



OSHA Subpart F Fire Protection and Prevention



The Employer shall:

Develop the fire protection program.
















Provide fire fighting equipment.

Periodically inspect fire fighting equipment.

Firefighting Equipment

Class “A” fire extinguishers: used for fires involving wood, paper, or paper products.

Table F-1 FIRE EXTINGUISHERS DATA

	WATER TYPE				FOAM	CARBON DIOXIDE	DRY CHEMICAL			
	 STORED PRESSURE	 CARTRIDGE OPERATED	 WATER PUMP TANK	 SODA ACID	 FOAM	 CO ₂	SODIUM OR POTASSIUM BICARBONATE		MULTI-PURPOSE AEC	
							 CARTRIDGE OPERATED	 STORED PRESSURE	 STORED PRESSURE	 CARTRIDGE OPERATED
CLASS A FIRES WOOD, PAPER, TRASH HAVING GLOWING EMBERS 	YES	YES	YES	YES	YES	NO (CUT DOWN CONTROL POINT SURFACE AREA)	NO (20" FILL, 20" FILL, 20" FILL, 20" FILL, 20" FILL, 20" FILL)	NO (20" FILL, 20" FILL, 20" FILL, 20" FILL, 20" FILL, 20" FILL)	YES	YES
CLASS B FIRES FLAMMABLE LIQUIDS GASOLINE, OIL, PAINTS, GREASE, ETC. 	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
CLASS C FIRES ELECTRICAL EQUIPMENT 	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES
CLASS D FIRES COMBUSTIBLE METALS 	SPECIAL EXTINGUISHING AGENTS APPROVED BY RECOGNIZED TESTING									
METHOD OF OPERATION	PULL PIN-SQUEEZE HANDLE	TURN UPSIDE DOWN AND BUMP	PUMP HANDLE	TURN UPSIDE DOWN	TURN UPSIDE DOWN	PULL PIN-SQUEEZE LEVER	RUPTURE CARTRIDGE SQUEEZE LEVER	PULL PIN-SQUEEZE HANDLE	PULL PIN-SQUEEZE HANDLE	RUPTURE CARTRIDGE SQUEEZE LEVER
RANGE	3' - 4'	3' - 4'	3' - 4'	3' - 4'	3' - 4'	3' - 8'	5' - 30'	5' - 20'	5' - 30'	5' - 20'
MAINTENANCE	CHECK AIR PRESSURE GAUGE MONTHLY	WEIGH GAS CARTRIDGE AND ADD WATER IF REQUIRED ANNUALLY	DISCHARGE AND FILL WITH WATER ANNUALLY	DISCHARGE ANNUALLY RECHARGE	DISCHARGE ANNUALLY RECHARGE	WEIGH SEMI-ANNUALLY	WEIGH GAS CARTRIDGE, CHECK CONDITION OF DRY CHEMICAL ANNUALLY	CHECK GAS PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	CHECK GAS PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	WEIGH GAS CARTRIDGE, CHECK CONDITION OF DRY CHEMICAL ANNUALLY

Class “B” fire extinguishers: used for fires involving flammable or combustible liquids

Class “C” fire extinguishers: used for fires involving electrical equipment



Firefighting Equipment (continued)

A fire extinguisher, not rated below 2A, must be provided for every 3,000 square feet of protected building area.

Travel distance to the nearest fire extinguisher shall never exceed 100 feet.

55-gallon open drum of water with 2 pails can substitute for a 2A fire extinguisher.

A ½ inch garden hose, not over 100 feet long and equipped with a nozzle, may be substituted for a 2A-rated fire extinguisher provided it can deliver 5 gallons per minute with a minimum hose stream range of 30 feet.



Firefighting Equipment (continued)

At least one 2-A fire extinguisher shall be provided for each floor in multistory buildings, and at least one fire extinguisher shall be located adjacent to the stairway

A fire extinguisher, rated not less than 10B, shall be provided within 50 feet of where more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are used on a project

Fire hose and connections can be used as a substitute for a 2-A rated fire extinguisher provided it is up to 100 feet long, 1 ½ inch diameter, and can discharge at least 25 gallons per minute and can reach all points of the area covered.



Firefighting Equipment (continued)

If the facility being constructed will have an automatic sprinkler protection system, this system should be put into service as soon as possible.



Fire Cutoffs

Fire walls and exit stairways, required for the completed buildings, shall be given construction priority

Fire doors, with automatic closing devices, shall be hung on openings as soon as practicable



Fire Prevention

Combustibles shall be piled with due regard to their stability and never higher than 20 feet.

Driveways around combustibles shall be at least 15 feet wide

Maximum grid size around combustible storage is 50 feet by 150 feet

Keep weeds and grass growth under control

No combustible materials shall be stored within 10 feet of a building or structure



Fire Prevention (continued)

Flammable or combustible liquids shall not be stored in areas used for exits, stairways, or where people may pass. No more than 25 gallons of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet

No more than 60 gallons of flammable or 120 gallons of combustible liquids shall be stored in any one storage cabinet

Outside storage of containers (not over 60 gallons per container) shall not exceed 1,100 gallons in any one pile or area, with piles or areas separated by at least 5 feet. Piles not to be nearer than 20 feet to a building.



Fire Prevention (continued)

Outdoor portable tank storage:

Two or more tanks (exceeding a combined capacity of 2,200 gallons) shall be separated by a 5-foot clear area

A portable fire extinguisher rated not less than 20-B shall be located outside of, but not more than 10 feet from the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids.



Tanks for above-ground storage

Not to exceed 2,500 gallons capacity





Dikes to confine fuel spills

If multiple tanks are within one diked area, the volume of containment must be at least equal to the volume of the largest tank

Dikes constructed from earth, steel, concrete or solid masonry must be designed to be liquid-tight

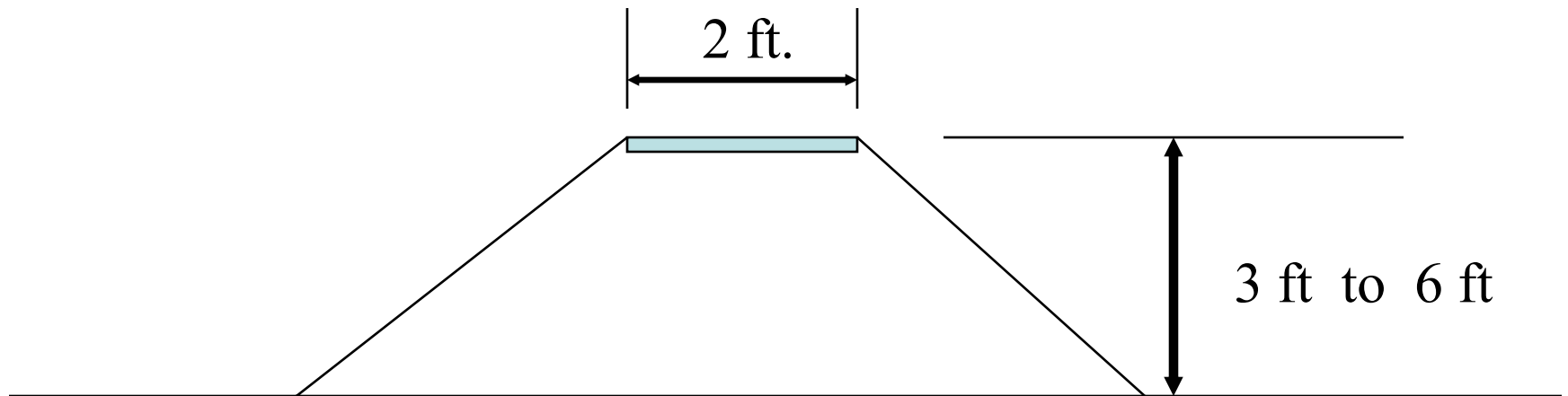






Dike walls at least 3 feet high must have a flat top dimension of at least 2 feet

Dike walls not to exceed 6 feet (above the interior grade)







Subpart G

Signs, Signals, & Barricades

*More on signs and barricades will be presented in the discussion of
Chapter 6 of the MUTCD*

1926.200

- (b) **Danger Signs** – shall have red as the predominant color
- (c) **Caution signs** – shall have yellow as the predominant color...
- (e) **Safety Instruction Signs** – when used, signs shall have a white background with green upper panel using white letters

Figure G-1



Figure G-2





Safety Sign - Definition

A visual alerting device in the form of a sign, label, decal, placard or other marking which advises the observer of the nature and degree of the potential hazard(s) which can cause an accident. It may also provide other directions to eliminate or reduce the hazard and advise of the probable consequences of not avoiding the hazard.



SAFETY SIGNS & COLORS

Applicable Standards

ANSI Z535.1 - Safety Color Code

ANSI Z535.2 - Environmental & Facility Safety Signs

ANSI Z535.3 - Criteria for Safety Symbols

ANSI Z535.4 - Product Safety Signs and Labels

ANSI Z535.5 - Accident Prevention Tags



Categories of Safety Signs

Environmental safety sign: Sign or placard in a work or public area that provides safety information about the immediate environment. (will be addressed)

Product safety sign: Sign, label, or decal affixed to a product that provides hazard and safety information about that product. (not addressed)



Classification of Safety Signs

(three tier personnel injury hazard classification & others)

DANGER

WARNING

CAUTION

NOTICE

SAFETY INSTRUCTIONS

FIRE SAFETY & DIRECTIONAL SIGNS (not discussed)



Safety Sign Format

(Normally made up of two or three “Panels”)

Signal word panel: Contains signal word. Also contains safety alert symbol for personnel hazards.

Message panel: Contains those words relating to: Identification of the hazard, how to avoid the hazard, and/or the probable consequence of not avoiding the hazard.

Symbol/Pictorial panel: Contains symbol



Safety Alert



It is used to alert to potential personal injury hazards. Obey all safety messages that follow to avoid possible injury or death.



Danger - Signal word panel

(ANSI 535.2)

DANGER: Imminently hazardous situation which, if not avoided, will result in death or serious injury.





Danger - Alternate signal word panel

(ANSI 535.2, for Danger only)

DANGER: Imminently hazardous situation which, if not avoided, will result in death or serious injury.



Warning - Signal word panel

(ANSI 53.1, ANSI 535.2)

WARNING: Potentially hazardous situation which, if not avoided, could result in death or serious injury.

Alternate (older) black letters, on safety orange truncated triangle, on a black background.



Caution - Signal word panel #1

(ANSI 53.1, ANSI 535.2)

CAUTION: Potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Alternate safety yellow on black background





Caution - Signal word panel #2

(ANSI 53.1, ANSI 535.2)

Used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.



CAUTION



Notice - Signal word panel

NOTICE: Signs used to indicate a statement of company policy or information indirectly related to the safety of personnel or protection of property.

NOTICE



General Safety-Signal word panel

Indicates general instructions relative to safe work practices, reminders of proper safety procedures, or location of safety equipment.

**SAFETY
INSTRUCTIONS**



Word Message Panel

Communicates information to an observer on the type of hazard, the consequence of not avoiding the hazard and how to avoid the hazard.

Some factors to consider:

- Can the hazard be inferred by the symbol?
- Reaction time required to avoid the hazard?
- Target audiences knowledge of the hazard?



Formatting the word message

(use “headline style”)

Omit pronouns (this, that, they) , articles (a, the, an), verbs (is, are, were)

Headline style Message examples:

Hazardous voltage inside

Keep out!

Keep access door locked



Action Statement

Tells the viewer how to avoid the hazard

Statement should be simple, direct and applicable to the hazard

Examples:

Keep out!

Wear hard hats

Keep away

No smoking

Call *before* you dig



Hazard description statement

Identify the hazard in clear simple language

Action and consequence can be omitted if obvious (such as
“slippery when wet”)

Examples:

Hazardous voltage inside

Buried underground cables

More than one source of voltage



Consequence statement

Tells the viewer in clear, simple language what will happen if the warning is ignored.

Examples:

- **Can shock, burn, or cause death**
- **Will disrupt electrical service**
- **Can irritate skin**
- **Can cause serious burns**
- **Exposure can cause nausea, and dizziness**



Symbols / pictorial panel

(ANSI Z535.3-1998)

SYMBOL: Graphic representation intended to convey a message. May represent a hazard, hazardous situation or precaution to avoid a hazard, the result of not avoiding the hazard or any combination of these messages.



Typical Symbol

Symbols - Recognition by a multi-ethnic, highly mobile, population derived from a multiplicity of social and educational backgrounds, with different reading skills and word comprehension.

Electrical
Hand with wire

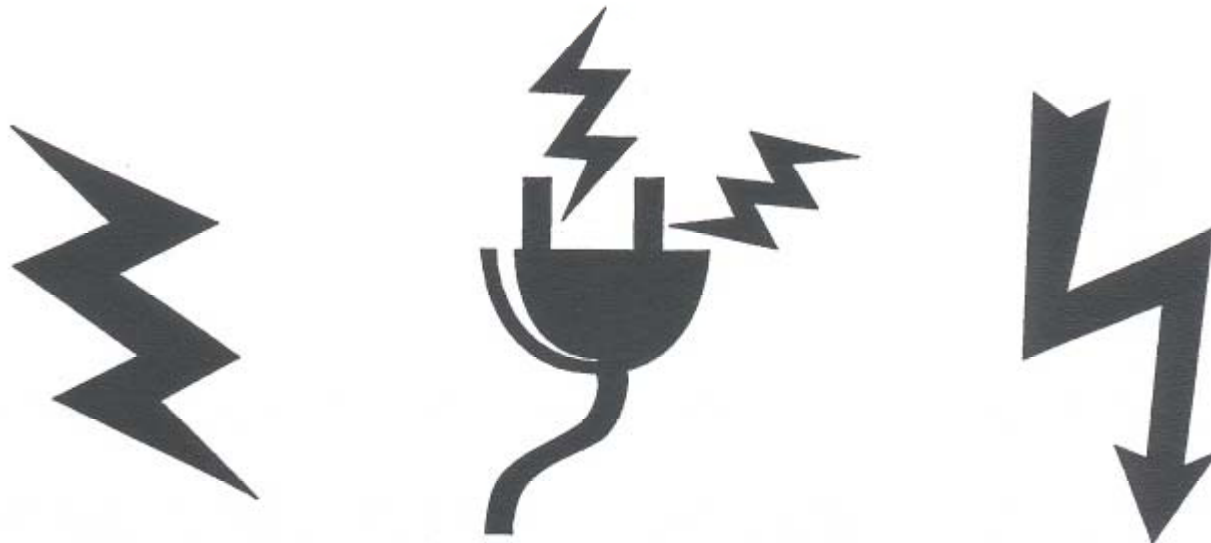


Electrical
Body with wire



Typical Symbol (cont'd)

Other electrical symbols - Use only with supplementary word messages (50 - 83% recognition testing)





Safety Sign Color

(recommended panel color schemes, all alternates not shown)

DANGER

- Signal word:** White letters on a safety red background, safety red exclamation mark
(Alternate): White letters on safety red oval with white outline on black rectangle
Message word: Black or red letters on white background, or white letters on black background
Symbol/pictorial: Black, safety red, or black and safety red on a white background

WARNING

- Signal word:** Black letters on a safety orange background, safety orange exclamation mark
(Alternate): Black letters within a safety orange truncated diamond on a black background
Message word: Black letters on a white background, or white letters on a black background
Symbol/pictorial: Black symbol on a white background. Alternate safety orange. background

CAUTION

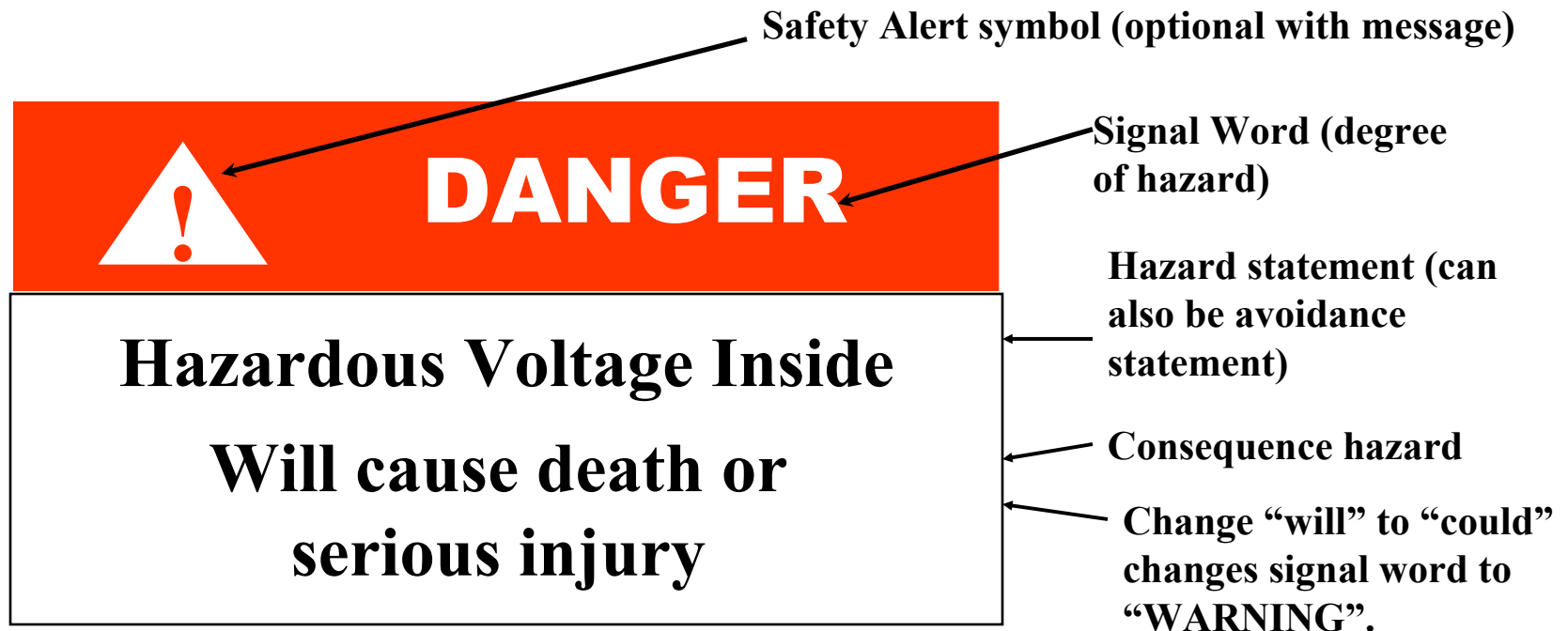
- Signal word:** Black letters on a safety yellow background, safety yellow exclamation mark
(Alternate): Black letters within a safety orange truncated diamond on a black background
Message word: Black letters on a white background, or white letters on a black background
Symbol/pictorial: Black symbol on a white background. Alternate safety yellow background.



Danger Sign - Example

(Based on interpretation of ANSI Z535.1-1997 / replaces Z53.1-1979)

Example safety sign with message panel where hazard may not be clearly understood.





Caution Sign - Example

Identify source of hazard where opening the supply disconnect does not remove all sources of hazardous voltages



**CONTAINS 120Vac FROM
MORE THAN ONE SOURCE**

(CONSULT SCHEMATIC (S) _____)



Arc-Flash / PPE Label

Example of a PPE label attached to the front of electrical equipment. (based on NFPA 70E-1995)

EQUIPMENT NAME _____
POWER SOURCE LOCATION _____
EQUIPMENT RATING _____ VOLT _____ PHASE _____
FLASH HAZARD BOUNDARY _____ inches PPE LEVEL _____
SHOCK HAZARD BOUNDARY:
LIMITED APPROACH _____ inches
RESTRICTED APPROACH _____ inches
PROHIBITED APPROACH _____ inches



Arc-Flash / PPE Label

(ANSI Z535.2, clauses 4.12.4, and 5.4.1)

Example of a PPE label attached to the front of electrical equipment. (based on NFPA 70E-1995)

NOTICE

EQUIPMENT NAME _____	
POWER SOURCE LOCATION _____	
EQUIPMENT RATING _____	VOLT ___ PHASE _____
FLASH HAZARD BOUNDARY _____	inches PPE LEVEL ____
SHOCK HAZARD BOUNDARY:	
LIMITED APPROACH _____	inches
RESTRICTED APPROACH _____	inches
PROHIBITED APPROACH _____	inches



Arc-Flash -Incident Energy Label

Changes to NFPA 70E arc-flash incident energy calculation may be required.

At this time, there is not a recognized label that could be attached to equipment.

Forms available in the back of the room to propose a label to NFPA. Chance to directly influence a standard.

Danger Sign Example - More than one language





OSHA Subpart H
Materials Handling, Storage,
Use, and Disposal



1926.250 Material Storage

(a) General

(2) **Floor load limits:** Safe floor load limits within buildings and structures (PSF) shall be conspicuously posted in all storage areas, except slab on grade

Safe load limits are not to be exceeded.

Call a licensed professional engineer (not in the Standard but should be).



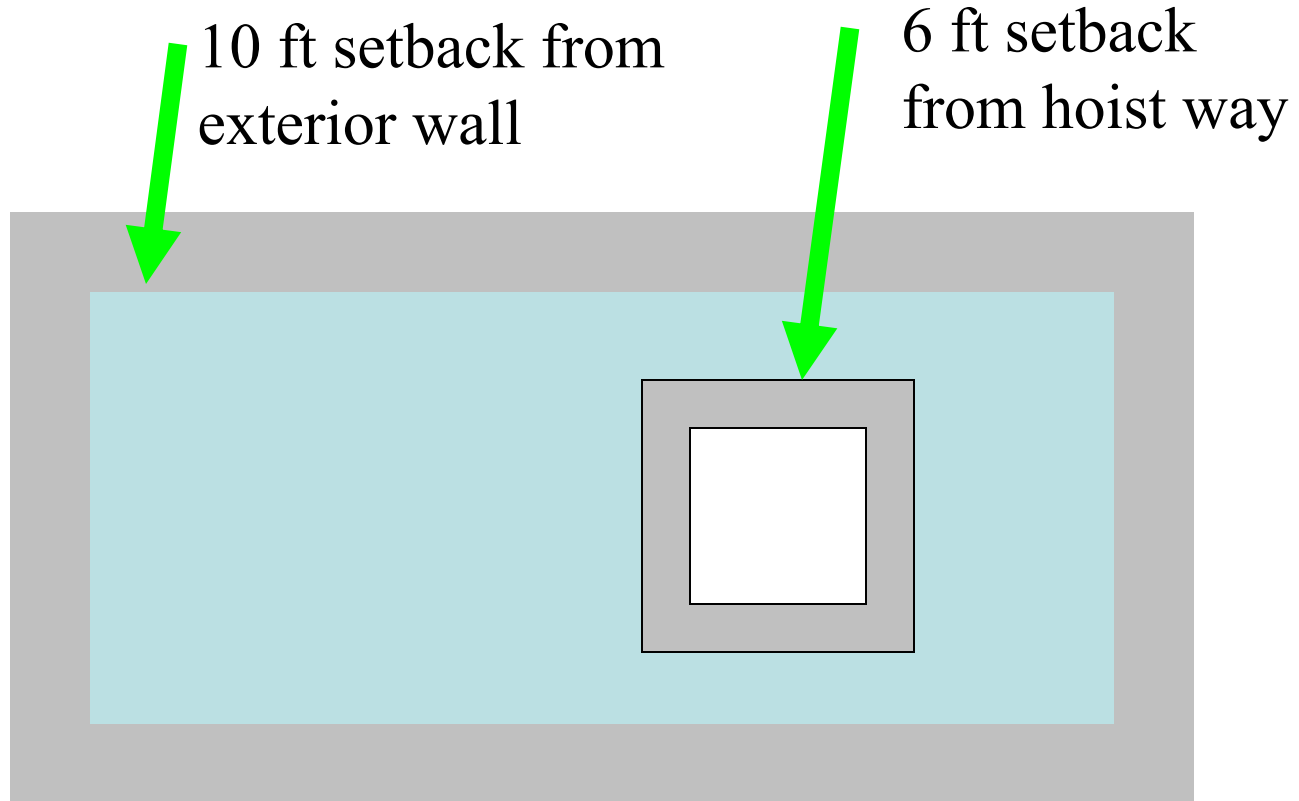
1926.250 Material Storage

(b) ***Material Storage*** Material storage inside buildings under construction shall not be stored within 6 ft of any hoistway or inside floor openings, nor within 10 ft of an exterior wall which does not extend above the top of the material being stored.

(b)(5) Materials not to be stored on scaffolds or runways in excess of supplies needed for immediate operations.

(b)(6) Brick stacks not to exceed 7 ft high. Loose stacked brick to be set back or tapered back 2 inches for every foot of height that exceeds 4 ft.

(b)(7) Block to be tapered back 1/2 block per tier above the 6 ft level (no limit given).





1926.250 Material Storage

(b) (8) Lumber:

(i) Used lumber to be stacked and must have the nails withdrawn first.

(iii) Lumber stacks to be stable and self-supporting

(iv) Maximum height of lumber stack shall be no more than 20 ft. Lumber stack is limited to 16 ft if manually stacked

(c) Housekeeping. Storage areas kept free of accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage. Vegetation control to be exercised when necessary.

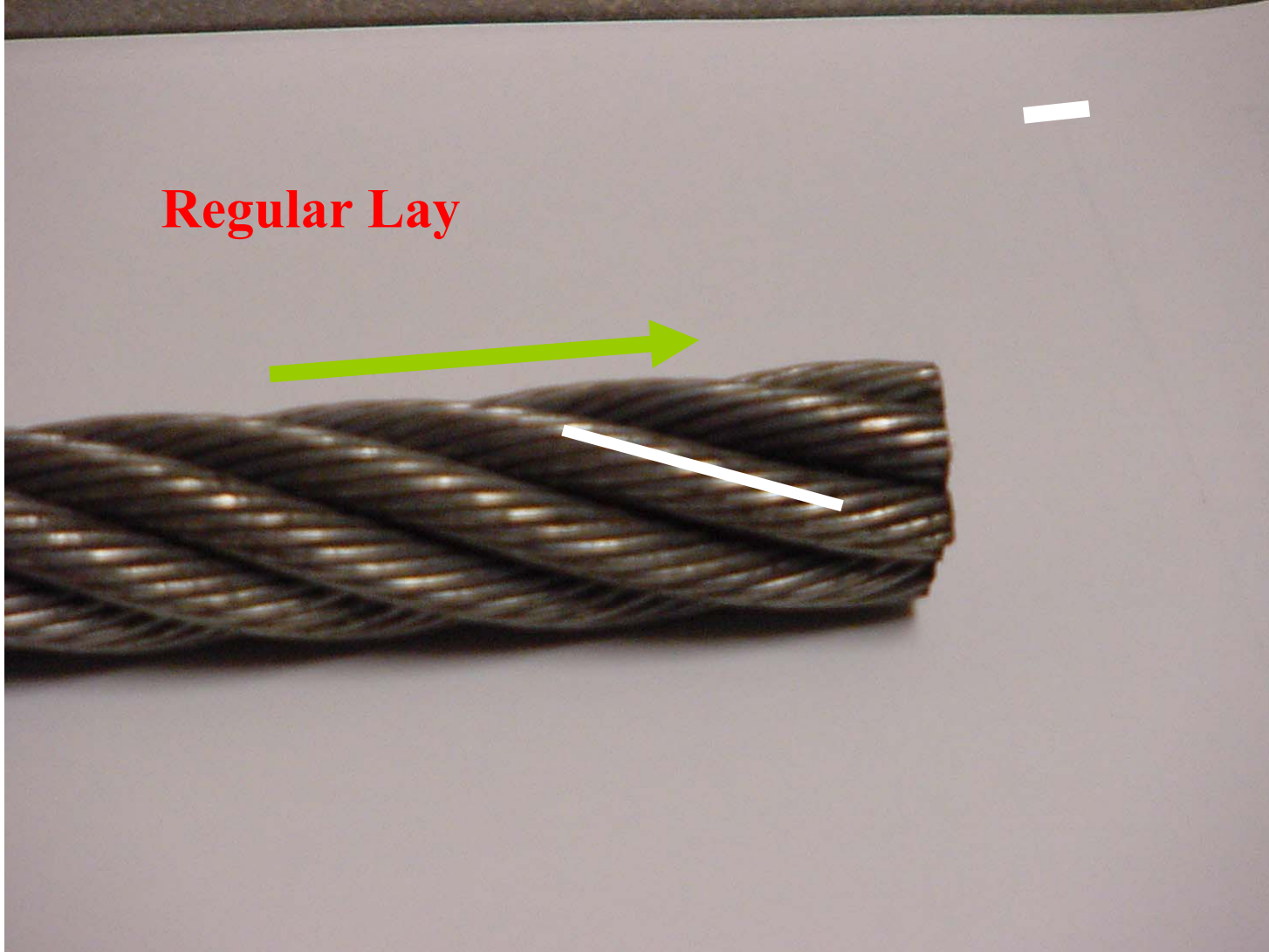


1926.251 Rigging Equipment for Material Handling

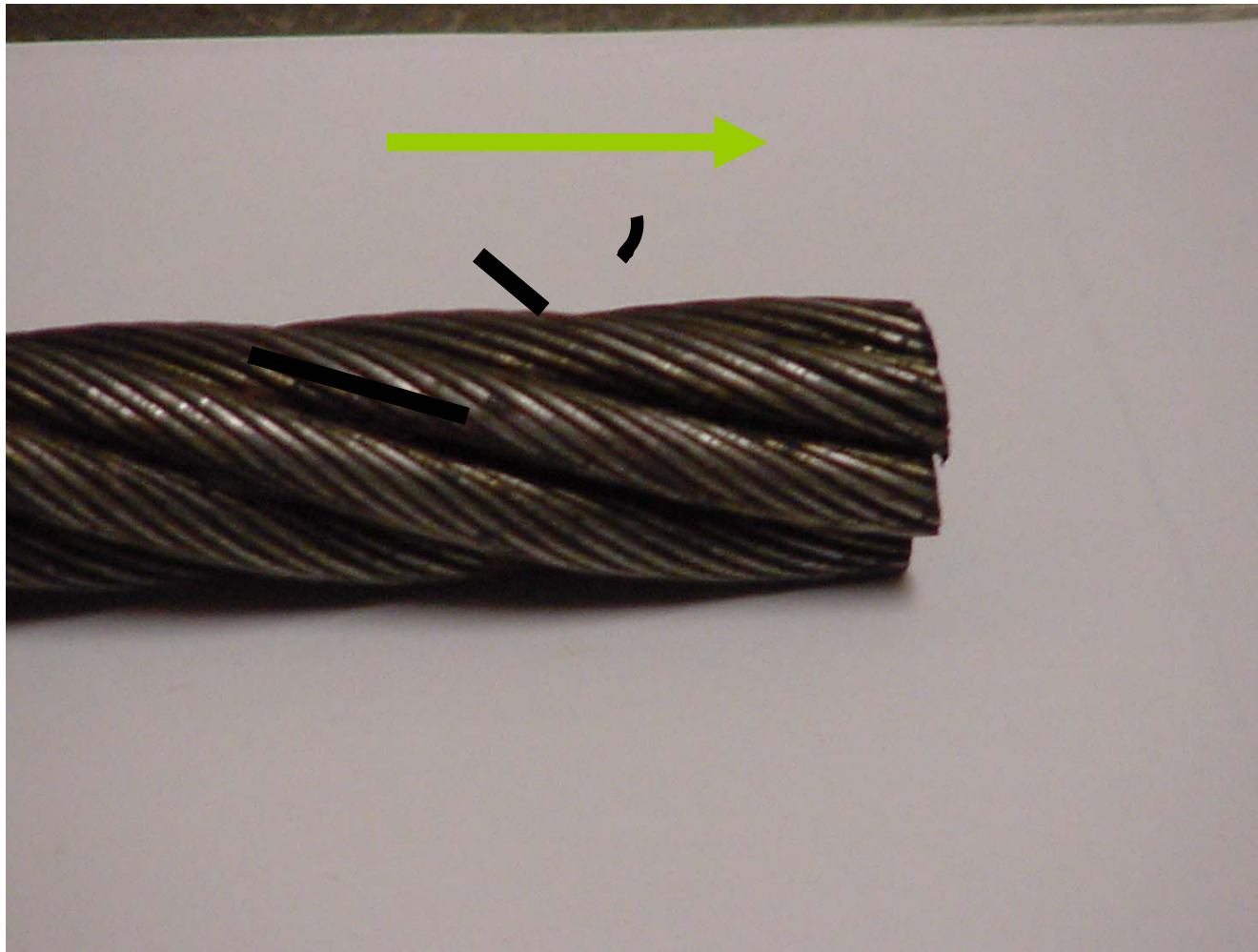
(a) ***General.*** (1) Rigging equipment to be inspected prior to use on each shift. Defective rigging equipment must be removed from service

(a)(4) Special custom design grabs, hooks, clamps, or other lifting accessories, shall be marked to show the safe working loads and proof-tested prior to use to 125% of the rated load.

(c)(4) (iv) Wire rope not to be used if in any length equal to 8 diameters, the total number of visible broken wires exceeds 10% of the total number of wires, or if wire rope shows signs of excess wear, or if wire rope shows signs of corrosion, or if other defects are apparent.

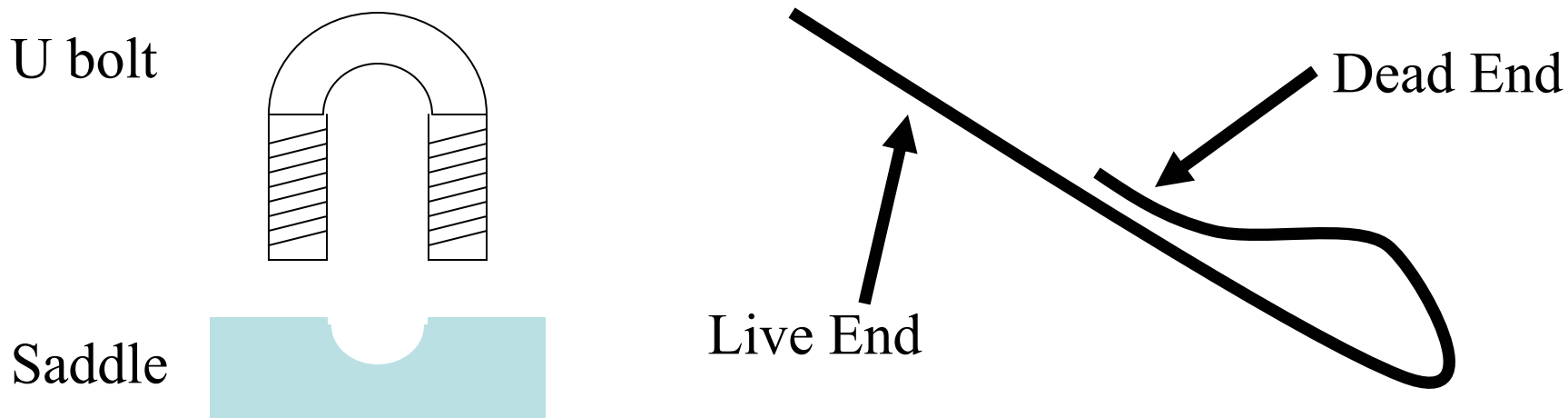


Regular Lay



1926.251

(c)(5)(i) When used for eye splices the U bolt shall be applied so that the “U” section is in contact with the dead end of the rope



(c)(14) Fiber core wire ropes slings shall be removed from service if exposed to temperatures in excess of 200°F. For non-fiber core wire rope slings, use temperature cannot exceed 400°F.



1926.252 Disposal of Waste Material

- (a) If materials are dropped more than 20 feet to any point lying outside the building, an enclosed chute of wood or equivalent material shall be used. The chute must be closed in on all sides.
- (b) When debris is dropped through holes in the flooring without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above. Warnings shall be posted regarding the hazard.
- (c) All scrap lumber, waste material and rubbish shall be removed from the immediate work area as the work progresses.