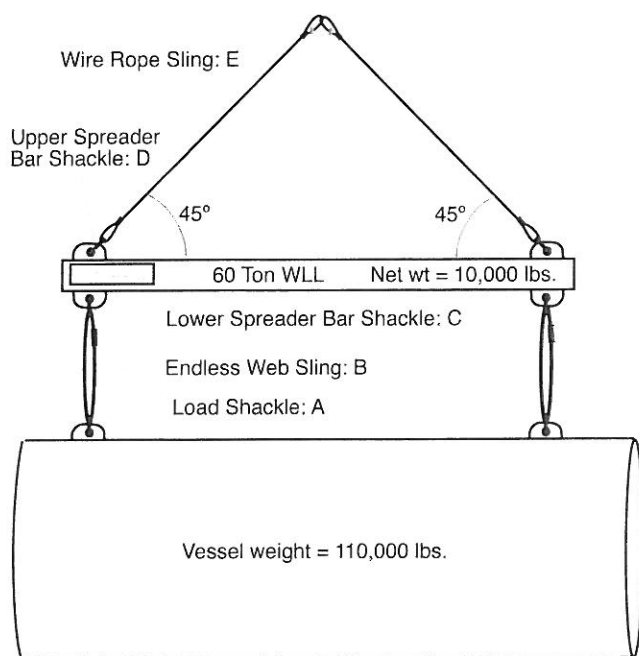


TECHNICAL WORKSHOP

Rigging Selection

Rig from the bottom up. Select the correct rigging for the load below using the Master Rigger's Reference Card panels at the right. Check your answer on Page 3.



- Determine the approximate load per pick point.
- Calculate the approximate tension per sling leg.
- Identify the minimum rigging needed for A, B, C, D and E.

Anticipated Tension	Rigging Selection
A. _____ lb	_____ in.
B. _____ lb	EN _____
C. _____ lb	_____ in.
D. _____ lb	_____ in.
E. _____ lb	_____ in.

Master Rigger's Reference Card

Angles / Ratios / Factors / Formulas / Data

Angle from horizontal	Sling length to height ratio	% of grade	Sling Load Factor [r]	Full Included Angle**	Block Load Factor [FIA**]	Angle from Ceiling
90	1.000 : 1 : 0.000	0.0	1.00	0	2.00	90
85	1.004 : 1 : 0.090	111.1	1.10	10	1.99	85
80	1.015 : 1 : 0.174	574.7	1.10	20	1.97	80
75	1.035 : 1 : 0.269	371.7	1.10	30	1.93	75
70	1.064 : 1 : 0.363	275.5	1.10	40	1.87	70
65	1.104 : 1 : 0.467	214.1	1.20	50	1.81	65
60	1.155 : 1 : 0.578	173.0	1.20	60	1.73	60
55	1.221 : 1 : 0.701	142.7	1.30	70	1.64	55
50	1.305 : 1 : 0.838	119.1	1.40	80	1.53	50
45	1.414 : 1 : 1.000	100.0	1.50	90	1.41	45
40	1.555 : 1 : 1.191	83.9	1.60	100	1.29	40
35	1.742 : 1 : 1.426	70.1	1.80	110	1.15	35
30	2.000 : 1 : 1.732	57.7	2.00	120	1.00	30
25	2.364 : 1 : 2.142	46.7	3.00	130	.84	25
20	2.924 : 1 : 2.748	36.4	3.00	140	.68	20
15	3.861 : 1 : 3.729	26.8	4.00	150	.52	15
10	5.747 : 1 : 5.659	17.1	6.00	160	.35	10
5	11.490 : 1 : 11.446	8.7	12.00	170	.17	5
0	∞ : 0 : ∞	0.0	∞	180	0	0

A



$$A^2 + B^2 = C^2$$

$$C^2 - A^2 = B^2$$

$$C^2 - B^2 = A^2$$

D/d Ratio Strength Efficiencies

$$30:1 = .94$$

$$20:1 = .92$$

$$10:1 = .86$$

$$5:1 = .77$$

$$2:1 = .65$$

$$1:1 = .50$$

B

d = diameter • r = radius • L = length • H = height • W = width
 ∞ = infinity • π or π = 3.1416 (3.2r) • Circumference = πd
 r = rounded • Area of a circle = πr^2 or $(d \times .8)$ • Volume = LWH
 Area of a square = LW • Area of triangle = $LW/2$ • Area of circle, when diameter is doubled it will quadruple the area • Fahrenheit to Centigrade $^{\circ}C = 5/9(^{\circ}F - 32)$ Centigrade to Fahrenheit $^{\circ}F = 9/5(^{\circ}C + 32)$
 • Wt. est. = Vol. in cu.ft. x 500 x density factor .02, .05, .10, .20, .30, etc.

C

1 mile = 5,280 ft., 1,760 yds., 1.61 km / 1 kilometer = .62 mile, 3,281 ft.
 1 yard = 3 ft., 36 inches, .91 meter / 1 meter = 1.09 yds, 39.37 in.
 1 ton (short) = .891 long ton, .91 metric ton, 2,000 pounds, 907 kgs
 1 ton (metric) = 1.1 short ton, .98 long ton, 2,204 lbs, 1,000 kgs
 1 pound = 16 ounces, .45 kg, / 1 kg = 1000 grams, 35 ozs, 2.2 lbs
 1 gallon (US liq) = 4 qts, 3.8 liters / 1 liter = .264 gallon (US), 1.06 qts

Steel Beam & Rigging Gear Capacities

Point load of steel beam			In-line Tension Capacity Chart				
Wide flange beams (W"xF")	[Yield Stress (Fy) 36KSI]		Tension in pounds	Wire Rope Slings 6x19 IPS IWRC	Web Slings Flat Endless	Chain Slings Alloy G-8	Shackles Carbon Steel
	10' span	20' span					
4x4	2,500	500	2,000	3/8	1-901	7/32	3/8
6x4	1,100	200	8,000	3/4	1-903	1/2	3/4
8x8	13,700	3,800	16,000	1	2-903	5/8	1
10x4	1,200	200	24,000	1-1/4	3-903	3/4	1-1/4
10x10	20,400	10,200	34,000	1-1/2	4-904	7/8	1-1/2
12x8	21,100	5,800	45,000	1-3/4	3-906	1	1-3/4
12x12	28,400	17,600	60,000	2	3-908	1-1/4	2
14x8	25,000	6,300	72,000	2-1/4	3-910	1-1/4	2-1/2
14x10	31,300	14,300	86,000	2-3/8	4-910	—	2-1/2
16x10	38,700	16,300	100,000	2-5/8	4-912	—	2-1/2

The above capacities are based on a design factor of 4 and for estimation only. Verify with engineer before using in-plant beam for rigging point.

The above capacities, sling descriptions and choices are for estimating purposes only. Always confirm the actual ratings of rigging equipment prior to making any lift.

The workshop at the left was taken from Mike's Rigging Mysteries, Orange Book. All 110 workshops are available at www.mikesriggingmysteries.com.

Where in the World is Bob?

Bob Schumacher, one of our worldwide traveling trainers, has taken the meaning of accumulating frequent flyer miles to a whole new level. Bob has spent several weeks overseas providing crane and rigging audits for J. Ray McDermott. McDermott has derrick barges that travel to ports worldwide and Bob has the responsibility of



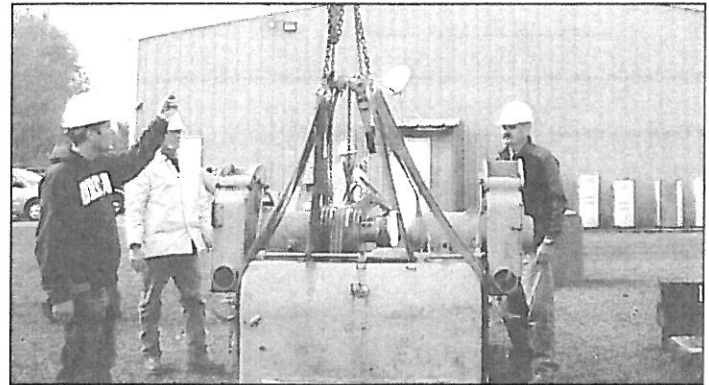
providing annual audits when the barges arrive in port. Bob travels from Dubai to Baku, Singapore to Mexico and other locations. Where in the world will Bob go next? You can pick Bob's next location and win a prize. Email us your answer and the winner

will receive a 3-card pack with our Journeyman Rigger Reference Card, Rigging Gear Inspection Reference Card and our Master Rigger Reference Card.

Bob will be traveling to one of these locations, can you pick where he will be traveling to next?

1. Singapore
2. Batam, Indonesia
3. Dubai, United Arab Emirates
4. Baku, Azerbaijan
5. Gardone, Italy
6. Veracruz, Mexico

Email your entry to whereisbob@wrrc.com.



New Classes for 2009

Lift Director & Site Supervisor

This one day program meets the responsibilities as outlined in ASME B30.5. The program covers lift site preparation, traffic control, load chart confirmation, hazard recognition, multiple crane lifts, lifting personnel, pick and carry operations and responsibilities of the operator, rigger and signaler.

Critical Lift Planning

This one day program covers load affirmation, crane verification, rigging confirmation, work site approval, pre-lift checklist, load schematic and rigging method, load travel path, personnel placement, load handling sequence and proper procedure.

Forklift & Telehandler Operator

This one day program covers terminology, pre-operation inspection, stability and capacity, load chart interpretation, attachments, operating practices, fueling, load handling, calculating load weight and battery care.

Welcome

Industrial Training International, Inc. is pleased to officially announce the addition of two new trainers to our staff. We welcome Jim Cox and Jay Dyson.



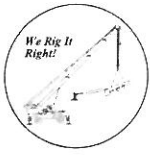
Jim Cox has over 24 years of experience in the rigging supply and overhead crane service industry. His knowledge of rigging applications and crane usage make Jim a great addition to the ITI team. Jim serves as a trainer/consultant for clients needing instruction in rigging and gear inspections, overhead and mobile crane operation, lift planning and accident investigation.

Jay Dyson is a trainer and field service specialist. Jay is currently certified as a Mobile Crane Inspector and an NCCCO Certified Mobile Crane Operator for conventional and hydraulic cranes. Jay's overall experience and knowledge of the crane offer a well-rounded base that promotes safety and efficiency.



The appointment of Jim Cox and Jay Dyson bring additional strength to our training staff and we welcome their upbeat and positive approach to safety and training.

Wire Rope & Rigging Consultants



Did you know that Industrial Training International, Inc. has a division called Wire Rope & Rigging Consultants? Wire Rope & Rigging Consultants provides crane and rigging safety manual development, accident investigation, lift planning, expert witness testimony and crane and rigging audits. Whether developing a simple checklist for daily operation or designing a 200 page procedure manual, WRC can help employers and employees prevent an accident from occurring by pre-planning and developing safe and proper techniques for rigging, crane and heavy equipment operations. Please contact us with any special needs that you may have at 800.727.6355 or by visiting our website at www.wrrc.com.

TIRC Training & Inspection Resource Center

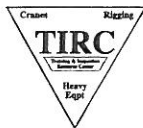
The Training & Inspection Resource Center offers reference materials for the crane, rigging and heavy equipment industry. Reference cards, posters, decals, books, manuals, videos, cd's, inspection forms and miscellaneous items can be found in the TIRC catalog or online at www.tirc.net. Let us help you find the materials to build your reference library or let us help you find the materials to create an in-house program to be presented by a qualified person. You can place an order over the phone at 888.567.8472, by faxing to 360.225.5666 or online at www.tirc.net.



TIRC New Products

Mike's Safety Tips
Item # 7050 – 3 Booklet Set
for \$6.99

These easy to read "tips" booklets work great as a set. Each booklet contains over 25 tips per



subject: rigging practices, mobile crane operations and overhead crane use. Your employees will really enjoy the discussion that is generated around the "tips" subjects during monthly safety meetings. These booklets are also excellent for annual employee handouts, safety gifts and training supplements. To order your set, call 888.567.8472 or visit our website at www.tirc.net.



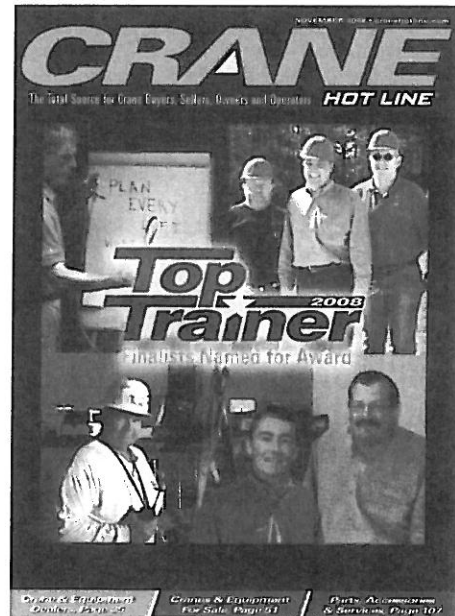
Association of Crane & Rigging Professionals



The ACRP General Meeting will be held on May 5 - 8, 2009 in Las Vegas, Nevada. The theme of the meeting will be "Don't Gamble on Rigging". For more information contact ACRP at 800.690.3921 or on the web at www.acrp.net.

CRANE Trainers of the Year

ITI trainers Devon Beasley, Russ Donaldson and ITI President, Mike Parnell were nominated and received the award of "Professional Trainer of the Year" from Crane Hotline Magazine. The November 2008 issue recognized Devon, Russ and Mike for their innovative training techniques and hands-on instruction.



Devon, Russ and Mike continue to develop programs that are "fresh and new" by working with professional organizations that are instrumental in adopting standards and regulations that promote a safe work environment and operation.

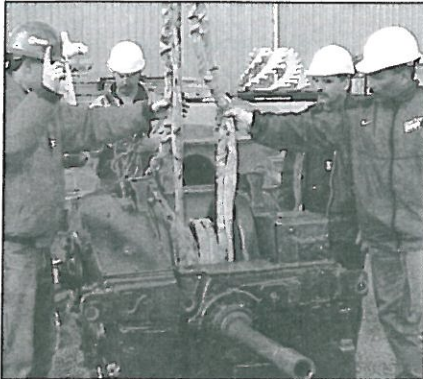
Industrial Training International, Inc. wishes to congratulate corporate top trainer Ray Feidt, corporate honorable mention winners Al Abel and Jim Canfield and the professional top trainer honorable mention winner Ronald Gray.

Answers to Page 1 Workshop

- | | |
|---------------------|-------------------------|
| A. 55,000 lb, 2 in. | D. 84,600 lb, 2 1/2 in. |
| B. 55,000 lb, 3-908 | E. 84,600 lb, 2 3/8 in. |
| C. 55,000 lb, 2 in. | |

CLIENT SITE TRAINING PROGRAMS

Course length varies based on the number of participants and course subjects selected.



Lift Director / Site Supervisor

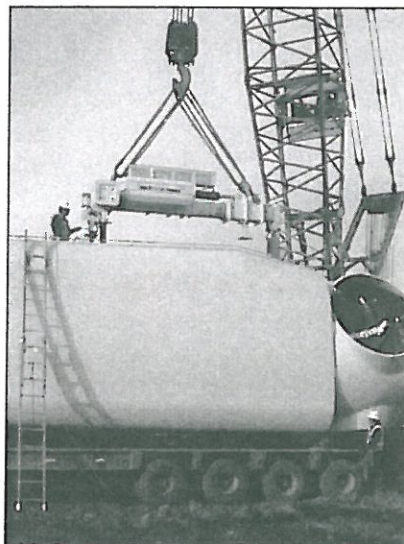
- Lift Site Preparation
- Traffic Control
- Load Chart Confirmation
- Responsibilities of Operator, Rigger, Signaler
- Hazard Recognition
- Multiple Crane Lifts
- Lifting Personnel
- Pick & Carry Operations

Course Length: 1-2 Days

Journeyman Rigger Program

- Terms & Definitions
- Load Weight Estimation
- Center of Gravity
- Rigging Removal Criteria
- Load Control
- Rigging Capacities
- Sling Angles & Tensions
- Horizontal Rigging
- Sling & Rigging Selection
- Rigging Procedures
- Accident Case Studies
- OSHA/ASME Standards
- Hands-On Workshops

Course Length: 2-3 Days



Aerial Work Platform Operator

- Introduction to Work Platforms
- Pre-Operational Inspection
- Control Functions
- Operating Practices
- ASME Standards
- Hands-On Operating

Course Length: 1 Day

Forklift/Telehandler Operator

- Introduction to Forklifts
- Operator Qualifications
- Components
- Daily Inspections
- Operating Practices
- Stability
- Safety
- Maintenance
- OSHA/ASME Standards
- Hands-On Operating

Course Length: 1-2 Days

Master Rigger Program

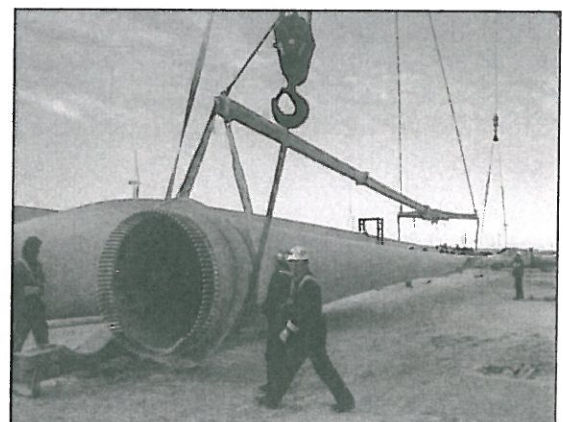
- Journeyman Rigging Review
- Load Weight Estimation
- Discover the CG
- Off-Level Pick Points
- Jacking & Rolling
- Incline Plane
- Chain Fall Load Drifting
- Spreader Bar Lifts
- Rigging Blocks & Winching Workshop
- Accident Case Studies
- Communications
- Hands-On Workshops

Course Length: 3-5 Days

Critical Lift Planning

- Load Affirmation
- Crane Verification
- Rigging Confirmation
- Worksite Approval
- Pre-lift Checklist
- Load Schematic
- Load Travel Path
- Load Handling Sequence Procedures

Course Length: 1-2 Days



CLIENT SITE TRAINING PROGRAMS

Course length varies based on the number of participants and course subjects selected.

Rigging Gear Inspector Basics

- Wire Rope Slings
- Synthetic Web & Round Slings
- Alloy Chain Slings
- Rigging Hardware
- Below-the-Hook Lifting Devices
- Hands-on Inspections
- OSHA/ASME Standards

Course Length: 1 Day

Boom Truck Operator

- Daily Inspections
- Boom Truck Set-up
- Load Chart Interpretation
- Operator Responsibilities
- Rigging Practices
- Operating Practices
- Communication
- Operating Near Power Lines
- OSHA/ASME Standards
- Hands-On Operating

Course Length: 3-4 Days

Mobile Crane Operator

- Introduction to Mobile Cranes
- Technical Information
- Operating Practices
- Leverage
- Lift Considerations
- Communications
- Daily Inspection
- Rigging Practices
- Load Chart Workshop
- Accident Case Study
- OSHA/ASME Standards
- Hands-On Operating

Course Length: 4-5 Days

Rigging Gear Inspector Level I & II

- Wire Rope
- Wire Rope Slings
- Synthetic Web & Round Slings
- Alloy Chain Slings
- Rigging Hardware
- Below-the-Hook Lifting Devices
- OSHA/ASME Standards
- Written Exams
- Students' Hands-On Inspection Evaluations

Course Length: 3 Days

Overhead Crane Inspector

- Hoist Chain Inspection
- Wire Rope Inspection
- Daily, Monthly & Annual Checklists
- Limit Switches
- Brakes
- Structural
- Drive Trains
- OSHA/ASME Standards
- Hands-On Inspections

Course Length: 2-4 Days

Overhead Crane Operator

- Introduction to Overhead Cranes
- Daily Inspections
- Control Functions
- Crane Operating Practices
- Hand Signals
- Rigging
- OSHA/ASME Standards
- Hands-On Operating

Course Length: 1-2 Days

Mobile Crane Inspector

- Inspection Requirements
- Safety Procedures
- Inspection Components
- Mechanical Systems
- Structural Components
- Electrical, Hydraulic & Air Systems
- Hoist Systems
- Safety Items
- OSHA/ASME Standards
- Hands-On Inspections

Course Length: 2-4 Days

UPCOMING EVENTS

January 2009

- 4 -7 SCRA January Board & Committee Meetings in Midway, UT
- 6 Forklift & Telehandler Operator Training in Woodland, WA
- 7 - 8 Journeyman Rigger Training in Woodland, WA
- 13 - 16 Master Rigger Training in Woodland, WA
- 18 - 21 ASME B30 Committee Meetings in Las Vegas, NV
- 22 ACRP Board Meeting in Las Vegas, NV

February 2009

- 3 - 5 Rigging Gear Inspector Level III in Woodland, WA
- 9 - 13 NCCCO Mobile Crane Operator Certification in Woodland, WA
- 10 - 12 Rigging Gear Inspector Level I in Birmingham, AL
- 17 - 19 Construction Safety Council Annual Safety Conference in Rosemont, IL
- 24 - 27 Mobile Crane Inspector Training in Woodland, WA

March 2009

- 3 - 6 Master Rigger Training in Woodland, WA
- 9 -13 NCCCO Mobile Crane Operator Certification in Woodland, WA
- 16 - 20 Mobile Crane Operator Training in Woodland, WA
- 24 - 27 Rigging Gear Inspector Level I in Woodland, WA
- 30 - Apr. 1 Boom Truck Operator Training in Birmingham, AL
- 31 AEM Executive Committee Meeting in Washington, DC
- 31 Lift Director & Site Supervisor Training in Woodland, WA

April 2009

- 1 Critical Lift Planning Training in Woodland, WA
- 2 Forklift & Telehandler Operator Training in Woodland, WA
- 6- 10 NCCCO Mobile Crane Operator Certification in Woodland, WA
- 19 -22 AWRP General Meeting in Austin, TX
- 21 - 22 Overhead Crane Inspector in Birmingham, AL
- 23 - 24 NCCCO Overhead Crane Operator Certification in Birmingham, AL
- 23 - 24 Journeyman Rigger Training in Woodland, WA
- 28 - May 1 Mobile Crane Inspector Training in Woodland, WA

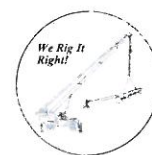
ITI Testimonials

"Recently we were required to make a 3-crane pick on an ice breaker barge being built at our facility. This was a specialty lift that required several months of pre-planning including developing a critical lift plan and organizing pre-lift meetings with everyone involved. The lift was a great success! Our experienced crew has gained tremendous knowledge and skill by attending advanced training and hands-on activities provided by Industrial Training International. Challenging workshops, hands-on instruction and superior instructors prepared us to accomplish projects like this!"

*Troy Higdon, Crane & Rigging Instructor
ACL-Jeffboat*

"As the media reminds us of the high rates of accidents occurring to operators and riggers, we at Cianbro Companies strive to provide our employees with the skills and knowledge of how to prevent an accident. In the past our company has received Master Rigging Training from Industrial Training International. They offer a hands-on approach by providing rigging gear inspection, proper rigging procedures and load control using almost any vertical or horizontal rigging system. The classroom teaching techniques and hands-on learning exercises that we have received from the Industrial Training International group has guided our company in creating our own successful in-house rigging training program. The Industrial Training International crew and facilities are truly a world class group, solely dedicated to educating and improving the crane and rigging world."

*George Arsenault, Rigging Training Coordinator,
Cianbro Companies*



The Professional Rigger is a publication of Industrial Training International, Inc. It is distributed to those whose occupations require the safe and proper use of lifting and rigging equipment.

For more information contact
The Professional Rigger
 PO Box 1660, Woodland WA 98674
 360.225.1100
 or visit our website: www.wrrc.com