Demobilizing Construction Sites Safely
Using NFPA 241

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About AWC
Codes and Standards
Green Building
Manufacturing Environmental Regulation
Advocacy and Public Policy
POLLING QUESTION

1. What is your profession?
   a) Architect
   b) Engineer
   c) Code Official
   d) Fire Service
   e) Builder/Product Manufacturer

COURSE DESCRIPTION

Due to COVID-19, construction sites are being shut down all over the country. Abandoned and unprotected construction sites pose a risk to the community. During this shutdown it is the goal of the fire service that builders leave their construction site as reasonably fire safe as possible. This program provides guidance that is based on compliance with Chapter 33 of the 2018 International Fire Code, Chapter 33 of the 2018 International Building Code, and NFPA Standards 1 and 241.
IN THE EVENT OF A SITE SHUTDOWN

It is recommended that jurisdictions give time to builder’s to finish the building envelope or make arrangements to protect the exposed wood from the weather.

If it’s possible/practical to activate fire protection systems (sprinklers) it is recommended.

• Early installation of permanent or temporary fire compartments can limit fire spread
• Address protection of door openings, windows, shafts and service penetrations
• Provide temporary fire alarm system and modified evacuation procedures to address expected fire spread rate
• Provide separation distances or fire barriers between adjacent buildings appropriate to the fire hazard
NAHB JOBSITE RECOMMENDATIONS

Construction Jobsite Safety Recommendations

NAHB is a leading member of the Construction Industry Safety Coalition (CISC), which has provided a detailed plan to outline the steps that every employer and employee can take to reduce the risk of exposure to COVID-19.

The plan describes how to prevent worker exposure to coronavirus, protective measures to be taken on the jobsite, personal protective equipment and work practice controls to be used, cleaning and disinfecting procedures, and OSHA guidance on what to do if a worker becomes sick.

- CISC Coronavirus Preparedness and Response Plan for Construction
- COVID-19 Jobsite Checklist and toolbox talk
- Template Letter: Essential Industry Employee Notification
- Template Letter: Employee Notification of Potential Exposure


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Free to Qualified Officials

Fire Safety Manuals

Links & Resources

Webinars

Checklists & Guidance documents

Quarterly newsletters

www.constructionfiresafety.org
LEARNING OBJECTIVES

Upon completion, participants will be better able to:

1. **Risks & Hazards**
   - Identify risks & hazards on construction sites. Focus on hazards that can occur during the shutdown.

2. **Codes & Standards**
   - Apply model codes and standards that pertain to safety precautions during construction.

3. **Best Practices**
   - Identify best practices regarding housekeeping, equipment, flammable and combustible materials, and other hazardous activities on construction sites.

4. **“Light’s Out” Plan**
   - Identify steps to take before shutting down the site to ensure fire safety.
Nature of the Problem

U.S. fire departments report the following structure fire averages
- 3,750 under construction
- 2,560 during major renovations
- 2,130 under demolition

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Campbell, Richard, NFPA, Fires in Structures Under Construction, Undergoing Major Renovation, or Being Demolished, April 2017

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Significant Fires During Construction
Bound Brook, NJ  
January 12, 2020

- Meridia Main  
- 174-unit apartment  
  - 2 story concrete podium  
  - 4 stories wood frame  
- 7 alarms  
- 70 departments/ 3 Counties  
- Destroyed 4 surrounding buildings  
- Power cut to downtown for a day  
- Commuter rail line shut down  
- 100 homes evacuated  
- Arson - arrest made

Wilsonville, OR  
March 31, 2019

- $10 million loss  
- 1am in the morning  
  - Three alarms  
  - Six roof exposure fires  
- Four-story wood-frame  
  - 20-unit apartment building  
- Radiant heat melted 14 vehicles  
- Incendiary fire - ATF
Polling Question

2. Which element is NOT part of the three legged stool of effective firefighting?
   a) FD Access
   b) Water Supply
   c) Early Notification
   d) None of the above
Understanding Risks & Hazards

It’s no surprise that construction sites can become an unsafe environment

SOURCES OF IGNITION

- Smoking Materials
- Cooking
- Open Flames
- Electrical equipment
- Light fixtures
- Heat and Sparks from grinding and cutting metal
- Arson
SOURCES OF FUEL

- Combustible refuse and trash
- Building materials
- Flammable gases - e.g. propane
- Flammable liquids
- Packaging materials

OWNER’S & BUILDER’S RESPONSIBILITY

Prevention Starts Here!
OWNER RESPONSIBILITIES

- **Safe work environment** – every owner’s primary responsibility
- **Comprehensive management policy** – starts at the top and works down to labor force
- Building owner & general contractor – **high priority on fire safety**
- Builder’s primary responsibility – **work closely with AHJ**
  - ensure **all regulatory requirements are met**

NFPA – FIRE SAFETY PROGRAM

"A **fire safety program shall be included in all construction, alteration, or demolition contracts**, and the right of the owner to administer and enforce this program shall be established, even if the building is entirely under the jurisdiction of the contractor." NFPA 241 Sec. 1.3.4

- The **owner must designate** a person who shall be **responsible for the fire prevention program** and **authorize them to enforce** its provisions. NFPA 241 Sec. 7.2
FIRE SAFETY PROGRAM

All of the following should be addressed in a fire safety program

• Good housekeeping
• On-site security
• Fire protection systems: installation as construction progresses and preservation of existing systems during demolition
• Training of employees
• Development of a pre-fire plan w/ local fire department
• Rapid communication
• Consider special hazards
• Protection of existing structures from exposure to fire

PROGRAM MANAGER RESPONSIBILITIES

NFPA 241 sec. 7.2.4

• Proper training in the use of fire protection equipment
• Development of pre-fire plan with local FD
• Responsible for presence of adequate fire protection devices
• Supervision of the permitting of hot work
• Weekly self inspection program
• Authorize planned impairments
FIRE SUPPRESSION RESPONSIBILITIES

The Codes & Standards that pertain to safety precautions during construction

MODEL CODES THAT SAFEGUARD CONSTRUCTION

Chapter 33

Chapter 16

Chapter 33
AHJ RESPONSIBILITIES

Team providing local government representation

1. Building Department – provides enforcement and oversight of building construction process in accordance with state and local statutes
3. Fire Suppression Division – develops
   • pre-fire plan, tactics, and strategy
   • site assessment of water supply, access to the area, and exposure protection

Polling Question

3. Which model code does NOT safeguard construction?
   a) NFPA 1
   b) IFC
   c) NFPA 1620
   d) NFPA 241
BEST PRACTICES & CODE REQUIREMENTS

...regarding site security, housekeeping, hot work, equipment fueling, smoking, food preparation and other hazardous activities on construction sites

SITE SECURITY

• Guard service shall be provided when required by the AHJ

• Security fences shall be provided where required by the AHJ

• Entrances to the structure under construction must be secured

• The guard service must be trained in the following
  • Notification procedure
  • Function & operation of fire protection equipment
  • Familiarization of fire hazards
  • Use of construction elevator
SITE SECURITY

- Site security plan, based on security assessment, should include:
  - Personal observations
  - Log books
  - Video technology
  - Scheduled patrol routes
  - Proper notification procedures

In 2019, there were 27 multifamily construction fires

16 are reported in the media as “suspicious”
SITE SECURITY

THEY ALWAYS PUT UP FENCES AFTER THE FIRE!

- Thoughts on Site Security
  - Video/artificial intelligence fence line monitoring.
  - "Real fence" surrounding the site - secured into the ground/pavement/sidewalk. No "weighted base" temp fencing.
  - Signs – "video security" and "no expectation of privacy"
**SEPARATION DISTANCES**

- There must be adequate separation between buildings under construction and temporary construction related structures*

- Example from Table 4.2.1
  - 20 feet of temp structure exposing wall length would need to be 30 feet away from building under construction

  *a 75% distance reduction permitted with automatic sprinkler system in temporary structure

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**BEST PRACTICES - HOUSEKEEPING**

- Clear premises of all refuse and process waste

- Remove waste, scrap and debris daily

- Keep all building site areas free of accumulated packing materials (e.g. pallets, paper, etc.)

- Provide appropriate metal bins (or dumpsters with lids) for combustible waste disposal such as oil rags
  - Empty these containers at the end of every shift
  - Take contents off-site
### BEST PRACTICES - HOUSEKEEPING

- Storage places accessible to firefighters
- Clear spaces around stored materials and provide adequate gangways between them
- If a sprinkler system is installed, all material stacks should not impede effective sprinkler operations
- Trash dumpsters located at least 50 feet from the building – the further away the better

### BEST PRACTICES - ELECTRICAL

Electrical equipment and transmission systems can be an ignition source during construction

Care is required to minimize risk

- Install and maintain all electrical systems and equipment, including temporary installations, in accordance with state regulations
- Regularly inspect all portable electrical devices and extension cords
- Remove any faulty or damaged equipment from use immediately, label accordingly, and remove or secure it to prevent future use
BEST PRACTICES - WASTE MATERIALS

- Remove combustible waste materials, including dust and debris, from the building and immediate vicinity
- Store scrap lumber and combustible materials before its disposal as far from buildings as reasonably practicable
- Unless specific items of vegetation are planned to be retained, remove all dry vegetation 60 feet from buildings under construction and work areas
- Prohibit open fires, including burning of waste materials, on site

BEST PRACTICES - COMBUSTIBLE MATERIAL STORAGE

Where significant volumes of wood framing and other combustible building materials are to be stored on site, they should be stored in a secure area at least 75 feet away from any buildings or partially constructed buildings
BEST PRACTICES - COMBUSTIBLE MATERIAL STORAGE

If combustible building materials have to be stored within or close to the building under construction, the storage area should

- Have controlled access
- Monitored by guard service or fire detection system
- Fire extinguishers close by
- Be protected from ignition sources

BEST PRACTICES - FLAMMABLE LIQUIDS & GASES

Storage and use of flammable liquids and gases require specific safety measures that address risks of use in confined spaces and potential explosions, in addition to normal fire risks.

Typical requirements found in NFPA Standards include

- NFPA 30- Flammable & Combustible Liquids Code
- NFPA 54- National Fuel Gas Code
BUILT-IN FIRE PROTECTION FEATURES

The following components and systems are not considered to be effective in minimizing the risks until they are complete:

- Fire stairs, including fire-resistant walls
- Fire-protective materials to structural steel
- Automatic fire sprinkler systems and other automatic suppression systems
- Fire compartment boundaries, including fire doors, penetration seals, and general protection of other openings

FIREFIGHTING ACCESS: EXTERIOR

- Designate a suitable location as a command post provided with plans, emergency info, keys, and communications
- Every building must be accessible by a road with an all weather driving surface of at least 20’ of unobstructed width
- Dead-end roads more than 150’ must include a turnaround
- Access road(s) must be within 150’ of all exterior 1st floor walls
FIREFIGHTING ACCESS: STAIRS

- Provide at least one useable stairway at all times
- Extended upward as each floor is completed
- Stairways must be lighted
- Enclose stairways once exterior walls are complete
- Provide identification signs to include floor level, stair designation, and exit path direction

FIREFIGHTING ACCESS: STANDPIPES

- Maintain in conformity with building progress and ready for use
- Install at least one standpipe, prior to construction exceeding 40', within one floor of the highest point of construction (IFC Section 3313.1)
- Must be conspicuously marked and readily accessible FDC
- One hose outlet on each floor
**FIREFIGHTING ACCESS: WATER SUPPLY**

- Fire protection water supply (temporary or permanent) shall be available once combustible material accumulates - NFPA 241
- Where underground water main or hydrants are to be provided, they shall be installed, completed, and in service prior to start of construction

**FIREFIGHTING ACCESS: WATER SUPPLY**

- An approved water supply for fire protection...shall be made available as soon as combustible materials arrive on the site. IFC Sec. 3312
- What is considered an approved water supply that meets the requirements of the IFC or NFPA 241?
WATER SUPPLY: EXAMPLE OF A LOCAL INTERPRETATION

- The minimum fire flow required when the contractor brings combustible materials on site is 1,500 gpm at 25 psi.
- At least one hydrant shall be within 500 feet of any combustible materials.
- Contractor is responsible for ensuring that the water supply is available at all times.

POLLING QUESTION

4. The code requires at least _____ of unobstructed width for FD access roads?
   a) 15 feet
   b) 20 feet
   c) 25 feet
   d) 30 feet
“LIGHTS OUT” PLANNING

Recommendations to Safeguard the Construction Site

“LIGHTS OUT” PLAN: FD ACCESS

- Contact information, access keys and plans be updated and readily available nearest the closest entry point to the building or site in a lockbox or document box that is secured.
- Access roads must be cleared of any obstruction, storage and vehicles
- Secure holes and openings in floors, roofs and shaft-ways with appropriate similar rating products
“LIGHTS OUT” PLAN: SECURITY

Security is a “must.”

- Trained security force
- Cameras
- Combination of guards and cameras
- Monitor the status of utilities
- Fire protection and alarm features must be returned to their state of ready and with appropriate signage

“LIGHTS OUT” PLAN: GENERAL FIRE SAFETY

- Dumpsters need to be emptied of combustible waste
- Combustible building materials should be removed or reduced and secured
- ALL flammable and combustible liquids must be removed
FIRE SUPPRESSION UNITS- PRE-INCIDENT PLANNING

FOR NOW, YOUR PRE-INCIDENT FIRE PLAN MUST:
- Be conducted from the exterior.
- Be as reasonably practical to achieve a 360-degree size up including roof view.
- Adhere to the policy of social distancing
- Not allow personnel to enter a locked site unless it is an emergency.

LIFE SAFETY CONSIDERATIONS MUST TAKE PRECEDENT DURING THE PRE-FIRE PLAN.
- Hydrant locations and color.
- Initial Tactical Operations- Offensive or Defensive fire attack.
- Potential exposures.
- Apparatus placement
- Potential structural collapse.
- Fire department sprinkler/standpipe connections.
- Fire alarm annunciator panels.
- Building construction type.

Polling Question

5. True or False? Before shutting down a construction site all holes and openings in floors, roofs and shaftways must be secured.
   a) True
   b) False
CONCLUSION
What to do, when you have to stop!

1 Risks & Hazards
We have identified causes of construction fires and risks and hazards associated with construction sites!

2 Codes & Standards
We reviewed safeguards during construction codes in NFPA 241, IFC Chapter 33, and NFPA 1.

3 Best Practices
We reviewed best practices to mitigate risks and hazards identified.

4 "Lights Out" Planning
We went through components of a well-prepared fire safety plan for when you have to demobilize the construction sight.

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