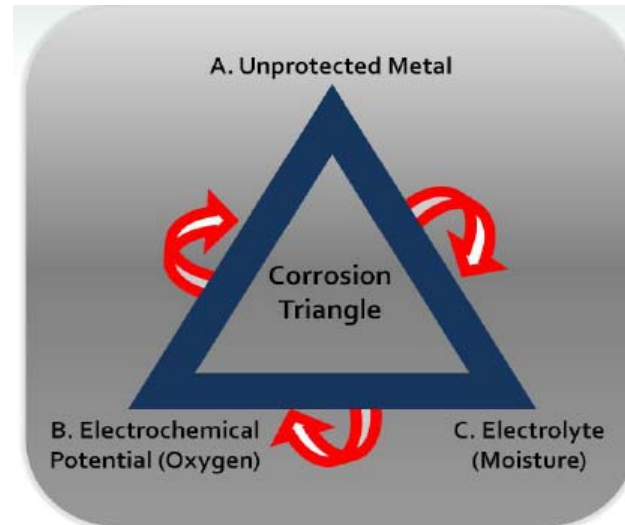
	Inspect fire hydrants, fire department connections, wall hydrants, fire pump test headers, water motor gongs, etc., for proper drainage.
	Protect sections of exposed piping and fire, domestic or mill water supplies from freezing.
	Install colored marker poles at hydrants, pits and valve locations.
	Ensure that sprinkler valve and meter pits are dry and frost-proof.
	Repair any leaking fire protection devices.
	Ensure that all fire hoses are properly drained, dried and stored.
	Ensure that gravity water tanks and fire pump suction tanks are full and properly heated to a minimum of 40°F, and inspect them for leakage and structural integrity. The temperature must be checked on a regular basis. Vents should be inspected for ice blockage.
	Service all water tank and fire pump house heating systems and maintain these systems in good working order.
	Full service diesel fire pump drivers and equip them with block heaters. Inspect and/or test the following:
	Batteries and battery chargers
	Fuel supplies
	Anti-freeze coolant solutions

SECTION E — HEATING SYSTEMS

	Service heating systems and correct any deficiencies:
--	---

Corrosion in Sprinkler Systems

- Corrosion: 5th leading cause of all sprinkler system failures, 40%-60% due to MIC (source FM Global)
- Microbiologically Induced Corrosion (MIC): “An electrochemical corrosion process that is concentrated and accelerated by the activity of specific bacteria within a fire sprinkler system, resulting in the premature failure of metallic system components.”
- NFPA 25 Handbook



Corrosion in Sprinkler Systems

- Leads to:
 - pinhole leaks
 - deterioration of components (gaskets, etc.),
 - ongoing repairs,
 - sprinkler head blockage,
 - restrictions of water flow in pipe



Corrosion in Sprinkler Systems

Prevention:

1. Use nonmetal pipe (data indicate galvanized pipe still has significant corrosion problems)
2. Eliminate oxygen (Nitrogen inerting via nitrogen generator)
3. Ensure proper testing and maintenance per NFPA 25 (3 year flow testing – should indicate waterflow path is not obstructed)
4. Reduce water (considered desiccant or air dryers for air compressors)
5. 5 year internal inspections per NFPA (wet and dry systems)
6. Can also test and treat the water supply when know MIC conditions exist



Sprinkler Head Damage

To limit potential for sprinkler head impact damage:

- Concealed sprinkler heads
 - ceiling and wall mounted versions
- Review placement for living quarters



Impairment Procedures

- Reduce the chance of major loss of property and interruption to facility operations
- MHEC member facilities are to implement impairment management procedures
- Any time a system is taken out of service (maintenance, emergency repair, renovation, etc.)



Master Property Program

A Program of the Midwestern Higher Education Compact

Property Risk Control Standards


Impairment Procedures

Includes:

- automatic sprinkler systems
- gaseous systems
- dry chemical extinguishing systems
- fire pumps
- fire water storage tanks
- underground fire mains and valves
- fire hydrants,
- detection systems
- fire alarm and communication systems

Impairment Procedures

- All impairments should be reported to GRC through their web-based impairment notification system portal:
<https://grcconnect.globalriskconsultants.com/ins/app/Main/Registry.aspx?q=0>
- Also a link to the GRC impairment system at:
<http://www.mhec.org/prop-risk-control-info>

 Global Risk Consultants®

Attach 1 copy of notification to impaired device(s). Place 1 copy at impairment monitoring station.

MHEC IMPAIRMENT NOTIFICATION

To GRC Impairment Desk GRC File No.:
impairment@globalriskconsultants.com Site Tag No.:

Facility Information

School: _____ City: _____
 Building: _____ State/Prov: _____

Person responsible for this impairment

Name: _____ Units: Metric English
 Email: _____ Phone: _____

Impairment Information

Start Time: _____ Anticipated Completion Time: _____
 Start Date: _____ Anticipated Completion Date: _____
 Type of impairment: Planned Emergency
 Area(s) impaired: _____ System(s) impaired: _____

Type of equipment impaired:

Sprinkler System Fire Pump Equipment Tagged? Yes No
 Gaseous Protection System Fire Water Tank
 Other Fixed Protection System Public Water Supply
 Fire Alarm/Detection System Other Description: _____

Reason for impairment:

Precautions to be followed:

Notify Fire Department Notify Area Supervisors Emergency Riser Connection
 Notify Alarm Company Additional Watch Service Others (describe below)
 Cease Hazardous Operations Work to be Continuous
 Prohibit Hot Work Hose/Extinguishers Available

Approved by **Impairment Coordinator** (Name): _____

Restoration Information

System restored at: _____ Date: _____ Time: _____
 Alarm System Normal Main Drain Test Conducted Static pressure: _____ psi
 Valves Re-opened and Sealed/Locked Residual pressure: _____ psi

Person providing Restoration Notification (Name): _____

MHEC Plan Review Services

Submit plans to GRC (and Marsh):

- All newly-constructed buildings and buildings undergoing major renovations where the post-renovation total insured values (inclusive of finished building and occupied content values) are anticipated to exceed \$5million.
- Roof projects exceeding 10,000 sq.ft.
- Fire sprinkler projects involving more than 25 sprinkler heads
- Room-wide fixed extinguishing system installations (example: gaseous agent or inert agent system for new data center)
- Fire water system installations or improvements (examples: New fire main networks, fire pumps)
- Other projects desired by a member to be reviewed, but outside the project parameters listed above.

Conclusion

- Majority of unwanted alarms and nuisances can be traced backed to design, installation or maintenance deficiencies
- Nuisance detectors : consider replacing, cleaning, relocation, or change type or sensitivity
- Review freeze precautions prior to winter
- MHEC Property Risk Control Standard
 - Impairment Procedures
 - Plan Review Guidelines

Open Discussion



References

- The Fire Protection Research Foundation
- National Fire Protection Association (NFPA)
- FM Global
- mhec.org