

BLOCK WIRING
MULTIPLE PAIR AERIAL SERVICE WIRE
PLACING AND STRINGING SAGS

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1. <u>GENERAL</u>	
1.01 This section covers the placing and sag requirements for aerial service wire (ASW) .	
1.02 This section is reissued to:	
● Add ASW-2/22-F, ASW-5/22-F, and ASW-6/22-F	
● Add B drop wire ground clamp (AT-8989)	
● Add B drive tie (AT-9012)	
1.03 Multiple pair ASW may be used in runs up to 700 feet and may be used with fuseless protectors and 24 AWG stub cable.	
1.04 Multiple pair ASW should not be installed at temperatures below -10°F.	

PROPRIETARY

Not for use or disclosure outside Southwestern Bell Telephone Company except under written agreement.

- 1.05 Multiple pair ASW should be distributed from a pole, but it may be distributed from a span clamp provided the cable suspension strand is not pulled noticeably out of line.
- 1.06 Splicing of C or E multiple pair ASW is not recommended. The method of splicing multiple pair ASW is outlined in Part 7 of this section.
- 1.07 Refer to the following sections for additional information.

<u>SECTION</u>	<u>TITLE</u>
462-350-211	Drop and Block Wiring - Attachment Devices for Walls in Medium and Light Loading Areas
462-350-212	Drop and Block Wiring - Attachment Devices for Walls in Heavy Loading Area
462-350-213	Drop and Block Wiring - Fastening and Equipping Drop (ASW) Wire Runs to Buildings
462-350-214	Drop (ASW) and Block Wiring - Fastening and Equipping Intermediate and Last Attachments of Drop and Block Wire Runs on Buildings
462-500-015	Clearances for Multiple Drop (ASW) Wire in Light Loading Areas
462-500-016	Clearances for Multiple Drop (ASW) Wire in Medium Loading Areas
462-500-017	Clearances for Multiple Drop (ASW) Wire in Heavy Loading Areas

- 1.08 Determine information on multiple pair ASW may be found in the 626 Division practices.

2. PRECAUTIONS

- 2.01 Never place multiple pair ASW over primary power conductors.
- 2.02 Obtain assistance before placing multiple pair ASW over streets, highways, or elsewhere, if traffic, trees, or other conditions are such that one person cannot do the work safely.
- 2.03 Insulating gloves in addition to other protective equipment shall be worn by all employees when performing all operations in which the handline or ASW may come in contact with power wires or power cable.
- 2.04 The handline used to raise the multiple pair ASW shall be free from metallic strands and shall be dry.

- 2.05 When necessary to carry a handline up a pole or ladder, secure one end of the handline to a B handline carrier (Fig. 1) attached to a body belt. If the B handline carrier is not available, double the end of the handline back on itself for a distance of approximately 1 foot and place this loop under the side or back of the body belt so it will be released under tension.

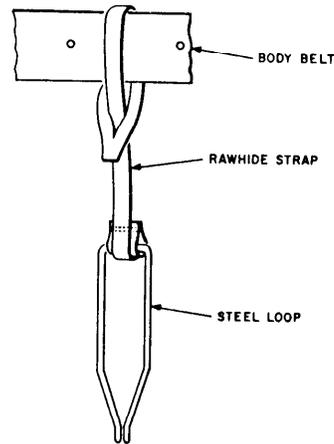


Fig. 1 - B Handline Carrier

- 2.06 Never release the ASW support from a wire span while working inside the angle formed by the wire.
- 2.07 When multiple pair ASW is to be attached to a span clamp, place the extension ladder on the field side of the suspension strand not in the street or highway. If there is no street or highway adjacent to the span clamp, place the ladder preferably against the opposite side of the strand from the ASW run to the building.
- 2.08 Do not support an extension ladder on multiple pair ASW.
- 2.09 Locate first attachment where ASW run will be clear of any obstructions.
- 2.10 Locate ring runs with consideration to permanency and accessibility. Avoid runs requiring the use of long ladders.
- 2.11 At pole-to-building runs, tension multiple pair ASW at the pole end of the run.

3. ASSOCIATED MATERIAL AND APPARATUS

3.01 Materials and apparatus required in connection with the installation of multiple pair ASW and their uses are described in Tables A and B.

4. PLACING MULTIPLE PAIR AERIAL SERVICE WIRE (ASW)IMPORTANT:

- Do not connect the building end of the support wire to the customers ground.
- Place the wire to avoid contact between the support wire and metal siding or other conductive material on customers building. Use insulated attachments at these locations. (See Section 462-350-213).

NOTE: Building attachments which do not require removal of insulation from support wire are considered insulated.

TABLE A
BUILDING ATTACHMENTS AND FASTENERS

ATTACHMENT (Note 2)	ATTACHMENT HARDWARE	FASTENER(S) (Note 1) REQUIRED FOR USE ON			REMARKS
		MASONRY	WOOD	STUCCO ON WOOD	
First	Drop Wire Anchor	5/16 x 1-3/4 in. Hammer Drive Anchor	No. 18 RH Galvanized Wood Screw 2-1/2 in. or longer (screw should penetrate studding 1-1/4 in. min)		Only one multiple pair ASW shall be supported on a drop wire hook
Second or Last	No. 9 Cable Clamp	1/4 x 1 in. Hammer Drive Anchor	1-1/2 in. No. 14 Galvanized RH Wood Screws	2 in. No. 14 RH Wood Screws	Place clamp 6 in. from ASW hook or entrance to terminal, protector, or building
Intermediate	5/8 in. Drive Rings	1/4 x 1 in. D Drive Anchor	B Drive Tie (AT-9012)		Space rings approx. 3 ft apart hor, 6 ft apart vert

Note 1: When the original wall surface has been covered by either aluminum or vinyl covering, add 1 inch to the length of the recommended fastener. Any holes made in aluminum or vinyl siding must be sealed with a caulking compound.

Note 2: See Section 462-350-213 for information on insulated attachments.

TABLE B
ASSOCIATED MATERIAL AND APPARATUS

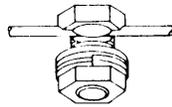
MATERIAL OR APPARATUS	APPLICATION	FOR USE WITH MULTIPLE PAIR ASW		
		2/22-F 5/22-F 6/22-F	C	E
Reliable Electric Co. Wirevise (No. 5056B) (Fig. 2)	To connect support wire to drive hooks, drop wire wire hooks, or span clamps	Yes	No	No
Preformed Dead End (DE-2506) (Fig. 3)				
Bridging Connector, 6C (Fig. 4)	For joining support wire in order to maintain mechanical and electrical continuity	Yes	No	No
AT-8851 Tangent Support (Fig. 5)	For intermediate pole attachment	Yes	No	No
B Drop Wire Ground Clamp (AT-8989) (Fig. 6)	For grounding and bonding steel support wire of multiple pair ASW	Yes	No	No
B Drive Tie (Fig. 7) (AT-9012)	For fastening to wood surfaces	Yes	Yes	Yes
Buffalo Lineman's Tool, Catalog No. 1 (Fig. 10)	For pulling wire to proper tension and snubbing	Yes	No	No
Multiple Drop Wire Puller, AT-7480		No	Yes	Yes
116A or 116C Protector and No. 10 Ground Wire	Six-pair fuseless station protector for inside or outside mounting	Yes	Yes	Yes
104-Type Wire Terminal	Six-pair wire terminal similar to 116A or 116C protector without protector	Yes	Yes	Yes
D Drop Wire Clamp	For supporting wire at span attachments	No	Yes	Yes
B Drive Hook	First and last pole attachments	Yes	Yes	Yes
Reliable Electric Co. Wirelink (5057N) (Fig. 20)	For joining support wire in splicing operation	Yes	No	No
701 Connectors (Fig. 20)	For splicing 22-gauge conductors of multiple pair ASW	Yes	No	No
13A Splice Case (Fig. 20)	For enclosing splice	Yes	No	No
B Sealing Tape (Fig. 20)	For forming sealing collars around drop wire in 13A splice case	Yes	No	No
B Sealing Cord (Fig. 20)	For sealing 13 A splice case	Yes	No	No
F-6 Sealing Washers (Fig. 16)	For containing B sealing tape in 13A splice case	Yes	No	No
B Polyethylene Tape (Fig. 16)	Provides dielectric barrier between wirelink, connectors, and splice case	Yes	No	No
C Vinyl Tape (Fig. 16)	For marking and to secure B polyethylene tape	Yes	No	No
142A or 142E Protector and No. 10 Ground Wire	Five-pair fuseless station protector for inside or outside mounting	Yes	No	No
128A or 128E Protector and No. 12 Ground Wire	Two-pair fuseless station protector for inside or outside mounting	Yes	No	No



Fig. 2 - No. 5056b Wirevise



Fig. 3 - DE-2506 Dead End



BRIDGING CONNECTOR

Fig. 4 - Bridging Connector for 0.083 Support Wire

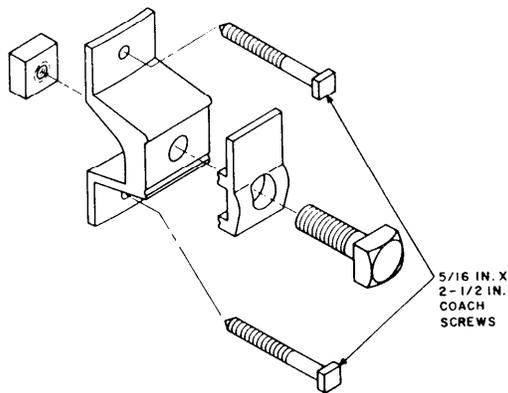


Fig. 5 - AT-8851 Tangent Support

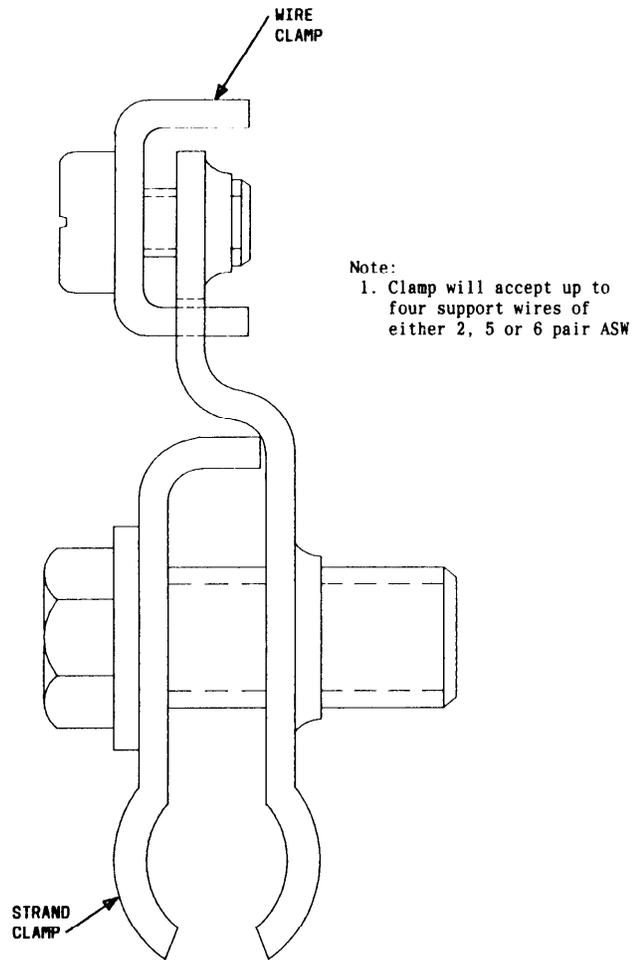


Fig. 6 - B Drop Wire Ground Clamp (AT-8989)

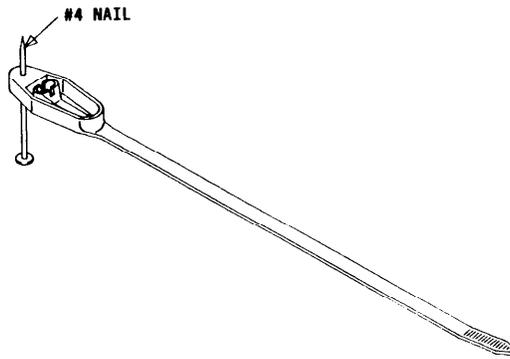


Fig. 7 - B Drive Tie (AT-9012)

Building Runs

4.01 Place multiple pair ASW from the protector to the first attachment (Fig. 8) as follows:

- (1) Attach the multiple pair ASW to the building with the hardware described in Table A.
- (2) At the first attachment:
 - (a) Cut the support wire
 - (b) Slit the web for 10 inches toward the pole.
- (3) Crush the PVC jacket of the support wire between the handles of the diagonal pliers and remove the insulation.
- (4) Place a black plastic cable tie around the jacketed pairs and support wire at the point of separation to prevent further splitting of the web.
- (5) Install a No. 5056B wirewise (Fig. 2) or a DE-2506 dead end (Fig. 3) on the bare support wire and over drop wire hook (Fig. 9).
- (6) Toward the protector, slit the support wire for approximately 2 or 3 feet and remove that portion of support wire. Exercise caution not to damage the PVC jacket.

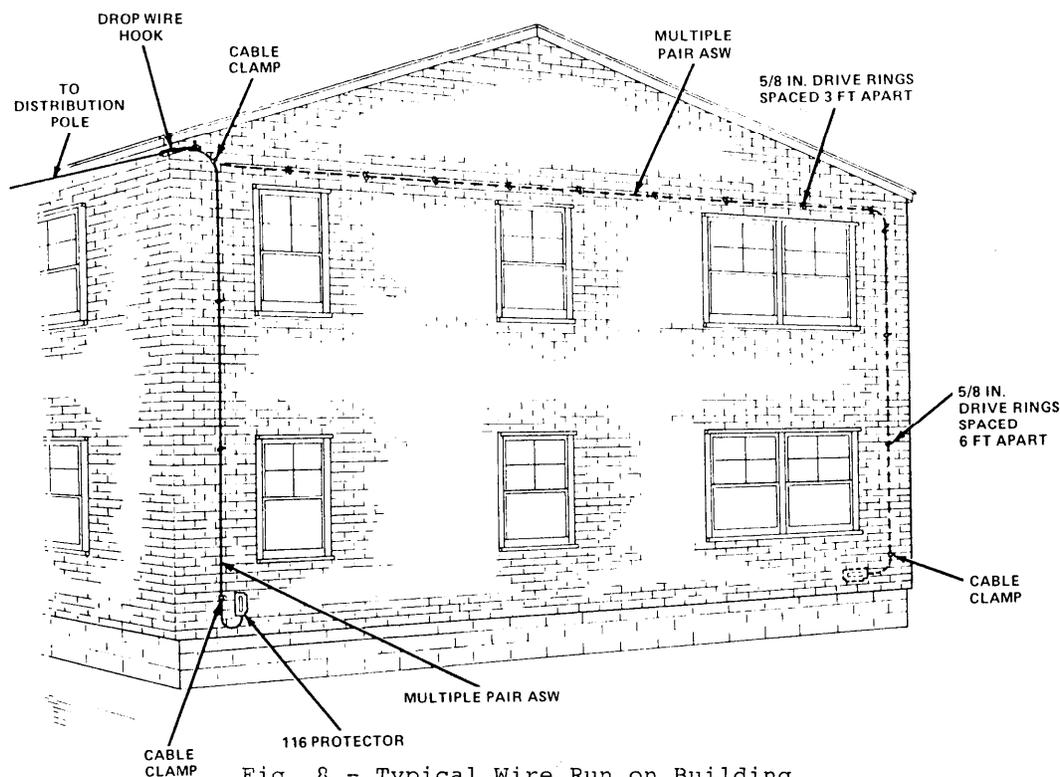


Fig. 8 - Typical Wire Run on Building

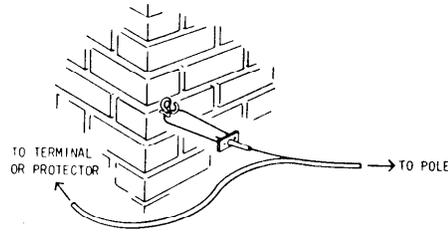


Fig. 9 - Multiple Drop Wire Installed at First Building Attachment

NOTE: At installations where there is more than one building attachment, such as building-to-building spans, the support wire must be continuous (both electrically and mechanically) up to the last attachment. Where it is necessary to cut the support wire, it must be rejoined with a GC bridging connector (Fig. 4). At a junction with buried plant, bond the support wire to the terminal housing.

Pole Runs and Attachments

4.02 Place multiple pair ASW at pole runs as follows:

- (1) Pay out multiple pair ASW at building-to-pole spans as described for drop wire in Section 462-400-205.
- (2) Using a Buffalo lineman's tool, catalog No. 1 (Fig. 10), tension the wire to the required sag. See Part 5 for stringing sags.

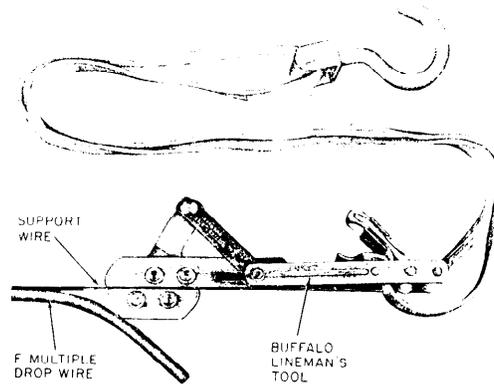


Fig. 10 - Buffalo Lineman's Tool, Catalog No. 1

NOTE: When tensioning multiple pair ASW, the jaws of the Buffalo lineman's tool shall engage only the support wire. Initial sagging does not require removal of insulation from support wire. However, when applying full stringing tension, removal of the insulation is recommended to prevent possible slippage within the jaws.

- (3) Cut the wire to the required length making an allowance for a 6-inch drip loop.
- (4) Cut the web and separate the support wire from the jacket to approximately 8 inches from the pole attachment.
- (5) Place a black plastic cable tie around the jacket and support wire at the point of separation to prevent further splitting of the web.
- (6) Cut the support wire at the required length allowing sufficient length for bonding to the cable strand.
- (7) Crush and strip the PVC jacket from the support wire back to the cable tie(s).
- (8) Install a DE-2506 dead end or a No. 5056B wirewise on the bare support wire and attach to pole attachment. Release and remove drop wire puller.
- (9) Complete the pole attachment as shown in Fig. 11, 12, and 13.

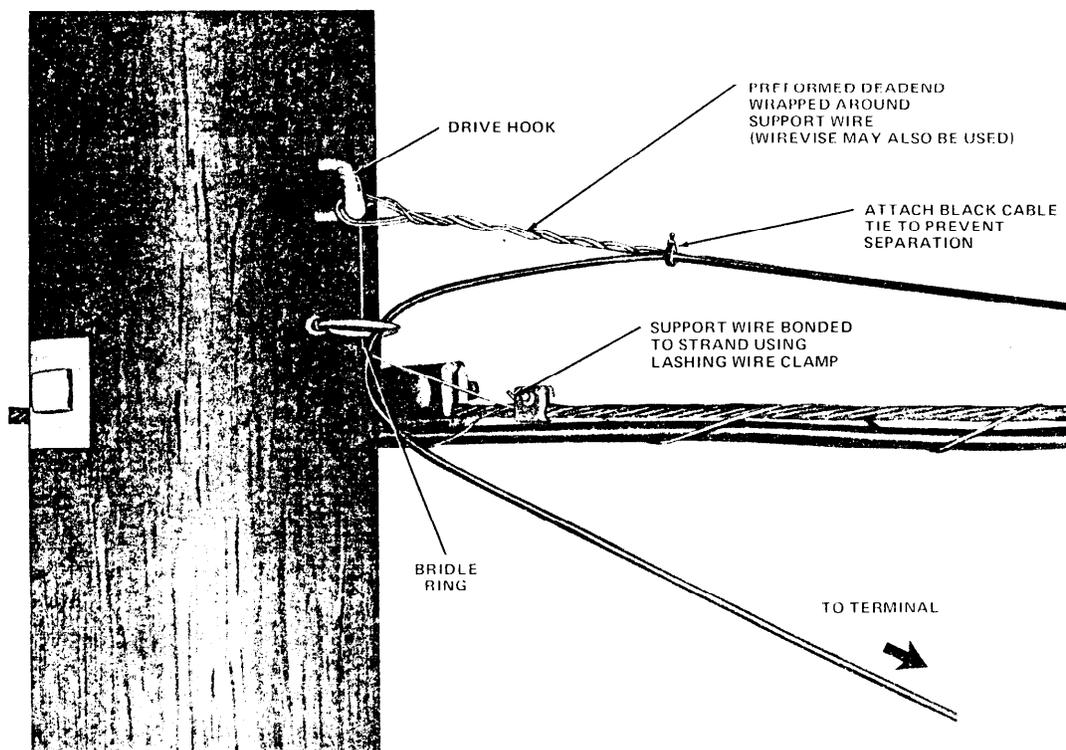


Fig. 11 - Completed Pole Attachment

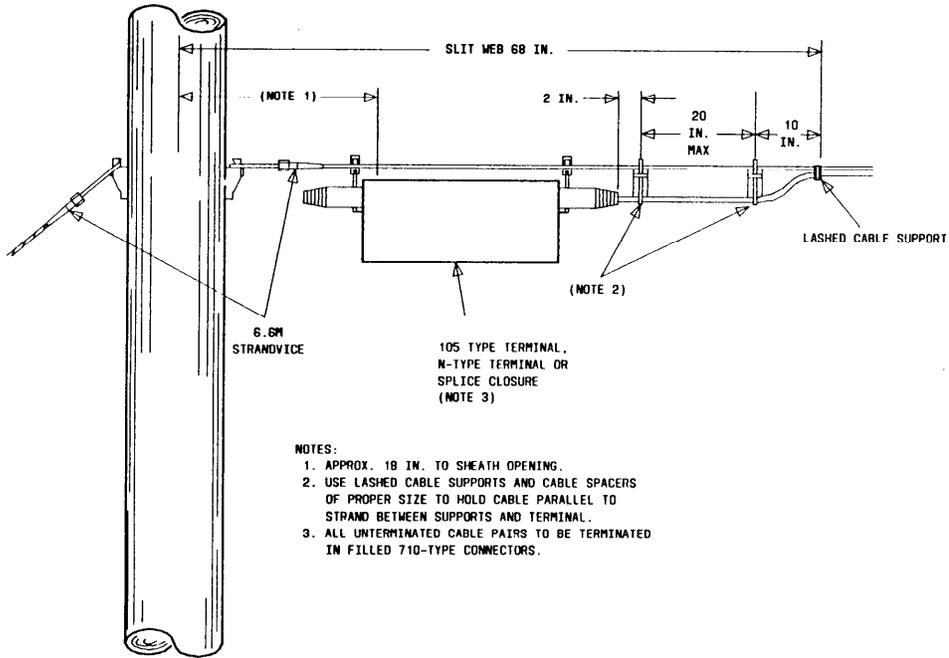


Fig. 12 - Dead Ending Self-Supporting Cable

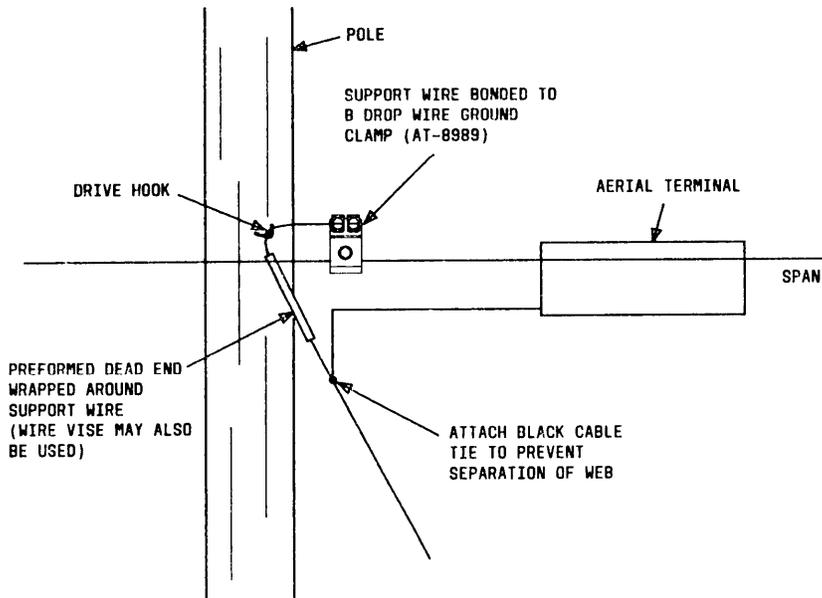


Fig. 13 - Drop Wire Ground Clamp Attached to Span

Pole-to-Pole Spans

- 4.03 At installations where pole-to-pole spans are required, attach the support wire at the end pole of the run in the same manner as described in paragraph 4.02. If splicing is required, follow the instructions in Part 7. The support wire must be both electrically and mechanically continuous. To maintain continuity at areas where the support wire is not under tension, use a bridging connector (Fig. 14).
- 4.04 When necessary to attach the support wire to intermediate poles along a run, an AT-8851 tangent support (Fig. 5) may be installed as follows:
- (1) Center the tangent support 8 inches above the strand if the drop wire crosses a street, and 8 inches below the strand if the drop wire remains on the same side.
 - (2) Tension the wire to the required sag and remove approximately 2 inches of insulation from the support wire at the tangent support attachment.
 - (3) Insert the bare wire in the semicircular groove of the tangent support and tighten.
 - (4) Place a cable tie approximately 4 inches from the tangent support on each side to prevent further separation.

Turns at Intermediate Poles and Midspan

- 4.05 When it is necessary to make a turn in the multiple pair ASW run at an intermediate pole location, attach the drop wire as shown in Fig. 14

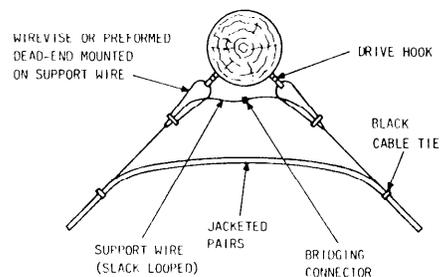


Fig. 14 - Turn in Multiple ASW Run at Intermediate Pole

4.06 When it is necessary to make a turn in the multiple pair ASW run at midspan, attach the drop wire as shown in Fig. 15.

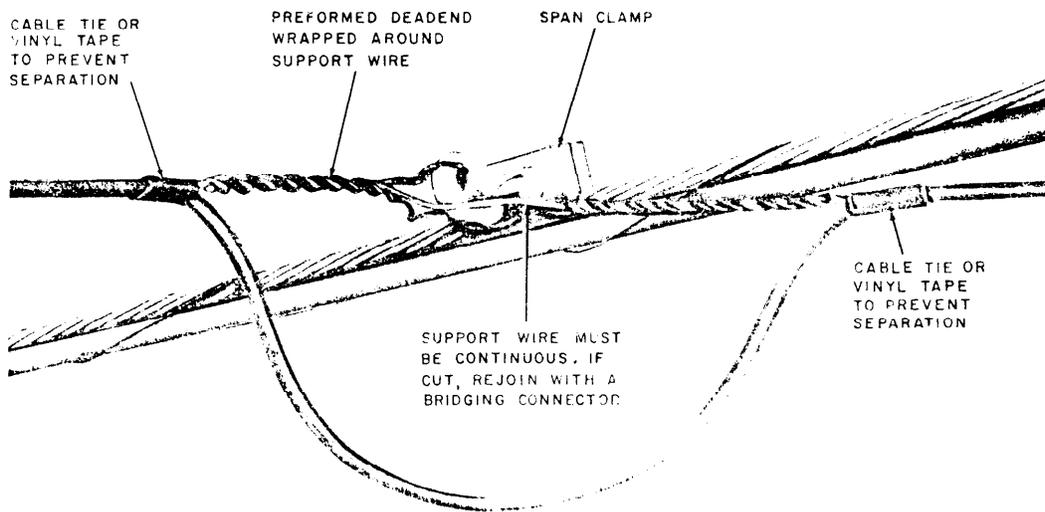


Fig. 15 - Turn In Multiple Pair ASW Run at Midspan

5. STRINGING SAGS

- 5.01 String multiple pair ASW to the sags in Table C on pole-to-pole and pole-to-house spans except in those cases where adequate ground clearances can only be obtained with the minimum sags of Table D. Your supervisor will advise the storm loading to be assumed for the area concerned.

TABLE C
NORMAL STRINGING SAGS FOR
MULTIPLE PAIR ASW 5/22-F and 6/22-F

SPAN LENGTH	STRINGING (Note 1 and 2)			FINAL UNLOADED SAG FOLLOWING STORM LOADING		SAG INCREASE FROM STRINGING TO FINAL CONDITION
	SAG		TENSION	FEET	INCHES	INCHES
	FEET	INCHES	POUNDS			
HEAVY LOADING AREA						
100	1	9	65	2	0	3
125	2	10	65	3	4	6
150	4	0	65	4	6	6
175	5	6	65	6	1	7
200	7	0	65	7	7	7
225	9	0	65	9	8	8
250	11	2	65	11	11	9
MEDIUM LOADING AREA						
100	1	9	65	1	0	-
125	2	10	65	3	0	2
150	4	0	65	4	2	2
175	5	6	65	5	9	3
200	7	0	65	7	3	3
225	9	0	65	9	4	4
250	11	2	65	11	6	4
LIGHT LOADING AREA						
100	1	9	65	Same as stringing sags		No increases
125	2	10	65			
150	4	0	65			
175	5	6	65			
200	7	0	65			
225	9	0	65			
250	11	2	65			
Over 250 Ft - Use minimum sags shown in Table D.						

Note 1: Stringing tension for 2-pair (ASW-2/22-F) wire is 45 pounds for all loading areas and the sags are unchanged.

Note 2: Stringing tension for C and E multiple pair ASW is 110 pounds for all loading areas, and the sags are unchanged.

TABLE D
 MINIMUM STRINGING SAGS FOR
 MULTIPLE PAIR ASW 5/22-F and 6/22-F

SPAN LENGTH	STRINGING (Note 1 and 2)			FINAL UNLOADED SAG FOLLOWING STORM LOADING		SAG INCREASE FROM STRINGING TO FINAL CONDITION	
	SAG		TENSION				
FEET	FEET	INCHES	POUNDS	FEET	INCHES	FEET	INCHES
HEAVY LOADING AREA							
100	1	4	85	1	11		7
125	2	1	85	2	9		8
150	3	0	85	3	8		8
175	4	1	85	4	10		9
200	5	4	85	6	2		10
225	6	9	85	7	8		11
250	8	4	85	9	5	1	1
275	10	0	85	11	3	1	3
300	12	0	85	13	3	1	3
MEDIUM LOADING AREA							
100	1	4	85	1	8		4
125	2	1	85	2	5		4
150	3	0	85	3	4		4
175	4	1	85	4	6		5
200	5	4	85	5	9		5
225	6	9	85	7	2		5
250	8	4	85	8	10		6
275	10	0	85	10	6		6
300	12	0	85	12	6		6
LIGHT LOADING AREA							
100	1	4	85	Same as stringing sags		No increases	
125	2	1	85				
150	3	0	85				
175	4	1	85				
200	5	4	85				
225	6	9	85				
250	8	4	85				
275	10	0	85				
300	12	0	85				

Note 1: Stringing tension for 2-pair (ASW-2/22-F) wire is 60 pounds for all loading areas and the sags are unchanged.

Note 2: Stringing tension for C and E multiple pair ASW is 150 pounds for all loading areas, and the sags are unchanged.

5.02 Use the minimum sags of Table D in cases where these reduced sags provide the only means of obtaining ground clearances under the wire in spans.

5.03 The sag given to multiple pair ASW may be estimated by sighting between wire supports.

6. PREPARATION OF CONDUCTORS FOR TERMINATION

6.01 Prepare multiple pair ASW for termination in accordance with Fig. 16 through 19.

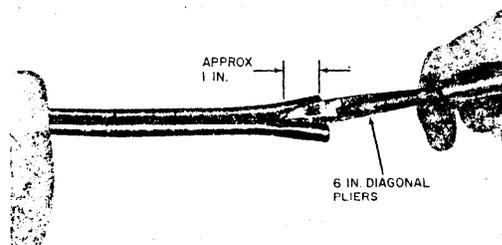


Fig. 16 - Cutting Web With Diagonal Pliers

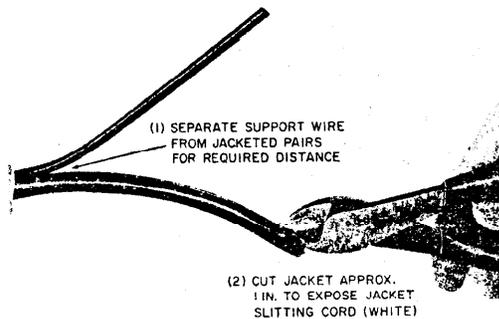


Fig. 17 - Cutting Jacket With Diagonal Pliers

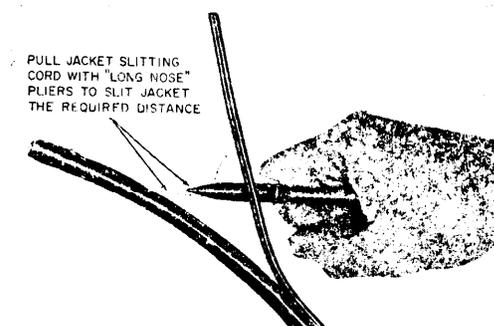


Fig. 18 - Slitting Jacket

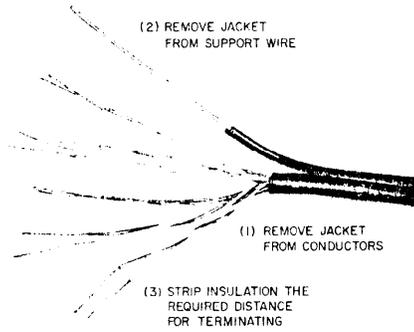


Fig. 19 - Conductors Prepared for Termination

7. SPLICING MULTIPLE PAIR ASW

7.01 Multiple pair ASW may be spliced before placing, using the material listed in Table B and shown in Fig. 20.

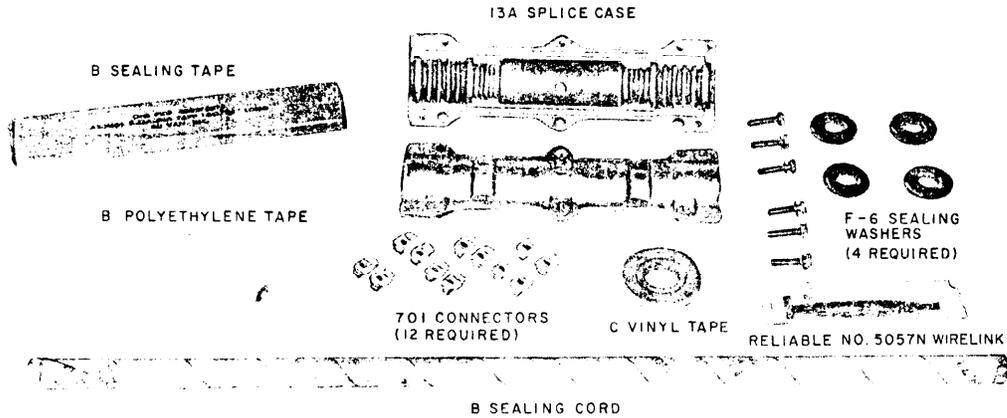


Fig. 20 - Material Required for Splicing Multiple Pair ASW

7.02 Splice multiple pair pair ASW as illustrated in Fig. 21 through 28.

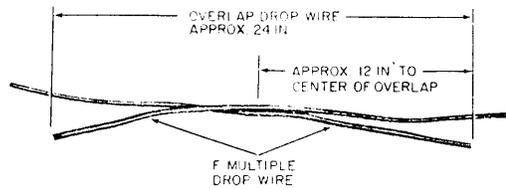


Fig. 21 - Overlap Multiple Pair ASW

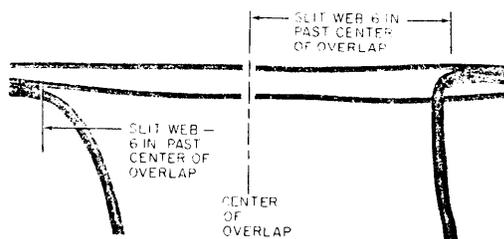


Fig. 22 - Slit Web

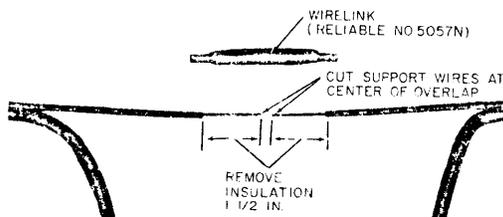


Fig. 23 - Preparing Support Wire for Installation of Wirelink

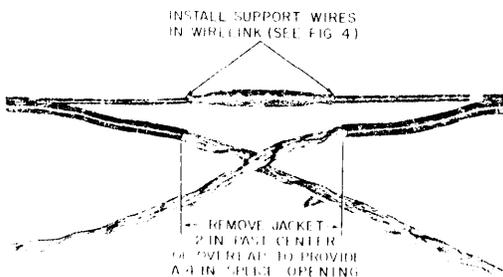


Fig. 24 - Support Wire Installed in Wirelink

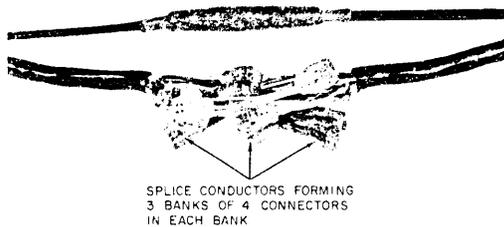


Fig. 25 - Splicing Completed

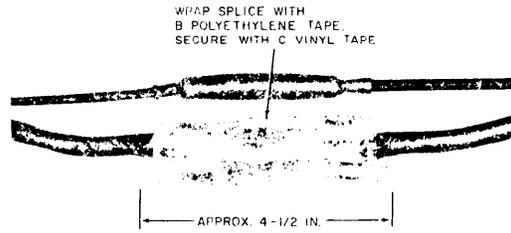
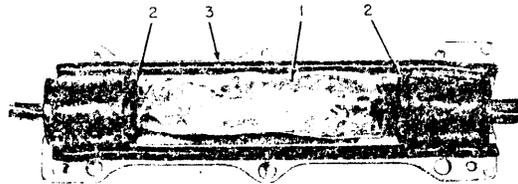


Fig. 26 - Splice Wrapped With B Polyethylene Tape



- 1 WRAP SPLICE AND WIRELINK WITH B POLYETHYLENE TAPE - SECURE WITH C VINYL TAPE
- 2 SCUFF JACKET AND FORM SEALING COLLAR WITH B SEALING TAPE (PLACE A SHORT LENGTH OF SEALING TAPE BETWEEN SUPPORT WIRE AND CONDUCTOR INSULATION BEFORE WRAPPING WITH B SEALING TAPE). PLACE F 6 SEALING WASHERS ON BOTH SIDES OF EACH SEALING COLLAR.
3. PLACE PREPARED SPLICE IN 13A CABLE CLOSURE. COMPLETE INSULATION PER SECTION 633-470-100. DO NOT INSTALL INNER SHEATH CLAMPS.

Fig. 27 - Splice Placed in 13A Splice Case

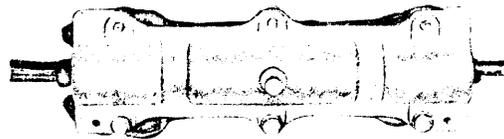


Fig. 28 - Completed Splice