

The Professional Rigger®

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TECHNICAL NEWS

CG & SLING TENSIONS

Many things affect the distribution of weight being lifted at various pick points on a load:

1) Where the slings or lifting attachments are secured in relation-

ship to the load's CG. 2) If the pick points are not equidistant from the CG, then the weight distribution will probably be unequal. 3) If the slings lifting the load are not in a straight vertical plane, there'll be added tension in the slings due to the angle.

Using Section 2 of WRRC's Rigger's Reference Card, find the

solutions to the problems below. Focus on identifying how the weight of each load is distributed in regard to the respective pick points. If an angle is involved, how much additional load is introduced to the sling(s)?

[See if you can design a better rigging system for each of the examples below.]

#1

Tension in sling A =

Tension in sling B =

Load wt. = 8,200 lbs.

#2

Tension in sling C =

Tension in sling D =

Load wt. = 22,000 lbs.

Load Factors

To find c (hypotenuse)
 Given: $a^2 + b^2 = c^2$ Sample: $4^2 + 3^2 = c^2$, $16 + 9 = c^2$, $25 = c^2$, $\sqrt{25} = 5$

5,000 # 5,000 #
 Tension in c = $\frac{\text{length c}}{\text{length a}} \times \text{share of load wt.}$ $\frac{c}{a} = \text{Load Factor}$
 Given: length c = 10' and length a = 8', what is tension in c?
 Solution: Tension in c = $\frac{10}{8} \times 5,000$, $T_c = 1.25 \times 5,000$, $T_c = 6,250\#$

How much tension in chain come-a-long A?
 Ten. in A = $\frac{3}{1} \times 4,000$ Ten. in A = 12,000 # **8,000 #**

INVERSE PROPORTION TO DISTANCE	
Hoist A tension	Hoist B tension
$8 + 2 = 10$, $\frac{2}{10} = .20$	$8 + 2 = 10$, $\frac{8}{10} = .80$
$.20 \times 10,000 = 2,000$	$.80 \times 10,000 = 8,000$
A = 2,000 + 1/2 beam wt.	B = 8,000 + 1/2 beam wt.

#3

Tension in sling E =

Tension in sling F =

Load wt. = 16,000 lbs.

#4

Tension in sling G =

Tension in sling H =

Load wt. = 30,000 lbs.

(see solutions to this workshop on pg. 3, col. 3)

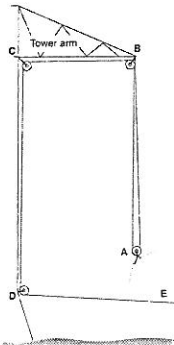
CLIENT NEWS

UTAH POWER & LIGHT

Forty UP&L employees participated during the two-day Comprehensive Rigging Course conducted during the week of April 8. Mr. Ron Freestone contracted WRRC to present a program which included rigging gear inspection and load control practices for vertical and horizontal rigging systems. ♦

WESTERN AREA POWER ADMINISTRATION

A two-day Comprehensive Rigging Course was conducted on February 20 and 21, 1991 for 30 WAPA employees. Mr. Don Moranville, Safety Manager for WAPA, asked WRRC to present an eight-hour classroom program followed by a series of field rigging exercises. ♦



PACIFIC POWER

Mr. Darrell Goodfellow and Mr. Rich Schaffer requested four 2-day line crew rigging courses be conducted for Pacific Power employees based in central and northern Wyoming. Dead-ending poles and towers plus skyline application workshops were presented during the classroom portions, followed by hands-on segments which required moving a series of loads using one, and at times two, line trucks. ♦



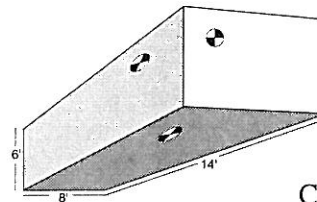
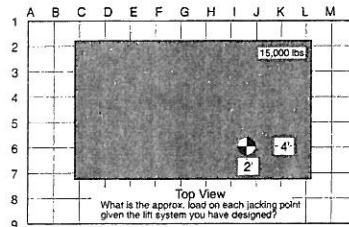
BOISE'S RIGGING SUPPLY

Boise, Idaho was the location of a one-day Mini-Rigging Program conducted by WRRC in March. Approx. 100 customers of Boise's Rigging Supply attended. The workshops included basic hitch types, tension on sling legs, load control, center of gravity and lift points, and a special session on tie-down and roll-lashing.

The afternoon was capped off with an open-house at Boise's Rigging, which included demonstrations of splicing and pull testing. ♦

JIM BRIDGER POWER PLANT

Maintenance crews at Pacific Power's Jim Bridger Power Plant participated in a series of hoisting & rigging workshops designed to enhance their skill levels in load control, load weight calculation, sling tensions, offset CGs, picking & turning loads and more. Mr. Les Paulson coordinated the eight days of activities. ♦



E G & G OF IDAHO, INC.

E G & G of Idaho in Idaho Falls was the site for a 3-day Certified Inspector Program. Mr. Harold Thorne contracted WRRC to conduct the training for 12 employees. The program was presented to develop and increase the participants' skills and knowledge in wire rope and rigging gear maintenance and inspection. The five sections covered during the program included wire rope, wire rope slings, synthetic web slings, alloy chain slings and rigging gear/testing. Written exams on each section were given and a series of rigging gear inspections were performed. ♦

WEYERHAEUSER

WRRC was asked by Mr. Dick Bold, Maintenance Skills Education Mgr. for Weyerhaeuser in Springfield, OR, to develop and present a Skills Beyond Journeyman Program covering state and federal regulations on rigging gear and running rope inspections, rigger's responsibilities, and advanced classroom/hands-on rigging and overhead crane operator training. The program includes complete testing of all participants and is being conducted over a period of several weeks. ♦

Weyerhaeuser in Everett, WA was the site for three two-day Comprehensive Rigging Courses held in February and March. Mr. Mike Fish, Maint. Supervisor, asked WRRC to present the programs.

The courses included extensive classroom instruction of proper rigging techniques and load control methods followed by a series of field rigging exercises. ♦

North Bend, OR was the location for a two-day Overhead Crane Operator "Train-the-Trainer" Program on March 18

and 19, 1991. Three operators participated in the course which was coordinated by Weyerhaeuser's Ms. Helen Aten. The program included classroom sessions with written exams and hands-on operator evaluations were completed by each person moving live loads according to an operator's checklist. ♦

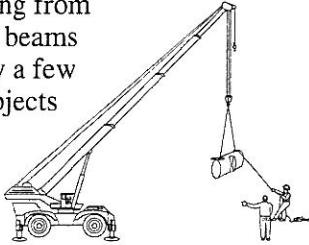
The Professional Rigger is a quarterly publication of Wire Rope & Rigging Consultants, Inc. It is distributed to those whose occupations require the safe and effective use of lifting and rigging equipment. For more information contact: Editor, The Professional Rigger, PO Box 728, Vancouver, WA 98666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

MASTER RIGGER COURSE - DJPP

Mr. K. Dale Williams of Pacific Power's Dave Johnston Power Plant in Glenrock, WY requested WRRC conduct its Master Rigger's Course for the core group of millwrights who are generally responsible to handle the toughest rigging jobs within the plant. A combination of indoor and outdoor activities made for a very challenging 4 days.

Jacking and rolling, load turning and drifting from overhead beams were only a few of the subjects covered.

The teams made a series of load movements using a blended crane operator and rigger's checklist. ♦



WESTERN ENERGY COMPANY

In early March, WRRC conducted a week long Comprehensive Rigging Course with hands-on instruction for Western Energy Company in Colstrip, MT. Mr. Jerry Morris coordinated the training program for over 60 employees. The participants were divided into two groups, each receiving eight hours of classroom activity followed by an extensive series of field rigging exercises with the participants implementing the items covered in the class segments. ♦



TWO 1991 CERTIFIED INSPECTOR PROGRAMS

Last Spring

Some of the companies who attended the March 1991 CIP program included Boeing, Trojan Nuclear, Chelan County PUD,

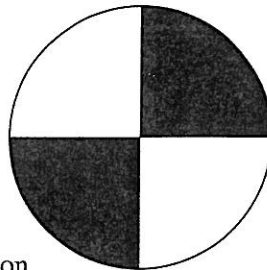
Mason & Hanger, Fiberweb North America, Omaha Public Power, McDermott, Weyerhaeuser, Baltimore Gas & Electric, E G & G, Tooele Army Depot, Longbeach Naval Shipyard, Jones Oregon Stevedoring, Longshoreman Local 21, Davis Erection, Montana Power, Rochelle Coal, Wright Schuchart Harbor, Westinghouse Hanford, Ross Island Sand & Gravel, Delcon Engineering, Rasmussen Wire Rope & Rig., and Stevedoring Services of America.

Upcoming Fall Course

WRRC will be sponsoring another CIP program this year on **October 22-24, 1991** due to the tremendous interest and participation by our clients. This program provides the employer-designated person with a high level of skill and knowledge as to the proper requirements and methods of inspection which pertain to the five subject areas of Wire Rope, Wire Rope Slings, Synthetic Web Slings, Alloy Steel Chain Slings, Rigging Hardware and Proof/Destructive Testing, according to the removal criteria based on the applicable OSHA, ANSI, ASTM and AISI regulations, standards and guidelines. Please see the program flyer enclosed for more information. ♦

'92 RIGGING CONFERENCE PLAN EARLY!

The date for RC'92 has been scheduled for March 10-12, 1992 in Norwalk (Los Angeles) CA. CABLECO will be this year's Regional Host. We are looking forward to another outstanding conference! Put the dates on your calendar and



'92 Rigging conference (cont.)

call today to register, as seating is limited to the first 160 paid registrants due to the unique hands-on session. Please see the enclosed Rigging Conference 1992 Flyer for more information. (WRRC has a promotional Rigging Conference video available upon request.) ♦

CG & Sling Tensions Workshop Solutions (from pg. 1)

#1

To find tension in A

$$6+6=12, 6/12=.5 \times 8,200=4,100 \text{ lbs.}$$

[Minimum wire rope diameter = 1/2"]

To find tension in B

$$6+6=12, 6/12=.5 \times 8,200=4,100 \text{ lbs.}$$

[Minimum wire rope diameter = 1/2"]

#2

To find tension in C

$$6/4=1.5, 1.5 \times (22,000/2)=16,500 \text{ lbs.}$$

[Minimum wire rope diameter = 1"]

To find tension in D

$$6/4=1.5, 1.5 \times (22,000/2)=16,500 \text{ lbs.}$$

[Minimum wire rope diameter = 1"]

#3

To find tension in E

$$4+6=10, 6/10=.6$$

$$.6 \times 16,000=9,600 \text{ lbs.}$$

[Minimum wire rope diameter = 3/4"]

To find tension in F

$$4+6=10, 4/10=.4$$

$$.4 \times 16,000=6,400 \text{ lbs.}$$

[Minimum wire rope diameter = 5/8"]

#4

To find tension in G

$$7+3=10, 3/10=.3$$

$$.3 \times 30,000=9,000$$

$$9,000 \times (8/4)=18,000 \text{ lbs.}$$

[Minimum wire rope diameter = 1-1/8"]

To find tension in H

$$7+3=10, 7/10=.7$$

$$.7 \times 30,000=21,000$$

$$21,000 \times (5/4)=26,250 \text{ lbs.}$$

[Minimum wire rope diameter = 1-3/8"]

WRRC NEWS

(cont.)

NEW VIDEOTAPE RELEASE

Synthetic Slings & Ropes

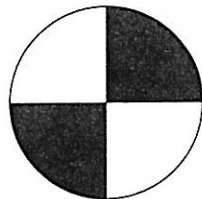
Pre-Use Safety Inspection

Videotape • Handbook • Quiz

This videotape visually illustrates how synthetic rigging gear can be damaged in the field, then identifies the proper inspection criteria and techniques for synthetic flat and round web slings, plus three strand, "2 in 1" type double braid and hollow braid synthetic ropes. Handbook and quizzes are available which can be given to the viewer to measure the effectiveness of the film. Preview charge is \$25, \$145 rental for one week, and \$425 purchase. Call WRRC today for more info (206) 693-6030. ♦

MAGNETIC CG LOGO

WRRC has designed, produced and uses a magnetic CG logo which helps riggers and crane operators to focus on rigging to the CG (center of gravity).



3-3/4" ←

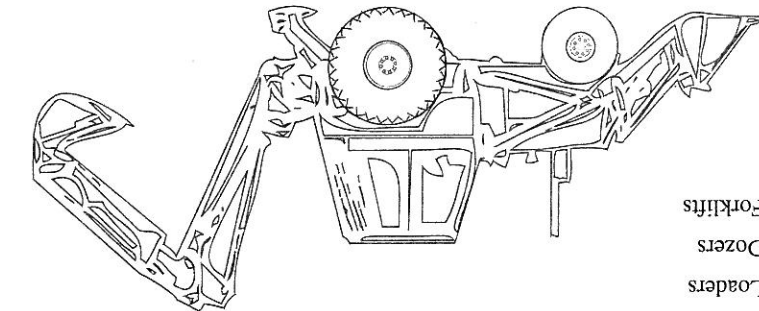
Many of our clients have requested and purchased these magnetic CG logos for their crews. They are used as safety awards, "safe-rigging" reminders, teaching tools, and actual targets for live rigging activities. Whatever the use, they are handy to have for a variety of applications. These magnetic logos can be purchased for \$2 or less depending on the quantity. Order from WRRC : (206) 693-6030. ♦

A one-day "Train-the-Trainer" Bridge Crane Training Course was conducted for employees of STC Submarine Systems, Inc. The Portland, OR employer's Safety & Training Admin., Mr. Wes Olson, will oversee the continuation of the program in the future. ♦

STC SUBMARINE SYSTEMS

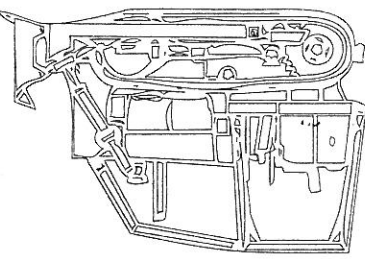
Grant County PUD's Senior Electrical Engineer, Mr. Roger Supervisor, contracted CET to conduct a series of classroom and hands-on training courses to address their Cat Dozer and JD Backhozer/Loader at their Wenatchee, WA location. Chelan County PUD employees were required to perform earthmoving activities incorporating safety, efficiency of motion and maximum production. ♦

GRANT COUNTY PUD



Mobile Cranes
Overhead & Gantry Cranes
Evaluating Work Platforms
Suspended Personnel Platforms
Backhoes
Scrapers
Loaders
Dozers
Forklifts

Weyerhaeuser Co. CET will be conducting a series of load securement and tie-down training courses for yard and road drivers at Weyerhaeuser's Longview, WA facility. Mr. David Stout, Technical Training Coordinator, contracted CET to present the program which will focus on the handling and securing of rolls used in paper machines. The rolls weigh between 2,000-60,000# and vary from 10-20'. Much of the course content addresses over-the-road hauling and tie-down requirements as established by state and federal standards. ♦



Mr. Roger Bennett, Maintenance Supervisor, contracted CET to conduct a series of classroom and hands-on training courses to address their Cat Dozer and JD Backhozer/Loader at their Wenatchee, WA location. Chelan County PUD employees were required to perform earthmoving activities incorporating safety, efficiency of motion and maximum production. ♦

CHELAN COUNTY PUD

CRANE & EQUIPMENT TRAINING, INC. CET is off to a roaring start with a number of first class training programs under its belt for 1991. CET (formerly a division of WRRC) is providing on-site skills training courses for the following:

NEWS

