

# 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.

## 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.

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

*<sup>a</sup>Four 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*

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

*<sup>b</sup>Candidates 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>.

1. Garby, Ronald G. *IPT's Crane and Rigging Training Manual, 2005*  
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 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 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. A candidate who passes the Class I written test is eligible to schedule a 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.

## 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.

Boom Length in Feet	Operating Radius in Feet	Boom Angle Degrees	Boom Point: Elev.	Capacity: Crawlers Retracted	Capacity: Crawlers Extended
240 Feet	40	81.4	244.3	89,200	103,100
	45	80.2	243.5	75,200	86,700
	50	78.9	242.6	64,500	74,300
	55	77.7	241.5	56,100	64,600
	60	76.5	240.4	49,300	56,800
	65	75.3	239.1	43,700	50,400
	70	74.0	237.7	38,900	45,000
	75	72.8	236.3	34,900	40,400
	80	71.5	234.6	31,400	36,500
	85	70.3	232.9	28,400	33,100
	90	69.0	231.1	25,700	30,100
	95	67.7	229.1	23,400	27,500
	100	66.4	227.0	21,300	25,100
	105	65.1	224.7	19,400	23,000
	110	63.8	222.3	17,700	21,100
	115	62.5	219.8	16,200	19,400
	120	61.1	217.1	14,800	17,800
	125	59.7	214.3	13,500	16,400
	130	58.3	211.3	12,300	15,100
	135	56.9	208.1	11,200	13,900
140	55.5	204.7	10,200	12,800	
145	54.0	201.2	9,200	11,700	
150	52.5	197.5	8,300	10,800	
155	51.0	193.5	7,400	9,900	
160	49.5	189.4	6,600	9,900	

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

Question	Correct Answer	Reference(s)
1	A	<i>IPT Manual</i> 2005, pages 371-2
2	D	OSHA §1926.1407(a)(2)
3	A	<i>IPT Manual</i> 2005, pages 237-8
4	D	OSHA §1926.1413(a)(2)
5	C	<i>IPT Manual</i> 2005, page 220
6	B	<i>IPT Manual</i> 2005, page 359
7	B	<i>IPT Manual</i> 2005, pages 19-22
8	C	<i>IPT Manual</i> 2005, pages 92-3; OSHA 1926.1431(d)(5)(v)
9	D	OSHA §1926.1431(a)
10	C	<i>IPT Manual</i> 2005, pages 309-10*
11	A	OSHA §1926.553(a)(1)
12	B	<i>IPT Manual</i> 2005, pages 27-28

\* 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'
  
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. 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

Question	Correct Answer	Reference(s)
1	C	<i>IPT Manual 2005, pages 384-6</i>
2	D	OSHA §1926.1407(a)(2)
3	A	<i>IPT Manual 2005, pages 237-8</i>
4	D	OSHA §1926.1413(a)(2)
5	C	<i>IPT Manual 2005, page 220</i>
6	B	<i>IPT Manual 2005, pages 359</i>
7	B	<i>IPT Manual 2005, pages 19-22</i>
8	A	OSHA 1926.1400 (b)
9	D	<i>IPT Manual 2005, page 528</i>
10	C	<i>IPT Manual 2005, page 409</i>
11	A	<i>IPT Manual 2005, page 292</i>
12	B	<i>IPT Manual 2005, pages 27-28</i>