

Fire Alarm System Replacement Considerations

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Learning Objectives

This presentation will feature the following learning objectives:

1. How do you know if your fire alarm system needs upgrade or replacement?
2. How can you plan for a successful fire alarm system replacement?
3. What design options are available for fire alarm system replacements?
4. What four factors should influence a quality fire alarm system replacement plan?



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Disclaimer Slide

Today's presenter is currently employed by *Jensen Hughes, Inc.*, which provides many of the services referenced in this presentation.



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Do You Need a Fire Alarm System Upgrade or Replacement?

FIRE ALARM SYSTEM REPLACEMENT CONSIDERATIONS



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Aged Fire Alarm Systems

- Tens of thousands of systems are aged, inadequate, ineffective or even non-functional
- As age increases, troubles increase, and total-system failures are common
- Upgrading an FACU may require much more!
- Other considerations:
 - Change in Occupancy or Use
 - New Safety Requirements, like Emergency Communications
 - Interface with New Security or Mechanical Equipment
 - Legal Mandates
 - Risk Reduction
 - Significant Building Remodel or Additions



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Upgrade or Replace Top 3

- **Age**
 - FACU over 25 years old (1998)
 - Smoke Detection over 20 years old (2003)
 - Smoke Alarms over 10 years old (2013)
 - Carbon Monoxide Detection over 10 years old (2013)
- **Deficiencies / Troubles**
 - Functional failures (logs?)
 - Wiring failures
 - Unavailable replacements
- **Change in Occupancy / Use**
 - Change in Use
 - Occupant Load
 - Storage



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Upgrade or Replace Q&A



When should my fire alarm system be upgraded or replaced under NFPA 72?

- NFPA 72 does not directly require system upgrades or replacements
- Based on system age, environment, occupancy, use, and other factors
- Can the existing fire alarm system support a major upgrade in HVAC, controls, power, or elevator systems?
- Have a professional inventory and evaluate the existing system

If I am told my fire alarm system is obsolete, does NFPA 72 require me to replace it?

- No
- First, verify the situation with an unbiased professional
- Can you locate replacement parts?
- Has someone tried to “fix” the system to maintain its operational status

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Upgrade or Replace Q&A



If I have a problem with my obsolete fire alarm system, why should I begin planning a replacement when NFPA 72 does not require that?

- If you have a catastrophic failure of an obsolete fire alarm system, you will require an emergency full system replacement.
- Facility managers should always know the age and true condition of their installed fire alarm system
- A planned system replacement can be as much as one half the cost of an “emergency” system replacement!

Under NFPA 72, what are the steps necessary to upgrade or replace a fire alarm system?

- Immediately address any fire alarm system older than 20 years!
- Re-evaluate your fire alarm system needs before beginning the system replacement.
- Do not allow a contractor to convince you that a “one-for-one” replacement of all devices and notification appliances will be either the right thing or that it will be code compliant!
- Potential risk that the AHJ will not accept the new system.

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Upgrade or Replace Q&A



What is considered an impairment to a fire alarm system and how must an impairment be addressed?

- Impairment: Any condition that affects the ability of the system to provide the intended life safety operations of the system.
- Must be corrected immediately or within a reasonable time from notification.
- A fire watch may be required for both planned and unplanned impairments.
- Must notify AHJ and the supervising station

If we are performing a remodel project, how does that affect my fire alarm system?

- Depends on the size of the remodel, the impact of the project on the existing fire alarm system, and the need to expand the existing fire alarm system to be code compliant.
- Verify if your jurisdiction enforces NFPA 241, *Safeguarding Construction, Alteration, and Demolition Operations*.
- Engage the services of a Fire Protection Engineer and do not rely solely on your Contractor's opinion.

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Upgrade OR Replace?

- What challenges do you face?
 - Lack of funds
 - Long deferred maintenance and now overdue for replacement
 - Occupied buildings?
 - Lack of existing system inventory
- Danger of significant component failure
- What does code require for today's use of the building?
- Do you, or should you, move from a horn-based system to a voice-based fire alarm system?



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Design Options for Fire Alarm Replacements

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Design Options

- Serious decisions must be made on how to design a fire alarm system upgrade or replacement.
- FM stresses on time and economics
- Consider pros and cons of three potential options:

THE VENDOR APPROACH

THE CODE CONSULTANT
APPROACH

THE TRADITIONAL A&E
APPROACH

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The Vendor Approach



PROS

- FM has strong working relationship / trust with Vendor
- Existing equipment can be upgraded with the existing system manufacturer's equipment
 - No UL Listing compatibility issues
 - Reuse of some existing devices / locations
 - Reuse of existing system wiring
- Potentially quicker upgrade or migration
- Potentially simpler plan review and commissioning
- Local vendor has good knowledge of local codes and AHJ requirements



CONS



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CONS

- Does not include the services of a Fire Protection Engineer
 - Could miss critical items
 - Interfaced system like fire sprinkler, access control, door egress, fire/smoke barriers, and mechanical/electrical system upgrades or changes are not adequately addressed
- Potential for a questionable, code minimum, "one-for-one" replacement design
- Local vendor may not have the design expertise
- Vendor may have to sub-contract installation
- Limited system features or UL compatibility issues



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The Vendor Approach

- What could go wrong?



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The Code Consultant Approach



PROS

- Variety of excellent and well-qualified code consultant firms
 - May have national or international reach
 - May provide engineering, construction management or even fire investigation services
- May provide strong assistance to FM who may have limited expertise with life safety systems
- Often high-quality designs using FPE services
 - Needs analysis, un-biased existing system review
 - Specification writing and bid review / award opinions
 - Construction management and commissioning oversight
- Usually vendor-neutral design



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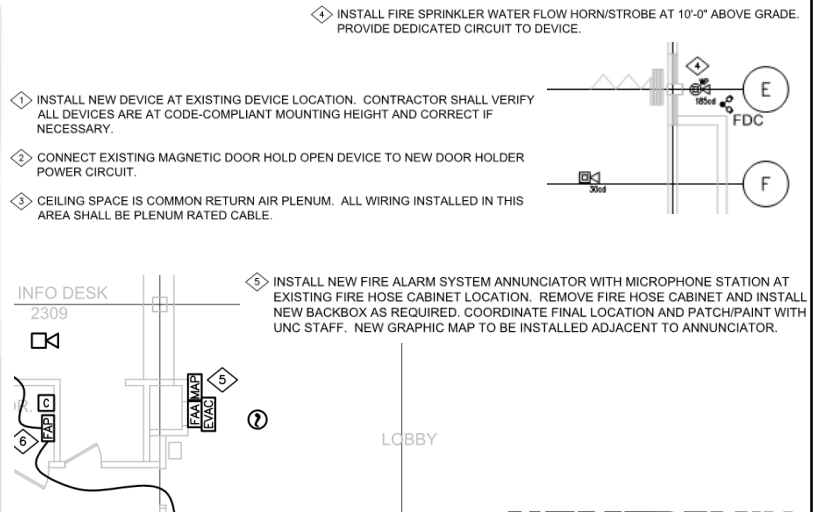
CONS

- Local presence may not be available; increased cost
- Lack of local Code and AHJ knowledge
- Services may be limited to life safety systems, with upgrades to mechanical or architectural features being handled separately
- Increase in upgrade time due to specification writing and open bid process
- Vendor chosen may require every feature of the existing system to be replaced



The Code Consultant Approach

• What could go right?



The Traditional A&E Approach



PROS

- Traditional approach for many owners and FM, especially for large facilities
- A&E Firm manages the entire process from owner consultation and conceptual design to construction and commissioning
- Safe approach for building owner and operator
- Complete building approach, reviewing each system and sub-system with a needs-analysis and life cycle approach
- Strong specification-driven approach with General Contractor-led installation team



CONS

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CONS

- Long construction schedule
- Significantly more complex commissioning process
- Could be overkill where only a life safety system upgrade is necessary
- May leave out the services of a dedicated Fire Protection Engineer
- Design/Construction Team may rely heavily or push compliance requirements down to the fire alarm vendor

The Traditional A&E Approach

- What is going on?

ARCHITECT
CIVIL ENGINEER
STRUCTURAL ENGINEER
MECHANICAL ENGINEER
ELECTRICAL ENGINEER
FIRE ALARM ENGINEER
FIRE PROTECTION ENGINEER

HENSEL PHELPS
Fire - Life - Safety

Bid Package #6
Pre-Bid RFI Log

Project: ██████████
Project Manager: ██████████

ITEM	SUBSYSTEM	DATE REQUESTED	DATE SUBMITTED	RESPONSE REQUIRED	ISSUE / QUESTION	REGISTERED BY	DATE RESPONSE RECEIVED	Q&A RESPONSE	RESPONDED BY	DATE RESPONDED
1	Steel Surface Finishing	11/22/21	12/3/21	A10.8000	SSM 2 is shown on the A10.8000 Finish Material Schedule but not shown called out on the plan drawings. Please confirm material is not used if material is used, please specify where.	LT	12/10/21	SSM 2 is not used on Phase 2.	STN	12/10/21
2	Column Covers	11/22/21	12/3/21	A10.8000	SCC-1 and SCC-3 are shown on the A10.8000 Finish Material Schedule but is not shown called out on the plan drawings. Please confirm material is not used if material is used, please specify where.	LT	12/10/21	SCC-1 and SCC-3 are not used on Phase 2.	STN	12/10/21
3	Column Covers	11/22/21	12/3/21	A10.2010 A10.8100	SSM 10.2010 shows SCC-5 column covers along the walk finish area A10.8100 call for SCC-7 column covers. Please clarify what is required.	LT	12/10/21	These column covers should be SCC-5, the callouts on SSMS 10.2010 will be corrected to SCC-5.	STN	12/10/21
4	Ceiling & Recessed	11/22/21	12/3/21	Spec. 09.28.23	Submittal table showed is not called out on drawings over the parking structure. Please confirm specification 09.28.23. Standard Recessioned Recessed Panels are not required. If it is required, please clarify where the system.	LT	12/10/21	Recessed ceiling detail may occur in the LED/DTSC Product to be issued at a later date.	STN	12/10/21

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Cost Considerations

- Cost is always a significant consideration, with much debate...



The Vendor Approach

- Theoretically, the lowest cost
- Potential for lease options
- Without competitive bid or cost check, is it really a cost competitive number?
- Often requires other contracts or projects to “complete” the project
- Large facility management time investment

The Code Consultant Approach

- Competitive bid process, quality cost analysis & scope of work review
- Best option when upgrades only involve life safety systems
- Open bid/open specification process can lead to life safety system cost reduction

The Traditional A&E Approach

- Competitive bid process, quality cost analysis & scope of work review
- Normally highest cost option due to extensive scope of work involved
- More easily upgrade other building systems like HVAC, elevators, architectural features, etc.
- Open bid/open specification process can lead to life safety system cost reduction
- Possible owner advantages with construction insurance risk and safety

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Quality Considerations

- The quality of the design effort will determine the long-term success
- Need a Fire Protection Engineer involved!



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projects, but standardized design criteria are not available for many buildings and hazards. An Engineer is the only legally authorized entity to evaluate fire protection needs and determine whether the design is appropriately based on a standardized or special approach. Even where a



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The Worst Approach

- To do nothing at all!
- Risk and liability increase with system age.
- Building facility managers do well to consider:
 - What are my real needs now and over the next couple of years when it comes to the life safety of my building occupants?
 - What real system problems do I currently face and what design options described herein can help me address my real needs?
 - What changes have occurred with my building, or might occur in the near future, that affects the above design option I need to consider?
 - If I lead with a fire alarm upgrade, what other systems should follow, and how does that affect what kind of design I should select now?



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Factors for a Successful Fire Alarm Replacement

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You Need a Plan!

- With upgrade or total replacement, you need a solid plan!
- Commitment from all stakeholders
- Address the goals of life safety, property protection, reliability, equipment standardization, and operational cost.



Credit: Presenter Media

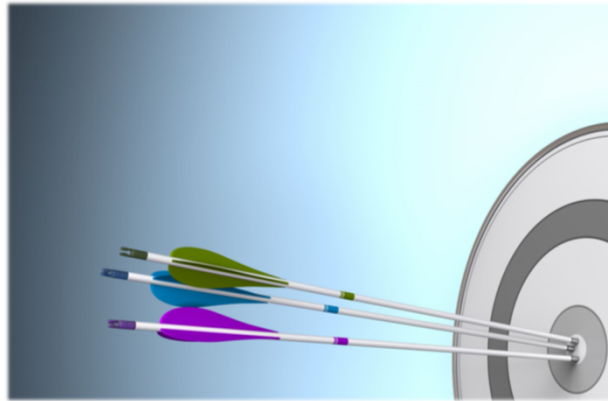
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Mission Effectiveness

- Four factors that affect mission effectiveness and operational reliability:

- Design
- Equipment
- Installation
- Maintenance



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Design



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- Proper design is critical!
- Understand and verify the qualifications of the designer selected.
- Have they considered the big picture?
- What systems or equipment within the building need to be interfaced with now or in the future?
- What advantages will a voice fire alarm system provide for your and what design changes are required to make that happen?

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Equipment

2

- Quality equipment, not just 'what will work'!
- Increased variety provides competitive pricing.
- Your designer should be able to provide a good understanding of the various strengths and weaknesses of various manufacturers.
- What new technologies exist to improve your system performance?

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Installation

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- Does your fire alarm vendor have the installation skills for a large fire alarm replacement or upgrade?
- Does the electrical contractor lack knowledge of specific low voltage or fire alarm specific techniques?
- If 'in-house' installers are used, can they meet the timeline?
- Design meets installation meets programming!

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Maintenance



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- Inspection and Maintenance ensures long-term reliability and operational effectiveness
- Will the new system require a significantly larger amount of inspection, test, or maintenance?
- Is there capacity for additions or modifications?
- What is the test plan and who can perform it?
- Increase life span and return on investment.

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Final Thoughts



- There is much to consider with a fire alarm system upgrade or replacement.
- Create a replacement plan based on the principles discussed.
- Create a strong partnership between:
 - Owner / Facility Manager
 - System Designer
 - Manufacturer / Vendor
 - Installer
 - AHJ
- Consider additional new technology that can be built into your new system.

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Resources

Need more resources? Join fnPrime!



Q&A

Thank You!
Any questions?



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Please fill out my session survey through the event app!

