Practice Test 8

Core Examination

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

1. What soil condition requires the most extensive ground preparation?
   A. Bedrock
   B. Saturated clay or organic soil
   C. Compacted gravel
   D. Dense sand

2. When must competent persons inspect crane setup?
   A. Weekly
   B. Monthly
   C. Annually
   D. Before operations and when conditions change

3. What is the minimum distance from excavations for crane setup?
   A. Based on soil analysis and excavation depth
   B. 5 feet
   C. 10 feet
   D. Distance not regulated

4. When operating on concrete slabs, what must be verified?
   A. Concrete color
   B. Concrete age
   C. Slab thickness and reinforcement adequacy
   D. Surface texture only

5. What determines outrigger float placement?
   A. Float color
   B. Solid bearing surface under entire float
   C. Float age
   D. Float manufacturer preference

6. During crane operations, when must ground bearing be reassessed?
   A. Hourly
   B. Daily
   C. Weekly

D. After heavy rain or ground disturbance

7. What clearance is required for power lines 50 to 200 kilovolts?
   A. Minimum 15 feet or de-energization
   B. 5 feet
   C. 10 feet
   D. No clearance required

8. When planning lifts, what rigging information is essential?
   A. Rigger name
   B. Rigging color
   C. Sling capacity and configuration
   D. Rigging manufacturer

9. What must be considered when determining crane position?
   A. Crane color
   B. Fuel capacity
   C. Operator preference
   D. Access to all lift points within capacity

10. When must pedestrian barriers be installed?
   A. Around hazardous crane operating areas
   B. Never required
   C. Only at night
   D. Monthly

11. What is required when operations affect adjacent property?
   A. Verbal notification
   B. Higher insurance
   C. Night operations
   D. Property owner notification and agreements

12. During lifts near capacity, what is essential?
   A. Verbal agreement
   B. Insurance notification
   C. Enhanced planning and supervision
   D. No special requirements

13. When must crane travel paths be surveyed?
   A. Annually

B. Before travel to verify clearances and strength
C. Monthly
D. Survey not required

14. What determines if spotters are needed?
A. Crane age
B. Time of day
C. Fuel level
D. Blind spots or restricted visibility

15. What must be established for crane exclusion zones?
A. Physical barriers and warning signage
B. Verbal warnings only
C. No barriers needed
D. Higher insurance

16. When operating near busy roadways, what is required?
A. Verbal notification
B. Night operations
C. Higher insurance
D. Traffic control plans and flaggers

17. What is required before lifting near airport approach paths?
A. FAA notification and possible restrictions
B. Night operations only
C. Special crane paint
D. No restrictions

18. When must wind speed monitoring equipment be used?
A. Optional
B. Never required
C. When approaching manufacturer limits
D. Only in hurricanes

19. What determines if precipitation stops operations?
A. Safety impact on visibility or equipment
B. Any moisture
C. Operator preference
D. Never stop for precipitation

20. When lifting in darkness, what is required?
A. Operations prohibited
B. Reduced capacity
C. Higher insurance
D. Illumination of all work areas

21. When must dual crane lifts be engineered?
A. Never required
B. Optional
C. For complex or critical tandem operations
D. All dual lifts

22. What must be verified before changing configurations?
A. Insurance coverage
B. Load charts for new configuration
C. Crane color
D. Fuel level

23. When lifting over occupied areas, what is prohibited?
A. Personnel remaining under load path
B. Radio communication
C. Signal person use
D. Daytime operations

24. What determines maximum operating wind speed?
A. General guidelines
B. Operator comfort
C. Project schedule
D. Manufacturer specifications and load chart notes

25. When must rescue procedures be established?
A. Never required
B. Annually
C. Before operations in remote or hazardous areas
D. Monthly

26. What must be verified about counterweight installation?
A. Counterweight color
B. Secure attachment per manufacturer
C. Counterweight age

D. Installer name

27. When operating near heliports, what may be required?
A. Night operations
B. Special paint
C. Higher insurance
D. Height restrictions and coordination

28. What determines if additional blocking is needed?
A. Block color
B. Block age
C. Load weight distribution and rigging geometry
D. Block manufacturer

29. When must lift hazard briefings occur?
A. Never required
B. Annually
C. Before operations each day or shift
D. Monthly

30. What is required when boom must sweep over structures?
A. Verbal warning
B. Clearance verification or protection
C. Night operations
D. Special permits only

31. What is the standard signal for "raise boom"?
A. Arm extended, thumb pointing up
B. Circular motion
C. Arms overhead
D. One fist

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

33. What must signal persons do if load swings out of view?
A. Continue signaling

B. Estimate position
C. Stop operations or reposition
D. Signal faster

34. When must signals be reviewed with crews?
A. Never required
B. Before operations at new sites or with new personnel
C. Monthly only
D. Annually only

35. What is the standard signal for "lower boom"?
A. Circular motion
B. Both arms up
C. Arm extended, thumb pointing down
D. Arms crossed

36. During nighttime signaling, what is required?
A. No signaling possible
B. Illuminated signal devices
C. Louder voice only
D. Standard signals adequate

37. When can special signals be implemented?
A. Never
B. After demonstration and crew agreement
C. Anytime by operator
D. Only in emergencies

38. What command overrides all others?
A. Stop from any person
B. Radio commands
C. Hand signals
D. Horn signals

39. When must signal person certification be verified?
A. Monthly
B. Annually
C. Weekly
D. Before personnel give signals

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

41. During long operations, when are relief signal persons needed?
A. Never during operations
B. Every 2 hours
C. End of day only
D. When personnel become fatigued

42. What must operators verify before responding to signals?
A. Weather conditions
B. Fuel level
C. Clear understanding of command
D. Time of day

43. When using voice commands, what must be avoided?
A. Complete sentences
B. Unclear or ambiguous directions
C. Specific terms
D. Slow speech

44. What makes signal persons clearly visible?
A. Position only
B. Voice volume
C. Hand size
D. High-visibility apparel

45. When must alternative communication methods be ready?
A. When primary systems may fail
B. Never needed
C. Only for large cranes
D. Alternatives prohibited

46. Under OSHA, what must be assessed initially?
A. Operator salary
B. Fuel costs
C. Ground conditions and site hazards

D. Project budget

47. What does OSHA require for operator credentials?
A. Experience only
B. Certification by accredited organization
C. Verbal agreement
D. No credentials required

48. According to OSHA, when must inspections be documented?
A. During shift, annual, and after events
B. Annually only
C. Monthly only
D. Documentation optional

49. What must employers provide operators per OSHA?
A. Transportation
B. Familiarization on specific equipment
C. Lunch
D. Housing

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

51. What does OSHA require for load information?
A. Load charts readily available
B. Verbal capacity adequate
C. Charts optional
D. Memory adequate

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

53. What must OSHA inspections include?
A. Crane color

B. Identification of deficiencies
C. Operator preferences
D. Fuel type

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

55. What does OSHA require for identified defects?
A. Document only
B. Correction or removal from service
C. Continue with caution
D. Ignore if minor

56. According to OSHA, when must re-certification occur?
A. Never required
B. Every 10 years
C. Every three years minimum
D. Monthly

57. What must OSHA inspections address?
A. Paint color
B. Crane age only
C. Fuel capacity only
D. Safety devices and structural integrity

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

59. What does OSHA require regarding capacity information?
A. Verbal adequate
B. Memory sufficient
C. Current load charts accessible
D. Charts optional

60. According to OSHA, when can trainees operate cranes?
A. Never
B. With certified operator supervision
C. After 1 week
D. Anytime with owner approval

61. Under ASME B30.5, rated capacity is defined as what?
A. Maximum manufacturer-rated load
B. Any load lifted
C. Load plus safety factor
D. Operator decision

62. What does ASME B30.5 require for wire rope checks?
A. Monthly
B. Shift inspection when in regular use
C. Annually
D. Rope checks optional

63. According to ASME B30.5, when must equipment be tagged out?
A. Monthly
B. Quarterly
C. When unsafe conditions are identified
D. Annually

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

65. Under ASME B30.5, what governs personnel platforms?
A. Standard procedures
B. Verbal agreement
C. Platforms prohibited
D. ASME B30.23 requirements

66. What does ASME B30.5 specify about rated loads?
A. Can be exceeded slightly
B. Shall not be exceeded
C. Operator discretion

D. Load limits optional

67. According to ASME B30.5, when must boom angle indicators function?
A. Before operations for chart reading
B. Monthly
C. Annually
D. Indicators optional

68. What does ASME B30.5 require for maintenance documentation?
A. Verbal reports adequate
B. No documentation needed
C. Records prohibited
D. Written records maintained

69. Under ASME B30.5, critical lifts are determined by what?
A. Weight only
B. Time of day
C. Risk factors and potential consequences
D. Crane age

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

71. According to ASME B30.5, when must load tests be performed?
A. Weekly
B. Monthly
C. Testing optional
D. After installation and major repairs

72. What does ASME B30.5 prohibit regarding suspended loads?
A. Leaving loads unattended
B. Using tag lines
C. Radio communication
D. Signal persons

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

B. Continue slowly
C. Document concerns later
D. Consult any worker

74. What does ASME B30.5 require for rope removal?
A. Annual replacement
B. Monthly replacement
C. When deterioration criteria are met
D. Rope never removed

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

76. When interpreting charts, what must be identified first?
A. Operator name
B. Fuel level
C. Current crane configuration
D. Weather conditions

77. On load charts, radius is defined as what?
A. Horizontal distance from center of rotation
B. Vertical distance
C. Diagonal measurement
D. Boom length only

78. What relationship exists between radius and capacity?
A. Both increase together
B. No relationship
C. Capacity doubles with radius
D. Inverse relationship

79. When using attachments, what must be referenced?
A. Main boom charts only
B. Separate attachment charts or deductions
C. No charts needed
D. Estimate capacity

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

81. On load charts, what do symbols typically indicate?
A. Special conditions or footnotes
B. Highest capacity
C. Lowest capacity
D. Recommended capacity

82. When angle changes, what else changes?
A. Nothing
B. Only color
C. Only speed
D. Radius and capacity

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

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

85. What indicates structural versus stability limits?
A. Color coding
B. Page number
C. Bold text or notation
D. Font size

86. When counterweight is modified, what is required?
A. Insurance notification
B. Use of appropriate chart section
C. Counterweight color change

D. No action needed

87. What must be evaluated for wind-exposed loads?
A. Load color
B. Load age
C. Load manufacturer
D. Wind force effects on capacity

88. What information do chart footnotes provide?
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. Crane color change
C. Referencing correct chart section
D. No action needed

90. What affects capacity for off-center loads?
A. Color
B. Load position and center of gravity location
C. Age
D. Manufacturer

91. What converts mechanical power to hydraulic power?
A. Engine-driven hydraulic pump
B. Manual crank
C. Electric motor
D. Gravity

92. What symptoms indicate hydraulic system problems?
A. Normal operation
B. Proper temperatures
C. Slow function, noise, or leaks
D. Clean fluid

93. What do hydraulic filters accomplish?
A. Increase pressure

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

94. What causes hydraulic system overheating?
A. Excessive demand or inadequate cooling
B. Proper operation
C. Clean filters
D. Low operating hours

95. What is the function of relief valves?
A. Direct flow
B. Monitor temperature
C. Indicate levels
D. Limit maximum system pressure

Specialty Examination

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

1. What is a key operational advantage of crawler cranes?
A. High road speed
B. Low ground bearing pressure
C. Compact storage
D. Lowest initial cost

2. On telescopic cranes, what ensures synchronized extension?
A. Manual coordination
B. Gravity alone
C. Hydraulic flow dividers and position sensors
D. Operator skill only

3. What structural advantage do lattice booms provide?
A. Solid construction
B. Heavy materials
C. Compact design
D. Superior strength-to-weight from triangulation

4. On all-terrain cranes, what enables off-road travel?
A. Multiple drive axles and advanced suspension

B. Single axle design
C. Manual transmission only
D. Fixed differential

5. How do lattice cranes achieve maximum height?
A. Telescoping design
B. Modular assembly of boom sections
C. Hydraulic extension
D. Fixed boom lengths

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

7. What is an advantage of fixed operator cabs?
A. Simpler design with lower maintenance
B. Better all-around visibility
C. Higher lifting capacity
D. Superior operator comfort

8. When assembling lattice boom, what ensures proper connection?
A. Speed of installation
B. Operator experience alone
C. Visual inspection only
D. Correct pins with retention devices

9. What do boom pendants provide?
A. Boom extension
B. Rigging storage
C. Angular support from mast
D. Increased capacity

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

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

12. When using offset jibs, what variable affects capacity?
A. Time of day
B. Operator experience
C. Wind speed alone
D. Degree of offset angle

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

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

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

16. How do fly jib capacities compare?
A. Capacity increases
B. No change
C. Substantially reduced from main boom
D. Slight increase

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

D. Manufacturer engineering specifications

18. What benefit does wider track spacing provide?
A. Enhanced stability and capacity
B. Faster travel speed
C. Lower fuel consumption
D. Reduced maintenance

19. What is the primary telescopic crane advantage?
A. Higher capacity
B. Longer boom
C. Lower cost
D. Quick setup without assembly

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

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

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

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

24. When using boom inserts, what must be verified?
A. Insert color

B. Correct installation and chart reference
C. Insert age
D. Manufacturer location

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

26. On lattice booms, which elements carry main loads?
A. Lacing members
B. Main chord members
C. Battens
D. Connection 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 visual indicator requires removal?
A. Valley breaks or core protrusion
B. Proper lubrication
C. Manufacturer markings
D. Slight surface wear

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

3. During pre-operational checks, what hydraulic level is acceptable?
A. Any visible fluid
B. Within reservoir markings
C. Reservoir empty
D. Overfilled condition

4. When inspecting hooks, what measurement requires replacement?
   A. 5 percent throat increase
   B. 15 percent throat opening increase
   C. 20 percent increase
   D. Any increase acceptable

5. What indicates proper LMI calibration?
   A. Display illuminated
   B. Display has power
   C. Accurate tracking of boom and load
   D. Alarm sounds

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

7. What verifies hoist brake effectiveness?
   A. Visual inspection only
   B. Listen for noise
   C. Check fluid color
   D. Load hold test without drift

8. What is the first startup verification?
   A. Controls in neutral position
   B. Horn tested
   C. Boom extended
   D. Radio functioning

9. During engine 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 continuously?
   A. Deployment speed
   B. Crane remains within level specifications
   C. Paint condition

D. Serial numbers

11. What is the proper hoist function verification?
A. Variable speed operation 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 brake engagement
D. Binding or erratic response

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

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

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

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

17. What is the proper outrigger lock test?
A. Visual inspection only

B. Paint condition check
C. Engagement verification with load test
D. Listen for sounds

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

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

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

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

22. When checking hydraulic hoses, what indicates replacement?
A. Cracking, bulging, or visible deterioration
B. Hoses are flexible
C. Hoses have fittings
D. Hoses are labeled

23. What is the proper end-of-shift procedure?
A. Leave crane running
B. Secure controls only
C. Lower boom only
D. Lower boom, secure controls, document findings

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

25. When inspecting fire 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 locking pins?
A. Pin color
B. Pin age
C. Full insertion with retention devices engaged
D. Pin manufacturer

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

28. When inspecting structural pins, what indicates problems?
A. Proper paint
B. Wear, cracks, or hole elongation
C. Correct labels
D. Original installation date

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

30. During high-wind conditions, what is proper boom position?
A. Maximum height
B. Horizontal
C. Fully extended

D. Per manufacturer wind load specifications

Answers & Explanations - Practice Test 8

Core Examination

1. **Correct Answer: B (Saturated clay or organic soil)**

Saturated clay or organic soil requires the most extensive ground preparation for crane operations. These soils have very low bearing capacity, typically 500-1,500 pounds per square foot for soft clay. Organic soils compress significantly under load and may contain decomposing vegetation creating voids. Extensive preparation including excavation, replacement with engineered fill, or installation of ground improvement systems may be necessary.

2. **Correct Answer: D (Before operations and when conditions change)**

Competent persons must inspect crane setup before operations begin and when conditions change such as weather affecting ground, settlement occurring, or configuration changes. This inspection verifies ground adequacy, proper level, correct outrigger deployment, and absence of hazards. Inspections when conditions change ensure setup remains safe as circumstances evolve.

3. **Correct Answer: A (Based on soil analysis and excavation depth)**

Minimum distance from excavations for crane setup is based on soil analysis and excavation depth. Excavations create failure zones extending laterally beyond edges. The distance depends on soil type, excavation depth, slope angle, and loading. Engineering analysis determines safe setback preventing ground failure. As a general guideline, distance should be at least equal to excavation depth in stable soils, greater in weak soils.

4. **Correct Answer: C (Slab thickness and reinforcement adequacy)**

When operating on concrete slabs, slab thickness and reinforcement adequacy must be verified to support concentrated loads from outriggers or tracks. Slabs designed for distributed floor loads may fail under concentrated crane loads. Engineering evaluation confirms slab capacity, or additional support such as cribbing distributing loads over larger areas may be required.

5. **Correct Answer: B (Solid bearing surface under entire float)**

Outrigger float placement requires solid bearing surface under the entire float area. Voids, uneven surfaces, or partial support create concentrated loading causing excessive bearing pressure and potential failure.

The entire float must rest on prepared solid surface ensuring uniform load distribution across the full mat area.

6. **Correct Answer: D (After heavy rain or ground disturbance)**

During crane operations, ground bearing must be reassessed after heavy rain saturating soil reducing strength, or ground disturbance from nearby excavation or vehicle traffic. These events change ground conditions potentially compromising bearing capacity. Reassessment verifies conditions remain adequate for safe operations.

7. **Correct Answer: A (Minimum 15 feet or de-energization)**

For power lines 50 to 200 kilovolts, OSHA requires minimum 15-foot clearance or de-energization by the utility company. This increased clearance compared to lower voltages accounts for greater electrical arc potential at higher voltages. Lines must be de-energized if adequate clearance cannot be maintained throughout operations.

8. **Correct Answer: C (Sling capacity and configuration)**

When planning lifts, essential rigging information includes sling capacity ratings, sling configuration such as vertical, choker, or basket hitches, and sling angles affecting capacity. This information determines if rigging can safely support loads and identifies proper rigging arrangement for load characteristics and lift requirements.

9. **Correct Answer: D (Access to all lift points within capacity)**

When determining crane position, access to all lift points within capacity must be considered. The position must allow the crane to reach all required lift locations while maintaining adequate capacity at those radii. Optimal positioning completes all lifts without repositioning while maintaining capacity margins.

10. **Correct Answer: A (Around hazardous crane operating areas)**

Pedestrian barriers must be installed around hazardous crane operating areas preventing unauthorized personnel from entering swing radius, fall zones, or other areas where they could be struck by loads, boom, or counterweight. Physical barriers provide positive protection against inadvertent access.

11. **Correct Answer: D (Property owner notification and agreements)**

When operations affect adjacent property through boom swing, potential load drops, or other impacts, property owner notification and agreements are required. Written agreements establish permissions, responsibilities, and any necessary protections. Operating over or near adjacent property without authorization creates legal liability and safety concerns.

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

During lifts near capacity, enhanced planning documenting procedures and enhanced supervision by qualified personnel are essential. Operating near maximum capacity leaves minimal margin for errors or unexpected conditions. Detailed planning and oversight reduce risks when operating with reduced safety margins.

13. **Correct Answer: B (Before travel to verify clearances and strength)**

Crane travel paths must be surveyed before travel to verify clearances including overhead wires and obstructions, and surface strength to support crane weight. Survey identifies hazards requiring removal or route modification. This verification prevents contact with overhead obstructions and ground failure during travel.

14. **Correct Answer: D (Blind spots or restricted visibility)**

Spotters are needed when blind spots prevent operators from seeing travel path, loads, or surrounding areas, or when restricted visibility from weather or obstructions limits clear view. Spotters positioned where they can see provide guidance ensuring safe movements through areas operators cannot observe.

15. **Correct Answer: A (Physical barriers and warning signage)**

Crane exclusion zones require physical barriers preventing access and warning signage identifying hazards and restricted areas. Barriers such as fencing, barricades, or caution tape create visible boundaries while signs communicate dangers to personnel approaching areas.

16. **Correct Answer: D (Traffic control plans and flaggers)**

When operating near busy roadways, traffic control plans defining traffic routing and flaggers directing vehicles are required. Plans ensure traffic flows safely around operations while flaggers provide active direction preventing vehicles from entering hazardous areas when boom swings across roadways.

17. **Correct Answer: A (FAA notification and possible restrictions)**

Before lifting near airport approach paths, FAA notification and possible restrictions may be required. Cranes can interfere with flight operations requiring coordination with airport authorities. Cranes exceeding certain heights in approach zones may require special lighting, painting, or operational restrictions.

18. **Correct Answer: C (When approaching manufacturer limits)**

Wind speed monitoring equipment must be used when conditions approach manufacturer limits allowing operators to track actual wind speeds and cease operations if limits are exceeded. Continuous monitoring provides data for informed decisions about operating in variable wind conditions.

19. **Correct Answer: A (Safety impact on visibility or equipment)**

Precipitation stops operations when safety is impacted through visibility reduction preventing clear view of operations, or equipment function is affected through ice accumulation, electrical problems, or reduced braking. Safety must not be compromised by precipitation effects.

20. **Correct Answer: D (Illumination of all work areas)**

When lifting in darkness, illumination of all work areas including crane, loads, landing areas, rigging operations, and personnel positions is required. Adequate lighting allows clear visibility of operations, load positions, hazards, and hand signals preventing accidents from reduced visibility.

21. **Correct Answer: C (For complex or critical tandem operations)**

Dual crane lifts must be engineered for complex or critical tandem operations where load distribution, rigging configuration, or operational complexity require engineering analysis. Engineering ensures load sharing between cranes is calculated correctly and procedures account for all operational aspects.

22. **Correct Answer: B (Load charts for new configuration)**

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

23. **Correct Answer: A (Personnel remaining under load path)**

When lifting over occupied areas, personnel remaining under the load path is prohibited. This fundamental safety principle prevents injuries from dropped loads. All personnel must remain clear of areas under suspended loads or boom movement paths.

24. **Correct Answer: D (Manufacturer specifications and load chart notes)**

Maximum operating wind speed is determined by manufacturer specifications based on crane design and load chart notes that may specify reduced capacities or restrictions for wind conditions. Manufacturers establish maximum winds ensuring adequate stability and control under wind loading.

25. **Correct Answer: C (Before operations in remote or hazardous areas)**

Rescue procedures must be established before operations in remote or hazardous areas where standard emergency response may be delayed or specialized rescue may be required. Procedures ensure personnel understand response protocols and necessary equipment is available.

26. **Correct Answer: B (Secure attachment per manufacturer)**

Regarding counterweight installation, secure attachment per manufacturer specifications must be verified. Counterweight must be properly fastened preventing movement or detachment during operations. Loose counterweight can shift creating sudden stability loss or fall causing serious accidents.

27. **Correct Answer: D (Height restrictions and coordination)**

When operating near heliports, height restrictions and coordination with heliport operators may be required. Cranes can interfere with helicopter operations requiring notification and possible operational restrictions ensuring safe helicopter approach and departure paths.

28. **Correct Answer: C (Load weight distribution and rigging geometry)**

Whether additional blocking is needed is determined by load weight distribution and rigging geometry. Loads with uneven weight distribution or complex shapes may require blocking to prevent tipping or rotation during lifting, and rigging geometry may necessitate blocking for proper load balance.

29. **Correct Answer: C (Before operations each day or shift)**

Lift hazard briefings must occur before operations each day or shift. Daily briefings ensure personnel understand hazards, procedures, and responsibilities for that day's operations. Conditions and personnel may change daily requiring fresh communication of safety information.

30. **Correct Answer: B (Clearance verification or protection)**

When boom must sweep over structures, clearance verification ensuring adequate distance throughout sweep path or protection such as padding or temporary removal of fragile items is required. This prevents boom contact damaging structures or equipment.

31. **Correct Answer: A (Arm extended, thumb pointing up)**

The standard hand signal for "raise boom" consists of arm extended with thumb pointing upward. This signal clearly indicates the upward direction of desired boom movement, distinguished from other signals by the thumb-up orientation showing boom elevation.

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

When using radios, clear language with confirmations is essential. Communications must use unambiguous terminology and operators must confirm understanding through repeat-back before

executing commands. This protocol ensures communications are understood correctly preventing dangerous misunderstandings.

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

If load swings out of view, signal persons must stop operations or reposition where they can see the load. Someone with clear view of the load must monitor its position throughout lift cycles. Continuing without load visibility creates serious hazards.

34. **Correct Answer: B (Before operations at new sites or with new personnel)**

Signals must be reviewed with crews before operations at new sites or with new personnel to ensure mutual understanding of signals that will be used. This review prevents misunderstandings from regional variations, site-specific signals, or unfamiliarity with standard signals.

35. **Correct Answer: C (Arm extended, thumb pointing down)**

The standard hand signal for "lower boom" consists of arm extended with thumb pointing downward. This signal clearly indicates the downward direction of desired boom movement, providing intuitive visual communication of the lowering action.

36. **Correct Answer: B (Illuminated signal devices)**

During nighttime signaling, illuminated signal devices 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 allowing operators to see signals clearly.

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

Special signals can be implemented after demonstration to all parties and crew agreement regarding their meaning. This demonstration ensures operators, signal persons, and supervisors understand signal meanings. All personnel must agree before using special signals during operations.

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

Stop command from any person overrides all others. When stop is given by anyone for any reason, operators must stop immediately without attempting to determine which other signal to follow. This absolute priority ensures immediate response to safety concerns.

39. **Correct Answer: D (Before personnel give signals)**

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

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

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

41. **Correct Answer: D (When personnel become fatigued)**

During long operations, relief signal persons are needed when personnel become fatigued reducing attention, reaction time, or ability to perform effectively. Effective signaling requires full attention and clear communication. Fatigued signal persons create safety risks.

42. **Correct Answer: C (Clear understanding of command)**

Operators must verify clear understanding of commands before responding to signals. This verification through acknowledgment ensures signals were received and understood correctly. The communication loop must be complete before movements begin.

43. **Correct Answer: B (Unclear or ambiguous directions)**

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

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

High-visibility apparel makes signal persons clearly visible ensuring operators can see them against backgrounds and in varying lighting. High-visibility clothing in orange or lime with reflective striping makes signal persons readily identifiable.

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

Alternative communication methods must be ready when primary systems may fail from equipment malfunction, interference, or battery depletion. Predetermined backup methods ensure communication can continue if primary systems fail during operations.

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

Under OSHA, ground conditions and site hazards must be assessed initially. This hazard assessment identifies conditions requiring special precautions including ground preparation, power line clearances, and fall protection. The assessment establishes foundation for safe operations.

47. **Correct Answer: B (Certification by accredited organization)**

OSHA requires for operator credentials certification by accredited organization and employer evaluation. Accredited certification ensures operators have been tested to national standards. Employer evaluation verifies operators can safely operate specific equipment.

48. **Correct Answer: A (During 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 or incidents. Documentation provides accountability and verification of compliance.

49. **Correct Answer: B (Familiarization on specific equipment)**

Employers must provide operators per OSHA familiarization on specific equipment they will operate. This training supplements certification ensuring operators understand controls, capacities, and characteristics of actual equipment.

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

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

51. **Correct Answer: A (Load charts readily available)**

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

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

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

53. **Correct Answer: B (Identification of deficiencies)**

OSHA inspections must include identification of deficiencies affecting safe operations. Inspectors document all defects, wear, or conditions requiring correction ensuring equipment is safe.

54. **Correct Answer: D (Manufacturer or qualified engineer)**

Under OSHA, manufacturer or qualified engineer can approve modifications. Only these parties can verify through analysis that modifications maintain safety factors and structural integrity.

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

OSHA requires for identified defects correction before continued use or removal from service until repairs are completed. Operating with known defects violates requirements.

56. **Correct Answer: C (Every three years minimum)**

According to OSHA, re-certification must occur every three years minimum or when deficiencies are observed. Periodic re-evaluation ensures operators maintain competency.

57. **Correct Answer: D (Safety devices and structural integrity)**

OSHA inspections must address safety devices and structural integrity. Comprehensive inspections evaluate all systems affecting safe operations.

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

Under OSHA near energized lines, clearances meeting voltage requirements or line de-energization procedures must be established preventing electrocution.

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

OSHA requires regarding capacity information current load charts accessible to operators. Charts must match equipment configuration.

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

According to OSHA, trainees can operate with certified operator supervision who is physically present. This allows training under expert oversight.

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

Under ASME B30.5, rated capacity is defined as maximum manufacturer-rated load for specific configurations. Rated capacities include appropriate safety factors.

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

ASME B30.5 requires wire rope checks during shift inspection when in regular use. Frequent inspection identifies deterioration early.

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

According to ASME B30.5, equipment must be tagged out when unsafe conditions are identified. Equipment cannot return until conditions are corrected.

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

ASME B30.5 requires for alterations manufacturer or engineer approval. Only these parties can verify modifications maintain safety.

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

Under ASME B30.5, ASME B30.23 requirements govern personnel platforms. Special requirements ensure personnel safety.

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

ASME B30.5 specifies about rated loads they shall not be exceeded. This fundamental requirement prevents overloading.

67. **Correct Answer: A (Before operations for chart reading)**

According to ASME B30.5, boom angle indicators must function before operations for chart reading. Accurate angle information is essential.

68. **Correct Answer: D (Written records maintained)**

ASME B30.5 requires for maintenance documentation written records maintained. Records provide equipment history.

69. **Correct Answer: C (Risk factors and potential consequences)**

Under ASME B30.5, critical lifts are determined by risk factors and potential consequences requiring special procedures.

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

ASME B30.5 states about side loading it must be minimized or eliminated. Side loading creates dangerous stresses.

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

According to ASME B30.5, load tests must be performed after installation and major repairs. Tests verify capacity.

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

ASME B30.5 prohibits regarding suspended loads leaving loads unattended. Unattended loads create hazards.

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

Under ASME B30.5, uncertain operators must stop and seek qualified direction. Proceeding with uncertainty creates risks.

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

ASME B30.5 requires for rope removal when deterioration criteria are met. Objective criteria identify when replacement is needed.

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

According to ASME B30.5, qualified person authorizes equipment return verifying safe condition.

76. **Correct Answer: C (Current crane configuration)**

When interpreting charts, current crane configuration must be identified first. Configuration determines applicable chart section.

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

On load charts, radius is defined as horizontal distance from center of rotation to load centerline.

78. **Correct Answer: D (Inverse relationship)**

An inverse relationship exists between radius and capacity. As radius increases, capacity decreases.

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

When using attachments, separate attachment charts or deductions must be referenced. Attachments alter capacity.

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

Hook block and rigging weight must be subtracted for net lifting capacity. These consume capacity.

81. **Correct Answer: A (Special conditions or footnotes)**

On load charts, symbols typically indicate special conditions or footnotes requiring attention.

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

When angle changes, radius and capacity change. These parameters are interdependent.

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

Between chart values, lower capacity or conservative interpolation applies ensuring adequate margins.

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

Telescopic crane charts are arranged by boom length with radii listed for each length.

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

Bold text or notation indicates structural versus stability limits on charts.

86. **Correct Answer: B (Use of appropriate chart section)**

When counterweight is modified, use of appropriate chart section is required. Different counterweights provide different capacities.

87. **Correct Answer: D (Wind force effects on capacity)**

For wind-exposed loads, wind force effects on capacity must be evaluated. Wind creates additional forces.

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

Chart footnotes provide critical restrictions and conditions affecting operations.

89. **Correct Answer: C (Referencing correct chart section)**

When configurations change, referencing correct chart section is essential preventing overload.

90. **Correct Answer: B (Load position and center of gravity location)**

For off-center loads, load position and center of gravity location affect capacity requiring adjustments.

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

Engine-driven hydraulic pump converts mechanical power to hydraulic power pressurizing fluid.

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

Slow function, noise, or leaks indicate hydraulic system problems requiring attention.

93. **Correct Answer: B (Remove contaminants protecting components)**

Hydraulic filters accomplish removing contaminants protecting components from wear and damage.

94. **Correct Answer: A (Excessive demand or inadequate cooling)**

Excessive demand or inadequate cooling causes hydraulic system overheating damaging components.

95. **Correct Answer: D (Limit maximum system pressure)**

Relief valves function to limit maximum system pressure preventing damage from overpressure.

Specialty Examination

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

A key operational advantage of crawler cranes is low ground bearing pressure from wide track distribution. Crawler tracks spread crane weight over large surface areas creating ground pressures as low as 5-15 psi, allowing operations on soils that would not support wheeled cranes. This advantage enables work on soft ground, marshes, or unprepared surfaces where wheeled cranes would sink.

2. **Correct Answer: C (Hydraulic flow dividers and position sensors)**

On telescopic cranes, synchronized extension is ensured by hydraulic flow dividers and position sensors. Flow dividers distribute hydraulic flow proportionally to multiple extension cylinders ensuring sections extend together. Position sensors monitor actual section positions allowing control systems to adjust flow maintaining synchronization preventing one section from extending ahead of others.

3. **Correct Answer: D (Superior strength-to-weight from triangulation)**

Lattice booms provide the structural advantage of superior strength-to-weight ratio from triangulated framework design. The open lattice structure with diagonal lacing members creates efficient load paths distributing forces through triangulated geometry. This design achieves exceptional strength while minimizing weight, allowing lattice cranes to reach greater heights and lift heavier loads compared to solid boom designs.

4. **Correct Answer: A (Multiple drive axles and advanced suspension)**

On all-terrain cranes, multiple drive axles with power to all wheels and advanced suspension systems enable off-road travel. All-wheel drive ensures power reaches wheels with traction even on uneven terrain. Advanced suspension systems adjust to ground contours maintaining wheel contact. This combination allows operation on rough, soft, or unprepared surfaces.

5. **Correct Answer: B (Modular assembly of boom sections)**

Lattice cranes achieve maximum height through modular assembly of boom sections. Individual sections connect with pins creating continuous boom structures. This modularity allows boom configurations exceeding 400 feet for some models, with total height customized by selecting and assembling appropriate section combinations based on job requirements.

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

On telescopic cranes, unintended retraction is prevented by holding valves and mechanical locks. Hydraulic holding valves maintain pressure in extension cylinders preventing reverse flow. Mechanical locks engage when sections reach extended positions providing positive retention independent of hydraulic pressure. These dual systems ensure controlled safe boom extension and retraction.

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

An advantage of fixed operator cabs is simpler design with lower maintenance requirements. Fixed cabs eliminate rotating connections for hydraulic lines, electrical systems, and controls that must function through continuous rotation. This simpler design reduces maintenance needs, potential failure points, and initial cost compared to swing cab configurations.

8. **Correct Answer: D (Correct pins with retention devices)**

When assembling lattice boom, proper connection is ensured by correct pins with retention devices. Pins must be fully inserted through all connection holes with retention clips, bolts, or cotter pins properly engaged. Following manufacturer assembly sequence ensures proper load paths. Incomplete connections or missing retention can cause structural failure.

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

Boom pendants provide angular support from mast. Pendants are wire ropes connecting boom tip to mast top, carrying 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 (Integrated electronic control systems)**

On all-terrain cranes, integrated electronic control systems manage multiple axle steering. These sophisticated systems coordinate steering of multiple axles simultaneously for tight turns or independently for various maneuvers. Advanced systems automatically adjust axle steering angles based on vehicle speed, turn radius, and operator inputs optimizing maneuverability.

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

Luffing jibs offer the capability of radius adjustment without main boom movement. Luffing jibs can change angle independently through dedicated hoist systems, allowing radius changes while maintaining constant hook height or adjusting both parameters simultaneously. This versatility proves valuable for precision placement in confined spaces or working around obstructions.

12. **Correct Answer: D (Degree of offset angle)**

When using offset jibs, degree of offset angle affects capacity. As jibs offset from straight ahead centerline positions, capacity decreases due to altered loading patterns and increased structural stress on offset mechanisms. Charts show capacity values at various offset angles requiring operators to match actual offset to appropriate chart values.

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

Maximum boom length limits are determined by structural strength and stability constraints. Longer booms create greater overturning moments affecting stability and impose higher structural loads on boom members. Manufacturers establish maximum lengths through engineering analysis ensuring adequate strength and stability margins across all operating configurations.

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

Rough-terrain crane versatility is provided by compact size with crab steering capability. Crab steering allows rear wheels to steer opposite front wheels for tight turns or in the same direction for sideways movement. Combined with compact dimensions and short wheelbase, this enables operation in restricted areas and challenging terrain.

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

Boom angle is controlled by the boom hoist system. The boom hoist rope runs from the drum over sheaves at the mast top through pendants to the boom point. Adjusting rope length through the hoist raises or lowers boom angle. The mast provides the leverage point for angle changes.

16. **Correct Answer: C (Substantially reduced from main boom)**

Fly jib capacities are substantially reduced from main boom capacities. Fly jibs add significant weight at the boom tip, extend total boom length, and create additional structural loading. These factors combine to reduce capacity dramatically, often to 20-40 percent of main boom capacity at comparable radii.

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

Safe jib length is established by manufacturer engineering specifications. Manufacturers determine maximum jib lengths through structural analysis ensuring combined boom and jib loading remains within structural capacity limits and stability is maintained throughout the operating range for specific configurations.

18. **Correct Answer: A (Enhanced stability and capacity)**

Wider track spacing provides enhanced stability and capacity. Greater track spacing increases the base of support and moment arm for resisting overturning forces allowing higher lifting capacities. Wide-track configurations typically provide 15-30 percent greater capacity than narrow-track settings.

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

The primary telescopic crane advantage is quick setup without assembly requirements. Telescopic cranes arrive with boom mounted and extend hydraulically in minutes, while lattice cranes require boom assembly taking hours or days. This rapid deployment makes telescopic cranes ideal for projects requiring mobility.

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

When using boom extensions, proper installation and correct charts are critical. Extensions must be installed per manufacturer requirements with all connections complete. Appropriate load chart sections for extended configuration must be used as extensions significantly affect boom capacity.

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

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

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

Swing control on hydraulic cranes is provided by hydraulic motor with brake. The motor drives swing mechanism with speed proportional to control input. The brake automatically engages when controls return to neutral stopping rotation and holding position.

23. **Correct Answer: D (Using appropriate capacity chart)**

When changing track configuration, using the appropriate capacity chart is essential. Wide-track and narrow-track configurations provide substantially different capacities requiring different chart sections. Using incorrect charts creates serious overload risks.

24. **Correct Answer: B (Correct installation and chart reference)**

When using boom inserts, correct installation and chart reference must be verified. Inserts must be installed per manufacturer specifications with all connections complete. Appropriate chart sections for configurations with inserts must be used as they affect structural characteristics.

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

Boom sections during telescoping are guided by internal wear pads and guides. Wear pads made of low-friction materials ride on machined surfaces inside boom sections allowing smooth extension while maintaining alignment. These guides prevent binding and ensure concentric extension.

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

On lattice booms, main chord members carry main loads. These large structural members running the length of the boom at its corners form the primary load-carrying framework. Chords resist bending and compression forces while lacing and battens provide lateral support.

Practical Examination

1. **Correct Answer: A (Valley breaks or core protrusion)**

When inspecting wire rope, valley breaks or core protrusion requires removal. Valley breaks occur at valleys between strands on rope bends indicating fatigue failure. Core protrusion where the rope core extends beyond outer strands indicates internal damage and loss of proper rope structure. Either condition compromises rope integrity requiring immediate replacement before catastrophic failure occurs.

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

The proper rope inspection interval is each shift when in regular use per ASME B30.5 requirements. 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 rope management and safe operations.

3. **Correct Answer: B (Within reservoir markings)**

During pre-operational checks, acceptable hydraulic level is within reservoir markings. Fluid should be between minimum and maximum level indicators on the reservoir. Proper level ensures adequate fluid for system operation, allows for thermal expansion, and prevents pump cavitation from low levels or overflow from excessive levels.

4. **Correct Answer: B (15 percent throat opening increase)**

When inspecting hooks, 15 percent throat opening increase requires replacement. Throat opening increase beyond 15 percent of 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.

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

Proper LMI calibration is indicated by accurate tracking of boom and load. The system should respond immediately to boom angle changes, radius adjustments, and load additions displaying current capacity utilization accurately. Systems providing accurate real-time information reflecting actual crane configuration allow effective capacity monitoring.

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

During brake testing, immediate stop and hold indicates proper function. Properly functioning brakes engage automatically when controls return to neutral stopping movement immediately and holding position without drift. Any delay in engagement, continued coasting, or inability to hold position indicates brake problems.

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

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

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

The first startup verification is controls in neutral position. Before starting the engine, operators must verify all control levers are in neutral preventing unintended movements when hydraulic systems pressurize. Physical verification of each control position ensures safe startup.

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

During engine 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 must reach proper levels before placing systems under full load.

10. **Correct Answer: B (Crane remains within level specifications)**

When deploying outriggers, it is verified continuously that crane remains within level specifications. Real-time level monitoring during jack extension allows immediate adjustment of individual jack heights achieving proper level. Most manufacturers limit out-of-level to one percent requiring careful monitoring.

11. **Correct Answer: A (Variable speed operation with brake test)**

Proper hoist function verification is variable speed operation with brake test. Operators verify hoist responds smoothly at slow and fast speeds, controls return to neutral properly, brakes engage automatically when controls are released, and loads stop and hold without drift.

12. **Correct Answer: D (Binding or erratic response)**

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

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

When checking boom length indicators, accurate display of actual length is verified. Indicators must show exact boom length matching extended length. These indicators are essential for capacity determination using load charts. Inaccurate indicators create serious overload risks.

14. **Correct Answer: A (Severe kinking or bird-caging)**

Severe kinking or bird-caging mandates immediate rope removal. Kinks show permanent distortion with severe localized stress concentrations dramatically reducing strength. Bird-caging where strands separate from rope body indicates structural failure. Either condition can cause sudden failure under load.

15. **Correct Answer: D (Milky or cloudy appearance)**

During hydraulic inspection, milky or cloudy appearance indicates water contamination. Milky appearance shows water in fluid causing corrosion and reduced lubrication. Cloudiness indicates other contaminants. Contaminated fluid must be drained, system flushed, and sources corrected.

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

When testing anti-two-block devices, warning activation and hoist cutout indicates proper function. Visual and audible warnings should activate well before contact occurs and automatic hoist cutout should prevent actual two-blocking. The device provides warning allowing operator response then prevents contact through cutout.

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

Proper outrigger lock test is engagement verification with load test. Locks must engage properly when beams reach extended positions. Testing involves attempting to retract beams while locks are set confirming locks prevent movement. Locks failing to engage or allowing movement require repair.

18. **Correct Answer: B (Cracks or permanent deformation)**

During structural inspection, cracks or permanent deformation requires immediate attention. Structural cracks can propagate rapidly causing catastrophic failure. Permanent deformation indicates loading beyond design limits compromising integrity. Any structural damage requires engineering evaluation.

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

When inspecting rope terminations, secure attachment without loosening is critical. Terminations must maintain full grip on rope with no loosening between rope and socket, no cracks in components, and no deformation. Loosening compromises termination strength potentially allowing rope pullout.

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

LMI displays must provide functional readable capacity information. Displays must be operational showing appropriate capacity data and readable from operator's position under all lighting conditions. Non-functional or illegible displays prevent capacity monitoring creating overload risks.

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

During rope inspection, proper seating in all sheave grooves is required. Rope must seat fully in intended grooves throughout reeving paths. Improper seating with rope on sheave flanges causes concentrated wear and can lead to rope jumping from sheaves creating load drops.

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

When checking hydraulic hoses, cracking, bulging, or visible deterioration indicates replacement. Cracking particularly in bend areas, bulging indicating internal reinforcement failure, or other deterioration indicates imminent failure. Age-related hardening also warrants replacement.

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

Proper end-of-shift procedure is lower boom, secure controls, document findings. This sequence protects equipment from wind damage, prevents unauthorized operation, ensures safe configuration, and provides communication about equipment status for next operations.

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

During swing testing, smooth function with immediate brake indicates proper operation. Testing should show smooth acceleration responding to control, smooth operation at commanded speeds, smooth deceleration as control reduces, and immediate brake engagement returning to neutral.

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

When inspecting fire extinguishers, low pressure or expired inspection requires service. Fire extinguishers must maintain proper charge pressure and receive required periodic inspections. Low pressure or expired inspection indicate extinguishers may not function properly requiring servicing.

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

Regarding locking pins, full insertion with retention devices engaged must be verified. Pins must be fully inserted through all holes with no gaps and retention devices such as clips, bolts, or cotter pins properly engaged. Partial insertion or missing retention allows pins to back out causing failure.

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

During final pre-operation verification, it is confirmed that all systems are functional and area clear. This comprehensive verification confirms inspections are complete, all systems ready, and work area clear of personnel and obstacles within operating radii before beginning operations.

28. **Correct Answer: B (Wear, cracks, or hole elongation)**

When inspecting structural pins, wear, cracks, or hole elongation indicates problems. Excessive wear or cracks require pin replacement. Elongated holes indicate overloading or fatigue requiring structural evaluation and possible repair before returning to service.

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

Proper hydraulic cylinder operation is indicated by smooth operation without leaks. Cylinders should respond proportionally to controls without binding or jerking, show no hydraulic leaks from seals or fittings, and produce no unusual sounds. Smooth extension and retraction demonstrates proper function.

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

During high-wind conditions, proper boom position is per manufacturer wind load specifications. Manufacturers recommend positioning that minimizes wind loading typically lowering boom to moderate angles reducing wind sail area while maintaining clearance. Proper positioning protects structure from wind damage.