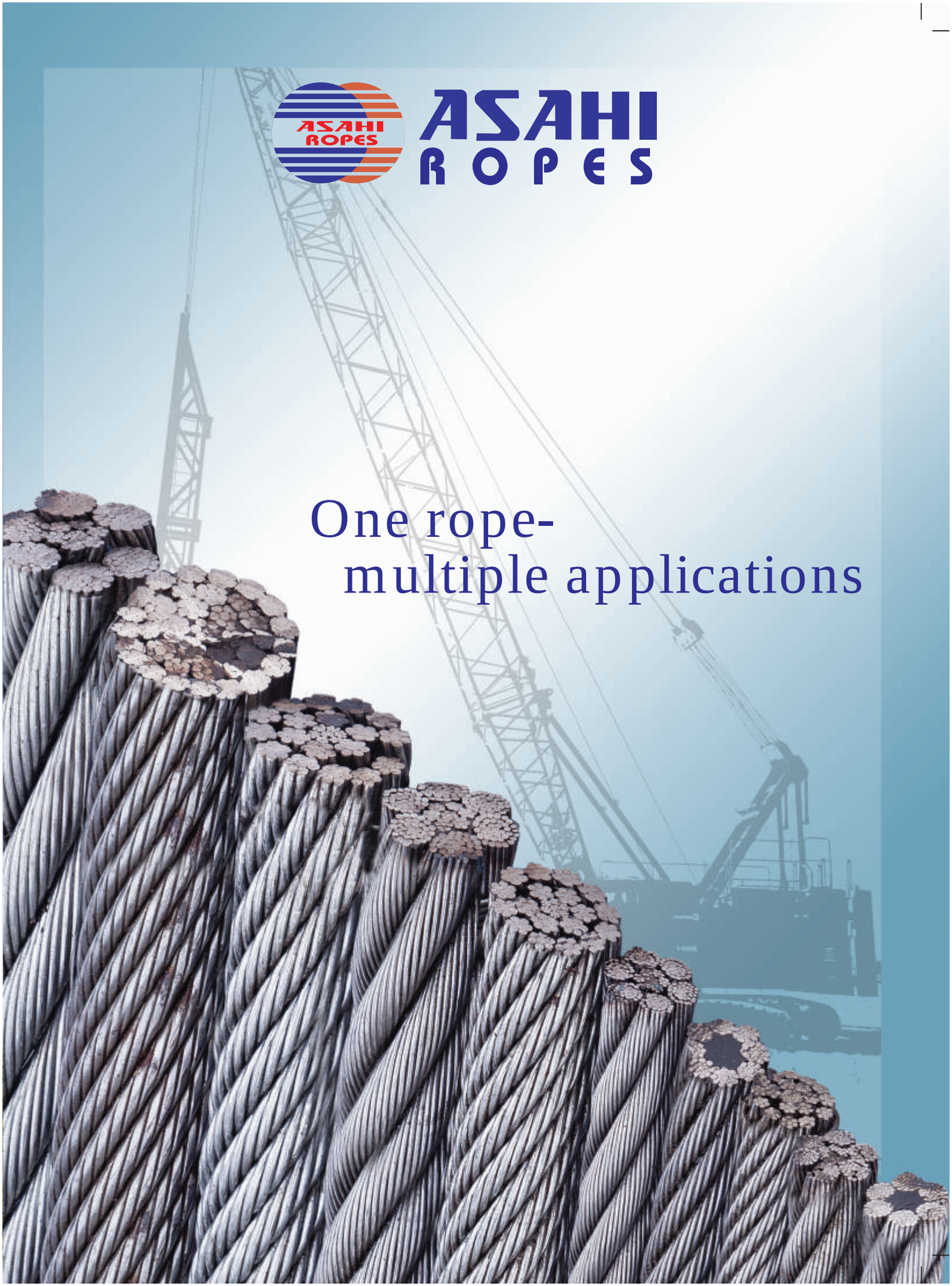
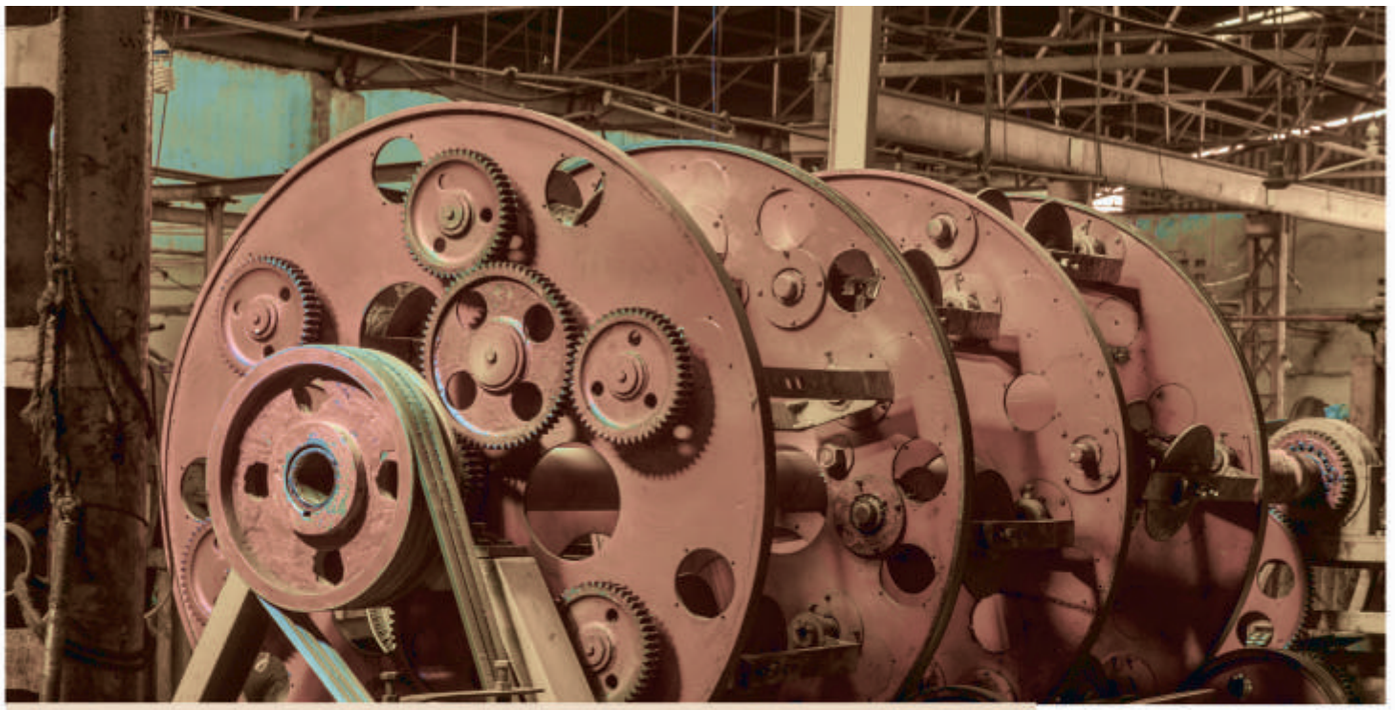
ASAHI ROPES

One rope-
multiple applications





Wire Ropes & Slings

ASAHI ROPES PRIVATE LIMITED was established in Delhi way back in 1986 by the people with a vast experience in the field of manufacturing and marketing of steel wire ropes and slings.

We have a state of the art plant and machinery, which are constantly modified and upgraded keeping in view the requirements of the market and product changes.

The objective of the company has always been to deliver the best quality product available at the best price in the market.

ASAHI is manufacturing a wide range of products such as General Engineering Ropes, Crane Ropes, Mining Ropes, Lift & Elevator Ropes, Pilling Ropes, Shipping Ropes, Fishing Ropes, Rotation Resistance Ropes, Aircraft Cables, Stainless Steel Ropes, Coated Ropes and Strands. Our diversified inventories of wire ropes have a diameter range of 3mm to 60 mm in various constructions, cores and coating. ASAHI also manufactures all kinds of slings fitted with different hardware and end fittings as per the needs of the customers.

All our products are manufactured with high precision in order to meet the industry's strict & consistently high quality standards. There is an ongoing R&D, with respect to production techniques and product design. Our QAP scans each and every production activity at various levels of production. To ensure that a zero defect material reaches our valued customers, the product is passed through strict quality checks at every stage i.e. Raw Material Testing, Online Product Testing and Finished Goods Test. To ensure this we are equipped with the latest testing facilities for wire, ropes and slings. ASAHI has developed products which drastically increase the performance and service durability thereby reducing maintenance time and cost.

ASAHI has been serving various customers, for nearly three decades, in Govt., Semi- Govt. and Private Sectors, spread over various industries such as Cranes & Material Handling, Lift & Elevators, Mining, Boring& Drilling, Ports, Railways, Power Plants, Defense, Ship Building, Marine Engineering, Automobile, Construction – Civil and Infrastructure, piling and various Original Equipment Manufacturers (OEMs). ASAHI's products are extensively acknowledged in the market for their high quality standards, durability, reliability, and optimum performance. We have also earned the trust & confidence of vast number of customers having diversified uses spread across the country.

The team of professionals at ASAHI aims to provide our customers the best of the products and the highest level of services.

This is what allows us to say "ASAHI ROPES ARE THAT SHINES".

Our final note about ASAHI wire rope products is that, we realize the importance of being different from our competitors. We strive to make your experience with ASAHI one, where you feel that we are a part of your success and that you count on ASAHI to fulfill your needs, whether they are big or small. Customized and Professional Client Service is a main say at ASAHI.

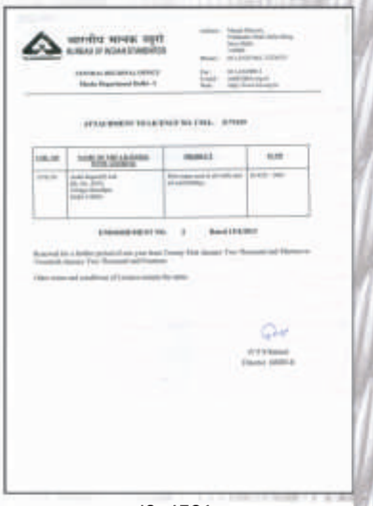
ASAHI ROPES

Approvals and Accreditations

NSIC Certified

ISO 9001:2008

IS: 2266



IS: 4521

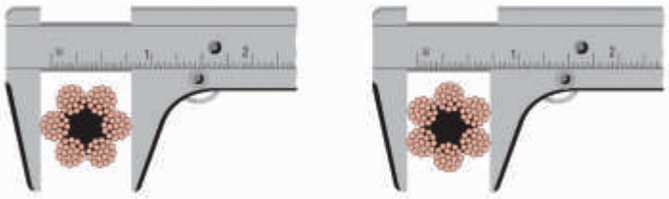
Major Clients

BHUSHAN · NALCO · HINDUSTAN COPPER LIMITED · Reliance Industries Limited · ACE The helpful place. · BHEL · सेल SAIL · ONGC · NTPC · SHREE CEMENT LIMITED · LARSEN & TOUBRO · NAVAYUGA · SIMPLEX INFRASTRUCTURES LIMITED · R.K. MARBLE GROUP · JSL · KEC · INDO FARM EQUIPMENT LIMITED · ITALIAN-THAI · HSL · दिल्ली मेट्रो रेल कॉरपोरेशन लिमिटेड DELHI METRO RAIL CORPORATION LTD. · Tractel

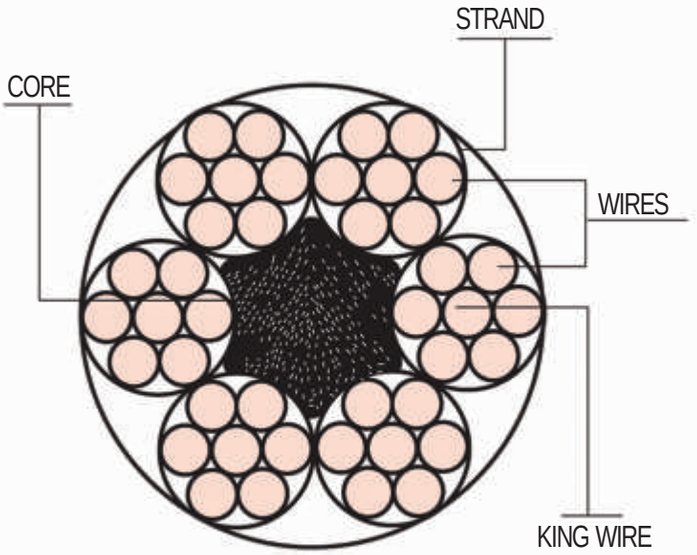
Wire Rope Components

Wire Strand Core

Rope Size



Measure the circle just touching the extreme outer limits (crown) of the strands.



WIRE ROPE

HOW TO ORDER A ROPE

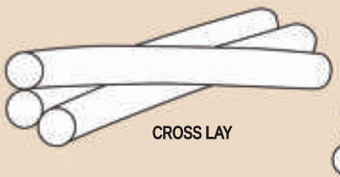
- Nominal diameter and tolerance
- Construction / Class / Brand Name
- Finish (galvanised or ungalvanised)
- Tensile Strength
- Minimum Breaking load requirement
- Core - Fibre /IWRC /WSC
- Lay - eg. Right hand regular lay
- Lubrication
- Packing - wooden reel/steel reel/coils.
- Particulars of fittings
- Preformed / Non-preformed
- Exact length per reel / coil etc (special length tolerance, if any)
- Delivery time
- Special requirements
- Pre-stretching
- Packaging
- Identification
- Third-party inspection

Note
It is always important to state the application of the rope other than the above points to ensure correct rope for your purpose.

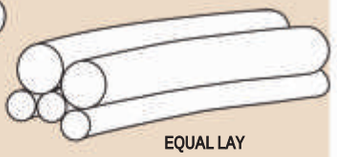
HOW TO IDENTIFY ASAHI ROPES

Every genuine ASAHI rope has this identification tape inside.

Fundamental Constructions



CROSS LAY



EQUAL LAY

SINGLE LAYER

- Single-Wire centre with six wires of the same diameter.

SEALE

- Equal number of wires in each layer.
- All wires in each layer are of the same diameter.
- Large outer wires rest in the valley between the small inner wires.

FILLER WIRE

- Inner layer having half the number of wires as the outer layer.
- Small filler wires, equal in number to the inner layer, are laid in the valleys of the inner layer.

WARRINGTON

- One diameter of wire in the inner layer.
- Two diameters of wire alternating large and small in the outer layer.
- The large outer-layer wires rest in the valleys and the smaller ones on the crowns of the inner layer.

COMBINED

- Combination of above constructions. Eg Seale-Filler, Warrington-Seale etc.

LAY

Direction of Wire & Strand Helix

Right Hand Regular lay (RHRL/RHO/sZ)

Left Hand Regular Lay (LHRL/LHO/zS)

Right Hand Langs Lay (RHRL/RHL/zZ)

Left Hand Langs Lay (RHLL/LHL/sS)

Alternate lay (Combination of Langs & Regular)

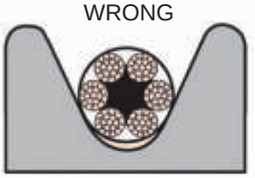
Special Alternate Lay (2 Langs 1 Regular)

Wire Rope Usage & Handling

IDEAL PULLEY GROOVE

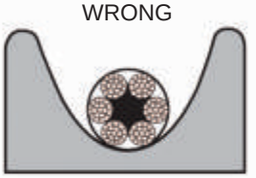
Greater contact area between the rope and the pulley reduces abrasion and enhances service life.

WRONG



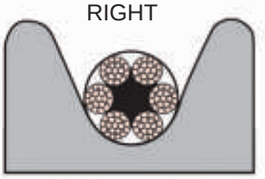
Sheave groove too narrow

WRONG



Sheave groove too wide

RIGHT

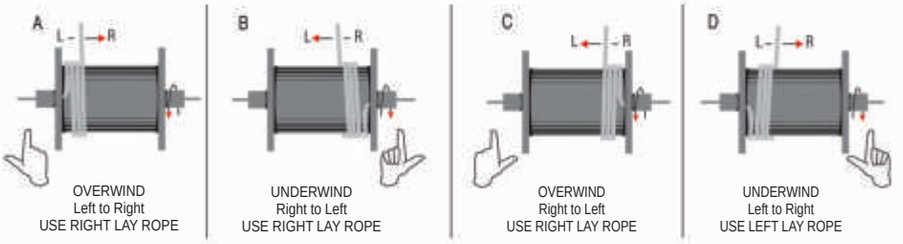


Sheave groove correctly
supporting the rope for 33% of its cicumference.

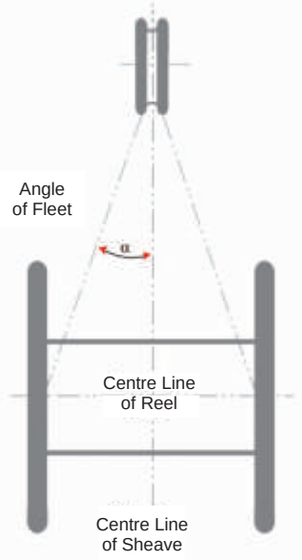
SPOOLING / ANCHORAGE OF ROPE ON DRUM

Ropes are supplied with zero internal torque.

Improper spooling induces torque in rope, reducing the rope life.



FLEET ANGLE

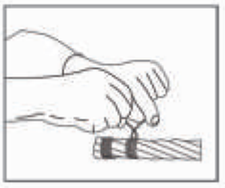


Note
Recommended angle
Grooved drum : $\alpha \leq 2.5^{\circ}$
Flat drum : $0.5^{\circ} \leq \alpha \leq 1.5^{\circ}$

ROPE CUTTING PROCEDURE

Seizing

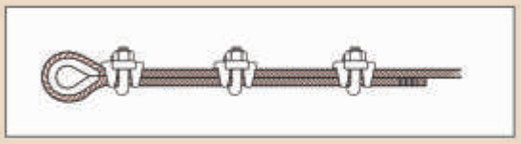
Twisting



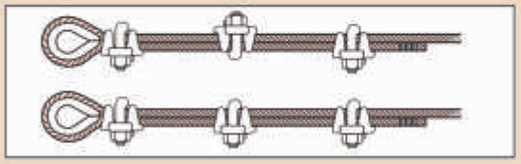
Cutting

Note
Seizing wire recommendation
for ungalvanised rope - use annealed wire.

ROPE CLAMPING



The Right way to Clip Wire Rope

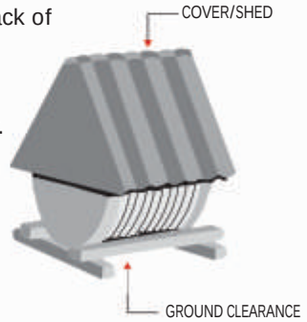


The Wrong way to Clip Wire Rope

Note
Improper fixing of clamps may lead to safety hazards.
For proper clamping practice, refer applicable standards or OEM recommendation.

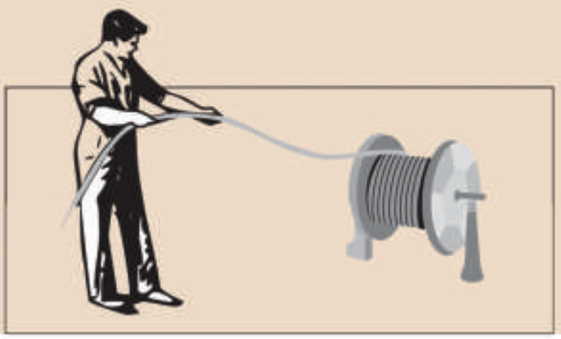
STORAGE

- Must be stored in a well ventilated shed.
- Free from moisture, dust and fumes.
- Suitable lubricant to be applied every 3 months to the outer layers.
- Reel containing ropes to be rolled through 90 degree after every 3 months.
- Protect wooden reels from the attack of termites.
- In no case the reels should be put on ground or uncemented floor.

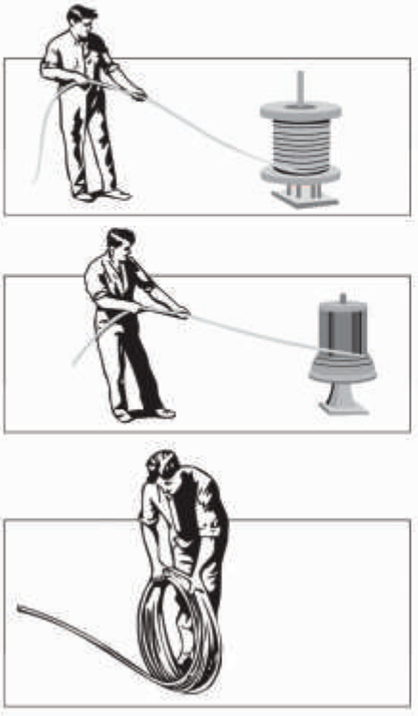


HANDLING - THE RIGHT WAY

- Use spindle through the reels for loading / unloading or put the rope on a swift with brake arrangement.
- Allow clearance for free rotation of reel when the rope end is pulled.
- Maintain constant tension during haul off.
- Prevent crossing of rope laps on the reel.
- Avoid possible kink, which is a permanent damage to a rope.



HANDLING - THE RIGHT WAY



Wire Rope Failure

WIRE ROPE CHARACTERISTICS

COMMONLY USED ROPE (NON -COMPACTED)
CHARACTERISTICS SIMPLY STATED

- More wires in the outer strand (14 for 36SW) will improve bend fatigue.
- Less wires in the outer strands (9 for 19S) improve wear/abrasion resistance characteristics.
- Steel core (IWRC) resists drum crushing better than fibre core.
- Langs lay resists interference at drum better than ordinary lay.

ABRASION RESISTANCE

Comparison of outer wire sizes for 25mm diameter rope, as illustration .

6 x 7	6 outer wires	2.54mm
6 x 19S	9 outer wires	2.11mm
6 x 25F	12 outer wires	1.70mm
6x36SW	14 outer wires	1.49mm
6 x 41SW	16 outer wires	1.34mm

TYPES OF TYPICAL FAILURES

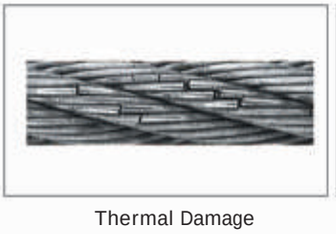
Termination Failure

Fatigue Failure

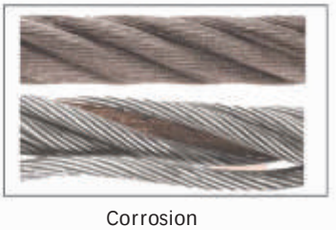
Birdcage

Shock Loading

Abrasion



Thermal Damage



Corrosion

RECOMMENDED DO'S & DONT'S

Do's

- Lubricate ropes with good quality acid free and moisture free lubricant.
- Regularly inspect the sheaves, rollers or pulleys - the life of a rope largely depends on their conditions.
- Inspect ropes and fittings/terminations periodically.

Don't's

- Do not allow ropes in store to deteriorate.
- Do not mishandle ropes when uncoiling or unreeling & allow kinks to form.
- Do not use Langs lay with a swivel.
- Do not use a rope with too large groove diameter on drums and pulleys.
- Do not cut a rope without sufficiently flexible for the size of drum or pulley.
- Do not load the rope beyond its safe working load Reduction of safety factor may jeopardise not only rope, but also equipment, job and men.

Note
Remember - Care in handling, installation, and careful inspection gives more life and enormous dividends.

GENERAL DISCARD CRITERIA-CRANE ROPES

- Rope diameter reduction >7% of NRD, only due to external wear.
- Rope diameter reduction >3% of NRD for rotation resistant ropes and >10% for other ropes due reasons other than external wear.
- For single layer (6 and 8-strand) and parallel-closed ropes if number of visible broken wires exceed 4% of total load bearing wires in all outer stands of the rope, over a length 6d or 8% in 30 d.
- For rotation resistant ropes if number of visible broken wires exceed 2 over a length 6 d or 4 in 30 d.
- Concentrated close group of broken wires in a length of 6d or in one strand.
- Wire break in the strand valley indicate internal rope deterioration requiring closed inspection of the rope, two or more valley breaks in 6xd requires discard.
- Broken wires at, adjacent to, the termination, require the termination to be remade by shortening the rope, otherwise the rope shall be discarded.
- Localised distortion, damage, crushing, kink, loop, birdcage formation.
- Localised core or strand protrusion.
- Localised rope diameter reduction or lay variation associated with waviness.
- Collapsed core or complete fracture of one strand
- Sign of severe corrosion or pitting.
- Damage due to heat.

Note
For discard of ropes other than crane wire ropes relevant code/standard should be referred.

The rope should be examined by a competent person who should always refer relevant code/ recommendation/ standard for deciding rope discard.

NRD- Nominal Rope Diameter.

Quality Control Department

At ASAHI, we put each rope through exhaustive testing by our Quality Control Team, to deliver a product with the best quality, strength & life. These include long series of physical test which are performed on raw material, work in-progress as well as the finished product.

These pictures present our QUALITY CONTROL CENTRE where our Team works tirelessly, enabling us to maintain the quality paradigms and make ASAHI a synonym for quality.

There is a brief sequence of various tests being executed at various stages of rope making.

METRIC-IMPERIAL DIAMETER CONVERSION

in.	mm.	in.	mm.	in.	mm.
5/32	3.97	15/16	23.8	2 1/2	63.5
3/16	4.76	1	25.4	2 3/4	69.9
7/32	5.56	1 1/16	27.0	3	76.2
1/4	6.35	1 1/8	28.6	3 1/4	82.6
5/16	7.94	1 3/16	30.2	3 1/2	88.9
3/8	9.53	1 1/4	31.8	3 3/4	95.3
7/16	11.1	1 5/16	34.9	4	101.6
1/2	12.7	1 1/2	38.1	4 1/4	108.0
9/16	14.3	15/16	41.3	4 1/2	114.3
5/8	15.9	1 3/4	44.5	4 3/4	120.7
11/16	17.5	1 7/8	47.6	5	127.0
3/4	19.0	2	50.8		
13/16	20.6	2 1/8	54.0		
7/8	22.2	2 1/4	57.2		

CONVERSION TABLE

Length	1m	= 1000 mm	= 3.281ft	= 39.37 inch
Force	1kN	= 101.97kp	= 0.10197 MT-f	= 224lbs-f
Tensile Strength	1N/mm²	= 0.10197 kp/mm²	= 145.04 p.s.i.	= 10 bar
Cross Section	1 mm²	= 0.00155 in²		
Weight	1 metric t	= 1000 kg = 1.102 short t	= 0.9842 long t	= 2204.6 lbs
Weight per Length Unit	1 kg/m	= 0.672 lbs/ft		

STAGE 1: RAW MATERIAL

WIRE

Since wire is the most important raw material for rope making and its quality has a direct effect on the working life of the rope, hence we put all our wire lots through a series of tests as per IS-1835:1976 which are laid down by the Bureau of Indian Standards.

A. Tensile Testing: This is done as per IS-1608:2005 to test the Breaking load of the wire to determine its ultimate tensile strength.

B. Torsion Test: This test is performed as per the guidelines laid down in IS-1717:2012 determine the ability of the wire to undergo plastic deformation during simple torsion in one direction.

C. Reverse Bend Test: This test is performed as per the guidelines laid down in IS-1716:1985 to determine ability of the wire to undergo plastic deformation during reverse bending and thus determine the flexibility of the wire.

D. Wrapping Test: This test is performed as per the guidelines laid down in IS-1716:1985 to determine ability of the wire to wrap itself over another material.

E. Adhesion Test: This test is performed to determine the quality & strength of zinc coating on the wires.

F. Galvanizing Test: This test is performed as per the guidelines laid down in IS-6745:1972 to determine the mass of Zinc Coating on the wires.

CORE

Fibre Core – Natural (Jute, Sisal, Manila) or Manmade (Polyolefin, Polyethene, Polypropylene etc.) is tested for various parameters such as its lay, diameter, lubrication, breaking strength etc., as per IS-1804:2004.

Steel Core (SC or WSC) / Independent Wire Rope Core (IWRC) – Wire for the core are selected as per the tensile, not exceeding the main wire. IWRC (7X7) or Strand core (1X7, 1X19, 1x36, 1X37) is constructed as per specifications laid down by BIS.

Quality Control Department

STAGE 2: IN PROCESS - ROPE/STRAND

DIAMETER: Constant checks are maintained both at the stranding stage and at the closing stage, so as to ensure diameter of the ropes are within the tolerance limits specified by BIS and high precision material is manufactured.

LAY: Direction and length of the lay is maintained both for strand as well as for the ropes and the limits are kept within the specification provided by BIS.

JOINTS: The possibility of the joints in a wire are kept to a minimum level & in no case more than one wire is joined in a length of 10 meters in the strands. The joints as far as possible are electrically butt-welded.

VISUAL DEFECTS: Both strands and ropes are constantly checked for any visual imperfection or deviations such as overlapping, loosening of wires/strands etc at the shop floor.

LUBRICATION: At all the stages the rope is thoroughly treated with suitable lubricants, which are as per IS 9182:1993 (Lubricants free from acidity alkalinity and having good adhesion to steel) to protect it from corrosion and lower down the internal friction among the wires, when it is put to use.

STAGE 3: FINISHED WIRE ROPE/STRAND

PHYSICAL PARAMETERS: The finished goods are again tested for all physical parameters like its Diameter, Lay, and any other visual defects such as over lapping or loosening of wires or strands.

PREFORMING: The performing test is carried out by un-laying 2 strands opposite to each other for approx. 2 rope lay lengths.

BREAKING LOAD TEST: All our finished products (both wire strand & wire rope) is put to a destructive test to determine its breaking load and the reading decides the passing of the material.

REEL: The finished goods are securely wound & packed on wooden reels or coiled so that the rope (when unwound) comes to its original shape & position. Moreover appropriate packaging of these reels and coils is ensured so as to avoid any possibility of transit damages.

Breaking load & mass for Asahi Ropes

6x19M (12/6-1)

Nomi. Dia	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
(1) mm	Fibre Core (CF) (2) kg/100m	Steel Core (CWR) (3) kg/100m	Fibre Core (CF) (4) kN	Steel Core[1] (CWR) (5) kN	Fibre Core (CF) (6) kN	Steel Core[1] (CWR) (7) kN	Fibre Core (CF) (8) kN	Steel Core[1] (CWR) (9) kN
8	22.1	24.4	31	33	35	38	39	42
9	28.0	30.8	39	42	44	48	49	53
10	34.6	38.1	48	52	54	59	60	65
11	41.9	46.1	58	63	66	71	73	79
12	49.8	54.8	69	75	78	85	87	94
13	58.5	64.3	82	88	92	99	102	110
14	67.8	74.6	95	102	107	115	118	128
16	88.6	97.4	124	133	139	150	154	167
18	112	123	156	169	176	190	195	211
19	125	137	174	188	196	212	217	235
20	138	152	193	208	218	235	241	260
22	167	184	234	252	263	284	292	315
24	199	219	278	300	313	338	347	375
26	234	257	326	352	368	397	407	440
28	271	298	378	409	426	461	472	510
32	354	390	494	534	557	602	617	666
36	448	493	625	675	705	761	781	843
38	500	550	697	752	785	848	870	939
40	554	609	772	834	870	940	964	1041
44	670	-	934	-	1053	-	1166	-
48	797	-	1112	-	1253	-	1388	-
52	936	-	1305	-	1471	-	1629	-

Note
To calculate the aggregate breaking force multiply the figures given in col 4, 6 and 8 by
1. 163 and in col 5, 7 and 9 by 1.25
1) Wire strand core (CWS) may be used for rope diameter 12 mm and below.

6 x 37M (18/12/6-1)

Nomi. Dia	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
(1) mm	Fibre Core (CF) (2) kg/100m	Steel Core[1] (CWR) (3) kg/100m	Fibre Core (CF) (4) kN	Steel Core[1] (CWR) (5) kN	Fibre Core (CF) (6) kN	Steel Core[1] (CWR) (7) kN	Fibre Core (CF) (8) kN	Steel Core[1] (CWR) (9) kN
8	22.1	24.4	30	32	33	36	37	40
9	28.0	30.8	37	40	42	46	47	51
10	34.6	38.1	46	50	52	56	58	62
11	41.9	46.1	56	60	63	68	70	76
12	49.8	54.8	67	72	75	81	83	90
13	58.5	64.3	78	84	88	95	98	105
14	67.8	74.6	91	98	102	110	113	122
16	88.6	97.4	118	128	134	144	148	160
18	112	123	150	162	169	183	187	202
19	125	137	167	180	188	203	209	225
20	138	152	185	200	209	225	231	250
22	167	184	224	242	253	273	280	302
24	199	219	267	288	301	325	333	359
26	234	257	313	338	353	381	391	422
28	271	298	363	392	409	442	453	489
32	354	390	474	512	534	577	592	639
36	448	493	600	648	676	730	749	809
38	500	550	668	722	753	814	834	901
40	554	609	741	800	835	902	924	999
44	670	737	896	968	1010	1091	1119	1208
48	797	877	1066	1152	1202	1298	1331	1438
52	936	1029	1252	1352	1411	1554	1562	1687
56	1085	-	1451	-	1636	-	1812	-
60	1246	-	1666	-	1878	-	2080	-
64	1417	-	1896	-	2137	-	2367	-

Note
To calculate the aggregate breaking force multiply the figures given in col 4, 6 and 8 by
1. 212 and in col 5, 7 and 9 by 1.25
1) Wire strand core (CWS) may be used for rope diameter 12 mm and below.

6 x 17S (8-8-1) and 6x19S (9-9-1)

Nomi. Dia	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
(1) mm	Fibre Core (CF) (2) kg/100m	Steel Core[1] (CWR) (3) kg/100m	Fibre Core (CF) (4) kN	Steel Core[1] (CWR) (5) kN	Fibre Core (CF) (6) kN	Steel Core[1] (CWR) (7) kN	Fibre Core (CF) (8) kN	Steel Core[1] (CWR) (9) kN
8	23.8	26.2	33	36	37	40	42	45
9	30.2	33.2	42	45	47	51	53	57
10	37.3	41.0	52	56	59	63	65	70
11	45.1	49.6	63	68	71	77	78	85
12	53.7	59.0	75	81	84	91	93	101
13	63.0	69.3	88	95	99	107	110	118
14	73.0	80.3	102	110	115	124	127	137
16	95.4	105	133	144	150	162	166	179
18	121	133	168	182	190	205	210	227
19	135	148	188	203	211	228	234	253
20	149	164	208	224	234	253	260	280
22	180	198	252	272	284	306	314	339
24	215	236	299	323	337	364	374	403
26	252	277	351	379	396	428	439	474
28	292	321	407	440	459	496	509	549
32	382	420	532	575	600	648	664	717
36	483	531	673	727	759	820	841	908
38	538	592	750	810	846	913	937	1012
40	596	656	831	898	937	1012	1038	1121
44	721	794	1006	1086	1134	1225	1256	1356
48	858	944	1197	1293	1350	1458	1495	1614
52	1008	1108	1405	1517	1584	1711	1754	1894

Note
To calculate the aggregate breaking force multiply the figures given in col 4, 6 and 8 by
1. 163 and in col 5, 7 and 9 by 1.25
1) Wire strand core (CWS) may be used for rope diameter 12 mm and below.

6 x 21F (10-5/F-5-1) and 6 x 25F (12-8 F-8-1)

Nomi. Dia	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
(1) mm	Fibre Core (CF) (2) kg/100m	Steel Core[1] (CWR) (3) kg/100m	Fibre Core (CF) (4) kN	Steel Core[1] (CWR) (5) kN	Fibre Core (CF) (6) kN	Steel Core[1] (CWR) (7) kN	Fibre Core (CF) (8) kN	Steel Core[1] (CWR) (9) kN
8	24.3	26.8	34	37	38	41	42	46
9	30.8	33.9	43	46	48	52	54	58
10	38.0	41.8	53	57	60	65	66	71
11	46.0	50.6	64	69	72	78	80	86
12	54.7	60.2	76	82	86	93	95	103
13	64.3	70.7	90	97	101	109	112	121
14	74.5	82.0	104	112	117	127	130	140
16	97.3	107	136	147	153	165	169	183
18	123	135	172	186	194	209	214	232
19	137	151	191	207	216	233	239	258
20	152	167	212	229	239	258	265	286
22	184	202	257	277	289	312	320	346
24	219	241	305	330	344	372	381	412
26	257	283	358	387	404	436	447	483
28	298	328	416	449	469	506	519	560
32	389	428	543	586	612	661	678	732
36	493	542	687	742	775	837	858	926
38	549	604	766	827	863	932	956	1032
40	608	669	848	916	956	1033	1059	1144
44	736	810	1026	1109	1157	1250	1281	1384
48	876	964	1222	1319	1377	1487	1525	1647
52	1028	1131	1434	1548	1616	1745	1790	1933
56	1192	1311	1663	1796	1874	2024	2076	2242
60	1369	1506	1909	2061	2152	2324	2383	2573
64	1557	1713	2172	2345	2448	2644	2711	2928

Note
To calculate the aggregate breaking force multiply the figures given in col 4, 6 and 8 by
1. 163 and in col 5, 7 and 9 by 1.25
1) Wire strand core (CWS) may be used for rope diameter 12 mm and below.

6 x 36 SW (14-7+7-7-1) (CWR)

Nomi. Dia	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
(1) mm	Fibre Core (CF) (2) kg/100m	Steel Core[1] (CWR) (3) kg/100m	Fibre Core (CF) (4) kN	Steel Core[1] (CWR) (5) kN	Fibre Core (CF) (6) kN	Steel Core[1] (CWR) (7) kN	Fibre Core (CF) (8) kN	Steel Core[1] (CWR) (9) kN
8	24.3	26.8	33	36	37	40	41	45
9	30.8	33.9	42	45	47	51	52	57
10	38.0	41.8	52	56	58	63	65	70
11	46.0	50.6	63	68	71	76	78	85
12	54.7	60.2	75	81	84	91	93	101
13	64.3	70.7	88	95	99	107	109	118
14	74.5	82.0	102	110	114	124	127	137
16	97.3	107	133	143	149	161	166	179
18	123	135	168	181	189	204	209	226
19	137	151	187	202	211	228	233	252
20	152	167	207	224	234	252	259	279
22	184	202	251	271	283	305	313	338
24	219	241	298	322	336	363	372	402
26	257	283	350	378	395	426	437	472
28	298	328	406	439	458	494	507	549
32	389	428	530	573	598	646	662	715
36	493	542	671	725	757	817	838	905
38	549	604	748	808	843	911	934	1008
40	608	669	829	895	934	1009	1035	1117
44	736	810	1003	1083	1130	1221	1252	1352
48	876	964	1193	1289	1345	1453	1490	1609
52	1028	1131	1401	1513	1579	1705	1748	1888
56	1192	1311	1624	1754	1831	1978	2028	2190
60	1369	1506	1865	2014	2102	2270	2328	2514

Note
To calculate the aggregate breaking force multiply the figures given in col 4, 6 and 8 by
1. 119 and in col 5, 7 and 9 by 1.28
1) Wire strand core (CWS) may be used for rope diameter 12 mm and below.

8 x 19 S (9-9-1)

Nomi. Dia	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
(1) mm	Fibre Core (CF) (2) kg/100m	Steel Core (CWR) (3) kg/100m	Fibre Core (CF) (4) kN	Steel Core[1] (CWR) (5) kN	Fibre Core (CF) (6) kN	Steel Core[1] (CWR) (7) kN	Fibre Core (CF) (8) kN	Steel Core[1] (CWR) (9) kN
8	22.3	27.2	29	34	33	38	36	42
9	28.2	34.4	36	43	41	49	46	54
10	34.9	42.5	45	53	51	60	56	66
11	42.2	51.4	55	64	61	73	68	80
12	50.2	61.2	65	77	73	86	81	96
13	58.9	71.8	76	90	86	101	95	112
14	68.3	83.3	88	104	100	117	110	130
16	89.2	109	115	136	130	153	144	170
18	113	138	146	172	165	194	182	215
19	126	153	163	192	183	216	203	240
20	139	170	180	213	203	240	225	265
22	169	206	218	257	246	290	272	321
24	201	245	260	306	293	345	324	382
26	236	287	305	359	343	405	380	449
28	273	333	353	417	398	470	441	520
32	357	435	461	544	520	614	576	680
36	452	551	584	689	658	777	729	860
38	503	614	651	768	734	865	812	958
40	558	680	721	851	813	959	900	1062
44	675	823	872	1029	983	1160	1089	1285
48	803	979	1038	1225	1170	1381	1296	1529
52	942	1149	1218	1437	1374	1621	1521	1795

Note
To calculate the aggregate breaking force multiply the figures given in col 4, 6 and 8 by
1. 19 and in col 5, 7 and 9 by 1.332
1) Wire strand core (CWS) may be used for rope diameter 12 mm and below.

17 x 7 (6-1) and 18 x 7 (6-1)

Nomi. Dia	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
(1) mm	Fibre Core (CF) (2) kg/100m	Steel Core (CWR) (3) kg/100m	Fibre Core (CF) (4) kN	Steel Core (CWR) (5) kN	Fibre Core (CF) (6) kN	Steel Core[1] (CWR) (7) kN	Fibre Core (CF) (8) kN	Steel Core (CWR) (9) kN
8	24.5	25.7	32	33	36	37	40	41
9	31.0	32.6	41	42	46	47	51	52
10	38.3	40.2	50	52	56	58	62	64
11	46.3	48.6	61	62	68	70	76	78
12	55.1	57.9	72	74	81	84	90	93
13	64.7	67.9	85	87	95	98	106	109
14	75.0	78.8	98	101	111	114	122	126
16	98.0	103	128	132	144	149	160	165
18	124	130	165	167	183	188	202	208
19	138	145	181	186	204	210	225	232
20	153	161	200	206	226	232	250	257
22	185	195	242	249	273	281	302	311
24	220	232	288	297	325	335	360	370
26	259	272	338	348	381	393	422	435
28	300	315	392	404	442	455	490	504
32	392	412	512	527	577	595	639	659
36	496	521	648	668	721	753	809	833
38	553	580	722	744	814	839	902	929
40	612	643	800	824	902	929	999	1029

Note
To calculate the aggregate breaking force multiply the figures given in col 4, 6 and 8 by
1. 282 and in col 5, 7 and 9 by 1.319

34 x 7 (6-1) and 36 x 7 (6-1)

Nomi. Dia	Approximate Mass		Minimum Breaking Force Corresponding to Rope Grade of					
			1570		1770		1960	
(1) mm	Fibre Core (CF) (2) kg/100m	Steel Core (CWR) (3) kg/100m	Fibre Core (CF) (4) kN	Steel Core (CWR) (5) kN	Fibre Core (CF) (6) kN	Steel Core (CWR) (7) kN	Fibre Core (CF) (8) kN	Steel Core (CWR) (9) kN
12	56.2	57.9	71	72	80	81	88	90
13	65.9	67.9	83	84	93	95	103	105
14	76.5	78.8	96	98	108	110	120	122
16	99.9	103	125	128	141	144	157	160
18	126	130	159	162	179	183	198	202
19	141	145	177	180	199	203	221	225
20	156	161	196	200	221	225	245	250
22	189	195	237	242	267	273	296	302
24	225	232	282	288	318	325	352	359
26	264	272	331	338	374	381	414	422
28	306	315	384	392	433	442	480	489
32	400	412	502	512	566	577	627	639
36	506	521	635	648	716	730	793	809
38	563	580	708	722	798	814	884	901
40	624	643	784	800	884	902	979	999
44	755	778	949	958	1070	1091	1185	1208
48	899	926	1129	1152	1273	1298	1410	1438
52	1055	1087	1325	1352	1494	1524	1655	1687
56	1224	1261	1537	1568	1733	1767	1919	1957

Note
To calculate the aggregate breaking force multiply the figures given in col 4, 6 and 8 by
1. 33 and in col 5, 7 and 9 by 1.346

Wire Rope Slings

A GENERAL INTRODUCTION TO SLINGS

In order to meet the ever burgeoning demand for Wire Rope Slings we have diversified into manufacturing of High Quality, Highly Reliable & Dependable Slings.

Wire rope slings are a basic material handling tool and are the most frequently used type of slings in the industry today. They offer a strong, dependable and economical option for most lifting applications. Numerous sling configurations are available to support a broad range of applications. They include single and multi-part slings, grommets, single leg slings, multiple leg bridles, and a wide variety of fittings and attachments.

Features that affect the rated capacity of the sling and that shall be considered in calculating the design factor are:

1. Nominal breaking strength.
2. Splicing or end-attachment.
3. Number of parts in the sling.
4. Type of hitch (e.g., straight pull, choker hitch, or basket hitch).
5. Angle of loading and load center of gravity.
6. Diameter of curvature around which the sling is bent.

TECHNICAL TERMINOLOGY FOR SLINGS

A. Soft Loop.

B. Hard Loop (With thimbles as per IS 2315-78).

C. Safe Working Load: For normal conditions of service SWL shall not exceed 1/6th of the minimum breaking strength of the Rope.

D. Minimum Leg Length: To achieve adequate flexibility and to allow splicing, leg length is not kept less than 70 times the diameter of the rope.

E. Selection of Rope: Up to 20mm diameter, Rope in the 6X19 construction provides sufficient flexibility and good wearing properties. For larger sizes 6X36 group is generally used for multiplied flexibility.

F. Testing of Slings : Slings are duly tested to their proof load (Which is double the Safe Working Load) and the Test Certificate for the same is issued dully signed by a competent Person / Quality Control Manager.

Machine Spliced Slings (as per IS 5245 Part II) These slings are spliced with aluminum ferrules (as per IS 10942) optimally pressed. The protruding of the rope is maintained to maximum half the diameter of the rope. A Flemish eye / splice sling is most frequently used and is fabricated by unlaying the rope body into two parts, an eye to be formed by looping one part in one direction and the other part in the opposite direction and laying the rope back together, a metal sleeve is slipped over the ends and pressed (or swaged) to secure the ends to the sling body.

Hand Spliced slings (as per IS 5245 part-I) is created by forming an eye and "tucking" and "locking" a strand of the wire rope under other adjacent strands, these slings are spliced, with at least 5 tucks which are tightly drawn and handled.

Types of Hitches

TYPES OF LOADS

Vertical

Vertical Hitches are made directly from the crane hook to the load. Full rated capacity of the sling may be used but never exceeded. A tagline should be attached to prevent rotation which can damage the sling. A sling with a hand – tucked splice can un lay and fail if the sling is allowed to rotate.

Choker

Choker Hitches reduce lifting capability of a sling, since this method of rigging affects the ability of the wire rope components to adjust during the lift, places angular loading on the body of the sling, and creates a small diameter bend in the body at the choke point.

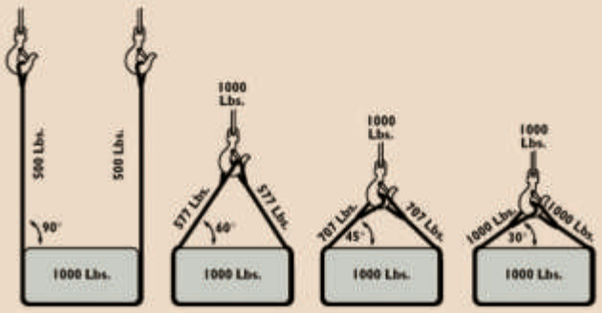
Basket

Basket Hitches distribute a load equally between the two legs of a sling. Rated capacities are influenced by sling angles.

Slings angles have a direct affect on the rated capacity of a sling.

This angle, which is measured between a horizontal line and the sling leg or body, may apply to a single leg sling in an angled vertical or basket hitch, or to a multi – legged bridle sling. Anytime pull is exerted at an angle on a leg, the tension or stress on each leg is increased. To illustrate, each sling leg in a vertical basket hitch absorbs 500 kgs. Of stress from a 1000 kgs. Load. The same load, when lifted in a 60 degree basket hitch, exerts 577 kgs. Of tension on each leg.

It is critical therefore, that rated capacities be reduced to account for sling angles. Angles less than 45 degrees are not recommended and those below 30 degrees should be avoided whenever possible.



Sling Angles in Degrees	Factor
15	.259
20	.342
25	.423
30	.500
35	.574
40	.643
45	.707
50	.766
55	.819
60	.866
65	.906
70	.940
75	.966
80	.985
85	.996
90	1.000

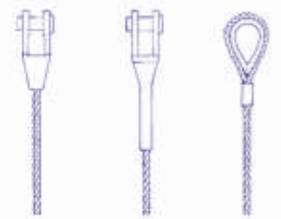
GUIDE LINE FOR USAGE

- Rated capacity of a wire rope sling is based upon the nominal or catalog strength of the wire rope and factors affecting the overall strength. These factors include termination efficiencies, type of hitch, number of rope parts in the sling body, diameter around which the sling is bent, and diameter of the pin or hook over which the sling eye is placed.
- Never force the eye of a sling onto a hook or pin that has a diameter larger than the natural width of the eye. Also avoid placing a sling eye onto a hook or pin whose diameter is less than the diameter of the sling body.
- Rated capacities of fitting and attachments must be equal to or greater than that of the wire rope sling.
- Never "Shock Load" a sling. The actual force caused by a sudden application of load can easily exceed the rated capacity and damage a sling. Abruptly releasing a load can also damage the sling.
- Protect the sling body against sharp edges and corners of load, protrusions or abrasive surfaces. Sharp bents can distort wire rope and reduce its strength.
- Fiber core wire rope slings should never be exposed to temperatures exceeding 200 degrees F. Avoid using IWRC wire rope sling at temperatures above 400 degrees F for below -60 degrees F.
- Slings are susceptible to damage and strength loss when used in chemically active environments.
- Slings fabricated with a hand tucked splice can unravel and fail if the sling is allowed to rotate during use.
- Do not drag slings across floors or pull from underneath loads.
- Avoid twist, kinks and knots before lifting.
- Store wire rope slings where they will not be subjected to dirt, moisture, extreme heat, corrosion or mechanical damage.

Termination Efficiencies (Approximate)
Applicable to nominal wire rope breaking strengths

Type of Termination	Efficiency IWRC[1]	Efficiency FC[2]
Wire Rope Socket (Spelter or Resin)	100%	100%
Swaged Socket (Regular Lay Ropes Only)	100%	NR
Mechanical Spliced Sleeve (Flemish Eye)		
1" diameter and smaller	95%	92-½%
Greater than 1" diameter thru 2"	92-½%	90%
Greater than 2" diameter thru 3½"	90%	NE
Loop or Thimble Splice-Hand Spliced (Tucked) (Carbon Steel Rope)		
¼"	90%	90%
5/16"	89%	89%
⅜"	88%	88%
7/16"	87%	87%
½"	86%	86%
⅝"	84%	84%
¾"	82%	82%
⅞" thru 2½"	80%	80%
Wedge Sockets[3] (Depending on Design)	75% to 80%	75% to 80%
Clips[3] (Number of clips varies with size of rope)	80%	80%

[1] IWRC = Independent Wire Rope Core
[2] FC = Fiber Core
[3] Typical values when applied properly. Refer to fitting manufacturer for exact values and method.
NR Not Recommended
NE Not Established



Wire Rope Socket Poured Spelter or Rasin | Wire Rope Socket Swaged | Mechanical Splice Loop or Thimble

Loop or Thimble Splice Hand Tucked | Wedge Socket | Clips

ASAHI ROPES

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