Practice Test 6

Core Examination

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

1. What is the recommended minimum compaction for crane setup areas?
   A. 50 percent
   B. 75 percent
   C. 95 percent of maximum density
   D. Compaction not required

2. When must crane setup be inspected by a competent person?
   A. Before operations begin at new locations
   B. Monthly
   C. Annually
   D. Inspections not required

3. What must be considered when positioning cranes near slopes?
   A. Slope color
   B. Slope age
   C. Slope vegetation
   D. Distance from edge and potential ground failure

4. When operating on fill material, what is essential?
   A. Fill color
   B. Fill age
   C. Verification of compaction and bearing capacity
   D. Fill material unrestricted

5. What determines adequate outrigger float size?
   A. Float color
   B. Outrigger load and ground bearing capacity
   C. Float age
   D. Float manufacturer

6. During crane operations, when must level be rechecked?
   A. Never
   B. Monthly
   C. After ground disturbance or settlement

D. Annually

7. What is required when lifting loads near overhead power lines?
   A. No special requirements
   B. Maintain required clearances or de-energize lines
   C. Operate at night only
   D. Increase capacity

8. When must lift plans be prepared in writing?
   A. Never required
   B. For all lifts
   C. Monthly
   D. For critical or complex lifts

9. What determines if a second crane is needed for a lift?
   A. Load exceeds single crane capacity or stability
   B. Time of day
   C. Weather conditions
   D. Operator preference

10. When operating in areas with underground utilities, what is required?
   A. Visual inspection only
   B. Verbal notification
   C. Utility location marking and protection
   D. No special requirements

11. What must be verified before crane travel with loads?
   A. Fuel level only
   B. Manufacturer permits travel with loads
   C. Weather only
   D. Travel with loads always permitted

12. During lift operations, who coordinates all crane movements?
   A. Designated signal person or lift director
   B. Any worker
   C. Equipment owner
   D. Insurance representative

13. What is required when crane swing radius extends into traffic areas?
   A. Operations unrestricted

B. Operate at night only
C. Traffic control and barricades
D. Swing radius does not matter

14. When must emergency evacuation routes be established?
A. Annually
B. Before operations in hazardous areas
C. Emergency routes not required
D. Monthly

15. What determines maximum crane operating radius for a lift?
A. Load chart capacity at required radius
B. Crane color
C. Time available
D. Operator preference

16. When lifting in confined spaces, what coordination is essential?
A. None required
B. Verbal only
C. Written reports
D. Signal persons and spotters

17. What must be done if wind conditions exceed manufacturer limits?
A. Continue slowly
B. Cease operations until conditions improve
C. Increase capacity margin
D. Wind limits are guidelines only

18. When operating near buildings, what must be considered?
A. Building color
B. Building age
C. Building height only
D. Clearances and potential load swing

19. What is required for night crane operations?
A. Adequate illumination of all work areas
B. Reduced capacity
C. Night operations prohibited
D. No special requirements

20. When must crane capacity be reduced?
A. Never
B. Monthly
C. For adverse conditions per manufacturer
D. Capacity reduction not permitted

21. What determines if outriggers must be fully extended?
A. Time available
B. Load chart requirements for planned capacity
C. Outrigger color
D. Always fully extended

22. When lifting loads over personnel, what is required?
A. Proceed slowly
B. Increase capacity
C. Verbal warning only
D. Prohibited by OSHA

23. What must be verified about rigging before lifts?
A. Adequate capacity and good condition
B. Rigging color
C. Rigging age
D. Rigging manufacturer

24. When must crane operations stop for weather?
A. Any rain
B. Never stop for weather
C. When safety is compromised
D. Monthly

25. What is required when cranes operate near airports?
A. Night operations only
B. Special crane color
C. Higher insurance
D. Height notification and possible restrictions

26. During tandem lifts, what must be prevented?
A. Overloading either crane or rigging failure
B. Using different crane models
C. Working on same day

D. Communication between operators

27. What determines if additional counterweight is needed?
A. Crane color
B. Time of day
C. Operator preference
D. Load chart requirements

28. When operating on grade, what must be considered?
A. Grade color
B. Grade age
C. Capacity reduction per manufacturer
D. Grade has no effect

29. What is required before lifting in public areas?
A. Higher insurance only
B. Permits and public protection measures
C. Night operations only
D. Public area operations prohibited

30. When must pre-lift meetings be conducted?
A. Never required
B. Monthly
C. Annually
D. Before critical or complex operations

31. What is the standard hand signal for "swing"?
A. Arm extended pointing in direction of swing
B. Both arms overhead
C. Circular motion
D. Arms at sides

32. When using radio communication, what language must be used?
A. Any language
B. Technical jargon
C. Abbreviated terms
D. Clear, standardized terminology

33. What must signal persons do if they lose sight of the load?
A. Stop operations or use additional signal person

B. Continue signaling
C. Estimate position
D. Signal faster

34. When must hand signals be reviewed with operators?
A. Annually only
B. Monthly only
C. Before operations at new sites
D. Hand signal review not required

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

36. During poor visibility, what must be used for signaling?
A. Louder voice
B. No signaling possible
C. Standard signals only
D. Enhanced visibility aids

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

38. What takes priority during conflicting directions?
A. Radio signals
B. Stop signal from any source
C. Hand signals
D. Newest signal

39. When must signal persons be qualified?
A. Before giving signals
B. Within first week
C. Within first month
D. Qualification not required

40. What is required when signal person cannot see operator?
A. Signal louder
B. Move closer
C. Continue current position
D. Use relay signal person or stop

41. During extended operations, when should signal persons be relieved?
A. Every 2 hours
B. Never during operations
C. When fatigued or ineffective
D. End of shift only

42. What must operators confirm before executing signals?
A. Weather conditions
B. Understanding through acknowledgment
C. Fuel level
D. Time of day

43. When using voice commands, what must be established?
A. Volume levels
B. Speaking speed
C. Frequency of communication
D. Confirmation protocols

44. What is required for signal person visibility?
A. Signal person position only
B. Lighting only
C. High-visibility clothing
D. Visibility not required

45. When must backup signal methods be available?
A. Never needed
B. Only for large cranes
C. When using radio as primary
D. Backup methods prohibited

46. Under OSHA, what must be assessed before crane use?
A. Operator salary
B. Site hazards and ground conditions
C. Fuel prices

D. Weather forecast only

47. What does OSHA require for crane operator certification?
A. Accredited certification and employer evaluation
B. Any training
C. No certification required
D. Verbal agreement

48. According to OSHA, when must annual inspections occur?
A. Monthly
B. Weekly
C. Every two years
D. At least annually

49. What must employers provide operators per OSHA?
A. Salary
B. Lunch
C. Site-specific training
D. Transportation

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

51. What does OSHA require for capacity placards?
A. Not required
B. Optional
C. Visible and legible information
D. Can be verbal

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

53. What must be documented per OSHA inspections?
A. Operator preferences

B. Date, findings, corrective actions
C. Weather only
D. Fuel consumption

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

55. What does OSHA require for deficient equipment?
A. Document only
B. Continue with caution
C. Ignore if minor
D. Correct or remove from service

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

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

58. Under OSHA, what is required for power line operations?
A. No requirements
B. Verbal notification
C. Clearances or de-energization procedures
D. Operations prohibited

59. What does OSHA require regarding load charts?
A. Optional documentation
B. Current and accessible
C. Can be verbal
D. Not required

60. According to OSHA, when can uncertified persons operate?
A. In emergencies
B. With 30 days experience
C. Anytime with approval
D. During training with certified operator

61. Under ASME B30.5, what is rated capacity?
A. Maximum load per manufacturer specifications
B. Any load lifted
C. Load plus 50 percent
D. Operator estimation

62. What does ASME B30.5 require for rope inspections?
A. Weekly
B. Monthly
C. Each shift in regular use
D. Annually

63. According to ASME B30.5, when must cranes be taken out of service?
A. Monthly
B. When unsafe conditions exist
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 needed

65. Under ASME B30.5, what is required for personnel platforms?
A. Standard procedures
B. Special requirements per B30.23
C. Personnel platforms prohibited
D. Verbal agreement

66. What does ASME B30.5 specify about operating limits?
A. No limits specified
B. Unlimited operations
C. Operator discretion

D. Follow manufacturer limitations

67. According to ASME B30.5, when must angle indicators work?
A. Before operations for capacity determination
B. Monthly
C. Annually
D. Indicators optional

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

69. Under ASME B30.5, what defines critical lifts?
A. Weight only
B. Complexity, risk, or consequences
C. Time of day
D. Crane age

70. What does ASME B30.5 require about side loading?
A. Side loading permitted
B. Increases capacity
C. No restrictions
D. Shall be avoided

71. According to ASME B30.5, when is load testing required?
A. Weekly
B. After installation and modifications
C. Monthly
D. Testing not required

72. What does ASME B30.5 specify about suspended loads?
A. Can be left overnight
B. Acceptable for breaks
C. Shall not be left unattended
D. No restrictions

73. Under ASME B30.5, what must operators do if uncertain?
A. Continue slowly

B. Document concerns
C. Consult coworkers
D. Stop and obtain direction

74. What does ASME B30.5 require for rope replacement?
A. Based on deterioration criteria
B. Monthly
C. Annually
D. Rope never replaced

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

76. When reading load charts, what must be known first?
A. Previous lifts
B. Current configuration
C. Operator name
D. Fuel level

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

78. What happens to capacity as radius increases?
A. Increases
B. Decreases
C. No change
D. Doubles

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

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

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

82. When boom angle changes, what happens?
A. Nothing
B. Radius and capacity change
C. Only height changes
D. Only speed changes

83. What capacity is used between chart values?
A. Lower capacity or interpolate
B. Higher capacity
C. Average values
D. Estimate

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

85. What indicates chart capacity limits?
A. Color
B. Page number
C. Notes or bold numbers
D. Font size

86. When counterweight changes, what is needed?
A. Insurance update
B. Correct chart for configuration
C. Counterweight color check

D. No action needed

87. What must be considered for large loads?
A. Load color
B. Load age
C. Load manufacturer
D. Wind effects on stability

88. What do chart footnotes contain?
A. Important restrictions and conditions
B. Crane history
C. Operator names
D. Maintenance schedules

89. When using different configurations, what is essential?
A. Reference correct chart each time
B. Use first chart for all
C. Estimate capacity
D. Charts not needed

90. What affects capacity for unusual loads?
A. Color
B. Age
C. Dimensions and center of gravity
D. Manufacturer

91. What provides hydraulic power in cranes?
A. Electric motor
B. Manual pump
C. Gravity
D. Engine-driven pump

92. What indicates hydraulic problems?
A. Normal operation
B. Proper temperature
C. Slow function or leaks
D. Clean fluid

93. What is the purpose of hydraulic filters?
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 poor cooling

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

Specialty Examination

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

1. What is a key disadvantage of telescopic cranes compared to lattice boom cranes?
A. Faster setup time
B. Easier transport
C. Simpler operation
D. Lower maximum capacity for equivalent crane size

2. On crawler cranes, what allows continuous 360-degree rotation?
A. Track movement
B. Manual rotation
C. Rotating superstructure on slew bearing
D. Boom pivoting

3. What is the primary purpose of boom stops on mobile cranes?
A. Prevent over-backward tipping
B. Control swing speed
C. Limit outrigger extension
D. Adjust counterweight

4. When operating hydraulic telescopic cranes, what controls boom extension?

A. Manual cranks
B. Hydraulic cylinders with flow control
C. Wire rope system
D. Gravity assist

5. What advantage do lattice boom cranes offer for extreme lifts?
A. Faster setup
B. Simpler operation
C. Lower cost
D. Ability to achieve greater heights and capacities

6. On all-terrain cranes, what allows transition between travel and lift modes?
A. Manual conversion only
B. Separate crews required
C. Automated outrigger and suspension systems
D. Complete disassembly

7. What is the function of a boom dolly?
A. Carry counterweights
B. Support boom during transport
C. Increase capacity
D. Store tools

8. When installing lattice boom jibs, what is critical?
A. Follow manufacturer assembly sequence
B. Install in any order
C. Speed of installation
D. Jib color matching

9. What provides boom angle support on lattice cranes?
A. Hydraulic cylinders only
B. Manual cranks
C. Pendant system through mast
D. Counterweight position

10. On all-terrain cranes, what coordinates steering of multiple axles?
A. Mechanical linkages
B. Manual controls
C. Separate steering wheels
D. Electronic or hydraulic systems

11. What is a key benefit of luffing jibs?
A. Adjust radius without boom movement
B. Lower cost
C. Simpler operation
D. Higher capacity

12. When reading load charts with offset jibs, what additional variable matters?
A. Time of day
B. Operator position
C. Wind speed only
D. Offset angle

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

14. On rough-terrain cranes, what provides off-road capability?
A. Large tires and high ground clearance
B. Multiple axles
C. Long wheelbase
D. Fixed suspension

15. What system raises and lowers lattice boom angle?
A. Hydraulic cylinders only
B. Manual winches
C. Boom hoist through mast
D. Counterweight movement

16. How do capacities with fly jibs compare to main boom?
A. Capacity increases
B. No change
C. Slight reduction
D. Significantly reduced

17. What determines safe jib length for configurations?
A. Jib color
B. Manufacturer specifications

C. Operator experience
D. Ground conditions

18. On crawler cranes, what does wider track spacing provide?
A. Faster travel
B. Lower fuel use
C. Greater stability and capacity
D. Reduced ground pressure only

19. What setup advantage do telescopic cranes have?
A. Higher capacity
B. Rapid deployment
C. Longer boom
D. Lower cost

20. When using boom extensions, what must be verified?
A. Extension color
B. Proper installation and chart use
C. Extension age
D. Extension weight only

21. Which hoist typically provides faster line speeds?
A. Main hoist only
B. Manual hoist
C. Auxiliary hoist
D. All equal speed

22. On hydraulic cranes, what provides swing control?
A. Manual rotation
B. Wire rope
C. Electric motor only
D. Hydraulic motor with brake

23. When changing crawler track configuration, what is critical?
A. Use appropriate load chart
B. Paint tracks
C. Notify insurance
D. Track width doesn't affect capacity

24. When operating with boom inserts, what is essential?

A. Insert color
B. Correct installation and load chart
C. Insert age
D. Insert manufacturer location

25. What guides telescopic boom sections during extension?
A. External tracks
B. Operator vision
C. Gravity
D. Internal wear pads and guides

26. On lattice booms, which members 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 broken wire pattern requires removal?
A. Six randomly distributed in one lay
B. One broken wire
C. Two broken wires in entire rope
D. Broken wires not a concern

2. What is the proper inspection method for wire rope internal condition?
A. Visual exterior only
B. Weight measurement
C. Open strands to examine interior
D. Length measurement only

3. During pre-operational checks, what hydraulic condition requires attention?
A. Proper level
B. Contaminated or milky fluid
C. Clear appearance
D. Correct temperature

4. When inspecting load hooks, what requires replacement?
   A. Minor scratches
   B. Cracks or excessive throat opening
   C. Normal wear
   D. Proper latch function

5. What indicates LMI system malfunction?
   A. No response to boom movement
   B. Display is illuminated
   C. Display shows numbers
   D. System has power

6. During brake testing, what indicates proper swing brake function?
   A. Gradual stopping
   B. Continued coasting
   C. Immediate stop when control released
   D. Delayed engagement

7. What procedure tests boom hoist brake function?
   A. Raise boom then release to verify hold
   B. Visual inspection only
   C. Lower boom slowly
   D. Listen for sounds

8. What is the first step in crane startup?
   A. Start engine immediately
   B. Test horn first
   C. Extend boom
   D. Verify controls neutral

9. During warm-up, what must be monitored?
   A. Radio only
   B. Oil pressure and temperature
   C. Time only
   D. Fuel gauge only

10. When deploying outriggers, what must be verified?
   A. Crane level within specifications
   B. Deployment speed

C. Paint condition
D. Serial numbers visible

11. What is the proper hoist function test method?
A. Maximum speed only
B. Minimum speed only
C. Variable speeds with smooth control
D. Testing not required

12. During control testing, what indicates problems?
A. Smooth operation
B. Normal sounds
C. Proper speed
D. Erratic response or binding

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

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

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

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

17. What is the proper outrigger lock check?

A. Visual only
B. Paint condition
C. Verify engagement and test retention
D. Listen for sounds

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

19. When inspecting rope terminations, what is critical?
A. Termination color
B. Secure attachment with no loosening
C. Termination age
D. Termination weight

20. What must be verified about LMI displays?
A. Display size
B. Display color
C. Functional and readable
D. Display age

21. During rope inspection, what requires immediate attention?
A. Proper lubrication
B. Correct color
C. Manufacturer markings
D. Rope not seated in sheaves

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

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

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

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

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

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

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

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

30. During wind shutdown, what is proper boom position?
A. Maximum height
B. Horizontal

C. Fully extended
D. Per manufacturer to minimize wind load

Answers & Explanations - Practice Test 6

Core Examination

1. **Correct Answer: C (95 percent of maximum density)**

The recommended minimum compaction for crane setup areas is 95 percent of maximum density per standard Proctor testing. This high compaction level ensures adequate soil strength and minimizes settlement under crane loading. Compaction to 95 percent provides reliable bearing capacity and reduces risks of differential settlement that could compromise crane stability during operations.

2. **Correct Answer: A (Before operations begin at new locations)**

Crane setup must be inspected by a competent person before operations begin at new locations. This inspection verifies that ground conditions are adequate, level is within specifications, outriggers are properly deployed, and no hazards exist. The competent person ensures setup procedures are followed correctly and conditions support safe operations.

3. **Correct Answer: D (Distance from edge and potential ground failure)**

When positioning cranes near slopes, the distance from the edge and potential for ground failure must be considered. Slopes create zones of reduced soil strength extending beyond slope faces. If crane support points fall within these weakened zones, ground failure can occur causing crane tipping. Adequate setback distances prevent slope failure hazards.

4. **Correct Answer: C (Verification of compaction and bearing capacity)**

When operating on fill material, verification of compaction and bearing capacity is essential. Fill material quality varies widely depending on material type, placement method, and compaction. Testing confirms that fill provides adequate support. Uncompacted or poorly compacted fill can consolidate under crane loads causing sudden settlement.

5. **Correct Answer: B (Outrigger load and ground bearing capacity)**

Adequate outrigger float size is determined by anticipated outrigger loads and ground bearing capacity. Float size must be sufficient to distribute loads creating bearing pressures below soil capacity. Calculation considers maximum outrigger reactions from planned lifts and soil bearing strength, with larger floats required for higher loads or weaker soils.

6. **Correct Answer: C (After ground disturbance or settlement)**

During crane operations, level must be rechecked after ground disturbance such as nearby excavation or vehicle traffic, or after visible settlement. Ground changes can alter crane level compromising stability. Continuous monitoring identifies developing problems allowing correction before level exceeds safe limits.

7. **Correct Answer: B (Maintain required clearances or de-energize lines)**

When lifting loads near overhead power lines, required clearances based on line voltage must be maintained or lines must be de-energized by the utility company. OSHA specifies minimum clearances for various voltages. These clearances prevent electrocution from electrical arcing between cranes or loads and energized lines.

8. **Correct Answer: D (For critical or complex lifts)**

Lift plans must be prepared in writing for critical or complex lifts including heavy lifts, proximity to hazards, multiple-crane operations, or lifts where standard procedures may not provide adequate control. Written plans document procedures, equipment requirements, and safety measures ensuring thorough planning and providing reference during execution.

9. **Correct Answer: A (Load exceeds single crane capacity or stability)**

A second crane is needed for a lift when the load exceeds single crane capacity or when lift configuration would compromise single crane stability. Tandem lifts require detailed planning, coordination, and specialized procedures. Load distribution between cranes must be carefully calculated and maintained throughout operations.

10. **Correct Answer: C (Utility location marking and protection)**

When operating in areas with underground utilities, utility location marking through professional locating services and protection measures are required. Underground lines must be marked preventing accidental damage from outrigger deployment, excavation, or ground preparation. Utilities must be notified allowing monitoring or protective measures.

11. **Correct Answer: B (Manufacturer permits travel with loads)**

Before crane travel with loads, it must be verified that the manufacturer permits travel with loads for the specific crane model and that conditions meet manufacturer specifications. Not all cranes are designed for loaded travel. When permitted, manufacturers specify capacity limits, speed restrictions, and ground condition requirements.

12. **Correct Answer: A (Designated signal person or lift director)**

During lift operations, a designated signal person or lift director coordinates all crane movements. This individual has overall authority for the operation, directs operators, ensures procedures are followed, and monitors safety throughout lift cycles. Clear authority prevents confusion and ensures coordinated safe operations.

13. **Correct Answer: C (Traffic control and barricades)**

When crane swing radius extends into traffic areas, traffic control and barricades are required. Traffic must be routed around swing areas or stopped when boom swings through traffic lanes. Barricades prevent vehicles from entering swing radius where boom contact could cause serious accidents.

14. **Correct Answer: B (Before operations in hazardous areas)**

Emergency evacuation routes must be established before operations in hazardous areas such as proximity to power lines, hazardous materials, or unstable structures. These routes ensure personnel can quickly evacuate if emergencies develop. Routes must remain clear and be known to all personnel.

15. **Correct Answer: A (Load chart capacity at required radius)**

Maximum crane operating radius for a lift is determined by load chart capacity at the required radius. As radius increases, capacity decreases. The maximum radius at which adequate capacity exists for the load weight determines the furthest operating position. Beyond this radius, capacity is insufficient for safe lifting.

16. **Correct Answer: D (Signal persons and spotters)**

When lifting in confined spaces, coordination through signal persons and spotters is essential. Limited visibility and tight clearances require multiple personnel positioned where they can see operations and guide operators safely. Spotters monitor clearances while signal persons direct movements preventing contact with obstructions.

17. **Correct Answer: B (Cease operations until conditions improve)**

If wind conditions exceed manufacturer limits, operations must cease until conditions improve. Excessive winds create loading on boom structures and suspended loads that can exceed stability margins or cause loss of control. Operating in excessive winds creates serious tipping risks and control difficulties.

18. **Correct Answer: D (Clearances and potential load swing)**

When operating near buildings, clearances accounting for boom movement and potential load swing must be considered. Buildings restrict swing paths and create obstacles. Load swing from wind or crane movement can cause contact with buildings. Adequate clearances prevent contact protecting both equipment and structures.

19. **Correct Answer: A (Adequate illumination of all work areas)**

Night crane operations require adequate illumination of all work areas including the crane, loads, landing areas, and personnel positions. Lighting must allow clear visibility of operations, load positions, hazards, and hand signals. Inadequate lighting creates serious safety risks through reduced visibility preventing safe operations.

20. **Correct Answer: C (For adverse conditions per manufacturer)**

Crane capacity must be reduced for adverse conditions per manufacturer specifications. Conditions requiring capacity reduction include out-of-level setup, high winds, partial outrigger extension, or equipment wear. Manufacturers provide specific derating factors or procedures for various adverse conditions.

21. **Correct Answer: B (Load chart requirements for planned capacity)**

Whether outriggers must be fully extended is determined by load chart requirements for planned capacity. Charts show different capacities for various outrigger extensions. If loads can be handled safely with partial extension, full extension may not be required. Charts guide proper outrigger deployment for planned operations.

22. **Correct Answer: D (Prohibited by OSHA)**

Lifting loads over personnel is prohibited by OSHA regulations. This fundamental safety principle prevents injuries from dropped loads or rigging failures. All personnel must remain clear of areas under suspended loads. Operations must stop or personnel must move to safe locations before loads pass overhead.

23. **Correct Answer: A (Adequate capacity and good condition)**

Before lifts, rigging must be verified to have adequate capacity for load weight and configuration, and be in good condition without damage or wear exceeding limits. This verification includes inspecting slings, shackles, hooks, and connections confirming they can safely support loads throughout lift cycles.

24. **Correct Answer: C (When safety is compromised)**

Crane operations must stop for weather when safety is compromised through reduced visibility, high winds, lightning, or other conditions affecting safe operations. Operators must assess weather conditions continuously and cease operations when conditions create hazards even if conditions remain within some manufacturer limits.

25. **Correct Answer: D (Height notification and possible restrictions)**

When cranes operate near airports, height notification to airport authorities and possible restrictions under FAA regulations are required. Cranes can interfere with flight paths or navigation systems. Cranes exceeding certain heights may require lighting, painting, or operational restrictions coordinated with airport authorities.

26. **Correct Answer: A (Overloading either crane or rigging failure)**

During tandem lifts, overloading either crane or rigging failure must be prevented. Load distribution between cranes must be carefully calculated and maintained. If loads shift between cranes during operations, one crane may become overloaded. Rigging must be adequate for worst-case loading throughout the lift.

27. **Correct Answer: D (Load chart requirements)**

Whether additional counterweight is needed is determined by load chart requirements. Charts show capacities for specific counterweight configurations. If current counterweight provides insufficient capacity for planned lifts, additional counterweight may allow operations if crane design permits. Charts guide proper counterweight configuration.

28. **Correct Answer: C (Capacity reduction per manufacturer)**

When operating on grade, capacity reduction per manufacturer specifications must be considered. Slopes reduce effective stability by altering moment relationships. Manufacturers provide capacity reduction factors or modified charts for sloped operations accounting for the degree and direction of slope.

29. **Correct Answer: B (Permits and public protection measures)**

Before lifting in public areas, permits authorizing operations and public protection measures are required. Protection includes barricades preventing public access to hazardous areas, traffic control, and personnel monitoring for safety. Permits ensure authorities are aware and operations meet regulatory requirements.

30. **Correct Answer: D (Before critical or complex operations)**

Pre-lift meetings must be conducted before critical or complex operations requiring coordination, special procedures, or heightened hazard awareness. These meetings review procedures in detail ensuring all personnel understand roles, hazards, communication methods, and emergency procedures before beginning challenging operations.

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

The standard hand signal for "swing" consists of the arm extended pointing in the direction of desired swing movement. This directional signal clearly indicates which direction the superstructure should rotate, allowing operators to respond appropriately to the visual direction cue.

32. **Correct Answer: D (Clear, standardized terminology)**

When using radio communication, clear, standardized terminology must be used. Standard terms describe movements unambiguously preventing misinterpretation. All communications should use complete phrases that cannot be confused. Abbreviated or unclear language increases risks of misunderstanding causing incorrect movements.

33. **Correct Answer: A (Stop operations or use additional signal person)**

If signal persons lose sight of the load, operations must stop or an additional signal person positioned where they can see the load must be used. Someone with clear view of the load must monitor its position and provide direction ensuring safe handling throughout lift cycles.

34. **Correct Answer: C (Before operations at new sites)**

Hand signals must be reviewed with operators before operations at new sites to ensure mutual understanding of signals that will be used. This review prevents misunderstandings from regional variations or site-specific signals. All parties must agree on signal meanings before beginning operations.

35. **Correct Answer: A (Arm extended with thumb pointing down)**

The standard hand signal for "lower the load" consists of the arm extended with the thumb pointing downward. This signal clearly indicates the downward direction of desired load movement, distinguished from other signals by the thumb-down orientation.

36. **Correct Answer: D (Enhanced visibility aids)**

During poor visibility, enhanced visibility aids must be used for signaling. This includes illuminated signals, lighted wands, reflective clothing, or additional lighting allowing operators to clearly see signals despite fog, darkness, dust, or other visibility reductions. Enhanced visibility maintains effective communication.

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

Modified signals can be used after they are demonstrated to all parties and agreement is established regarding their meaning. This demonstration ensures operators, signal persons, and supervisors understand signal meanings preventing misinterpretation. All personnel must agree before using modified signals during operations.

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

During conflicting directions, the stop signal from any source takes priority. When stop is given by any person 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: A (Before giving signals)**

Signal persons must be qualified before giving signals. Qualification ensures individuals have knowledge of standard signals and crane operations, and ability to effectively perform signal person duties. Operating without qualified signal persons creates serious accident risks from incorrect or misunderstood signals.

40. **Correct Answer: D (Use relay signal person or stop)**

When signal persons cannot see operators, a relay signal person must be used maintaining the communication chain, or operations must stop. Visual contact between operator and signal person is essential for effective communication. Operating without this contact creates serious hazards from miscommunication.

41. **Correct Answer: C (When fatigued or ineffective)**

During extended operations, signal persons should be relieved when they become fatigued reducing attention and reaction time, or when unable to perform effectively. Effective signaling requires full attention and clear communication ability. Fatigued signal persons create safety risks through reduced performance.

42. **Correct Answer: B (Understanding through acknowledgment)**

Operators must confirm understanding through acknowledgment before executing signals. This confirmation through repeat-back or acknowledgment ensures that signals were received and understood correctly. The communication loop must be complete before potentially hazardous movements begin.

43. **Correct Answer: D (Confirmation protocols)**

When using voice commands, confirmation protocols requiring acknowledgment and repeat-back must be established. These protocols ensure communications are understood correctly preventing misinterpretations. Structured communication prevents dangerous misunderstandings during crane operations.

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

High-visibility clothing is required for signal person visibility ensuring operators can clearly see them against backgrounds and in varying lighting conditions. High-visibility apparel in colors like orange or lime with reflective striping makes signal persons readily identifiable in busy work environments.

45. **Correct Answer: C (When using radio as primary)**

Backup signal methods must be available when using radio as primary communication. Radio systems can fail from equipment malfunction, interference, or dead batteries. Predetermined hand signals provide backup ensuring communication can continue if radio communication is lost during operations.

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

Under OSHA, site hazards including power lines and fall hazards, and ground conditions must be assessed before crane use. This hazard assessment identifies conditions requiring special precautions or control measures. The assessment establishes foundation for safe operations at each location.

47. **Correct Answer: A (Accredited certification and employer evaluation)**

OSHA requires crane operator qualification through accredited certification by approved testing organizations and employer evaluation on specific equipment and site hazards. Both components ensure operators possess necessary knowledge and can safely operate in actual site conditions with equipment they will use.

48. **Correct Answer: D (At least annually)**

According to OSHA, annual inspections must occur at least annually by qualified persons. These comprehensive inspections evaluate all aspects of crane condition including structural integrity, mechanical systems, and safety devices. Annual inspections identify problems requiring correction before they cause failures.

49. **Correct Answer: C (Site-specific training)**

Employers must provide operators per OSHA with site-specific training addressing hazards and conditions at actual work locations. This training supplements certification ensuring operators understand site hazards, procedures, and emergency measures specific to where they will work.

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

Under OSHA, crane assembly operations must be supervised by a qualified assembly/disassembly director. This individual has specific knowledge of assembly procedures and ensures manufacturer procedures are followed correctly. The A/D director verifies connection integrity throughout assembly operations.

51. **Correct Answer: C (Visible and legible information)**

OSHA requires capacity placards with visible and legible information. Capacity information must be displayed where operators can reference it. Illegible or missing placards prevent operators from determining available capacity creating overload risks.

52. **Correct Answer: B (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 elevated A/D work.

53. **Correct Answer: B (Date, findings, corrective actions)**

OSHA inspections must document inspection date, equipment identification, findings identifying defects or unsafe conditions, and corrective actions taken. This documentation provides accountability, history, and verification of compliance with inspection requirements.

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

Under OSHA, only the manufacturer or qualified engineer can authorize crane modifications. Only these qualified parties can verify through analysis that modifications maintain adequate safety factors and do not adversely affect structural integrity or stability.

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

OSHA requires for deficient equipment that deficiencies must be corrected before continued use or equipment must be removed from service until corrections are made. Operating with known defects violates safety requirements and creates serious hazards.

56. **Correct Answer: A (Every three years or when deficiencies occur)**

According to OSHA, operators must be re-evaluated every three years or when performance deficiencies are observed. This periodic re-evaluation ensures operators maintain competency and identifies skill deterioration requiring additional training.

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

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

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

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

59. **Correct Answer: B (Current and accessible)**

OSHA requires regarding load charts that they must be current for equipment configuration and accessible to operators during operations. Charts must match actual crane setup to provide accurate capacity information for lift planning and execution.

60. **Correct Answer: D (During training with certified operator)**

According to OSHA, uncertified persons can operate during training when directly supervised by a certified operator who is physically present at controls. This allows hands-on training under expert supervision. The certified operator must be able to take control immediately if necessary.

61. **Correct Answer: A (Maximum load per manufacturer specifications)**

Under ASME B30.5, rated capacity is the maximum load for which the crane is designed and built by the manufacturer for specific configurations. Rated capacities account for all operating conditions and include appropriate safety factors.

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

ASME B30.5 requires wire rope inspection each shift when equipment is in regular use. This frequent inspection allows operators to identify rope deterioration before defects progress to failure.

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

According to ASME B30.5, cranes must be taken out of service when unsafe conditions exist including malfunction, damage, or defects affecting safe operation. Equipment cannot return to service until conditions are corrected and verified.

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

ASME B30.5 requires for modifications that manufacturer or qualified engineer approval must be obtained. Only these qualified parties can verify that modifications maintain adequate safety factors.

65. **Correct Answer: B (Special requirements per B30.23)**

Under ASME B30.5, personnel platforms require special requirements detailed in ASME B30.23. These requirements ensure personnel safety during high-risk hoisting operations.

66. **Correct Answer: D (Follow manufacturer limitations)**

ASME B30.5 specifies regarding operating limits that manufacturer limitations must be followed. Manufacturers establish limits based on crane design characteristics.

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

According to ASME B30.5, angle indicators must work before operations for capacity determination. Operators rely on angle information for accurate chart reading.

68. **Correct Answer: C (Written records)**

ASME B30.5 requires written records for maintenance documenting inspections and repairs. These records provide equipment history and verify compliance.

69. **Correct Answer: B (Complexity, risk, or consequences)**

Under ASME B30.5, critical lifts are defined by complexity, risk factors, or potential consequences of failure.

70. **Correct Answer: D (Shall be avoided)**

ASME B30.5 requires that side loading shall be avoided. Side loading creates dangerous bending stresses.

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

According to ASME B30.5, load testing is required after installation and after modifications affecting capacity.

72. **Correct Answer: C (Shall not be left unattended)**

ASME B30.5 specifies loads shall not be left suspended when cranes are unattended.

73. **Correct Answer: D (Stop and obtain direction)**

Under ASME B30.5, if operators are uncertain, they must stop and obtain direction from qualified persons.

74. **Correct Answer: A (Based on deterioration criteria)**

ASME B30.5 requires rope replacement based on specific deterioration criteria.

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

According to ASME B30.5, a qualified person must authorize return to service after repairs.

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

When reading load charts, current crane configuration must be known first.

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

On load charts, radius measures horizontal distance from center of rotation.

78. **Correct Answer: B (Decreases)**

Capacity decreases as radius increases.

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

When using attachments, separate charts or deductions apply.

80. **Correct Answer: A (Rigging and hook block weight)**

Rigging and hook block weight must be deducted for net capacity.

81. **Correct Answer: D (Special notes or conditions)**

On load charts, asterisks indicate special notes or conditions.

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

When boom angle changes, radius and capacity change.

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

Between chart values, use lower capacity or interpolate.

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

Telescopic charts are organized by boom length and radii.

85. **Correct Answer: C (Notes or bold numbers)**

Chart capacity limits are indicated by notes or bold numbers.

86. **Correct Answer: B (Correct chart for configuration)**

When counterweight changes, use correct chart for configuration.

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

For large loads, consider wind effects on stability.

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

Chart footnotes contain important restrictions and conditions.

89. **Correct Answer: A (Reference correct chart each time)**

When using different configurations, reference correct chart each time.

90. **Correct Answer: C (Dimensions and center of gravity)**

For unusual loads, dimensions and center of gravity affect capacity.

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

Engine-driven pump provides hydraulic power in cranes.

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

Slow function or leaks indicate hydraulic problems.

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

Hydraulic filters remove contaminants.

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

Excessive load or poor cooling causes hydraulic overheating.

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

Relief valves control maximum pressure.

Specialty Examination

1. **Correct Answer: D (Lower maximum capacity for equivalent crane size)**

A key disadvantage of telescopic cranes compared to lattice boom cranes is lower maximum capacity for equivalent crane size. The heavier telescopic boom structure with nested sections weighs significantly more than open lattice framework achieving similar length. This weight difference reduces available lifting capacity. Lattice cranes can achieve higher capacities due to superior strength-to-weight ratios of the triangulated lattice design.

2. **Correct Answer: C (Rotating superstructure on slew bearing)**

On crawler cranes, continuous 360-degree rotation is allowed by the rotating superstructure mounted on a slew bearing. The superstructure containing the cab, engine, and boom rotates on this large bearing mounted on the crawler frame. This allows the boom to swing freely while tracks remain stationary.

3. **Correct Answer: A (Prevent over-backward tipping)**

The primary purpose of boom stops on mobile cranes is preventing over-backward tipping by stopping boom elevation before the boom angle becomes so steep that the crane tips backward. These devices provide critical protection particularly during light or no-load conditions when boom weight alone can cause backward instability at high angles.

4. **Correct Answer: B (Hydraulic cylinders with flow control)**

When operating hydraulic telescopic cranes, boom extension is controlled by hydraulic cylinders with flow control systems. Extension cylinders push boom sections outward while flow control manages extension speed and synchronization ensuring sections extend smoothly together maintaining proper alignment.

5. **Correct Answer: D (Ability to achieve greater heights and capacities)**

Lattice boom cranes offer for extreme lifts the ability to achieve greater heights and capacities through modular boom sections that can be assembled to extreme lengths. The efficient lattice structure provides exceptional strength-to-weight ratios allowing boom configurations exceeding 400 feet for some cranes with capacities unmatched by telescopic designs.

6. **Correct Answer: C (Automated outrigger and suspension systems)**

On all-terrain cranes, automated or semi-automated outrigger and suspension systems allow transition between travel and lift modes. These systems coordinate outrigger extension and deployment, carrier suspension adjustment, and other functions required for mode changes reducing setup time and operator workload.

7. **Correct Answer: B (Support boom during transport)**

The function of a boom dolly is supporting the boom during highway transport. Long lattice booms that cannot remain mounted on cranes during transport are placed on boom dollies providing wheeled support. The dolly supports boom weight, provides steering capability, and allows safe highway towing as a separate unit.

8. **Correct Answer: A (Follow manufacturer assembly sequence)**

When installing lattice boom jibs, it is critical to follow manufacturer assembly sequence exactly. Jib sections must be assembled in specific sequences ensuring proper load paths and structural integrity. Any deviation or incomplete connections can cause structural failure during operations.

9. **Correct Answer: C (Pendant system through mast)**

Boom angle support on lattice cranes is provided by the pendant system working through the mast structure. 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 providing positive support.

10. **Correct Answer: D (Electronic or hydraulic systems)**

On all-terrain cranes, electronic or hydraulic systems coordinate steering of multiple axles. These sophisticated systems can steer axles simultaneously for tight turns or independently for different maneuvers. Advanced systems automatically coordinate axle steering angles based on vehicle speed and operator inputs.

11. **Correct Answer: A (Adjust radius without boom movement)**

A key benefit of luffing jibs is the ability to adjust operating radius without main boom movement. Luffing jibs can change angle independently through their own hoist system, allowing radius adjustment while maintaining constant hook height or adjusting both parameters for precision placement.

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

When reading load charts with offset jibs, the additional variable that matters is the offset angle from boom centerline. As jibs offset from straight ahead positions, capacity decreases due to altered loading patterns. Charts show capacity values at various offset angles.

13. **Correct Answer: B (Structural capacity and stability)**

Maximum boom length on mobile cranes is limited by structural capacity of boom members to support loads and overall crane stability. Longer booms create greater overturning moments and impose higher structural loads. Manufacturers establish maximum lengths ensuring adequate strength and stability margins.

14. **Correct Answer: A (Large tires and high ground clearance)**

On rough-terrain cranes, large off-road tires and high ground clearance provide off-road capability. These design features allow operation on uneven, soft, or unprepared surfaces where standard wheeled vehicles cannot operate. The single-axle or tandem-axle design with large tires provides excellent rough terrain performance.

15. **Correct Answer: C (Boom hoist through mast)**

The system that raises and lowers lattice boom angle is the boom hoist working through the mast. The boom hoist rope runs from the drum over the mast top to the boom point. Adjusting rope length through the hoist raises or lowers boom angle.

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

Capacities with fly jibs are significantly reduced compared to main boom alone. Fly jibs add 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.

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

Safe jib length for configurations is determined by manufacturer specifications based on structural analysis. Manufacturers establish maximum jib lengths ensuring that combined boom and jib loading remains within structural limits and that stability is maintained.

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

On crawler cranes, wider track spacing provides greater stability and capacity by increasing the base of support. Greater track spacing increases the moment arm for resisting overturning moments allowing higher lifting capacities.

19. **Correct Answer: B (Rapid deployment)**

The setup advantage telescopic cranes have is rapid deployment without boom assembly requirements. Telescopic cranes arrive with boom mounted and extend hydraulically in minutes, while lattice cranes require assembly taking hours or days.

20. **Correct Answer: B (Proper installation and chart use)**

When using boom extensions, proper installation per manufacturer requirements and use of appropriate load chart sections must be verified. Extensions affect boom strength and capacity requiring specific chart sections showing capacities for extended configurations.

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

Auxiliary hoist typically provides faster line speeds than main hoists. Auxiliaries are designed for lighter loads using smaller ropes and drums allowing higher speeds, making them efficient for handling rigging or lighter materials.

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

On hydraulic cranes, swing control is provided by a hydraulic motor with brake system. The motor drives the swing mechanism with speed proportional to control input, while the brake stops and holds position when controls return to neutral.

23. **Correct Answer: A (Use appropriate load chart)**

When changing crawler track configuration, it is critical to use the appropriate load chart for the track configuration. Wide-track and narrow-track configurations provide substantially different capacities requiring different chart sections.

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

When operating with boom inserts, correct installation per manufacturer requirements and use of the appropriate chart section is essential. Inserts affect boom structural characteristics and capacity requiring proper installation and correct chart use.

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

Telescopic boom sections during extension are guided by internal wear pads and guide systems. Wear pads made of low-friction materials ride on machined surfaces inside boom sections allowing smooth extension while maintaining alignment.

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

On lattice booms, main chord members carry primary loads. These large angle or tube members running the length of the boom at its corners form the main load-carrying framework resisting bending and compression forces.

Practical Examination

1. **Correct Answer: A (Six randomly distributed in one lay)**

When inspecting wire rope, the broken wire pattern requiring removal is six randomly distributed broken wires in one rope lay length, or three broken wires in one strand in one lay. These ASME B30.5 removal criteria indicate that wire rope strength has deteriorated to unsafe levels through fatigue, overload, or corrosion requiring immediate replacement.

2. **Correct Answer: C (Open strands to examine interior)**

The proper inspection method for wire rope internal condition is opening strands to examine interior wires and core condition. This involves using a spike or tool to separate strands allowing visual inspection of

internal wires for corrosion, broken wires, or wear not visible from exterior inspection. Internal damage often progresses hidden from view.

3. **Correct Answer: B (Contaminated or milky fluid)**

During pre-operational checks, contaminated or milky hydraulic fluid appearance requires attention. Milky appearance indicates water contamination causing corrosion and reduced lubrication. Other contamination including dirt or wear particles accelerates component wear. Contaminated fluid must be drained, the system flushed, and contamination sources corrected.

4. **Correct Answer: B (Cracks or excessive throat opening)**

When inspecting load hooks, cracks in any area of the hook body or excessive throat opening beyond specifications require replacement. Throat opening increase above 15 percent or manufacturer limits indicates permanent stretching from overloads. Any of these conditions compromises hook integrity requiring replacement.

5. **Correct Answer: A (No response to boom movement)**

LMI system malfunction is indicated by no response to boom movement or erratic readings not corresponding to actual crane positions. Properly functioning LMI systems track boom angle and radius changes displaying current capacity utilization. Systems that fail to respond cannot provide reliable capacity information.

6. **Correct Answer: C (Immediate stop when control released)**

During brake testing, proper swing brake function is indicated by immediate stop when the control is released to neutral. The brake should engage automatically without operator action and hold position without drift. Any delay or continued coasting indicates brake adjustment or repair is needed.

7. **Correct Answer: A (Raise boom then release to verify hold)**

The procedure testing boom hoist brake function is raising the boom using elevation control, then releasing control to neutral and verifying that the boom immediately stops and holds position without drift. The automatic brake should engage instantly preventing any boom lowering.

8. **Correct Answer: D (Verify controls neutral)**

The first step in crane startup is verifying that all control levers are in neutral positions before starting the engine. This verification prevents unintended crane movements when hydraulic systems pressurize after engine start. Operators should physically check each control position.

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

During warm-up, oil pressure and temperature gauges must be monitored. Oil pressure should stabilize quickly indicating proper lubrication. Temperature gauges should show gradual warming toward operating temperature. Abnormal readings indicate problems requiring attention.

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

When deploying outriggers, it must be verified that crane level remains within manufacturer specifications as jacks extend and lift the carrier. Real-time level monitoring allows immediate adjustment of jack heights achieving proper level.

11. **Correct Answer: C (Variable speeds with smooth control)**

The proper hoist function test method is operating at variable speeds with smooth control response. Operators should verify that hoist responds smoothly to control inputs at both slow and fast speeds, that controls return to neutral properly, and that brakes engage automatically.

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

During control testing, erratic response not proportional to inputs or binding preventing smooth movement indicates problems requiring repair. Controls should respond smoothly and proportionally to inputs without delays, binding, or erratic behavior.

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

When checking boom indicators, it must be verified that indicators accurately display current boom length matching actual extended length. These indicators are essential for capacity determination using load charts. Inaccurate indicators create serious overload risks.

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

Rope condition requiring immediate removal is kinking or bird-caging showing permanent distortion with strands separating from rope body. Kinks create severe localized stress concentrations dramatically reducing rope strength. Kinked rope can fail suddenly under loads well below normal capacity.

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

During fluid inspection, milky or cloudy appearance indicates contamination. Milky appearance shows water contamination, while cloudiness indicates other contaminants. Water contamination causes corrosion, reduces lubrication effectiveness, and can lead to component failure.

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

When testing anti-two-block, proper function is indicated by visual and audible warnings activating well before contact occurs and automatic hoist cutout preventing actual boom tip contact with the hook block. The device should provide adequate warning allowing operator response.

17. **Correct Answer: C (Verify engagement and test retention)**

The proper outrigger lock check is verifying that locks engage properly when beams reach extended positions, then attempting to retract beams while locks are set. This testing confirms that locking mechanisms prevent beam movement.

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

During boom inspection, cracks in structural members or permanent deformation suggesting overload or impact damage require attention. Structural cracks can propagate rapidly under load causing catastrophic failure. Deformation indicates the boom has been loaded beyond design limits.

19. **Correct Answer: B (Secure attachment with no loosening)**

When inspecting rope terminations, it is critical to verify secure attachment with no loosening between rope and socket or wedge, no cracks in termination components, and no deformation. Terminations must maintain full grip on rope.

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

Regarding LMI displays, it must be verified that the display is functional showing appropriate information and readable from the operator's position. Non-functional displays prevent capacity monitoring creating serious overload risks. Illegible displays cannot be used effectively.

21. **Correct Answer: D (Rope not seated in sheaves)**

During rope inspection, rope not properly seated in sheave grooves or running on sheave flanges requires immediate attention. Improper seating causes concentrated wear on both rope and sheaves and can lead to rope jumping from sheaves creating sudden load drops.

22. **Correct Answer: D (Cracking or bulging)**

When checking hoses, cracking particularly in bend areas or bulging indicating internal reinforcement failure indicates replacement is needed. These conditions indicate imminent hose failure under pressure. Age-related hardening also warrants replacement.

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

The proper end-of-shift procedure is lowering boom to safe storage angle, securing all controls in neutral positions, and documenting any issues requiring attention. This sequence protects equipment from wind damage, prevents unauthorized operation, and provides communication about equipment status.

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

During swing testing, proper operation is indicated by smooth acceleration responding to control input, smooth operation at commanded speeds, smooth deceleration as control reduces, and immediate brake engagement when control returns to neutral.

25. **Correct Answer: B (Low pressure or expired tag)**

When inspecting fire extinguishers, low gauge pressure indicating charge loss or expired inspection tags indicating service is overdue require service. Fire extinguishers must maintain proper charge and receive required inspections.

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

Regarding locking pins, it must be verified that pins are fully inserted through all holes with no gaps visible and that retention devices such as clips, bolts, or pins are properly engaged. Partial insertion or missing retention allows pins to back out causing sudden boom collapse.

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

During final verification, it must be confirmed that all required inspections are complete with no unresolved defects, all systems are functional and ready for operations, and the work area is clear of personnel and obstacles within operating radii.

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

When inspecting boom pins, wear reducing pin diameter, cracks in pin bodies, or elongated pin holes indicate problems requiring correction. Excessive wear or cracks require pin replacement. Elongated holes indicate overloading or fatigue damage.

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

Proper cylinder function is indicated by smooth operation responding proportionally to controls without binding or jerking, no hydraulic leaks from seals or fittings, and no unusual sounds. Cylinders should extend and retract smoothly throughout their stroke.

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

During wind shutdown, the proper boom position is per manufacturer specifications to minimize wind loading. Manufacturers typically recommend lowering boom to moderate angles that reduce wind sail area while maintaining adequate ground clearance protecting boom structure from wind damage.