

Practice Test 10

Core Examination

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

1. What material provides insufficient bearing capacity?
 - A. Compacted gravel
 - B. Dense sand
 - C. Loose fill or recently placed material
 - D. Bedrock

2. When must crane setup be inspected by competent persons?
 - A. Before each new setup location
 - B. Weekly
 - C. Monthly
 - D. Annually

3. What is the primary risk near excavations?
 - A. Ground failure extending beyond excavation edges
 - B. Excavation depth only
 - C. Excavation width only
 - D. Visual appearance

4. When operating on pavement, what must be assessed?
 - A. Pavement color
 - B. Pavement thickness and structural capacity
 - C. Surface temperature
 - D. Pavement age

5. What is essential for outrigger mat placement?
 - A. Mat color
 - B. Mat age
 - C. Mat manufacturer
 - D. Full contact with solid surface

6. During operations, when must crane level be checked?
 - A. Continuously and after any changes
 - B. Once daily
 - C. Weekly

D. Monthly

7. What clearance is required for lines over 350 kilovolts?

- A. 10 feet
- B. 15 feet
- C. 20 feet
- D. Per OSHA voltage-specific table

8. When planning lifts, what calculation is critical?

- A. Load weight including rigging
- B. Crane color
- C. Time available
- D. Weather forecast

9. What determines appropriate boom configuration?

- A. Boom color
- B. Fuel level
- C. Reach, height, and capacity requirements
- D. Time of day

10. When must road closures be coordinated?

- A. When operations impact public roadways
- B. Never required
- C. Only at night
- D. Monthly

11. What is required near adjacent property?

- A. Verbal notification
- B. Higher insurance
- C. Night operations
- D. Clearance verification and permissions

12. During maximum capacity operations, what is required?

- A. Verbal agreement
- B. Standard procedures
- C. Enhanced planning and qualified supervision
- D. No special requirements

13. When must crane travel paths be assessed?

- A. Monthly

- B. Before travel for clearances and bearing
- C. Annually
- D. Assessment optional

14. What determines need for spotters?

- A. Operator blind spots or visibility restrictions
- B. Crane size
- C. Time of day
- D. Fuel level

15. What must be established for safety?

- A. Parking areas
- B. Break rooms
- C. Offices
- D. Exclusion zones with barriers

16. When operating near traffic, what is essential?

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

17. What is required near airport operations?

- A. Night operations
- B. FAA notification and coordination
- C. Special paint
- D. Higher insurance

18. When must wind speed be monitored?

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

19. When does weather stop crane operations?

- A. Any precipitation
- B. Never
- C. When safety is compromised
- D. Monthly

20. What is required for nighttime operations?
- A. Operations prohibited
 - B. Reduced capacity
 - C. Adequate illumination of all areas
 - D. Special permits
21. When are dual-crane plans required?
- A. Never
 - B. Complex or critical tandem lifts
 - C. All dual lifts
 - D. Optional
22. What must be verified after configuration changes?
- A. Correct load charts for new setup
 - B. Insurance coverage
 - C. Fuel level
 - D. Crane color
23. What is prohibited during lifts?
- A. Radio use
 - B. Signal persons
 - C. Daytime operations
 - D. Personnel under suspended loads
24. What establishes wind limits?
- A. General guidelines
 - B. Operator preference
 - C. Manufacturer specifications
 - D. Project schedule
25. When must emergency procedures be ready?
- A. Never required
 - B. Before high-risk operations
 - C. Monthly
 - D. Annually
26. What must be verified about counterweight?
- A. Color
 - B. Age
 - C. Secure attachment per specifications

D. Manufacturer name

27. What may be required near heliports?

- A. Night operations
- B. Height restrictions and coordination
- C. Special paint
- D. Higher insurance

28. What determines blocking needs?

- A. Block color
- B. Load shape and rigging configuration
- C. Block age
- D. Block manufacturer

29. When must safety briefings occur?

- A. Daily before operations
- B. Monthly
- C. Annually
- D. Weekly

30. What is required for boom over buildings?

- A. Verbal warning
- B. Higher insurance
- C. Special permits
- D. Clearance or evacuation

31. What is the standard signal for "emergency stop"?

- A. Both arms extended overhead waving
- B. Circular motion
- C. Arms at sides
- D. One fist

32. When using radios, what protocol is critical?

- A. Fast speech
- B. Abbreviated terms
- C. Any style
- D. Clear language with acknowledgments

33. What must signal persons do if view is blocked?

- A. Continue signaling

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

34. When must hand signals be practiced?

- A. Never
- B. Before operations with new personnel
- C. Monthly
- D. Annually

35. What is the standard signal for "retract boom"?

- A. Arms overhead
- B. Circular motion
- C. One arm extended
- D. Both fists pulling back

36. During low visibility, what is required?

- A. Enhanced or illuminated signals
- B. No signaling possible
- C. Voice only
- D. Standard signals adequate

37. When can modified signals be implemented?

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

38. What command overrides all others?

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

39. When must signal person credentials be verified?

- A. Before they give any signals
- B. Weekly
- C. Monthly
- D. Annually

40. What is required if signal person relocates?
- A. Continue signaling
 - B. Stop and establish new visibility
 - C. Move quickly
 - D. No action needed
41. When are relief signal persons needed?
- A. Every hour
 - B. End of shift
 - C. Never during operations
 - D. When fatigue impairs performance
42. What must operators verify?
- A. Clear understanding before acting
 - B. Weather
 - C. Fuel level
 - D. Time
43. When using voice commands, what must be avoided?
- A. Complete sentences
 - B. Specific terms
 - C. Ambiguous or unclear 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 first?
- A. Fuel costs
 - B. Ground and site hazards
 - C. Operator salary

D. Project budget

47. What does OSHA require for operators?

- A. Experience only
- B. Age only
- C. Certification and employer evaluation
- D. No requirements

48. According to OSHA, when must inspections be documented?

- A. Never
- B. Monthly only
- C. Optional
- D. Shift, annual, and after events

49. What must employers provide?

- A. Site and equipment familiarization
- B. Transportation
- C. Lunch
- D. Housing

50. Under OSHA, who directs assembly?

- A. Any worker
- B. Owner
- C. Qualified A/D director
- D. Insurance agent

51. What does OSHA require for load data?

- A. Verbal adequate
- B. Accessible current charts
- C. Memory sufficient
- D. Optional

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. Deficiencies and corrective actions
- C. Fuel type
- D. Crane color

54. Under OSHA, who approves modifications?

- A. Operator
- B. Owner
- C. Manufacturer or qualified 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. Safety-critical systems and components
- C. Age only
- D. Fuel capacity

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

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

59. What does OSHA require for capacity information?

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

60. According to OSHA, when can trainees operate?
- A. Never
 - B. After 1 week
 - C. With certified operator supervision
 - D. Anytime
61. Under ASME B30.5, rated capacity is defined as 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. Monthly
 - B. Annually
 - C. Optional
 - D. Each shift in regular use
63. According to ASME B30.5, when must equipment stop?
- A. When unsafe conditions are identified
 - B. Monthly
 - C. Quarterly
 - D. Annually
64. What does ASME B30.5 require for modifications?
- A. Manufacturer or engineer approval
 - B. Verbal approval
 - C. Owner approval
 - D. No approval
65. Under ASME B30.5, what governs personnel platforms?
- A. Standard procedures
 - B. Verbal agreement
 - C. ASME B30.23 special requirements
 - 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. Annually
- C. Before operations for capacity determination
- D. Optional

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

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

69. Under ASME B30.5, critical lifts are determined by what?

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

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

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

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

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

72. What does ASME B30.5 prohibit?

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

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

- A. Continue slowly

- B. Document later
- C. Consult anyone
- D. Stop and seek qualified direction

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

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

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

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

76. When reading charts, what is identified first?

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

77. On charts, radius is defined as what?

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

78. What happens as radius increases?

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

79. When using attachments, what is needed?

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

80. What must be deducted for net capacity?
- A. Fuel
 - B. Operator weight
 - C. Hook block and rigging weight
 - D. Counterweight
81. On charts, special markings indicate what?
- A. Highest capacity
 - B. Notes or conditions
 - C. Lowest capacity
 - 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. Lower capacity or conservative interpolation
 - D. Estimate freely
84. How are telescopic charts organized?
- A. Alphabetically
 - B. By boom length with radii
 - C. Randomly
 - D. By age
85. What indicates capacity limits?
- A. Bold text or notation
 - B. Color
 - C. Page number
 - D. Font size
86. When counterweight changes, what is needed?
- A. Insurance
 - B. Appropriate chart section
 - C. Color change

D. No action

87. What must be considered for large loads?

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

88. What do footnotes contain?

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

89. When configurations change, what is essential?

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

90. What affects capacity for unbalanced loads?

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

91. What converts mechanical to hydraulic power?

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

92. What indicates hydraulic problems?

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

93. What do hydraulic filters do?

- A. Remove contaminants

- B. Increase pressure
- C. Cool fluid
- D. Add lubrication

94. What causes hydraulic overheating?

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

95. What do relief valves control?

- A. Flow direction
- B. Maximum system pressure
- 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 advantage do crawler cranes provide?

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

2. On telescopic cranes, what synchronizes extension?

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

3. What gives lattice booms strength advantage?

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

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

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

11. What capability do luffing jibs offer?
- A. Radius adjustment without boom movement
 - B. Higher capacity
 - C. Lower cost
 - D. Simpler operation
12. When using offset jibs, what affects capacity?
- A. Time of day
 - B. Offset angle from centerline
 - C. Wind alone
 - D. Operator skill
13. What limits maximum boom length?
- A. Operator preference
 - B. Fuel capacity
 - C. Boom color
 - D. Structural capacity and stability
14. What provides rough-terrain maneuverability?
- A. Long wheelbase
 - B. Multiple axles
 - C. Compact size with crab steering
 - D. Fixed suspension
15. What controls lattice boom angle?
- A. Manual cranks
 - B. Boom hoist system through mast
 - C. Counterweight position
 - D. Hydraulic cylinders only
16. How do fly jib capacities compare?
- A. Significantly reduced from main boom
 - B. No change
 - C. Increased
 - 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. Faster travel
- B. Greater stability and capacity
- C. Lower fuel use
- D. Reduced maintenance

19. What is the telescopic crane advantage?

- A. Rapid deployment without assembly
- B. Higher capacity
- C. Longer boom
- D. Lower cost

20. When using boom extensions, what is critical?

- A. Extension color
- B. Proper installation and load charts
- C. Extension age
- D. Extension weight

21. Which hoist offers faster speeds?

- A. Main hoist
- B. Manual hoist
- C. Auxiliary hoist
- D. All equal

22. What provides hydraulic crane swing?

- A. Hydraulic motor with proportional control
- B. Manual rotation
- C. Wire rope
- D. Electric motor only

23. When changing track configuration, 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 chart sections
- D. Manufacturer location

25. What guides boom section telescoping?

- A. External rails
- B. Internal wear pads and guide systems
- 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 requires removal?

- A. Proper flexibility
- B. Adequate lubrication
- C. Exceeding removal criteria for damage
- 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 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. Power on
 - C. Accurate tracking of configuration and load
 - D. Alarm sounds

6. During brake testing, what is proper function?
 - A. Gradual stopping
 - B. Immediate stop and hold
 - C. Continued movement
 - D. Delayed engagement

7. What verifies hoist brake function?
 - A. Visual inspection
 - B. Noise check
 - C. Load hold test without drift
 - D. Fluid level check

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

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

10. When deploying outriggers, what is verified?
 - A. Deployment speed
 - B. Paint condition

- C. Serial numbers
- D. Crane level maintained within specifications

11. What is proper hoist testing?

- A. Maximum speed only
- B. Minimum speed only
- C. Variable speeds with brake function 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 display of actual length

14. What rope condition requires immediate removal?

- A. Kinking or severe bird-caging
- B. Proper flexibility
- C. Adequate lubrication
- 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 automatic cutout activation
- C. Device labeled
- D. Device makes sound

17. What is proper lock verification?

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

18. During structural inspection, what requires attention?

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

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 capacity 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 sheave grooves

22. When checking hoses, what requires replacement?

- A. Hoses flexible
- B. Cracking, bulging, or deterioration
- 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. 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. Crane painted
- B. All systems functional and area clear
- 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. Smooth operation without leaks
- B. Cylinders visible
- C. Cylinders painted
- D. Cylinders labeled

30. During high winds, what is proper positioning?

- A. Maximum height
- B. Horizontal

- C. Fully extended
- D. Per manufacturer wind specifications

Answers & Explanations - Practice Test 10

Core Examination

1. **Correct Answer: C (Loose fill or recently placed material)**

Loose fill or recently placed material provides insufficient bearing capacity for crane operations. Uncompacted or recently placed fill has not achieved adequate consolidation and density. Bearing capacity may be very low, often less than 1,000 pounds per square foot. These materials compress significantly under crane loads causing dangerous settlement. Material must be properly compacted and allowed to consolidate before supporting crane operations.

2. **Correct Answer: A (Before each new setup location)**

Crane setup must be inspected by competent persons before each new setup location. Each site presents unique ground conditions, hazards, and requirements. This inspection verifies ground adequacy, proper level, correct outrigger deployment, and absence of hazards. Fresh inspection at each location ensures setup is appropriate for actual site conditions encountered.

3. **Correct Answer: A (Ground failure extending beyond excavation edges)**

The primary risk near excavations is ground failure extending beyond excavation edges. Excavations create zones of reduced soil strength that extend laterally beyond visible excavation faces. If crane support falls within these weakened zones, ground can fail causing crane tipping. The failure zone extent depends on soil type, excavation depth, and loading.

4. **Correct Answer: B (Pavement thickness and structural capacity)**

When operating on pavement, pavement thickness and structural capacity must be assessed to support concentrated loads from outriggers. Pavements designed for distributed vehicle loads may fail under concentrated crane loads. Engineering evaluation or testing confirms pavement can support anticipated loads, or additional support such as cribbing distributes loads preventing pavement failure.

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

For outrigger mat placement, full contact with solid surface is essential. 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 and potential failure. Full contact ensures uniform load distribution across the entire mat area.

6. Correct Answer: A (Continuously and after any changes)

During operations, crane level must be checked continuously through monitoring systems and after any changes such as configuration adjustments or detected ground settlement. Real-time monitoring identifies developing problems. Level directly affects stability margins requiring immediate attention if specifications are exceeded.

7. Correct Answer: D (Per OSHA voltage-specific table)

For lines over 350 kilovolts, clearance is determined per OSHA voltage-specific table which provides required distances for various voltages. At these extreme voltages, clearances exceed 20 feet and continue increasing with voltage. OSHA Table A provides specific clearances ensuring adequate safety margins for electrical arc potential.

8. Correct Answer: A (Load weight including rigging)

When planning lifts, load weight including rigging is critical to calculate. Total suspended weight includes the actual load plus all rigging components such as slings, shackles, and spreader bars. This total weight determines required crane capacity. Failing to account for rigging weight can result in overloading the crane.

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

Appropriate boom configuration is determined by reach to operating radius, height needed for placement, and capacity requirements at that configuration. These three factors interact to establish what boom length and angle are needed. Configuration must provide adequate capacity at required radius while achieving necessary height.

10. Correct Answer: A (When operations impact public roadways)

Road closures must be coordinated when operations impact public roadways through boom swing, load placement, or crane positioning affecting traffic flow. Coordination with traffic authorities ensures proper permits, timing, and traffic control implementation. Public safety requires professional traffic management when roadways are affected.

11. Correct Answer: D (Clearance verification and permissions)

Near adjacent property, clearance verification ensuring operations remain within authorized boundaries and permissions from property owners if operations affect their property are required. Written agreements

establish authorization and protective measures. Operating without permission creates legal liability and safety concerns for neighboring property occupants.

12. Correct Answer: C (Enhanced planning and qualified supervision)

During maximum capacity operations, enhanced planning documenting detailed procedures and qualified supervision by experienced personnel are required. Operating at or near maximum capacity leaves minimal safety margin for errors or unexpected conditions. Comprehensive planning and expert oversight reduce risks when margins are minimal.

13. Correct Answer: B (Before travel for clearances and bearing)

Crane travel paths must be assessed before travel to identify clearances including overhead and lateral obstructions, and verify bearing strength to support crane weight. Assessment identifies hazards requiring removal or route changes. This prevents contact with obstructions and ground failure during travel.

14. Correct Answer: A (Operator blind spots or visibility restrictions)

Need for spotters is determined by operator blind spots preventing clear view of travel path or operations, or visibility restrictions from weather or obstructions. Spotters positioned where they can see provide guidance through areas operators cannot observe directly. Effective spotting prevents accidents in limited visibility situations.

15. Correct Answer: D (Exclusion zones with barriers)

For safety, exclusion zones with barriers must be established preventing unauthorized personnel from entering hazardous areas. Physical barriers such as fencing or barricades create visible boundaries. These zones encompass swing radius, potential fall areas, and other hazardous regions. Barriers provide positive protection against inadvertent access.

16. Correct Answer: C (Traffic control measures)

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

17. Correct Answer: B (FAA notification and coordination)

Near airport operations, FAA notification and coordination are required. Cranes can interfere with aircraft navigation, approach paths, or radar systems. FAA must be notified of crane locations, heights, and durations. Coordination may result in operational restrictions, required lighting, or prohibited operation times.

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

Wind speed must be monitored when approaching operational limits allowing operators to track actual conditions. Continuous monitoring provides data for informed decisions about continuing or stopping operations. This prevents operating in winds exceeding manufacturer limits that compromise stability or control.

19. Correct Answer: C (When safety is compromised)

Weather stops crane operations when safety is compromised through visibility reduction, equipment function impairment, or unsafe conditions. This includes heavy rain limiting visibility, ice accumulation affecting equipment, or lightning creating electrocution risks. Safety must not be compromised by adverse weather.

20. Correct Answer: C (Adequate illumination of all areas)

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

21. Correct Answer: B (Complex or critical tandem lifts)

Dual-crane plans are required for complex or critical tandem lifts where load distribution, rigging configuration, or operational complexity require engineering analysis. Engineering ensures load sharing is calculated correctly, procedures account for coordination requirements, and failure modes are addressed. Complex operations demand formal planning.

22. Correct Answer: A (Correct load charts for new setup)

After configuration changes, correct load charts for new setup must be verified. Different boom lengths, counterweights, or attachments require different chart sections. Charts must match actual configuration to provide accurate capacity information. Using wrong charts creates serious overload risks.

23. Correct Answer: D (Personnel under suspended loads)

During lifts, personnel under suspended loads is prohibited by OSHA. This fundamental requirement prevents injuries from dropped loads or rigging failures. All personnel must remain clear of areas under suspended loads or boom paths. Operations stop until personnel move to safe locations.

24. Correct Answer: C (Manufacturer specifications)

Wind limits are established by manufacturer specifications based on crane design, stability characteristics, and testing. Manufacturers determine maximum wind speeds through engineering analysis ensuring adequate stability and control margins under wind loading. These specifications must be followed for safe operations.

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

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

26. Correct Answer: C (Secure attachment per specifications)

About counterweight, secure attachment per specifications must be verified. Counterweight must be properly positioned and fastened per manufacturer instructions preventing movement or detachment. Loose counterweight can shift during operations creating sudden stability loss or fall causing catastrophic accidents.

27. Correct Answer: B (Height restrictions and coordination)

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

28. Correct Answer: B (Load shape and rigging configuration)

Blocking needs are determined by load shape and rigging configuration. Loads with irregular shapes or uneven weight distribution may require blocking to prevent tipping or rotation. Rigging configurations may necessitate blocking for proper load positioning and stability during lifting and placement.

29. Correct Answer: A (Daily before operations)

Safety briefings must occur daily before operations. Daily briefings ensure personnel understand hazards, procedures, assignments, and communication methods for that day's work. Conditions, personnel, and tasks may change daily requiring fresh communication of safety information ensuring everyone is informed.

30. Correct Answer: D (Clearance or evacuation)

For boom over buildings, clearance verification throughout boom paths or evacuation of personnel from under boom is required per OSHA. This prevents injuries from dropped loads, boom failure, or falling components. Either adequate clearance must be maintained or structures must be evacuated.

31. Correct Answer: A (Both arms extended overhead waving)

The standard hand signal for "emergency stop" consists of both arms extended overhead waving rapidly back and forth. This highly visible dramatic signal indicates immediate danger requiring instant cessation of all movements. The distinctive motion ensures recognition even at distance or in challenging conditions.

32. Correct Answer: D (Clear language with acknowledgments)

When using radios, clear language with acknowledgments is critical. Communications must use unambiguous terminology and operators must acknowledge understanding before executing commands. This repeat-back protocol ensures communications are understood correctly completing the communication loop before movements begin.

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

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

34. Correct Answer: B (Before operations with new personnel)

Hand signals must be practiced before operations with new personnel to ensure mutual understanding of signals that will be used. This practice prevents misunderstandings from unfamiliarity with standard signals or variations. All parties must demonstrate understanding before operations begin.

35. Correct Answer: D (Both fists pulling back)

The standard hand signal for "retract boom" consists of both fists positioned in front of the body making a pulling back motion toward the body. This signal simulates pulling boom sections inward, providing an intuitive visual representation of the desired retraction movement.

36. Correct Answer: A (Enhanced or illuminated signals)

During low visibility, enhanced or illuminated signals are required. This includes lighted wands, reflective clothing, or additional lighting making signals visible despite fog, darkness, or dust. Enhanced visibility maintains effective communication when normal signals would be difficult to see.

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

Modified signals can be implemented after demonstration and crew agreement. Special signals must be demonstrated to all parties ensuring everyone understands their meanings. All personnel must agree on signal meanings before using modified signals. This prevents misunderstandings during actual operations.

38. Correct Answer: B (Stop signal from anyone)

Stop signal from anyone overrides all others. When stop is given by any person for any reason, operators must stop immediately. This absolute priority ensures immediate response to safety concerns. Anyone observing danger can stop operations preventing accidents.

39. Correct Answer: A (Before they give any signals)

Signal person credentials must be verified before they give any signals. This verification ensures individuals directing crane movements are qualified through training and evaluation. Operating with unqualified signal persons creates serious accident risks from incorrect signals or poor judgment.

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

If signal person relocates, operations must stop and new visibility must be established. Operators must know where to look for signals and signal persons must verify adequate visibility from new positions. Clear communication must be re-established before continuing ensuring effective signal transmission.

41. Correct Answer: D (When fatigue impairs performance)

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

42. Correct Answer: A (Clear understanding before acting)

Operators must verify clear understanding before acting on signals. This verification through acknowledgment or repeat-back ensures signals were received and understood correctly. The communication loop must be complete confirming mutual understanding before potentially hazardous movements begin.

43. Correct Answer: C (Ambiguous or unclear language)

When using voice commands, ambiguous or unclear 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 apparel)

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

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

Backup communication must be ready when primary systems may fail from equipment malfunction, interference, environmental conditions, or battery depletion. Predetermined backup methods ensure communication can continue if primary systems fail. This redundancy maintains safe control under all circumstances.

46. Correct Answer: B (Ground and site hazards)

Under OSHA, ground and site hazards must be assessed first. This hazard assessment identifies conditions requiring special precautions including ground bearing capacity, power line proximity, fall hazards, and other site-specific risks. The assessment establishes foundation for comprehensive safe operation planning.

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

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

48. Correct Answer: D (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, history, and verification of compliance with inspection requirements.

49. Correct Answer: A (Site and equipment familiarization)

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

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

Under OSHA, qualified assembly/disassembly director must direct assembly. This individual has specific knowledge of assembly procedures ensuring manufacturer instructions are followed correctly, verifying connection integrity, and coordinating assembly activities. The A/D director ensures safe assembly practices.

51. Correct Answer: B (Accessible current charts)

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

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 preventing serious injuries.

53. Correct Answer: B (Deficiencies and corrective actions)

OSHA inspections must document deficiencies affecting safe operations and corrective actions taken. Documentation identifies all defects, wear, or unsafe conditions and records how they were addressed. This provides accountability and verification that equipment is maintained safely.

54. Correct Answer: C (Manufacturer or qualified 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 critical characteristics.

55. Correct Answer: A (Correction or removal 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 by qualified persons.

56. Correct Answer: D (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 immediately requiring assessment and potential additional training.

57. Correct Answer: B (Safety-critical systems and components)

OSHA inspections must evaluate safety-critical systems and components including structural elements, mechanical systems, safety devices, controls, and wire rope. Comprehensive inspections identify defects or conditions affecting safe operations requiring correction before work continues.

58. Correct Answer: A (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 protecting personnel and equipment.

59. Correct Answer: D (Current accessible charts)

OSHA requires for capacity information current accessible charts. Charts must match equipment configuration and be available for operator reference. Accurate capacity information is essential for lift planning and safe execution throughout operations.

60. Correct Answer: C (With certified operator supervision)

According to OSHA, trainees can operate with certified operator supervision who is physically present at controls. This allows hands-on training under expert oversight. The certified operator must be able to take immediate control if necessary protecting trainee and others.

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

Under ASME B30.5, rated capacity is defined as 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 ensuring safe operations.

62. Correct Answer: D (Each shift in regular use)

ASME B30.5 requires for rope inspection each shift when in regular use. This frequent inspection allows operators to identify rope deterioration including broken wires, wear, kinking, or corrosion before defects progress to dangerous levels. Daily inspection is fundamental to safe operations.

63. Correct Answer: A (When unsafe conditions are identified)

According to ASME B30.5, equipment must stop when unsafe conditions are identified including malfunction, damage, or defects affecting safe operation. Equipment cannot return to service until conditions are corrected and verified by qualified personnel ensuring safety.

64. Correct Answer: A (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 do not adversely affect structural integrity or other critical characteristics.

65. Correct Answer: C (ASME B30.23 special requirements)

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

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 designed safety margins.

67. Correct Answer: C (Before operations for capacity determination)

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

68. Correct Answer: A (Written documentation and records)

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

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

Under ASME B30.5, critical lifts are determined by 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 planning and procedures.

70. Correct Answer: B (Must be avoided or minimized)

ASME B30.5 states about side loading it must be avoided or 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: C (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 or structural integrity.

72. Correct Answer: A (Leaving loads suspended unattended)

ASME B30.5 prohibits leaving loads suspended 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: D (Stop and seek qualified direction)

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

74. Correct Answer: C (When deterioration criteria are met)

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

75. Correct Answer: B (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 after repairs or maintenance.

76. Correct Answer: C (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 at various radii.

77. Correct Answer: B (Horizontal distance from center of rotation)

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 and must be calculated accurately. Radius changes with boom angle variations.

78. Correct Answer: D (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 capacity at minimum radius.

79. Correct Answer: A (Separate charts or deductions)

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

80. Correct Answer: C (Hook block and rigging weight)

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

81. Correct Answer: B (Notes or conditions)

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

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

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

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

Telescopic charts are organized 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 their specific radius within that section.

85. Correct Answer: A (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 which factor limits capacity helps operators recognize when configuration changes might increase available capacity.

86. Correct Answer: B (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 sections creates serious overload risks or unnecessarily limits operations.

87. Correct Answer: D (Wind force effects)

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

88. Correct Answer: A (Critical restrictions and conditions)

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 and understood.

89. Correct Answer: C (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 for actual configuration.

90. Correct Answer: B (Center of gravity location)

For unbalanced loads, center of gravity location affects capacity. Loads with offset centers of gravity, unusual shapes, or uneven weight distribution may require capacity reductions beyond normal chart values. Load positioning must account for actual center of gravity location.

91. Correct Answer: D (Engine-driven pump)

Engine-driven pump converts mechanical to hydraulic power. 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 throughout the crane.

92. Correct Answer: C (Slow function, noise, or leaks)

Slow function, noise, or leaks indicate hydraulic problems. Slow function suggests inadequate pressure or flow. Unusual noise indicates cavitation or component damage. Leaks show seal failure. Any of these symptoms requires investigation and correction before continued operations.

93. Correct Answer: A (Remove contaminants)

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

94. Correct Answer: D (Excessive load or inadequate cooling)

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

95. Correct Answer: B (Maximum system pressure)

Relief valves control maximum system 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 excessive pressure conditions.

Specialty Examination

1. Correct Answer: D (Superior stability and ground pressure distribution)

Crawler cranes provide the advantage of superior stability and ground pressure distribution. Wide track bases create exceptional resistance to tipping through increased moment arms. Tracks distribute crane weight over large surface areas creating ground pressures as low as 5-15 psi. This low ground pressure allows operations on soft soils that would not support wheeled cranes, while the wide stable base enables handling of heavier loads.

2. Correct Answer: B (Hydraulic flow control and position sensors)

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

3. Correct Answer: C (Efficient triangulated framework)

Lattice booms achieve strength advantage through efficient triangulated framework. The open structure with diagonal lacing members creates 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 achieving extreme heights and capacities.

4. Correct Answer: D (All-wheel drive and suspension systems)

On all-terrain cranes, all-wheel drive and suspension systems 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 extreme heights 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 for some crane models with heights adjusted by selecting appropriate section combinations.

6. Correct Answer: B (Holding valves and mechanical locks)

On telescopic cranes, holding valves and mechanical locks prevent retraction. Hydraulic holding valves maintain pressure in extension cylinders preventing reverse flow that would cause retraction. 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: D (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 from movement. This simpler design reduces maintenance requirements, potential failure points, and associated costs compared to swing cab configurations requiring rotating seals and connections.

8. Correct Answer: A (Proper pins with retention and correct sequence)

When assembling lattice booms, proper pins with retention and correct sequence ensure safety. Pins must be fully inserted through all connection holes with retention devices such as clips or cotter pins 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.

9. Correct Answer: D (Angular boom support from mast)

Boom pendants provide angular boom 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 the boom hoist changes boom angle while pendants provide positive constant support.

10. Correct Answer: C (Electronic or hydraulic control systems)

On all-terrain cranes, electronic or hydraulic 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 for each axle maximizing maneuverability for different conditions.

11. Correct Answer: A (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 in confined spaces.

12. Correct Answer: B (Offset angle from centerline)

When using offset jibs, offset angle from centerline affects capacity. As jibs offset from straight ahead 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 requiring operators to reference appropriate values.

13. Correct Answer: D (Structural capacity and stability)

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

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

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

15. Correct Answer: B (Boom hoist system through mast)

Lattice boom angle is controlled by boom hoist system through mast. 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 structure provides the leverage point for angle changes.

16. Correct Answer: A (Significantly reduced from main boom)

Fly jib capacities are significantly reduced from main boom capacities. Fly jibs add substantial weight at boom tip, extend total boom length, and create additional structural loading on the system. These factors combine to reduce capacity dramatically with fly jib capacities often 20-40 percent of main boom capacity at comparable radii requiring careful capacity 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 structural capacity limits and stability is maintained. Engineering analysis verifies structural members can support loads throughout the operating range for each specific configuration.

18. Correct Answer: B (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 for the same crane model.

19. Correct Answer: A (Rapid deployment without assembly)

The telescopic crane advantage is rapid deployment without assembly requirements. Telescopic cranes arrive with boom mounted and extend hydraulically in minutes achieving full length quickly. Lattice cranes require boom assembly taking hours or days. This speed advantage makes telescopic cranes ideal for projects requiring mobility between locations or quick response.

20. Correct Answer: B (Proper installation and load charts)

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

21. Correct Answer: C (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 while main hoists handle primary heavy loads.

22. Correct Answer: A (Hydraulic motor with proportional control)

Hydraulic motor with proportional control 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 preventing drift.

23. Correct Answer: D (Appropriate capacity chart)

When changing track configuration, 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 with capacity actually available.

24. Correct Answer: C (Correct installation and chart sections)

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

25. Correct Answer: B (Internal wear pads and guide systems)

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

26. Correct Answer: A (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 and loads. Lacing members and battens provide lateral support maintaining chord spacing and overall structural geometry while chords carry primary forces.

Practical Examination

1. Correct Answer: C (Exceeding removal criteria for damage)

When inspecting wire rope, exceeding removal criteria for damage requires removal. ASME B30.5 establishes specific removal criteria including numbers of broken wires, diameter reduction of 7 percent or more, 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.

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 when they can be addressed safely.

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, and ready for safe operations without contamination issues.

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.

5. Correct Answer: C (Accurate tracking of configuration and load)

Proper LMI function is indicated by accurate tracking of configuration and load. 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. Systems providing accurate real-time information allow effective capacity monitoring preventing overload situations.

6. Correct Answer: B (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. Any delay in engagement, continued coasting after control release, or inability to hold position indicates brake adjustment or repair is needed.

7. Correct Answer: C (Load hold test without drift)

Load hold test 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.

8. Correct Answer: B (Controls in neutral position)

Before engine start, controls in neutral position 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.

9. Correct Answer: A (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 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.

10. Correct Answer: D (Crane level maintained within specifications)

When deploying outriggers, crane level maintained within specifications 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.

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

Proper hoist testing is variable speeds with brake function 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.

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.

13. Correct Answer: D (Accurate display of actual length)

When checking boom indicators, accurate display of actual length is verified. Indicators must accurately display actual boom length matching physically extended length within acceptable tolerances. 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 safe operations.

14. Correct Answer: A (Kinking or severe bird-caging)

Kinking or severe bird-caging requires immediate rope removal. Kinks show permanent distortion with severe localized stress concentrations dramatically reducing rope strength at kinked locations. 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 capacity.

15. Correct Answer: C (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. Contaminated fluid must be drained, system flushed, and contamination sources corrected before refilling.

16. Correct Answer: B (Warnings and automatic cutout activation)

When testing anti-two-block, warnings and automatic 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 damage.

17. Correct Answer: B (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.

18. Correct Answer: A (Cracks or permanent deformation)

During structural inspection, cracks or permanent deformation requires attention. Structural cracks in boom members, turret components, or other structural elements 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 safely 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 indicating overstress. Any loosening compromises termination strength potentially allowing rope pullout under load requiring replacement before operations continue.

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

LMI displays must provide functional readable capacity 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. Non-functional or illegible displays prevent capacity monitoring creating serious overload risks requiring repair.

21. Correct Answer: D (Proper seating in all sheave grooves)

During rope inspection, proper seating in all sheave grooves is required. Rope must seat fully in intended sheave grooves throughout entire reeving paths from drum through all sheaves. 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: B (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 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 or inadvertent movements, and documenting any issues or defects 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 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.

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 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. 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: B (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.

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.

29. Correct Answer: A (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 function.

30. Correct Answer: D (Per manufacturer wind specifications)

During high winds, proper positioning is per manufacturer wind 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.