

# Practice Test 12

## Core Examination

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**Instructions:** Select the best answer for each question. You have 90 minutes to complete this section.

1. What ground material requires extensive preparation?
  - A. Compacted gravel
  - B. Dense sand
  - C. Bedrock
  - D. Organic soil or saturated clay
  
2. When must setup areas be re-inspected?
  - A. Weekly
  - B. Monthly
  - C. After weather or ground changes
  - D. Annually
  
3. What determines excavation setback distance?
  - A. Standard 5-foot rule
  - B. Visual inspection only
  - C. Soil type and excavation depth
  - D. Distance optional
  
4. When operating on concrete, what must be verified?
  - A. Concrete color
  - B. Slab capacity for concentrated loads
  - C. Concrete age
  - D. Surface temperature
  
5. What is required under mats?
  - A. Full contact with solid surface
  - B. Any surface
  - C. Gravel only
  - D. Concrete only
  
6. During operations, when must level be verified?
  - A. Once daily
  - B. Weekly
  - C. Monthly
  - D. Continuously or when conditions change

7. What clearance applies to 200-350 kV lines?
- A. 10 feet
  - B. 15 feet
  - C. 20 feet or de-energization
  - D. 5 feet
8. When planning lifts, what is critical?
- A. Crane color
  - B. Load weight including rigging
  - C. Time available
  - D. Weather forecast
9. What determines boom configuration?
- A. Boom color
  - B. Fuel level
  - C. Reach, height, and capacity needs
  - D. Time of day
10. When must road access be restricted?
- A. Never required
  - B. When operations affect public roadways
  - C. Only at night
  - D. Monthly
11. What is required near property lines?
- A. Verbal notification
  - B. Clearance verification and permissions
  - C. Higher insurance
  - D. Night operations
12. During near-capacity operations, what is essential?
- A. Enhanced planning and supervision
  - B. Verbal agreement
  - C. Standard procedures
  - D. No special requirements
13. When must travel paths be evaluated?
- A. Monthly
  - B. Annually

- C. Evaluation optional
- D. Before travel for clearances

14. What determines spotter requirements?

- A. Operator visibility limitations
- B. Crane size
- C. Time of day
- D. Fuel level

15. What must be established around operations?

- A. Parking areas
- B. Break rooms
- C. Offices
- D. Barriers and exclusion zones

16. When operating near traffic, what is required?

- A. Night operations
- B. Special insurance
- C. Traffic control measures
- D. No requirements

17. What is needed near flight paths?

- A. Night operations
- B. Aviation authority notification
- C. Special paint
- D. Higher insurance

18. When must wind be monitored?

- A. Never required
- B. Monthly
- C. Annually
- D. When approaching operational limits

19. When does precipitation stop operations?

- A. When safety or visibility is affected
- B. Any precipitation
- C. Never
- D. Monthly

20. What is required for nighttime lifts?

- A. Operations prohibited
- B. Reduced capacity
- C. Adequate illumination
- D. Special permits

21. When are engineered tandem plans required?

- A. Never
- B. Complex critical dual lifts
- C. All dual lifts
- D. Optional

22. What must be verified before changes?

- A. Appropriate load charts
- B. Insurance
- C. Fuel level
- D. Crane color

23. What is prohibited during operations?

- A. Radio use
- B. Personnel under loads
- C. Signal persons
- D. Daytime operations

24. What establishes wind operating limits?

- A. General guidelines
- B. Operator preference
- C. Project schedule
- D. Manufacturer specifications

25. When must rescue procedures be ready?

- A. Before high-risk operations
- B. Never required
- C. Monthly
- D. Annually

26. What must be verified about counterweight?

- A. Color
- B. Age
- C. Secure installation per specifications
- D. Manufacturer name

27. What may be required near heliports?
- A. Night operations
  - B. Height limits and coordination
  - C. Special paint
  - D. Higher insurance
28. What determines blocking requirements?
- A. Block color
  - B. Block age
  - C. Block manufacturer
  - D. Load characteristics and rigging
29. When must safety briefings occur?
- A. Monthly
  - B. Before each day's operations
  - C. Annually
  - D. Weekly
30. What is required for boom over structures?
- A. Verbal warning
  - B. Special permits
  - C. Clearance or protective measures
  - D. Higher insurance
31. What is the standard signal for "raise load"?
- A. Arms overhead
  - B. Circular motion
  - C. One fist
  - D. Arm extended upward, finger pointing up
32. When using radios, what is essential?
- A. Clear language with confirmations
  - B. Fast speech
  - C. Abbreviated terms
  - D. Any style
33. What must signal persons do without visibility?
- A. Continue signaling
  - B. Estimate position

- C. Stop or reposition for visibility
- D. Signal faster

34. When must signals be reviewed?

- A. Never
- B. Before new site or personnel
- C. Monthly
- D. Annually

35. What is the standard signal for "swing"?

- A. Arm extended pointing in swing direction
- B. Circular motion
- C. One arm extended
- D. Both fists

36. During darkness, what is required?

- A. No signaling possible
- B. Illuminated signals
- C. Voice only
- D. Standard signals adequate

37. When can special signals be implemented?

- A. Never
- B. Anytime
- C. After demonstration and agreement
- D. Only emergencies

38. What command has priority?

- A. Stop from anyone
- B. Radio commands
- C. Hand signals
- D. Horn signals

39. When must signal person qualifications be verified?

- A. Weekly
- B. Monthly
- C. Annually
- D. Before giving signals

40. What is required if signal person moves?

- A. Continue signaling
- B. Stop and establish visibility
- C. Move quickly
- D. No action needed

41. When are relief personnel needed?

- A. When fatigue impairs performance
- B. Every hour
- C. Never during operations
- D. End of shift

42. What must operators confirm?

- A. Weather
- B. Fuel level
- C. Time
- D. Understanding before executing

43. When using voice commands, what must be avoided?

- A. Complete sentences
- B. Specific terms
- C. Ambiguous language
- D. Slow speech

44. What ensures signal person visibility?

- A. Position only
- B. High-visibility apparel
- C. Voice volume
- D. Hand size

45. When must backup communication be ready?

- A. Never needed
- B. Only large cranes
- C. Optional
- D. When primary may fail

46. Under OSHA, what must be assessed initially?

- A. Ground conditions and site hazards
- B. Fuel costs
- C. Operator salary
- D. Project budget

47. What does OSHA require for operators?
- A. Certification and evaluation
  - B. Experience only
  - C. Age only
  - D. No requirements
48. According to OSHA, when are inspections documented?
- A. Never
  - B. Monthly only
  - C. Shift, annual, and after events
  - D. Optional
49. What must employers provide?
- A. Transportation
  - B. Lunch
  - C. Housing
  - D. Equipment familiarization
50. Under OSHA, who supervises assembly?
- A. Any worker
  - B. Owner
  - C. Qualified A/D director
  - D. Insurance agent
51. What does OSHA require for capacity data?
- A. Accessible load charts
  - B. Verbal adequate
  - C. Memory sufficient
  - D. Optional
52. According to OSHA, when is fall protection required?
- A. Never
  - B. Only above 10 feet
  - C. Optional
  - D. Above 6 feet during A/D
53. What must OSHA inspections document?
- A. Operator preferences
  - B. Deficiencies and corrections

- C. Fuel type
- D. Crane color

54. Under OSHA, who approves modifications?

- A. Operator
- B. Owner
- C. Manufacturer or engineer
- D. Any supervisor

55. What does OSHA require for defects?

- A. Correction or removal from service
- B. Document only
- C. Continue cautiously
- D. Ignore if minor

56. According to OSHA, when must re-evaluation occur?

- A. Never
- B. Every 10 years
- C. Monthly
- D. Every three years or when deficiencies arise

57. What must OSHA inspections evaluate?

- A. Paint only
- B. Age only
- C. Safety-critical systems
- D. Fuel capacity

58. Under OSHA, what is required near power lines?

- A. Verbal notification
- B. Clearances or de-energization
- C. Higher insurance
- D. No requirements

59. What does OSHA require for load information?

- A. Verbal adequate
- B. Memory sufficient
- C. Current accessible charts
- D. Optional

60. According to OSHA, when can trainees operate?

- A. Never
- B. With certified operator present
- C. After 1 week
- D. Anytime

61. Under ASME B30.5, rated capacity is defined as what?

- A. Any load
- B. Load plus 50 percent
- C. Operator decision
- D. Maximum manufacturer-rated load

62. What does ASME B30.5 require for rope inspection?

- A. Shift inspection when in use
- B. Monthly
- C. Annually
- D. Optional

63. According to ASME B30.5, when must equipment stop?

- A. Monthly
- B. Quarterly
- C. When unsafe conditions exist
- D. Annually

64. What does ASME B30.5 require for modifications?

- A. Verbal approval
- B. Manufacturer or engineer approval
- C. Owner approval
- D. No approval

65. Under ASME B30.5, what governs platforms?

- A. ASME B30.23 requirements
- B. Standard procedures
- C. Verbal agreement
- D. Platforms prohibited

66. What does ASME B30.5 specify about rated loads?

- A. Can exceed slightly
- B. Operator discretion
- C. Shall not be exceeded
- D. Optional limits

67. According to ASME B30.5, when must indicators function?

- A. Monthly
- B. Before operations
- C. Annually
- D. Optional

68. What does ASME B30.5 require for maintenance?

- A. Written documentation
- B. Verbal reports
- C. No records
- D. Records prohibited

69. Under ASME B30.5, critical lifts are based on what?

- A. Weight only
- B. Risk and consequences
- C. Time
- D. Crane age

70. What does ASME B30.5 state about side loading?

- A. Permitted
- B. Increases capacity
- C. No restrictions
- D. Must be minimized

71. According to ASME B30.5, when are load tests required?

- A. After installation and major repairs
- B. Weekly
- C. Monthly
- D. Optional

72. What does ASME B30.5 prohibit?

- A. Tag lines
- B. Radio use
- C. Leaving loads unattended
- D. Signal persons

73. Under ASME B30.5, uncertain operators must do what?

- A. Continue slowly
- B. Stop and seek direction

- C. Document later
- D. Consult anyone

74. What does ASME B30.5 require for rope replacement?

- A. Monthly
- B. Annually
- C. Never
- D. When criteria are met

75. According to ASME B30.5, who authorizes return?

- A. Operator
- B. Owner
- C. Qualified person
- D. Any mechanic

76. When reading charts, what is identified first?

- A. Current configuration
- B. Operator
- C. Fuel level
- D. Weather

77. On charts, radius is defined as what?

- A. Vertical distance
- B. Diagonal measure
- C. Boom length
- D. Horizontal distance from center

78. What happens as radius increases?

- A. Both increase
- B. Capacity decreases
- C. No relationship
- D. Capacity doubles

79. When using attachments, what is needed?

- A. Main boom charts
- B. No charts
- C. Separate charts or deductions
- D. Estimate

80. What must be deducted for net capacity?

- A. Hook block and rigging
- B. Fuel
- C. Counterweight
- D. Operator weight

81. On charts, special marks indicate what?

- A. Notes or conditions
- B. Highest capacity
- C. Lowest capacity
- D. Recommended capacity

82. When angle changes, what else changes?

- A. Nothing
- B. Radius and capacity
- C. Color only
- D. Speed only

83. Between chart values, what applies?

- A. Higher capacity
- B. Average
- C. Estimate freely
- D. Lower capacity or conservative interpolation

84. How are telescopic charts organized?

- A. By boom length with radii
- B. Alphabetically
- C. Randomly
- D. By age

85. What indicates capacity limits?

- A. Color
- B. Page number
- C. Font size
- D. Bold text or notation

86. When counterweight changes, what is needed?

- A. Appropriate chart section
- B. Insurance
- C. Color change
- D. No action

87. What must be considered for large loads?

- A. Color
- B. Age
- C. Wind effects
- D. Manufacturer

88. What do footnotes contain?

- A. Critical restrictions
- B. Crane history
- C. Operator names
- D. Maintenance logs

89. When configurations change, what is essential?

- A. Insurance update
- B. Color change
- C. No action
- D. Correct chart reference

90. What affects capacity for unbalanced loads?

- A. Color
- B. Age
- C. Center of gravity location
- D. Manufacturer

91. What converts power to hydraulic?

- A. Manual crank
- B. Engine-driven pump
- C. Electric motor
- D. Gravity

92. What indicates hydraulic problems?

- A. Slow function or leaks
- B. Normal operation
- C. Proper temperature
- D. Clean fluid

93. What do hydraulic filters do?

- A. Increase pressure
- B. Cool fluid

- C. Add lubrication
- D. Remove contaminants

94. What causes hydraulic overheating?

- A. Proper operation
- B. Clean filters
- C. Excessive load or poor cooling
- D. Low hours

95. What do relief valves control?

- A. Flow direction
- B. Maximum pressure
- C. Temperature
- D. Fluid level

## Specialty Examination

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**Instructions:** Select the best answer for each question. You have 60 minutes to complete this section.

1. What advantage do crawler cranes provide?

- A. High road speed
- B. Low ground pressure and stability
- C. Compact storage
- D. Low maintenance

2. On telescopic cranes, what controls extension?

- A. Hydraulic flow control and sensors
- B. Manual coordination
- C. Gravity
- D. Operator skill alone

3. What gives lattice booms strength?

- A. Solid construction
- B. Triangulated framework design
- C. Heavy materials
- D. Compact design

4. On all-terrain cranes, what enables off-road capability?

- A. Single axle
- B. Manual transmission

- C. All-wheel drive and suspension
  - D. Fixed differential
5. How do lattice cranes achieve height?
- A. Modular boom section assembly
  - B. Telescoping sections
  - C. Hydraulic extension
  - D. Fixed lengths
6. On telescopic cranes, what prevents retraction?
- A. Friction only
  - B. Gravity
  - C. Manual brakes
  - D. Holding valves and locks
7. What advantage do fixed cabs provide?
- A. Better visibility
  - B. Higher capacity
  - C. Simpler design with lower maintenance
  - D. Improved comfort
8. When assembling lattice booms, what is critical?
- A. Speed
  - B. Proper pins and assembly sequence
  - C. Visual inspection only
  - D. Experience alone
9. What do boom pendants provide?
- A. Angular support from mast
  - B. Boom extension
  - C. Rigging storage
  - D. Capacity increase
10. On all-terrain cranes, what manages steering?
- A. Manual linkages
  - B. Separate operators
  - C. Mechanical cables
  - D. Electronic control systems
11. What capability do luffing jibs offer?

- A. Higher capacity
- B. Radius adjustment without boom movement
- C. Lower cost
- D. Simpler operation

12. When using offset jibs, what affects capacity?

- A. Time of day
- B. Wind alone
- C. Offset angle
- D. Operator skill

13. What limits boom length?

- A. Operator preference
- B. Fuel capacity
- C. Boom color
- D. Structural and stability limits

14. What provides rough-terrain maneuverability?

- A. Compact size with crab steering
- B. Long wheelbase
- C. Multiple axles
- D. Fixed suspension

15. What controls lattice boom angle?

- A. Manual cranks
- B. Boom hoist system
- C. Counterweight position
- D. Hydraulic cylinders only

16. How do fly jib capacities compare?

- A. No change
- B. Increased
- C. Slight increase
- D. Significantly reduced

17. What establishes safe jib length?

- A. Manufacturer specifications
- B. Jib color
- C. Operator decision
- D. Ground conditions

18. What does wider track spacing provide?
- A. Faster travel
  - B. Lower fuel use
  - C. Reduced maintenance
  - D. Greater stability and capacity
19. What is the telescopic crane advantage?
- A. Higher capacity
  - B. Longer boom
  - C. Quick setup without assembly
  - D. Lower cost
20. When using boom extensions, what is critical?
- A. Proper installation and charts
  - B. Extension color
  - C. Extension age
  - D. Extension weight
21. Which hoist offers faster speeds?
- A. Main hoist
  - B. Auxiliary hoist
  - C. Manual hoist
  - D. All equal
22. What provides hydraulic crane swing?
- A. Manual rotation
  - B. Wire rope
  - C. Electric motor only
  - D. Hydraulic motor with brake
23. When changing track width, what is essential?
- A. Track color
  - B. Insurance notification
  - C. Appropriate capacity chart
  - D. Width irrelevant
24. When using boom inserts, what is critical?
- A. Insert color
  - B. Correct installation and charts

- C. Insert age
- D. Manufacturer location

25. What guides boom telescoping?

- A. Internal wear pads and guides
- B. External rails
- C. Operator vision
- D. Gravity

26. On lattice booms, which carry primary loads?

- A. Lacing members
- B. Battens
- C. Bolts
- D. Main chord members

## Practical Examination

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**Instructions:** Select the best answer for each question. This section evaluates your understanding of hands-on operating procedures and inspection requirements.

1. When inspecting wire rope, what requires removal?

- A. Damage exceeding removal criteria
- B. Proper flexibility
- C. Adequate lubrication
- D. Manufacturer markings visible

2. What is the proper rope inspection frequency?

- A. Weekly
- B. Monthly
- C. Each shift when in regular use
- D. Annually

3. During pre-operational checks, what is acceptable?

- A. Clean fluid at proper level
- B. Milky appearance
- C. Empty reservoir
- D. Overfilled condition

4. When inspecting hooks, what requires replacement?

- A. 5 percent throat increase

- B. 10 percent increase
- C. 12 percent increase
- D. 15 percent or manufacturer limit exceeded

5. What indicates proper LMI function?

- A. Display illuminated
- B. Accurate configuration and load tracking
- C. Power on
- D. Alarm sounds

6. During brake testing, what is proper function?

- A. Gradual stopping
- B. Continued movement
- C. Immediate stop and hold
- D. Delayed engagement

7. What verifies hoist brake function?

- A. Visual inspection
- B. Load hold without drift
- C. Noise check
- D. Fluid level check

8. What is verified before engine start?

- A. Controls in neutral
- B. Horn tested
- C. Boom extended
- D. Radio on

9. During warm-up, what is monitored?

- A. Ambient temperature
- B. Fuel level only
- C. Radio signal
- D. Oil pressure and temperature

10. When deploying outriggers, what is verified?

- A. Deployment speed
- B. Crane level maintained
- C. Paint condition
- D. Serial numbers

11. What is proper hoist testing?
  - A. Maximum speed only
  - B. Minimum speed only
  - C. Variable speeds with brake test
  - D. Visual inspection adequate
  
12. During control testing, what is acceptable?
  - A. Smooth proportional response
  - B. Delayed response
  - C. Binding movement
  - D. Erratic function
  
13. When checking boom indicators, what is verified?
  - A. Indicator color
  - B. Indicator location
  - C. Indicator age
  - D. Accurate length display
  
14. What rope condition requires immediate removal?
  - A. Proper flexibility
  - B. Adequate lubrication
  - C. Kinking or bird-caging
  - D. Correct diameter
  
15. During hydraulic inspection, what indicates contamination?
  - A. Clear appearance
  - B. Milky or cloudy fluid
  - C. Proper level
  - D. Amber color
  
16. When testing anti-two-block, what indicates proper function?
  - A. Warnings and cutout activation
  - B. Device visible
  - C. Device labeled
  - D. Device makes sound
  
17. What is proper lock verification?
  - A. Visual only
  - B. Paint check
  - C. Listen for sounds

D. Engagement verification with load test

18. During structural inspection, what requires attention?

- A. Normal paint wear
- B. Minor rust
- C. Cracks or deformation
- D. Proper labels

19. When inspecting terminations, what is critical?

- A. Termination color
- B. Secure attachment without loosening
- C. Termination age
- D. Termination weight

20. What must LMI displays provide?

- A. Display color
- B. Display size
- C. Functional readable information
- D. Display age

21. During rope inspection, what seating is required?

- A. Can ride flanges
- B. Proper seating in all grooves
- C. Seating not critical
- D. Visual adequate

22. When checking hoses, what requires replacement?

- A. Cracking, bulging, or deterioration
- B. Hoses flexible
- C. Hoses have fittings
- D. Hoses labeled

23. What is proper shutdown procedure?

- A. Leave running
- B. Secure controls only
- C. Lower boom only
- D. Lower boom, secure controls, document

24. During swing testing, what indicates proper operation?

- A. Continuous rotation

- B. Jerky movement
- C. Smooth operation with immediate brake
- D. Delayed response

25. When inspecting extinguishers, what requires service?

- A. Low pressure or expired inspection
- B. Extinguisher mounted
- C. Extinguisher visible
- D. Extinguisher labeled

26. What must be verified about pins?

- A. Pin color
- B. Pin age
- C. Pin manufacturer
- D. Full insertion with retention devices

27. During final verification, what is confirmed?

- A. All systems functional and area clear
- B. Crane painted
- C. Crane expensive
- D. Crane large

28. When inspecting pins, what indicates problems?

- A. Proper paint
- B. Correct labels
- C. Wear, cracks, or elongated holes
- D. Original installation

29. What indicates proper cylinder operation?

- A. Cylinders visible
- B. Smooth operation without leaks
- C. Cylinders painted
- D. Cylinders labeled

30. During high winds, what is proper positioning?

- A. Maximum height
- B. Per manufacturer specifications
- C. Horizontal
- D. Fully extended

# Answers & Explanations - Practice Test 12

## Core Examination

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### 1. **Correct Answer: D (Organic soil or saturated clay)**

Organic soil or saturated clay requires extensive preparation for crane operations. These materials have very low bearing capacity, typically 500-1,500 pounds per square foot or less when saturated. Organic soils contain decomposing vegetation creating voids and continuing settlement. Saturated clay loses strength dramatically when water-laden. These conditions require complete excavation and replacement with engineered fill or extensive ground improvement systems before supporting crane loads.

### 2. **Correct Answer: C (After weather or ground changes)**

Setup areas must be re-inspected after weather or ground changes. Heavy rain can saturate soil reducing bearing capacity. Ground changes from nearby excavation, vehicle traffic, or detected settlement can compromise setup safety. Re-inspection verifies conditions remain adequate after events that could affect ground stability or crane level ensuring continued safe operations.

### 3. **Correct Answer: C (Soil type and excavation depth)**

Excavation setback distance is determined by soil type and excavation depth. These factors control the extent of failure zones extending laterally beyond excavation edges. Weaker soils require greater setback. Deeper excavations create larger failure zones. Engineering analysis considering these factors determines safe distance preventing ground failure under crane loading.

### 4. **Correct Answer: B (Slab capacity for concentrated loads)**

When operating on concrete, slab capacity for concentrated loads must be verified. Concrete slabs designed for distributed floor loads may fail under concentrated crane outrigger loads. Engineering evaluation confirms slab thickness, reinforcement, and underlying support can handle anticipated concentrated loads or identifies need for load-spreading measures.

### 5. **Correct Answer: A (Full contact with solid surface)**

Under mats, full contact with solid surface is required. The entire mat must rest on prepared solid surface with no voids, uneven areas, or soft spots. Partial support creates concentrated loading causing excessive bearing pressure. Full contact ensures uniform load distribution across complete mat area maximizing effective bearing capacity.

### 6. **Correct Answer: D (Continuously or when conditions change)**

During operations, level must be verified continuously or when conditions change. Real-time monitoring identifies developing problems from settlement or changes. Crane level directly affects stability margins. Continuous monitoring combined with checks after configuration changes allows immediate correction if specifications are exceeded maintaining safe operations.

**7. Correct Answer: C (20 feet or de-energization)**

For 200-350 kV lines, OSHA requires 20 feet clearance or de-energization. This substantial clearance accounts for significant electrical arc potential at these high voltages. Lines must be de-energized by utility if adequate clearance cannot be maintained throughout all boom movements and operating conditions.

**8. Correct Answer: B (Load weight including rigging)**

When planning lifts, load weight including rigging is critical. Total suspended weight includes actual load plus all rigging components such as slings, shackles, spreader bars, and lifting beams. This complete weight determines required crane capacity. Failing to account for rigging weight results in overloading creating serious safety hazards.

**9. Correct Answer: C (Reach, height, and capacity needs)**

Boom configuration is determined by reach, height, and capacity needs. These three interrelated factors establish what boom length and angle are required. Configuration must provide adequate capacity at required radius while achieving necessary vertical height. All three parameters must be satisfied simultaneously for successful lift planning.

**10. Correct Answer: B (When operations affect public roadways)**

Road access must be restricted when operations affect public roadways through boom swing across lanes, load placement blocking traffic, or crane positioning obstructing flow. Restrictions prevent vehicles from entering hazardous areas and maintain safe orderly traffic movement. Coordination with authorities ensures proper implementation.

**11. Correct Answer: B (Clearance verification and permissions)**

Near property lines, clearance verification and permissions are required. Verification ensures operations remain within authorized boundaries. Permissions from adjacent property owners are needed if boom or loads will affect their property. Written agreements establish authorization and protective measures preventing legal issues.

**12. Correct Answer: A (Enhanced planning and supervision)**

During near-capacity operations, enhanced planning and supervision are essential. Operating near maximum capacity leaves minimal safety margin. Detailed planning documents all procedures while

qualified supervision provides expert oversight. This comprehensive approach reduces risks when operating with reduced margins.

**13. Correct Answer: D (Before travel for clearances)**

Travel paths must be evaluated before travel for clearances including overhead and lateral obstructions. Evaluation identifies hazards requiring removal or route modification. This verification prevents contact with overhead obstructions and ensures adequate clearances throughout travel path.

**14. Correct Answer: A (Operator visibility limitations)**

Operator visibility limitations determine spotter requirements. When blind spots prevent operators from seeing travel paths, loads, or surrounding areas, spotters are needed. Spotters positioned where they can see provide guidance through areas operators cannot directly observe maintaining safe movements.

**15. Correct Answer: D (Barriers and exclusion zones)**

Around operations, barriers and exclusion zones must be established. Physical barriers prevent unauthorized personnel from entering swing radius, fall zones, or areas where they could be struck. These zones encompass all hazardous regions with barriers providing positive protection against inadvertent access.

**16. Correct Answer: C (Traffic control measures)**

When operating near traffic, traffic control measures are required. Plans define routing, closures, and control methods. Trained flaggers or devices direct vehicles safely around operations. Professional traffic control prevents vehicles from entering hazardous zones maintaining public safety.

**17. Correct Answer: B (Aviation authority notification)**

Near flight paths, aviation authority notification is needed. Cranes can interfere with aircraft navigation or operations requiring FAA notification. Cranes exceeding certain heights in approach zones may require special lighting, marking, or operational restrictions coordinated with aviation authorities.

**18. Correct Answer: D (When approaching operational limits)**

Wind must be monitored when approaching operational limits. Continuous monitoring provides actual wind speed data allowing operators to track conditions and cease operations if limits are exceeded. This prevents operating in winds compromising stability or control.

**19. Correct Answer: A (When safety or visibility is affected)**

Precipitation stops operations when safety or visibility is affected through visibility reduction or equipment function impairment. Heavy rain limiting visibility, ice accumulation affecting equipment, or lightning creating electrocution risks require stopping. Safety must not be compromised by precipitation.

**20. Correct Answer: C (Adequate illumination)**

For nighttime lifts, adequate illumination is required including crane, loads, landing areas, rigging operations, and personnel positions. Lighting must allow clear visibility of operations, positions, hazards, and signals. Adequate illumination prevents accidents from reduced visibility.

**21. Correct Answer: B (Complex critical dual lifts)**

Engineered tandem plans are required for complex critical dual lifts where load distribution, rigging configuration, or operational complexity require engineering analysis. Engineering ensures load sharing is calculated correctly and procedures account for coordination requirements and potential failure modes.

**22. Correct Answer: A (Appropriate load charts)**

Before changes, appropriate load charts must be verified. Configuration changes require different chart sections. Charts must match actual configuration to provide accurate capacity information. Using charts for previous configurations creates serious overload risks.

**23. Correct Answer: B (Personnel under loads)**

During operations, personnel under loads is prohibited. This fundamental OSHA requirement prevents injuries from dropped loads or rigging failures. All personnel must remain clear of areas under suspended loads or boom paths.

**24. Correct Answer: D (Manufacturer specifications)**

Manufacturer specifications establish wind operating limits based on crane design, stability characteristics, and testing. Manufacturers determine maximum wind speeds through analysis ensuring adequate stability and control margins under wind loading.

**25. Correct Answer: A (Before high-risk operations)**

Rescue procedures must be ready before high-risk operations such as proximity to hazards, remote locations, or situations where standard emergency response may be inadequate. Plans ensure personnel understand protocols and necessary equipment is available.

**26. Correct Answer: C (Secure installation per specifications)**

About counterweight, secure installation per specifications must be verified. Counterweight must be properly positioned and fastened preventing movement or detachment. Loose counterweight can shift creating sudden stability loss or catastrophic accidents.

**27. Correct Answer: B (Height limits and coordination)**

Near heliports, height limits and coordination may be required. Cranes can interfere with helicopter operations. Notification allows heliport operators to adjust operations or establish restrictions. Coordination ensures both crane and helicopter operations proceed safely.

**28. Correct Answer: D (Load characteristics and rigging)**

Blocking requirements are determined by load characteristics and rigging including shape, weight distribution, and configuration. Loads with irregular shapes or uneven distribution may require blocking to prevent tipping. Rigging geometry may necessitate blocking for proper positioning.

**29. Correct Answer: B (Before each day's operations)**

Safety briefings must occur before each day's operations. Daily briefings ensure personnel understand hazards, procedures, assignments, and communication methods for that day's work. Conditions and personnel may change daily requiring fresh communication.

**30. Correct Answer: C (Clearance or protective measures)**

For boom over structures, clearance or protective measures are required. Clearance verification ensures adequate distance throughout movement paths. Protective measures such as padding or evacuation may be needed if adequate clearance cannot be maintained.

**31. Correct Answer: D (Arm extended upward, finger pointing up)**

The standard hand signal for "raise load" consists of arm extended upward with finger pointing up. This signal clearly indicates the upward direction of desired load movement. The extended arm and pointing finger provide intuitive visual communication of the raising action.

**32. Correct Answer: A (Clear language with confirmations)**

When using radios, clear language with confirmations is essential. Communications must use unambiguous terminology and operators must confirm understanding through acknowledgment before executing commands. This protocol ensures communications are understood correctly.

**33. Correct Answer: C (Stop or reposition for visibility)**

Without visibility, signal persons must stop or reposition for visibility. Someone with clear view must monitor throughout lift cycles. Continuing without visibility creates serious hazards from inability to detect problems.

**34. Correct Answer: B (Before new site or personnel)**

Signals must be reviewed before new site or personnel to ensure mutual understanding. This review prevents misunderstandings from unfamiliarity with signals or variations. All parties must demonstrate understanding before operations begin.

**35. Correct Answer: A (Arm extended pointing in swing direction)**

The standard hand signal for "swing" consists of arm extended pointing in the direction of desired swing. This directional signal clearly indicates which way the operator should rotate the crane providing unambiguous swing direction communication.

**36. Correct Answer: B (Illuminated signals)**

During darkness, illuminated signals are required. Lighted wands, flashlights, or chemical light sticks make hand signals visible. Signal persons should also wear reflective or illuminated clothing. Illumination allows operators to clearly see signals despite darkness.

**37. Correct Answer: C (After demonstration and agreement)**

Special signals can be implemented after demonstration and agreement. Special signals must be demonstrated to all parties ensuring everyone understands their meanings. All personnel must agree before using special signals during operations.

**38. Correct Answer: A (Stop from anyone)**

Stop from anyone has priority over all other commands. When stop is given by any person for any reason, operators must stop immediately. This absolute priority ensures immediate response to safety concerns.

**39. Correct Answer: D (Before giving signals)**

Signal person qualifications must be verified before giving signals. This verification ensures individuals directing crane movements are qualified through training and evaluation. Operating with unqualified signal persons creates serious accident risks.

**40. Correct Answer: B (Stop and establish visibility)**

If signal person moves, stop and establish visibility is required. Operations must stop and new visibility must be confirmed. Operators must know where to look and signal persons must verify adequate visibility from new positions.

**41. Correct Answer: A (When fatigue impairs performance)**

Relief personnel are needed when fatigue impairs performance reducing attention, reaction time, or communication clarity. Effective signaling requires full mental acuity. Fatigued personnel create safety risks through reduced performance and judgment.

**42. Correct Answer: D (Understanding before executing)**

Operators must confirm understanding before executing signals. This verification ensures signals were received and understood correctly. The communication loop must be complete before potentially hazardous movements begin.

**43. Correct Answer: C (Ambiguous language)**

When using voice commands, ambiguous language must be avoided. All communications should use specific unambiguous terminology that cannot be misinterpreted. Standard terms ensure instructions are understood correctly.

**44. Correct Answer: B (High-visibility apparel)**

High-visibility apparel ensures signal person visibility. High-visibility clothing in orange or lime with reflective striping makes signal persons readily identifiable allowing operators to locate them quickly against backgrounds.

**45. Correct Answer: D (When primary may fail)**

Backup communication must be ready when primary may fail from equipment malfunction, interference, or battery depletion. Predetermined backup methods ensure communication can continue if primary systems fail maintaining safe control.

**46. Correct Answer: A (Ground conditions and site hazards)**

Under OSHA, ground conditions and site hazards must be assessed initially. This hazard assessment identifies conditions requiring special precautions including ground bearing capacity, power lines, and fall hazards establishing foundation for safe planning.

**47. Correct Answer: A (Certification and evaluation)**

OSHA requires for operators certification and evaluation. Certification by accredited organizations ensures operators have been tested to national standards. Employer evaluation verifies operators can safely operate specific equipment in actual site conditions.

**48. Correct Answer: C (Shift, annual, and after events)**

According to OSHA, inspections are documented during shift inspections before daily use, annual comprehensive inspections, and after events such as repairs or incidents. Documentation provides accountability and verification of compliance.

**49. Correct Answer: D (Equipment familiarization)**

Employers must provide equipment familiarization per OSHA. This training supplements certification ensuring operators understand controls, capacities, characteristics of actual equipment, and site-specific hazards and procedures.

**50. Correct Answer: C (Qualified A/D director)**

Under OSHA, qualified assembly/disassembly director must supervise assembly. This individual has specific knowledge ensuring manufacturer instructions are followed correctly and verifying connection integrity.

**51. Correct Answer: A (Accessible load charts)**

OSHA requires for capacity data accessible load charts. Charts must be readily available to operators during operations for reference allowing capacity determination for planned lifts throughout workdays.

**52. Correct Answer: D (Above 6 feet during A/D)**

According to OSHA, fall protection is required above 6 feet during assembly/disassembly operations. Personal fall arrest systems or guardrails protect workers from fall hazards during elevated A/D work.

**53. Correct Answer: B (Deficiencies and corrections)**

OSHA inspections must document deficiencies and corrections identifying all defects, wear, or unsafe conditions and recording how they were addressed. This provides accountability and verification equipment is maintained safely.

**54. Correct Answer: C (Manufacturer or engineer)**

Under OSHA, manufacturer or engineer must approve modifications. Only these parties have expertise to verify modifications maintain adequate safety factors and do not adversely affect structural integrity or stability.

**55. Correct Answer: A (Correction or removal from service)**

OSHA requires for defects correction or removal from service. Defects must be corrected before continued use or equipment removed until repairs completed. Operating with known defects violates safety requirements.

**56. Correct Answer: D (Every three years or when deficiencies arise)**

According to OSHA, re-evaluation must occur every three years or when deficiencies arise. Periodic re-evaluation ensures operators maintain competency while deficiency-triggered evaluation addresses problems immediately.

**57. Correct Answer: C (Safety-critical systems)**

OSHA inspections must evaluate safety-critical systems including structural elements, mechanical systems, safety devices, controls, and wire rope. Comprehensive inspections identify defects affecting safe operations.

**58. Correct Answer: B (Clearances or de-energization)**

Under OSHA near power lines, clearances or de-energization must be established. These measures prevent electrocution from electrical contact or arcing protecting personnel and equipment.

**59. Correct Answer: C (Current accessible charts)**

OSHA requires for load information current accessible charts. Charts must match equipment configuration and be available for operator reference. Accurate current capacity information is essential.

**60. Correct Answer: B (With certified operator present)**

According to OSHA, trainees can operate with certified operator present who is physically at controls. This allows hands-on training under expert supervision with immediate intervention capability.

**61. Correct Answer: D (Maximum manufacturer-rated load)**

Under ASME B30.5, rated capacity is defined as maximum manufacturer-rated load for specific configurations. Rated capacities are established through design analysis and testing accounting for operating conditions and including safety factors.

**62. Correct Answer: A (Shift inspection when in use)**

ASME B30.5 requires for rope shift inspection when in use. This frequent inspection allows operators to identify deterioration before defects progress to dangerous levels. Daily inspection is fundamental to rope management.

**63. Correct Answer: C (When unsafe conditions exist)**

According to ASME B30.5, equipment must stop when unsafe conditions exist including malfunction, damage, or defects affecting safe operation. Equipment cannot return until conditions are corrected and verified.

**64. Correct Answer: B (Manufacturer or engineer approval)**

ASME B30.5 requires for modifications manufacturer or engineer approval. Only these qualified parties can verify modifications maintain adequate safety factors and do not adversely affect structural integrity.

**65. Correct Answer: A (ASME B30.23 requirements)**

Under ASME B30.5, ASME B30.23 requirements govern platforms. These special requirements include platform design standards, capacity reductions, safety devices, and operational procedures ensuring personnel safety.

**66. Correct Answer: C (Shall not be exceeded)**

ASME B30.5 specifies about rated loads they shall not be exceeded. This fundamental requirement prevents overloading that could cause equipment failure, instability, or structural damage.

**67. Correct Answer: B (Before operations)**

According to ASME B30.5, indicators must function before operations. Operators rely on indicator information for accurate chart reading and capacity verification. Non-functional indicators prevent proper capacity determination.

**68. Correct Answer: A (Written documentation)**

ASME B30.5 requires for maintenance written documentation. These records document inspections, maintenance performed, and repairs completed providing equipment history and verification of compliance.

**69. Correct Answer: B (Risk and consequences)**

Under ASME B30.5, critical lifts are based on risk and consequences. This includes operational complexity, proximity to hazards, or situations where failure would cause significant injury, death, or property damage.

**70. Correct Answer: D (Must be minimized)**

ASME B30.5 states about side loading it must be minimized. Side loading creates dangerous bending stresses in booms. Operators must maintain vertical load line alignment preventing side loading.

**71. Correct Answer: A (After installation and major repairs)**

According to ASME B30.5, load tests are required after installation and major repairs. These tests verify components can support rated loads with appropriate margins after changes affecting capacity.

**72. Correct Answer: C (Leaving loads unattended)**

ASME B30.5 prohibits leaving loads unattended. Leaving loads suspended when cranes are unattended creates hazards from rigging failure or equipment malfunction. Loads must be landed before leaving cranes.

**73. Correct Answer: B (Stop and seek direction)**

Under ASME B30.5, uncertain operators must stop and seek direction from supervisors or qualified persons. Proceeding with uncertainty creates serious accident risks. Operations resume only after safety is confirmed.

**74. Correct Answer: D (When criteria are met)**

ASME B30.5 requires for rope replacement when criteria are met. Specific deterioration criteria including broken wires, diameter reduction, kinking, and corrosion identify when replacement is needed.

**75. Correct Answer: C (Qualified person)**

According to ASME B30.5, qualified person authorizes return. This individual verifies repairs were performed correctly and equipment is safe before authorizing work resumption.

**76. Correct Answer: A (Current configuration)**

When reading charts, current configuration is identified first including boom length, counterweight amount, outrigger extension, and attachments. Configuration determines which chart section applies.

**77. Correct Answer: D (Horizontal distance from center)**

On charts, radius is defined as horizontal distance from center of rotation to vertical centerline of hoist line. This horizontal measurement determines capacity for operating conditions.

**78. Correct Answer: B (Capacity decreases)**

As radius increases, capacity decreases. Greater radius increases overturning moment reducing load that stability or structural capacity can support. This fundamental inverse relationship governs capacity.

**79. Correct Answer: C (Separate charts or deductions)**

When using attachments, separate charts or deductions are needed. Attachments significantly alter capacity compared to main boom alone requiring special chart sections or deduction factors.

**80. Correct Answer: A (Hook block and rigging)**

Hook block and rigging must be deducted for net capacity. These are supported by crane consuming capacity. Only remaining net capacity is available for actual loads.

**81. Correct Answer: A (Notes or conditions)**

On charts, special marks indicate notes or conditions requiring operator attention. These markings identify special requirements, limitations, restrictions, or transition points conveying critical operational information.

**82. Correct Answer: B (Radius and capacity)**

When angle changes, radius and capacity change. Raising boom angle decreases radius and generally increases capacity. Lowering boom angle increases radius and decreases capacity. These parameters are interdependent.

**83. Correct Answer: D (Lower capacity or conservative interpolation)**

Between chart values, lower capacity or conservative interpolation applies. Using lower capacity ensures adequate safety margins accounting for uncertainties and dynamic forces maintaining safety.

**84. Correct Answer: A (By boom length with radii)**

Telescopic charts are organized by boom length sections showing capacities at various radii for each length. This organization allows operators to find their boom length then read capacity for specific radius.

**85. Correct Answer: D (Bold text or notation)**

Capacity limits are indicated by bold text or notation showing whether structural capacity or stability limits capacity. Understanding limiting factor helps operators recognize when changes might increase capacity.

**86. Correct Answer: A (Appropriate chart section)**

When counterweight changes, appropriate chart section must be used. Different counterweight amounts provide substantially different capacities requiring different chart sections preventing overload.

**87. Correct Answer: C (Wind effects)**

For large loads, wind effects must be considered. Large surface areas create wind forces adding to overturning moments. Manufacturers may specify capacity reductions or restrictions for large loads in wind.

**88. Correct Answer: A (Critical restrictions)**

Footnotes contain critical restrictions and conditions that apply to operations. Footnotes provide important information including outrigger requirements, configuration restrictions, and environmental limits.

**89. Correct Answer: D (Correct chart reference)**

When configurations change, correct chart reference is essential. Each boom length, counterweight amount, or attachment requires consulting appropriate chart sections preventing serious overload risks.

**90. Correct Answer: C (Center of gravity location)**

For unbalanced loads, center of gravity location affects capacity. Loads with offset centers of gravity or unusual shapes may require capacity reductions beyond normal chart values.

**91. Correct Answer: B (Engine-driven pump)**

Engine-driven pump converts power to hydraulic. The pump draws fluid from reservoir and pressurizes it, converting mechanical power to hydraulic power driving cylinders and motors.

**92. Correct Answer: A (Slow function or leaks)**

Slow function or leaks indicate hydraulic problems. Slow function suggests inadequate pressure or flow. Leaks show seal failure. These symptoms require investigation and correction.

**93. Correct Answer: D (Remove contaminants)**

Hydraulic filters remove contaminants from fluid protecting components from wear and damage. Filters capture particles maintaining fluid cleanliness essential for system reliability and component longevity.

**94. Correct Answer: C (Excessive load or poor cooling)**

Excessive load or poor cooling causes hydraulic overheating. Excessive demand creates high heat generation while inadequate cooling prevents heat dissipation. Overheating damages seals and degrades fluid.

**95. Correct Answer: B (Maximum pressure)**

Relief valves control maximum pressure. Relief valves open when pressure exceeds settings, dumping excess flow preventing pressure spikes. This protection prevents damage from overpressure conditions.

## **Specialty Examination**

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**1. Correct Answer: B (Low ground pressure and stability)**

Crawler cranes provide the advantage of low ground pressure and stability. Wide track bases distribute crane weight over large surface areas creating ground pressures as low as 5-15 psi allowing operations on soft soils. The wide stable base creates exceptional resistance to tipping through increased moment arms. This combination enables crawler cranes to handle heavier loads on challenging ground conditions where wheeled cranes would sink or become unstable.

**2. Correct Answer: A (Hydraulic flow control and sensors)**

On telescopic cranes, hydraulic flow control and sensors control extension. Flow control valves regulate hydraulic fluid distribution to multiple extension cylinders ensuring proportional synchronized movement. Position sensors monitor actual section positions allowing control systems to adjust flow rates maintaining synchronization. This coordination prevents one section from extending ahead of others ensuring smooth controlled extension throughout boom length.

**3. Correct Answer: B (Triangulated framework design)**

Lattice booms achieve strength through triangulated framework design. The open structure with diagonal lacing members creates efficient load paths utilizing triangulated geometry principles. This design efficiently resists both compression and tension forces while minimizing weight. Triangulation provides exceptional strength-to-weight ratios making lattice structures ideal for extreme heights and capacities.

**4. Correct Answer: C (All-wheel drive and suspension)**

On all-terrain cranes, all-wheel drive and suspension enable off-road capability. All-wheel drive ensures power reaches wheels with traction even on uneven surfaces. Advanced suspension systems adjust to ground contours maintaining wheel contact and allowing independent axle articulation. This combination enables operation on rough, soft, or unprepared terrain where standard vehicles cannot function.

**5. Correct Answer: A (Modular boom section assembly)**

Lattice cranes achieve height through modular boom section assembly. Individual sections connect with pins creating continuous structures of varying lengths. Sections can be added or removed customizing boom length for specific jobs. This modularity allows configurations exceeding 400 feet with heights adjusted by selecting and assembling appropriate section combinations.

**6. Correct Answer: D (Holding valves and locks)**

On telescopic cranes, holding valves and locks prevent retraction. Hydraulic holding valves maintain pressure in extension cylinders preventing reverse flow. Mechanical locks engage at extended positions providing positive retention independent of hydraulic pressure. These dual safety systems ensure boom sections remain extended preventing dangerous uncontrolled retraction.

**7. Correct Answer: C (Simpler design with lower maintenance)**

Fixed cabs provide the advantage of simpler design with lower maintenance. Fixed cabs eliminate rotating connections for hydraulic lines, electrical systems, and controls that must function through continuous rotation and wear. This simpler design reduces maintenance requirements, potential failure points, and associated costs compared to swing cab configurations.

**8. Correct Answer: B (Proper pins and assembly sequence)**

When assembling lattice booms, proper pins and assembly sequence are critical. Pins must be fully inserted through all connection holes with retention devices properly engaged. Manufacturer assembly sequence must be followed exactly ensuring proper load paths and structural integrity. Incomplete connections or wrong sequence can cause structural failure creating catastrophic collapse.

**9. Correct Answer: A (Angular support from mast)**

Boom pendants provide angular support from mast. Pendants are wire ropes connecting boom tip to mast top, supporting the boom at various angles. These ropes carry compressive boom forces in tension preventing boom collapse. Adjusting pendant length through boom hoist changes boom angle while pendants provide positive constant support.

**10. Correct Answer: D (Electronic control systems)**

On all-terrain cranes, electronic control systems manage steering. These sophisticated systems coordinate steering of multiple axles simultaneously based on vehicle speed, turn radius, and operator inputs. Systems can steer axles together for tight turns or independently for various maneuvers. Advanced algorithms optimize steering angles maximizing maneuverability.

**11. Correct Answer: B (Radius adjustment without boom movement)**

Luffing jibs offer the capability of radius adjustment without boom movement. Luffing jibs have independent angle adjustment through dedicated hoist systems allowing operators to change jib angle varying operating radius while main boom remains stationary. This capability allows radius adjustment while maintaining hook height or adjusting both parameters for precision placement.

**12. Correct Answer: C (Offset angle)**

When using offset jibs, offset angle affects capacity. As jibs offset from straight ahead centerline positions, capacity decreases due to altered loading patterns creating side loads and increased structural stress on offset mechanisms. Charts show capacity values at various offset angles with greater offsets resulting in lower capacities.

**13. Correct Answer: D (Structural and stability limits)**

Structural and stability limits limit boom length. Longer booms create greater overturning moments affecting stability and impose higher structural loads. Structural members must resist forces without exceeding material strength. Manufacturers establish maximum lengths through engineering analysis ensuring adequate margins.

**14. Correct Answer: A (Compact size with crab steering)**

Compact size with crab steering provides rough-terrain maneuverability. Compact dimensions and short wheelbase enable tight turns. Crab steering allows rear wheels to steer opposite front wheels for minimum turn radius or same direction for sideways movement. This combination allows operation in restricted areas and challenging terrain.

**15. Correct Answer: B (Boom hoist system)**

Boom hoist system controls lattice boom angle. The boom hoist rope runs from drum over mast top sheaves through pendants to boom point. Winding rope on drum shortens pendants raising boom angle. Paying out rope lengthens pendants lowering boom angle. The mast provides leverage for angle changes.

**16. Correct Answer: D (Significantly reduced)**

Fly jib capacities are significantly reduced from main boom capacities. Fly jibs add substantial weight at boom tip extending leverage, extend total boom length increasing structural loading, and create additional bending moments. These factors combine to reduce capacity dramatically with fly jib capacities often 20-40 percent of main boom capacity at comparable radii.

**17. Correct Answer: A (Manufacturer specifications)**

Manufacturer specifications establish safe jib length. Manufacturers determine maximum jib lengths through structural analysis ensuring combined boom and jib loading remains within structural capacity limits and stability is maintained. Engineering analysis verifies structural members can support loads for each specific configuration.

**18. Correct Answer: D (Greater stability and capacity)**

Wider track spacing provides greater stability and capacity. Increased track width enlarges the stability base extending the moment arm for resisting overturning forces allowing higher lifting capacities before tipping limits are reached. Wide-track configurations typically provide 15-30 percent greater capacity than narrow-track settings.

**19. Correct Answer: C (Quick setup without assembly)**

Quick setup without assembly is the telescopic crane advantage. Telescopic cranes arrive with boom mounted and extend hydraulically in minutes achieving full operational length quickly. Lattice cranes

require boom section assembly taking hours or days. This speed advantage makes telescopic cranes ideal for projects requiring mobility or quick response.

**20. Correct Answer: A (Proper installation and charts)**

When using boom extensions, proper installation and charts are critical. Extensions must be installed per manufacturer specifications with all connections complete and secured. Appropriate load chart sections for extended configurations must be used as extensions significantly affect structural characteristics and capacity. Both proper installation and correct chart reference are essential.

**21. Correct Answer: B (Auxiliary hoist)**

Auxiliary hoist offers faster speeds than main hoists. Auxiliaries are designed for lighter loads using smaller diameter ropes and smaller drums allowing higher line speeds. Speed advantages may be 50-100 percent faster than main hoists making auxiliaries efficient for handling rigging, tools, or lighter materials.

**22. Correct Answer: D (Hydraulic motor with brake)**

Hydraulic motor with brake provides hydraulic crane swing. The motor drives swing mechanism with speed proportional to control input allowing smooth acceleration and deceleration. Proportional control allows precise swing positioning. Automatic brake engages when controls return to neutral stopping rotation and holding position.

**23. Correct Answer: C (Appropriate capacity chart)**

When changing track width, appropriate capacity chart is essential. Wide-track and narrow-track configurations provide substantially different capacities due to different stability bases. Different chart sections show capacities for each configuration. Using incorrect charts creates serious overload risks or unnecessarily limits operations.

**24. Correct Answer: B (Correct installation and charts)**

When using boom inserts, correct installation and charts are critical. Inserts must be installed per manufacturer specifications with all connections complete and secured. Appropriate chart sections for configurations with inserts must be used as inserts affect structural characteristics and capacity. Both proper installation and correct chart reference are essential.

**25. Correct Answer: A (Internal wear pads and guides)**

Internal wear pads and guides guide boom telescoping. Wear pads made of low-friction materials ride on machined surfaces inside boom sections allowing smooth extension while maintaining alignment. These guides prevent binding and ensure sections extend concentrically without jamming, misalignment, or damage to boom surfaces.

## 26. Correct Answer: D (Main chord members)

Main chord members carry primary loads on lattice booms. These large structural members running the full length of the boom at its corners form the primary load-carrying framework. Chords resist bending and compression forces from boom weight, loads, and operational dynamics. Lacing members and battens provide lateral support maintaining chord spacing while chords carry primary longitudinal forces.

## Practical Examination

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### 1. Correct Answer: A (Damage exceeding removal criteria)

When inspecting wire rope, damage exceeding removal criteria requires removal. ASME B30.5 establishes specific removal criteria including numbers of broken wires exceeding limits, diameter reduction of 7 percent or more from nominal, severe kinking, bird-caging, corrosion, or other defined deterioration. When rope condition exceeds any removal criterion, rope must be removed immediately regardless of other factors preventing catastrophic failure under load.

### 2. Correct Answer: C (Each shift when in regular use)

The proper rope inspection frequency is each shift when in regular use per ASME B30.5 requirements. This daily inspection allows operators to identify rope deterioration including broken wires, kinking, wear, or corrosion before defects progress to failure levels. Frequent inspection is fundamental to rope management ensuring problems are detected early when they can be addressed safely before becoming critical hazards.

### 3. Correct Answer: A (Clean fluid at proper level)

During pre-operational checks, clean fluid at proper level is acceptable. Hydraulic fluid should appear clear or amber depending on type, free from contamination, and maintained between minimum and maximum reservoir markings. This appearance and level indicate the system is properly serviced, adequately filled for thermal expansion, and ready for safe operations without contamination issues affecting performance or component life.

### 4. Correct Answer: D (15 percent or manufacturer limit exceeded)

When inspecting hooks, 15 percent or manufacturer limit exceeded requires replacement. Throat opening increase of 15 percent beyond original dimension or manufacturer specified limit indicates permanent stretching from overloads. ASME B30.10 establishes this removal criterion ensuring hooks are replaced before failure risk becomes unacceptable through reduced holding capability and weakened structure from permanent deformation indicating overstress.

**5. Correct Answer: B (Accurate configuration and load tracking)**

Proper LMI function is indicated by accurate configuration and load tracking. The system should respond immediately to boom angle changes, radius adjustments, and load additions displaying current capacity utilization accurately reflecting actual crane configuration and loading conditions. Systems providing accurate real-time information allow effective capacity monitoring preventing overload situations through timely warnings to operators.

**6. Correct Answer: C (Immediate stop and hold)**

During brake testing, immediate stop and hold is proper function. Properly functioning brakes engage automatically when controls return to neutral stopping movement immediately without delay and holding position without drift or movement under load. Any delay in engagement, continued coasting after control release, or inability to hold position indicates brake adjustment or repair is needed before operations continue.

**7. Correct Answer: B (Load hold without drift)**

Load hold without drift verifies hoist brake function. The proper procedure involves raising a load or unloaded hook to working height, releasing control to neutral, and verifying hoist immediately stops and holds position without drift or lowering. The automatic brake must engage instantly preventing any downward movement demonstrating proper function under actual loading conditions and gravity forces throughout the stroke.

**8. Correct Answer: A (Controls in neutral)**

Before engine start, controls in neutral is verified. Operators must physically verify all control levers are in neutral positions before starting engine. This verification prevents unintended crane movements when hydraulic systems pressurize after engine start. Physical verification of each control position ensures safe startup preventing dangerous unexpected movements that could cause injury or damage to equipment or surroundings.

**9. Correct Answer: D (Oil pressure and temperature)**

During warm-up, oil pressure and temperature are monitored. Oil pressure should stabilize quickly indicating proper lubrication system function providing adequate flow to engine and hydraulic components. Temperature gauges should show gradual warming toward operating range. Both engine coolant and hydraulic oil temperatures must reach proper levels before placing systems under full load ensuring adequate viscosity and lubrication for component protection.

**10. Correct Answer: B (Crane level maintained)**

When deploying outriggers, crane level maintained is verified. Real-time level monitoring during jack extension allows immediate adjustment of individual jack heights achieving proper level as crane lifts off tires or tracks. Most manufacturers limit out-of-level to one percent grade requiring careful monitoring and adjustment throughout the deployment process ensuring crane remains within specifications for stability calculations.

**11. Correct Answer: C (Variable speeds with brake test)**

Proper hoist testing is variable speeds with brake test. Operators verify hoist responds smoothly to control inputs at slow and fast speeds demonstrating proportional control, controls return to neutral properly without sticking, brakes engage automatically when controls are released, and loads stop and hold without drift demonstrating complete system function under various operating conditions from minimum to maximum speeds.

**12. Correct Answer: A (Smooth proportional response)**

During control testing, smooth proportional response is acceptable. Controls should respond smoothly and proportionally to operator inputs with immediate response, no delays, no binding, and no jerking. Functions should accelerate and decelerate smoothly with movements proportional to control inputs. This smooth response demonstrates proper control valve and hydraulic system function without internal wear, contamination, or mechanical problems.

**13. Correct Answer: D (Accurate length display)**

When checking boom indicators, accurate length display is verified. Indicators must accurately display actual boom length matching physically extended length within acceptable tolerances typically plus or minus one inch. These indicators are essential for capacity determination using load charts. Operators must know exact boom length to read capacities correctly making accurate indicators critical for preventing overload situations during operations.

**14. Correct Answer: C (Kinking or bird-caging)**

Kinking or bird-caging requires immediate rope removal. Kinks show permanent distortion with severe localized stress concentrations dramatically reducing rope strength at kinked locations to fractions of normal capacity. Bird-caging where strands separate from rope body forming a birdcage pattern indicates core failure and structural collapse. Either condition can cause sudden catastrophic failure under loads well below normal rated capacity.

**15. Correct Answer: B (Milky or cloudy fluid)**

During hydraulic inspection, milky or cloudy fluid indicates contamination. Milky appearance shows water contamination causing corrosion, reduced lubrication properties, and accelerated component wear. Cloudiness indicates other contaminants including dirt, wear particles, or chemical breakdown products.

Contaminated fluid must be drained, system flushed, and contamination sources corrected before refilling with clean fluid preventing component damage.

**16. Correct Answer: A (Warnings and cutout activation)**

When testing anti-two-block, warnings and cutout activation indicates proper function. Visual and audible warnings should activate well before contact occurs providing operator warning to stop hoisting. Automatic hoist cutout should prevent actual two-blocking through function interruption. The device provides warning allowing operator response then prevents contact through automatic cutout protecting equipment and preventing boom damage or structural failure.

**17. Correct Answer: D (Engagement verification with load test)**

Proper lock verification is engagement verification with load test. Locks must engage properly when components reach extended or set positions with positive engagement. Testing involves attempting to move locked components against locks confirming locks prevent movement under force. Locks failing to engage properly or allowing movement despite engagement require immediate repair before operations preventing accidental retraction or movement.

**18. Correct Answer: C (Cracks or deformation)**

During structural inspection, cracks or deformation requires attention. Structural cracks in boom members, turret components, or other structural elements can propagate rapidly under load causing catastrophic failure without warning. Permanent deformation indicates loading beyond design limits compromising structural integrity. Any structural damage requires engineering evaluation before equipment can safely return to service ensuring structural soundness.

**19. Correct Answer: B (Secure attachment without loosening)**

When inspecting terminations, secure attachment without loosening is critical. Terminations must maintain full grip on rope with no loosening between rope and socket or wedge, no cracks in termination components, and no deformation indicating overstress. Any loosening compromises termination strength potentially allowing rope pullout under load requiring replacement before operations continue preventing catastrophic load drops.

**20. Correct Answer: C (Functional readable information)**

LMI displays must provide functional readable information. Displays must be operational showing appropriate capacity and configuration data including boom length, angle, radius, and capacity utilization. Information must be readable from operator's position under all lighting conditions including direct sunlight. Non-functional or illegible displays prevent capacity monitoring creating serious overload risks requiring immediate repair before operations.

**21. Correct Answer: B (Proper seating in all grooves)**

During rope inspection, proper seating in all grooves is required. Rope must seat fully in intended sheave grooves throughout entire reeving paths from drum through all sheaves to hook. Improper seating with rope running on sheave flanges causes concentrated wear on both rope and sheaves and can lead to rope jumping from sheaves during operations creating sudden load drops or equipment damage.

**22. Correct Answer: A (Cracking, bulging, or deterioration)**

When checking hoses, cracking, bulging, or deterioration requires replacement. Cracking particularly in bend areas where flexing is greatest, bulging indicating internal reinforcement failure weakening hose structure, or other visible deterioration indicates imminent hose failure under pressure. Age-related hardening reducing flexibility also warrants replacement. Failed hoses under pressure can cause sudden loss of function or create safety hazards.

**23. Correct Answer: D (Lower boom, secure controls, document)**

Proper shutdown procedure is lower boom, secure controls, document. This sequence includes lowering boom to safe storage angle protecting from wind damage, securing all controls in neutral or off positions preventing unauthorized operation or inadvertent movements, and documenting any issues or defects requiring attention providing communication about equipment status and needed work for next operations.

**24. Correct Answer: C (Smooth operation with immediate brake)**

During swing testing, smooth operation with immediate brake indicates proper operation. Testing should show smooth acceleration responding to control without jerking, smooth operation at commanded speeds without binding or unusual noise, smooth deceleration as control reduces, and immediate brake engagement when control returns to neutral stopping rotation instantly demonstrating coordinated system function without wear or adjustment issues.

**25. Correct Answer: A (Low pressure or expired inspection)**

When inspecting extinguishers, low pressure or expired inspection requires service. Fire extinguishers must maintain proper charge pressure indicated by gauge in green zone and receive required periodic inspections documented on inspection tags. Low pressure indicates charge loss compromising effectiveness or expired inspection indicates service is overdue. Either condition means extinguishers may not function properly requiring immediate professional servicing.

**26. Correct Answer: D (Full insertion with retention devices)**

Regarding pins, full insertion with retention devices must be verified. Pins must be fully inserted through all connection holes with no gaps visible and retention devices such as clips, bolts, or cotter pins properly engaged preventing pins from backing out during operations. Partial insertion or missing retention allows

pins to work out during operations causing sudden structural connection failure and potential catastrophic boom collapse.

**27. Correct Answer: A (All systems functional and area clear)**

During final verification, all systems functional and area clear is confirmed. This comprehensive verification confirms all required inspections are complete with no unresolved defects, all safety and operating systems are functional and ready for operations, and work area is clear of personnel and obstacles within operating radii, swing paths, and load zones before beginning lift operations ensuring safe startup.

**28. Correct Answer: C (Wear, cracks, or elongated holes)**

When inspecting pins, wear, cracks, or elongated holes indicates problems. Excessive wear reducing pin diameter below specifications compromises connection strength. Cracks in pin bodies indicate fatigue or overstress requiring replacement. Elongated pin holes indicate overloading, impact damage, or fatigue damage requiring boom section or structural evaluation and possible repair or replacement before returning to service preventing failure.

**29. Correct Answer: B (Smooth operation without leaks)**

Proper cylinder operation is indicated by smooth operation without leaks. Cylinders should respond proportionally to controls without binding, jerking, or hesitation throughout the full stroke, show no hydraulic leaks from rod seals, glands, or tube fittings, and produce no unusual sounds suggesting cavitation, air entrainment, or mechanical problems. Smooth consistent extension and retraction demonstrates proper internal condition and seal integrity.

**30. Correct Answer: B (Per manufacturer specifications)**

During high winds, proper positioning is per manufacturer specifications. Manufacturers recommend positioning that minimizes wind loading typically lowering boom to moderate angles reducing wind sail area and structural loading while maintaining adequate ground clearance. Proper positioning protects boom structure from wind-induced damage during storms while maintaining crane stability through reduced overturning moments from wind forces on boom surfaces.