

5. The terms “competent person”, “thorough examination” and “lifting appliance” are defined in Form No. 1.

NOTE: For recommendations on test procedures reference may be made to the ILO document “Safety and Health in Dock Work”.

APPENDIX II TO PART 1918—TABLES FOR SELECTED MISCELLANEOUS AUXILIARY GEAR (MANDATORY)

NOTE: This appendix is mandatory and is to be used in the appropriate sections of part 1918 when certificates or the manufacturers’ use recommendations are not available.

TABLE 1—WIRE ROPE CLIPS

Improved plow steel, rope (Inches (cm))	Minimum number of clips		Minimum spacing (Inches (cm))
	Drop forged	Other material	
1/2 or less (1.3)	3	4	3 (7.6)
5/8 (1.6)	3	4	3 3/4 (9.5)
3/4 (1.9)	4	5	4 1/2 (11.4)
7/8 (2.2)	4	5	5 1/4 (13.3)
1 (2.5)	5	6	6 (15.2)
1 1/8 (2.9)	6	6	6 3/4 (17.1)
1 1/4 (3.2)	6	7	7 1/2 (19.1)
1 3/8 (3.5)	7	7	8 1/4 (21.0)
1 1/2 (3.8)	7	8	9 (22.9)

TABLE 2—NATURAL FIBER ROPE AND ROPE SLINGS—LOAD CAPACITY IN POUNDS (LBS.) SAFETY FACTOR=5—EYE AND EYE SLING—BASKET HITCH  
[Angle of rope to horizontal—90 deg. 60 deg. 45 deg. 30 deg.]

Rope diameter nominal inch	Vertical hitch	Choker hitch	Angle of rope to vertical			
			0 deg.	30 deg.	45 deg.	60 deg.
1/2	550	250	1,100	900	750	550
9/16	700	350	1,400	1,200	1,000	700
5/8	900	450	1,800	1,500	1,200	900
3/4	1,100	550	2,200	1,900	1,500	1,100
13/16	1,300	650	2,600	2,300	1,800	1,300
7/8	1,500	750	3,100	2,700	2,200	1,500
1	1,800	900	3,600	3,100	2,600	1,800
1 1/16	2,100	1,100	4,200	3,600	3,000	2,100
1 1/8	2,400	1,200	4,800	4,200	3,400	2,400
1 1/4	2,700	1,400	5,400	4,700	3,800	2,700
1 5/16	3,000	1,500	6,000	5,200	4,300	3,000
1 1/2	3,700	1,850	7,400	6,400	5,200	3,700
1 5/8	4,500	2,300	9,000	7,800	6,400	4,500
1 3/4	5,300	2,700	10,500	9,200	7,500	5,300
2	6,200	3,100	12,500	10,500	8,800	6,200
2 1/8	7,200	3,600	14,500	12,500	10,000	7,200
2 1/4	8,200	4,100	16,500	14,000	11,500	8,200
2 1/2	9,300	4,700	18,500	16,000	13,000	9,300
2 5/8	10,500	5,200	21,000	18,000	14,500	10,500

Endless Sling

1/2	950	500	1,900	1,700	1,400	950
9/16	1,200	600	2,500	2,200	1,800	1,200
5/8	1,600	800	3,200	2,700	2,200	1,600
3/4	2,000	950	3,900	3,400	2,800	2,000
13/16	2,300	1,200	4,700	4,100	3,300	2,300
7/8	2,800	1,400	5,600	4,800	3,900	2,800
1	3,200	1,600	6,500	5,600	4,600	3,200
1 1/16	3,800	1,900	7,600	6,600	5,400	3,800
1 1/8	4,300	2,200	8,600	7,500	6,100	4,300
1 1/4	4,900	2,400	9,700	8,400	6,900	4,900
1 5/16	5,400	2,700	11,000	9,400	7,700	5,400
1 1/2	6,700	3,300	13,500	11,500	9,400	6,700
1 5/8	8,100	4,100	16,000	14,000	11,500	8,100
1 3/4	9,500	4,800	19,000	16,500	13,500	9,500
2	11,000	5,600	22,500	19,500	16,000	11,000
2 1/8	13,000	6,500	26,000	22,500	18,500	13,000

TABLE 2—NATURAL FIBER ROPE AND ROPE SLINGS—LOAD CAPACITY IN POUNDS (LBS.) SAFETY FACTOR=5—EYE AND EYE SLING—BASKET HITCH—Continued  
 [Angle of rope to horizontal—90 deg. 60 deg. 45 deg. 30 deg.]

Rope diameter nominal inch	Vertical hitch	Choker hitch	Angle of rope to vertical			
			0 deg.	30 deg.	45 deg.	60 deg.
2¼ .....	15,000	7,400	29,500	25,500	21,000	15,000
2½ .....	16,500	8,400	33,500	29,000	23,500	16,500
2¾ .....	18,500	9,500	37,000	32,500	26,500	18,500

TABLE 3A

Polypropylene Rope and Rope Slings

Load Capacity in Pounds (lbs.) Safety Factor=6

Eye and Eye Sling

Basket Hitch

Angle of rope to horizontal

Rope diameter nominal in.	Vertical hitch	Choker hitch	Angle of rope to vertical			
			0 deg.	30 deg.	45 deg.	60 deg.
½ .....	650	350	1,300	1,200	950	650
9/16 .....	800	400	1,600	1,400	1,100	800
5/8 .....	1,000	500	2,000	1,700	1,400	1,000
¾ .....	1,300	700	2,700	2,300	1,900	1,300
13/16 .....	1,600	800	2,600	2,300	2,200	1,600
7/8 .....	1,800	900	3,100	2,700	2,600	1,800
1 .....	2,200	1,100	3,600	3,100	3,100	2,200
1 1/16 .....	2,500	1,300	4,200	3,600	3,600	2,500
1 1/8 .....	2,900	1,500	4,800	4,200	4,100	2,900
1 1/4 .....	3,300	1,700	6,700	5,800	4,700	3,300
1 5/16 .....	3,700	1,900	7,400	6,400	5,300	3,700
1 1/2 .....	4,700	2,400	9,400	8,100	6,700	4,700
1 5/8 .....	5,700	2,900	11,500	9,900	8,100	5,700
1 3/4 .....	6,800	3,400	13,500	12,000	9,600	6,800
2 .....	8,200	4,100	16,500	14,500	11,500	8,200
2 1/8 .....	9,700	4,800	19,500	16,500	13,500	9,700
2 1/4 .....	11,000	5,500	22,000	19,000	15,500	11,000
2 1/2 .....	12,500	6,300	25,500	22,000	18,000	12,500
2 5/8 .....	14,500	7,100	28,500	24,500	20,000	14,500

TABLE 3B

Polypropylene Rope and Rope Slings

Load Capacity in Pounds (lbs.) Safety Factor = 6

Endless Sling

Basket Hitch

Angle of rope to horizontal

90 deg. 60 deg. 45 deg. 30 deg.

Rope diameter nominal in.	Vertical hitch	Choker hitch	Angle of rope to vertical			
			0 deg.	30 deg.	45 deg.	60 deg.
½ .....	1,200	600	2,400	2,100	1,700	1,200
9/16 .....	1,500	750	2,900	2,500	2,100	1,500
5/8 .....	1,800	900	3,500	3,100	2,500	1,800
¾ .....	2,400	1,200	4,900	4,200	3,400	2,400
13/16 .....	2,800	1,400	5,600	4,900	4,000	2,800

Rope diameter nominal in.	Vertical hitch	Choker hitch	Angle of rope to vertical			
			0 deg.	30 deg.	45 deg.	60 deg.
7/8	3,300	1,600	6,600	5,700	4,600	3,300
1	4,000	2,000	8,000	6,900	5,600	4,000
1 1/16	4,600	2,300	9,100	7,900	6,500	4,600
1 1/8	5,200	2,600	10,500	9,000	7,400	5,200
1 1/4	6,000	3,000	12,000	10,500	8,500	6,000
1 5/16	6,700	3,400	13,500	11,500	9,500	6,700
1 1/2	8,500	4,200	17,000	14,500	12,000	8,500
1 5/8	10,500	5,100	20,500	18,000	14,500	10,500
1 3/4	12,500	6,100	24,500	21,000	17,500	12,500
2	15,000	7,400	29,500	25,500	21,000	15,000
2 1/8	17,500	8,700	35,500	30,100	24,500	17,500
2 1/4	19,500	9,900	39,500	34,000	28,000	19,500
2 1/2	23,000	11,500	45,500	39,500	32,500	23,000
2 5/8	25,500	13,000	51,500	44,500	36,500	25,500

TABLE 4A—RATED LOAD FOR GRADE 80 ALLOY STEEL CHAIN SLINGS<sup>1</sup> (CHAIN PER NACM)

Chain size nominal		Single leg sling-90 deg. to horizontal loading		Rated load double leg sling horizontal angle (note 2)					
				60 deg. Double at 60 deg.		45 deg. Double at 45 deg.		30 deg. Double at 30 deg.	
inch	mm	lb	kg	lb	kg	lb	kg	lb	kg
1/4	7	3,500	1,570	6,100	2,700	4,900	2,200	3,500	1,590
3/8	10	7,100	3,200	12,300	5,500	10,000	4,500	7,100	3,200
1/2	13	12,000	5,400	20,800	9,400	17,000	7,600	12,000	5,400
5/8	16	18,100	8,200	31,300	14,200	25,600	11,600	18,100	8,200
3/4	20	28,300	12,800	49,000	22,300	40,000	18,200	28,300	12,900
7/8	22	34,200	15,500	59,200	27,200	48,400	22,200	34,200	15,700
1	26	47,700	21,600	82,600	37,900	67,400	31,000	47,700	21,900
1 1/4	32	72,300	32,800	125,200	56,800	102,200	46,400	72,300	32,800

NOTES:  
 (1) Other grades of proof tested steel chain include Proof Coil (Grade 28), Hi-Test (grade 43 Chain, and Transport (grade 70) Chain. These grades are not recommended for overhead lifting and therefore are not covered by this standard.  
 (2) Rating of multi-leg slings adjusted for angle of loading between the inclined leg and the horizontal plane of the load.

TABLE 4B—MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Nominal chain or coupling link size		Maximum allowable wear of cross-sectional diameter, in.
inch	mm	
1/4	7	0.037
3/8	10	0.052
1/2	13	0.060
5/8	16	0.084
3/4	20	0.105
7/8	22	0.116
1	26	0.137
1 1/4	32	0.169

NOTE: For other sizes, consult chain or sling manufacturer.

TABLE 5—SAFE WORKING LOADS FOR SHACKLES  
 [In tons of 2,000 pounds]

Material size		Pin diameter		Safe working load in 2,000 lb tons
Inches	(cm)	Inches	(cm)	
1/2	(1.3)	5/8	(1.6)	1.4
5/8	(1.6)	3/4	(1.9)	2.2
3/4	(1.9)	7/8	(2.2)	3.2
7/8	(2.2)	1	(2.5)	4.3
1	(2.5)	1 1/8	(2.9)	5.6
1 1/8	(2.9)	1 1/4	(3.2)	6.7
1 1/4	(3.2)	1 3/8	(3.5)	8.2
1 3/8	(3.5)	1 1/2	(3.8)	10.0
1 1/2	(3.8)	1 5/8	(4.1)	11.9
1 3/4	(4.4)	2	(5.1)	16.2

TABLE 5—SAFE WORKING LOADS FOR SHACKLES—Continued  
[In tons of 2,000 pounds]

Material size		Pin diameter		Safe working load in 2,000 lb tons
Inches	(cm)	Inches	(cm)	
2	(5.1)	2¼	(5.7)	21.2

WIRE ROPE TABLE—RATE LOADS FOR SINGLE LEG SLINGS 6×19 OR 6×37 CLASSIFICATION  
IMPROVED PLOW STEEL GRADE ROPE WITH FIBER CORE (FC)  
[Rated loads [note 1], tons (2,000 lb)]

Rope diameter, inch	Vertical			Choker
	HT	MS	S	HT, MS&S
¼	0.49	0.51	0.55	0.38
5/16	0.78	0.79	0.85	0.6
3/8	1.1	1.1	1.2	0.85
7/16	1.4	1.5	1.7	1.2
½	1.8	2.0	2.1	1.5
9/16	2.3	2.5	2.7	1.9
5/8	2.8	3.1	3.3	2.3
¾	3.9	4.4	4.8	3.3
7/8	5.2	6.0	6.4	4.5
1	6.7	7.7	4.8	5.9
1 1/8	8.4	9.5	11	7.4
1 1/4	10	12	13	9.0
1 3/8	12	14	15	11
1 1/2	15	17	18	13
1 5/8	17	19	21	15
1 3/4	20	22	25	17
2	26	29	32	22

HT=Hand Tucked Splice.  
For Hidden Tuck Splice (IWRC), use values in HT (FC) columns.  
MS=Mechanical Splice.  
S=Poored Socket or Swaged Socket.  
NOTE: (1) These values are based on slings being vertical. If they are not vertical, the rated load shall be reduced. If two or more slings are used, the minimum horizontal angle between the slings shall also be considered.

WIRE ROPE TABLE—RATED LOADS FOR SINGLE LEG SLINGS 6×19 OR 6×37 CLASSIFICATION EXTRA  
IMPROVED PLOW STEEL GRADE ROPE WITH INDEPENDENT WIRE ROPE CORE (IWRC)  
[Rated loads [note 1], tons (2,000 lb)]

Rope diameter, inch	Vertical			Choker	Vertical basket	
	HT	MS	S	HT, MS&S	[Note (2)] HT	[Note (3)] MS&S
¼	0.53	0.59	0.59	0.31	1.1	1.1
5/16	0.82	0.87	0.92	0.64	1.6	1.7
3/8	1.2	1.2	1.3	0.92	2.3	2.5
7/16	1.5	1.7	1.8	1.2	3.1	3.4
½	2.0	2.2	2.3	1.6	4.0	4.4
9/16	2.5	2.8	2.9	2.0	4.9	5.5
5/8	3.0	3.4	3.6	2.6	6.0	6.8
¾	4.2	4.9	5.1	3.6	8.4	9.7
7/8	5.5	6.6	6.9	4.8	11	13
1	7.2	8.5	9.0	6.3	14	17
1 1/8	9.0	10	11	7.9	18	20
1 1/4	11	13	14	9.7	22	26
1 3/8	13	15	17	12	27	31
1 1/2	16	18	20	14	32	37
1 5/8	18	21	23	16	37	43
1 3/4	21	25	27	19	43	49
2	28	32	34	24	55	64

HT=Hand tucked Splice  
For Hidden Tuck Splice (IWRC), use values in HT columns of Table 3.  
MS=Mechanical Splice. S=Poored Socket or Swaged Socket.  
NOTES:  
(1) These values are based on slings being vertical. If they are not vertical, the rated load shall be reduced. If they are not vertical, the rated load shall be reduced. If two or more slings are used, the minimum horizontal angle between the slings shall also be considered.  
(2) These values only apply when the D/d ratio is 15 or greater.

(3) These values only apply when the D/d ratio is 25 or greater.  
 D=Diameter or curvature around which the body of the sling is bent. d=Diameter of rope.

WIRE ROPE TABLE-RATED LOADS FOR SINGLE LEG SLINGS 6×19 OR 6×37 CLASSIFICATION EXTRA  
 IMPROVED PLOW STEEL GRADE ROPE WITH INDEPENDENT WIRE ROPE CORE (IWRC)  
 [Rated loads [note 1], tons (2,000 lb)]

Vertical Rope diameter	Vertical		Choker	Vertical basket [note (2)]
	MS	S	MS&S	MS&S
1/4	0.65	0.68	0.48	1.3
5/16	1.0	1.1	.074	2.0
3/8	1.4	1.5	1.1	2.9
7/16	1.9	2.0	1.4	3.9
1/2	2.5	2.7	1.9	5.1
9/16	3.2	3.4	2.4	6.4
5/8	3.9	4.1	2.9	7.8
3/4	5.6	5.9	4.1	11
7/8	7.6	8.0	5.6	15
1	9.8	10	7.2	20
1 1/8	12	13	9.1	24
1 1/4	15	16	11	30
1 3/8	18	19	13	36
1 1/2	21	23	16	42
1 5/8	24	26	18	49
1 3/4	28	31	21	57
2	37	40	28	73

HT=Hand tucked Splice  
 For Hidden Tuck Splice (IWRC), use values in HT columns of Table 3.  
 MS=Mechanical Splice.  
 S=Poored Socket or Swaged Socket.

NOTE: (1) These values are based on slings being vertical. If they are not vertical, the rated load shall be reduced. If they are not vertical, the rated load shall be reduced. If two or more slings are used, the minimum horizontal angle between the slings shall also be considered.  
 (2) These values only apply when the D/d ratio is 25 or greater.

[62 FR 40202, July 25, 1997, as amended at 65 FR 40947, June 30, 2000]

APPENDIX III TO PART 1918—THE MECHANICS OF CONVENTIONAL CARGO GEAR (NON-MANDATORY)

NOTE: This appendix is non-mandatory and provides an explanation of the mechanics in the correct spotting of cargo handling gear.

Although the most prevalent method of cargo handling is accomplished through the use of modern shoreside container gantry cranes, there are occasions when break-bulk cargo is handled with conventional ship's cargo gear. This appendix provides a reference for those unfamiliar with such cargo gear.

Sections 1918.52, 1918.53, and 1918.54 all address the subject of rigging and operating vessel's cargo handling gear. It is important to understand that under the Burton System of cargo handling (conventional gear consisting of two cargo derricks with married falls), the midships or up-and-down boom should be spotted as close to the fore and aft centerline of the hatch as operationally possible. Such spotting of the up-and-down boom will allow the most effective leads for the guy(s) and preventer(s) to safely support the lateral stresses generated in the boom(s) by the married falls. As the lead of the

guy(s) and preventer(s) approaches the vertical, in supporting the boom(s) head, the total stress in the guy(s) increases rapidly due to the increased vertical force that is generated in the guy(s) in order to counteract any particular horizontal or lateral force exerted on the boom(s) head. The appreciable vertical forces that are generated in this process are transmitted, in substantial part, to the boom(s) and topping lift(s), causing proportionate compressive stresses in the boom(s) and tension stresses in the topping lift(s).

In general, guys and preventers must be located so that enough vertical resistance is developed so as to prohibit the boom(s) from jackknifing as cargo passes across the deck. Special care must be exercised in the proper placement of guys and preventers associated with the Burton or yard boom. Preventers, when used, must parallel as closely as possible the guys that they support. Guys and preventers must not be attached to the same fitting.

While under a load, the cargo falls (running rigging) must not be permitted to chafe on any standing or other running gear. Special attention must be paid to ensure that cargo runners work freely through the heel