

DALE
Lifting and Handing
Specialists

Crosby
Rigging
Information

The Crosby logo is displayed in a stylized, bold, red font with a black outline, set against a grey rectangular background. The letters are thick and blocky, with a slight shadow effect.

RISK MANAGEMENT			
RISK MANAGEMENT	TERMINOLOGY	FOR ADDITIONAL SUPPORT	
DEFINITION	WORKING LOAD LIMIT (WLL)	 <p>Contact DALE Lifting and Handling 0845 270 2919</p> <p>BLOCKS & FITTINGS FOR WIRE ROPE & CHAIN</p> <p>CROSBY® FITTINGS LEBUS® McKISSICK® WESTERN NATIONAL</p>	
COMPREHENSIVE SET OF ACTIONS THAT REDUCES THE RISK OF A PROBLEM, A FAILURE, AN ACCIDENT	THE MAXIMUM MASS OR FORCE WHICH THE PRODUCT IS AUTHORIZED TO SUPPORT IN A PARTICULAR SERVICE.		
<p>ASME B30.9 REQUIRES THAT SLING USERS SHALL BE TRAINED IN THE SELECTION, INSPECTION, CAUTIONS TO PERSONNEL, EFFECTS OF ENVIRONMENT, AND RIGGING PRACTICES. SLING IDENTIFICATION IS REQUIRED ON ALL TYPES OF SLINGS</p> <p>ASME B30.26 REQUIRES THAT RIGGING HARDWARE USERS SHALL BE TRAINED IN THE SELECTION, INSPECTION, CAUTIONS TO PERSONNEL, EFFECTS OF ENVIRONMENT, AND RIGGING PRACTICES. ALL RIGGING HARDWARE TO BE IDENTIFIED BY MANUFACTURER WITH NAME OF TRADEMARK OR MANUFACTURER.</p> <p>REFER TO THE CROSBY GROUP CATALOG AND OTHER PRODUCT APPLICATION INFORMATION.</p>	PROOF TEST		
	A TEST APPLIED TO A PRODUCT SOLELY TO DETERMINE INJURIOUS MATERIAL OR MANUFACTURING DEFECTS.		ULTIMATE STRENGTH
	THE AVERAGE LOAD OR FORCE AT WHICH THE PRODUCT FAILS OR NO LONGER SUPPORTS THE LOAD.		DESIGN FACTOR
	<p>AN INDUSTRIAL TERM DENOTING A PRODUCT'S THEORETICAL RESERVE CAPABILITY; USUALLY COMPUTED BY DIVIDING THE CATALOG ULTIMATE LOAD BY THE WORKING LOAD LIMIT. GENERALLY EXPRESSED AS A RATIO, e.g. 5 TO 1.</p> <p>Load Rated</p>		

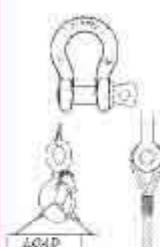
PLANNING AND RESPONSIBILITIES	
<p>PLAN EVERY LIFT, INCLUDE THE FOLLOWING QUESTIONS WITH THE QUESTIONS YOUR EXPERIENCE PROVIDES:</p> <ol style="list-style-type: none"> 1. WHO IS RESPONSIBLE (COMPETENT) FOR THE RIGGING? 2. HAS COMMUNICATIONS BEEN ESTABLISHED? 3. IS THE RIGGING IN ACCEPTABLE CONDITION? 4. IS THE RIGGING APPROPRIATE FOR LIFTING? 5. DOES THE RIGGING HAVE PROPER IDENTIFICATION? 6. DOES ALL GEAR HAVE KNOWN WORKING LOAD LIMITS? 7. WHAT IS THE WEIGHT OF THE LOAD? 8. WHERE IS THE LOAD'S CENTER OF GRAVITY? 9. WHAT IS THE SLING ANGLE? 10. WILL THERE BE ANY SIDE OR ANGULAR LOADING? 11. ARE THE SLINGS PADDED AGAINST SHARP CORNERS? 12. ARE THE WORKING LOAD LIMITS ADEQUATE? 13. IS THE LOAD RIGGED TO THE CENTER OF GRAVITY? 14. IS THE HITCH APPROPRIATE FOR THE LOAD? 15. IS A TAG LINE REQUIRED TO CONTROL LOAD? 16. WILL PERSONNEL BE CLEAR OF SUSPENDED LOADS? 17. IS THERE ANY POSSIBILITY OF FOULING? 18. WILL THE LOAD LIFT LEVEL AND BE STABLE? 19. ANY UNUSUAL ENVIRONMENTAL CONCERNS? 20. ANY SPECIAL REQUIREMENTS? <p>THE RIGGING MUST BE USED WITHIN MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY STANDARDS THAT INCLUDE OSHA, ASME, ANSI, API AND OTHERS.</p>	<p>USER RESPONSIBILITY</p> <ol style="list-style-type: none"> 1. UTILIZE APPROPRIATE RIGGING GEAR SUITABLE FOR OVERHEAD LIFTING. 2. UTILIZE THE RIGGING GEAR WITHIN INDUSTRY STANDARDS AND THE MANUFACTURER'S RECOMMENDATIONS. 3. CONDUCT REGULAR INSPECTION AND MAINTENANCE OF THE RIGGING GEAR. 4. PROVIDE EMPLOYEES WITH TRAINING TO MEET OSHA AND ASME (B30.9, B30.26, ETC.) REQUIREMENTS. <p>MANUFACTURERS RESPONSIBILITY</p> <ol style="list-style-type: none"> 1. PRODUCT AND APPLICATION INFORMATION 2. PRODUCT THAT IS CLEARLY IDENTIFIED NAME OR LOGO LOAD RATING AND SIZE TRACEABILITY 3. PRODUCT PERFORMANCE WORKING LOAD LIMIT DUCTILITY FATIGUE PROPERTIES IMPACT PROPERTIES 4. PRODUCT TRAINING AND TRAINING RESOURCES 

INSPECTION OF RIGGING HARDWARE	
INSPECTION FREQUENCY PER ASME B30.26	
<p>A VISUAL INSPECTION SHALL BE PERFORMED BY THE USER OR DESIGNATED PERSON EACH DAY BEFORE THE RIGGING HARDWARE IS USED.</p> <p>A PERIODIC INSPECTION SHALL BE PERFORMED BY A DESIGNATED PERSON, AT LEAST ANNUALLY. THE RIGGING HARDWARE SHALL BE EXAMINED AND A DETERMINATION MADE AS TO WHETHER THEY CONSTITUTE A HAZARD. WRITTEN RECORDS ARE NOT REQUIRED.</p> <p>SEMI-PERMANENT AND INACCESSIBLE LOCATIONS WHERE FREQUENT INSPECTIONS ARE NOT FEASIBLE SHALL HAVE PERIODIC INSPECTIONS PERFORMED.</p>	
REJECTION CRITERIA PER ASME B30.26	
<p>MISSING OR ILLEGIBLE MANUFACTURER'S NAME OR TRADEMARK AND/OR RATED LOAD IDENTIFICATION (OR SIZE AS REQUIRED)</p> <p>A 10% OR MORE REDUCTION OF THE ORIGINAL DIMENSION</p> <p>BENT, TWISTED, DISTORTED, STRETCHED, ELONGATED, CRACKED OR BROKEN LOAD BEARING COMPONENTS</p> <p>EXCESSIVE NICKS, GOUGES, PITTING AND CORROSION</p> <p>INDICATIONS OF HEAT DAMAGE INCLUDING WELD SPATTER OR ARC STRIKES, EVIDENCE OF UNAUTHORIZED WELDING</p> <p>LOOSE OR MISSING NUTS, BOLTS, COTTER PINS, SNAP RINGS, OR OTHER FASTENERS AND RETAINING DEVICES</p> <p>UNAUTHORIZED REPLACEMENT COMPONENTS OR OTHER VISIBLE CONDITIONS THAT CAUSE DOUBT AS TO THE CONTINUED USE OF THE SLING</p>	<p>ADDITIONALLY INSPECT WIRE ROPE CLIPS FOR:</p> <ol style="list-style-type: none"> 1. INSUFFICIENT NUMBER OF CLIPS 2. INCORRECT SPACING BETWEEN CLIPS 3. IMPROPERLY TIGHTENED CLIPS 4. INDICATIONS OF DAMAGED WIRE ROPE OR WIRE ROPE SLIPPAGE 5. IMPROPER ASSEMBLY <p>ADDITIONALLY, INSPECT WEDGE SOCKETS FOR:</p> <ol style="list-style-type: none"> 1. INDICATIONS OF DAMAGED WIRE ROPE OR WIRE ROPE SLIPPAGE 2. IMPROPER ASSEMBLY
ADDITIONAL REJECTION CRITERIA PER ASME B30.10 - HOOKS	
<p>ANY VISIBLY APPARENT BEND OR TWIST FROM THE PLANE OF THE UNBENT HOOK</p> <p>ANY DISTORTION CAUSING AN INCREASE IN THROAT OPENING OF 5%, NOT TO EXCEED 1/4"</p>	

INSPECTION OF SLINGS			
INSPECTION FREQUENCY PER ASME B30.9			
<p>A VISUAL INSPECTION FOR DAMAGE SHALL BE PERFORMED BY THE USER OR DESIGNATED PERSON EACH DAY OR SHIFT THE SLING IS USED.</p> <p>A COMPLETE INSPECTION FOR DAMAGE SHALL BE PERFORMED PERIODICALLY BY A DESIGNATED PERSON, AT LEAST ANNUALLY.</p> <p>WRITTEN RECORDS OF MOST RECENT PERIODIC INSPECTION SHALL BE MAINTAINED.</p>			
REJECTION CRITERIA PER ASME B30.9			
<p>MISSING OR ILLEGIBLE SLING IDENTIFICATION; EVIDENCE OF HEAT DAMAGE; SLINGS THAT ARE KNOTTED; FITTINGS THAT ARE PITTED, CORRODED, CRACKED, BENT, TWISTED, GOUGED, OR BROKEN; OTHER CONDITIONS, INCLUDING VISIBLE DAMAGE, THAT CAUSE DOUBT AS TO THE CONTINUED USE OF THE SLING.</p>			
WIRE ROPE SLINGS	CHAIN SLINGS	WEB SLINGS	ROUND SLINGS
<p>EXCESSIVE BROKEN WIRES, FOR STRAND-LAID AND SINGLE PART SLINGS, TEN RANDOMLY DISTRIBUTED BROKEN WIRES IN ONE ROPE LAY OR FIVE BROKEN WIRES IN ONE STRAND IN ONE ROPE LAY</p> <p>SEVERE LOCALIZED ABRASION OR SCRAPING, KINKING, CRUSHING, BIRDCAGING</p> <p>ANY OTHER DAMAGE RESULTING IN DAMAGE TO THE ROPE STRUCTURE</p> <p>SEVERE CORROSION OF THE ROPE OR END ATTACHMENTS</p>	<p>CRACKS OR BREAKS</p> <p>EXCESSIVE WEAR, NICKS OR GOUGES</p> <p>STRETCHED CHAIN LINKS OR COMPONENTS</p> <p>BENT, TWISTED OR DEFORMED CHAIN LINKS OR COMPONENTS</p> <p>EXCESSIVE PITTING OR CORROSION</p> <p>LACK OF ABILITY OF CHAIN OR COMPONENTS TO HINGE FREELY</p> <p>WELD SPLATTER</p>	<p>ACID OR CAUSTIC BURNS</p> <p>MELTING OR CHARRING OF ANY PART OF THE SLING</p> <p>HOLES, TEARS, CUTS OR SNAGS</p> <p>BROKEN OR WORN STITCHING IN LOAD BEARING SPLICES</p> <p>EXCESSIVE ABRASIVE WEAR</p> <p>DISCOLORATION AND BRITTLE OR STIFF AREAS ON ANY PART OF THE SLING, WHICH MAY MEAN CHEMICAL OR ULTRAVIOLET / SUNLIGHT DAMAGE</p>	<p>ACID OR CAUSTIC BURNS</p> <p>EVIDENCE OF HEAT DAMAGE</p> <p>HOLES, TEARS, CUTS, ABRASIVE WEAR OR SNAGS THAT EXPOSE THE CORE YARNS</p> <p>BROKEN OR DAMAGED CORE YARNS</p> <p>WELD SPLATTER THAT EXPOSES CORE YARNS</p> <p>DISCOLORATION AND BRITTLE OR STIFF AREAS ON ANY PART OF THE SLINGS, WHICH MAY MEAN CHEMICAL OR OTHER DAMAGE</p>

WIRE ROPE SLING CONNECTIONS AND HITCHES

CONNECTION TO FITTINGS




USE A THIMBLE TO PROTECT SLING AND INCREASE D/d

NEVER PLACE EYE OVER A FITTING SMALLER DIAMETER OR WIDTH THAN THE ROPE'S DIAMETER.


NEVER PLACE A SLING EYE OVER A FITTING WITH A DIAMETER OR WIDTH GREATER THAN ONE HALF THE LENGTH OF THE EYE.

CHOKER CAPACITY



A CHOKER HITCH HAS 75% OF THE CAPACITY OF A SINGLE LEG SLING ONLY IF THE ANGLE OF CHOKE IS 120 DEGREES OR GREATER. A CHOKE ANGLE LESS THAN 120 DEGREES CAN RESULT IN A CAPACITY AS LOW AS 40% OF THE SINGLE LEG.


BASKET HITCH CAPACITY



A BASKET HITCH HAS TWICE THE CAPACITY OF A SINGLE LEG ONLY IF D/d RATIO IS 25/1 AND THE LEGS ARE VERTICAL.

ANGLE	CAPACITY % OF SINGLE LEG
90	200 %
60	170 %
45	140 %
30	100 %

MULTIPLE LEG SLINGS




TRIPLE LEG SLINGS HAVE 50% MORE CAPACITY THAN DOUBLE LEG SLINGS (AT SAME SLING ANGLE) ONLY IF THE CENTER OF GRAVITY IS IN CENTER OF CONNECTION POINTS AND LEGS ARE ADJUSTED PROPERLY (THEY MUST HAVE AN EQUAL SHARE OF THE LOAD).

QUAD (4LEG) SLINGS OFFER IMPROVED STABILITY BUT PROVIDE INCREASED CAPACITY ONLY IF ALL LEGS SHARE AN EQUAL SHARE OF THE LOAD.

CHAIN SLING CONNECTIONS AND HITCHES

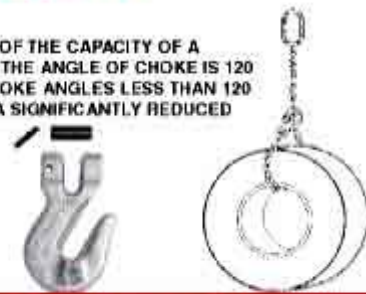
CONNECTION TO FITTINGS



USE MASTER LINKS TO COLLECT SLINGS AND TO CONNECT TO HOOK.

USE GRADE 8 (80) OR GRADE 10 (100) FITTINGS THAT MATCH THE W.L.L. OF CHAIN AND OFFER PROPER SECUREMENT.


CHOKER CAPACITY



A CHOKER HITCH HAS 80% OF THE CAPACITY OF A SINGLE LEG SLING ONLY IF THE ANGLE OF CHOKE IS 120 DEGREES OR GREATER. CHOKE ANGLES LESS THAN 120 DEGREES WILL RESULT IN A SIGNIFICANTLY REDUCED CAPACITY.

NO LOSS IN CAPACITY RESULTS IF A CRADLE GRAB HOOK IS USED.

BASKET HITCH CAPACITY



A TRUE BASKET HITCH HAS TWICE THE CAPACITY OF A SINGLE LEG ONLY IF THE LEGS ARE VERTICAL. NOTE THAT THE BASKET IS FORMED BY USING A CHAIN SLING WITH TWO MASTERLINKS AT EACH END CONNECTED TO THE HOOK.

HORIZONTAL ANGLE	CAPACITY % OF SINGLE LEG
90	200 %
60	170 %
45	140 %
30	100 %

MULTIPLE LEG SLINGS

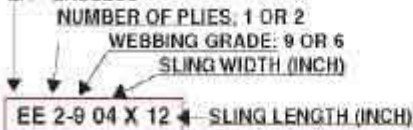
TRIPLE LEG CHAIN SLINGS HAVE 50% MORE CAPACITY THAN DOUBLE LEG CHAIN SLINGS (AT SAME SLING ANGLE) ONLY IF THE CENTER OF GRAVITY IS IN CENTER OF CONNECTION POINTS AND LEGS ARE ADJUSTED PROPERLY (THEY MUST HAVE AN EQUAL SHARE OF THE LOAD). QUAD (4LEG) CHAIN SLINGS OFFER IMPROVED STABILITY, BUT DO NOT PROVIDE INCREASED CAPACITY. THE CAPACITY OF A FOUR LEG CHAIN SLING IS CONSIDERED THE SAME AS THREE LEG CHAIN SLING.

SYNTHETIC SLING CONNECTIONS AND HITCHES

WEB SLING IDENTIFICATION INCLUDES:

SLING TYPE:

- TC - TRIANGLE CHOKER,
- TT - TRIANGLE TRIANGLE,
- EE - EYE AND EYE,
- EN - ENDLESS



ROUNDSLING IDENTIFICATION INCLUDES:

SLING NUMBER: 1-13

SLING NUMBERS ARE FOR REFERENCE ONLY, SOME ROUNDSLINGS HAVE DIFFERENT RATINGS.

SLING COLOR: PURPLE, GREEN, YELLOW, TAN, RED, WHITE, BLUE, ORANGE
SLING COLOR IS NOT FOLLOWED BY ALL MANUFACTURERS AND SOME COLORS HAVE MORE THAN ONE RATED LOAD.

FOLDING, BUNCHING OR PINCHING OF SYNTHETIC SLINGS, WHICH OCCURS WHEN USED WITH SHACKLES, HOOKS OR OTHER APPLICATION WILL REDUCE THE RATED LOAD.



CHOKER CAPACITY

A CHOKER HITCH HAS 80% OF THE CAPACITY OF A SINGLE LEG SLING ONLY IF THE ANGLE OF CHOKE IS 120 DEGREES OR GREATER. A CHOKE ANGLE LESS THAN 120 DEGREES WILL RESULT IN A CAPACITY AS LOW AS 40% OF THE SINGLE LEG.



BASKET HITCH CAPACITY

HORIZONTAL ANGLE	CAPACITY % OF SINGLE LEG
90	200%
60	170%
45	140%
30	100%

A TRUE BASKET HITCH HAS TWICE THE CAPACITY OF A SINGLE LEG ONLY IF THE LEGS ARE VERTICAL.



MULTIPLE LEG SLINGS

TRIPLE LEG SLINGS HAVE 50% MORE CAPACITY THAN DOUBLE LEG SLINGS (AT SAME SLING ANGLE) ONLY IF THE CENTER OF GRAVITY IS IN CENTER OF CONNECTION POINTS AND LEGS ADJUSTED PROPERLY (THEY MUST HAVE AN EQUAL SHARE OF THE LOAD).

QUAD (4LEG) SLINGS OFFER IMPROVED STABILITY BUT PROVIDE INCREASED CAPACITY ONLY IF ALL LEGS SHARE AN EQUAL SHARE OF THE LOAD.

ALWAYS SELECT AND USE WEB SLINGS AND ROUND SLINGS BY THE RATED LOAD SHOWN ON THE SLING IDENTIFICATION, NEVER BY WIDTH, COLOR OR SLING NUMBER

CENTER OF GRAVITY, WEIGHTS AND MEASURES

WHEN LIFTING VERTICALLY, THE LOAD WILL BE SHARED EQUALLY IF THE CENTER OF GRAVITY IS PLACED EQUALLY BETWEEN THE PICK POINTS.

IF THE WEIGHT OF THE LOAD IS 10,000 LBS., THEN EACH SLING WILL HAVE A LOAD OF 5,000 LBS. AND EACH SHACKLE AND EYEBOLT WILL ALSO HAVE A LOAD OF 5,000 LBS.



- UNIT WEIGHT STEEL = 490 LBS/FT³
- UNIT WEIGHT ALUMINUM = 165 LBS/FT³
- UNIT WEIGHT CONCRETE = 150 LBS/FT³
- UNIT WEIGHT WOOD = 50 LBS/FT³
- UNIT WEIGHT WATER = 62 LBS/FT³
- UNIT WEIGHT SAND AND GRAVEL = 120 LBS/FT³
- UNIT WEIGHT COPPER = 560 LBS/FT³
- UNIT WEIGHT OIL = 58 LBS/FT³

- 1 CUBIC FT. = 7.5 GALS
- 1 METRIC TON = 1.1 US TONS
- 1 KILOGRAM = 2.2 LBS

- 1/2 INCH = 12.7 mm
- 1 INCH = 25.4 mm

CENTER OF GRAVITY AND SLING LOADING

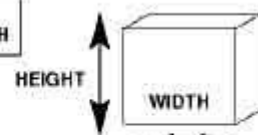
WHEN THE CENTER OF GRAVITY IS NOT EQUALLY SPACED BETWEEN THE PICK POINTS, THE SLING AND FITTINGS WILL NOT CARRY AN EQUAL SHARE OF THE LOAD. THE SLING CONNECTED TO THE PICK POINT CLOSEST TO THE CENTER OF GRAVITY WILL CARRY THE GREATEST SHARE OF THE LOAD.



SLING 2 IS CLOSEST TO COG. IT WILL HAVE THE GREATEST SHARE OF THE LOAD.

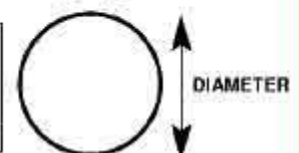
- SLING 2 = 10,000 X 8 / (8+2) = 8,000 LBS.
- SLING 1 = 10,000 X 2 / (8+2) = 2,000 LBS.

VOLUME OF CUBE =
HEIGHT x WIDTH x LENGTH

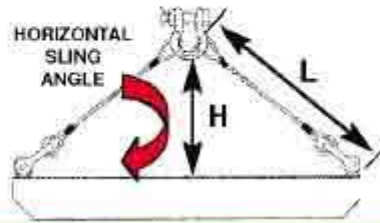


VOLUME OF SPHERE =
3.14 x (DIAM. x DIAM. x DIAM.) / 6

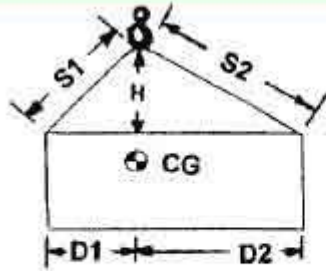
VOLUME OF CYLINDER =
3.14 x (DIAM. x DIAM. x LENGTH) / 4



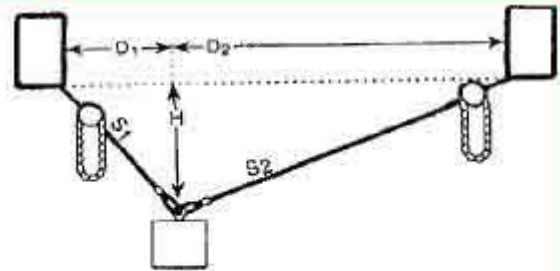
SLING ANGLE INFORMATION



HORIZONTAL SLING ANGLE (A) DEGREE	LOAD ANGLE FACTOR = L/H
90	1.000
60	1.155
50	1.305
45	1.414
30	2.000



HORIZONTAL SLING ANGLES OF LESS THAN 30 DEGREES ARE NOT RECOMMENDED REFER TO ANSI B30.9 FOR FULL INFORMATION



LOAD ON SLING CALCULATED
 TENSION 1 = LOAD X D2 X S1/(H(D1+D2))
 TENSION 2 = LOAD X D1 X S2/(H(D1+D2))

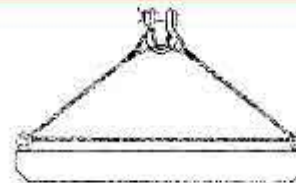
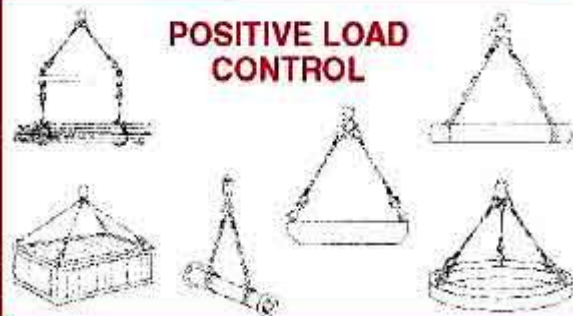
LOAD ON SLING CALCULATED
 TENSION 1 = LOAD X D2 X S1/(H(D1+D2))
 TENSION 2 = LOAD X D1 X S2/(H(D1+D2))

ASME B30.9 OPERATING PRACTICES AND LOAD CONTROL

WHENEVER ANY SLING IS USED, THE FOLLOWING PRACTICES SHALL BE OBSERVED.

1. SLINGS THAT ARE DAMAGED OR DEFECTIVE SHALL NOT BE USED.
2. SLINGS SHALL NOT BE SHORTENED WITH KNOTS OR BOLTS OR OTHER MAKESHIFT DEVICES.
3. SLING LEGS SHALL NOT BE KINKED.
4. SLINGS SHALL NOT BE LOADED IN EXCESS OF THEIR RATED CAPACITIES.
5. SLINGS USED IN A BASKET HITCH SHALL HAVE THE LOADS BALANCED TO PREVENT SLIPPAGE.
6. SLINGS SHALL BE SECURELY ATTACHED TO THEIR LOAD.
7. SLINGS SHALL BE PADDED OR PROTECTED FROM THE SHARP EDGES OF THEIR LOADS.
8. SUSPENDED LOADS SHALL BE KEPT CLEAR OF ALL OBSTRUCTION.
9. ALL EMPLOYEES SHALL BE KEPT CLEAR OF LOADS ABOUT TO BE LIFTED AND OF SUSPENDED LOADS.
10. HANDS OR FINGERS SHALL NOT BE PLACED BETWEEN THE SLING AND ITS LOAD WHILE THE SLING IS BEING TIGHTENED AROUND THE LOAD.
11. SHOCK LOADING IS PROHIBITED!
12. A SLING SHALL NOT BE PULLED FROM UNDER A LOAD WHEN THE LOAD IS RESTING ON THE SLING.

INSPECTION: EACH DAY BEFORE BEING USED, THE SLING AND ALL FASTENINGS AND ATTACHMENTS SHALL BE INSPECTED FOR DAMAGE OR DEFECTS BY A COMPETENT PERSON DESIGNATED BY THE EMPLOYER. ADDITIONAL INSPECTIONS SHALL BE PERFORMED DURING SLING USE WHERE SERVICE CONDITIONS WARRANT. DAMAGED OR DEFECTIVE SLINGS SHALL BE IMMEDIATELY REMOVED FROM SERVICE.



REEVING THROUGH CONNECTIONS TO LOAD INCREASES LOAD ON CONNECTION FITTINGS BY AS MUCH AS TWICE.
DO NOT REEVE!

BLOCK CONCEPTS

MECHANICAL ADVANTAGE

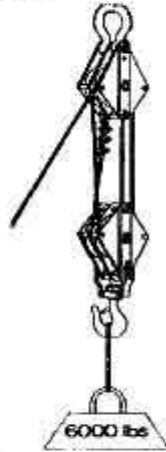
MECHANICAL ADVANTAGE IS THE LEVERAGE GAINED BY A MULTIPLE PART BLOCK.

THE THEORETICAL (IGNORE FRICTION) ADVANTAGE IS EQUAL TO THE NUMBER OF PARTS OF LINE SUPPORTING THE TRAVELING BLOCK (LOAD).

TOTAL LOAD ON THE BLOCK IS SUM OF ALL LOADS PLACED ON THE BLOCK END FITTING.

EXAMPLE

PARTS OF LINE = 4
 MECHANICAL ADVANTAGE = 4
 LINE PULL REQUIRED = $6000/4 = 1500$ LBS.
 LOWER BLOCK LOAD = 6000 LBS.
 REQUIRED W.L.L. = 6000 LBS.
 UPPER BLOCK LOAD = 6000 + LINE PULL + GEAR
 = $6000 + 1500 + \text{GEAR} = 7500$ LBS. PLUS
 REQUIRED W.L.L. = 7500 LBS. PLUS

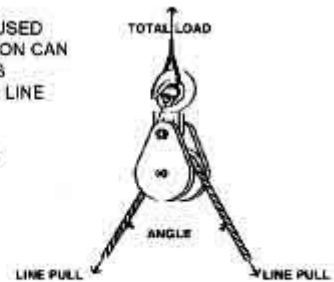


ANGLE FACTOR MULTIPLIERS

ANGLE	FACTOR	ANGLE	FACTOR
0°	2.00	100°	1.29
10°	1.99	110°	1.15
20°	1.97	120°	1.00
30°	1.93	130°	.84
40°	1.87	135°	.76
45°	1.84	140°	.68
50°	1.81	150°	.52
60°	1.73	160°	.36
70°	1.64	170°	.17
80°	1.53	180°	.00
90°	1.41		

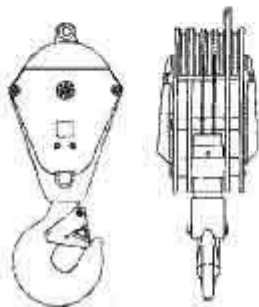
A SINGLE LINE SNATCH BLOCK USED TO CHANGE LOAD LINE DIRECTION CAN BE SUBJECTED TO TOTAL LOADS GREATLY DIFFERENT FROM THE LINE PULL.

TOTAL LOAD = LINE PULL TIMES ANGLE FACTOR MULTIPLIER



WORKING WITH BLOCKS

OVERHAUL WEIGHT



To determine the weight of the block or overhaul ball that is required to free fall the block, the following information is needed: **Size of wire rope, Number of line parts, Type of sheave bearing, Length of crane boom, and Drum Friction.**

BLOCK REEVING

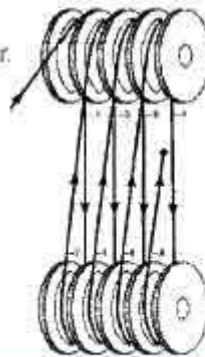
Straight laced reeving is a basic method of placing the rope through a set of blocks. The end of the rope is fed through the outside sheave of the upper block to the outside sheave of the lower (traveling) block. This continues to the last sheave.

ADVANTAGES:

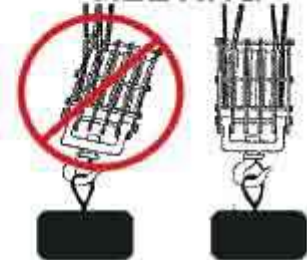
1. Allows blocks to run closer together.
2. Is simple.
3. Has no reverse bends.

DRAWBACKS:

Tilting because of imbalanced loading can cause block rotation and wear of the sheaves and wire rope



SYMMETRICAL REEVING



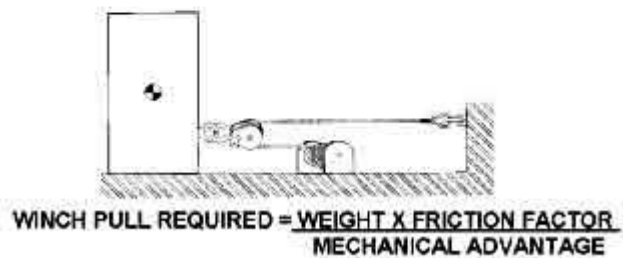
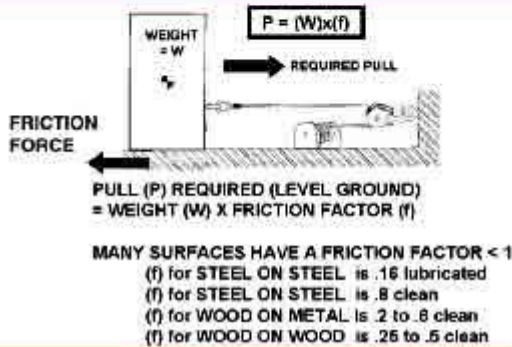
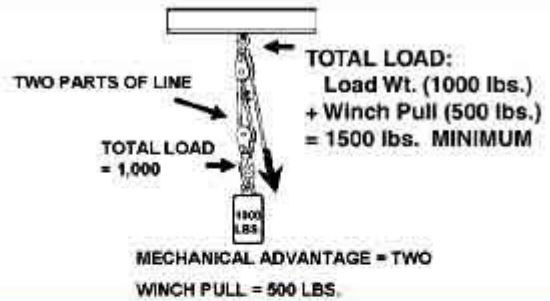
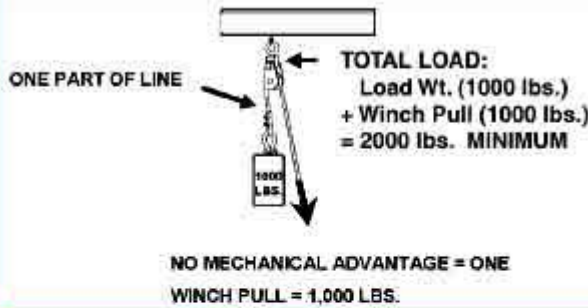
Reeve blocks symmetrically to distribute load evenly. All sheaves must be reeved to achieve the full working load limit of the block.

BLOCK CABLING

1. Reduce wire rope length
2. Use even part reeving
3. Dead end to boom
4. Evaluate wire rope construction

RIGGING WITH BLOCKS

3



SHEAVE BEARINGS

BEARING APPLICATIONS CRANE AND LOAD BLOCKS

- PLAIN BRONZE BUSHED:**
Moderate loads, low speeds and frequent use
- STRAIGHT ROLLER BEARINGS:**
Heavier loads, higher speeds and more frequent use
- TAPERED ROLLER BEARINGS:**
Heavy loads, high speeds, continuous operation

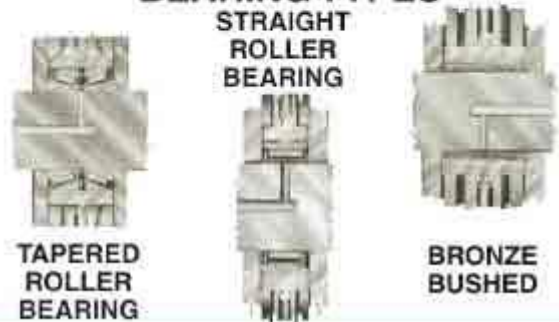
BEARING LUBRICATION GENERAL RECOMMENDATIONS

- PLAIN BRONZE BUSHED:**
Lubricate every 8 hours of continuous service and every 14 days of intermittent operation
- STRAIGHT ROLLER BEARINGS:**
Lubricate every 24 hours of continuous operation or every 14 days of intermittent operation
- TAPERED ROLLER BEARINGS:**
Lubricate every 40 hours of continuous service or every 30 days of intermittent operation

BEARING APPLICATIONS SNATCH BLOCKS

- PLAIN BRONZE BUSHED:**
Slow speeds, moderate loads, infrequent and intermittent use
- STRAIGHT ROLLER BEARINGS:**
Slow to medium speeds, moderate loads, intermittent and more frequent use

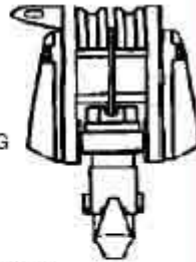
BEARING TYPES



BLOCK AND SHEAVE INSPECTION

AS A MINIMUM, EXAMINE THE FOLLOWING INSPECTION POINTS. REMOVE FROM SERVICE OR CORRECT BEFORE USE:

1. EXCESSIVE WEAR ON PINS OR AXLES, ROPE GROOVES, SIDE PLATES, BUSHINGS OR BEARINGS AND END FITTINGS,
2. DEFORMATION IN SIDE PLATES, PINS AND AXLES, LIFTING ATTACHMENT POINTS AND TRUNNIONS.
3. MISALIGNMENT OR WOBBLE IN SHEAVES.
4. SECURITY OF NUTS, BOLTS, AND OTHER LOCKING METHODS.
5. MISSING OR LOOSE SNAP RINGS ON PINS.
6. EXCESSIVE END PLAY OF SHEAVE BEARINGS ON SHAFT, MORE THAN .031 CLEARANCE PER SHEAVE WITH BUSHING OR STRAIGHT ROLLER BEARINGS.
7. EXCESSIVE SWIVEL CASE CLEARANCE (MORE THAN .12" - .18")
8. HOOK WITH DEFORMATION, CORROSION OF HOOK OR NUT THREADS, MISSING OR DEFECTIVE LATCH.
9. WELDING SIDE PLATES WITH WELD CRACKING OR CORROSION.



SHEAVE GROOVE



"NO DAYLIGHT" BETWEEN GROOVE AND GAUGE SHOWS GROOVE ACCEPTABLE



"DAYLIGHT" BETWEEN GROOVE AND GAUGE SHOWS WEAR



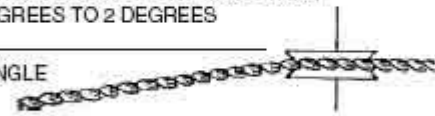
CORRUGATED GROOVES ACCELERATE WEAR OF WIRE ROPE

FLEET ANGLE

FLEET ANGLE IS THE ENTRANCE AND EXIT ANGLES OF THE WIRE ROPE RELATIVE TO THE SHEAVE

FLEET ANGLE SHOULD BE NO MORE THAN 1-1/2 DEGREES TO 2 DEGREES

FLEET ANGLE



BLOCK HOOK INSPECTION

CROSBY RECOMMENDS AS A MINIMUM:

1. A visual inspection for cracks, nicks, wear, gouges and deformation as part of a comprehensive documented inspection program, should be conducted by trained personnel in compliance with the schedule in ANSI B30.10.
2. For hooks used in frequent load cycles or pulsating load, or exposed to corrosive conditions (Road Salt, etc.) the hook and thread should be periodically inspected by Magnetic Particle or Dye Penetrant.

LUBRICATION OF HOOK BEARINGS:

Anti Friction — Every 14 days for frequent swiveling; every 45 days for infrequent swiveling.

Bronze Thrust Bushing or No Bearing — Every 16 hours for frequent swiveling; every 21 days for infrequent swiveling.

ANSI B30.10 INSPECTION FREQUENCY

1. **Frequent Inspection** - visual examinations by the operator or other designated person.
 - (a) normal service - monthly
 - (b) heavy service - weekly to monthly
 - (c) severe service - daily or weekly
 - (d) special or infrequent service as authorized by a qualified person - before and after each occurrence, with records of the operation.
2. **Period Inspection** - visual inspections by an appointed person making records of apparent external conditions to provide the basis for continuing evaluation.
 - (a) normal service - equipment in place - yearly; (definition: service, normal - service that involves operating at less than 85 percent of rated load except for isolated instances.)
 - (b) heavy service - as in normal service, unless external conditions indicate that disassembly should be done to permit detailed inspection - yearly; (definition: service, heavy service that involves operating 85 percent to 100 percent of rated as a regular specified procedure.)
 - (c) severe service - as in heavy service, except that the detailed inspection may show the need for use of nondestructive type of testing - quarterly; (definition: service, severe - heavy service coupled with abnormal operating conditions.)

FOR ADDITIONAL INFORMATION REFER TO ASME B30.10 AND OSHA 1910.179 OVERHEAD GANTRY CRANES