

CONSTRUCTION OF AERIAL CABLE PLANT

Purpose: This addendum is issued to supplement Section 635 with revised information relative to the construction of Figure 8 cable plant. It replaces Addendum No. 1.

Additions:

2. HANDLING AND STORAGE OF CABLE

2.02 Figure 8 cable should be handled and stored in such a manner as to prevent physical damage. The ends of the cable on the reel should be adequately sealed to prevent moisture entering the cable core or the interstices of the supporting strand.

3. STRINGING OF CABLE

3.12 Guying shall be completed in the section of line before Figure 8 cable stringing begins.

3.13 Figure 8 cable should be placed from a moving reel whenever possible. It should be placed in stringing blocks on the poles where it should remain during the remainder of the placing and tensioning operations.

3.14 Where it is necessary, because of physical obstructions, to pull in the Figure 8 cable from a stationary reel, the cable should be run through stringing blocks under a sufficient amount of tension to avoid excessive bending and to prevent the cable contacting the ground or obstructions between poles. Care should be exercised to prevent continuous spiralings occurring in Figure 8 cable when strung from a stationary reel. Since the cable is spiraled by hand from alternate poles after it is tensioned, any existing spirals would be increased in one span and removed in the adjacent span. It would then be very difficult to obtain a uniform number of spirals in every span.

4. STRAND SPLICES

4.02 Reel end splices in the Figure 8 cable's support strand shall be made during the placing operation by means of insulated automatic type splicing sleeves. It is important that only enough insulation be removed from the support member to properly install the splicing sleeve. A sufficient amount of overlap of the jacketed conductors should be provided to permit splicing of the cable in a ready-access enclosure. The free ends of the jacketed conductors should be temporarily taped to the undisturbed portion of the Figure 8 cable before proceeding with the placing operations. The cable can thus be tensioned and spiraled before the cable conductors are spliced.

5. TENSIONING OF CABLE

5.08 Figure 8 cable may be tensioned with the aid of series dynamometer, weights, or sagged by the target method. The cable should be temporarily supported at each pole in stringing blocks until after the cable has been tensioned and the tension equalized in all spans of the section being tensioned. Tension should be applied slowly while the entire length of cable being pulled is observed for evidence of snagging or failure to move freely through its temporary supports at the poles.

5.09 The initial stringing tension for Figure 8 cable depends upon the size of its support strand, the size of the cable core, the storm loading district involved, the maximum permissible span length and the temperature at the time of tensioning.

5.10 Tables 1a through 6a show the stringing sags and tensions to be used for the various size cables supported by a 3/16-inch EHS 7-wire galvanized steel strand. Tables 7a through 10a are for cable supported by the 1/4-inch EHS 7-wire galvanized steel strand. These tables contain sag and tension data for all three loading districts. The loading district to which each temperature applies is shown to the left of the temperatures.

5.11 Each table also contains a different tension for each 100 foot interval of span length. The tension to be used is that shown immediately below the sag at a given temperature for the maximum span in the pulling section. For example, assume that a 50-pair, 22-gauge Figure 8 cable supported by a 1/4-inch EHS stranded messenger is to be used in the Medium Loading District. Table 7a would be consulted to determine the initial sag and tension values. Also assume that the temperature during the tensioning operation is 75°F. and that the span lengths in the pulling section range from 275 feet to 350 feet. From Table 7a, the stringing tension to be applied for this pulling section is 1,562 pounds.

5.12 The cable sizes appearing on each Table in this addendum are as follows:

<u>3/16" Support Strand</u>		<u>1/4" Support Strand</u>	
Table 1a	6/24	Table 7a	25/19 50/22 75/24
Table 2a	6/22 12/24	Table 8a	75/22 100/24
Table 3a	6/19 12/22 18/24	Table 9a	50/19 100/22 150/24
Table 4a	18/22 25/24	Table 10a	75/19 200/24
Table 5a	12/19 25/22		
Table 6a	18/19 50/24		

5.13 One method successfully employed by some contractors for tensioning Figure 8 cable is illustrated by Figure 13. With this method four or five cable spans are tensioned at a time by fastening the tensioning device to the base of the next pole. As the tension applied in the next pulling section of cable approaches the tension in the first section, the tensioning device at the base of the pole slacks off and the tensioning grip can be removed from the support member of the cable. The cable is then taken up the pole and placed in the supporting hardware on the pole. The sag in the adjacent spans may be affected to some degree when the cable is taken up the pole. This may result in about 3 inches increased sag in a 300-foot span. This amount of increased sag for cable is negligible. Usually when this method is employed, the need for temporary guys is eliminated.

5.14 When tensioning Figure 8 cable, it is important that the insulation over the support strand is not damaged. Tensioning by means of grips placed over the insulated support wire or strand is preferred, providing that this can be accomplished without rupturing the insulation. The Crescent Tool Company's No. 800 insulated wire grip, or equivalent, has been found to be suitable for this purpose.

10. CABLE SPLICING

10.06 Splicing of Figure 8 cable and mounting of the splice enclosure should be performed in accordance with the REA Splicing Standard PC-2. Ready-access enclosures are used for these splices.

11. CABLE TERMINALS

11.04 When ready-access enclosures are installed on Figure 8 cable for the purpose of mounting a terminal block, it will usually require the use of a strand jack or slack puller to relieve the tension on the cable conductors in order to make the necessary tap connections.

15. PREVENTION OF CABLE DANCING

15.07 Because of the configuration of the Figure 8 cable, it will probably be as susceptible to dancing as conventional lashed aerial cable. Therefore it should be spiraled in each span at the time of installation as shown on Guide Drawing 250-1 of the REA Form 511.

15.08 Experience has shown that spiraling is generally effective in reducing the dancing of Figure 8 cable. However, occasionally the conditions may be such that spiraling alone will not eliminate the cable dancing. In such cases it is advisable to construct a catenary by installing a 6M suspension strand approximately two feet above the Figure 8 cable to divide the one span essentially into three or four unequal spans. The cable should still be spiraled in the catenary.

16. PRECAUTIONS

16.09 As a safety measure, the support strand of the Figure 8 cable should not be used to support a platform or a ladder. The Figure 8 cable should not be ridden with a cable car.

TABLE 1a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 3/16-inch EHS Stranded Messenger. This Table applies to the following size:

<u>Loading District</u>		<u>Temperature OF</u>				
		6 Pr.		24 Ga.		
Heavy.	-30	0	30	60	90	120
Medium	-15	15	45	75	105	
Light.	0	30	60	90	120	
<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>					
100	3	3	3	4	4	4
125	4	4	5	5	6	7
150	6	6	7	7	8	9
175	8	8	9	10	11	12
200	10	11	12	13	14	16
(Tension)	(1037)	(961)	(877)	(800)	(719)	(638)
225	13	14	15	16	18	20
250	15	17	18	20	22	24
275	19	20	22	24	26	29
300	22	24	26	28	31	34
(Tension)	(1033)	(961)	(885)	(812)	(738)	(668)
325	26	28	30	33	36	39
350	30	32	35	38	41	45
375	34	37	40	43	47	51
400	39	42	45	49	53	58
(Tension)	(1028)	(961)	(892)	(825)	(760)	(698)
425	44	47	51	55	59	64
450	50	53	57	61	66	71
475	55	59	63	68	73	79
500*	61	65	70	75	80	86
(Tension)	(1024)	(961)	(898)	(839)	(781)	(727)
525	67	72	77	82	88	
550	74	79	84	90	96	
575	81	86	92	98	105	
600**	88	94	100	106	113	
(Tension)	(1019)	(961)	(904)	(849)	(796)	

*Maximum Span Heavy Loading District (Will Develop 60% Loaded Tension)

**Will Develop 51% Loaded Tension in Medium Loading District and 42% Loaded Tension in Light Loading District.

TABLE 2 a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 3/16-inch EHS Stranded Messenger. This Table applies to the following sizes:

<u>Loading District</u>	<u>Temperature OF.</u>						
	6 Pr.	12 Pr.	22 Ga.	24 Ga.			
Heavy.	-30	0	30	60	90	120	
Medium.	-15	15	45	75	105		
Light	0	30	60	90	120		
<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>						
100	3	3	4	4	5	5	
125	5	5	6	6	7	8	
150	7	7	8	9	10	11	
175	9	10	10	11	13	14	
200	11	12	14	15	16	18	
	(Tension)	(1042)	(961)	(879)	(802)	(723)	(647)
225	14	16	17	18	20	23	
250	18	19	21	23	25	28	
275	21	23	25	27	30	33	
300	25	27	30	32	35	38	
	(Tension)	(1033)	(961)	(887)	(818)	(749)	(682)
325	30	32	35	37	41	44	
350	35	37	40	43	47	51	
375	40	43	46	49	53	58	
400	45	48	52	56	60	65	
	(Tension)	(1025)	(961)	(896)	(835)	(774)	(716)
425	51	55	58	63	67	72	
450	58	61	65	70	75	80	
475*	64	68	73	77	83	88	
500	71	75	80	86	91		
	(Tension)	(1022)	(961)	(902)	(845)	(792)	
525	78	83	88	94	100		
550	86	91	97	103	109		
575	94	100	105	112	119		
600**	103	108	115	121	128		
	(Tension)	(1014)	(961)	(910)	(860)	(813)	

*Maximum Span Heavy Loading District (Will Develop 60% Loaded Tension)

**Will Develop 52% Loaded Tension in Medium Loading District and 44% Loaded Tension in Light Loading District.

TABLE 3a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 3/16-inch EHS Stranded Messenger. This Table applies to the following sizes:

6 Pr. 19 Ga.
12 Pr. 22 Ga.
18 Pr. 24 Ga.

<u>Loading District</u>	<u>Temperature OF.</u>						
Heavy.	-30	0	30	60	90	120	
Medium	-15	15	45	75	105		
Light.	0	30	60	90	120		
<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>						
100	4	4	4	5	5	6	
125	5	6	6	7	8	9	
150	8	8	9	10	11	12	
175	10	11	12	13	14	16	
200	13	14	15	17	19	21	
	(Tension)	(1041)	(961)	(884)	(807)	(731)	(658)
225	17	18	19	21	23	26	
250	20	22	24	26	28	31	
275	25	26	29	31	34	37	
300	29	31	34	37	40	43	
	(Tension)	(1028)	(961)	(892)	(825)	(760)	(698)
325	35	37	40	43	46	50	
350	40	43	46	49	53	57	
375	46	49	52	56	60	65	
400	52	56	59	63	68	73	
	(Tension)	(1020)	(961)	(901)	(844)	(788)	(735)
425	59	63	67	71	76	81	
450*	66	70	75	79	84	90	
475	74	78	83	88	94		
500	82	87	92	97	103		
	(Tension)	(1016)	(961)	(908)	(857)	(808)	
525	91	96	101	107	113		
550	100	105	111	117	123		
575	109	115	121	127	134		
600**	119	125	131	138	145		
	(Tension)	(1008)	(961)	(916)	(872)	(830)	

*Maximum Span Heavy Loading District (Will Develop 60% Loaded Tension)

**Will Develop 53% Loaded Tension in Medium Loading District and 45% Loaded Tension in Light Loading District.

TABLE 4a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 3/16-inch EHS Stranded Messenger. This Table applies to the following sizes:

18 Pr. 22 Ga.
25 Pr. 24 Ga.

<u>Loading District</u>	<u>Temperature OF.</u>					
Heavy.	-30	0	30	60	90	120
Medium	-15	15	45	75	105	
Light.	0	30	60	90	120	
<u>Span Length - Feet</u>	<u>Initial Sag in Inches and (Initial Tension in Pounds)</u>					
100	4	4	5	5	6	7
125	6	7	7	8	9	10
150	9	9	10	11	12	14
175	12	13	14	15	17	18
200	15	16	18	19	21	23
(Tension)	(1033)	(961)	(886)	(814)	(742)	(670)
225	19	21	22	24	26	29
250	24	25	27	30	32	35
275	29	31	33	36	39	42
300	34	37	39	42	45	49
(Tension)	(1026)	(961)	(897)	(834)	(774)	(716)
325	40	43	46	49	53	56
350	47	50	53	56	60	65
375	54	57	60	64	68	73
400	61	65	69	73	77	82
(Tension)	(1016)	(961)	(907)	(854)	(805)	(757)
425*	69	73	77	82	86	92
450	77	82	86	91	97	
475	87	91	96	101	107	
500	96	101	106	112	117	
(Tension)	(1009)	(961)	(914)	(869)	(826)	
525	106	111	117	122	128	
550	117	122	128	134	140	
575	128	133	139	146	152	
600**	139	145	151	158	165	
(Tension)	(1002)	(961)	(922)	(885)	(848)	

*Maximum Span Heavy Loading District (Will Develop 60% Loaded Tension,
**Will Develop 53% Loaded Tension in Medium Loading District and 46% Loaded Tension in Light Loading District.

TABLE 5a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 3/16-inch EHS Stranded Messenger. This Table applies to the following sizes:

<u>Loading District</u>	<u>Temperature OF.</u>					
	12 Pr.		19 Ga.		25 Pr.	
Heavy	-30	0	30	60	90	120
Medium	-15	15	45	75	105	
Light	0	30	60	90	120	

<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>					
100	5	5	5	6	7	7
125	7	8	8	9	10	11
150	10	11	12	13	14	15
175	13	14	16	17	19	20
200	17	19	20	22	24	26
(Tension)	(1034)	(961)	(889)	(820)	(751)	(684)
225	22	24	25	27	30	32
250	27	29	31	33	36	39
275	33	35	37	40	43	46
300	39	42	44	47	51	54
(Tension)	(1021)	(961)	(901)	(843)	(788)	(735)
325	46	49	52	55	59	63
350	53	56	60	63	67	72
375	61	65	68	72	77	81
400	70	74	78	82	86	91
(Tension)	(1010)	(961)	(912)	(865)	(820)	(777)
425*	79	83	87	92	97	102
450	89	93	98	103	108	
475	99	104	109	114	119	
500	110	115	120	126	131	
(Tension)	(1004)	(961)	(920)	(880)	(842)	
525	122	127	132	138	144	
550	134	139	145	151	157	
575	147	152	158	164	170	
600**	160	166	172	178	185	
(Tension)	(996)	(961)	(928)	(895)	(864)	

*Maximum Span Heavy Loading (Will Develop 60% Loaded Tension)

**Will Develop 54% Loaded Tension in Medium Loading District and 47% Loaded Tension in Light Loading District.

TABLE 6a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 3/16-inch EHS Stranded Messenger. This Table applies to the following sizes:

<u>Loading District</u>	<u>Temperature OF.</u>					
			18 Pr. 50 Pr.		19 Ga. 24 Ga.	
Heavy	-30	0	30	60	90	120
Medium.	-15	15	45	75	105	
Light.	0	30	60	90	120	
<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>					
100	6	6	6	7	8	9
125	8	9	10	11	12	13
150	12	13	14	15	17	18
175	16	18	19	20	22	24
200	21	23	24	26	28	31
(Tension)	(1028)	(961)	(894)	(830)	(767)	(707)
225	27	29	31	33	35	38
250	33	35	38	40	43	46
275	40	43	45	48	51	55
300	48	51	54	57	60	64
(Tension)	(1014)	(961)	(908)	(858)	(810)	(764)
325	57	60	63	66	70	74
350	66	69	73	76	80	84
375	76	79	83	87	91	95
400	86	90	94	98	103	107
(Tension)	(1002)	(961)	(920)	(881)	(843)	(807)
425*	98	102	106	110	115	120
450	110	114	119	123	128	
475	122	127	132	137	142	
500	136	141	146	151	156	
(Tension)	(995)	(961)	(929)	(897)	(866)	
525	150	155	160	166	171	
550	165	170	176	181	187	
575	181	186	192	197	203	
600**	197	203	209	214	220	
(Tension)	(988)	(961)	(935)	(910)	(886)	

*Maximum Span Heavy Loading District (Will Develop 60% Loaded Tension)

**Will Develop 54% Loaded Tension in Medium Loading District and 47% Loaded Tension in Light Loading District.

TABLE 7 a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 1/4-inch EHS Stranded Messenger. This table applies to the following sizes:

25 Pr. 19 Ga.
50 Pr. 22 Ga.
75 Pr. 24 Ga.

<u>Loading District</u>	<u>Temperature °F.</u>					
Heavy.....	-30	0	30	60	90	120
Medium.....	-15	15	45	75	105	
Light.....	0	30	60	90	120	

<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>					
100	5	5	5	6	6	7
125	7	8	8	9	10	11
150	10	11	12	13	14	15
175	13	14	16	17	18	20
200	18	19	20	22	24	26
(Tension)	(1845)	(1729)	(1604)	(1485)	(1367)	(1247)
225	22	24	25	27	29	32
250	27	29	31	33	36	39
275	33	35	37	40	43	46
300	39	42	44	47	50	54
(Tension)	(1831)	(1729)	(1625)	(1526)	(1428)	(1333)
325	46	49	52	55	58	62
350	54	56	60	63	67	71
375	62	65	68	72	76	81
400	70	74	78	82	86	91
(Tension)	(1813)	(1729)	(1644)	(1562)	(1483)	(1406)
425	80	83	87	92	96	101
450	89	93	98	102	107	112
475	100	104	108	113	118	124
500	111	115	120	125	130	136
(Tension)	(1798)	(1729)	(1659)	(1592)	(1528)	(1464)
525	122	127	132	137	143	149
550	134	139	145	150	156	162
575	147	152	158	163	169	176
600*	160	166	171	177	183	190
(Tension)	(1785)	(1729)	(1672)	(1617)	(1563)	(1511)

*Will Develop 58% Loaded Tension in Heavy Loading District, 47% Loaded Tension in Medium Loading District and 42% Loaded Tension in Light Loading District.

TABLE 8 a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 1/4-inch EHS Stranded Messenger. This table applies to the following sizes:

<u>Loading District</u>			<u>Temperature °F.</u>			
	75 Pr.	22 Ga.	100 Pr.	24 Ga.		
Heavy.....	-30	0	30	60	90	120
Medium.....	-15	15	45	75	105	
Light.....	0	30	60	90	120	
<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>					
100	6	6	7	7	8	9
125	9	9	10	11	12	13
150	12	13	14	15	17	18
175	17	18	19	20	22	24
200	22	23	25	26	28	31
(Tension)	(1837)	(1729)	(1616)	(1506)	(1396)	(1289)
225	27	29	31	33	35	38
250	34	36	38	40	43	46
275	41	43	46	48	51	55
300	49	51	54	57	60	64
(Tension)	(1818)	(1729)	(1639)	(1552)	(1467)	(1386)
325	57	60	63	66	70	74
350	67	70	73	77	80	84
375	77	80	84	87	91	96
400	87	91	95	99	103	108
(Tension)	(1799)	(1729)	(1659)	(1591)	(1525)	(1461)
425	99	103	107	111	115	120
450	111	115	119	124	129	133
475	124	128	133	137	142	147
500	138	142	147	152	157	162
(Tension)	(1784)	(1729)	(1674)	(1620)	(1569)	(1518)
525	152	157	162	167	172	177
550	167	172	177	182	188	193
575	183	188	193	199	204	210
600*	200	205	210	216	221	227
(Tension)	(1772)	(1729)	(1685)	(1643)	(1601)	(1561)

*Will Develop 58% Loaded Tension in Heavy Loading District, 47% Loaded Tension in Medium Loading District and 43% Loaded Tension in Light Loading District.

TABLE 9a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 1/4-inch EHS Stranded Messenger. This Table applies to the following sizes:

<u>Loading District</u>	<u>Temperature °F.</u>					
	50 Pr.	19 Ga.	100 Pr.	22 Ga.	150 Pr.	24 Ga.
Heavy.....	-30	0	30	60	90	120
Medium.....	-15	15	45	75	105	
Light.....	0	30	60	90	120	
<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>					
100	7	8	8	9	10	11
125	11	12	13	13	15	16
150	16	17	18	19	21	22
175	21	22	24	26	27	29
200	28	29	31	33	35	37
(Tension)	(1826)	(1729)	(1628)	(1531)	(1437)	(1345)
225	35	37	39	41	44	46
250	43	45	48	50	53	56
275	53	55	58	60	63	67
300	63	65	68	71	75	78
(Tension)	(1801)	(1729)	(1655)	(1585)	(1516)	(1450)
325	74	77	80	83	87	90
350	86	89	92	96	99	103
375	99	102	106	109	113	117
400	113	116	120	124	128	132
(Tension)	(1782)	(1729)	(1675)	(1623)	(1572)	(1523)
425	128	131	135	139	143	148
450	143	147	151	155	160	164
475	160	164	168	173	177	182
500	178	182	186	191	195	200
(Tension)	(1768)	(1729)	(1689)	(1650)	(1612)	(1574)
525	197	201	205	210	214	219
550	216	220	225	230	235	240
575	237	241	246	251	256	261
600*	258	263	268	272	277	283
(Tension)	(1758)	(1729)	(1699)	(1669)	(1640)	(1610)

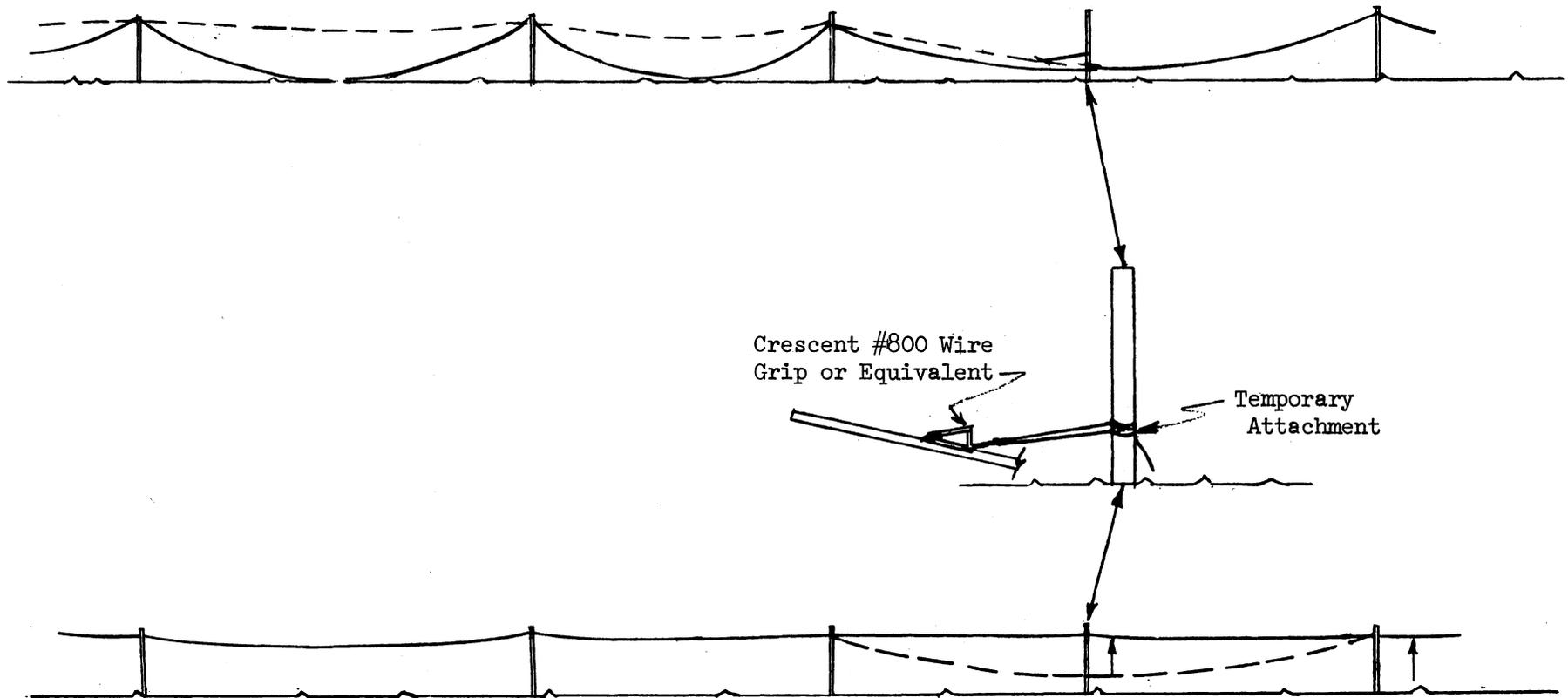
*Will Develop 59% Loaded Tension in Heavy Loading District, 47% Loaded Tension in Medium Loading District and 43% Loaded Tension in Light Loading District.

TABLE 10a

Initial Stringing Sag and Tension Data for Figure 8 Cables Supported by a 1/4-inch EHS Stranded Messenger. This table applies to the following sizes:

<u>Loading District</u>	<u>Temperature °F.</u>					
	75 Pr.	19 Ga.	200 Pr.	24 Ga.		
Heavy.....	-30	0	30	60	90	120
Medium.....	-15	15	45	75	105	
Light.....	0	30	60	90	120	
<u>Span Length - Feet</u>	<u>Initial Sag in inches and (Initial Tension in Pounds)</u>					
100	9	10	10	11	12	13
125	14	15	16	17	18	20
150	20	21	22	24	25	27
175	27	28	30	32	34	36
200	35	37	39	41	43	46
(Tension)	(1813)	(1729)	(1644)	(1563)	(1483)	(1406)
225	45	47	49	51	54	56
250	56	58	60	63	65	68
275	67	70	73	75	78	81
300	81	83	86	89	92	95
(Tension)	(1785)	(1729)	(1672)	(1617)	(1564)	(1511)
325	95	98	101	104	107	110
350	110	113	116	120	123	127
375	127	130	133	137	140	144
400	145	148	152	155	159	163
(Tension)	(1767)	(1729)	(1690)	(1652)	(1615)	(1578)
425	164	167	171	175	178	182
450	184	188	191	195	199	203
475	206	209	213	217	221	225
500	229	232	236	240	244	248
(Tension)	(1755)	(1729)	(1701)	(1674)	(1647)	(1621)
525	253	257	260	264	269	273
550	278	282	286	290	294	298
575	305	309	313	317	321	325
600*	333	337	341	345	349	354
(Tension)	(1748)	1729)	(1709)	(1689)	(1669)	(1649)

*Will Develop 58% Loaded Tension in Heavy Loading District, 46% Loaded Tension in Medium Loading District and 42% Loaded Tension in Light Loading District.



TENSIONING FIGURE 8 CABLE

FIGURE 13