Chicago Crane Operators Examination Study Guide

Cranes and hoisting equipment with a rated capacity of 2,000 pounds or more require a licensed operator for use in the City of Chicago. This study guide includes general information about testing procedures (page 1), types of equipment requiring a Chicago license (page 2), content outlines (pages 3-4), study materials and a description of the practical exams (page 5), and sample questions (pages 6-12) to help candidates prepare for the written examinations.

General Information

PURPOSE OF THE EXAMINATIONS

These examinations for Chicago Crane Operators assess the knowledge and skills of candidates who intend to operate cranes or hoisting equipment with a rated capacity of 2,000 pounds or more in Chicago. A candidate who passes the Class I written test is eligible to take any Class I or Class II practical exam for a specific license type listed on page 2 of this Study Guide. A candidate who passes the Class II written test is eligible to take any Class II practical exam for a specific license type. Chicago Building inspectors may stop work at locations that are using cranes or hoisting equipment without a properly licensed operator.

TEST VALIDITY & TEST LENGTH

Each written test is three hours in length. All test questions have been validated to meet strict psychometric controls and have been approved by the Chicago Crane Operators Examining Board.

STUDY MATERIALS

Study materials for these examinations are described in this Study Guide. OSHA requirements for crane operators are available free on the U.S. Department of Labor website.

MISSING AN EXAMINATION

There are no "make-up" dates for written tests. You may re-register for the next examination date. THERE ARE NO REFUNDS.

WHAT TO BRING TO THE EXAM

Each candidate should bring two (2) sharpened Number 2 black lead pencils and a non-programmable, non-printing, solar- or battery-powered portable or pocket calculator. No power source will be available for calculators at the test site. Candidates will not be permitted to use any books, notes or other reference materials during these examinations. Cell phones are prohibited during an examination.

 LICENSURE

Candidates who score 70 or higher will receive a PASS notice and instructions to schedule the appropriate practical examination(s).

FAILURE

Candidates who score below 70 will receive a FAILURE notice and an application for re-examination. Candidates are encouraged to retake the examination; many candidates who initially fail such an exam pass on subsequent attempts.

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Classifications of Equipment Requiring a Chicago Crane License

All cranes and hoisting equipment with a rated capacity of 2,000 pounds or more require a licensed operator for use in the City of Chicago. The following classifications apply. Additional information about Practical Exams appears page 5 of this study guide.

<table>
<thead>
<tr>
<th>Class I Equipment</th>
<th>Written Exam</th>
<th>Practical Exam</th>
<th>License Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower Crane – Hammerhead</td>
<td>Class I</td>
<td>Yes</td>
<td>A-1</td>
</tr>
<tr>
<td>Tower Crane – Luffing Boom</td>
<td>Class I</td>
<td>Yes</td>
<td>A-2</td>
</tr>
<tr>
<td>Tower Crane – Self-Erecting</td>
<td>Class I</td>
<td>Yes</td>
<td>A-3</td>
</tr>
<tr>
<td>Friction Crawler Crane or Friction Truck Crane</td>
<td>Class I</td>
<td>Yes</td>
<td>B-1 to 4^a</td>
</tr>
<tr>
<td>Hydraulic Crawler Crane or Hydraulic Truck Crane with Lattice Boom</td>
<td>Class I</td>
<td>Yes</td>
<td>C-1 to 4^a</td>
</tr>
<tr>
<td>Hydraulic Mobile Crane: rough terrain or all-terrain</td>
<td>Class I</td>
<td>Yes</td>
<td>D-1 to 4^a</td>
</tr>
<tr>
<td>Mobile Crane: boom truck</td>
<td>Class I</td>
<td>Yes</td>
<td>E-1 to 4^a</td>
</tr>
<tr>
<td>Industrial Crane or Carry Deck Crane</td>
<td>Class I</td>
<td>Yes</td>
<td>F</td>
</tr>
<tr>
<td>Spider Crane</td>
<td>Class I</td>
<td>Yes</td>
<td>G</td>
</tr>
<tr>
<td>Chicago Boom, Drumhoist or Derrick</td>
<td>Class I</td>
<td>Yes</td>
<td>H</td>
</tr>
<tr>
<td>Rack and Pinion Skips</td>
<td>Class I</td>
<td>Yes</td>
<td>I</td>
</tr>
<tr>
<td>Other Class I Cranes or hoisting equipment</td>
<td>Class I</td>
<td>Yes</td>
<td>J</td>
</tr>
</tbody>
</table>

^aFour Boom Length classifications apply for License Types B, C, D and E:
1=Up to 100 feet  2=Up to 150 feet  3=Up to 189 feet  4=190 feet or greater

<table>
<thead>
<tr>
<th>Class II Equipment</th>
<th>Written Exam</th>
<th>Practical Exam</th>
<th>License Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articulating Crane, Knuckleboom Crane or Mobile Crane: Knuckleboom Truck</td>
<td>Class II</td>
<td>Yes</td>
<td>AA</td>
</tr>
<tr>
<td>Multi-Purpose Machine with Hoisting Device</td>
<td>Class II</td>
<td>Yes</td>
<td>BB</td>
</tr>
<tr>
<td>All-Terrain Forklift with Hook or Winch</td>
<td>Class II</td>
<td>Yes</td>
<td>CC</td>
</tr>
<tr>
<td>Power-Operated Floor or Deck-Type Crane</td>
<td>Class II</td>
<td>Yes</td>
<td>DD</td>
</tr>
<tr>
<td>Overhead Crane</td>
<td>Class II</td>
<td>Yes</td>
<td>EE</td>
</tr>
<tr>
<td>Gantry Crane or Crane on a Monorail</td>
<td>Class II</td>
<td>No</td>
<td>FF</td>
</tr>
<tr>
<td>Boom attached to Mast-Climbing Work Platform</td>
<td>Class II</td>
<td>No</td>
<td>GG</td>
</tr>
<tr>
<td>Power Window Washing Unit when used to erect</td>
<td>Class II</td>
<td>No</td>
<td>HH</td>
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<tr>
<td>Track Backhoe used for erecting</td>
<td>Class II</td>
<td>Yes</td>
<td>I</td>
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<tr>
<td>Service/Mechanic Truck with Hoisting Device</td>
<td>Class II</td>
<td>Yes</td>
<td>JJ</td>
</tr>
<tr>
<td>Other Class I Cranes or hoisting equipment</td>
<td>Class II</td>
<td>Case by case</td>
<td>KK</td>
</tr>
</tbody>
</table>

^bCandidates who pass Class I or Class II written tests may take any Class II practical exam.

Any crane set on a flotation device, locomotive rail device, wheel mounted device, pedestal device or portal device shall have the appropriate classification, license and testing requirements for the underlying crane type identified above.
Class I Crane Operators Written Test (65 questions)

1. Types of Equipment 10 questions
   A. Tower & mobile cranes
   B. Drum hoists, derricks, etc.
   C. Spider cranes, carry decks, etc.
   D. Forklifts, floor cranes, etc.

2. Operating Practices 8 questions
   A. Set-up
   B. Power lines
   C. Ground conditions

3. Rigging & Signals 15 questions
   A. Wire rope
   B. Drums
   C. Slings
   D. Rigging hardware
   E. Fiber rope
   F. Signaling

4. Inspections & Maintenance 4 questions
   A. Hoisting equipment
   B. Rope & rigging hardware

5. Safe Working Loads 14 questions
   A. Wire rope slings
   B. Chain slings
   C. Estimating load weights
   D. Safe load rules
   E. Capacity limits & deductions

6. OSHA Regulations & Workplace Safety 10 questions
   A. Crane types/safety
   B. Rigging equipment
   C. Power lines
   D. Equipment safety
   E. Demolition

7. Hoisting Personnel Safely 4 questions
   A. Manbasket design requirements
   B. Operating manbaskets safely
Class II Crane Operators Written Test (65 questions)

1. Types of Equipment 8 questions
   A. Articulating crane, knuckleboom crane or mobile crane: knuckleboom truck
   B. Overhead gantry cranes
   C. Forklifts, floor cranes, etc.

2. Operating Practices 9 questions
   A. Set-up
   B. Power lines
   C. Ground conditions

3. Rigging & Signals 17 questions
   A. Wire rope
   B. Drums
   C. Slings
   D. Rigging hardware
   E. Fiber rope
   F. Signaling

4. Inspections & Maintenance 6 questions
   A. Hoisting equipment
   B. Rope & rigging hardware

5. Safe Working Loads 14 questions
   A. Wire rope slings
   B. Chain slings
   C. Estimating load weights
   D. Safe load rules
   E. Capacity limits & deductions

6. OSHA Regulations & Workplace Safety 11 questions
   A. Crane types/safety
   B. Rigging equipment
   C. Power lines
   D. Equipment safety
Recommended Study Materials
for the Chicago Crane Operators Written Examinations

All candidates must respond to test questions that are based on information provided in the following sources. The Code of Federal Regulations (29 CFR 1910 and 1926) is available through the Occupational Safety and Health Administration (OSHA) website on at http://www.osha.gov.

   Publisher: IPT Publishing and Training, Ltd. Phone: (403) 962-4548
   Box 9590, Edmonton, Alberta, Canada T6E 5X2

2. Code of Federal Regulations, Title 29, (OSHA)
   Part 1910, Subpart N Materials Handling & Storage, Sections 176-184
   Part 1926, Subpart H Rigging Equipment, Section 251
   Part 1926, Subpart N Cranes, Derricks, Hoists, Elevators & Conveyors Sections 550-554
   Part 1926, Subpart O Material Handling Equipment, Sections 600 & 602
   Part 1926, Subpart T Demolition, Sections 858 & 859
   Part 1926, Subpart CC Cranes & Derricks in Construction, Sections 1400-1441
   Publisher: U.S. Government Printing Office
   Available at http://www.osha.gov

Operating manuals for hoisting equipment and cranes also may help a candidate prepare for this examination.

**Chicago Crane Operators Practical Examinations**

A practical examination is required for each license type as identified on page 2 of this Study Guide. These practical exams require safety review, set-up, communications and signaling, and demonstration of safe operation while performing tasks suitable for that type of crane or hoisting equipment. All practical exams will be scored by two experienced crane operators in a facility designed to conduct such examinations safely. Candidates will be scheduled for up to two attempts to pass the practical exam on a specific type of crane or hoisting equipment within the scheduled exam period.

Additional information will be available after a candidate passes the Class I or Class II written examination. Each candidate must pass the Class I or Class II written test before any practical exam can be scheduled. A candidate who passes the Class I written test is eligible to take any Class I or Class II practical exam for a specific license type as listed on page 2 of this Study Guide. A candidate who passes the Class II written test is eligible to take any Class II practical exam for a specific license type. Separate fees are due for each license type practical exam taken.
Class I Crane Operator Sample Questions

All questions on these examinations are multiple choice with one correct answer and three incorrect choices. For these sample tests only, answers and references are provided at the end of each sample test to help you prepare for these examinations.

1. Which of the following best describes the minimum requirement for wire anchorage on a hoist drum?
   A. At least three wraps when the load block is at its lowest position
   B. At least four wraps when the load block is at its highest position
   C. At least five wraps when the load block is at its lowest position
   D. At least six wraps when the load block is at its highest position

2. Crane operators must assure that no part of the equipment, load line or load including rigging and lifting accessories is closer than how many feet to a power line when voltage in the line is unknown?
   A. 5’
   B. 10’
   C. 15’
   D. 20’

3. The lowest amount of ground pressure for a crane is exerted when the total weight of the machine is distributed
   A. over the entire area.
   B. over one corner.
   C. over the front.
   D. over the side.

4. Which of these requires immediate replacement of rotation-resistant wire rope under OSHA standards?
   A. Any sign of corrosion
   B. Insufficient lubrication
   C. Any reduction in diameter
   D. Two broken wires in six rope diameters
5. Who should be watching the load when a crane is working in the blind?
   A. The rigger
   B. The operator
   C. One signalman
   D. Two signalmen

6. When the engine of a crane is running, maintenance personnel must never
   A. reset the controls.
   B. be under the machine.
   C. operate the machine.
   D. reposition the crane.

7. Which of the following most accurately describes wire rope faults?
   A. A protruding core indicates that the rope should be tightly wrapped before reuse.
   B. Bird caging may be caused by sudden release of tension on an overloaded rope.
   C. Fatigue fractures are always visible on the exterior of the wire rope.
   D. Strand nicking typically is caused by scrubbing or localized wear.

8. Cranes using a manbasket or personnel hoisting equipment must have what type of blocking equipment?
   A. Timber blocking
   B. A two-block device
   C. An anti-two-block device
   D. Two-block damage prevention

9. When do OSHA regulations authorize the use of a manbasket or suspended personnel platform to hoist personnel?
   A. When personnel prefer a manbasket over ladders or scaffolding
   B. When safer methods expose personnel to harsh weather conditions
   C. When conventional methods of transporting personnel are more expensive
   D. When no safer method exists due to structural design or worksite conditions
Question 10 refers to the following information for a mobile crane.

<table>
<thead>
<tr>
<th>Boom Length in Feet</th>
<th>Operating Boom</th>
<th>Boom Capacity: Crawler Retracted</th>
<th>Boom Capacity: Crawler Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Radius in Feet</td>
<td>Angle Degrees</td>
<td>Elev.</td>
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<tr>
<td>40</td>
<td>81.4</td>
<td>244.3</td>
<td>89,200</td>
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<td>45</td>
<td>80.2</td>
<td>243.5</td>
<td>75,200</td>
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<td>50</td>
<td>78.9</td>
<td>242.6</td>
<td>64,500</td>
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<td>55</td>
<td>77.7</td>
<td>241.5</td>
<td>56,100</td>
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<td>60</td>
<td>76.5</td>
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<td>65</td>
<td>75.3</td>
<td>239.1</td>
<td>43,700</td>
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<td>70</td>
<td>74.0</td>
<td>237.7</td>
<td>38,900</td>
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<td>75</td>
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<td>236.3</td>
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<td>80</td>
<td>71.5</td>
<td>234.6</td>
<td>31,400</td>
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<td>85</td>
<td>70.3</td>
<td>232.9</td>
<td>28,400</td>
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<td>69.0</td>
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<td>95</td>
<td>67.7</td>
<td>229.1</td>
<td>23,400</td>
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<td>100</td>
<td>66.4</td>
<td>227.0</td>
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<tr>
<td>105</td>
<td>65.1</td>
<td>224.7</td>
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<td>110</td>
<td>63.8</td>
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<td>115</td>
<td>62.5</td>
<td>219.8</td>
<td>16,200</td>
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<td>61.1</td>
<td>217.1</td>
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<td>59.7</td>
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<tr>
<td>160</td>
<td>49.5</td>
<td>189.4</td>
<td>6,600</td>
</tr>
</tbody>
</table>

Load weights:
- Jib: 3,500 lbs.
- Headache ball & hook: 750 lbs.
- Load block: 4,550 lbs.
- Slings: 660 lbs.
- Main load line below boom jib: 1,125 lbs.
- Load line below the jib tip: 50 lbs.
- Weight of load: 44,750 lbs.

10. Which statement most accurately describes this load?

A. The total lifted load cannot be hoisted safely with this crane.
B. The maximum operating radius with crawlers extended is 55 feet.
C. The boom and jib with lifting components should not be lowered below 52.5°.
D. The maximum operating radius with no load and crawlers extended is 140 feet.
11. Which of these is required for moving parts of base-mounted drum hoists that could be a hazard?

A. They must be guarded.
B. They may not be used.
C. They must have warning signs.
D. They must have automatic disconnection devices.

12. In rigging, estimates of load weights typically are measured in which of these?

A. Kilograms
B. Pounds per cubic foot
C. Grams per cubic meter
D. Pounds per cubic inch

Class I Crane Sample Question Answer Key

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct Answer</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>D</td>
<td>OSHA §1926.1407(a)(2)</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>OSHA §1926.1413(a)(2)</td>
</tr>
<tr>
<td>5</td>
<td>C</td>
<td><em>IPT Manual</em> 2005, page 220</td>
</tr>
<tr>
<td>6</td>
<td>B</td>
<td><em>IPT Manual</em> 2005, page 359</td>
</tr>
<tr>
<td>8</td>
<td>C</td>
<td><em>IPT Manual</em> 2005, pages 92-3; OSHA 1926.1431(d)(5)(v)</td>
</tr>
<tr>
<td>9</td>
<td>D</td>
<td>OSHA §1926.1431(a)</td>
</tr>
<tr>
<td>10</td>
<td>C</td>
<td><em>IPT Manual</em> 2005, pages 309-10*</td>
</tr>
<tr>
<td>11</td>
<td>A</td>
<td>OSHA §1926.553(a)(1)</td>
</tr>
</tbody>
</table>

* Load chart calculations for Question 10 result in a total lifted load of 55,385 lbs., which limits the maximum operating radius with crawlers extended to 60 feet. The weight of all components is 10,635 lbs., which limits the boom angle to 52.5° and the maximum operating radius with no load and crawlers extended to 150 feet.
Class II Crane Operator Sample Questions

All questions on these examinations are multiple choice with one correct answer and three incorrect choices. For these sample tests only, answers and references are provided at the end of each sample test to help you prepare for these examinations.

1. Why are articulating or knuckleboom trucks favored in many applications?
   A. They have higher rated capacity than front or rear mounted turrets.
   B. They allow safe operation without setting outriggers for most loads.
   C. They are better suited for working in tight spaces.
   D. They do not require a rated capacity load limiter.

2. Crane operators must assure that no part of the equipment, load line or load including rigging and lifting accessories is closer than how many feet to a power line when voltage in the line is unknown?
   A. 5’
   B. 10’
   C. 15’
   D. 20’

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   C. Fatigue fractures are always visible on the exterior of the wire rope.
   D. Strand nicking typically is caused by scrubbing or localized wear.

8. What does OSHA specify for attachments to devices defined as cranes and related hoisting equipment?
   A. The category excludes concrete pumps.
   B. The category includes equipment used to move a suspended load.
   C. The category excludes equipment that is rarely used to hoist materials.
   D. The category includes all equipment that could be used to move materials onto a construction site.

9. Limit switches are prohibited for which of the following?
   A. To check capacity
   B. To scale weight
   C. As a fail-safe device
   D. As a stopping device
10. Material handlers or fork trucks may use which of these?

A. A fifth wheel  
B. Double hooks  
C. Front stabilizers  
D. An overload alarm

11. Which statement accurately describes loads on cranes and hoisting equipment?

A. Gross load is the net load plus the weight of all rigging components.  
B. Gross capacity indicates the maximum size of a safe load for a crane.  
C. Net capacity is the most important number in crane safe loading charts.  
D. Net load indicates the total weight of the lift and crane attachments.

12. In rigging, estimates of load weights typically are measured in which of these?

A. Kilograms  
B. Pounds per cubic foot  
C. Grams per cubic meter  
D. Pounds per cubic inch

Class II Crane Sample Question Answer Key

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct Answer</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C</td>
<td><em>IPT Manual</em> 2005, pages 384-6</td>
</tr>
<tr>
<td>2</td>
<td>D</td>
<td>OSHA §1926.1407(a)(2)</td>
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<tr>
<td>4</td>
<td>D</td>
<td>OSHA §1926.1413(a)(2)</td>
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<tr>
<td>5</td>
<td>C</td>
<td><em>IPT Manual</em> 2005, page 220</td>
</tr>
<tr>
<td>6</td>
<td>B</td>
<td><em>IPT Manual</em> 2005, pages 359</td>
</tr>
<tr>
<td>8</td>
<td>A</td>
<td>OSHA 1926.1400 (b)</td>
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<td>9</td>
<td>D</td>
<td><em>IPT Manual</em> 2005, page 528</td>
</tr>
<tr>
<td>10</td>
<td>C</td>
<td><em>IPT Manual</em> 2005, page 409</td>
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