Practice Test 9

Core Examination

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

1. What ground material provides unreliable bearing capacity?
   A. Compacted gravel
   B. Organic soil or peat
   C. Dense sand
   D. Bedrock

2. When must setup areas be re-evaluated?
   A. Weekly
   B. Monthly
   C. Annually
   D. After weather events or ground changes

3. What determines setback distance from slopes?
   A. Soil type, slope angle, and loading conditions
   B. Visual inspection only
   C. Standard 5-foot distance
   D. Setback distance optional

4. When working on fill, what must be determined?
   A. Fill color
   B. Fill source
   C. Compaction level and bearing capacity
   D. Fill age

5. What is required under outrigger floats?
   A. Any surface
   B. Level, solid bearing 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 kilovolt lines?
   A. 10 feet
   B. 15 feet
   C. 20 feet or de-energization
   D. 5 feet

8. When planning lifts, what must be calculated?
   A. Center of gravity and rigging points
   B. Crane color
   C. Operator experience
   D. Weather only

9. What must be considered for boom length selection?
   A. Boom color
   B. Time available
   C. Fuel capacity
   D. Required reach and lift height

10. When must traffic lanes be closed?
   A. Never required
   B. When crane operations affect traffic
   C. Only at night
   D. Monthly

11. What is required near property lines?
   A. Verbal notification
   B. Higher insurance
   C. Clearance verification and permissions
   D. Night operations

12. During near-capacity operations, what is essential?
   A. Detailed procedures and enhanced supervision
   B. Verbal agreement
   C. Standard procedures
   D. No special requirements

13. When must travel routes be evaluated?
   A. Before crane travel for obstacles and strength

B. Monthly
C. Annually
D. Evaluation optional

14. What determines spotter requirements?
A. Crane size
B. Limited operator visibility
C. Time of day
D. Fuel level

15. What must be installed around work areas?
A. Parking spaces
B. Break rooms
C. Offices
D. Barriers preventing unauthorized access

16. When operating near highways, what is required?
A. Traffic control and coordination
B. Night operations only
C. Special insurance
D. No requirements

17. What is needed near flight paths?
A. Night operations
B. Special paint
C. Higher insurance
D. Aviation authority notification

18. When must wind monitoring be implemented?
A. When conditions approach limits
B. Never required
C. Monthly
D. Annually

19. When does rain stop operations?
A. Any precipitation
B. Never
C. When safety is impacted
D. Monthly

20. What is required for night lifts?
A. Adequate work area illumination
B. Operations prohibited
C. Reduced capacity
D. Special permits

21. When are engineered dual-crane plans required?
A. Never
B. Optional
C. All dual lifts
D. Complex tandem operations

22. What must be verified before configuration changes?
A. Insurance
B. Fuel level
C. Appropriate load charts
D. Crane color

23. What is prohibited over occupied spaces?
A. Radio use
B. Personnel under loads
C. Signal persons
D. Daytime operations

24. What establishes wind operating limits?
A. Manufacturer specifications
B. General guidelines
C. Operator preference
D. Project schedule

25. When must emergency response plans be ready?
A. Never required
B. Monthly
C. Annually
D. Before hazardous area operations

26. What must be verified about counterweight?
A. Color
B. Age
C. Proper installation and securing

D. Manufacturer name

27. What may be required near helicopter facilities?
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. Annually
C. Before each day's operations
D. Weekly

30. What is required for boom over structures?
A. Verbal warning
B. Higher insurance
C. Clearance or protective measures
D. Special permits

31. What is the standard signal for "use main hoist"?
A. Circular motion
B. Pat head with hand
C. Arms crossed
D. One fist

32. When using radios, what is critical?
A. Clear communication with confirmations
B. Fast speech
C. Abbreviated terms
D. Any communication style

33. What must signal persons do if visibility is lost?
A. Continue signaling

B. Signal faster
C. Estimate position
D. Stop or reposition for visibility

34. When must signals be reviewed?
A. Never
B. Monthly
C. Before operations with new crews
D. Annually

35. What is the standard signal for "dog everything"?
A. Circular motion
B. Hands clasped in front
C. Arms overhead
D. One arm extended

36. During darkness, what is required?
A. No signaling possible
B. Voice only
C. Illuminated signals
D. Standard signals adequate

37. When can non-standard signals be used?
A. Never
B. After demonstration and agreement
C. Anytime
D. Only emergencies

38. What command has absolute priority?
A. Radio signals
B. Stop from any person
C. Hand signals
D. Horn signals

39. When must signal person qualifications be verified?
A. Before they direct operations
B. Weekly
C. Monthly
D. Annually

40. What is required if signal person moves?
A. Continue signaling
B. Move quickly
C. No action needed
D. Stop and establish new visibility

41. When are relief personnel needed?
A. When fatigue affects performance
B. Never during operations
C. Every hour
D. End of shift only

42. What must operators confirm?
A. Weather
B. Fuel level
C. Time
D. Understanding of signals

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 clothing
C. Voice volume
D. Hand size

45. When must backup communication be available?
A. Never needed
B. Only large cranes
C. Optional
D. When primary may fail

46. Under OSHA, what initial assessment is required?
A. Site hazards and ground conditions
B. Fuel costs
C. Operator salary

D. Project budget

47. What does OSHA require for operators?
A. Experience only
B. Age only
C. Certification and evaluation
D. No requirements

48. According to OSHA, when must inspections be documented?
A. Never
B. Shift, annual, and after events
C. Monthly only
D. Optional

49. What must employers provide operators?
A. Equipment-specific familiarization
B. Transportation
C. Lunch
D. Housing

50. Under OSHA, who supervises assembly?
A. Any worker
B. Qualified A/D director
C. Owner
D. Insurance agent

51. What does OSHA require for capacity data?
A. Verbal adequate
B. Memory sufficient
C. Optional
D. Accessible load charts

52. According to OSHA, when is fall protection required?
A. Above 6 feet during A/D
B. Never
C. Only above 10 feet
D. Optional

53. What must OSHA inspections document?
A. Operator preferences

B. Fuel type
C. Deficiencies and corrections
D. Crane color

54. Under OSHA, who approves modifications?
A. Operator
B. Manufacturer or engineer
C. Owner
D. Any supervisor

55. What does OSHA require for defects?
A. Document only
B. Continue cautiously
C. Ignore if minor
D. Correct or remove from service

56. According to OSHA, when must re-evaluation occur?
A. Never
B. Every three years or when deficiencies arise
C. Every 10 years
D. Monthly

57. What must OSHA inspections evaluate?
A. Paint only
B. Age only
C. Safety-critical systems
D. Fuel capacity only

58. Under OSHA, what is required near power lines?
A. Verbal notification
B. Higher insurance
C. No requirements
D. Clearances or de-energization

59. What does OSHA require for load data?
A. Current charts accessible
B. Verbal adequate
C. Memory sufficient
D. Optional

60. According to OSHA, when can trainees operate?
A. Never
B. After 1 week
C. With certified operator present
D. Anytime

61. Under ASME B30.5, rated capacity means what?
A. Any load
B. Maximum manufacturer-rated load
C. Load plus 50 percent
D. Operator decision

62. What does ASME B30.5 require for rope inspection?
A. Shift inspection in regular use
B. Monthly
C. Annually
D. Optional

63. According to ASME B30.5, when must equipment stop?
A. Monthly
B. When unsafe conditions exist
C. Quarterly
D. Annually

64. What does ASME B30.5 require for modifications?
A. Verbal approval
B. Owner approval
C. Manufacturer or engineer approval
D. No approval

65. Under ASME B30.5, what governs personnel 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. Optional limits

D. Shall not be exceeded

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 documentation?
A. Written maintenance records
B. Verbal adequate
C. No records
D. Records prohibited

69. Under ASME B30.5, critical lifts are based on what?
A. Weight only
B. Time
C. Crane age
D. Risk and consequences

70. What does ASME B30.5 state about side loading?
A. Permitted
B. Increases capacity
C. Must be minimized
D. No restrictions

71. According to ASME B30.5, when are load tests required?
A. Weekly
B. After installation and major repairs
C. Monthly
D. Optional

72. What does ASME B30.5 prohibit?
A. Tag lines
B. Radio use
C. Signal persons
D. Leaving loads unattended

73. Under ASME B30.5, uncertain operators must do what?
A. Stop and seek direction

B. Continue slowly
C. Document later
D. Consult anyone

74. What does ASME B30.5 require for rope removal?
A. When criteria are met
B. Monthly
C. Annually
D. Never

75. According to ASME B30.5, who authorizes return to service?
A. Operator
B. Owner
C. Qualified person
D. Any mechanic

76. When reading charts, what is identified first?
A. Operator
B. Fuel level
C. Weather
D. Current configuration

77. On charts, radius means what?
A. Vertical distance
B. Diagonal measure
C. Horizontal distance from center
D. Boom length

78. What happens as radius increases?
A. Capacity decreases
B. Both increase
C. No relationship
D. Capacity doubles

79. When using attachments, what is referenced?
A. Main boom charts
B. No charts
C. Estimate
D. Separate charts or deductions

80. What must be deducted for net capacity?
A. Fuel
B. Hook block and rigging
C. Counterweight
D. Operator weight

81. On charts, special marks indicate what?
A. Highest capacity
B. Lowest capacity
C. Notes or conditions
D. Recommended capacity

82. When angle changes, what else changes?
A. Radius and capacity
B. Nothing
C. Color only
D. Speed only

83. Between chart values, what applies?
A. Higher capacity
B. Average
C. Estimate freely
D. Lower or interpolate conservatively

84. How are telescopic charts arranged?
A. Alphabetically
B. Randomly
C. By boom length and radii
D. By age

85. What indicates capacity limits?
A. Color
B. Bold text or notation
C. Page number
D. Font size

86. When counterweight changes, what is needed?
A. Insurance
B. Color change
C. Appropriate chart section

D. No action

87. What must be considered for large loads?
A. Color
B. Wind effects
C. Age
D. Manufacturer

88. What do footnotes contain?
A. Crane history
B. Operator names
C. Maintenance logs
D. Critical restrictions

89. When configurations change, what is essential?
A. Correct chart reference
B. Insurance update
C. Color change
D. No action

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 filters do?
A. Increase pressure

B. Cool fluid
C. Remove contaminants
D. Add lubrication

94. What causes overheating?
A. Proper operation
B. Excessive load or poor cooling
C. Clean filters
D. Low hours

95. What do relief valves control?
A. Maximum pressure
B. Flow direction
C. Temperature
D. Fluid level

Specialty Examination

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

1. What is a primary advantage of crawler cranes for heavy lifting?
A. High travel speed
B. Compact storage
C. Low maintenance
D. Excellent stability from wide track base

2. On telescopic cranes, what controls boom extension speed?
A. Gravity
B. Hydraulic flow control valves
C. Manual adjustment
D. Operator coordination alone

3. What gives lattice booms their strength advantage?
A. Triangulated structural design
B. Solid construction
C. Heavy materials
D. Compact dimensions

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

A. Single axle design
B. All-wheel drive with suspension systems
C. Manual transmission
D. Fixed differential

5. How do lattice cranes achieve extreme reach?
A. Telescoping sections
B. Hydraulic extension
C. Modular boom assembly
D. Fixed boom design

6. On telescopic cranes, what prevents retraction?
A. Holding valves and locks
B. Friction only
C. Gravity
D. Manual brakes

7. What advantage do fixed cabs provide?
A. Better visibility
B. Higher capacity
C. Improved comfort
D. Lower maintenance

8. When assembling lattice sections, what ensures safety?
A. Speed
B. Experience alone
C. Proper pins and sequence
D. Visual inspection only

9. What do boom pendants provide?
A. Boom extension
B. Angular boom support
C. Rigging storage
D. Capacity increase

10. On all-terrain cranes, what manages steering?
A. Electronic control systems
B. Manual linkages
C. Separate operators
D. Mechanical cables

11. What capability do luffing jibs offer?
A. Higher capacity
B. Lower cost
C. Simpler operation
D. Radius change without boom movement

12. When using offset jibs, what affects capacity?
A. Time of day
B. Offset angle degree
C. Wind alone
D. Operator skill

13. What limits maximum boom length?
A. Operator preference
B. Fuel capacity
C. Structural and stability limits
D. Boom color

14. What provides rough-terrain maneuverability?
A. Long wheelbase
B. Multiple axles
C. Fixed suspension
D. Compact size with crab steering

15. What controls lattice boom angle?
A. Boom hoist system
B. Manual cranks
C. Counterweight position
D. Hydraulic cylinders only

16. How do fly jib capacities compare?
A. Increased
B. Significantly reduced
C. No change
D. Slight increase

17. What establishes safe jib length?
A. Jib color
B. Operator decision

C. Ground conditions
D. Manufacturer specifications

18. What does wider track spacing provide?
A. Greater stability and capacity
B. Faster travel
C. Lower fuel use
D. Reduced maintenance

19. What is the telescopic crane advantage?
A. Higher capacity
B. Longer boom
C. Lower cost
D. Rapid setup

20. When using boom extensions, what is critical?
A. Extension color
B. Extension age
C. Proper installation and charts
D. Extension weight alone

21. Which hoist offers faster speeds?
A. Auxiliary hoist
B. Main hoist
C. Manual hoist
D. All equal

22. What provides hydraulic crane swing?
A. Manual rotation
B. Hydraulic motor with brake
C. Wire rope
D. Electric motor only

23. When changing track width, what is essential?
A. Track color
B. Insurance notification
C. Width irrelevant
D. Appropriate capacity chart

24. When using boom inserts, what is critical?

A. Insert color
B. Insert age
C. Correct installation and charts
D. Manufacturer location

25. What guides boom section telescoping?
A. External rails
B. Internal wear pads and guides
C. Operator vision
D. Gravity

26. On lattice booms, which carry primary loads?
A. Main chord members
B. Lacing members
C. Battens
D. Bolts

Practical Examination

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 indicates wear requiring removal?
A. Proper flexibility
B. Adequate lubrication
C. Reduction exceeding removal criteria
D. Manufacturer markings visible

2. What is the proper rope inspection frequency?
A. Weekly
B. Each shift when in regular use
C. Monthly
D. Annually

3. During pre-operational checks, what hydraulic condition is proper?
A. Clean fluid at correct level
B. Milky appearance
C. Empty reservoir
D. Overfilled

4. When inspecting hooks, what requires removal?
   A. 5 percent throat increase
   B. 10 percent increase
   C. 12 percent increase
   D. 15 percent or manufacturer limit

5. What indicates proper LMI function?
   A. Display illuminated
   B. Accurate boom 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. Load hold without drift
   B. Visual inspection
   C. Noise check
   D. Fluid level check

8. What is verified before engine start?
   A. Horn tested
   B. Boom extended
   C. Radio on
   D. Controls in neutral

9. During warm-up, what is monitored?
   A. Ambient temperature
   B. Fuel level only
   C. Oil pressure and temperature
   D. Radio signal

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. Variable speeds with brake test
B. Maximum speed only
C. Minimum speed only
D. Visual inspection adequate

12. During control testing, what is unacceptable?
A. Smooth response
B. Proportional movement
C. Proper brakes
D. Erratic response or binding

13. When checking boom indicators, what is verified?
A. Indicator color
B. Indicator location
C. Accurate length display
D. Indicator age

14. What rope condition requires immediate removal?
A. Proper lubrication
B. Kinking or bird-caging
C. Adequate flexibility
D. Correct diameter

15. During hydraulic inspection, what indicates contamination?
A. Clear appearance
B. Proper level
C. Milky or cloudy fluid
D. Amber color

16. When testing anti-two-block, what indicates proper function?
A. Device visible
B. Warnings and cutout activation
C. Device labeled
D. Device makes sound

17. What is proper lock verification?

A. Engagement verification with load test
B. Visual only
C. Paint check
D. Listen for sounds

18. During structural inspection, what requires attention?
A. Normal paint wear
B. Minor rust
C. Proper labels
D. Cracks or deformation

19. When inspecting terminations, what is critical?
A. Termination color
B. Termination age
C. Secure attachment without loosening
D. Termination weight

20. What must LMI displays provide?
A. Functional readable information
B. Display color
C. Display size
D. Display age

21. During rope inspection, what seating is required?
A. Can ride flanges
B. Seating not critical
C. Visual adequate
D. Proper seating in all grooves

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, secure controls, document
D. Lower boom only

24. During swing testing, what indicates proper operation?
A. Continuous rotation
B. Smooth operation with immediate brake
C. Jerky movement
D. Delayed response

25. When inspecting extinguishers, what requires service?
A. Extinguisher mounted
B. Low pressure or expired inspection
C. Extinguisher visible
D. Extinguisher labeled

26. What must be verified about pins?
A. Full insertion with retention devices
B. Pin color
C. Pin age
D. Pin manufacturer

27. During final verification, what is confirmed?
A. Crane painted
B. Crane expensive
C. All systems functional and area clear
D. Crane large

28. When inspecting pins, what indicates problems?
A. Wear, cracks, or elongated holes
B. Proper paint
C. Correct labels
D. Original installation

29. What indicates proper cylinder operation?
A. Cylinders visible
B. Cylinders painted
C. Cylinders labeled
D. Smooth operation without leaks

30. During high winds, what is proper positioning?
A. Maximum height
B. Per manufacturer specifications

C. Horizontal
D. Fully extended

Answers & Explanations - Practice Test 9

Core Examination

1. **Correct Answer: B (Organic soil or peat)**

Organic soil or peat provides unreliable bearing capacity for crane operations. These soils contain decomposing vegetation creating voids and compress significantly under load. Bearing capacity is typically very low, often less than 500 pounds per square foot. Organic materials continue decomposing creating ongoing settlement. These soils require complete removal and replacement with engineered fill or extensive ground improvement for safe crane operations.

2. **Correct Answer: D (After weather events or ground changes)**

Setup areas must be re-evaluated after weather events such as heavy rain or freeze-thaw cycles, or ground changes from nearby excavation or vehicle traffic. Weather can saturate soil reducing strength, while ground disturbance can alter bearing capacity or crane level. Re-evaluation verifies conditions remain adequate for continued safe operations.

3. **Correct Answer: A (Soil type, slope angle, and loading conditions)**

Setback distance from slopes is determined by soil type affecting failure zone extent, slope angle creating different failure geometries, and loading conditions from crane weight and outrigger reactions. Engineering analysis considers these factors determining safe distance preventing slope failure. Weaker soils and steeper slopes require greater setback distances.

4. **Correct Answer: C (Compaction level and bearing capacity)**

When working on fill, compaction level and bearing capacity must be determined. Fill quality varies widely depending on material, placement method, and compaction achieved. Testing confirms fill provides adequate support for crane loading. Uncompacted or poorly compacted fill can consolidate under loads causing dangerous settlement.

5. **Correct Answer: B (Level, solid bearing surface)**

Under outrigger floats, level solid bearing surface is required. The entire float must rest on prepared level surface ensuring uniform load distribution. Voids, uneven surfaces, or partial support create concentrated

loading causing excessive bearing pressure and potential failure. Surface must be solid without soft spots or weak areas.

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

During operations, level must be verified continuously through monitoring systems or when conditions change such as ground settlement, configuration changes, or environmental factors. Crane level directly affects stability margins. Continuous monitoring identifies developing problems allowing immediate correction before level exceeds safe limits.

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

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

8. **Correct Answer: A (Center of gravity and rigging points)**

When planning lifts, center of gravity location and rigging points must be calculated. Center of gravity determines load balance and stability during lifting. Rigging point locations affect load distribution to slings and must be positioned to maintain balance. Accurate calculations prevent load tipping or shifting during operations.

9. **Correct Answer: D (Required reach and lift height)**

Boom length selection must consider required reach to operating radius and lift height needed for load placement. Longer booms reach greater distances and achieve higher elevations. The combination of boom length and angle determines both radius and height capabilities allowing selection of appropriate configuration for job requirements.

10. **Correct Answer: B (When crane operations affect traffic)**

Traffic lanes must be closed when crane operations affect traffic through boom swing across roadways, load placement blocking lanes, or crane positioning obstructing traffic flow. Traffic control prevents vehicles from entering hazardous areas and maintains safe orderly traffic movement around operations.

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

Near property lines, clearance verification ensuring operations remain within authorized areas and permissions from adjacent property owners are required if boom or loads will swing over or affect adjacent property. Written agreements establish authorization and any necessary protective measures. Operating without permission creates legal liability.

12. **Correct Answer: A (Detailed procedures and enhanced supervision)**

During near-capacity operations, detailed procedures documenting all aspects and enhanced supervision by qualified personnel are essential. Operating near maximum capacity leaves minimal margin for errors or unexpected conditions. Comprehensive planning and oversight reduce risks when safety margins are reduced.

13. **Correct Answer: A (Before crane travel for obstacles and strength)**

Travel routes must be evaluated before crane travel to identify obstacles including overhead wires and clearance restrictions, and verify surface strength to support crane weight during movement. Route surveys prevent contact with overhead obstructions and ground failure during travel.

14. **Correct Answer: B (Limited operator visibility)**

Spotter requirements are determined by limited operator visibility preventing clear view of travel path, loads, or surrounding areas. Spotters positioned where they can see provide guidance through areas operators cannot observe. Blind spots during travel, load handling, or operations near obstructions necessitate spotters.

15. **Correct Answer: D (Barriers preventing unauthorized access)**

Around work areas, barriers preventing unauthorized access must be installed. Physical barriers such as fencing, barricades, or caution tape create visible boundaries preventing personnel from entering swing radius, fall zones, or areas where they could be struck. Barriers provide positive protection against inadvertent access.

16. **Correct Answer: A (Traffic control and coordination)**

When operating near highways, traffic control plans and coordination with traffic authorities are required. Plans define traffic routing around operations ensuring vehicles flow safely. Coordination with authorities ensures compliance with regulations and proper implementation of traffic control measures.

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

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

18. **Correct Answer: A (When conditions approach limits)**

Wind monitoring must be implemented when conditions approach manufacturer 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 that compromise stability or control.

19. **Correct Answer: C (When safety is impacted)**

Rain stops operations when safety is impacted through visibility reduction preventing clear view, or equipment function is affected through ice accumulation, electrical problems, or reduced friction. Operations must not continue when precipitation creates unsafe conditions regardless of project pressures.

20. **Correct Answer: A (Adequate work area illumination)**

For night lifts, adequate work area illumination is required including crane, loads, landing areas, rigging operations, and personnel positions. Lighting must allow clear visibility of operations, load positions, hazards, and signals. Inadequate lighting creates serious safety risks from reduced visibility.

21. **Correct Answer: D (Complex tandem operations)**

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

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

Before configuration changes such as boom length or counterweight adjustments, appropriate load charts for the new configuration must be verified. Different configurations provide different capacities requiring correct chart sections. Using charts for previous configuration after changes creates serious overload risks.

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

Over occupied spaces, 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. Operations must stop or personnel must move before loads pass overhead.

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

Wind operating limits are established by manufacturer specifications based on crane design, stability characteristics, and testing. Manufacturers determine maximum wind speeds through analysis and testing ensuring adequate stability and control margins under wind loading for specific crane models and configurations.

25. **Correct Answer: D (Before hazardous area operations)**

Emergency response plans must be ready before hazardous area operations such as proximity to power lines, hazardous materials, unstable structures, or remote locations where standard emergency response may be inadequate. Plans ensure personnel understand procedures and necessary equipment is available.

26. **Correct Answer: C (Proper installation and securing)**

About counterweight, proper installation and securing per manufacturer specifications must be verified. Counterweight must be correctly positioned and fastened preventing movement or detachment. Loose counterweight can shift during operations creating sudden stability loss or fall causing catastrophic accidents.

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

Near helicopter facilities, height limits and coordination with heliport operators may be required. Cranes can interfere with helicopter approach and departure paths requiring notification and possible operational restrictions. Coordination ensures safe helicopter operations continue during crane activities.

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

Blocking requirements are determined by load characteristics including weight distribution and shape, and rigging geometry. Loads with uneven weight distribution may require blocking to prevent tipping. Complex rigging configurations may necessitate blocking for proper load positioning and stability during lifting.

29. **Correct Answer: C (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 of safety information and operational plans.

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

For boom over structures, clearance verification ensuring adequate distance throughout movement paths or protective measures such as padding or temporary removal of fragile items are required. This prevents boom contact damaging structures, equipment, or utilities during swing or boom angle changes.

31. **Correct Answer: B (Pat head with hand)**

The standard hand signal for "use main hoist" consists of patting the head with one hand. This distinctive signal clearly indicates the operator should switch to or continue using the main hoist function, differentiating main hoist operations from auxiliary hoist operations.

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

When using radios, clear communication with confirmations is critical. Communications must use unambiguous terminology and operators must confirm understanding through repeat-back or acknowledgment before executing commands. This protocol ensures communications are understood correctly preventing dangerous misunderstandings.

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

If visibility is lost, signal persons must stop operations or reposition where they can see loads and operations. Someone with clear view must monitor load position and movements throughout lift cycles. Continuing without visibility creates serious hazards from inability to detect problems.

34. **Correct Answer: C (Before operations with new crews)**

Signals must be reviewed before operations with new crews to ensure mutual understanding of signals that will be used. This review prevents misunderstandings from unfamiliarity with standard signals, regional variations, or site-specific signals. All parties must understand signal meanings before operations begin.

35. **Correct Answer: B (Hands clasped in front)**

The standard hand signal for "dog everything" or stop all functions consists of hands clasped together in front of the body. This signal indicates all crane functions should stop and remain stopped until new signals are given, used when securing crane or pausing operations.

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

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

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

Non-standard signals can be used after demonstration and agreement. Special signals must be demonstrated to all parties ensuring operators, signal persons, and supervisors understand their meanings. All personnel must agree on signal meanings before using non-standard signals during operations.

38. **Correct Answer: B (Stop from any person)**

Stop command from any person has absolute priority. When stop is given by anyone for any reason, operators must stop immediately. This absolute priority ensures immediate response to safety concerns regardless of who identifies the hazard.

39. **Correct Answer: A (Before they direct operations)**

Signal person qualifications must be verified before they direct operations. This verification ensures individuals directing crane movements are qualified through training and evaluation demonstrating knowledge and ability. Operating with unqualified signal persons creates serious accident risks.

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

If signal person moves, operations must stop and new visibility must be established. Operators must know where to look for signals and signal persons must have adequate visibility from new positions. Communication must be re-established before continuing operations.

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

Relief personnel are needed when fatigue affects performance reducing attention, reaction time, or ability to communicate clearly. Effective signaling requires full attention and clear communication. Fatigued signal persons create safety risks through reduced performance and judgment.

42. **Correct Answer: D (Understanding of signals)**

Operators must confirm understanding of signals before responding. This confirmation through acknowledgment or repeat-back ensures signals were received and understood correctly. The communication loop must be complete verifying mutual understanding 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 for directions and functions ensure instructions are understood correctly preventing dangerous misunderstandings.

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

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

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

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

46. **Correct Answer: A (Site hazards and ground conditions)**

Under OSHA, initial assessment of site hazards and ground conditions is required. This hazard assessment identifies conditions requiring special precautions including power lines, fall hazards, ground bearing capacity, and proximity hazards. The assessment establishes foundation for safe operation planning.

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

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

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

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

49. **Correct Answer: A (Equipment-specific familiarization)**

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

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

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

51. **Correct Answer: D (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. Charts must be current for equipment configuration providing accurate capacity information.

52. **Correct Answer: A (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 guardrail systems protect workers from fall hazards during boom assembly and other elevated A/D work.

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

OSHA inspections must document deficiencies affecting safe operations and corrections taken. Documentation identifies all defects, wear, or conditions requiring attention and records corrective actions ensuring equipment is maintained safely and providing accountability.

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

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

55. **Correct Answer: D (Correct or remove from service)**

OSHA requires for defects correction before continued use or removal from service until repairs are completed. Operating with known defects violates safety requirements and creates serious hazards. Equipment cannot return to service until verified safe.

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

According to OSHA, re-evaluation must occur every three years minimum or when deficiencies are observed. Periodic re-evaluation ensures operators maintain competency. Deficiency-triggered evaluation addresses problems as they arise requiring immediate assessment.

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. These comprehensive inspections identify defects or conditions affecting safe operations requiring correction before work continues.

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

Under OSHA near power lines, clearances meeting voltage-based requirements or de-energization procedures must be established. These measures prevent electrocution from electrical contact or arcing between cranes or loads and energized lines.

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

OSHA requires for load data current charts accessible to operators. Charts must match equipment configuration and be available for reference. Operators need accurate capacity information for lift planning and execution throughout operations.

60. **Correct Answer: C (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. The certified operator must be able to take immediate control if necessary.

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

Under ASME B30.5, rated capacity means maximum manufacturer-rated load for specific configurations. Rated capacities are established by manufacturers through design analysis and testing accounting for all operating conditions and including appropriate safety factors.

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

ASME B30.5 requires for rope inspection shift inspection when in regular use. This frequent inspection allows operators to identify rope deterioration including broken wires, wear, or damage before defects progress to dangerous levels.

63. **Correct Answer: B (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 to service until conditions are corrected and verified by qualified personnel.

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

ASME B30.5 requires for modifications manufacturer or engineer approval. Only these qualified parties can verify through analysis that modifications maintain adequate safety factors and structural integrity.

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

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

66. **Correct Answer: D (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. Operating within rated capacity maintains safety margins.

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

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

68. **Correct Answer: A (Written maintenance records)**

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

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

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

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

ASME B30.5 states about side loading it must be minimized. Side loading creates dangerous bending stresses in booms not designed for such loads. Even minor side loads can cause structural failure requiring operators to maintain vertical load line alignment.

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

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

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

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

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

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

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

ASME B30.5 requires for rope removal when criteria are met. Specific deterioration criteria including numbers of broken wires, diameter reduction, kinking, and corrosion identify when rope strength has deteriorated requiring replacement.

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

According to ASME B30.5, qualified person authorizes return to service. This individual verifies repairs were performed correctly, equipment is safe for operations, and all safety systems function properly before authorizing work resumption.

76. **Correct Answer: D (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 and what capacity is available for planned operations.

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

On charts, radius means horizontal distance from center of rotation to vertical centerline of hoist line. This horizontal measurement determines capacity for operating conditions and must be calculated accurately for proper chart use.

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

As radius increases, capacity decreases. Greater radius increases overturning moment that loads create, reducing load that stability or structural capacity can support. This fundamental inverse relationship means capacity at maximum radius is fraction of minimum radius capacity.

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

When using attachments, separate charts or deductions are referenced. Jibs, extensions, and other attachments significantly alter capacity compared to main boom alone requiring consultation of special chart sections or applying specified deduction factors.

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

Hook block and rigging must be deducted for net capacity. Hook block and any rigging above the load are supported by crane consuming capacity. Only remaining net capacity is available for actual loads being lifted.

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

On charts, special marks indicate notes or conditions requiring operator attention. These markings identify special requirements, capacity limitations, operational restrictions, or transition points. All special marks must be understood as they convey critical information.

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

When angle changes, radius and capacity change. Raising boom angle decreases radius bringing load closer and generally increases capacity. Lowering boom angle increases radius moving load outward and decreases capacity. These parameters are interdependent.

83. **Correct Answer: D (Lower or interpolate conservatively)**

Between chart values, lower capacity or conservative interpolation applies. Using lower capacity ensures adequate safety margins accounting for measurement uncertainties and dynamic forces. Conservative interpolation maintains safety when operating between chart values.

84. **Correct Answer: C (By boom length and radii)**

Telescopic charts are arranged by boom length sections showing capacities at various operating radii for each length. This organization allows operators to find their boom length section, then read capacity for specific radius within that section.

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

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

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

When counterweight changes, appropriate chart section must be used. Different counterweight amounts provide substantially different capacities requiring different chart sections. Using wrong chart creates serious overload risks or unnecessarily restricts operations.

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

For large loads, wind effects must be considered. Large surface areas create wind forces that add to overturning moments. Manufacturers may specify capacity reductions for loads exceeding certain surface areas or when operating in winds with large loads.

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

Footnotes contain critical restrictions and conditions that apply to operations. Footnotes provide important information including outrigger requirements, configuration restrictions, environmental limits, and other factors affecting safe operations. All footnotes must be read.

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

When configurations change, correct chart reference is essential. Each boom length, counterweight amount, or attachment requires consulting appropriate chart sections. Using wrong charts creates serious overload risks from incorrect capacity information.

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. Load positioning and rigging must account for actual center of gravity.

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 from engine to hydraulic power. Pressurized fluid flows through system driving cylinders and motors performing work.

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

Slow function or leaks indicate hydraulic problems. Slow function suggests inadequate pressure or flow while leaks show seal failure. Any of these symptoms requires investigation and correction before continued operations.

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

Filters remove contaminants from hydraulic fluid protecting components from wear and damage. Filters capture particles from external contamination and internal wear debris, maintaining fluid cleanliness essential for system reliability and component longevity.

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

Excessive load or poor cooling causes overheating. Excessive demand creates high heat generation while inadequate cooling from low fluid, dirty coolers, or continuous operation prevents heat dissipation. Overheating damages seals and degrades fluid.

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

Relief valves control maximum pressure. Relief valves open when pressure exceeds settings, dumping excess flow to reservoir preventing pressure spikes. This protection prevents damage to pumps, hoses, cylinders, and other components from overpressure.

Specialty Examination

1. **Correct Answer: D (Excellent stability from wide track base)**

A primary advantage of crawler cranes for heavy lifting is excellent stability from wide track base. Crawler tracks spread crane weight over large surface areas creating low ground bearing pressure and providing a wide stable base. The track width typically extends beyond the crane body creating exceptional resistance to tipping. This stability advantage allows crawler cranes to handle heavier loads compared to wheeled cranes of similar size.

2. **Correct Answer: B (Hydraulic flow control valves)**

On telescopic cranes, boom extension speed is controlled by hydraulic flow control valves. These valves regulate the volume of hydraulic fluid flowing to extension cylinders controlling extension and retraction rates. Operators adjust control inputs varying flow rates to achieve desired extension speeds. Flow control ensures smooth controlled boom movements preventing sudden extensions or retractions.

3. **Correct Answer: A (Triangulated structural design)**

Lattice booms achieve their strength advantage through triangulated structural design. The open framework with diagonal lacing members creates efficient load paths distributing forces through triangulated geometry. This design principle provides exceptional strength while minimizing weight. Triangulation efficiently resists both compression and tension forces making lattice structures ideal for long boom applications.

4. **Correct Answer: B (All-wheel drive with suspension systems)**

On all-terrain cranes, all-wheel drive with suspension systems enables rough terrain 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 axle articulation. This combination enables operation on rough, soft, or unprepared surfaces where standard vehicles cannot function.

5. **Correct Answer: C (Modular boom assembly)**

Lattice cranes achieve extreme reach through modular boom assembly. Individual boom sections connect with pins creating continuous structures. Sections can be added or removed customizing boom length for specific jobs. This modularity allows configurations exceeding 400 feet for some crane models. Additional sections extend reach while maintaining structural integrity through proper assembly.

6. **Correct Answer: A (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 set positions

providing positive retention independent of hydraulic pressure. These dual safety systems ensure boom sections remain extended preventing dangerous uncontrolled retraction.

7. **Correct Answer: D (Lower maintenance)**

Fixed cabs provide the advantage of lower maintenance. Fixed cabs eliminate rotating connections for hydraulic lines, electrical systems, and controls that wear from continuous rotation. This simpler design reduces maintenance requirements, potential failure points, and associated costs. Fixed cabs also eliminate the rotating bearing requiring periodic service in swing cab designs.

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

When assembling lattice sections, proper pins and sequence ensure safety. Pins must be fully inserted through all connection holes with retention devices engaged. Manufacturer assembly sequence must be followed exactly ensuring proper load paths and structural integrity. Incomplete connections or wrong sequence can cause structural failure during operations creating catastrophic accidents.

9. **Correct Answer: B (Angular boom support)**

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

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

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

11. **Correct Answer: D (Radius change without boom movement)**

Luffing jibs offer the capability of radius change without boom movement. Luffing jibs have independent angle adjustment through dedicated hoist systems. Operators can change jib angle varying 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: B (Offset angle degree)**

When using offset jibs, offset angle degree affects capacity. As jibs offset from straight ahead positions, capacity decreases due to altered loading patterns. Side loading increases structural stress on offset

mechanisms. Charts show capacity values at various offset angles. Greater offset angles result in lower capacities requiring operators to reference appropriate chart values.

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

Maximum boom length is limited by structural and stability limits. Longer booms create greater overturning moments affecting stability and impose higher structural loads. Boom members must resist bending and compression forces without exceeding material strength. Manufacturers establish maximum lengths through engineering analysis ensuring adequate margins.

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

Rough-terrain maneuverability is provided by compact size with crab steering. Compact dimensions and short wheelbase enable tight turns. Crab steering allows rear wheels to steer opposite front wheels or in the same direction enabling sideways movement. This combination allows operation in restricted areas and challenging terrain where larger cranes cannot maneuver.

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

Lattice boom angle is controlled by the boom hoist system. The boom hoist rope runs from drum over mast top sheaves through pendants to boom point. Winding rope on the drum shortens pendants raising boom angle. Paying out rope lengthens pendants lowering boom angle. The mast provides leverage for angle changes.

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

Fly jib capacities are significantly reduced from main boom capacities. Fly jibs add substantial weight at boom tip, extend total length, and create additional structural loading. These factors combine to reduce capacity dramatically. Capacities may be 20-40 percent of main boom capacity at comparable radii requiring careful planning.

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

Manufacturer specifications establish safe jib length. Manufacturers determine maximum jib lengths through structural analysis ensuring combined boom and jib loading remains within capacity limits. Analysis verifies structural members can support loads and stability is maintained. Specifications account for various configurations and operating conditions.

18. **Correct Answer: A (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. This allows 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: D (Rapid setup)**

The telescopic crane advantage is rapid setup. Telescopic cranes arrive with boom mounted and extend hydraulically in minutes. Lattice cranes require boom assembly taking hours or days. This speed advantage makes telescopic cranes ideal for projects requiring mobility between multiple locations or quick response to changing site needs.

20. **Correct Answer: C (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 secure. Appropriate load chart sections for extended configurations must be used. Extensions significantly affect boom capacity requiring correct charts to prevent overloading.

21. **Correct Answer: A (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. This makes auxiliaries efficient for handling rigging, tools, or lighter materials.

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

Hydraulic motor with brake provides hydraulic crane swing. The motor drives swing mechanism with speed proportional to control input. Smooth proportional control allows precise swing positioning. Automatic brake engages when controls return to neutral stopping rotation and holding position preventing drift.

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

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

24. **Correct Answer: C (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. Appropriate chart sections for configurations

with inserts must be used. Inserts affect boom structural characteristics and capacity requiring proper installation and chart reference.

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

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

26. **Correct Answer: A (Main chord members)**

Main chord members carry primary loads on lattice booms. These large structural members running the boom length at corners form the main load-carrying framework. Chords resist bending and compression forces from boom weight and loads. Lacing members and battens provide lateral support while chords carry primary forces.

Practical Examination

1. **Correct Answer: C (Reduction exceeding removal criteria)**

When inspecting wire rope, reduction exceeding removal criteria indicates wear requiring removal. ASME B30.5 specifies diameter reduction of 7 percent or more from nominal diameter as a removal criterion. This reduction indicates loss of metallic area from broken wires, wear, or corrosion reducing rope strength to unsafe levels. Measurement at multiple points along the rope identifies areas of excessive wear.

2. **Correct Answer: B (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. Frequent inspection is fundamental to rope management ensuring problems are detected early.

3. **Correct Answer: A (Clean fluid at correct level)**

During pre-operational checks, clean fluid at correct level is proper hydraulic condition. 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 and ready for operations.

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

When inspecting hooks, 15 percent or manufacturer limit requires removal. 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.

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

Proper LMI function is indicated by accurate boom 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. Systems providing accurate real-time information allow effective capacity monitoring preventing overload.

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. Any delay in engagement, continued coasting, or inability to hold position indicates brake adjustment or repair is needed.

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

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

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

Before engine start, controls in neutral is verified. Operators must 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.

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

During warm-up, oil pressure and temperature are monitored. Oil pressure should stabilize quickly indicating proper lubrication system function. 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.

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 deployment process.

11. **Correct Answer: A (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, controls return to neutral properly, brakes engage automatically when controls are released, and loads stop and hold without drift demonstrating complete system function.

12. **Correct Answer: D (Erratic response or binding)**

During control testing, erratic response or binding is unacceptable. Controls should respond smoothly and proportionally to operator inputs without delays, binding, jerking, or erratic behavior. Functions should accelerate and decelerate smoothly. Problems suggest control valve issues, hydraulic system problems, or mechanical binding requiring correction before operations.

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

When checking boom indicators, accurate length display is verified. Indicators must accurately display actual boom length matching extended length. These indicators are essential for capacity determination using load charts. Operators must know exact boom length to read capacities correctly. Inaccurate indicators create serious overload risks requiring calibration or repair.

14. **Correct Answer: B (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. Bird-caging where strands separate from rope body indicates structural failure. Either condition can cause sudden failure under loads well below normal capacity requiring immediate rope replacement.

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

During hydraulic inspection, milky or cloudy fluid indicates contamination. Milky appearance shows water contamination causing corrosion and reduced lubrication. Cloudiness indicates other contaminants including dirt or wear particles. Contaminated fluid must be drained, system flushed, and contamination sources corrected before refilling with clean fluid.

16. **Correct Answer: B (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. Automatic hoist cutout

should prevent actual two-blocking through function interruption. The device provides warning allowing response then prevents contact through cutout protecting equipment.

17. **Correct Answer: A (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. Testing involves attempting to move locked components confirming locks prevent movement. Locks failing to engage properly or allowing movement despite engagement require immediate repair before operations.

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

During structural inspection, cracks or deformation requires attention. Structural cracks in boom members or other components can propagate rapidly under load causing catastrophic failure. Permanent deformation indicates loading beyond design limits compromising structural integrity. Any structural damage requires engineering evaluation before equipment can return to service.

19. **Correct Answer: C (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. Any loosening compromises termination strength potentially allowing rope pullout requiring replacement before operations.

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

LMI displays must provide functional readable information. Displays must be operational showing appropriate capacity and configuration data, and readable from operator's position under all lighting conditions. Non-functional displays prevent capacity monitoring creating serious overload risks. Illegible displays cannot be used effectively requiring repair.

21. **Correct Answer: D (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. 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.

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

When checking hoses, cracking, bulging, or deterioration requires replacement. Cracking particularly in bend areas, bulging indicating internal reinforcement failure, or other visible deterioration indicates

imminent hose failure under pressure. Age-related hardening reducing flexibility also warrants replacement. Failed hoses under pressure can cause loss of function or safety hazards.

23. **Correct Answer: C (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, and documenting any issues requiring attention providing communication about equipment status for next operations.

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

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

25. **Correct Answer: B (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. Low pressure indicates charge loss or expired inspection indicates service is overdue. Either condition means extinguishers may not function properly requiring immediate servicing.

26. **Correct Answer: A (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. Partial insertion or missing retention allows pins to back out during operations causing sudden structural connection failure and potential boom collapse.

27. **Correct Answer: C (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 systems are functional and ready for operations, and work area is clear of personnel and obstacles within operating radii and swing paths before beginning lift operations.

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

When inspecting pins, wear, cracks, or elongated holes indicates problems. Excessive wear reducing pin diameter below specifications or cracks in pin bodies require pin replacement. Elongated pin holes indicate

overloading, impact damage, or fatigue requiring boom section or structural evaluation and possible repair or replacement before returning to service.

29. **Correct Answer: D (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, show no hydraulic leaks from seals, glands, or fittings, and produce no unusual sounds suggesting cavitation or mechanical problems. Smooth extension and retraction throughout stroke demonstrates proper function.

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 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.