



Construction Fire Safety Best Practices

BCD-231



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NOTE: The information regarding 2021 IBC & IFC, NFPA 921, and NFPA 1620 is for informational purposes only. New York State has not adopted these documents but may in a future Code cycle

COURSE DESCRIPTION



This program provides information to assist the Fire Service charged with responsibilities for fire and life safety on a construction site to follow best practices. Builders and building officials will also benefit from the information provided. The purpose is to reduce the risk of injuries and losses from fire. The information applies to the design and planning stages as well as the actual construction phase of buildings. Many hazards can be addressed before they become an issue by adoption of best practices and rigorous code enforcement. The primary focus of this program is on large buildings during construction. Other topics that include demolition, alterations, renovations, repair and maintenance, as well as newly-completed buildings will be discussed. 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.

LEARNING OBJECTIVES

Upon completion, participants will be better able to:

1

Risks & Hazards

Identify risks & hazards on construction sites. Learn the leading causes of fires in structures under construction.

2

Codes & Standards

Apply model codes and standards that pertain to safety precautions during construction. Including code changes in the 2021 IFC.

3

Best Practices

Identify best practices regarding housekeeping, hot work, equipment fueling, smoking, food preparation and other hazardous activities on construction sites.

4

Fire Safety Plans

Identify the components of a good fire safety plan and be able to work with builders to develop a plan.



www.constructionfiresafety.org

Free to Qualified Officials
Fire Safety Manuals
Links & Resources
Webinars
Checklists & Guidance
documents
Quarterly newsletters





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Construction Fire Safety Coalition

October 17 at 5:30 PM

Let's keep these firefighters in our thoughts and prayers!



BALTIMORESUN.COM

Seven firefighters, two others injured in gas explosion, fire in Northeast Baltimore

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Construction Fire Safety Coalition

October 17 at 10:33 AM

Nearly 400 Texas fire marshals attended an October 14 presentation on fire protection during construction at the 20th Annual Texas Fire Marshal's Association annual conference in Austin.

Rob Neale, principal at Integra Code Consultants and Coalition for Construction Fire Safety partner, presented a two-hour seminar promoting the Coalition's message on construction site hazards and mitigation strategies.

Although only a handful of attendees indicated they currently enforce the fire prevention program requirements of the International Fire Code or NFPA 241, following the presentation several indicated they would redouble their efforts to do so.



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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

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



Risk Management

Construction market hammered by rising fire, water damage claims

Claire Wilkinson

June 04, 2019



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Construction

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Construction companies are stepping up risk management efforts and making greater use of technology in response to a growing number of fire and water damage claims during construction projects, according to industry sources.

Related Stories



Inland marine premiums double in decade: Best

Most Read in Risk Management

1. 2019 Break Out Awards
2. Damaged Noah's Ark replica awash with insurer resistance
3. AIG promotes McElroy to head North American general insurance
4. Dismissal of suit challenging IRS

The Insurance Industry

Fire Loss: Most Severe

- Fire is almost three times the average claim size from water damage.
- Fire losses are only one-twelfth of all claims in total

Wilkinson, Claire, *Construction Market Gets Hammered by Rising Fire, Water Damage Claims*, Business Insurance.com, Posted June 4, 2019.



Significant Fires During Construction

Construction Fire Safety Best Practices



PALMER TOWNSHIP (EASTON), PA

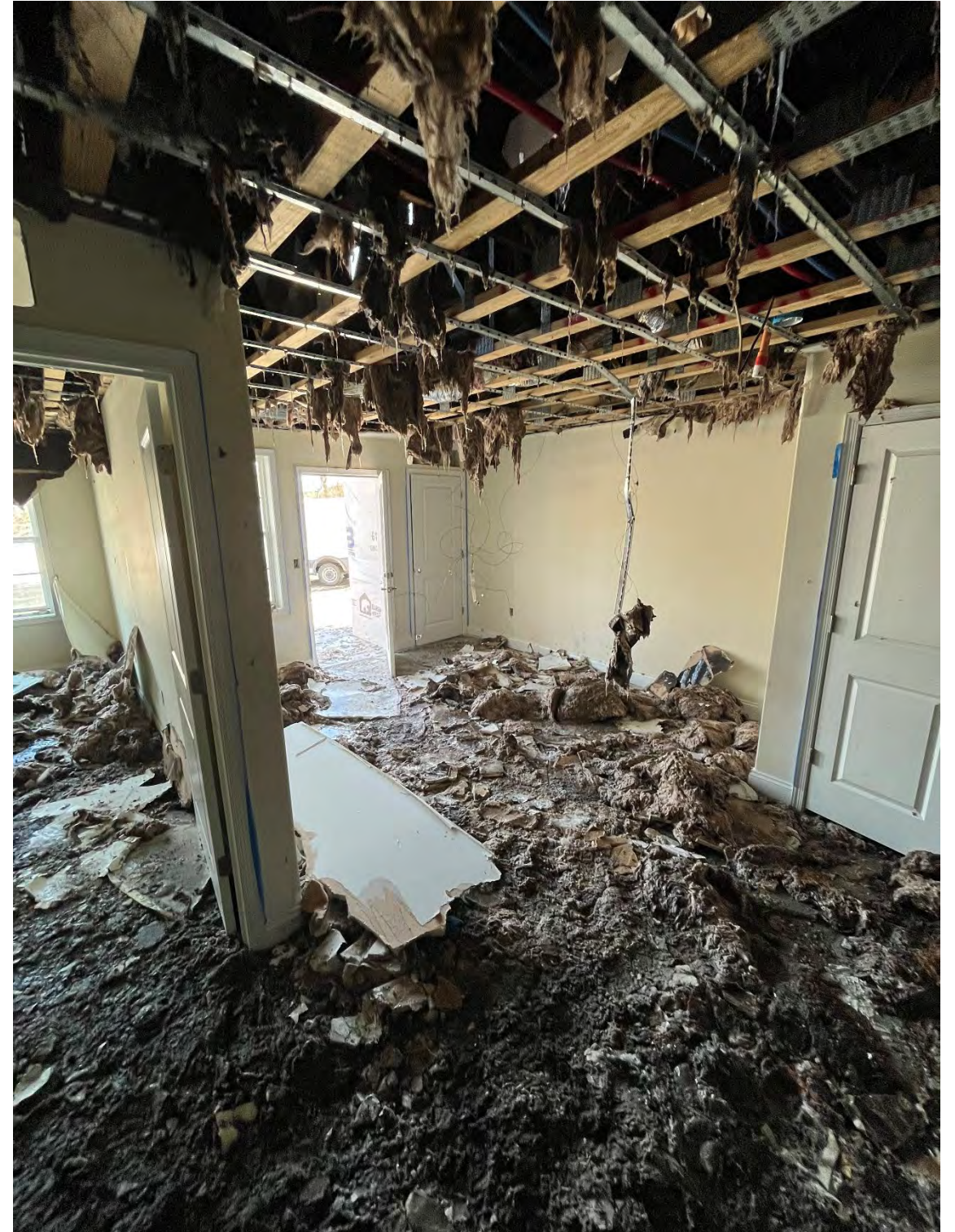
1-31-22

- Identical Buildings-1 involved
 - 3 Story Type VA
 - Platform Wood Frame
- 2 alarms
- Fire was the result of a heater placed too close to combustibles.
- Ruled accidental by fire marshal.



PALMER TOWNSHIP (EASTON), PA

1-31-22



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



Courtesy NJ.com



FAIRFAX COUNTY, VA: FEBRUARY 8, 2020



Time: Approximately 8am

Location: 2800 block of Poag Street, Penn Daw, Fairfax County, VA

Response: 5 Alarms- Firefighters from Alexandria, Arlington, Fort Belvoir and Prince George's County assisted Fairfax County.

Injuries: One firefighter and one civilian (passerby) were taken for minor injuries

Cause: Cigarette dropped into a combustible garbage chute



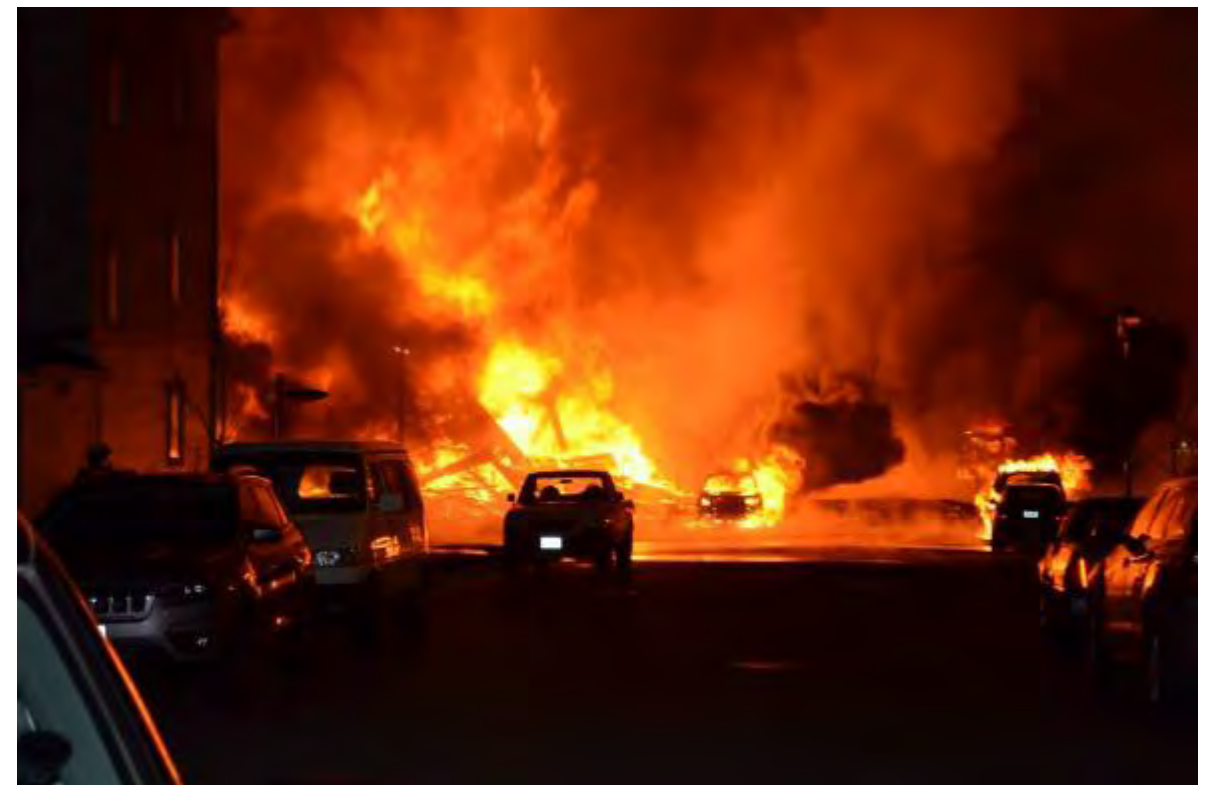
Wilsonville, OR

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



Courtesy the Oregonian



Courtesy the Oregonian

Denver, Colorado

March 7, 2018

- Two dead, one missing
- Middle of afternoon
 - Three alarms
 - Six roof exposure fires
- Five-story wood-frame
 - 80-unit multi-family
- Radiant heat melted 40 vehicles
- Undetermined cause



Courtesy the Denver Post



Courtesy the CBS Denver

College Park, Maryland April 24, 2017

- Seven-story mixed use
 - Retail/residential
- Sprinkler system installed, but not yet operational
- UMD closed, senior housing evacuated
- \$39 million
- Cause: accidental
- Razing top five floors



Courtesy the Washington Post

Waltham, Massachusetts July 23, 2017

- Apartment building under construction
 - 264 units
 - Five buildings
- 10 alarms depleted Boston-region fire resources
- High winds affected spread
- Chief Paul Ciccone: “Fire was intentionally set”



Courtesy Scott Eisen for the Boston Globe

Oakland, California July 7, 2017

- The Waverly
 - Seven story, mixed use
 - 328,000 ft²
 - 196 units
- Construction crane collapse risk
- 100 neighbors evacuated
- ATF: Undetermined cause
- Similar to other East Bay arson fires



Photo credit: SF Gate. com

Boston, Massachusetts June 28, 2017

- Treadmark Building
- 83-unit apartment
 - Occupancy due within 17 days
 - Six stories
- Sprinkler status operational, but not activated
- 90-minute call delay
- Emergency generator exhaust too close to combustibles

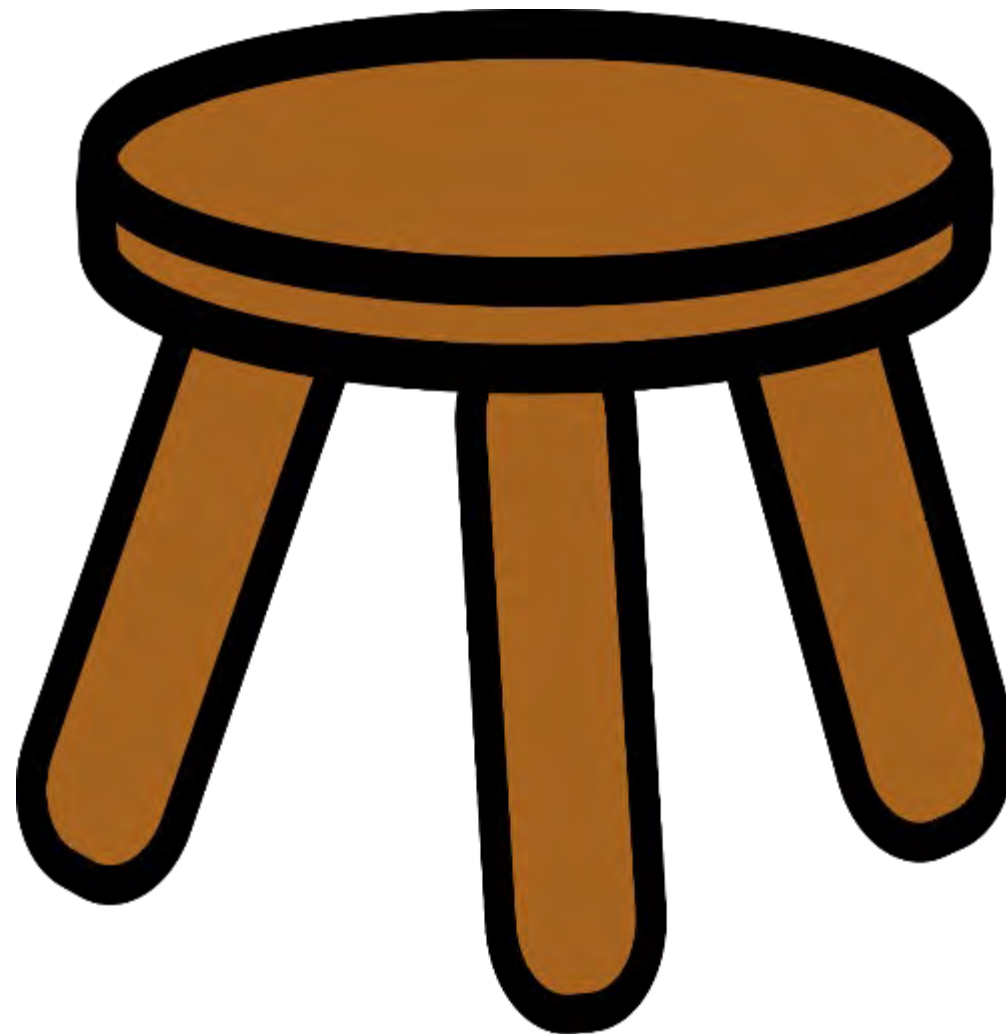


Photo courtesy Boston.cbs.local.com

The Three-legged Stool of Effective Firefighting

FD ACCESS

**EARLY
NOTIFICATION**



WATER SUPPLY



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

CAUSES OF CONSTRUCTION FIRES



- Cooking Equipment - 27%
- Heating Equipment - 13%
- Intentionally Set Fires - 13%
- Torch, Burner, or Soldering Iron - 6%
- Smoking Materials - 5%
- Exposure Fires - 3%
- Playing with Heating Source - 2%

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

FIRES OCCURRING DURING MAJOR RENOVATION



- Heating Equipment - 15%
- Intentionally Set Fires - 13%
- Torch, Burner, or Soldering Iron - 10%
- Cooking Equipment - 9%
- Smoking Materials - 4%
- Exposure Fires - 3%

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

FIRES OCCURRING DURING DEMOLITION



- Intentionally Set Fires - 42%
- Torch, Burner, or Soldering Iron - 12%
- Heating Equipment - 3%
- Cooking Equipment - 2%
- Smoking Materials - 2%
- Exposure Fires - 2%

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



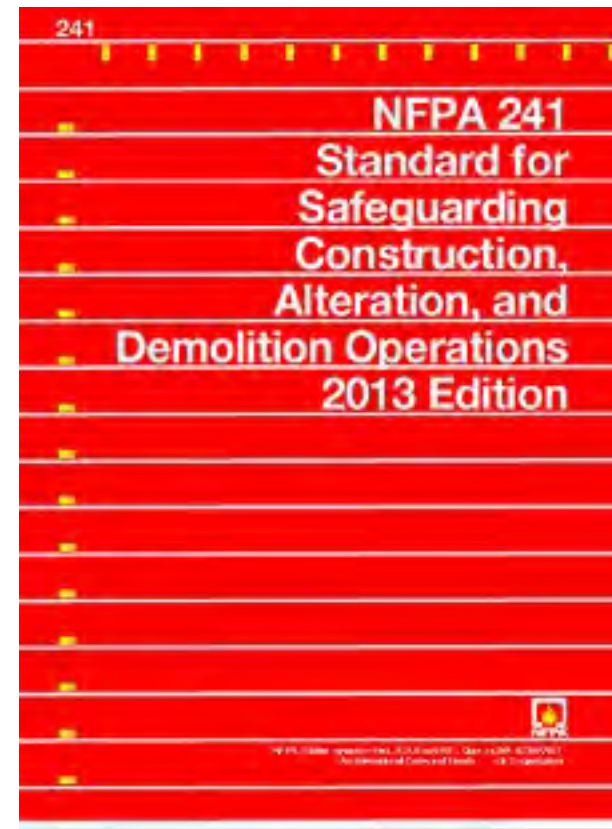
CODES & STANDARDS/ ROLES & RESPONSIBILITIES

...that pertain to safety precautions during construction

MODEL CODES THAT SAFEGUARD CONSTRUCTION



Chapter 33



Chapter 16



Chapter 33

NYS STANDARDS THAT SAFEGUARD CONSTRUCTION

NYS specifically adopted the provisions of NFPA Standard 1142 (Standard for water supplies for Suburban and Rural Firefighting) to address the concerns for addressing fires in these specific areas.



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
 - control **permitting process for hot work**



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



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



EMPLOYEE RESPONSIBILITIES

Establishment and maintenance of work conditions is management's responsibility

However, all employees should also be fire and safety conscious

- Report - all potential fire hazards
- Observe - all fire safety rules, procedures and codes of safe practice
- Use - tools, safety equipment and personal protective equipment provided



JOB SITE VISITOR RESPONSIBILITIES

Job site visitors must check in with site supervisor for safety reasons

Visitors must wear appropriate PPE

- Hard hat and safety vest
- Goggles
- Stout shoes

Visitor safety tips

- Staying visible
- Remaining alert
- Being aware of surroundings
- Never approaching equipment, unless the operator has acknowledged their presence
- Not parking vehicles in any way that would block fire department access



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
2. Fire Prevention Bureau – enforces adopted Fire Code provisions
3. Fire Suppression Division – develops
 - pre-fire plan, tactics, and strategy
 - site assessment of water supply, access to the area, and exposure protection



ACTIONS TO BE TAKEN

What specific things can you do to improve upon fire and life safety on Construction sites?

- Understand Fire & Building Code provisions designed to increase safety on-site
- Understand and implement appropriate NFPA Standards
- Train, educate, and certify all personnel on what to look for and what to do if a fire occurs
- Eliminate un-safe practices
- Identify and follow "best practices"





FIRE SAFETY PROGRAM

Construction Site Safety Plans

FIRE SAFETY PROGRAM

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

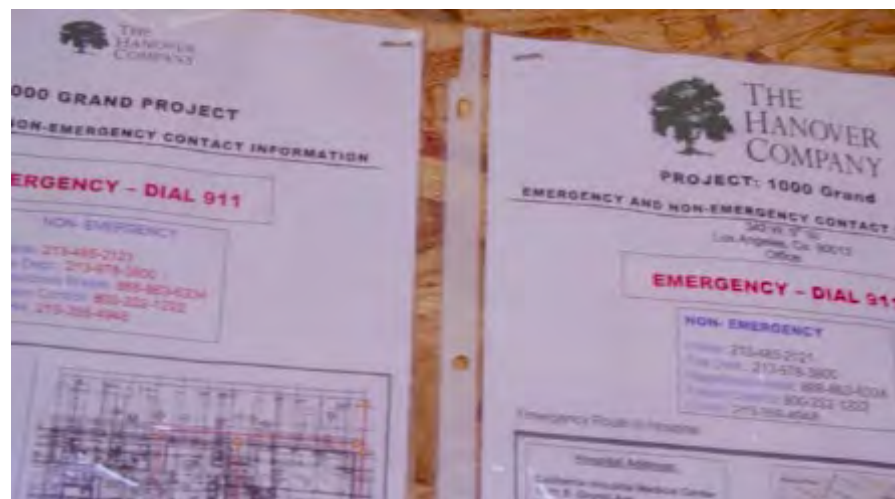
- Good housekeeping
- On-site security
- Fire protection systems: installation as construction progresses and preservation of existing systems during demolition
- Training of employees
- Development of a pre-fire plan w/ local fire department
- Rapid communication
- Consider special hazards
- Protection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

FIRE SAFETY PLAN

NFPA 241 Chapter 7 / IFC 3308

Fire prevention plan (FPP) should include

- Organizational structure and responsibilities for fire safety
- Name and contact phone number of person(s) responsible for FPP compliance
- Arrangements for recording fire safety training given to site personnel and visitors, including required actions in case of fire
- Risk assessments and FPE reports requiring specific fire safety measures
- Fire safety requirements in compliance with applicable fire and building codes
- Procedures for reporting emergencies to the fire department
- Procedures for emergency notification, evacuation and/or relocation of all persons in the building under construction which are aligned with site emergency notification plan



FIRE SAFETY PLAN: CONTINUED

- Fire prevention measures
 - security requirements
 - control of ignition sources
- Procedures for Hot Work permit operations, cutting and welding
- Electrical supplies and equipment
- Compliance with 'no smoking' policies
- Plant equipment and vehicles
- Prohibition of open fires
- Control/reduction of combustible materials
- Control flammable liquids and gases
- Proper storage and disposal of waste materials
- Fire department access, facilities and coordination
- Evacuation plan and procedures



FIRE SAFETY PLAN: CONTINUED

- Fire protection provisions
 - portable fire extinguishers
 - standpipes
 - hydrants, hose reels and water supplies
 - automatic fire sprinklers*
 - automatic fire detection and alarm systems*
 - temporary emergency lighting*
- Separation from adjacent buildings and other hazards
- Special provisions if work is being carried out in occupied buildings
- Urban wildland interface clearance requirements, if appropriate

*These items can only be evaluated during the final stage of construction





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



SITE SECURITY

- As of June 2019- 12 multifamily construction fires
 - 11 are reported in the media as “suspicious”



SITE SECURITY

THEY ALWAYS PUT UP THE FENCES AFTER THE FIRE!



SITE SECURITY

- Convincing corporate leadership of the critical importance of site (physical) security during daytime operation and night time trespass prevention is a challenge.
 - An effective security perimeter interferes with site logistics, can be limiting to placement of construction stock
 - Most contractors aren't sufficiently sophisticated to understand how fences really affect site logistics.
 - Fences need not be a barrier to site logistics, a common challenge among urban builders.



SITE SECURITY

- 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



BEST PRACTICES - HOUSEKEEPING

- Housekeeping “rules” not the same as housekeeping “activity”
- Can quickly deteriorate from lack of action
- Supervisors need to enforce consistently and take action when it is violated
- NFPA 241 deals with waste disposal in Section 5.4



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 - HOT WORK

Hot work includes all activity that could initiate fires or explosions by providing a heat source that ignites combustible material

Definitions

- Hot Work – operations including cutting, welding, thermite welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of torch-applied roof system or any other similar activity
- Hot Work Area – the area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the Hot Work
- Hot Work Equipment – electric or gas welding or cutting equipment used for Hot Work



BEST PRACTICES - HOT WORK

- Hot Work Permits – issued by Permit Authorizing Individual (PAI) under Hot Work Program permitting welding or other Hot Work to be done on locations
- Hot Work Program – a permitted program, carried out by a general contractor allowing them to oversee and issue permits for Hot Work conducted on the job site
- Permit Authorizing Individual – a person trained in safety and fire safety considerations concerned with Hot Work. Responsible for reviewing the site(s) prior to issuing permits as part of the Hot Work permit program and following up as the job progresses
- Torch-Applied Roof System – bituminous roofing systems using membranes that are adhered by heating with a torch and melting asphalt back coating instead of mopping hot asphalt for adhesion

BEST PRACTICES - HOT WORK

Hot Work should be closely controlled

Implement a permit system including

- Requirements for written permission (a permit) prior to commencement of hot works
- Hot works permits must be specific to a location, activity and work period and must not provide blanket coverage for more than one location activity or work period



BEST PRACTICES - HOT WORK

Other management practices to reduce ignition potential

- Reinforce accountability and ensure constant fire mitigation measures
- Combustible materials at least 35 feet away from Hot Work area
 - If they cannot be moved, cover area with a fire-resistant blanket
 - Sweep floors in these areas of all combustible waste and debris
- Cover all floor and wall openings within 35 feet of a hot work area to prevent hot sparks from entering walls or falling to a lower level
- Hot Works should never be conducted in the presence of flammable gases, vapors, liquids, or dust



BEST PRACTICES - HOT WORK

- Provide appropriate fire extinguishers that are properly sized, fully charged, and ready for operation
- Keep evacuation paths clear
- Assign a suitably trained and equipped person to fire watch during hot works until released by the PAI
- PAI to inspect hot works areas at day's end
 - Also by security staff, if reasonably practicable and safe to access the area
- Provide means for communicating an alarm in accordance with Emergency Action Plan



BEST PRACTICES - FIRE WATCH

- NFPA 241 Sec. 5.1.3
- Fire watch shall be assigned no other duties
- A fire watch shall be posted for the duration of the hot work
- For torch applied roofing operation, fire watch must remain for 2 hours after work is complete



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 - ELECTRICAL

- Securely fasten any equipment that operates at surface temperatures exceeding 167°F to prevent hot parts from contact with combustible materials
- Equip fragile components, such as temporary lights, with guards to prevent accidental damage where exposed to impact
- Low voltage equipment should be used where practicable
- Remove temporary wiring immediately after completing the job
- Use only metal halide lights with Type O lamps for temporary lighting
 - Do not permit storage of combustible and flammable materials directly below such temporary light fixtures due to catastrophic lamp failure potential

BEST PRACTICES - ELECTRICAL

Open Splices and bad wiring



BEST PRACTICES - SMOKING

- Smoking materials are a significant ignition source for fires on construction sites
- Smoking restrictions should be applied throughout a construction site because hazardous materials, such as flammable liquids and gases, may be used in open as well as enclosed areas
- If provided, designated smoking areas should be constructed of (or protected by) noncombustible materials and separated from buildings under construction by at least 20 feet
 - Also provide safe receptacles for smoking materials
- Smoking restriction zones must be clearly identified, sign-posted and strictly enforced

BEST PRACTICES - COOKING

- Prohibit food preparation that involves the use of open flames
- Designate areas where meals can be warmed utilizing a microwave or other non-flame producing heat



BEST PRACTICES - HEAVY EQUIPMENT & VEHICLES

- No vehicles should be parked inside of buildings unless fire detection systems are installed and monitored
- Make sure that the equipment has cooled down and there are no leaks in the fuel or hydraulic system
- Locate equipment so that their exhausts discharge away from combustible materials
- Prevent combustible materials coming in contact with hot surfaces on vehicles
- Fuel storage and service areas should not be located within structures under construction.
- Policies for refueling of tools and equipment should require that the appliance be cool before refilling

BEST PRACTICES - WASTE MATERIALS

- Schedule delivery of combustible materials as close to installation as possible
- Remove combustible waste materials, including dust and debris, from the building and immediate vicinity at shift end
- 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 - HEATING EQUIPMENT

- Locate temporary areas to protect against weather outside of any structure
- Conduct refueling of heating devices outside and safely
- Maintain separation distance from combustible materials
- Require personnel to be in attendance when the heater is running
- Restrain device to minimize risk of knock-over or incorrect location
- Inspect regularly



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, as well as, any location where hot work is undertaken



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
- Not in a hot work location
- Monitored by guard service or fire detection system
- Fire extinguishers close by
- Be protected from ignition sources

BEST PRACTICES - EXPOSED COMBUSTIBLE MATERIALS

For buildings of four or more stories, where the exposed façade is combustible or construction is predominantly of combustible construction, consider additional controls

- Progressively clad exposed combustible materials with fire-resistant coverings
- If sprinklers are to be provided, progressively commission the system

BEST PRACTICES – PASSIVE SYSTEMS

- 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

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 51- *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*
- NFPA 54- *National Fuel Gas Code*



NATIONAL FIRE PROTECTION ASSOCIATION

The leading information and knowledge resource on fire, electrical and related hazards

BEST PRACTICES - GAS LINE PURGING

Gas line purging requirements as described by National Fuel Gas Code

- To the outdoors
- Continuously monitored to discharge point, if done indoors then combustible gas detector must be used to monitor discharge point
- Ignition sources kept at least ten feet from discharge point
- Discharge point at least ten feet from openings and 25 feet from intakes
- Evacuate non-purging employees
- Purging stopped when 90 percent gas volume reached

BEST PRACTICES - FLAMMABLE LIQUIDS

- Train workers in storage and handling of dangerous goods
- Keep storage of flammable liquids and gases to a day's supply
- Store flammable liquids and gases in clearly labeled containers compliant with NFPA Standards
- Provide clear signage identifying materials being stored and prohibiting smoking, open flame, hot works, and use of mobile phones



BEST PRACTICES - FLAMMABLE LIQUIDS

- Deal with leakage or spillage promptly and safely
- Keep flammable liquid containers and tanks closed when not in use
- Segregate storage of flammable liquids and gases from materials that could intensify fire
- Properly remove flammable materials in approved containers before work is carried out on an empty container or vessel
- Liquids may only be used for their intended purposes

BEST PRACTICES - GARBAGE CHUTES

- Construct chutes of noncombustible materials and locate outside building envelope
- Minimize accumulation of combustible materials close to the chute
- Change-out dumpsters frequently to prevent chute clogging
- Protect combustible trash chute interior by a temporary automatic sprinkler within a recess near chute top*

*Can be connected by a firehose or commercial rubber hose not less than 3/4" diameter

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



CASE STUDY- ROCKVILLE, MD 40 UPPER ROCK

- 149 unit, 4 story, construction fire
- Montgomery County, MD Fire Chief stated that to control the fire his units were flowing as much as 5,000 gpm
- How many jurisdictions could generate that flow?
- If adequate water is not available, operations must shift to exposure protection



AVALON BAY - FIRE ELIMINATION PLAN

- Site Security
- Source of ignition reduction
- Detection



AVALON BAY - FIRE ELIMINATION PLAN

- Site Security Pass/ Fail Test
- “If I can put on a hardhat and look like a construction worker and wander through the site, you failed.”
- “If your front gate is open to the public and no one is guarding or truck entering/exiting, you fail.”
 - Jeff Hutchins, Senior Director Safety & Health Avalon Bay





NEW CONSTRUCTION SAFETY CODE PROVISIONS IFC 2021 EDITION

New Tools to Aid the Fire Service Enforcement of Construction
Safety Codes

NEW CONSTRUCTION SAFETY CODE PROVISIONS IFC 2021 EDITION

- **Daily Fire Safety Inspections**
- **Fire Watch Requirements**
- **Cooking Separation Requirement**
- **Site Safety Plan Requirement**
- **Site Safety Director Responsibilities**



DAILY FIRE SAFETY INSPECTIONS

The most impactful change regarding construction fire safety is requiring the construction “Site Safety Director” to conduct daily fire safety inspections at the project site.



DAILY FIRE SAFETY INSPECTIONS

Site Safety Director must conduct daily fire safety inspections at the project site.

These daily inspections must include the exterior and interior of the buildings under construction everyday until the certificate of occupancy is issued.

The daily inspections must be documented and available immediately upon request of the fire official. Failure to conduct and/or document the daily inspections can result in a violation being issued.

3rd offense the fire official can issue a “stop work” order until the fire code official receives “satisfactory assurances” of future compliance.

REQUIREMENTS OF THE DAILY INSPECTIONS

- ✓ Inspect hot work areas
- ✓ Inspect all temporary heating equipment
- ✓ Ensure combustible trash and debris is removed from the non-work areas daily
- ✓ Ensure temporary wiring does not have exposed conductors
- ✓ Flammable liquids and hazardous materials are being stored properly in approved locations

REQUIREMENTS OF THE DAILY INSPECTIONS

- ✓ Fire hydrants are unobstructed and “clearly visible”
- ✓ Inspect fire access to confirm free of obstructions
- ✓ Ensure standpipes are in service and go up with the building within one floor of the highest construction
- ✓ Portable fire extinguishers are in service and properly spaced



FIRE WATCH REQUIREMENTS

Fire watch mandatory for buildings above 40 feet in height or with an aggregate area exceeding 50,000 square feet.

It was felt that “these buildings are large enough to create a significant loss to the community, endanger firefighters, and consume resources...if the building burns.”



FIRE WATCH REQUIREMENTS

Allows fire watch personnel to also serve as security.

The fire watch personnel must be trained in the use of portable fire extinguishers and fire reporting.

The fire watch must have at least one means to notify the fire department.

Fire watch personnel must keep a record of all time periods of duty, including a log of all patrols and times and locations that buildings were entered and inspected.



COOKING SEPARATION REQUIREMENT

The designated cooking area must be at least 10 feet from combustible materials with a signage as the “designated cooking area” cooking outside this approved area is prohibited.



SITE SAFETY PLAN REQUIREMENT

A “Site Safety Plan” is now required and must be submitted prior to issuance of the of a building permit.



SITE SAFETY PLAN NEEDS TO INCLUDE:

- Name and contact information of Site Safety Director
- Documentation of the training
- Procedures for emergency notification
- Fire Department Vehicle Access
- Location of fire protection equipment and systems
- Smoking and cooking policy, designated areas
- Location and safety considerations for temporary heating equipment

SITE SAFETY PLAN REQUIREMENT

- Hot work permit plan
- Plans for control of combustible waste material
- Locations and storage methods of flammable and combustible liquids and other hazardous materials
- Provisions for site security
- Changes that affect this plan
- Other site-specific information required by the Fire Code Official

SITE SAFETY DIRECTOR TRAINING REQUIREMENT

The Site Safety Director must have qualifications “specific to their roles and responsibilities.”

The training and qualifications must be made available to the fire official upon request.

No specific training or qualifications are enumerated in the code for the position of Site Safety Director.



SITE SAFETY DIRECTOR RESPONSIBILITIES

The duties of the Site Safety Director include:

- ensuring compliance with the site safety plan,
- responsible for the guard service,
- training of the fire watch personnel,
- ensure all fire protection equipment is operational,
- ensure hot work procedures are followed,
- plan for all system impairments,
- and maintain all required records.

CONCLUSION

What is predictable, is preventable!

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

Fire Safety Plans

We went through components of a well-prepared fire safety plan.



AMERICAN WOOD COUNCIL

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