

Tackling the Construction Fires Crisis (NFPA 241- 51B)

Chicago Build Expo – October 23, 2024

Robert Duval – Regional Director – Fire investigator – Northeast Region



IT'S A BIG WORLD. LET'S PROTECT IT TOGETHER.®

Agenda

- Background on construction fires.
- NFPA 241
- NFPA 51B

Construction Fire Background





Why are buildings under construction vulnerable?

- Incomplete/inactive fire protection systems
- Incomplete passive fire protection
- Different fire load
- Construction activities

The NFPA Fire & Life Safety Ecosystem



www.nfpa.org/ecosystem



Current Events: Construction Fires



Fires in Structures Under Construction by Use

**Table 1. Fires in Structures Under Construction by Property Use:
2017–2021 Annual Averages**

Property Use	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Residential	3,370	(76%)	4	(86%)	45	(76%)	\$293	(79%)
Mercantile, business	270	(6%)	0	(0%)	3	(5%)	\$12	(3%)
Outside or special property	240	(5%)	0	(0%)	2	(4%)	\$41	(11%)
Assembly	160	(3%)	0	(0%)	3	(5%)	\$9	(2%)
Storage	150	(3%)	0	(0%)	1	(2%)	\$4	(1%)
Health care, detention, correction	70	(2%)	1	(14%)	4	(7%)	\$6	(2%)
Educational	60	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Manufacturing, processing	50	(1%)	0	(0%)	0	(0%)	\$1	(0%)
Industrial, utility, defense, agriculture, mining	30	(1%)	0	(0%)	1	(2%)	\$3	(1%)
Unclassified	30	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Total	4,440	(100%)	5	(100%)	59	(100%)	\$370	(100%)

Note: Sums may not equal totals due to rounding errors.

Source: NFIRS 5.0 and NFPA's fire experience survey.

**Boston (South Station Hi-Rise Construction Site)
April 9, 2024**



Fire reported at construction site above South Station, work halted for safety review



NFPA.ORG

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Istanbul Nightclub – April 1, 2024

- 29 Killed in Fire at Istanbul Nightclub
- The fire took place at Masquerade, a popular club that was closed to the public and undergoing renovations. Six people were arrested.



Prescott Valley, AZ



April 1, 2024 - \$60million Damage



NFPA.ORG

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Fire breaks out at Swedish amusement park under construction, man missing

GOTHENBURG, Sweden, Feb 12 (Reuters) - A powerful fire broke out at an amusement park in the western Swedish city of Gothenburg on Monday, engulfing outdoor water slides and related facilities that were under construction, eyewitnesses and rescue services said.



Apartment Building – Aurora, CO

- January 14, 2024
- \$150M East Colfax Apartment
- Largest fire in departments history
- 5 Days/50 FD companies to extinguish
- Not related to similar fire 2 days prior



Apartment Building- Las Vegas, NV

- June 20, 2023.
- \$90M project 75% complete, only one structure saved.
- Cause under investigation.
- Fire crews on site for days to maintain coverage at the site.



Photo Credit: Michael Bell

Apartment Building- Charlotte, NC

- May 19, 2023.
- Two deaths, several rescues.
- Cause under investigation, may have been related to a spray-foam insulation trailer.
- Project future remains unclear.



Photo Credit: Charlotte Fire Department

South Park After Action Report – October 2024

- Implement more command field technicians and conduct more training for the technicians who are responsible for managing communications and aiding firefighters.
- Staff the field communications unit
- Increase survival training
- Increased Staffing in Fire Inspections/Construction Project Reviews
- Fire Code Updates (by January 2025) – 241/FPPM requirements

High-Rise Building- Hong Kong

- March 2, 2023.
- 42 story tower fire.
- 2 people injured
- Fire started near top and spread down the building.



Photo Credit: Tyrone Siu/Reuters

Apartment Building- Seattle, Washington

- April 9, 2021
- 2nd fire in less than a week
- Suspected arson
- Original fire caused \$3 million in damage
- This fire caused an additional \$4000 in damage



Photo Credit: Komo News

Warehouse Fire- Brownsburg, IN

- March 18, 2022.
- Lack of hydrants.
- Cause may have been hotwork on roof.
- Fire contained to construction materials.



Photo Credit: Chris Anderson

Historic Fire- Notre Dame Cathedral

- April 15, 2019.
- Approximately 850-year-old building.
- Sections of the cathedral were undergoing renovation.
- Multiple fire causes have been suggested.



Photo Credit: Bertrand Guay/Agence France-Presse — Getty Images

June 28,2017 – Boston, MA

Loss - <\$45million

Sprinklers/Alarms – No yet in Service

Cause – Exhaust Stack for Generator

One Hour Delay in Reporting Fire



B



Can

-
-
-
-
-



Fire Fighter Fatalities in Buildings Under Construction, Renovation or Demolition



August 18, 2007 – NY City

2 FF Killed

Building Damaged in 9-11 Attacks being Demolished

Cause: Discarded Smoking Materials



Apartment Building- Buffalo, NY

- March 1, 2023.
- Firefighter LODD.
- Cause under investigation.
- Fire caused \$2.6 million in damage.
- <https://www.wsaz.com/video/2023/03/01/firefighter-killed-massive-4-alarm-fire-downtown-buffalo/>



Photo Credit: WIVB News

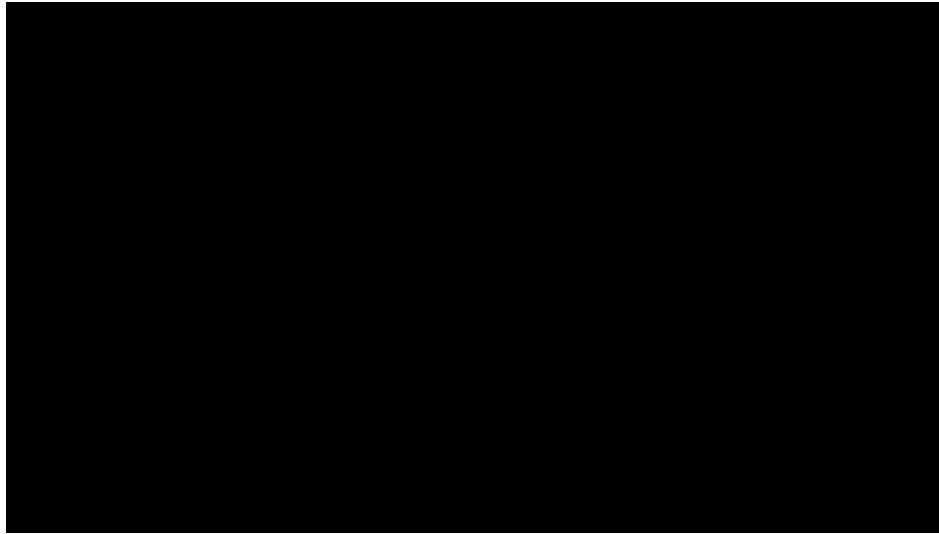
LODD Audio – Buffalo March 1, 2023



March 26, 2014 – Boston, MA

2 FF Killed

Cause: Hot Work Being Conducted Outside





The Numbers: Data on Construction Fires

 **RESEARCH**



Fires in Structures Under Construction

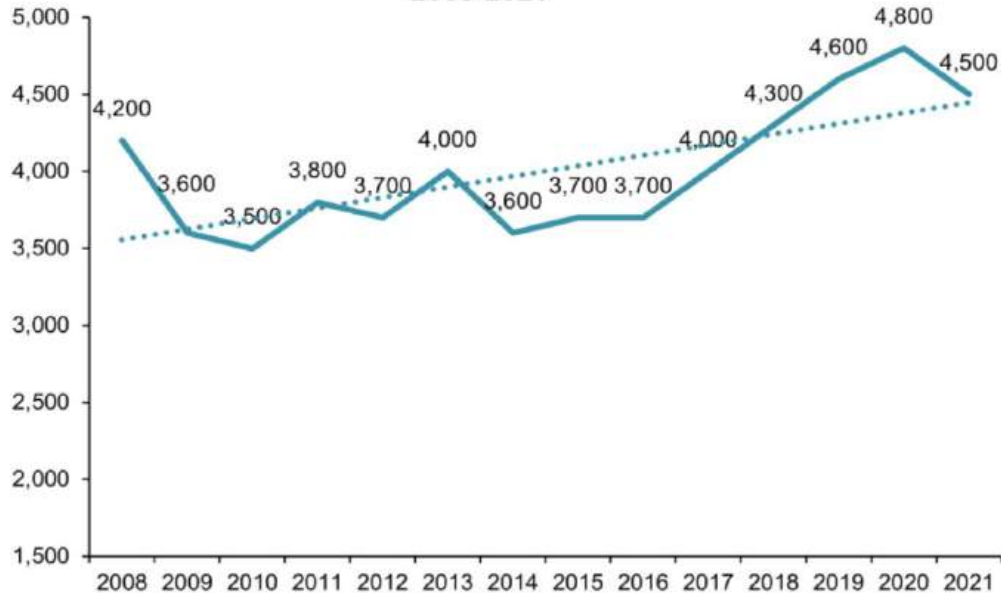
Richard Campbell
October 2023

www.nfpa.org/constructionfiresafety



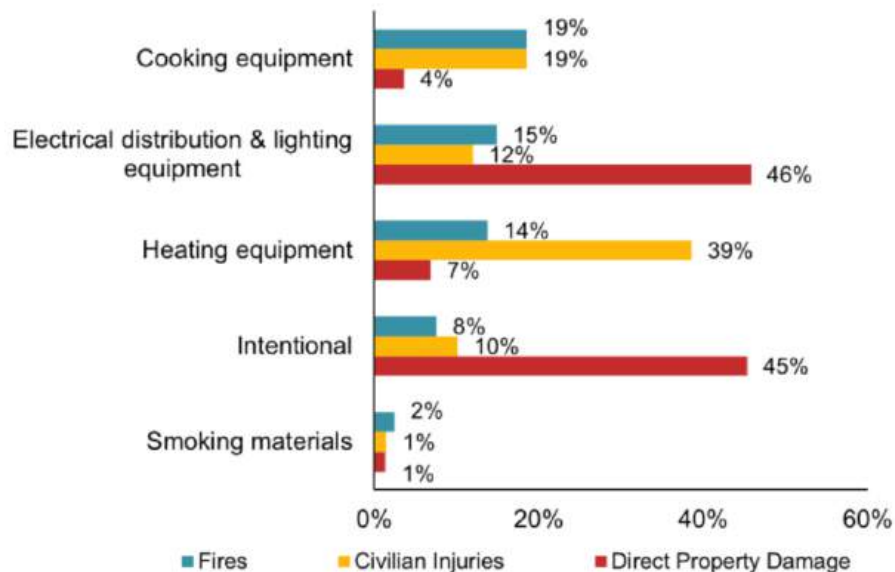
The Numbers: Data on Construction Fires

**Figure 1. Fires in Structures Under Construction:
2008-2021**



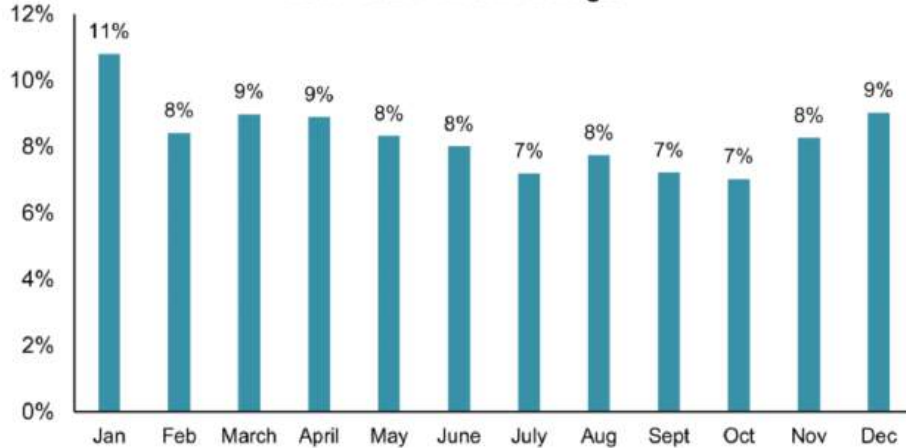
Fires in Structures Under Construction by Cause

Figure 2. Fires in Structures Under Construction by Leading Cause: 2017-2021 Annual Averages

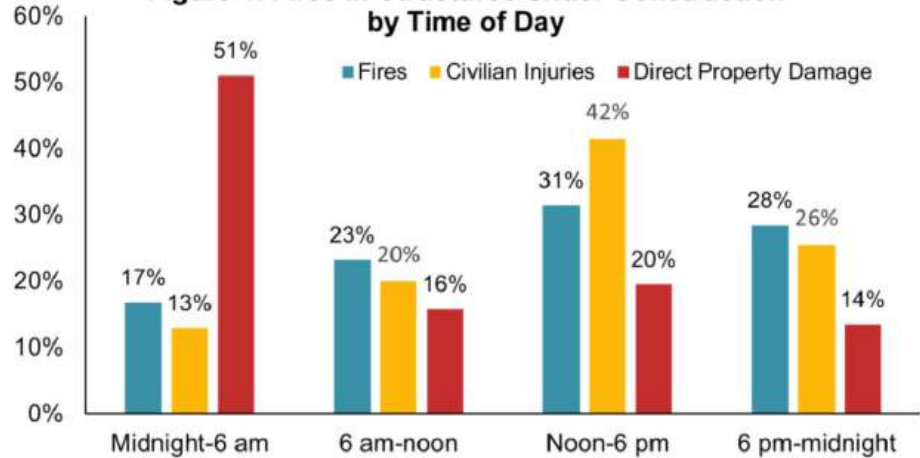


Fires by Month and Time of Day

**Figure 3. Fires in Structures Under Construction by Month:
2017–2021 Annual Averages**

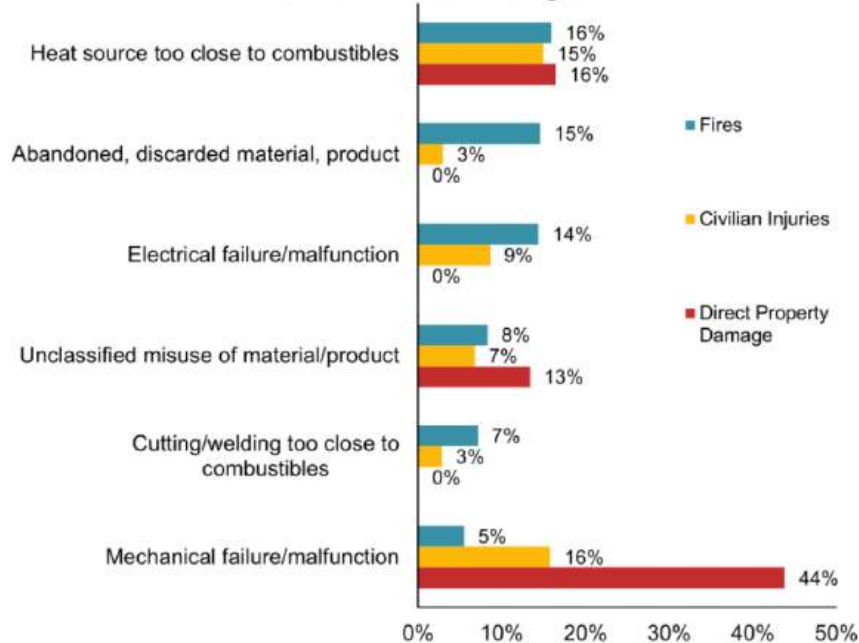


**Figure 4. Fires in Structures Under Construction
by Time of Day**



Factors Contributing to Ignition

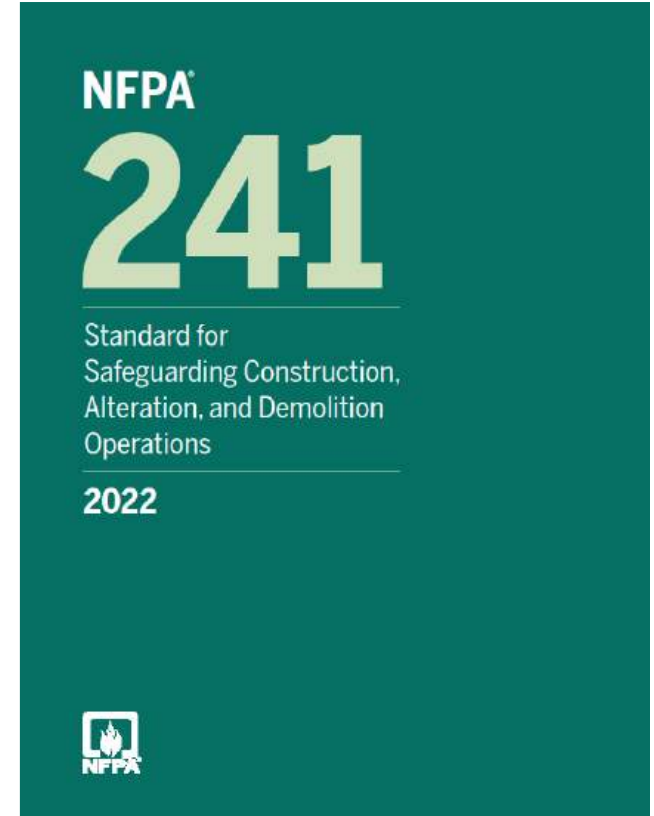
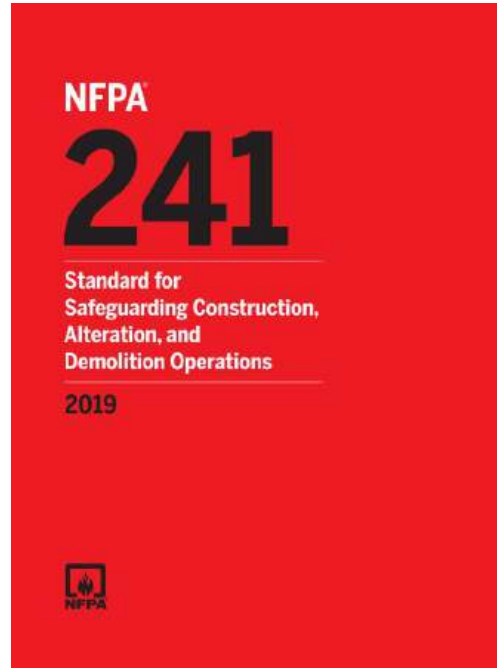
**Figure 6. Fires in Structures Under Construction
by Factors Contributing to Ignition:
2017-2021 Annual Averages**



NFPA 241: Through the Years

**Recommended
Good Practice Requirements for
BUILDING CONSTRUCTION OPERATIONS**

May
1933
Reprint 1954



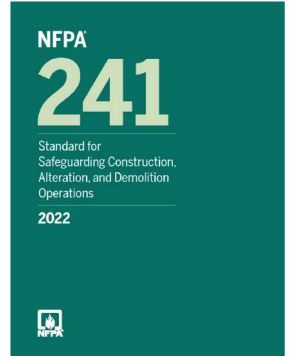
The Causes Haven't Changed Significantly!

	<u>1933 In New York City</u>		<u>Today</u>
• Salamanders	37	26.8%	31%
• Gas explosions	2	1.4%	
• Spontaneous ignition	1	0.7%	
• Acetylene torch	25	18.1%	28%
• Electrical	6	4.3%	13%
• Tar or pitch kettle	6	4.3%	
• Forge	2	1.2 %	Not Used today
• Smoking	10	7.2%	11%
• Hot rivets	10	7.2%	Not Used today
• Miscellaneous known causes	8	5.8%	
• Unknown	31	22.4%	28%
• Total:	138		100%

NFPA 241-1933 (12 pages, no references)	NFPA 241-2013 (21 pages, 19 mandatory references)
Scope.no references	Chapter 1 Administration (A.1.1, A.1.3.1, A.1.3.2)
Scaffolding.	8.2 Scaffolding, Shoring, and Forms. (A.8.2, A.8.2.5)
Flameproofed Wood.	8.7 Fire Protection During Construction
Wooden Forms.	8.2 Scaffolding, Shoring, and Forms.
Wind Breakers.	4.3 Temporary Enclosures.
Salamanders and Heaters.	5.2 & 10.3 Temporary Heating Equipment.
Tarpaulins.	4.3 Temporary Enclosures.
Fusion Welding and Cutting Processes.	5.1 Hot Work
Gasoline and Other Volatiles.	5.5 Flammable and Combustible Liquids and Flammable Gases
Smoking in Hazardous Locations.	5.3 Smoking
Tar Kettles.	9.2 Asphalt and Tar Kettles.
Hoists.	7.5.7 Hoists and Elevators.
Hoisting Machinery.	7.5.7 Hoists and Elevators.
Elevators.	7.5.7 Hoists and Elevators.
Stairs.	7.2.5 Site Security
Fireproofing.	8.7 Fire Protection During Construction
Storage of Materials.	8.3 Construction Material and Equipment Storage
Workmen's Shanties.	4.2 Temporary Offices and Sheds.
Standpipes	7.6 Standpipes
First Aid Fire Appliances.	7.7 * First-Aid Fire-Fighting Equipment.
Access to Fire Extinguishing Equipment.	7.7.6 *
Heating Apparatus.	8.4 Permanent Heating Equipment
Electrical Equipment.	11.4 Electrical
Watch Service.	7.2.5 Site Security
Disposal of Waste.	5.4 Waste Disposal
Fire Warden.	7.1 Fire Safety Program.
Demolition or Extensive Alterations.	Chapter 10 Safeguarding Demolition Operations

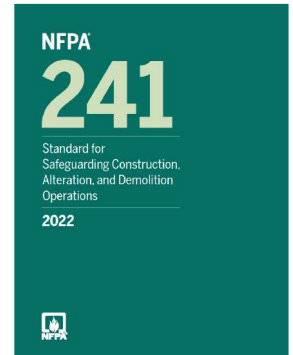
Reorganization

- > Chapter 1 – Administration
- > Chapter 2 – Referenced Publications
- > Chapter 3 – Definitions
- > Chapter 4 – General Requirements
- > Chapter 5 – Temporary Construction, Equipment, and Storage
- > Chapter 6 – Utilities
- > Chapter 7 – Processes and Hazards
- > Chapter 8 – Safeguarding Construction and Alteration Operations
- > Chapter 9 – Safeguarding Demolition Operations
- > Chapter 10 – Safeguarding Roofing Operations
- > Chapter 11 – Safeguarding Underground Operations
- > Chapter 12 – Safeguarding Construction Operations for Tall Mass Timber Wood Structures
- > Chapter 13 – Safeguarding Construction Operations for Large Wood Frame Structures
- > Annex A – Explanatory Material
- > Annex B – Informational References



NFPA 241: Fire Prevention Program Manager (Partial List)

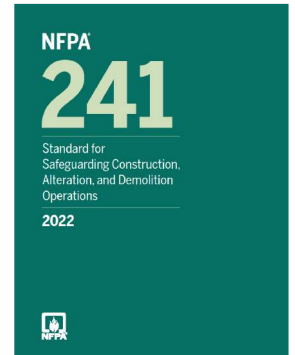
- Owner must designate
- Authority to enforce the fire prevention program
- Must have knowledge of standards
- Responsible for guard service
- Provides training on protection equipment
- Must conduct daily inspections
- Ensures presence/adequacy of devices
- Authorizes impairments
- Responsible for the development of pre-incident plan



NFPA 241: Fire Prevention Program

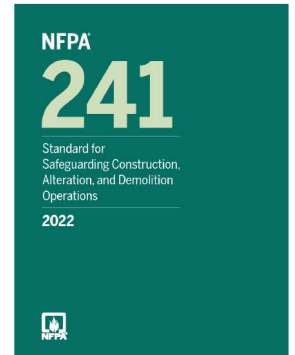
4.2.1

An overall project-specific Fire Prevention Program shall be developed.



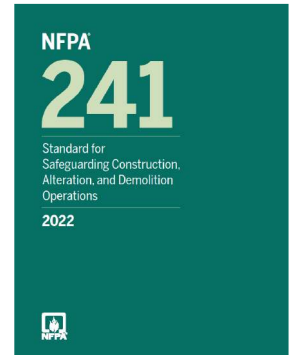
NFPA 241: Fire Prevention Program

- Pre incident plan
- Emergency contacts
- Site emergency communication procedures
- Site personnel
- Signage
- Hot work operations
- Fire protection systems
- Emergency incident location



NFPA 241: Fire Prevention Program

- Good housekeeping
- Waste disposal
- Security
- Special hazards
- Protection of existing structures
- Documentation
- Life safety plan
- Temporary utilities



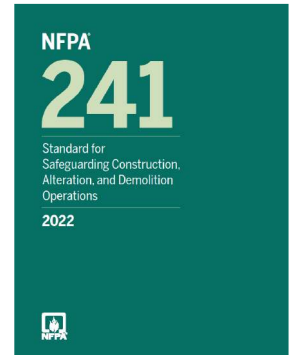
NFPA 241: Fire Prevention Program

The Fire Prevention Program can also include other items:

4.3.2.2*

Measures used to place permanent fire protection systems temporarily in service during construction shall be as follows:

- (1) In conformance with the Fire Prevention Program
- (2) Evaluated based on the type and status of the system
- (3) Evaluated based on the conditions of the building construction



NFPA 241: Enforcement

The AHJ has a critical role in ensuring safety on a construction site.

1.6 Enforcement.

1.6.1

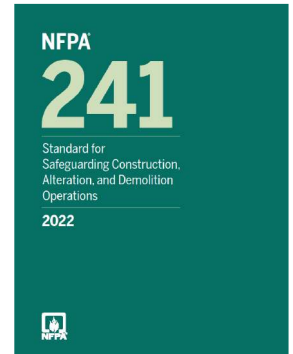
This standard shall be administered and enforced by the authority having jurisdiction (AHJ) designated by the governing authority.

1.6.2

The AHJ shall determine whether the provisions of this standard have been met.

1.6.3*

The AHJ shall be permitted to accept partial requirements of this standard.





NFPA® Resources: Fire Safety on Construction Sites

Thank you for your participation in today's webinar. NFPA® is here to help you with this important topic. Just a few of the resources available to you include:

- Research papers, video and fact sheets - [nfpa.org/ConstructionFireSafety](https://www.nfpa.org/ConstructionFireSafety)
- Training courses -
 - Fire Prevention Program Manager Training
 - [nfpa.org/FPPMDemo](https://www.nfpa.org/FPPMDemo)
 - Construction Site Fire Safety Fundamentals Training
 - [nfpa.org/ConstructionSafetyFundamentalsDemo](https://www.nfpa.org/ConstructionSafetyFundamentalsDemo)
 - NFPA 51B, *Hot Work Safety*
 - [nfpa.org/HotWorkDemo](https://www.nfpa.org/HotWorkDemo)
 - NFPA 241, *Safeguarding Construction, Alteration and Demolition Operations*
 - NFPA 70E®, *Standard for Electrical Safety in the Workplace*®
 - Curso En Línea para el Certificado de Seguridad de Trabajos en Caliente

Need team training, or to secure digital team access to codes and standards?

Contact an NFPA representative by visiting [nfpa.org/BusinessSolutions](https://www.nfpa.org/BusinessSolutions) or scan:



Training- Fundamentals

Training for Everyone

Everyone on a construction site is responsible for fire safety. NFPA has training to meet the needs of every type of worker, no matter their experience level. Explore all the options NFPA offers to find the right solutions to help improve safety at your site.

Construction Site Fire Safety Fundamentals

Online Training

Get instruction on identifying everyday, on-site fire hazards and how to deal with them in this self-paced online course.



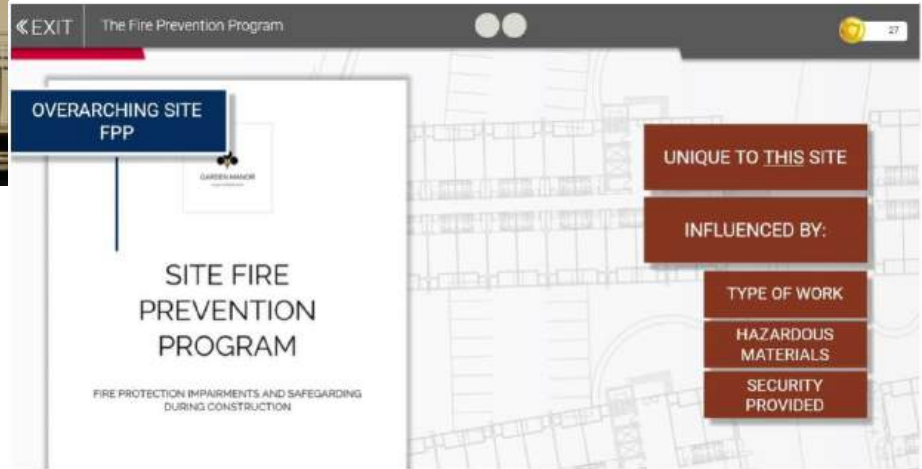
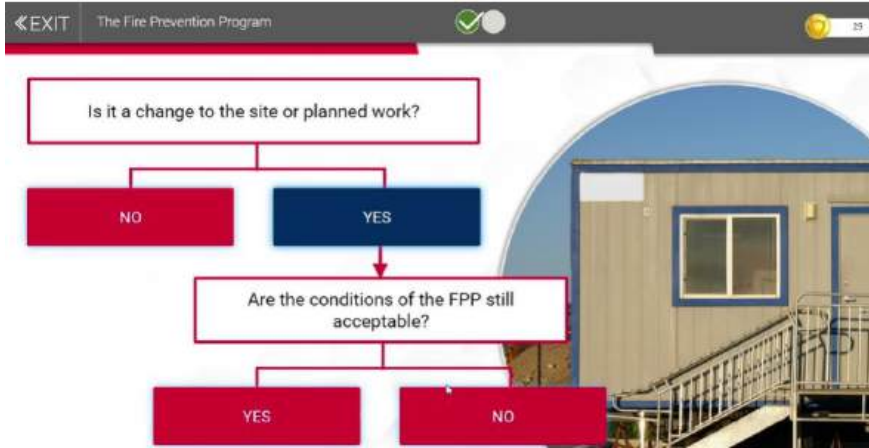
Training- FPPM

Try Out the New Fire Prevention Program Manager Online Training

The Fire Prevention Program Manager Online Training Series is a new interactive 5-part course that covers general fire protection awareness for all people on construction sites and the role of fire prevention program managers on a construction project. [Try out the course demo!](#)

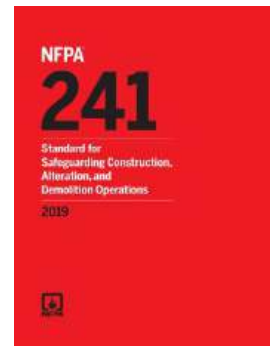


Training- FPPM



Learning Objectives

- **Understand** the organization of NFPA 241
- **Understand** the role of the Fire Prevention Program Manager (FPPM) and the Fire Safety Plan
- **Practice** developing a mock Fire Safety Program



New Challenges on Construction Sites

Tool Battery and Charging



Electric Equipment and Charging



Electric Transportation Storage



ESS



Use of Spaces



NFPA 51B



NFPA 51B *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work* is required by reference, and therefore, compliance is not optional

- OSHA references NFPA 51B in 29 CFR 1919 Subpart Q
- NFPA 1, *Fire Code*, requires compliance with NFPA 51B in Chapter 41.

Hot Work Ordinance: Boston, MA

- Boston, MA required AHJ permits for hot work
- March 26, 2014 fire caused by unpermitted hot work
- Took the lives of Lieutenant Ed Walsh and Fire Fighter Michael Kennedy



Hot Work Ordinance: Boston, MA

- June 2016: Boston City Council passed an ordinance amending the Boston Fire Prevention Code requiring that, effective January 1, 2017, all persons engaged in hot work operations must obtain a Hot Work Safety Certificate
- September 2016: Hot Work Safety Train-the-Trainer began
- January 1, 2017: Effective date



Hot Work Ordinance: Boston, MA

- Hot work shall comply with NFPA 51B and 527 CMR 1.00 Massachusetts Comprehensive Fire Safety Code, Chapter 41
- Revised definition for hot work
- Requires permit from the fire department to install, operate, or maintain any system for welding or cutting, generate acetylene, or store calcium carbide or any of the gasses used in welding, cutting, and heat-treating
- Applicant needs NFPA Hot Work Safety Certification or equivalent, as well as anyone performing hot work or serving as a fire watch



Figure 1.
Home and non-home hot work structure fires
Annual estimated average: 2017–2021

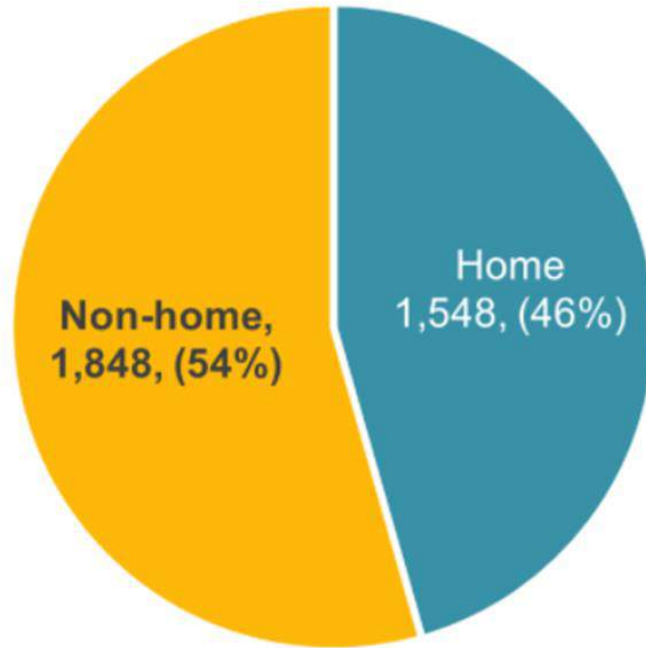


Figure 2.
All, home, and non-home hot work structure fires by leading
equipment involved
Estimated annual averages: 2017–2021

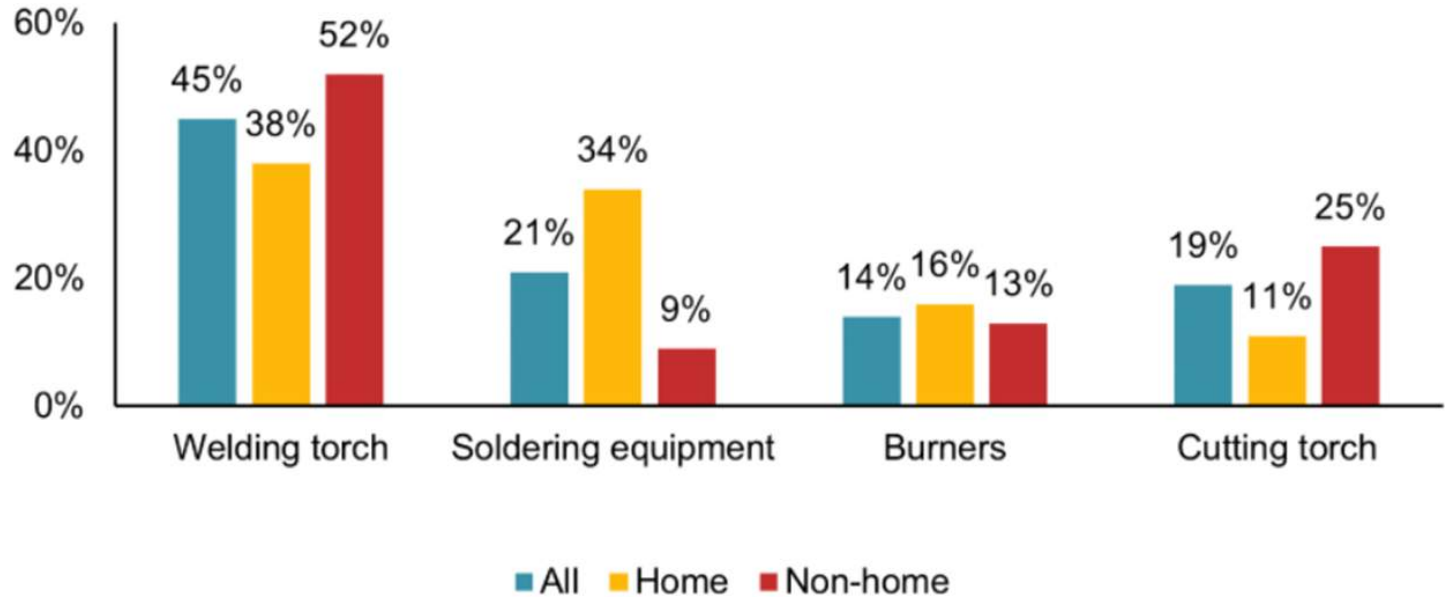


Figure 3A.
Home structure fires involving hot work by area of origin
Estimated annual averages: 2017–2021

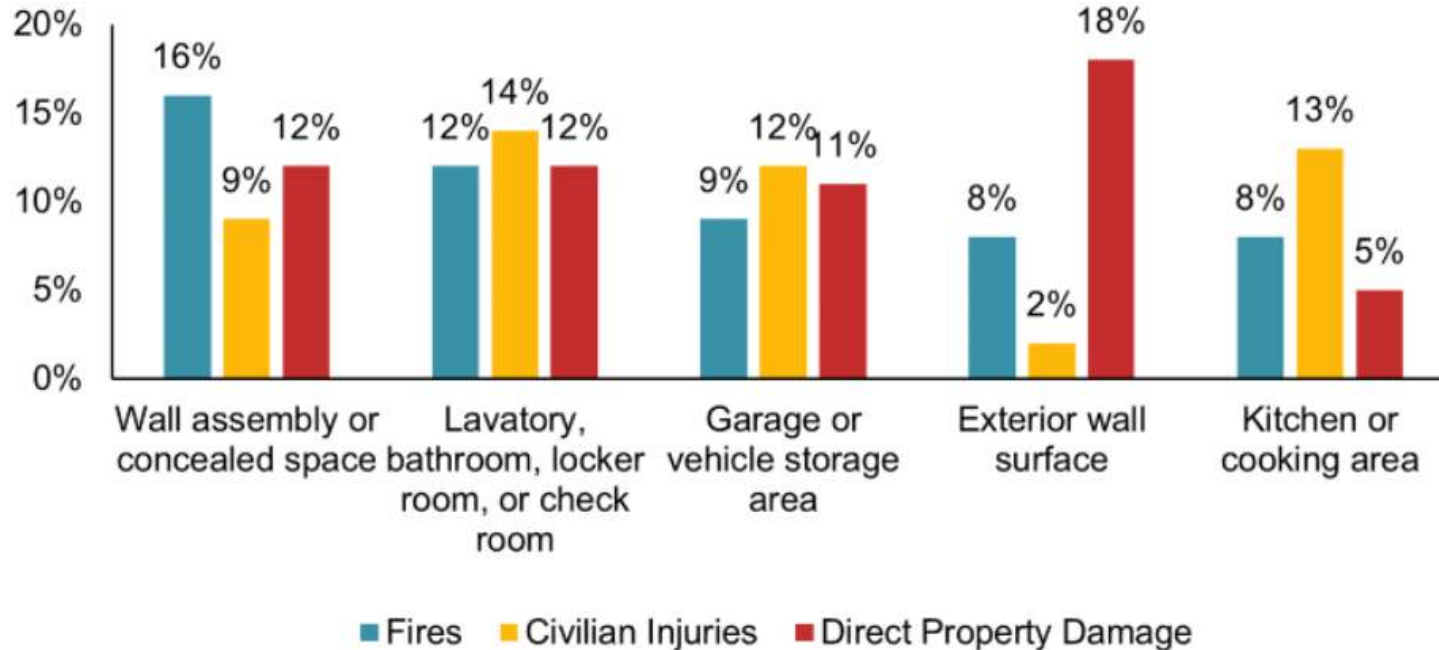


Table 3. All Structure Fires Caused by Hot Work by Structure Status: 2017–2021 Annual Averages

Structure Status	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Occupied and operating	2,636	(78%)	19	(100%)	111	(93%)	\$232	(79%)
Under major renovation	199	(6%)	0	(0%)	0	(0%)	\$23	(8%)
Under construction	278	(8%)	0	(0%)	6	(5%)	\$31	(11%)
Vacant and secured	56	(2%)	0	(0%)	0	(0%)	\$2	(1%)
Unclassified structure status	37	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Idle, not routinely used	37	(1%)	0	(0%)	0	(0%)	\$2	(1%)
Being demolished	69	(2%)	0	(0%)	1	(1%)	\$0	(0%)
Unknown	48	(1%)	0	(0%)	1	(1%)	\$0	(0%)
Vacant and unsecured	14	(0%)	0	(0%)	0	(0%)	\$1	(0%)
Undetermined	23	(1%)	0	(0%)	0	(0%)	\$0	(0%)
Total	3,396	(100%)	19	(100%)	120	(100%)	\$292	(100%)

Note: Sums may not equal totals due to rounding errors. Confined structure fires (NFIRS incident types 113–118) were excluded from this analysis.

Source: NFIRS 5.0 and NFPA’s fire experience survey.

**Table 7. All Structure Fires Caused by Hot Work by Factor Contributing to Ignition:
2017–2021 Annual Averages**

Factor Contributing to Ignition	Fires		Civilian Deaths		Civilian Injuries		Direct Property Damage (in Millions)	
Cutting, welding too close to combustibles	1,045	(31%)	9	(45%)	27	(23%)	68	(23%)
Heat source too close to combustibles	971	(29%)	6	(33%)	38	(31%)	49	(17%)
None	345	(10%)	0	(0%)	11	(9%)	18	(6%)
Undetermined	169	(5%)	4	(22%)	5	(4%)	39	(13%)
Equipment not being operated properly	144	(4%)	0	(0%)	8	(6%)	77	(26%)
Arc, spark from operating equipment	127	(4%)	0	(0%)	3	(2%)	4	(1%)
Misuse of material or product, other	103	(3%)	0	(0%)	7	(6%)	2	(1%)
Equipment unattended	76	(2%)	0	(0%)	6	(5%)	7	(2%)
Other factor contributed to ignition	64	(2%)	0	(0%)	1	(1%)	3	(1%)
Equipment used for not intended purpose	41	(1%)	0	(0%)	3	(2%)	3	(1%)
Mechanical failure, malfunction, other	34	(1%)	0	(0%)	0	(0%)	1	(0%)
Operational deficiency, other	33	(1%)	0	(0%)	0	(0%)	1	(0%)
Failure to clean	33	(1%)	0	(0%)	2	(2%)	2	(1%)
Other known factor	383	(11%)	0	(0%)	18	(15%)	32	(11%)
Total	3,396	(100%)	19	(100%)	120	(100%)	\$292	(100%)
Total factors	3,567	(105%)	19	(100%)	128	(107%)	304	(104%)

Basis for Hot Work Safety

- Apply one or more of the following steps to ensure hot work safety:
 - Move hot work to location free from combustibles and away from hazardous areas
 - Move combustibles a safe distance from the work or properly shield against ignition if the work cannot be moved
 - Schedule welding and cutting so that materials are not exposed during welding and cutting operations

NFPA Hot Work Safety Course

3-Step Approach to Hot Work Safety

- **Recognition** – hazard identification
 - Determine type of hot work, including alternative methods to hot work
 - Determine fuel sources
- **Evaluation** – assess degree of hazards
 - Visual inspection of hot work location
- **Control** – minimize or eliminate hazards
 - Safety Team and Permit, ventilation, isolation of fuel and ignition sources, training, PPE

Recognition

What is Hot Work?

Activities involving:

- Flame
- Spark production
- Heat



Recognition - Typical Hot Work

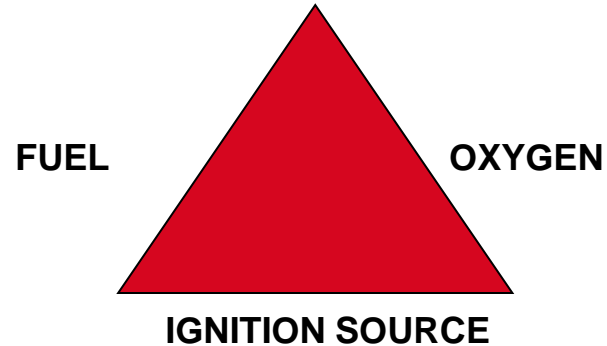
- Welding
- Cutting
- Grinding
- Soldering
- Brazing
- Heat Treating
- Hot riveting
- Thawing pipe
- Drilling and tapping
- Powder-driven fasteners
- Torch-applied roofing
(see *NFPA 241*)
including tar kettles,
melters, hock heaters
- Similar applications that
produce or use spark,
flame or heat



Recognition

Components of Fire

- Oxygen
- Fuel
- Ignition (usually the type of hot work)



Recognition Fuel Sources

- Flammable or combustible liquids
- Combustible dusts
- Fuels and lubricants
- Paints or coatings
- Cleaning solvents
- Common combustibles - paper, rags, scaffolding, insulation, roofing materials
- Improperly cleaned containers



Qualitative and Quantitative

- Qualitative
 - Material properties and characteristics
 - Safety Data Sheets (SDS)
 - Physical and visual inspection
- Quantitative
 - Atmospheric monitoring when flammable gases or vapors involved or adjacent
 - Frequent testing

Control

Hot Work Safety Team

- Team includes
 - Permit Authorizing Individual (PAI),
 - Hot Work Operator,
 - and Fire Watch
- All responsible for safety during hot work



Control

Hot Work Safety Team



- Permit Authorizing Individual (PAI)
 - Considers alternatives to hot work
 - Inspects site, issues internal permits and follows AHJ procedures for external permits
 - Trained in health and safety issues regarding hot work
- Hot Work Operator
 - Performs hot work they are trained to do
- Fire Watch
 - Monitors for smoldering or fires, sounds alarm, stops hot work if conditions change
 - Remains on site after hot work is completed to monitor

Control Hot Work Permit

- Forces completion and documentation of **Recognition**, **Evaluation** and **Control** steps
 - Separates unintentional fuel from ignition
- Posted permit is notice to everyone of possible hazards
- See Hot Work Permit – Decision Tree
 - Is there an acceptable alternative to hot work?



HOT WORK PERMIT

Seek an alternative/safer method if possible!

Before initiating hot work, ensure precautions are in place as required by NFPA 51B and ANSI Z49.1.
Make sure an appropriate fire extinguisher is readily available.

This Hot Work Permit is required for any operation involving open flame or producing heat and/or sparks. This work includes, but is not limited to, welding, brazing, cutting, grinding, soldering, thawing pipe, torch-applied roofing, or chemical welding.

Date _____	Hot work by <input type="checkbox"/> employee <input type="checkbox"/> contractor
Location/Building and floor _____	Name (print) and signature of person doing hot work _____
Work to be done _____	I verify that the above location has been examined, the precautions marked on the checklist below have been taken, and permission is granted for this work.
Time started _____ Time completed _____	Name (print) and signature of permit-authorizing individual (PAI) _____
THIS PERMIT IS GOOD FOR ONE DAY ONLY	

- Available sprinklers, hose streams, and extinguishers are in service and operable.
- Hot work equipment is in good working condition in accordance with manufacturer's specifications.
- Special permission obtained to conduct hot work on metal vessels or piping lined with rubber or plastic.

Requirements within 35 ft (11 m) of hot work

- Flammable liquid, dust, lint, and oily deposits removed.
- Explosive atmosphere in area eliminated.
- Floors swept clean and trash removed.
- Combustible floors wet down or covered with damp sand or fire-resistive/noncombustible materials or equivalent.
- Personnel protected from electrical shock when floors are wet.
- Other combustible storage material removed or covered with listed or approved materials (welding pads, blankets, or curtains; fire-resistive tarpaulins, metal shields, or noncombustible materials).
- All wall and floor openings covered.
- Ducts and conveyors that might carry sparks to distant combustible material covered, protected, or shut down.

Requirements for hot work on walls, ceilings, or roofs

- Construction is noncombustible and without combustible coverings or insulation.
- Combustible material on other side of walls, ceilings, or roofs is moved away.

Requirements for hot work on enclosed equipment

- Enclosed equipment is cleaned of all combustibles.
- Containers are purged of flammable liquid/vapor.
- Pressurized vessels, piping, and equipment removed from service, isolated, and vented.

Requirements for hot work fire watch and fire monitoring

- Fire watch is provided during and for a minimum of 30 min. after hot work, including any break activity.
- Fire watch is provided with suitable extinguishers and, where practical, a charged small hose.
- Fire watch is trained in use of equipment and in sounding alarm.
- Fire watch can be required in adjoining areas, above and below.
- Yes No Per the PAI/fire watch, monitoring of hot work area has been extended beyond the 30 min.

Download a permit in fillable PDF form:

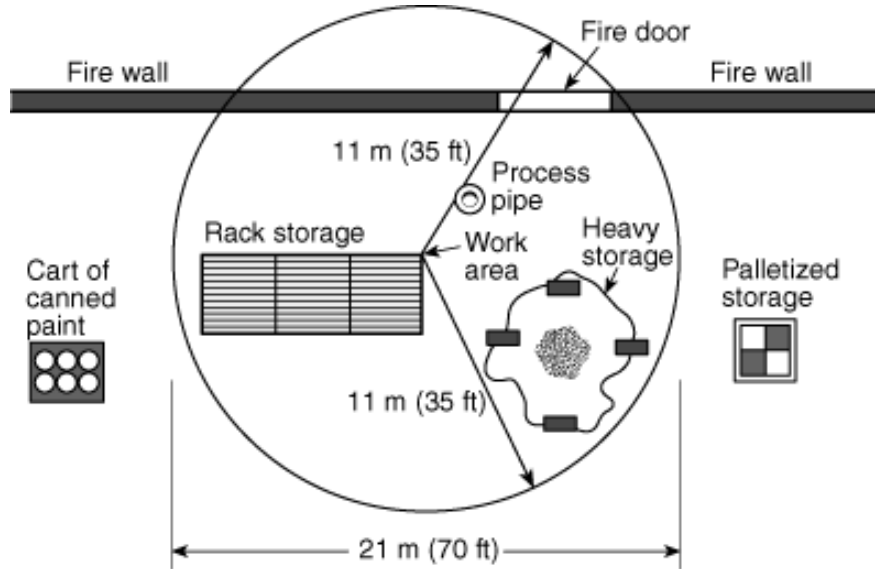
nfpa.org/hotwork



Sphere of Influence: 35-Foot Rule

- Combustibles 35-feet from work
 - Moved or protected
 - What about flammable/combustible vapors?
- Origin of provision
 - Cited in OSHA 29 CFR 1910.252
- Horizontal versus vertical distance
- Subtle passages, openings, ventilation duct openings, moving equipment or machinery, environmental conditions, such as high winds

Hot Work – 35 foot rule



- Remove or shield from sparks all potential fuels within 11 m (35 ft) of the work area. (In this case, the paint cart and palletized storage have been moved.)
- Empty racks on which the work is to be done of all storage.
- Close fire doors and seal floor openings such as the area surrounding process piping with noncombustible caulking.
- Cover heavy combustible storage that is impractical to move with the fire-resistant tarpaulin.



HOT WORK SAFETY CERTIFICATE ONLINE TRAINING



3-step approach to hot work safety



What is hot work and why is it dangerous?



Relevant standards, regulations, ordinances



1. Recognize when hot work is planned



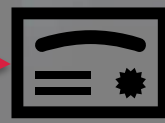
2. Evaluate all risks associated with the work



3. Apply proper controls for the work



Safety program, permits, and fire watch



www.nfpa.org/hotwork



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