The Professional Rigger®

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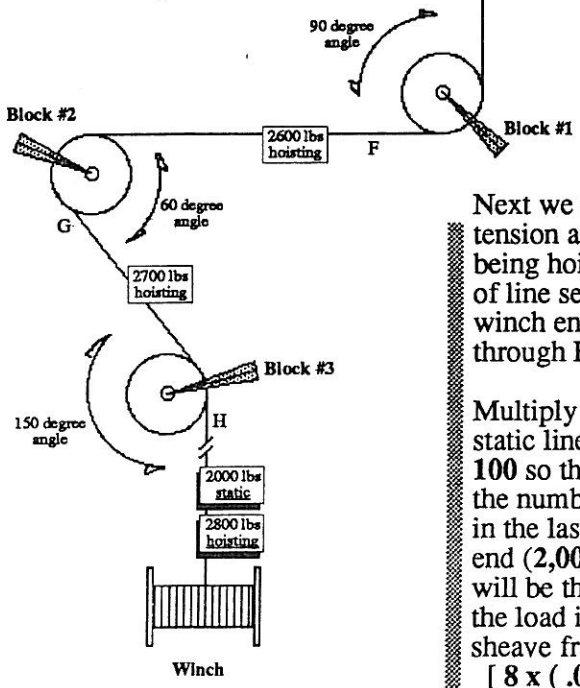
Technical News

Block & Tackle / Snatch Blocks

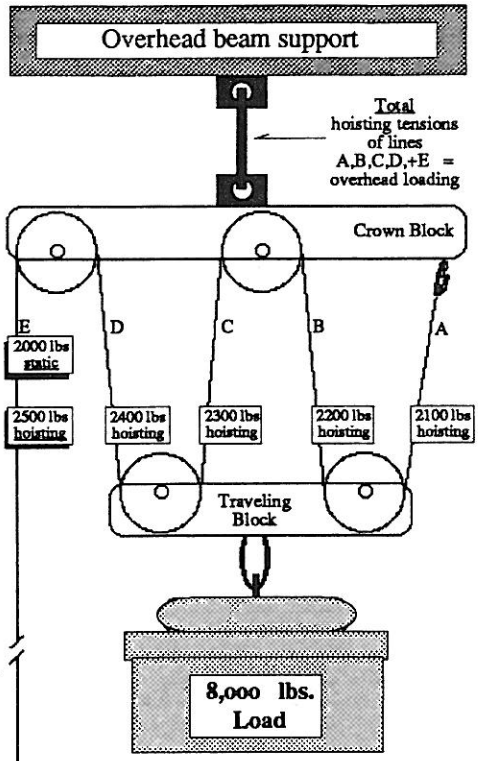
Block and tackle rigging and skidding loads via winch and snatch blocks are tried and true rigging systems which are still actively used in underground mining, ship repair, power utility work, machinery installation/removal, logging, and millwright jobs in many industries.

When setting up a block & tackle system, we want to know the weight of the load and rigging gear, the lead line pull necessary to hoist the load and the resulting load on the overhead support beam or head structure.

How many parts of line are working for us in the illustrated block & tackle system? Count the number of lines entering and exiting the traveling block. If we divide the load weight by this number, we'll know the approx. tension on the lead line when the load is not in motion (static). 8,000 divided by 4 = 2,000 lbs.



A 4-part block & tackle system. Lead line is running through 3 snatch blocks in a horizontal plane.



Next we can determine the lead line tension at the winch when the load is being hoisted by counting the number of line sections from dead end to winch end, in this case line sections A through H = 8.

Multiply that number (**8**) by 5% of the static line tension (2,000) which = **100** so that (8 x 100 = **800**), then add the number **800** to the tension found in the last line section at the winch end (**2,000**). This new number **2,800** will be the lead line's tension when the load is being hoisted (accounts for sheave friction and rope flexing).

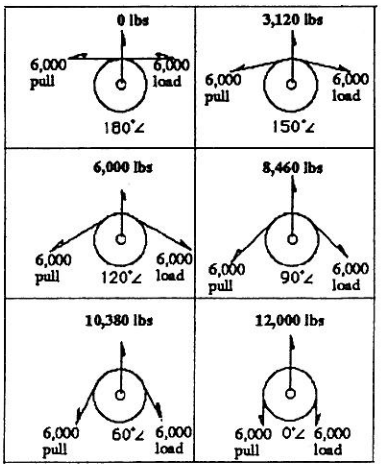
[8 x (.05 x 2000)] + 2000 = 2800

The next area of concern is the load being introduced to the overhead beam support. We can estimate the load by adding the hoisting tensions of line sections A through E to arrive at the approximate load being put on the beam.

A =	2100	
B =	2200	
C =	2300	
D =	2400	
E =	2500	
Beam Tension =	11,500	(plus rigging)

Another area to be addressed is the tension being placed on the snatch blocks. The example table below indicates the load factor to use, which should be multiplied by the line tension closest to the winch drum.

Line Angle	Load Factor	Line Pull	Block Tension
180	-0- x	6000 =	-0-
150	.52 x	6000 =	3,120
120	1.00 x	6000 =	6,000
90	1.41 x	6000 =	8,460
60	1.73 x	6000 =	10,380
0	2.00 x	6000 =	12,000



Now let's see what the tensions are at block positions 1, 2, & 3 in the illustration to the left.

Line section F @ 2,600 x 1.41 = 3,666 lbs tension in block #1

Line section G @ 2,700 x 1.73 = 4,671 lbs tension in block #2

Line section H @ 2,800 x .52 = 1,456 lbs tension in block #3

Client News

Sacramento County

Mr. Graham McEntire, Training Officer for the Sacramento County Water Quality Div. contracted WRRC to instruct maintenance and operations crews in safe rigging practices. The April '89 course will be conducted by WRRC consultant Dave Schaner, and will include classroom and hands-on training sessions.

Coors Brewing Co.

Mr. Del McDonald, Training Supervisor for Coors in Golden, CO has contracted WRRC to present a comprehensive 5-day course for a select group of maintenance people within the plant. The program will be partially instructed by Mr. Walter F. Hirth, rigging expert and author of a number of rigging instruction manuals used in North America.

The course will cover rigging, hoisting with bridge/gantry and mobile cranes, plus a special series on jacking and rolling machinery. Two days of actual rigging & hoisting and jacking & rolling loads will help evaluate the particpants' skills.

Hemlo Gold Mine

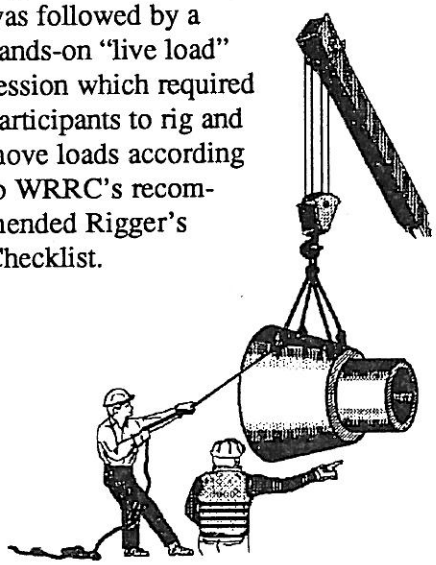
Mr. Dan Nelson, Plant Superintendent for Hemlo Gold Mine in Marathon, ONT Canada requested that WRRC conduct two, 2-day instructional rigging courses for shop and underground crews working at the mine, located on the north shore of Lake Superior.

Maneuvering loads and equipment up and down the mine's shaft, then landing those loads safely onto various levels can present a number of challenges. WRRC's Rigging Simulator provided the crews with insight as to tensions introduced when using air tugger winches during block & tackle and snatch block type rigging.

Seattle City Light

Mr. Paul Weintraub, Exec. Asst. to Dir. of Oper. for Seattle City Light coordinated a series of 2-day rigging courses for sub-station maintenance, electrical construction, power house and warehouse crews.

Eight hours of classroom instruction was followed by a hands-on "live load" session which required participants to rig and move loads according to WRRC's recommended Rigger's Checklist.



Basin Electric Power Coop.

Mr. Bayard Jones, Training Supervisor for BEPC's Laramie River Power Plant in Wheatland, WY, coordinated a series of 2-day comprehensive rigging courses for coal-yard and plant employees. The courses which were conducted last December, addressed a variety of rigging applications which the BEPC crews must face on a year-round basis.

Idaho Power

Line and sub-station maintenance crews of Idaho Power Co. in Pocatello and Twin Falls, ID will be participating in a series of WRRC conducted 2-day rigging courses in June '89. Idaho Power's Training Supt. Mr. Flip Howell, has developed the format and schedule for the 2-day courses and will assist in making the detailed arrangements necessary for a successful program.

Bonneville Power Admin.

A series of 1-day rigging courses were presented this past winter to electrical maintenance crews working in the Pacific Northwest. Mr. Bill Beebe, Training Coordinator for BPA developed the training schedule for the programs, which addressed the effects of shock loading, rigging geometry and sling angles. Many program workshops helped to provide an excellent learning environment for the crew members.

Chelan County P.U.D.

Mr. Roger Bennett, Maint. Supt. for Chelan County P.U.D. has asked WRRC to provide line and sub-station maintenance crews with a series of rigging workshops and hands-on training sessions. The April '89 program will place a special emphasis on boom truck and line truck type hoisting systems.

Weyerhaeuser Paper Co.

Mr. Jack Quien, Maintenance Education Coordinator at Weyerhaeuser's Cosmopolis, WA mill requested that WRRC present a Boom Truck Operators Course for equipment operators. A few of the course subjects included

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load chart interpretation, set-up, an operator's checklist and safe operating practices.

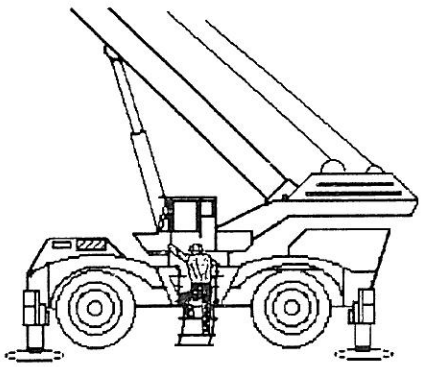
After attending an 8-hour classroom session each participant received hands-on instruction and evaluation by WRRC's Devon Beasley while making a series of "live" lifts.

Western Area Power Admin.

Mr. Jerry Paulson, Chief of Trans. Line Branch for WAPA's northern region has contracted WRRC to present a series of 12-hour rigging courses for crews in the Bismark and Fargo areas. The April sessions will address many rigging challenges faced by power utility line crews.

Weyerhaeuser Paper Co.

Mr. Jerry Reed, Maintenance Education Coordinator for Weyerhaeuser's Springfield,OR paper mill contracted WRRC to present a 5-day Mobile Crane Operator Training Program.



The program which included three days of classroom and two days of hands-on training, was conducted by contract consultant Devon Beasley for operators from Weyerhaeuser's Paper and Forest Products divisions.

Wyodak

Mr. Baird Langworthy, Training Coordinator for Wyodak Power Generating Facility in Gillette, WY has requested two 2-day rigging courses for maintenance millwrights to be held during April. A few of the topics being presented will include overhead beam rigging, two-hook picks and safe bridge crane operations.

P & M Coal Company

A comprehensive 5-day mobile crane operator training course will be presented by WRRC for operators working at P & M's open-pit mine in Gallup, NM. The program will focus on a variety of cranes used throughout the mine, including crawler, truck mounted and rough terrain units. Skills Training Supervisor for P & M Coal, Mr. Gene Roberts, requested the May course be customized to their equipment and work environment.

WRRC News

OR Gov. Safety & Health Conf.

WRRC President Mike Parnell made a presentation to participants who attended the Oregon GS&HC this month. The 90 minute program entitled, "Rig It Right!" addressed many factors which lead to rigging related accidents. Methods to prevent such incidents were identified during two accident analysis workshops.

Welcome Aboard

We are pleased to welcome two experts to WRRC's independent consultants group.

- Mr. Dave Schaner of Irvine, CA brings 30+ years of experience in the field of cranes, API crane standards, crane testing and load moment indicator design and installation.
- Mr. Walter Hirth of Richmond, CA has worked in the crane and rigging industries for many years and has authored several instructional rigging manuals which are currently being used by numerous trade groups.

Congratulations !

WRRC President R. Michael Parnell has been named as an Outstanding Young Man of America for 1988.

OSHA / ANSI

Regulations and Standards

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

Overhead and Gantry Cranes

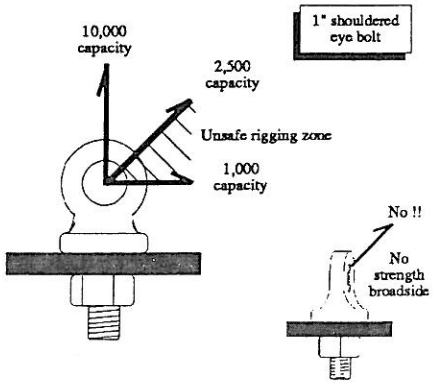
Excerpts from the 7-1-88 edition of 29CFR Ch.XVII§1910.179(n).

- (3.vii) *Moving the load.* The operator shall test the brakes each time a load approaching the rated load is handled. The brakes shall be tested by raising the load a few inches and applying the brakes.
- (3.x) *Moving the load.* The employer shall insure that the operator does not leave his position at the controls while the load is suspended.

Safety Tips

Small Details = Big Mistakes

- When rigging with shouldered eye bolts make sure, the load is within the bolt's capacity, they are used at <= 45 degree angle from the vertical plane and are in alignment to the hook or lifting device (not with the eye broadside to the strain - no strength).



WIRE ROPE & RIGGING CONSULTANTS, INC.
PO BOX 728
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