

# The Professional Rigger®

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## Technical News

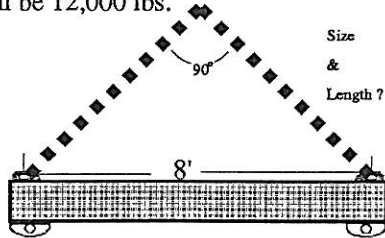
### Calculating Sling Legs

When our consultants conduct rigging courses, they teach the participants a quick method to calculate the minimum size and length of slings for a given load using a formula which has been included at the bottom of our rated capacity card.

**Problem:** We need to install a set of slings between the crane hook and a spreader bar, which will create a 90 degree full included angle or less.

**Question #1:** What size of wire rope slings do we need?

**Facts:** Spreader bar length is 8'. The weight of the load, bar and rigging gear will be 12,000 lbs.



**Solution #1:** Since we want to rig the load at a 90 degree angle or less, we can look in the 90 degree column on the rated capacity card and find what size of wire rope meets or exceeds 12,000 lbs. We find that the sling legs will need to be made of at least 3/4" wire rope.

**Question # 2 -** What is the minimum length for these slings?

**Facts:** A quick calculating formula has been included at the bottom of the rated capacity card. (See bottom left corner.) **SLING LENGTH** is the minimum length of sling needed from the crane hook to the sling's connection or contact point on the load.

**LOAD WIDTH** (or length) is the distance between the load's shackle (connection) points or load edges.

**MULTIPLIER** is the number located at the bottom of each degree angle column, and is used in the formula according to which angle (60, 90, 120) the slings form when installed.

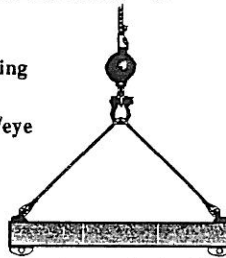
**Sling Length = Load Width x Multiplier**

**Solution #2:** Since the pad eyes are 8' apart, let 8 represent **LOAD WIDTH** and the **MULTIPLIER** is .75, as taken from the bottom of the 90 degree column.

$$\text{SLING LENGTH} = 8' \times .75$$

$$\text{SLING LENGTH} = 6'$$

Hook-to-bar rigging should be:  
(2) 3/4" x 6' eye/eye slings



Now a chance to test the reader's skills.

What size and length of slings would you need between the hook and a 20' spreader bar? [Total wt. of load and rigging = 25,000 lbs.]

**Angle    Size    Length**

60    \_\_\_\_ x \_\_\_\_

90    \_\_\_\_ x \_\_\_\_

120    \_\_\_\_ x \_\_\_\_

[Solution Pg. 2, Col. 3]

## SAFETY TIPS

### People vs. Loads - No Contest !

Many accidents and near misses can be avoided if precautions are taken concerning the number of people around, under and above a load when it is being transported from one location to another. During the pre-lift meeting, many questions should be asked as to the people and machinery in the load's travel route.

1.) What are the consequences to people and machinery should the lifting device or a piece of rigging gear fail?

2.) Will there be construction, maintenance or production people at work areas near the load's planned route? Can those people temporarily leave their work areas as the load passes?

3.) Is there an alternative route which reduces the risk to people and equipment? Is the alternative reasonable and cost-efficient?

4.) Is anyone assigned to serve as a spotter for hazards to vehicle or pedestrian traffic? Example: Pinch-point between a rubber-tire mobile crane and surrounding equipment or machinery.

5.) Are rigging crew members in an unnecessary risk position as pertains to the load's movement? Example: Under the load while trying to align the load's placement onto a bolt pattern. If a piece of gear failed, would the crew members be protected in some way?

6.) Will there be a tag line or restraining device used to prevent dangerous load sway?

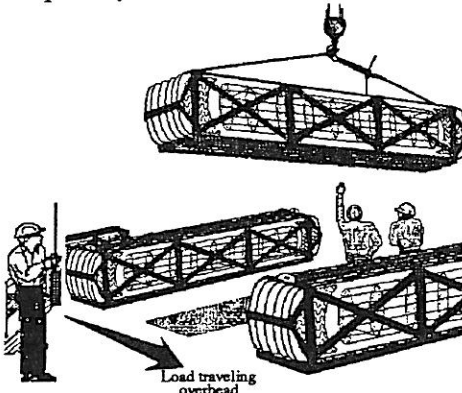
7.) Would it be safer to roll, skid or dolly the load along the travel path, rather than from an overhead lifting device? What is the capacity of the floor, foundation or support system?

Wire Rope - Mechanical Splice Slings - Rated Capacity In Pounds						
SLING DIAMETER (inches)	VERTICAL	CHOKER	STRAIGHT	BASKET		
				INCLUDED ANGLES		
				60°	90°	120°
1/4	1,120	840	2,200	1,940	1,580	1,120
5/16	1,740	1,300	3,400	3,000	2,400	1,740
3/8	2,400	1,860	4,800	4,200	3,600	2,400
7/16	3,400	2,400	6,800	5,800	4,800	3,400
1/2	4,400	3,200	8,800	7,600	6,200	4,400
9/16	5,600	4,200	11,200	9,600	7,800	5,600
5/8	6,800	5,000	13,600	11,800	9,600	6,800
3/4	9,800	7,200	19,600	16,800	13,800	9,800
7/8	13,200	9,800	26,400	22,000	18,600	13,200
1	17,000	12,800	34,000	30,000	24,000	17,000
1 1/8	20,000	15,800	40,000	36,000	30,000	20,000
1 1/4	26,000	18,400	52,000	44,000	36,000	26,000
1 3/8	30,000	22,000	60,000	52,000	42,000	30,000
1 1/2	36,000	26,000	72,000	62,000	50,000	36,000
1 5/8	42,000	30,000	84,000	72,000	60,000	42,000
1 3/4	50,000	36,000	100,000	86,000	70,000	50,000
MULTIPLIER				1.00	.75	.60

(For 60, 90, & 120 full Included Angles) Sling length = Load width x Multiplier

[SAFETY TIPS cont.]

8.) Can the load or rigging gear make accidental contact with a high voltage line? Can the power be disconnected or temporarily shut-off?



9.) What are the environmental conditions (wind, temperature, rain, ice, etc) which can have direct affects on the load or gear?

10.) Will the rigging gear and lifting devices be fully inspected before use?

## CLIENT NEWS

### Western Area Power Admin.

The line maintenance crews assigned to WAPA's Huron, S.D. region will be participating in a two-day program in January, 1989.

Mr. Bob Jones of WAPA has requested that WRRC present a course which includes block & tackle rigging, rigging from tower arms and a hands-on session. This is WRRC's second comprehensive program for WAPA, the first conducted last February in Ft. Peck, MT.

### WA-Dept. of Labor & Industries

Mr. Pete Schmidt, Safety Regional Administrator and D. D. Hoffman, Training Coordinator for the State of Washington Dept. of L & I requested a special short course on wire rope, slings and rigging gear inspection to be presented to 36 compliance officers gathered for a one week training program in Pasco, WA on September 26, 1988.

State regulations and ANSI standards

were addressed and the participants were asked to inspect field samples for abused, worn and defective rigging gear.

### SC & RA

The magazine, LIFTING & TRANSPORTATION INTERNATIONAL reported that the 45th SC&RA Annual Convention held at the Saddlebrook Resort in Wesley Chapel, FL attracted approx. 500 members. WRRC joins industry members in offering its congratulations to the following 1988 Job of the Year Award Winners.

#### Hauling Job of the Year

(Trucking) Miller Transfer and Rigging Co.  
(Moving) Econofreight United Transport Ltd.

#### Millwright Job of the Year

Belding Corp.

#### Rigging Job of the Year

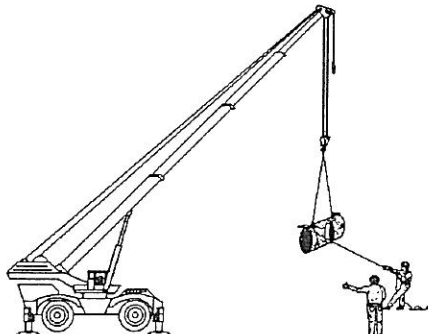
(<\$100K) Commercial Contracting Corp.  
(\$100K-\$750K) Shaughnessy & Co.  
(>\$750K) Grayston White & Sparrow Ltd.

Those involved or interested in heavy hauling and rigging could benefit greatly by subscribing to LIFTING & TRANSPORTATION INTERNATIONAL, a bi-monthly publication of the Specialized Carriers & Rigging Association, headquartered in Alexandria, VA. [For association information or magazine subscriptions call (703) 838-1980.]

### Weyerhaeuser Paper Co.

Mr. John Remmers, Training Coordinator at Weyerhaeuser's Longview, WA paper mill contracted WRRC to present a 5-day Mobile Crane Operator Training Program.

The program was instructed by guest consultant, Mr. Devon Beasley of EG&G Idaho Inc., a Dept. of Energy nuclear facility near Idaho Falls. Mr. Beasley is an 18-year crane operator/instructor and a



member of the teaching staff of the Idaho National Engineering Laboratory.

The course for Weyerhaeuser included three days of classroom instruction and written examinations, then two days of hands-on skills proficiency testing using three mobile units at six load stations.

### Occidental Chemical

The cell repair and maintenance crews of Occidental Chemical's Delaware City, DE facility made full use of the three-day rigging course provided in late October. Occidental's Henry Walton, George Sturgis and John Kline asked that a special session on chain-fall rigging and a hands-on course be included to round out the program sessions.

A number of rigging accident case study workshops were also conducted to help reinforce the need for "safety-first" when the Occidental crews are faced with such a large variety of rigging and lifting tasks.

### City of Los Angeles - Water & Power Dept.

Mr. Ike Descallar of the Los Angeles Water & Power Dept., contracted WRRC to present a series of rigging courses for 150 employees who routinely perform a variety of rigging tasks. The crew members participating in the classroom and hands-on programs were challenged with many problem solving and accident case study workshops as a part of the instructional format. The October

[Solution to problem, Pg. 1, Col. 2]

Angle	Size	Length
60	1" x	20'
90	1-1/8" x	15'
120	1-1/4" x	12'

The Professional Rigger is a quarterly publication of Wire Rope & Rigging Consultants, Inc. It is distributed to those whose occupations require the safe and effective use of lifting and rigging equipment. For more information contact: Editor, The Professional Rigger, PO Box 728, Vancouver, WA 98666 (206) 693-6030

(City of L.A., cont.)

training series also included the proper use of an operator's and rigger's checklist for safe rigging operations.

## Pacific Power

Mr. Dick Laudahl of Medford, OR, the District Operations Manager for Pacific Power's southern Oregon and northern California district, has requested a comprehensive rigging program for the area distribution crews during January.

A special session addressing tower arm rigging and block & tackle systems will cap-off WRRC's two, 2-day courses.

## Boise Cascade Paper Group

Maintenance planner Mr. Jerry Martin of Boise Cascade Paper Group in St. Helens, OR arranged for WRRC to provide a series of two-day comprehensive rigging courses for millwrights and maintenance personnel.

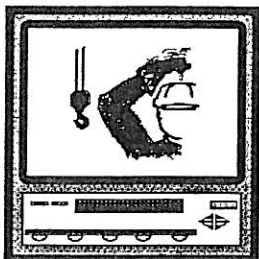
The October programs included rigging gear inspection, rigging applications and rigging design. The use of WRRC's Rigging Simulator presented crew members with typical problems encountered with overhead beam and confined space rigging.

## WRRC NEWS

### Video Tape Program

WRRC is offering a free preview (no preview charge) of any or all WRRC video tapes, for Preview Orders received between November 15, 1988 and January 15, 1989.

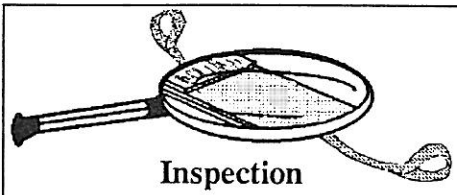
This limited-time offer is available to all clients in the U.S., Canada, Australia and Europe. [Shipping and customs charges will be billed to the client.]



## Certified Inspector Program

The next scheduled CIP course will be on March 21-24, 1989 in Vancouver, WA.

The five CIP sections cover wire rope, wire rope slings, synthetic web slings, alloy chain slings, and rigging hardware/proof testing. The instructional format is based on OSHA CFR 29 1910, ANSI B30 series, ASTM A-391, ASTM E-4 and RR-W-410D. The participants are required to pass written and hands-on field inspection



tests to complete each course section. (Refer to WRRC's Training Brochure for details.)

This course is available to organizations or companies in North America. Please contact WRRC to sponsor a local program.

## OSHA / ANSI

### Regulations and Standards

OSHA regulations or ANSI standards are printed here as a service to our clients.

### Crawler, Locomotive & Truck Cranes

[The following are from the 7-1-85 edition of 29CFR Ch.XVII§1910.180(h)]

- (2.i) *Attaching the load.* The hoist rope shall not be wrapped around the load.
- (3.i.b) *Moving the load.* The load is well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches.
- (3.ii.b) *Moving the load.* Multiple part lines shall not be twisted around each other.
- (3.ii.c) *Moving the load.* The hook shall be brought over the load in such a manner as to prevent swinging.
- (3.iv) *Moving the load.* Side loading of booms shall be limited to freely suspended loads. Cranes shall not be used

for dragging loads sideways.

- (3.v) *Moving the load.* No hoisting, lowering, swinging, or traveling shall be done while anyone is on the load or hook.

## Alloy Steel Chain Slings

[The following are from the 7-1-85 edition of 29CFR Ch.XVII§1910.184(e)]

- (1) *Sling identification.* Alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity and reach.
- (2.ii) *Attachments.* Makeshift links or fasteners formed from bolts or rods, or other such attachments, shall not be used.
- (3.ii) *Inspections.* The employer shall make and maintain a record of the most recent month in which each alloy steel chain sling was thoroughly inspected, and shall make such record available for examination.
- (7.i) *Repairing and reconditioning alloy steel chain slings.* Worn or damaged alloy steel chain slings or attachments shall not be used until repaired. When welding or heat testing is performed, slings shall not be used unless repaired, reconditioned and proof tested by the sling manufacturer or an equivalent entity.
- (7.ii) *Repairing and reconditioning alloy steel chain slings.* Mechanical coupling links or low carbon steel repair links shall not be used to repair broken lengths of chain.

## President's Corner

### Research, Review & Respond

When preparing for any rigging job, the rigging supervisor must research all aspects of the load, the lifting or moving devices and the environment - above, below and around.

Once the research has been completed, the information must be objectively reviewed. All of the bits and pieces have to make sense. Have you ever said, "I had a gut feeling that wasn't right".

Respond to the task methodically and with confidence.

R. Michael Parnell

**WIR**

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