



---

# Materials Handling, Storage, Use and Disposal

- *29 CFR 1926 – Subpart H*

# Objectives

---

In this course, we will discuss:

- Minimum OSHA requirements for material handling, storage and equipment
- Cover safe storage of materials
- Review proper use of rigging equipment
- Identify hazards and abatement methods



# Materials Storage

1926.250(b)(1)

- In buildings under construction, materials must not be placed within 6 feet of a hoistway or floor opening.





# Materials Storage

---

1926.250(b)(2)-(5)

- Use personal fall arrest equipment when working on stored material in silos, hoppers, tanks, and similar storage areas.
- Noncompatible materials shall be segregated in storage.
- Materials shall not be stored on scaffolds or runways except for immediate operations.





# Materials Storage

---

1926.250(b)(6)

- Stack bricks in a manner that will keep them from falling.
- Do not stack more than 7 feet high.
- Taper back a loose brick stack after it is 4 feet high.





# Materials Storage

---

1926.250(b)(7)

- When masonry blocks are stacked higher than 6 feet
  - The stack should be tapered back one-half block per tier above the 6-foot level.



# Materials Storage

1926.250(b)(8)

- Storage of lumber
  - Remove nails before stacking
  - Stacked level and on sills
  - Stack lumber so that it is stable and self supporting
  - Piles not to exceed 20 feet
    - » 16 feet if handled manually



# Materials Storage

---

1926.250(b)(9)

- Structural steel, pipe, bar stock, etc., unless racked, must be stacked and blocked to prevent spreading or tilting.







# Housekeeping

1926.250(c)

- Storage areas must be kept free from accumulation of materials that create hazards from:
  - Tripping
  - Fire
  - Explosion
  - Pest harborage





# Dockboards

1926.250(d)

- Dockboards must be strong enough to carry imposed load.
  - Portable dockboards must be properly secured in position.
  - Provided with handholds, or other effective means, to permit safe handling



# Dockboards

1926.250(d)(4)

- Positive protection must be provided to prevent railroad cars from moving during loading or unloading operations.





# Rigging Equipment

---

1926.251(a)(1)

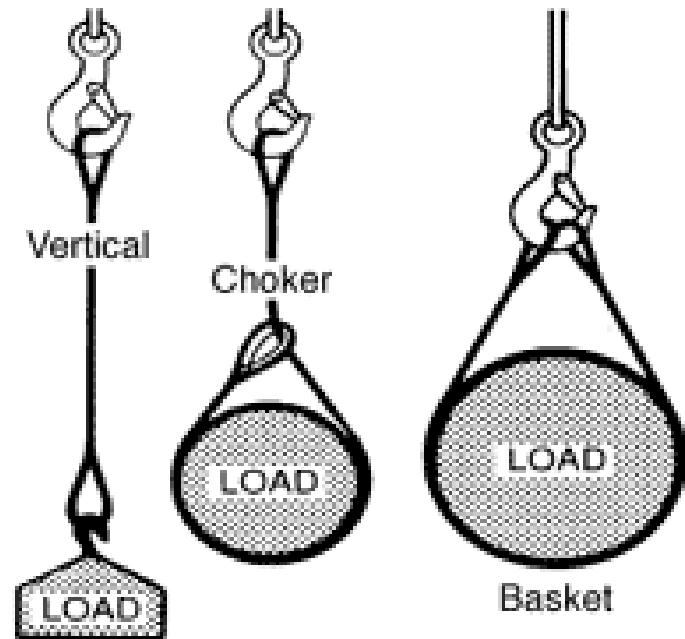
- Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe.
- Defective rigging equipment shall be removed from service.



# Rigging Equipment

1926.251(a)(2)

- Most commonly used sling configurations in construction rigging
  - Vertical, choker, and basket hitches
- Use applicable tables in Subpart H for rated capacities of various sling configurations



# Rigging Equipment

1926.251(a)(2)

- General
  - Rigging equipment shall not be loaded in excess of its recommended safe working load.

TABLE H - 1. -- RATED CAPACITY (WORKING LOAD LIMIT), FOR ALLOY STEEL CHAIN SLINGS (1)				
Rated Capacity (Working Load Limit), Pounds [Horizontal angles shown in parentheses] (2)				
Chain size, inches	Single branch sling--	Double sling vertical angle (1)		
	loading	90 deg.	30 deg.	45 deg.
			(60 deg.)	(45 deg.) (30 deg.)
1/4.....	3,250	5,560	4,550	3,250
3/8.....	6,600	11,400	9,300	6,600
1/2.....	11,250	19,500	15,900	11,250
5/8.....	16,500	28,500	23,300	16,500
3/4.....	23,000	39,800	32,500	23,000
7/8.....	28,750	49,800	40,600	28,750
1.....	38,750	67,100	54,800	38,750
1 1/8...	44,500	77,000	63,000	44,500
1 1/4...	57,500	99,500	81,000	57,500
1 3/8...	67,000	116,000	94,000	67,000
1 1/2...	80,000	138,000	112,900	80,000
1 3/4...	100,000	172,000	140,000	100,000



# Rigging Equipment

---

1926.251(a)(3)-(4)

- Rigging equipment shall be removed from work area so as not to present a hazard to employees when not in use.
- Custom design grabs, hooks, clamps, or other lifting accessories shall be marked to indicate the safe working loads.



# Rigging Equipment Slings

---

1926.250(a)(5)

- Types of slings covered are those made from alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope, and synthetic web.



**Chain**



**Wire rope**



**Metal mesh**



**Synthetic**

---



# Rigging Equipment Inspections 1926.251(a)(6)

---

- Inspections
  - Equipment must be inspected prior to use and each shift.
    - » Also, as necessary during its use
  - Damaged or defective equipment must be removed from service.



# Alloy Steel Chains

1926.251(b)(1)

- Chain slings must have permanently affixed durable identification stating:
  - Size, grade, rated capacity, and sling manufacturer



# Alloy Steel Chains

1926.251(b)(2)

- Hooks, rings, oblong links, or other attachments, when used with alloy steel chains, must have a rated capacity at least equal to that of the chain.





# Alloy Steel Chains

1926.251(b)(3)

- Job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, etc., or other such attachments, shall not be used.
  - Kinked or knotted chains must not be used for lifting.
  - Chains must not be shortened by bolting, wiring or knotting.





# Alloy Steel Chains

---

1926.251(b)(4)

- Must adhere to manufacturer's recommended ratings for safe working loads of chains and chain slings
- Rated capacity must conform to values shown in Table H-1





# Alloy Steel Chains

---

1926.251(b)(5)

- Chains must be removed from service when maximum allowable wear is reached at any point of any link.
  - As indicated in Table H-2

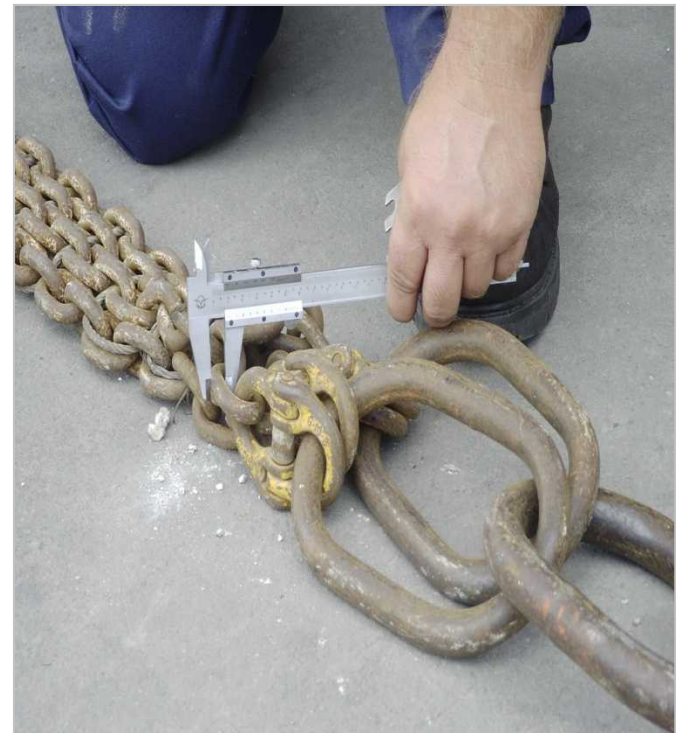




# Alloy Steel Chains

1926.251(b)(6)(i)

- A thorough periodic inspection of slings must be made on a regular basis.
  - At least annually
- Inspection determined on the basis of:
  - Frequency of sling use
  - Severity of service conditions
  - Nature of lifts being made
  - Experience gained on service life of slings

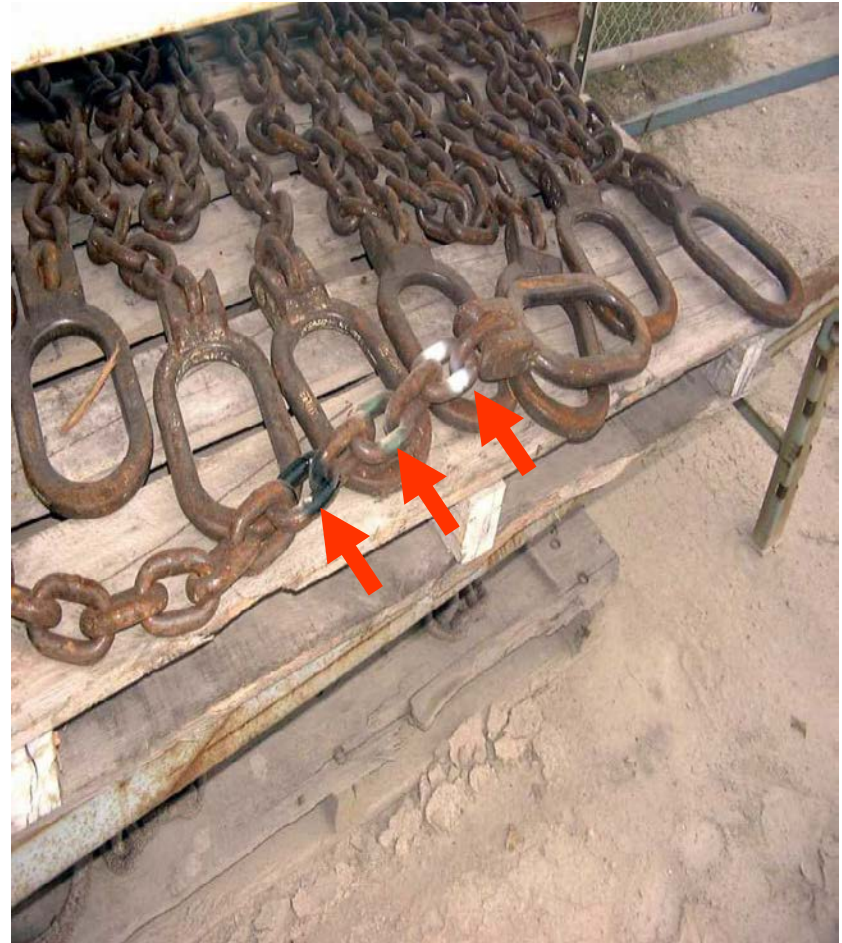




# Alloy Steel Chains

1926.251(b)(6)(ii)

- A record of the most recent month in which the chain sling was thoroughly inspected must be maintained.
- The record must be available for examination.





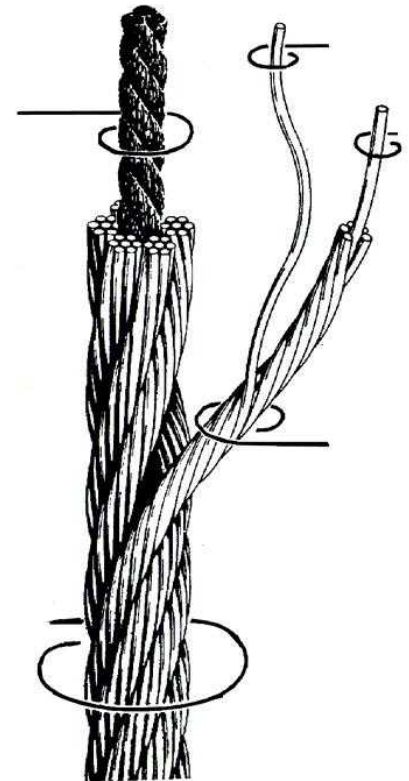


# Wire Rope Slings

---

1926.251(c)

- Considerations when selecting wire rope
  - Strength
  - Flexibility or resistance to bending fatigue
  - Resistance to abrasion
  - Resistance to crushing
  - Resistance to rotation
  - Resistance to corrosion



# Wire Rope Slings

---

1926.251(c)(4)(i)

- Eye splices made in any wire rope must have at least three full tucks.

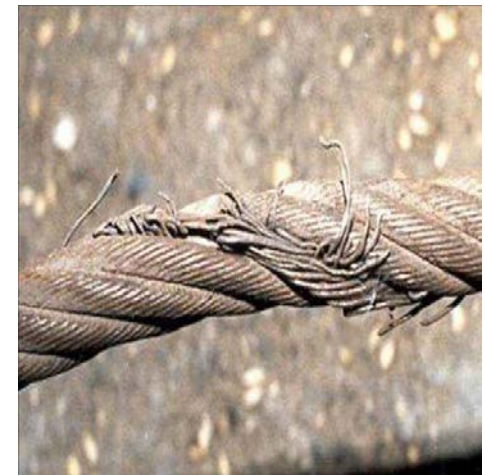




# Wire Rope Slings

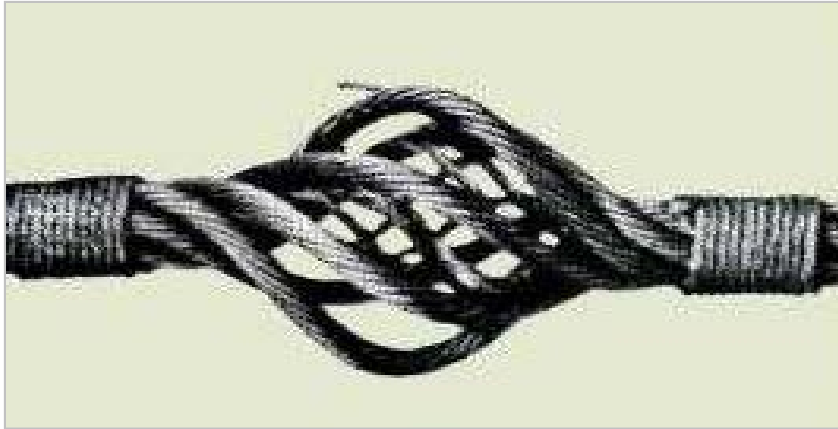
1926.251(c)(4)(iv)

- Wire rope must not be used if in any length of eight diameters:
  - Total number of visible broken wires exceed 10% of the total number of wires
  - Rope shows excessive wear, corrosion, or defect



# Wire Rope Slings

1926.251(c)(4)(iv)



**Bird Caging**



**Kinking**

**Crushing**



**Heat Damage**





# Wire Rope Slings

---

1926.251(c)(5)(i)

- When using U-bolt wire rope clips to form eyes, ensure the “U” section is in contact with the dead end of the rope.



**Correct Method**

---



# Synthetic Web Slings

1926.251(e)

- Synthetic web sling markings
  - Slings must be marked or coded to show:
    - » Name or trademark of manufacturer
    - » Rated capacities for the type of hitch
    - » Type of material



# Synthetic Web Slings

1926.251(e)(4)

- Synthetic web sling markings
  - Fittings must have a breaking strength at least equal to that of the sling
  - Fittings must be free of sharp edges



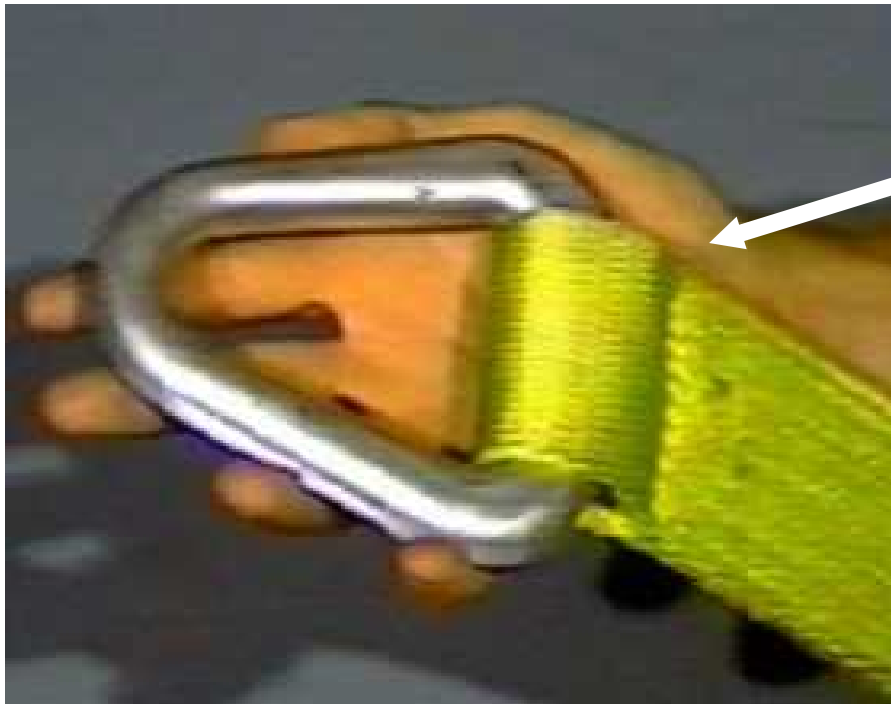


# Synthetic Web Slings

---

1926.251(e)(5)

- Stitching is the only method allowed to attach end fittings to webbing, or to form eyes



**Stitching**

---



# Environmental Conditions 1926.251(e)(6)-(7)

---

- Chemicals

- Nylon web slings shall not be used where fumes, vapors, sprays, mists or liquids of acids or phenolics are present.
- Polyester or polypropylene web slings, or web slings with aluminum fittings shall not be used where fumes, vapors, sprays, mists or liquids of caustics are present.

- Heat

- Synthetic web slings of polyester and nylon shall not be used in excess of 180 deg. F (82 deg. C).
  - Polypropylene web slings shall not be used at temperatures in excess of 200 deg. F (93.33 deg. C).
-

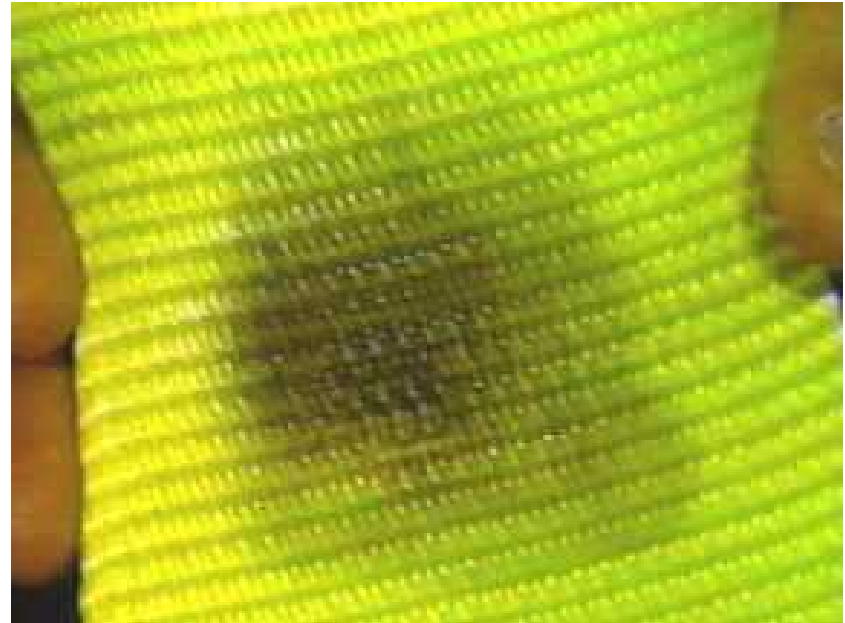


# Synthetic Web Slings

---

1926.251(e)(8)

- Remove from service if any of the following conditions are present:
  - Acid or caustic burns
  - Melting or charring of any part
  - Snags, punctures, tears or cuts
  - Broken or worn stitches
  - Distortion of fittings



**Heat Damage**

---

# Shackles and Hooks

1926.251(f)(1)

- Table H-19 shall be used to determine the safe working loads of various sizes of shackles.
- Higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than 5 is maintained.
- Manufacturer's recommended safe working loads not to be exceeded.





# Shackles and Hooks

---

1926.251(f)



**Right**



**Wrong**





# Shackles and Hooks

1926.251(f)(2)

- Follow manufacturer's recommendations in determining safe working load (SWL)
  - If manufacturer's SWL is not available:
    - » Must be tested to the intended SWL before they are initially put into use
    - » Employer must keep a record of the dates and test results



# Disposal of Waste Materials

1926.252(a)

- An enclosed chute must be used when dropping material more than 20 feet outside of a building.



# Disposal of Waste Materials 1926.252(b)

---

- When debris is dropped through holes in floors without the use of chutes:
  - Area must be enclosed with barricades
  - Warning signs must be posted at each level





# Disposal of Waste Materials 1926.252(c)-(e)

---

- All scrap lumber, waste material, and rubbish must be removed from the immediate work area as work progresses.
- Disposal of waste material or debris by burning shall comply with local fire regulations.
- All solvent waste, oily rags, and flammable liquids must be kept in fire resistant covered containers until removed from worksite.







# Summary

---

In this course, we discussed:

- Minimum OSHA requirements for material handling, storage and equipment
- Covered safe storage of materials
- Reviewed proper use of rigging equipment
- Identified hazards and abatement methods



**Thank You For Attending!**

---

**Final Questions?**

---