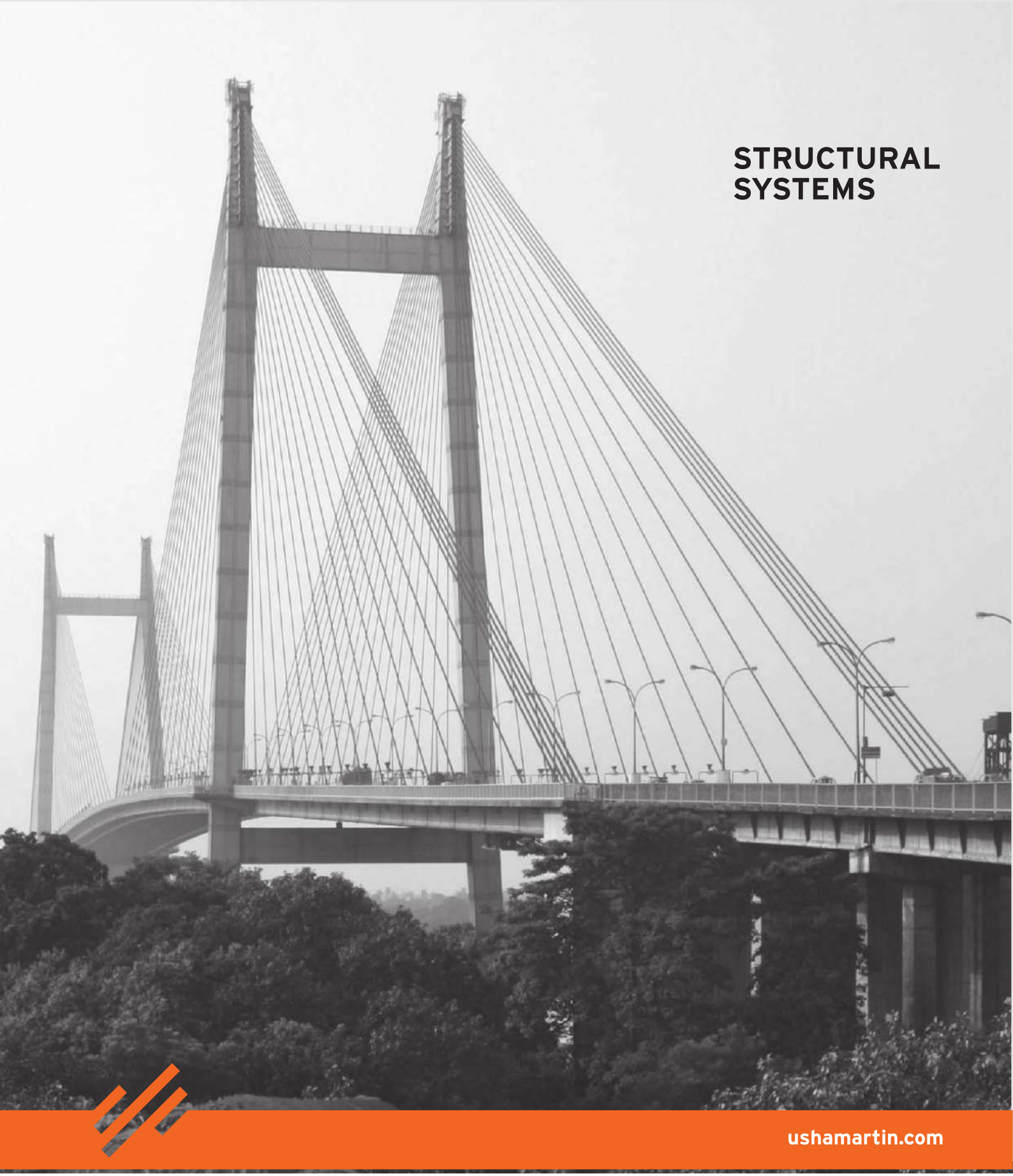
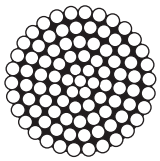


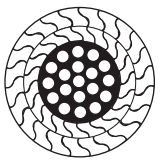
STRUCTURAL SYSTEMS

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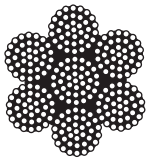
USHA MARTIN



Spiral Strands



Locked Coil Wire Strands



Round Strand Bridge Ropes

OTHER ROPES

- Parallel Wire Stay Cables
- Parallel Strand Stay Cables
- Wires for Cable Spinning

APPLICATIONS

- Suspension Bridges
- Cable Stayed Bridges
- Tower Guy Strands
- Pipeline Suspension Bridges
- Suspended Roof Structures
- Boom Pendants
- Architectural Applications

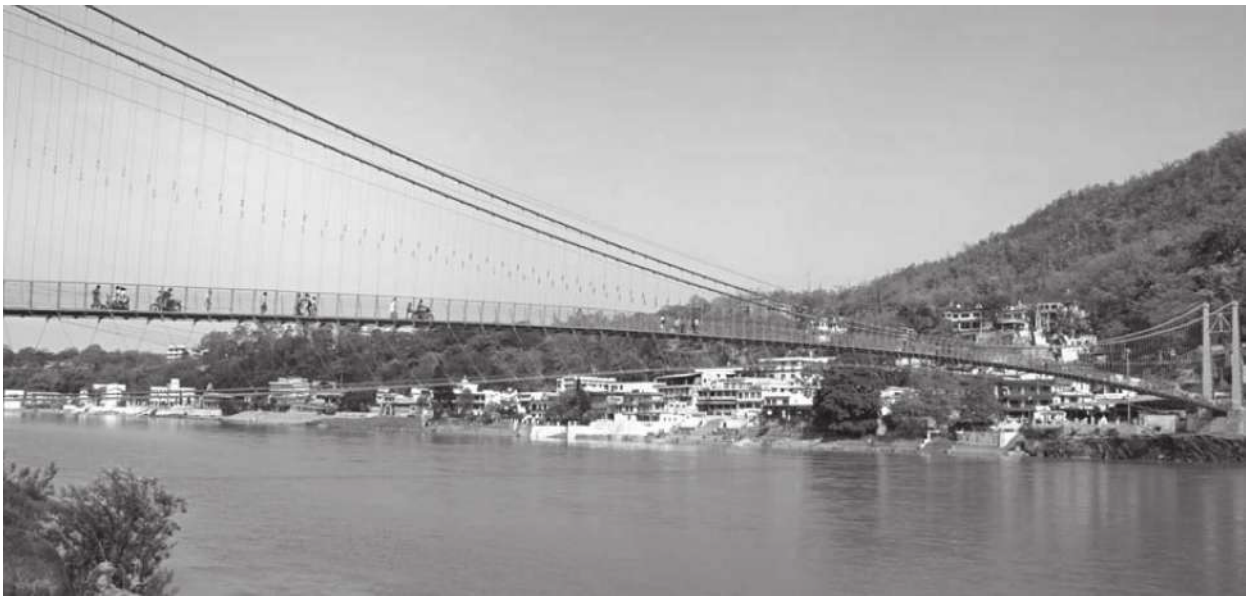


Some of the prestigious projects around the world today stand testimony to the quality of Usha Martin Cable Support – The Vidyasagar Setu (Second Hooghly Bridge) in Kolkata, India; The Lion's Gate Bridge in Vancouver, Canada; TV Towers in UAE & Namibia and innumerable suspension bridges in India, Bhutan & Nepal to name only a few.

Usha Martin's bridge cables, prestretched and protected from corrosion are supplied with requisite end fittings in ready to install condition.

BVQI EN 29001/ISO 9001 BS5750 APPROVED BY BVQI NATIONAL ACCREDITATION OF CERTIFICATION BODIES

BVQI EN 29001/ISO 9001/BS5750 APPROVED BY BVQI Approvd by the Dutch Council for Certification



Spiral Strands

Description

Spiral Strands are assembly of two or more layers of round wires held helically around a centre usually of a single round wire. The wires are generally laid in opposite direction at different layers which is known as contra lay arrangement.

Direction of lay

The outer layer of wires in spiral strands are of right hand lay unless mentioned otherwise by the customers.

Protection from corrosion

The wires have galvanised coated surface finish. If specially called for; the wires can be given additional protection against corrosion in the inner layers of the strands with a compatible filling of an active pigment (inorganic zinc paint) that remains like a paste. The dosing of the inner filling is such that it does not emerge from the strands while in use.

Tensile grade

The Spiral Strands are generally supplied in 1570 grade& 1770 grade. However, strands with lower grades can also be supplied.

Construction

Generally the Strands of following construction are commonly used. However, tailor-made designs to suit consultants'/contractors' requirements can also be taken up.

1x7 (6-1)
1x19 (12: 6-1)
1x37 (18: 12 : 6-1)
1x61 (24: 18: 12:6-1)
1x91 (30:24: 18: 12:6-1)
1x127 (36:30:24: 18: 12:6-1)

Pre-stretching

Spiral Strands are pre-stretched under controlled conditions.

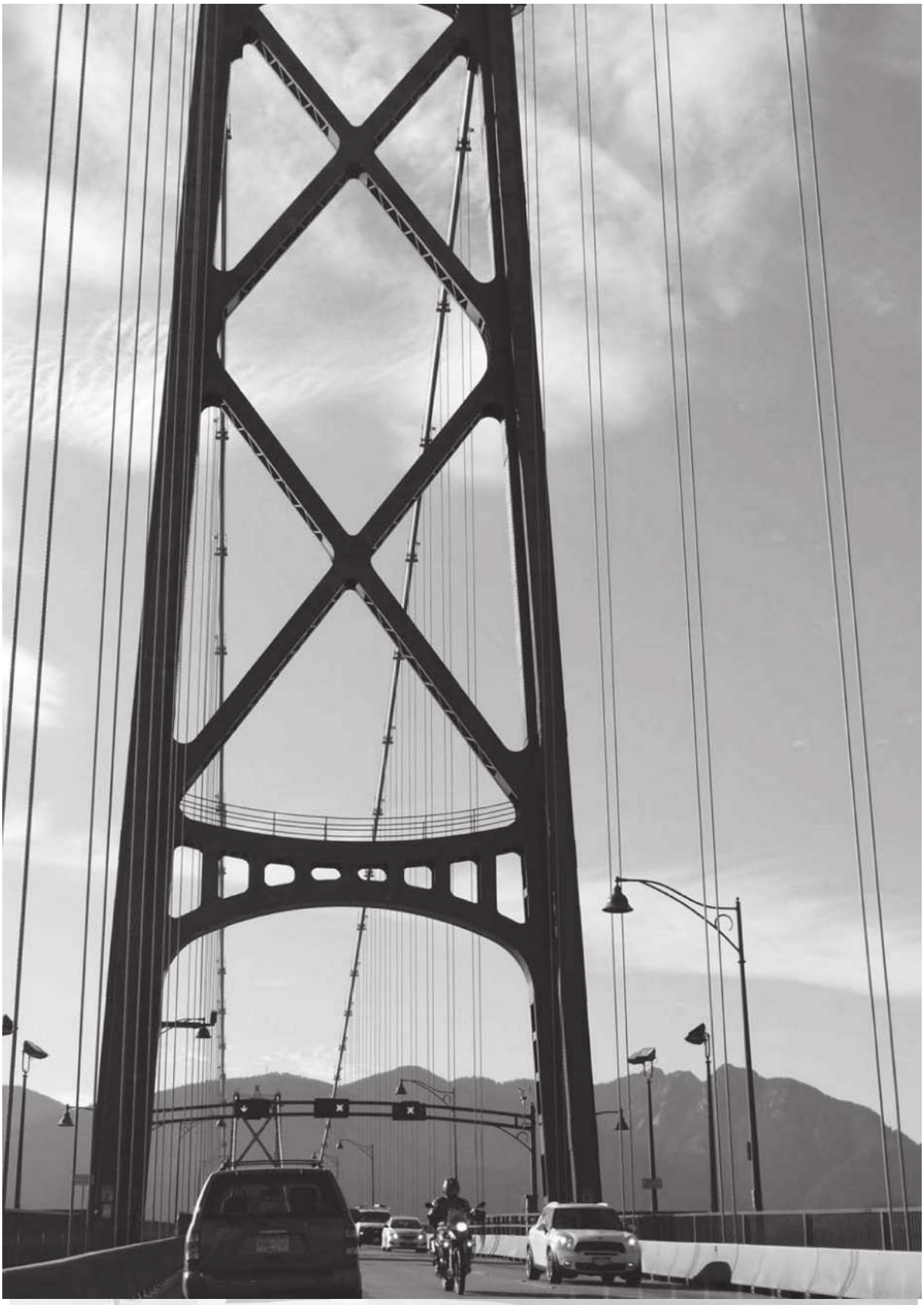
End Fittings

Spiral Strands are supplied with end fittings having desired lengths within the specified tolerance and in ready to install condition as per the requirements.

Minimum Breaking Force and Mass

Nominal Diameter		Metallic Area	Mass (Approx)		Minimum Breaking Force			
					1570 N/mm²		1770 N/mm²	
mm	inch	mm²	kg/m	lb/ft.	kN	1000 lb.	kN	1000 lb
Construction 1x19								
11	7 1/16	70.7	0.587	0.394	99.9	22.5	113	25.3
13	1/2	98.8	0.820	0.551	140	31.4	157	35.4
14.5	9/16	123	1.02	0.685	174	39.0	196	44.0
16	5/8	150	1.24	0.834	211	47.5	238	53.6
19	3/4	211	1.756	1.18	298	67.0	336	75.5
Construction 1x37								
22	7/8	282	2.34	1.57	390	87.6	439	98.8
26	1	394	3.27	2.20	544	122	614	138
29	1 1/8	490	4.07	2.73	677	152	763	172
32	1 1/4	597	4.95	3.33	824	185	930	209
35	1 3/8	714	5.93	3.98	986	222		
38	1 1/2	842	6.98	4.69	1160	261		
42	1 5/8	1030	8.53	5.73	1420	319		
Construction 1x61								
20		233	1.93	1.30	322	72.3	363	81.5
22	7/8	282	2.34	1.57	389	87.5	439	98.6
26	1	393	3.27	2.19	544	122	613	138
29	1 1/8	489	4.06	2.73	676	152	762	171
32	1 1/4	596	4.95	3.32	823	185	928	209
35	1 3/8	713	5.92	3.98	985	221	1110	250
38	1 1/2	840	6.98	4.69	1160	261	1310	294
42	1 5/8	1030	8.52	6.73	1420	319		
45	1 3/4	1180	9.78	6.57	1630	366		
48	1 7/8	1340	11.1	7.48	1850	416		
50		1450	12.1	8.11	2010	452		
51	2	1510	12.6	8.44	2090	470		
52		1570	13.1	8.78	2170	489		
54	2 1/8	1700	14.1	9.46	2340	527		

* Special requirements on breaking forces can also be met.
* Spiral Strands may be provided conforming to various relevant national and international standards to suit customer needs.
* Spiral Strands can also be provided in sizes and constructions not included in the tables of this brochure.



Minimum Breaking Force and Mass

Nominal Diameter		Metallic Area	Mass (Approx)		Minimum Breaking Force 1570 N/mm²		Minimum Breaking Force 1770 N/mm²	
mm	inch	mm²	kg/m	lb/ft.	kN	1000 lb.	kN	1000 lb
Construction 1x91								
40		929	7.71	5.18	1280	288	1450	325
42	1 5/8	1020	8.50	5.71	1410	318	1590	358
45	1 3/4	1180	9.76	6.55	1620	365	1830	412
48	1 7/8	1340	11.1	7.46	1850	415	2080	468
51	2	1510	12.5	8.42	2.090	469	2350	529
54	2 1/8	1690	14.0	9.44	2340	526		
57	2 1/4	1890	15.7	10.5	2610	586		
60	2 3/8	2090	17.3	11.7	2890	649		
64	2 1/2	2380	19.7	13.3	3280	738		
66		2530	21.0	14.1	3490	785		
Construction 1x127 to 1x547								
68		2680	22.3	15.0	3710	833	4180	940
71	2 3/4	2930	24.3	16.3	4040	909	4560	1020
74	2 7/8	3180	26.4	17.7	4390	987	4950	1110
77	3	3440	28.6	19.2	4750	1070	5360	1210
80	3 1/8	3720	30.8	20.7	5130	1150	5790	1300
84		4100	34.0	22.8	5660	1270	6380	1430
87	3 3/8	4390	36.5	24.5	6070	1364	6840	1540
90	3 1/2	4700	39.0	26.2	6500	1460	7320	1650
92		4910	40.8	27.4	6790	1530	7650	1720
96	3 3/4	5350	44.4	29.8	7390	1660	8330	1870
103	4	6160	51.1	34.3	8510	1910	9590	2160

* Special requirements on breaking forces can also be met.
* Spiral Strands may be provided conforming to various relevant national and international standards to suit customer needs.
* Spiral Strands can also be provided in sizes and constructions not included in the tables of this brochure.

LOCKED COIL WIRE ROPES

Description

Locked Coil Wire Ropes are manufactured from steel throughout, being built up by laying series of concentric layers of shaped wires or a combination of round and shaped wires over a core made with round wires. The term 'Locked Coil' is derived from the fact that the wires of the outer layer and some of the wires of the inner layers are so designed to have a special shape so that they remain interlocked with one another. Full Locked Type construction which is more common in structural projects has an outer wire covering of 'Z' shaped wires which fit one to another; each wire being held in position by the adjacent wires.

Direction of lay

The wires of the outer layer in a Locked Coil Wire Rope are laid in right hand direction (Right Hand Lay) unless requested otherwise by the customer. The wires of the next inner layer below the top layer are laid in opposite direction. The wires of the subsequent inner layers are laid in same or opposite direction as per the requirement of design.

Protection from corrosion

All Locked Coil Wire Ropes are adequately lubricated both internally and externally for protection against corrosion. If specially called for; the inner layers can be lubricated with a compatible filling of an active pigment (inorganic zinc paint) that remains like a paste. The dosing of the inner filling is such that it does not come out during use. The surface finish of the wires are either bright or drawn galvanised. The zinc coating for the round wires conform to international standards. The zinc coating on the shaped wires are maintained as per requirement.

Tensile grade

In order to achieve the desired breaking force of Locked Coil Wire Ropes an appropriate combination of tensile grades is used for shaped and round wires.

Construction

The arrangement of wires in the ropes are as per Usha Martin's standard design. A construction having multiple layers of shaped wires can be manufactured. However, Locked Coil Wire Ropes of special construction can be designed as per the requirement of the customer.

Pre-stretching

Locked Coil Wire Ropes are pre stretched under controlled conditions.

End-Fittings

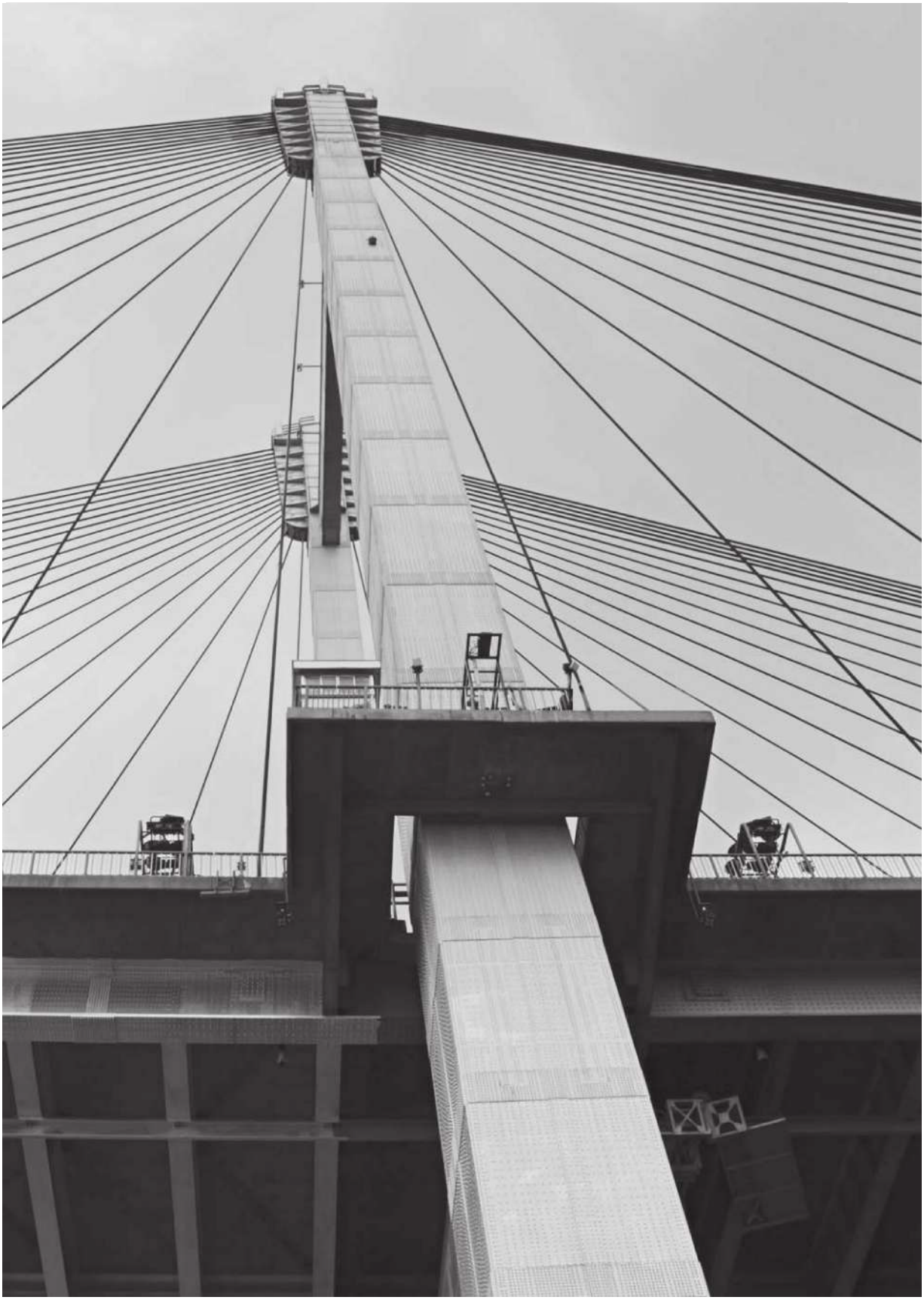
Locked Coil Wire Ropes are supplied with end fittings having desired lengths within the specified tolerance and in ready to install condition as per the requirements.

Minimum Breaking Force and Mass

Nominal Diameter		Metallic Area	Mass (Approx)		Minimum Breaking Force					
					1370 N/mm²		1470 N/mm²		1570 N/mm²	
mm	inch	mm²	kg/m	lb/ft.	kN	1000 lb.	kN	1000 lb.	kN	1000 lb.
Center of Round Wires and 1 Layer of Shaped Wires										
20		254	2.16	1.45	321	72.2	344	77.3	368	82.7
22	7/8	308	2.61	1.75	388	87.2	416	93.5	445	100
25		398	3.37	2.27	501	113	538	121	574	129
26	1	430	3.65	2.45	542	122	582	131	601	140
28		499	4.23	2.84	629	141	674	152	720	162
29	1 1/8	535	4.54	3.05	674	152	723	163	773	174
30		572	4.86	3.27	722	162	774	174	827	186
32	1 1/4	651	5.53	3.72	821	185	881	198	941	212
34		735	6.25	4.20	927	208	994	224	1060	239
35	1 3/8	779	6.62	4.45	982	221	1050	237	1130	253
36		824	7.00	4.70	1040	234	1120	251	1190	268
38	1 1/8	919	7.80	5.24	1160	260	1240	279	1330	298
40		1018	8.65	5.81	1280	288	1380	309	1470	330
Centre of Round Wires and 2 Layers of Shaped Wires										
25		412	3.50	2.35	520	117	558	125	596	134
26	1	446	3.79	2.55	562	126	603	136	644	145
28		517	4.40	2.95	652	147	700	157	747	168
29	1 1/8	555	4.72	3.16	699	157	750	169	801	180
32	1/1/4	676	5.74	3.85	851	191	914	205	976	219
35	1 3/8	808	6.87	4.61	1020	229	1090	246	1170	262
38	1 1/2	953	8.10	5.44	1200	270	1290	290	1380	309
40		1060	8.97	6.02	1330	299	1430	321	1520	343
42	15/8	1160	9.89	6.64	1470	330	1570	354	1680	378
45	1 3/4	1340	11.40	7.63	1680	379	1810	406	1930	434
48	17/8	1520	12.9	8.68	1920	431	2060	462	2200	494
49		1580	13.5	9.04	2000	449	2140	482	2290	514
50		1650	14.0	9.42	2080	467	2230	501	2380	536

* Special requirements on breaking forces can also be met.
* Locked Coil Wire Ropes may be provided conforming to various relevant national and international standards to suit customer needs.
* Locked Coil Wire Ropes can also be provided in sizes and constructions not included in the tables of this brochure.





Minimum Breaking Force and Mass

Nominal Diameter		Metallic Area	Mass (Approx)		Minimum Breaking Force					
					1370 N/mm²		1470 N/mm²		1570 N/mm²	
mm	inch	mm²	kg/m	lb/ft.	kN	1000 lb.	kN	1000 lb.	kN	1000 lb.
Center of Round Wires and 1 Layer of Shaped Wires										
51	2	1800	15.3	10.3	2270	509	2430	547	2600	584
54	2 1/8	2020	17.1	11.5	2540	571	2730	613	2910	654
57	2 1/4	2250	19.1	12.8	2830	636	3040	683	3240	729
61	2 3/8	2570	21.9	14.7	3240	729	3480	782	3710	835
64	2 1/2	2830	24.1	16.2	3570	802	3830	861	4090	919
67	2 5/8	3100	26.4	17.7	3910	879	4200	943	4480	1010
71	2 3/4	3490	29.6	19.9	4390	987	4710	1060	5030	1130
72		3580	30.5	20.5	4520	1020	4850	1090	5180	1160
74	2 7/8	3780	32.2	21.6	4770	1070	5220	1150	5470	1230
77	3	4100	34.8	23.4	5160	1160	5540	1250	5920	1330
80	3 1/8	4420	37.7	25.3	5580	1250	5980	1350	6390	1440
81		4530	38.5	25.9	5720	1290	6130	1380	6550	1470
82		4650	39.5	26.5	5860	1320	6280	1410	6710	1510
85		4990	42.4	28.5	6290	1420	6750	1520	7210	1620
88		5350	45.5	30.6	6750	1520	7240	1630	7730	1740
90	3 1/2	5600	47.6	32.0	7060	1590	7570	1702	8090	1820
92		5920	50.3	33.8	7460	1680	8000	1800	8540	1920
94		6180	52.5	35.3	7780	1750	8350	1880	8920	2010
96	3 3/4	6440	54.8	36.8	8120	1830	8710	1960	9300	2090
98		6710	57.1	38.3	8460	1900	9080	2040	9700	2180
100		6990	59.4	39.9	8810	1980	9450	2130	10100	2270
103	4	7420	63.0	42.4	9350	2100	10000	2250	10700	2408
104		7560	64.3	43.2	9530	2140	10200	2300	10900	2460
106		7850	66.8	44.9	9900	2230	10600	2990	11300	2550
109	4/14	8310	70.6	47.4	10500	2350	11200	2530	12000	2700
110		8460	71.9	48.3	10700	2400	11400	2570	12200	2750
112		8770	74.5	50.1	11100	2480	11900	2670	12700	2850
114		9080	77.2	51.98	11400	2570	12300	2760	13100	2950
115	4 1/2	9240	78.6	52.8	11700	2620	12500	2810	13400	3000
118		9730	82.7	55.6	12300	2760	13200	2960	14100	3160
120		10100	85.6	57.5	12700	2850	13600	3060	14500	3270
122	4 3/4	10400	88.4	59.4	13100	2950	14100	3160	15000	3380
125		10900	92.8	62.4	13800	3090	14800	3320	15800	3550

* Special requirements on breaking forces can also be met.
* Locked Coil Wire Ropes may be provided conforming to various relevant national and international standards to suit customer needs.
* Locked Coil Wire Ropes can also be provided in sizes and constructions not included in the tables of this brochure.

Round Strand Bridge Ropes

6 Strand ropes with steel strand core, galvanized and pre-stretched with end fittings in ready to install condition construction-6x37 WS (18:12:6-1)

Nominal Diameter		Metallic Area	Mass (Approx)		Minimum Breaking Force 1570 N/mm²
mm	inch	mm²	kg/m	lb/ft.	kN
25	1	290	2.38	1.59	340
28	1 1/8	363	2.99	2.00	426
32	1 1/4	475	3.91	2.62	556
35	1 3/8	568	4.67	3.13	665
38	1 1/2	663	5.50	3.68	784
40	-	735	6.10	4.09	869
42	1 5/8	810	6.73	4.51	958
44	1 3/4	890	7.38	4.94	1050
48	1 7/8	1060	8.78	5.88	1250
50	-	1150	9.53	6.39	1360

Bridge ropes in 6X19 WS (12:1 6- 1) & 6X7 WS (6-1) constructions with wire strand core fully galvanised and prestretched and end fittings in ready to install condition are also available.

* Special requirements on breaking forces can also be met.
* Round Strand Bridge Ropes may be provided conforming to various relevant national and international standards to suit customer needs.
* Round Strand Bridge Ropes can also be provided in sizes and constructions not included in the tables of this brochure.



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