We Rig It Right!

The Professional Rigger®

Volume 12 Number 3 December 1997

TECHNICAL NEWS

Pick & Turn

To upright a load, precautions must be taken to avoid overloading any equipment, whether crane(s) or rigging gear. In this workshop we are given the load's weight of 27,000 lbs. The available lifting points have been designed into the load [concrete column with steel anchored lugs]. The precast column must be picked and turned in midair. (If the column was lifted only at the double lug end, we might cause excessive bending and buckling).

The first step is to determine the distribution of weight. When the column is suspended in a horizontal position, how much will be carried by the main hoist and how much by the auxiliary hoist? After we determine the load at each hoist, then we can select the rigging which has sufficient rated capacity to meet or exceed the anticipated loading.

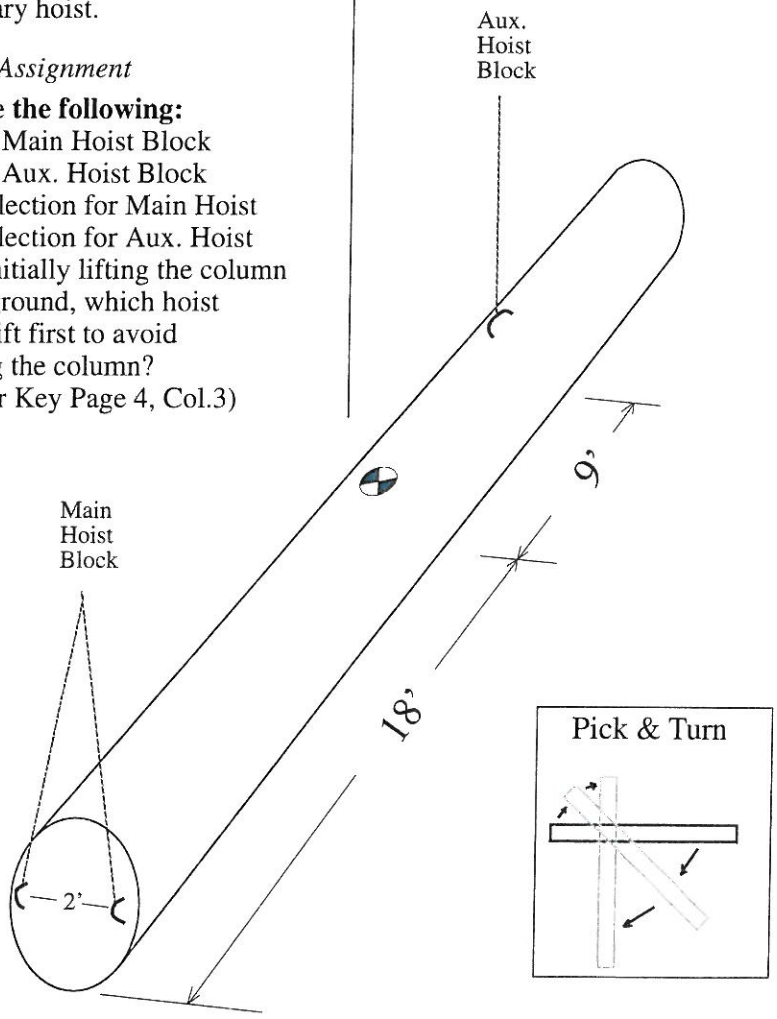
Use Section 2 from the Journeyman Rigger's Reference Card to solve the questions relating to weight distribution.

Then use Section 1 to choose the proper wire rope slings to be attached to the main hoist and auxiliary hoist.

Workshop Assignment

Determine the following:

1) Load to Main Hoist Block
2) Load to Aux. Hoist Block
3) Sling selection for Main Hoist
4) Sling selection for Aux. Hoist
5) When initially lifting the column off the ground, which hoist should lift first to avoid buckling the column?
(Answer Key Page 4, Col.3)



Journeyman Rigger's Reference Card
Section 1

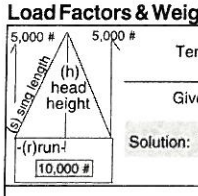
Sling Capacities MECHANICAL SPLICE IN POUNDS DESIGN FACTOR 5:1 ①

Wire Rope IPS IWRC	Size in inches	VERTICAL	CHOKER	2 - Legs or Basket 90° 1.00	60° .85	45° .70	30° .50	3 - Legs 60° Only if 1/3 each leg	Size in mm	Wire Rope IPS IWRC
	1/4	1,100	840	2,200	1,940	1,580	1,100	2,900	6.4	
	5/16	1,700	1,300	3,400	3,000	2,400	1,700	4,500	8.0	
	3/8	2,400	1,860	4,800	4,200	3,600	2,400	6,300	9.6	
	7/16	3,400	2,500	6,800	5,800	4,800	3,400	8,700	11.0	
	1/2	4,400	3,200	8,800	7,600	6,200	4,400	11,400	13.0	
	9/16	5,500	4,200	11,000	9,600	7,700	5,500	14,400	14.0	
	5/8	6,800	5,000	13,600	11,800	9,600	6,800	17,700	16.0	
	3/4	9,700	7,200	19,400	16,800	13,600	9,700	25,200	19.0	
	7/8	13,000	9,800	26,000	22,000	18,300	13,000	33,000	22.0	
	1	17,000	12,800	34,000	30,000	24,000	17,000	45,000	25.4	
	1-1/8	20,000	15,600	40,000	36,000	30,000	20,000	54,000	28.5	
	1-1/4	25,000	18,400	50,000	42,000	34,000	25,000	63,000	32.0	
			MULTIPLIER →	1.00	.75	.60	← MULTIPLIER			

Formula to find sling length Total distance between pick points x Multiplier = Sling Length

Journeyman Rigger's Reference Card
Section 2

Load Factors & Weight Distribution ②

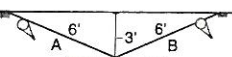


Tension in s = $\frac{\text{length s}}{\text{length h}}$ x share of load wt. $\frac{s}{h}$ = Load Factor

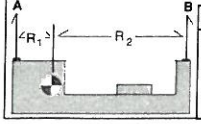
Given: length s = 10' and length h = 8' What is tension in s?

Solution: Tension in s = $\frac{10}{8}$ x 5,000 Ts = 1.25 x 5,000 Ts = 6,250#

How much tension in chain come-a-long A?



Tension in A = $\frac{6}{3}$ x 4,000 Tension in A = 8,000 # 8,000 #



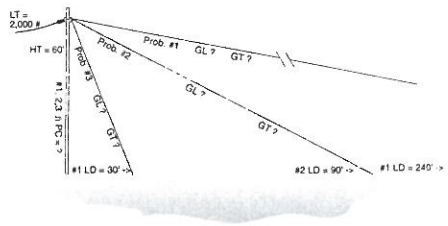
Share of Load Wt. @ A	Share of Load Wt. @ B	Legend
$R_1 + R_2$ = TS	$R_1 + R_2$ = TS	R_1 = Run, Side 1
R_2 = P	R_1 = P	R_2 = Run, Side 2
TS	TS	TS = Total Span
P x W = Share of Load Wt @ A	P x W = Share of Load Wt @ B	P = Percentage
		W = Weight of Load

CLIENT NEWS

Lineman Rigger Programs

A number of WRRC clients have recently requested Lineman Rigger Programs. This 2-day program can accommodate up to 24 individuals and can be conducted as a four day school with two back-to-back programs.

The classroom instruction includes load weight estimation, determining center of gravity and rigging gear capacities.



During the hands-on session, a pole and cross-arm structure is used for dead-ending and cross-arm loading exercises. The use of WRRC's Lineman Rigger's Reference Card as a field tool assists in determining the tension in span lines and guys and tension. The card offers such useful information as wire design factors and copper wire size. Dynamometers are connected to various attachment points to help reinforce crew members' calculated loads and tension when securing guys and anchors.

Recent clients of this program include:

Mission Valley Power
Polson, MT • September 9 - 12

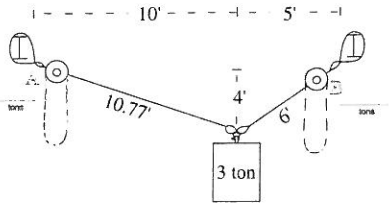
Montana Power
Butte, MT • September 18 - 19

Lane Electric
Eugene, OR • September 29 - Oct. 2

Pacificorp
Rexburg, ID • November 4-5

Grant County PUD

A four day Master Rigger Program was conducted for 14 mechanics, electricians, and crane operators at the Wanapum Dam location. The classroom portion of the program



included drifting loads using two hoists and inclined planes. Hands-on stations included jacking & rolling, load leveling techniques, inclined planes and determining CG by weighing each end of the load.

The use of dynamometers during the hands-on sessions helped to reinforce estimation methods used to calculate the load weights, CG and the amount of tension on the slings at various angles.

American Commercial Barge Line (ACBL)

WRRC instructors have completed over 20 weeks of training for individuals at 15 ACBL locations. Programs have included Rigging, Crane & Rigging Management and Mobile & Overhead Crane Operator Training.

Attendees have been very enthusiastic about the training they have received. Comments regarding the major strong points of the program include; load chart interpretation, learning why and how to make a proper and safe lift on any crane, and pre-lift inspections.

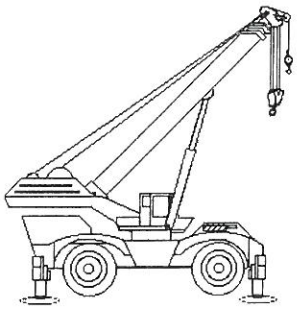
Participants agree they have greatly increased their knowledge and skill level of crane and rigging operations and are now more confident in performing the daily activities necessary for their jobs.

Pacific Gas Transmission

WRRC just completed 4 weeks of commercial driver's license instruction and 1 week of dozer/backhoe training at PGT's Rosalia, Sand Point and Redmond locations.

Mason & Hanger

WRRC's Devon Beasley conducted Mobile Crane Operator and Rigger Training for 14 individuals at the Pantex Plant in Amarillo, TX.

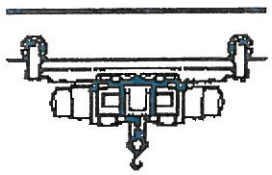


The activity-centered program included the use of WRRC's crane simulator which demonstrates weight distribution and outrigger loading.

During the classroom portion participants were instructed in load weight calculation, rigging to the center of gravity, stability & control, and hitch capacities.

Burlington Northern

Lincoln, NE was the site of an Overhead Inspector Program. Three days were dedicated to training 8 new inspectors and one day was spent recertifying 7 previous attendees. Participants became familiar with the inspection criteria as outlined in the OSHA & ANSI Standards.



The Professional Rigger
is a publication of
Wire Rope & Rigging Consultants.
It is distributed to those whose
occupations require the
safe, proper, and proper use of
lifting and rigging equipment.
For more information contact
The Professional Rigger
PO Box 1660 • Woodland WA 98674
(360) 225-1100

Cranes Rigging
TIRC
Training & Inspection Resource Center
Heavy Eqpt

WINTER SPECIAL!

ORDER BEFORE JAN. 30, 1998
Toll Free • 1-888-567-8472
M-F 8am-5pm (PST)

Wire Rope & Rigging Consultant's Training Products Available Through TIRC!

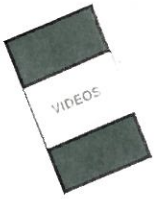
Over 120 other products available. Call *TODAY!* for your free catalog.
- **Personal Items**
- **Rigging Crew Gear**
- **Training Products**
- **Inspection Tools**
- **Safety Committee Awards**

We Rig It Right! Hat

White cap with navy blue bill. Embroidered crane with slogan "We Rig It Right". One size fits all.
Item #9060 - $12.00/ea.

Video Tapes

Slings & Rigging Hardware
44 minutes
Sling types, their use and benefits are covered, as well as inspection.
Item #4030



Basic Rigging
34 minutes
A comprehensive rigger's checklist, hitch types and more.
Item # 4040

Synthetic Slings & Ropes
28 minutes
Inspection criteria and techniques are shown for synthetic, flat and round web slings.
Item # 4060

Hand Signals 16 minutes
An instruction film in standard hand signals used during safe crane operations.
Item # 4010

Rigger's Reference Cards

10% Off Any Combination Order of 50 Cards or More
Offer Good Through January 30, 1998.

Journeyman Rigger's Reference Card
Over 200,000 sold in 7 countries, this 10 panel card shows load drifting, offset CG, weights, and much more
Item #3010
Spanish Version #3011

typical style folds to 2" x 3.25"

Any combination of cards are available at the following quantity discount price schedule.	
1-49	$4.95/ea.
50-99	$4.50/ea.
100-499	$4.00/ea.
500-999	$3.75/ea.
1000-1999	$3.50/ea.
2000-2999	$3.25/ea.
3000+	$3.00/ea.

Rigging Gear Inspection
Latest removal criteria for rigging gear and slings (wire rope, web, round, and alloy chain).
Item #3050

Lineman Rigger's Reference Card
Card shows dead-ending poles/ towers, cross-arm loads, loads at center span and much more.
Item #3020

Coming Soon!

Mobile Crane Operator's Card
20 panel folding card addresses the following subjects: Crane Leverage, Pre-Op Inspection, Crane Setup, etc.
Item #3070 - $7.95 each

Heavy Equipment Operator's Card
Equipment specific panels cover pre-op inspections and operating practices for various types of heavy equipment
Item #3040

Master Rigger Version
Five panels on each side display level & incline plane, 1/2/3/4 leg lifts, CG's, CoF and more.
Item #3020

We Rig It Right!

The Professional Rigger®

Volume 12 Number 3 December 1997

TECHNICAL NEWS

Pick & Turn

To upright a load, precautions must be taken to avoid overloading any equipment, whether crane(s) or rigging gear. In this workshop we are given the load's weight of 27,000 lbs. The available lifting points have been designed into the load [concrete column with steel anchored lugs]. The precast column must be picked and turned in midair. (If the column was lifted only at the double lug end, we might cause excessive bending and buckling).

The first step is to determine the distribution of weight. When the column is suspended in a horizontal position, how much will be carried by the main hoist and how much by the auxiliary hoist? After we determine the load at each hoist, then we can select the rigging which has sufficient rated capacity to meet or exceed the anticipated loading.

Use Section 2 from the Journeyman Rigger's Reference Card to solve the questions relating to weight distribution.

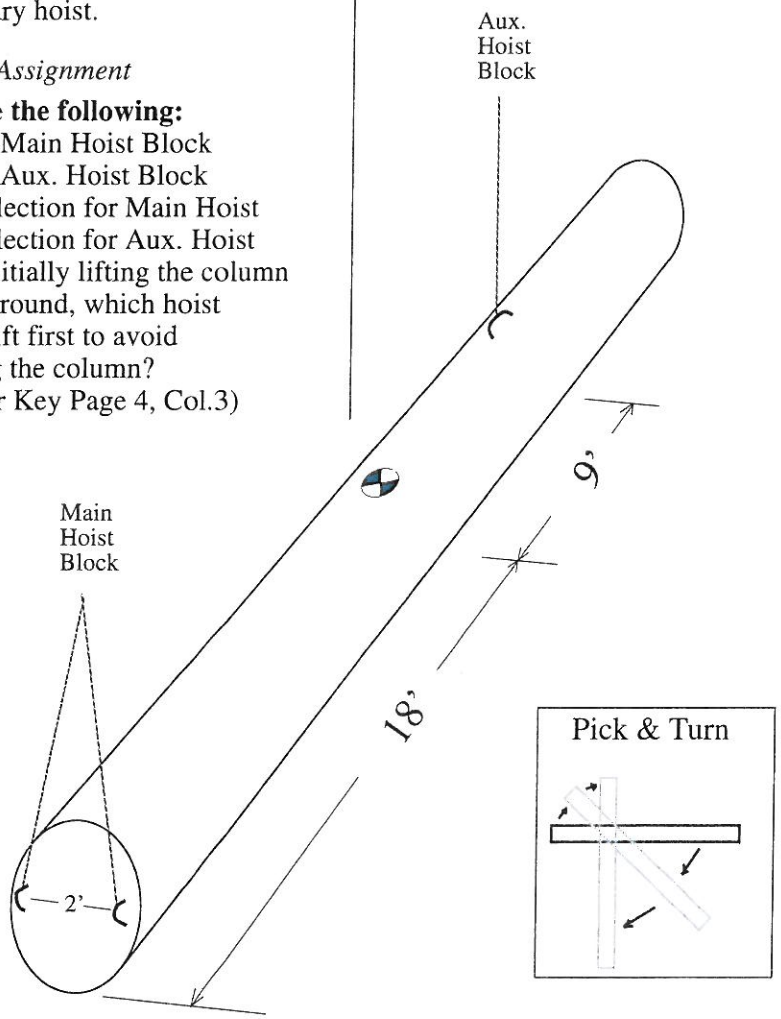
Then use Section 1 to choose the proper wire rope slings to be attached to the main hoist and auxiliary hoist.

Workshop Assignment

Determine the following:

1) Load to Main Hoist Block
2) Load to Aux. Hoist Block
3) Sling selection for Main Hoist
4) Sling selection for Aux. Hoist
5) When initially lifting the column off the ground, which hoist should lift first to avoid buckling the column?

(Answer Key Page 4, Col.3)



Journeyman Rigger's Reference Card
Section 1

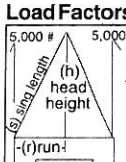
Sling Capacities MECHANICAL SPLICE IN POUNDS DESIGN FACTOR 5:1 ①

Wire Rope IPS IWRC	Size in inches	VERTICAL	CHOKER	2 - Legs or Basket 90° 1.00	60° .85	45° .70	30° .50	3 - Legs 60° Only # 1/3 each leg	Size in mm	Wire Rope IPS IWRC
	1/4	1,100	840	2,200	1,940	1,580	1,100	2,900	6.4	
	5/16	1,700	1,300	3,400	3,000	2,400	1,700	4,500	8.0	
	3/8	2,400	1,860	4,800	4,200	3,600	2,400	6,300	9.6	
	7/16	3,400	2,500	6,800	5,800	4,800	3,400	8,700	11.0	
	1/2	4,400	3,200	8,800	7,600	6,200	4,400	11,400	13.0	
	9/16	5,500	4,200	11,000	9,600	7,700	5,500	14,400	14.0	
	5/8	6,800	5,000	13,600	11,800	9,600	6,800	17,700	16.0	
	3/4	9,700	7,200	19,400	16,800	13,600	9,700	25,200	19.0	
	7/8	13,000	9,800	26,000	22,000	18,300	13,000	33,000	22.0	
	1	17,000	12,800	34,000	30,000	24,000	17,000	45,000	25.4	
	1-1/8	20,000	15,600	40,000	36,000	30,000	20,000	54,000	28.5	
	1-1/4	25,000	18,400	50,000	42,000	34,000	25,000	63,000	32.0	
			MULTIPLIER →	1.00	.75	.60	← MULTIPLIER			

Formula to find sling length Total distance between pick points x Multiplier = Sling Length

Journeyman Rigger's Reference Card
Section 2

Load Factors & Weight Distribution ②

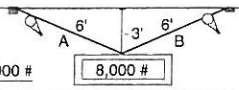


Tension in s = $\frac{\text{length s}}{\text{length h}}$ x share of load wt. $\frac{s}{h}$ = Load Factor

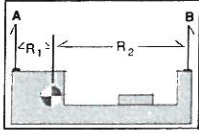
Given: length s = 10' and length h = 8' What is tension in s?

Solution: Tension in s = $\frac{10}{8}$ x 5,000 Ts = 1.25 x 5,000 Ts = 6,250#

How much tension in chain come-a-long A?



Tension in A = $\frac{6}{3}$ x 4,000 Tension in A = 8,000 # 8,000 #



Share of Load Wt. @ A	Share of Load Wt. @ B	Legend
$R_1 + R_2$ = TS	$R_1 + R_2$ = TS	R_1 = Run, Side 1
$\frac{R_2}{TS}$ = P	$\frac{R_1}{TS}$ = P	R_2 = Run, Side 2
P x W = Share of Load Wt @ A	P x W = Share of Load Wt @ B	TS = Total Span
		P = Percentage
		W = Weight of Load