

LOAD CHART & RIGGING PRACTICE



SELF ERECT TOWER CRANE

Potain IGO 50 Tower Crane

CraneSafe Certification

Document #:
Self Erect Tower Crane Practice
LCR.SETC.POIGO50.P1

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CraneSafe
CERTIFICATION

CraneSafe Certification + Fulford Harbour Group
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Introduction

These seven questions are for you to use to help get ready for the load chart and rigging part of the CraneSafe Certification assessment for Self Erect Tower Crane.

The questions on your assessment will be different from these but will be presented in the same format as these questions.

Following the questions are load charts and jib rating charts. We have not included all of the charts for this crane - but everything you need to answer the questions is included in the load and jib charts you have here. You do not need the crane manual or full load chart package to answer the questions.

Following the load charts are rigging tables - use these to help answer the rigging questions included in the practice questions. These same rigging charts will be used in your assessment so it is a good idea to become familiar with them.

Attached to the back of this practice exercise is an answer sheet. The answer sheet explains how we arrived at the correct answer and you can use this to help work through any questions you may have gotten wrong.

The crane industry in BC has stated that operators must get a minimum of five out of seven questions right on the load chart and rigging part of the assessment to be competent.

Operator Information *This section to be completed by Operator*

Operator Name: _____

Employer: _____

Make & Model of Crane _____

Signature: _____

Assessor Information *This section to be completed by Assessor*

Assessor Name: _____

Date of Assessment: Month _____ Day _____ Year _____

Place of Assessment: _____

Load Chart & Rigging Questions

1. Determine the increase in capacity when the SM1 Hook Block is installed at full radius.

- Jib – L40 / 131' 3" @ 0 degrees

Answer: _____ pounds

2. Determine the maximum capacity for this crane configuration?

- Jib – L40 / 131' 3" @ 0 degrees
- Radius – 42' 8"
- Load Block – DM

Answer: _____ pounds

3. Determine the difference in capacity between the two jib lengths below?

- Jib 1 – L40 / 131' 3" @ 0 degrees
- Jib 2 – L40 / 97' 1"
- Hook Block – DM
- Radius – 55' 9"

Answer: _____ pounds

4. Determine the maximum capacity.

- Jib – L40 / 131' 3" @ 0 degrees
- Radius – 82'

Answer: _____ pounds

5. Determine the reduction in capacity.

- Jib – L40 / 97' 1"
- Radius – 84' 8"
- Load Block installed – SM

Answer: _____

6. Determine the minimum size of nylon web slings required to perform this lift.

- 2-Leg Basket Hitch
- Sling Angle – 60 degrees
- Load Weight – 7,000 pounds

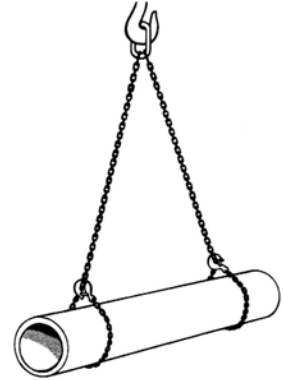
Answer: _____ inches



7. Determine the minimum size of grade 8 alloy steel chains required to perform this lift?

- 2 Leg Bridle Hitch
- Load – choked
- Sling Angle – 45 degrees
- Load Weight – 7,100 pounds

Answer: _____ inch



Reference
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Load Charts



Jib Configuration: L40 with maximum hook reach of 131'-3" at 0°

Hook Reach (ft)	9'-10"	42'-6"	45'-11"	49'-3"	52'-6"	55'-9"	59'-1"	62'-4"	65'-7"	75'-6"	78'-9"	79'-5"	82'-0"	88'-7"	96'-5"	105'-0"	114'-10"	121'-5"	131'-3"
Reeving	Capacities (lbs)																		
SM1	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,233	3,869	3,417	3,164	2,844	2,668	2,425
SM	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,178	4,136	3,968	3,616	3,175	2,932	2,612	2,436	2,205	
DM	8,818	8,818	8,080	7,419	6,845	6,360	5,930	5,556	5,214	4,409	4,178	4,136	3,968	3,616	3,175	2,932	2,612	2,436	2,205

Maximum Hook Heights at Jib Tip: H = 76'-1"
 Maximum Hook Heights at Jib Foot: H = 68'-3"



Jib Configuration: L36 with maximum hook reach of 118'-1" at 0°

Hook Reach (ft)	9'-10"	46'-11"	49'-3"	52'-6"	55'-9"	59'-1"	62'-4"	65'-7"	72'-2"	79'-5"	83'-0"	85'-4"	87'-3"	88'-7"	96'-5"	105'-0"	114'-10"	118'-1"	
Reeving	Capacities (lbs)																		
SM1	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,321	3,825	3,549	3,197	3,086	
SM	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,277	4,158	4,079	3,594	3,318	2,965	2,866	
DM	8,818	8,818	8,311	7,683	7,132	6,658	6,239	5,864	5,225	4,707	4,409	4,277	4,158	4,079	3,594	3,318	2,965	2,866	

Maximum Hook Heights at Jib Tip: H = 75'-2"
 Maximum Hook Heights at Jib Foot: H = 68'-3"



Jib Configuration: L40 with maximum hook reach of 97'-1" at 0°

Hook Reach (ft)	9'-10"	45'-7"	49'-3"	52'-6"	55'-9"	59'-1"	62'-4"	65'-7"	72'-2"	81'-0"	82'-0"	84'-8"	85'-4"	88'-7"	97'-1"
Reeving	Capacities (lbs)														
SM1	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,370	4,178	3,748
SM	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,332	4,173	4,134	3,946	3,527
DM	8,818	8,818	8,058	7,441	6,911	6,449	6,041	5,677	5,060	4,409	4,332	4,173	4,134	3,946	3,527

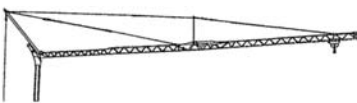
Maximum Hook Heights at Jib Tip: H = 73'-6"
 Maximum Hook Heights at Jib Foot: H = 68'-3"



Jib Configuration: L36 with maximum hook reach of 97'-1" at 0°

Hook Reach (ft)	9'-10"	45'-7"	49'-3"	52'-6"	55'-9"	59'-1"	62'-4"	65'-7"	72'-2"	81'-0"	82'-0"	84'-8"	85'-4"	88'-7"	97'-1"
Reeving	Capacities (lbs)														
SM1	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,370	4,178	3,748
SM	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,332	4,173	4,134	3,946	3,527
DM	8,818	8,818	8,058	7,441	6,911	6,449	6,041	5,677	5,060	4,409	4,332	4,173	4,134	3,946	3,527

Maximum Hook Heights at Jib Tip: H = 73'-6"
 Maximum Hook Heights at Jib Foot: H = 68'-3"



Jib Configuration: L28 with maximum hook reach of 91'-10" at 0°

Hook Reach (ft)	9'-10"	51'-6"	55'-9"	59'-1"	62'-4"	65'-7"	72'-2"	75'-6"	82'-0"	85'-4"	88'-7"	91'-10"
Reeving	Capacities (lbs)											
SM1	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409
SM	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409	4,409
DM	8,818	8,818	8,014	7,485	7,011	6,592	5,886	5,578	5,049	4,828	4,608	4,409

Maximum Hook Heights at Jib Tip: H = 73'-2"
 Maximum Hook Heights at Jib Foot: H = 68'-3"

These charts are for assessment purposes only and should not be used to operate a crane.
 The individual crane's load chart, operating instructions and other instructional plates must be read and understood prior to operating the crane.

Reeving Abbreviations




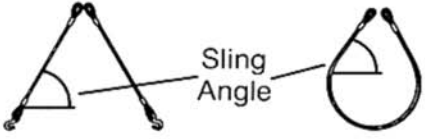
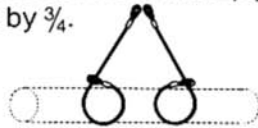
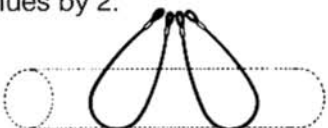
- SM1: 2-part line configuration with section of hookblock removed
SM: 2-part line configuration with section of hookblock stowed at jib
DM: 4-part line configuration

Jib Configurations




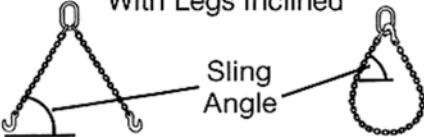
- L40 (131ft / 40m): Standard jib with jib extension (13ft / 4m)
L36 (118ft / 36m): Standard jib
L28 (92ft / 28m): Standard jib with nose removed

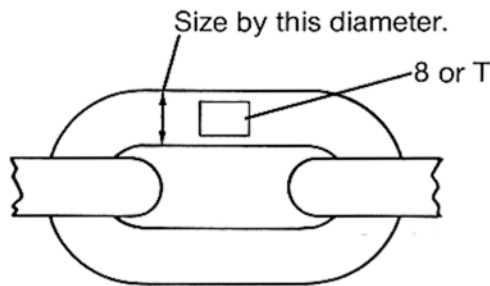
Reference
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Wire Rope Slings

6 x 19 Classification Group, Improved Plow Steel, IWRC						
Rope Diameter (Inches)	MAXIMUM SAFE WORKING LOADS — POUNDS Safety Factor = 5 per OH&S Regulations					
	Single Vertical Hitch	Single Choker Hitch	Single Basket Hitch (Vertical Legs)	2-Leg Bridle Hitch & Single Basket Hitch With Legs Inclined		
					60°	45°
3/16	650	480	1,300	1,100	900	650
1/4	1,150	860	2,300	2,000	1,600	1,150
5/16	1,750	1,300	3,500	3,000	2,500	1,750
3/8	2,550	1,900	5,100	4,400	3,600	2,550
7/16	3,450	2,600	6,900	6,000	4,900	3,450
1/2	4,700	3,500	9,400	8,150	6,650	4,700
9/16	5,700	4,200	11,400	9,900	8,050	5,700
5/8	7,100	5,300	14,200	12,300	10,000	7,100
3/4	10,200	7,650	20,400	17,700	14,400	10,200
7/8	13,750	10,300	27,500	23,800	19,400	13,750
1	17,950	13,450	35,900	31,100	25,400	17,950
1 1/8	22,750	17,000	45,500	39,400	32,200	22,750
1 1/4	28,200	21,200	56,400	48,800	39,900	28,200
1 3/8	34,800	26,100	69,600	60,300	49,200	34,800
1 1/2	41,300	31,000	82,600	71,500	58,400	41,300
				If used with Choker Hitch multiply above values by 3/4. 		
				For Double Basket Hitch multiply above values by 2. 		
Note: Table values are for slings with eyes and thimbles in both ends, Flemish Spliced Eyes and mechanical sleeves.						

Chain Slings

GRADE T (8) ALLOY STEEL						
Chain Size (Inches)	MAXIMUM SAFE WORKING LOADS — POUNDS Safety Factor = 5 per OH&S Regulations					
	Single Vertical Hitch	Single Choker Hitch	Single Basket Hitch (Vertical Legs)	2-Leg Bridle Hitch & Single Basket Hitch With Legs Inclined		
					60°	45°
1/4	2,800	2,100	5,600	4,850	3,959	2,800
3/8	5,680	4,260	11,360	9,838	8,032	5,680
1/2	9,600	7,200	19,200	16,627	13,574	9,600
5/8	14,480	10,860	28,960	25,079	20,475	14,480
3/4	22,640	16,980	45,280	39,212	32,013	22,640
7/8	27,360	20,520	54,720	47,388	38,687	27,360
1	38,160	28,620	76,320	66,093	53,958	38,160
1 1/4	57,840	43,380	115,680	100,179	81,786	57,840

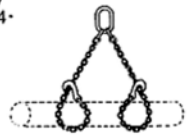


Size by this diameter.


8 or T

Use only alloy steel chain. Links will be stamped with 8 or T.

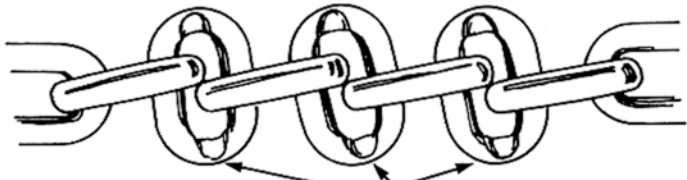
If used with Choker Hitch multiply above values by 3/4.



For Double Basket Hitch multiply above values by 2.



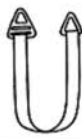
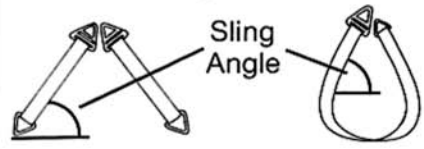
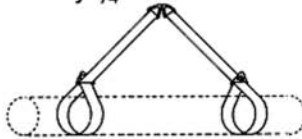
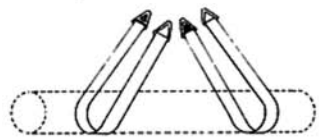


Strength based on ISO Standards and adjusted to reflect a safety factor of 5.



Discard if more than 10% wear at bearing surfaces.

Nylon Web Slings

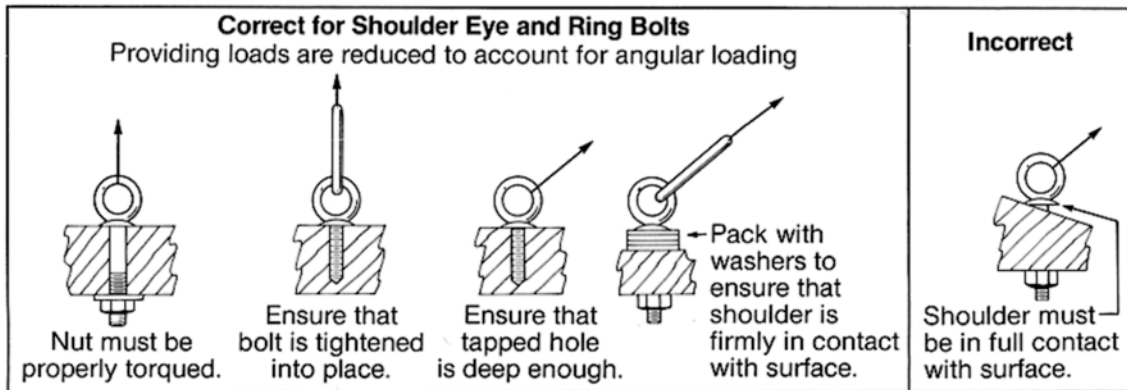
6800 lb/in Material						
MAXIMUM SAFE WORKING LOADS — POUNDS (SAFETY FACTOR =5) (Eye & Eye, Twisted Eye, Triangle Fittings, Choker Fittings)						
Web Width (Inches)	Single Vertical Hitch	Single Choker Hitch	Single Basket Hitch (Vertical Legs)	2-Leg Bridle Hitch & Single Basket Hitch With Legs Inclined		
						
				60°	45°	30°
1	1,100	825	2,200	1,905	1,555	1,100
2	2,200	1,650	4,400	3,810	3,110	2,200
3	3,300	2,475	6,600	5,715	4,665	3,300
4	4,400	3,300	8,800	7,620	6,220	4,400
5	5,500	4,125	11,000	9,525	7,775	5,500
6	6,600	4,950	13,200	11,430	9,330	6,600
				If used with Choker Hitch multiply above values by $\frac{3}{4}$. 		
				For Double Basket Hitch multiply above values by 2. 		
<ol style="list-style-type: none"> For safe working loads of endless or grommet slings, multiply above values by 2. Values have been adjusted to reflect fabrication efficiency (FE) using formulas and tables developed by the Web Sling Association. This accounts for strength loss due to stitching and manufacture. All web slings must carry a load rating tag as specified in OH&S Regulations. 						

Eye Bolts

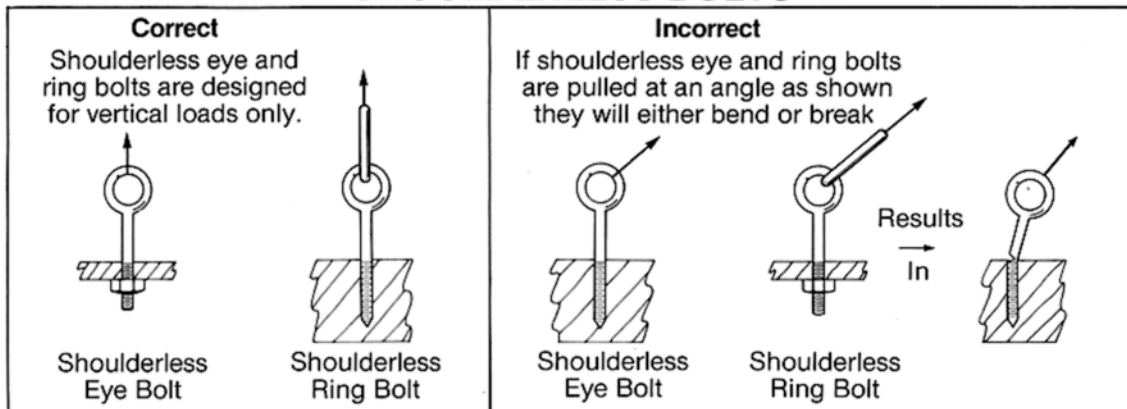
Stock Diameter (Inches)	SAFE WORKING LOADS (LBS) CORRESPONDING TO ANGLE OF PULL			
	Vertical	60°	45°	Less than 45°
1/4	500	175	125	NOT RECOMMENDED
5/16	800	280	200	
3/8	1,200	420	300	
1/2	2,200	770	550	
5/8	3,500	1,225	875	
3/4	5,200	1,820	1,300	
7/8	7,200	2,520	1,800	
1	10,000	3,500	2,500	
1 1/4	15,200	5,320	3,800	
1 1/2	21,400	7,490	5,350	

1. SWL for plain (shoulderless) eye bolts are same as for shoulder bolts under vertical load. Angular loading is not recommended.
 2. Use only forged steel eye bolts.

SHOULDER BOLTS



SHOULDERLESS BOLTS



Answer Key

1. Answer: **220 pounds**

With SM block completely removed, 220 pounds of capacity is gained.

2. Answer: **8,818 pounds**

As per L40 / 131' 3" @ 0 degrees

3. Answer: **551 pounds**

Jib 2: Capacity at 55' 8" radius 6,911 pounds

Jib 1: Capacity at 55' 8" radius 6,360 pounds

551 pounds

4. Answer: **4,233 pounds**

With SM block removed.

5. Answer: **236 pounds**

Difference in Capacity

SM1 block 4,409 pounds

SM block 4,173 pounds

236 pounds

6. Answer: **2 inch**

Capacity of a 2" sling is 3,810 pounds.

$$3,810 \times 2 = 7,620 \text{ pounds}$$

7. Answer: **1/2 inch**

Net Capacity

Capacity of a 3/8" chain 2 part bridle at 45 degrees 8,032 pounds

Deduction for choked hitch 2,008 pounds

6,024 pounds

The capacity for one 1/2" grade 8 alloy steel chain is 10,180.5 pounds.

Reference
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