

## **Company Directive**

### **STANDARD TECHNIQUE: OH4K/1**

#### **Relating to the Design of Insulated Aerial Bundle Conductor For LV Overhead Distribution Systems**

**Author:** P Hooper

**Implementation Date:** September 2007

**Approved by** 

**Policy Manager**

**Date:** 13 - 09 - 07

<b>Document Revision &amp; Review Table</b>		
<b>Date</b>	<b>Comments</b>	<b>Author</b>
26/02/2013	1. Page numbering in contents page amended. 2. Section 2 Safety – Reference to ST:OH5D added. 3. Section 11.1 Planning - paragraph added to clarify the requirements when retaining ‘G’, ‘S’ and ‘L’ poles. 4. Section 11.2 Replacement of Poles - paragraphs added / amended to clarify when poles shall be replaced.	Mike Chapman
28/08/2013	Section 11.2 - clarification that staff who test and assess will be suitably trained and competent	Paul Jewell

## CONTENTS

	<b>Forward</b>	<b>5</b>
<b>1.0</b>	<b>Scope</b>	<b>5</b>
<b>2.0</b>	<b>Safety</b>	<b>5</b>
<b>3.0</b>	<b>Clearances</b>	<b>5</b>
<b>4.0</b>	<b>Conductors</b>	<b>6</b>
<b>5.0</b>	<b>Poles</b>	<b>6</b>
<b>6.0</b>	<b>Stays</b>	<b>7</b>
<b>7.0</b>	<b>Electrical Connections</b>	<b>8</b>
<b>8.0</b>	<b>Pole Fittings</b>	<b>9</b>
<b>9.0</b>	<b>Transformer Poles</b>	<b>10</b>
<b>10.0</b>	<b>Services</b>	<b>11</b>
<b>11.0</b>	<b>Refurbishment of Line</b>	<b>12</b>

## Appendix A

<b>Table 1</b>	<b>ABC Conductor Details</b>	<b>13</b>
<b>Table 2</b>	<b>Erection Tension Table</b>	<b>13</b>
<b>Table 3</b>	<b>Hot and Cold Curve for 4 Core 50mm<sup>2</sup> and 95mm<sup>2</sup></b>	<b>14</b>
<b>Table 4</b>	<b>Hot and Cold Curve for 4 Core 120mm<sup>2</sup></b>	<b>14</b>
<b>Table 5</b>	<b>Hot and Cold Curve for 2 Core 50mm<sup>2</sup></b>	<b>14</b>
<b>Table 6</b>	<b>Hot and Cold Curve for 2Core 95mm<sup>2</sup></b>	<b>14</b>

## Appendix B

<b>Chart 1</b>	<b>Un-Stayed Angle Pole Selection Chart (4x 50mm<sup>2</sup>)</b>	<b>15</b>
<b>Chart 2</b>	<b>Un-Stayed Angle Pole Selection Chart (4x 95 &amp; 120mm<sup>2</sup>)</b>	<b>16</b>
<b>Chart 3</b>	<b>Stayed Pole Selection Chart for 50mm<sup>2</sup> Normal Locations</b>	<b>17</b>
<b>Chart 4</b>	<b>Stayed Pole Selection Chart for 95 &amp; 120mm<sup>2</sup> Normal Locations</b>	<b>18</b>
<b>Chart 5</b>	<b>Stayed Pole Selection Chart for 50mm<sup>2</sup> Exposed Locations</b>	<b>19</b>
<b>Chart 6</b>	<b>Stayed Pole Selection Chart for 95 &amp; 120mm<sup>2</sup> Exposed Locations</b>	<b>20</b>
<b>Chart 7</b>	<b>Stay Setting Chart</b>	<b>21</b>

*Page Revised 26<sup>th</sup> February 2013*

## **Appendix C   Diagrams**

<b>Fig 1   ABC Intermediate Pole 0°-30° Line Deviation</b>	<b>22</b>
<b>Fig 2   ABC Running Section Pole 0°-20° Line Deviation</b>	<b>23</b>
<b>Fig 3   ABC Running Section Pole 20°-90° Line Deviation</b>	<b>24</b>
<b>Fig 4   ABC to Open Wire Transition Pole</b>	<b>25</b>
<b>Fig 5   ABC Terminal Pole</b>	<b>26</b>
<b>Fig 6   ABC Cable Pole</b>	<b>27</b>
<b>Fig 7   ABC Tee-Off Intermediate Pole</b>	<b>28</b>
<b>Fig 8   ABC Tee-Off Section Pole</b>	<b>29</b>
<b>Fig 9   ABC Fuse/Link Pole</b>	<b>30</b>
<b>Fig 10   ABC Single Phase Service Connection from ABC Pole</b>	<b>31</b>
<b>Fig 11   Three Phase Service from an ABC Pole</b>	<b>32</b>
<b>Fig 12   Stripping Diagram for Concentric Service Cable</b>	<b>33</b>
<b>Fig 13   Jointing Details for Single Phase Service Cable</b>	<b>34</b>

***Page Revised 26<sup>th</sup> February 2013***

## **FORWARD**

Aerial Bundled Conductors (ABC) are made up of compact circular stranded hard-drawn aluminum conductors insulated with a single layer of cross-linked polyethylene. The conductor bundle is self supporting. All the connections are insulated making the complete system effectively insulated.

### **1.0 SCOPE**

This standard technique sets out the requirements for the use of ABC. Where practicable ABC shall be used in place of open-wire LV distribution systems in the following circumstances:-

- Where existing LV lines are to be refurbished.
- Where two wire systems are to be converted to four wire systems
- Where a diversion of an existing line is needed for two or more spans.
- New LV lines or extensions

### **2.0 SAFETY**

Any work carried out on an ABC system shall be in accordance with Section 8 of the Distribution Safety Rules and ST:OH5D.

### **3.0 CLEARANCES**

#### **3.1 General**

All ABC overhead lines shall be designed for a hot curve temperature rating of 75°C (See Appendix A).

Clearances shall be in accordance with POL:OH1. Where temporary building work or scaffolding infringes these clearances the ABC bundle must be protected with temporary shrouding such as PLP Treeguard.

#### **3.2 Clearance from Trees**

Bundles through trees require a reduced 'corridor' when compared with open-wire systems. However, under no circumstances must mature branches be allowed to come into contact with the bundle.

*Page Revised 26<sup>th</sup> February 2013*

Where the ABC bundle is close to trees or within 3m of any part of the tree which could provide unauthorised access to the bundle (eg children climbing etc), it shall be sheathed with a PLP “tree guard” or equivalent, to provide mechanical protection.

## **4.0 CONDUCTORS**

### **4.1 Types and Sizes**

Aerial Bundle Conductors shall be to ESI Specification 43-13 and the following sizes shall be used

- 50 sq mm 2 conductor bundle
- 50 sq mm 4 conductor bundle
- 95 sq mm 2 conductor bundle
- 95 sq mm 4 conductor bundle
- 120 sq mm 4 conductor bundle.

### **4.2 Span Lengths**

ABC shall be erected with:-

- A basic Span of 50 metres
- A Maximum Span of 90 metres

### **4.3 Erection sag**

Erection sags and tensions are in tables 2, 3 and 4 appendix A.

## **5.0 POLES**

### **5.1 Pole Fabrication**

Poles shall be fabricated as shown on drawing 43-12/14 (ST:OH4T in part 1 of the overhead line manual). Pole sizes and ultimate loadings are as stated in BS 1990.

### **5.2 Factor of Safety**

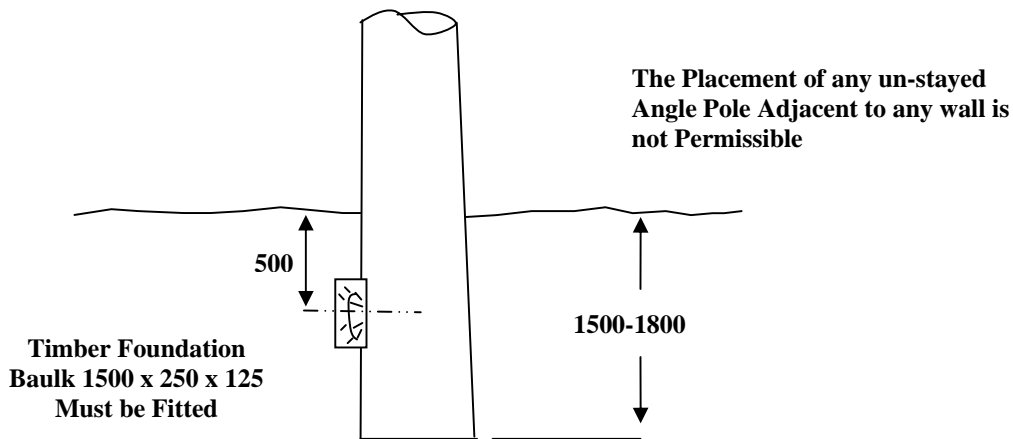
A factor of safety of 2.5 shall be applied to supports in normal locations. In exposed coastal areas and in areas where the wind speed regularly exceeds 50 mph (380 N/mm<sup>2</sup>) the factor of safety shall be increased to 3.0.

*Page revised 23 February 2011*

### 5.3 Un-stayed Poles

The minimum class of support to be used shall be a Medium class pole. Charts 1 and 2 shall be used in the selection of pole sizes for various deviations and wind loaded spans.

Where a service is to be attached to an un-stayed pole, care must be taken to ensure that the pole is capable of accepting the additional load. Where this is not the case the pole foundations may need to be enhanced as shown in fig 1.



**Fig 1**

### 5.4 Stayed Poles

Charts 3 and 4 provide the selection data for stayed poles with a factor of safety of 2.5. Where the pole is in an exposed position and the factor of safety has been increased to 3.0 charts 5 and 6 shall be used.

## 6.0 STAYS

### 6.1 Stay Assembly

Stay assemblies shall be in accordance with ST:OH4L.

### 6.2 Stay Sizes

The following 1150 grade stay strand shall be used:-

- 7/3.25mm (Type 1) with a safe working load of 26kN
- 7/4.00mm (Type 2) with a safe working load of 40kN

### 6.3 Stay Angles

The angle between the pole and stay shall be within a range of 20°- 45°. Stay spreads are shown in chart 7.

### 6.4 Stay Insulators

Type 1 stay insulators shall be fitted in all stays associate with ABC lines.

### 6.5 Out of Balance Stays

At poles supporting both open-wire conductors and ABC bundles it will be necessary to provide an additional stay to cater for the out of balance loading imposed on the pole.

Typical tensions at 10°C for ABC bundles and 4 wire open-wire systems are given in the table below.

Conductor	Tension kgf
50 mm <sup>2</sup> ABC 2 Core	90
50 mm <sup>2</sup> ABC 4 Core	268
95 mm <sup>2</sup> ABC 2 Core	246.9
95 mm <sup>2</sup> ABC 4 Core	497
120 mm <sup>2</sup> ABC 4 Core	497
16 mm <sup>2</sup> HD Copper (3/0.104 inch <sup>2</sup> )	280
32 mm <sup>2</sup> HD Copper (3/0.147 inch <sup>2</sup> )	1020
70 mm <sup>2</sup> HD Copper (7/0.136 inch <sup>2</sup> )	1392
50 mm <sup>2</sup> Aluminium (7/0.122 inch <sup>2</sup> )	808
100 mm <sup>2</sup> Aluminium (7/0.137 inch <sup>2</sup> )	1072

## 7.0 ELECTRICAL CONNECTIONS

### 7.1 General

Only approved insulated connectors shall be used on ABC lines. These are listed in ST: OH 10A.

*Page Revised 14<sup>th</sup> July 2008*



## **7.2 Branch Connections**

Branch connections shall be made using insulation piercing connectors (IPC's). IPC's should not be removed once they have been installed.

Care should be taken to ensure that cut ends of branch connectors are pushed fully home in to the end cap provided with the IPC.

## **7.3 Through Connections**

Insulated compression joints shall be used at ABC section positions and for connection to open wire systems.

## **7.4 Conductor End Seals**

All exposed cut ends of ABC cores shall be fitted with an end seal.

## **8.0 POLE FITTINGS**

### **8.1 General**

All fittings supporting ABC systems shall be in accordance with ESI specification 43-13.

### **8.2 Anchor Clamps**

Anchor clamps shall be fitted in such a manner as to ensure that only the insulated jaws come into contact with the conductor's insulation.

Insulated cable tie supports can be used to keep the conductor's insulation away from any steelwork or stays.

### **8.3 Suspension Clamps**

Suspension clamps are suitable for line deviations of up to 30° and for an uplift position on straight line poles where the vertical angle does not exceed 30°.

In situations where uplift can occur the suspension clamp should be captivated using keeper type suspension hook.

## **9.0 TRANSFORMER POLES**

The phase cores shall be connected directly into the pole-mounted fuses.

The neutral core shall be removed from the bundle just above the fuses and connected directly on to the transformer neutral stem.

A length of ABC minus the neutral shall then be used for the phase connections between the transformer and the fuses.

## **10.0 SERVICES FROM ABC LINES**

### **10.1 Services**

ABC services shall be connected in accordance with ST: OH 6A.

### **10.2 Service Spans**

The maximum aerial span for concentric service cable is:-

- 30m for single phase cables
- 20m for three phase cables

Where the spans exceed these values it will be necessary to erect a service pole with an ABC span.

### **10.3 Service Connections**

All work shall be carried out in accordance with ST: OH 14A.

A maximum of four connections (i.e. two single phase or one three phase service) can be accepted on any one pole. Where more than four connections are required a Service Connection Box will be needed.

As it is not possible to check polarity with a test lamp on the main, polarity shall be confirmed at the service cut-out.

## 10.4 Service Disconnections

All work shall be carried out in accordance with ST: OH 14A.

For services connected directly to the ABC core the method of disconnection will be to:-

- Cut the phase core 150mm from the connector
- Fit an end seal over the stub end
- Do not remove the insulated piercing connector

Reconnection can be achieved by connecting the live stub using an insulate compression through joint.

## 10.5 Service Disconnection Box

A plastic, weatherproof connection box shall be used for multiple service connections of up to 9 phase and neutral service cores.

The box shall be attached to the pole using 16mm bolts or coach screws. Where possible the box shall be fitted above the ABC main to reduce the risk of damage by ladder etc.

To connect the Service Connection box to the ABC main 50 sq mm tails shall be used, with two insulation piercing connector's fitted on each side of the pole as shown in fig 2. The tails shall be supported with cable ties as necessary.

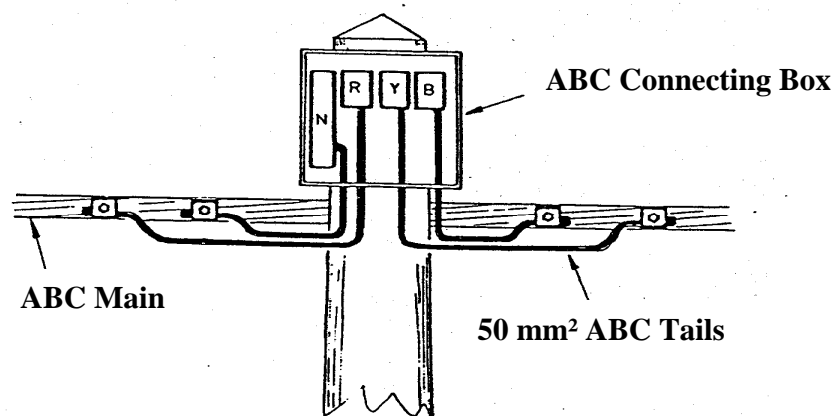


Fig 2

*Page Revised 19<sup>th</sup> June 2008*

Multi-purpose electrical grease should be applied to the conductor ends before fitting them into the terminals.

## **11.0 REFURBISHMENT OF EXISTING LINES**

### **11.1 Planning**

Where open-wire systems are to be replaced with ABC, an on site inspection should be carried in order to determine site specific problems prior to work commencing.

All 'G', 'S' and 'L' poles, if retained, shall be tested in line with ST:OH5B to ascertain their condition and that they are fit for purpose to meet the requirements of this ST prior to work commencing on site.

Whenever practicable the ABC bundle should be erected with the existing LV conductors live. If this is not possible then the work should be planned in such a way as to ensure that supply interruptions are kept to a minimum.

Prior to any work commencing a risk assessment in accordance with ST: HS 20A should be carried out.

### **11.2 Replacement of Poles**

All decayed poles labeled 'D' shall be replaced prior to the open-wire network being replaced with ABC.

For business efficiency 'S' and 'L' poles shall normally be replaced as part of refurbishment work, however; subject to satisfactory testing and assessment as described in 11.1 above by a suitably trained and competent person, the project controller may decide that their continued use is safe and appropriate. In this case care shall be taken to ensure that these poles retain the correct classification in CROWN after the work has been completed.

Good poles 'G' shall be retained where possible and only replaced where they do not meet the requirements of this ST.

Replacement poles shall be of a size and at span lengths as detailed in paragraphs 4 and 5.

Do not cut off the pole heads of retained poles.

### **11.3 Replacement Stays**

Older pattern stay rods plus any rods showing bad corrosion shall be replaced. In addition, even where stay rods are adequate, it will probably be necessary to replace all staywire and fixings.

*Page revised 28 August 2013*

# APPENDIX A

Table 1

ABC DESIGN CRITERIA					
	2x50 ABC	4x50 ABC	2x95 ABC	4x95 ABC	4x120 ABC
Greased Conductor Weight (kg/m)	0.35	0.70	0.65	1.30	1.63
Cross Sectional Area of Conductor (mm <sup>2</sup> )	100	200	190	380	480
Conductor Overall Diameter (mm)	24.5	29.5	32.5	39.0	44.0
Coefficient of Linear Expansion (/Degree C)	2.30E-05	2.30E-05	2.30E-05	2.30E-05	2.30E-05
Modulus of Elasticity (kg/mm <sup>2</sup> )	5491.20	5491.20	5491.20	5491.20	5491.20
Rated Breaking Strength of Conductor (kgf)	1549	3098	3119	6238	7910
Basic / Recommended Span (m)	50	50	50	50	50
Wind Pressure on Conductor (N/m <sup>2</sup> )	380	380	380	380	380
Radial Ice Thickness (mm)	4.75	4.75	4.75	4.75	4.75
Ice Density (kg/m <sup>3</sup> )	913	913	913	913	913
Absolute Maximum Working Tension (MWT) Limit (kgf)	371.76	743.52	748.56	1497.12	1898.40
Temperature at MWT Limit (Degrees C)	-5.6	-5.6	-5.6	-5.6	-5.6
Maximum "Everyday" Tension (EDT) Limit (kgf)	133.59	267.18	248.09	496.18	496.18
Temperature at EDT Limit (Degrees C)	10	10	10	10	10
Maximum Conductor Tension (MCT) (kgf) -6°C	371.76	707.93	717.77	1080.27	1016.99
Maximum Conductor Weight (MCW) (kg/m)	0.75	1.17	1.16	1.90	2.29
Maximum Conductor Pressure (MCP) (kg/m)	1.32	1.51	1.63	1.88	2.07
Freezing Point Tension (FPT) (kgf) at 0 °C	96.91	311.65	289.58	579.17	550.09

Table 2

ERECTION TENSION TABLE (kgf) Main Line 50m Basic Span					
Temp (°C)	50 mm <sup>2</sup> 2 Core	50 mm <sup>2</sup> 4 Core	95 mm <sup>2</sup> 2 Core	95 mm <sup>2</sup> 4 Core	120 mm <sup>2</sup> 4 Core
0	101	341.5	317.5	635	583.7
5	96.9	311.7	289.6	579.2	550.1
10	93.3	287.3	266.9	533.7	521.3
15	90	267.2	248.1	496.2	496.2
20	87	250.3	232.4	464.8	474.2
25	84.3	236	219.1	438.1	454.8
30	81.8	224	207.6	415.2	437.4

Page Revised 14<sup>th</sup> July 2008

Table 3

DESIGN SAG TABLE FOR 4 Core 50 and 95 mm <sup>2</sup> (Main Line)											
Cold Curve											
Temp (°C)	Span Length (m)										
	40	45	50	55	60	65	70	75	80	85	90
-5.6	0.40	0.51	0.63	0.77	0.91	1.07	1.24	1.42	1.62	1.83	2.05
Hot Curve											
Temp (°C)	Span Length (m)										
	40	45	50	55	60	65	70	75	80	85	90
75	0.90	1.14	1.41	1.70	2.03	2.38	2.76	3.17	3.60	4.07	4.56

Table 4

DESIGN SAG TABLE FOR 4 Core 120mm <sup>2</sup> (Main Line)											
Cold Curve											
Temp (°C)	Span Length (m)										
	40	45	50	55	60	65	70	75	80	85	90
-5.6	0.55	0.70	0.87	1.05	1.25	1.46	1.70	1.95	2.22	2.50	2.81
Hot Curve											
Temp (°C)	Span Length (m)										
	40	45	50	55	60	65	70	75	80	85	90
75	0.99	1.25	1.55	1.87	2.23	2.62	3.03	3.48	3.96	4.47	5.02

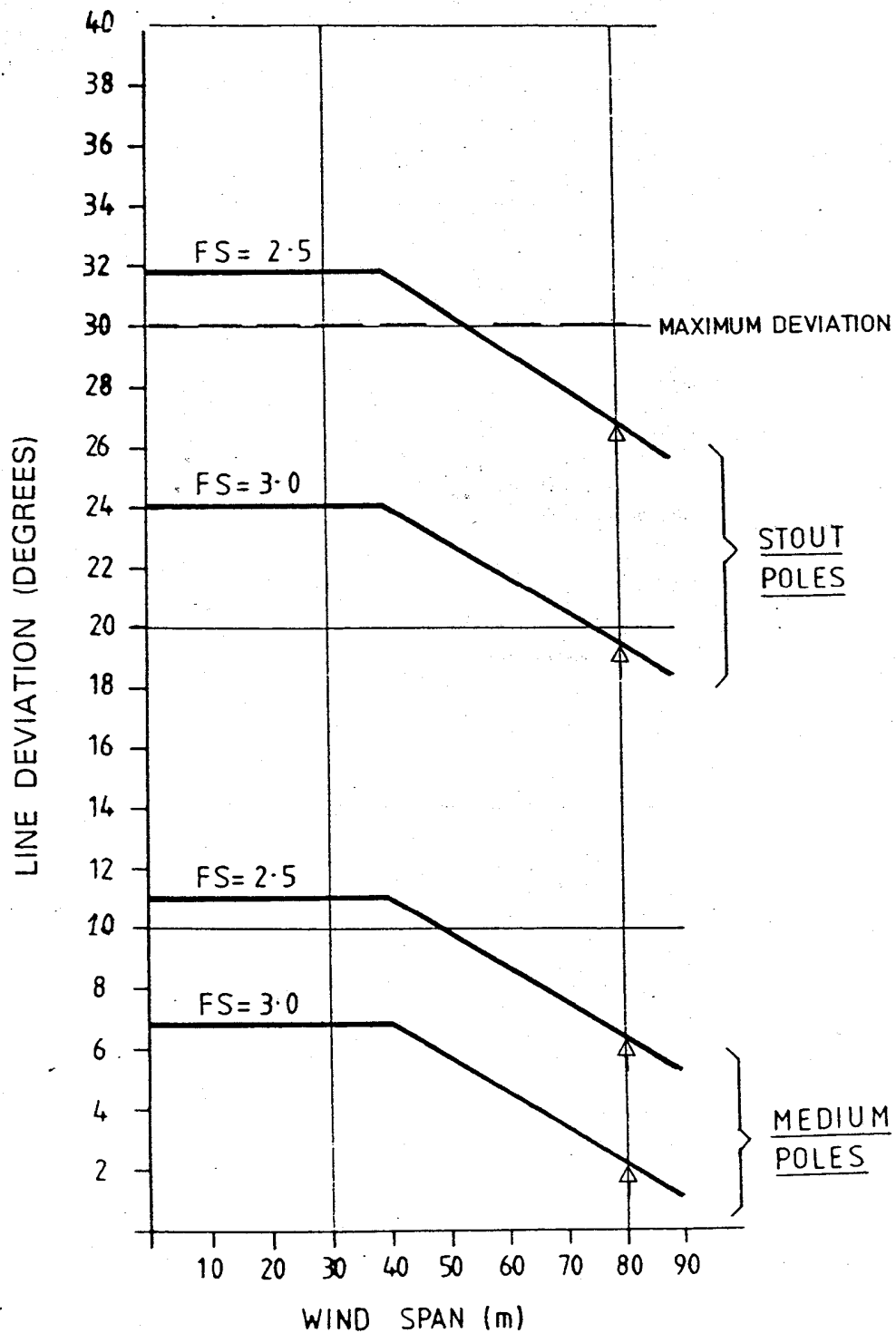
Table 5

DESIGN SAG TABLE FOR 2 Core 50mm <sup>2</sup> (Main Line)											
Cold Curve											
Temp (°C)	Span Length (m)										
	40	45	50	55	60	65	70	75	80	85	90
-5.6	0.69	0.87	1.08	1.30	1.55	1.82	2.11	2.42	2.76	3.11	3.49
Hot Curve											
Temp (°C)	Span Length (m)										
	40	45	50	55	60	65	70	75	80	85	90
75	1.08	1.36	1.68	2.04	2.43	2.85	3.30	3.79	4.31	4.87	5.46

Table 6

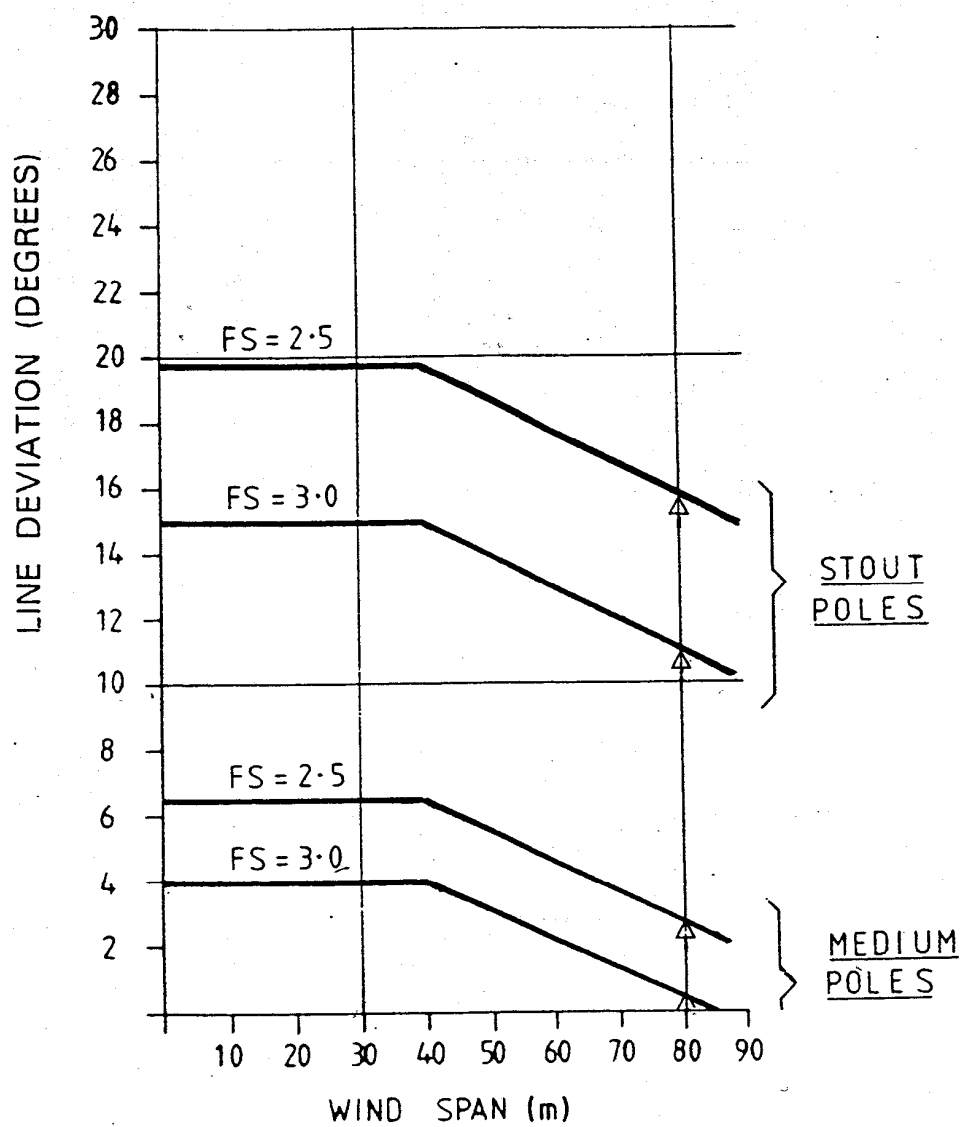
DESIGN SAG TABLE FOR 2 Core 95mm <sup>2</sup> (Main Line)											
Cold Curve											
Temp (°C)	Span Length (m)										
	40	45	50	55	60	65	70	75	80	85	90
-5.6	0.40	0.51	0.63	0.77	0.91	1.07	1.24	1.42	1.62	1.83	2.05
Hot Curve											
Temp (°C)	Span Length (m)										
	40	45	50	55	60	65	70	75	80	85	90
75	0.90	1.14	1.41	1.70	2.03	2.38	2.76	3.17	3.60	4.07	4.56

*Page Revised 14<sup>th</sup> July 2008*



An allowance has been included in this chart for aerial service attachments.

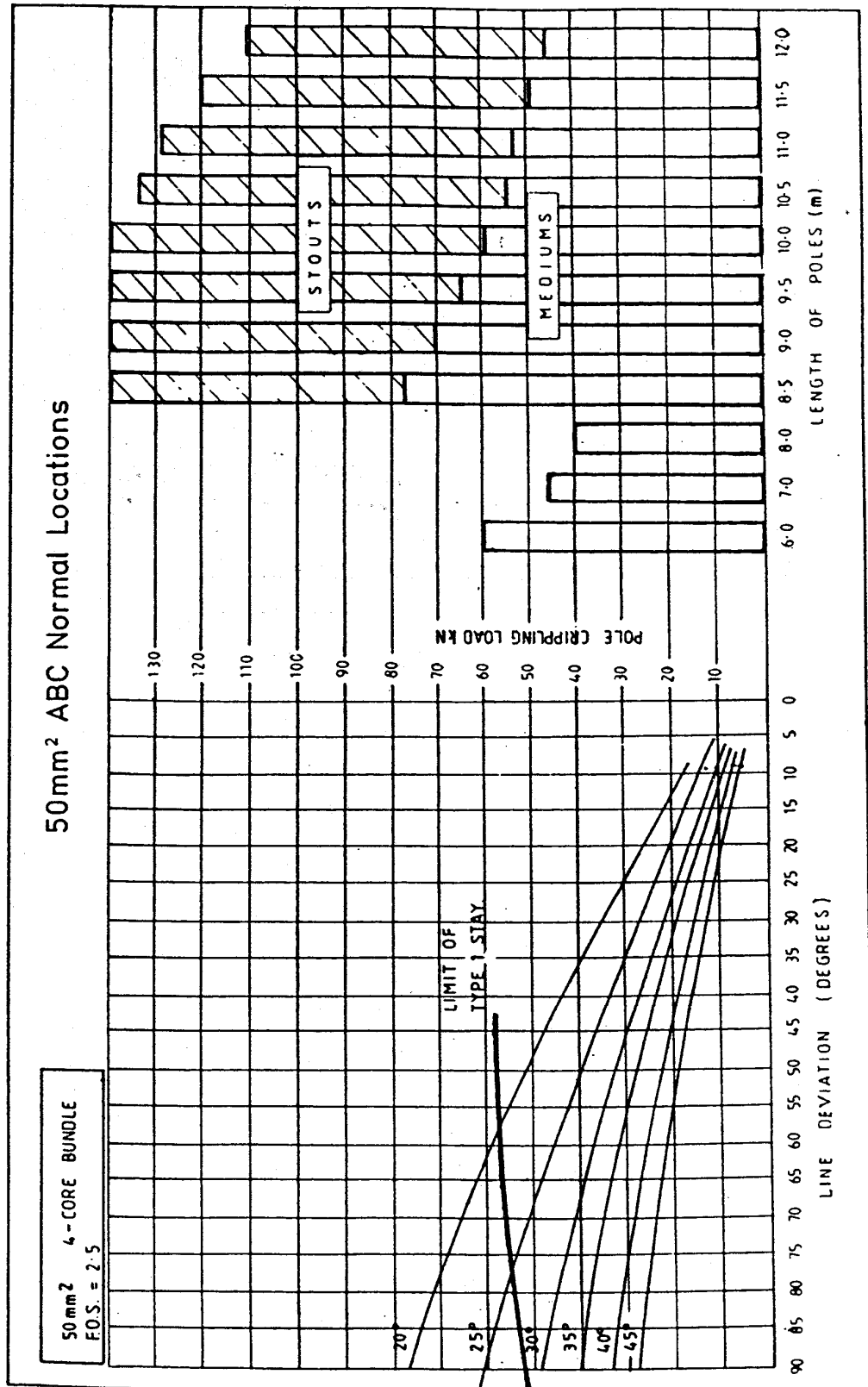
**Chart 1- Un-stayed Angle Pole Selection Chart  
For 50 sq mm ABC**



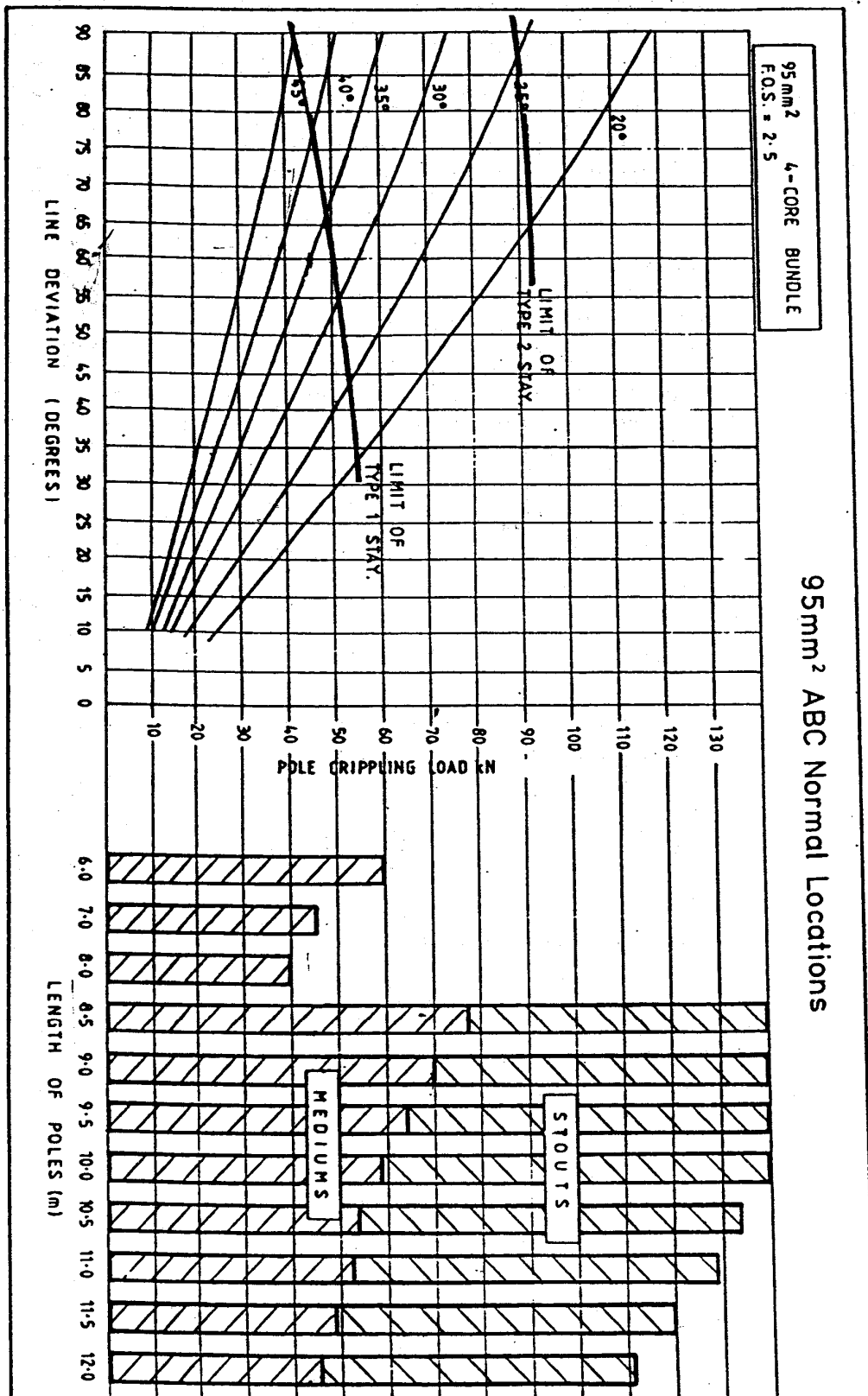
An allowance has been included in this chart for aerial service attachments.

**Chart 2- Un-stayed Angle Pole Selection Chart  
For 95 and 120 sq mm ABC**

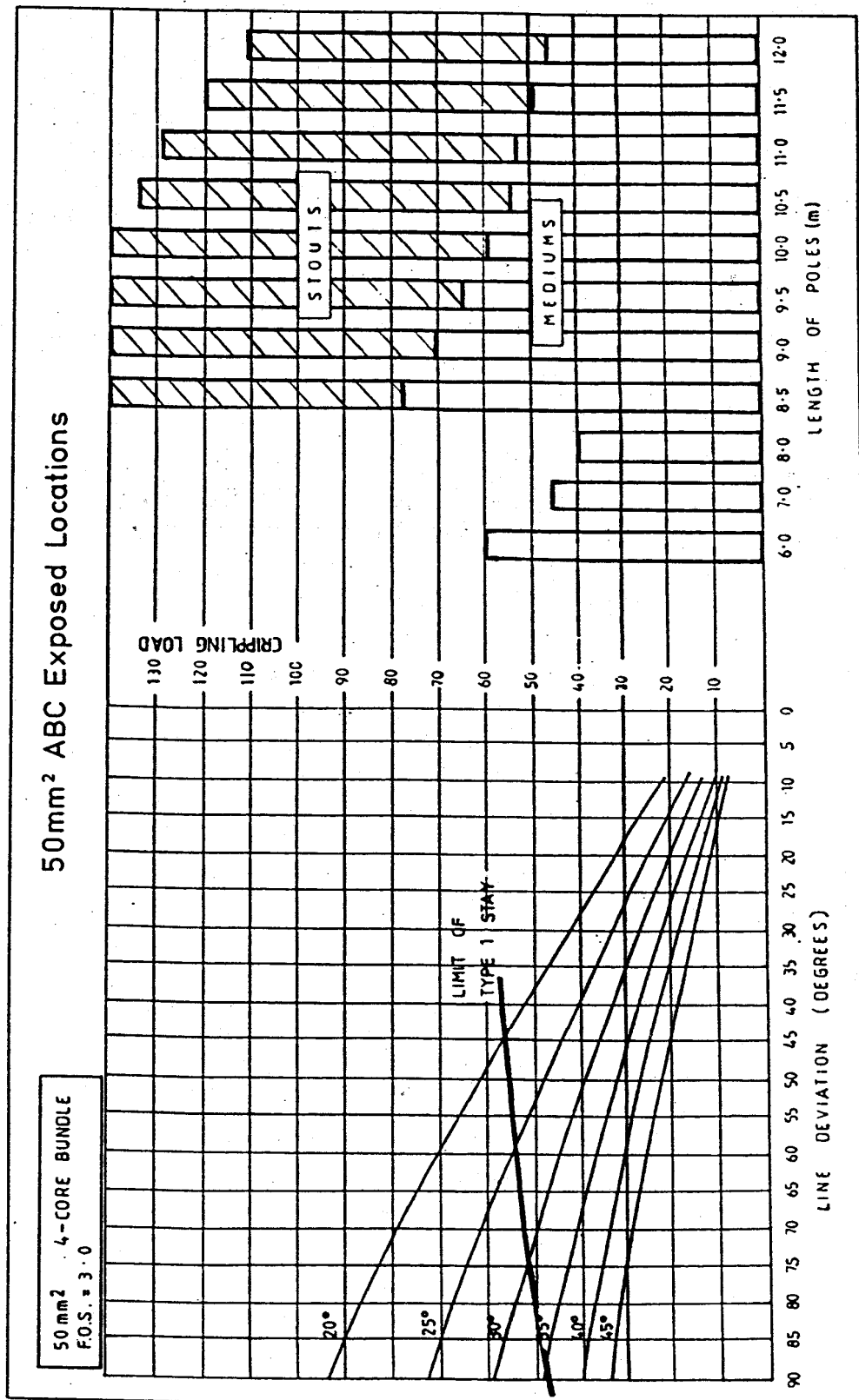




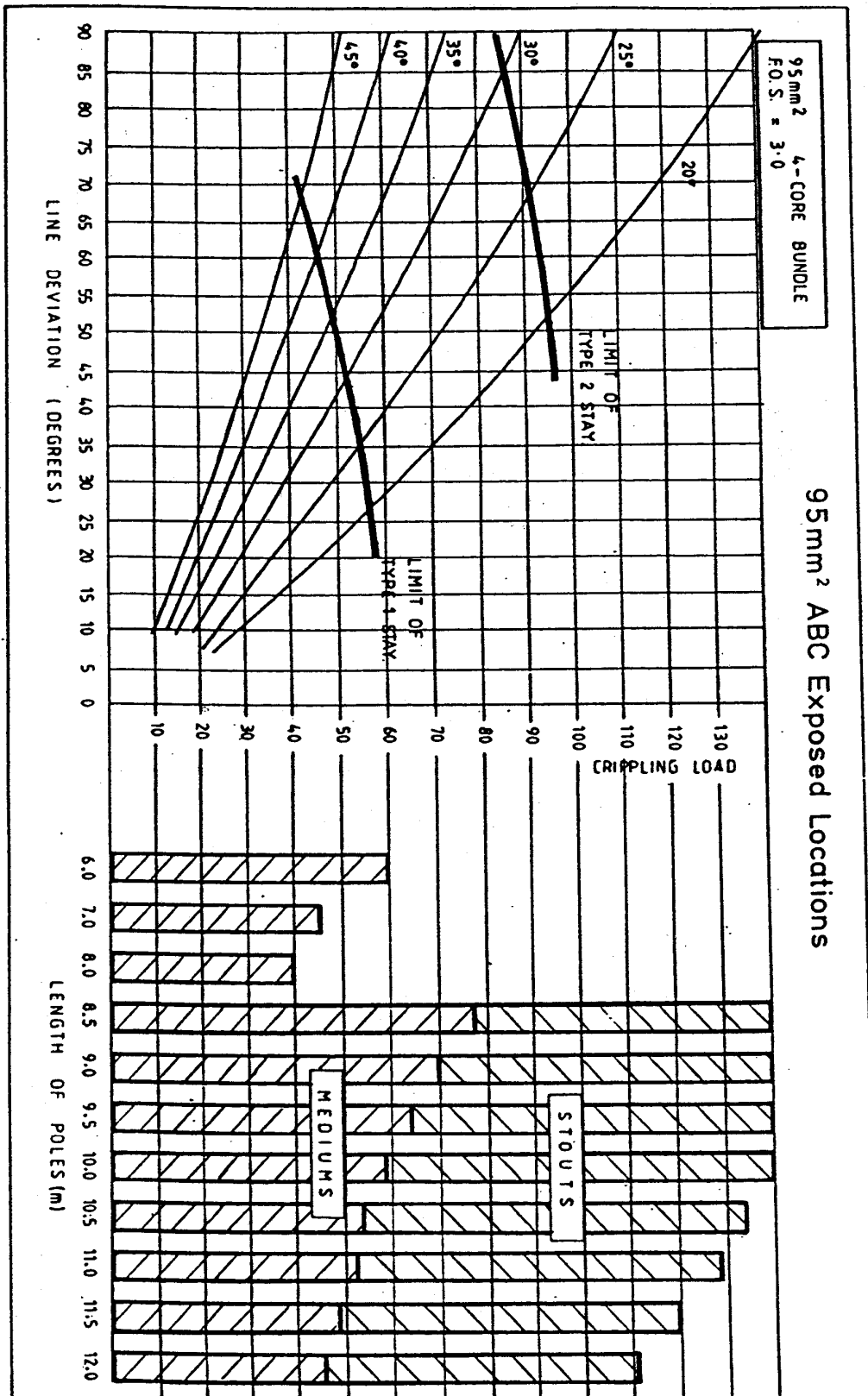
**Chart 3- Stayed Pole Selection Chart For 50 sq mm ABC  
Normal Locations (F.O.S= 2.5)**



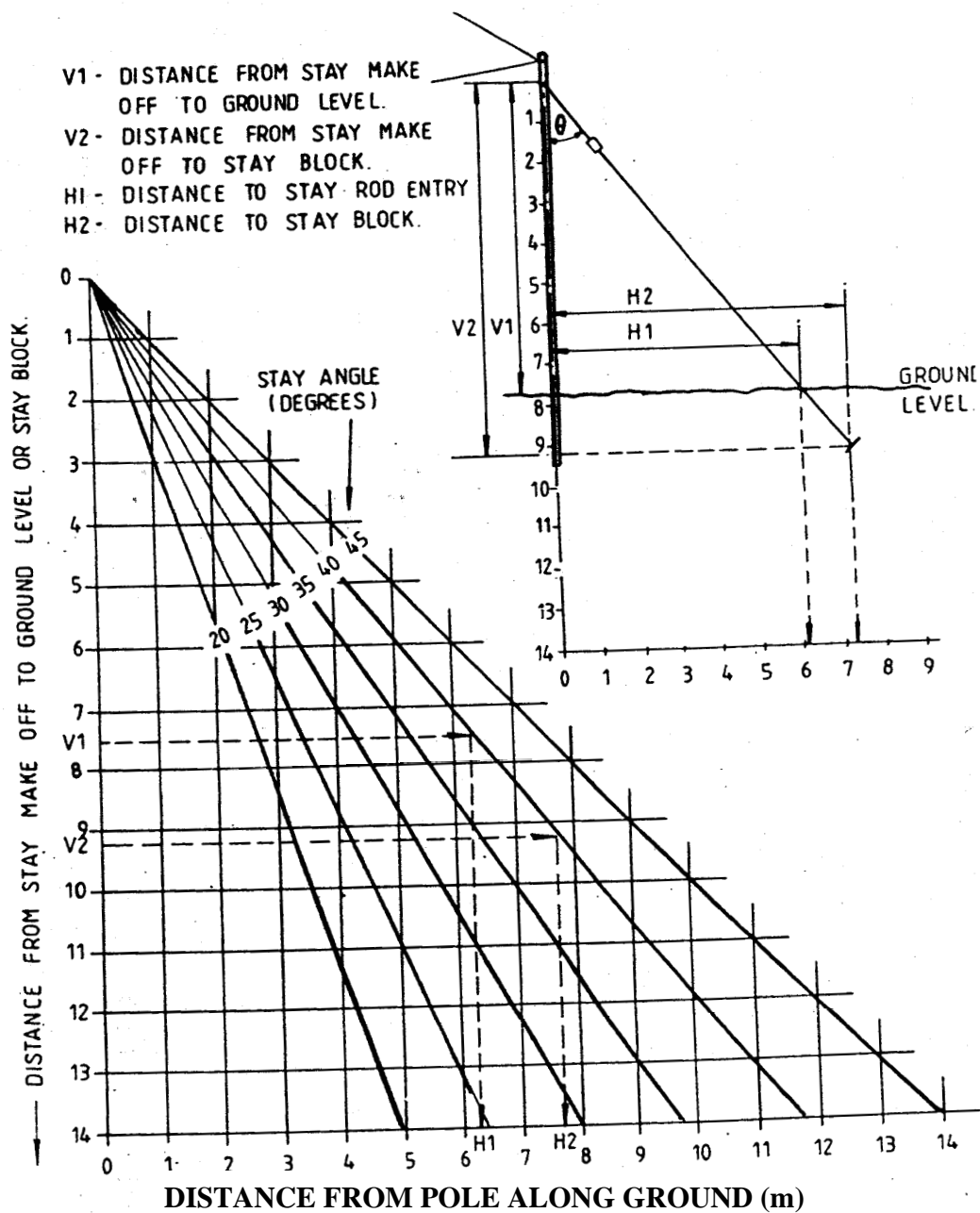
**Chart 4- Stayed Pole Selection Chart For 95 and 120 sq mm ABC  
Normal Locations (F.O.S= 2.5)**



**Chart 5- Stayed Pole Selection Chart For 50 sq mm ABC  
Exposed Locations (F.O.S=3.0)**



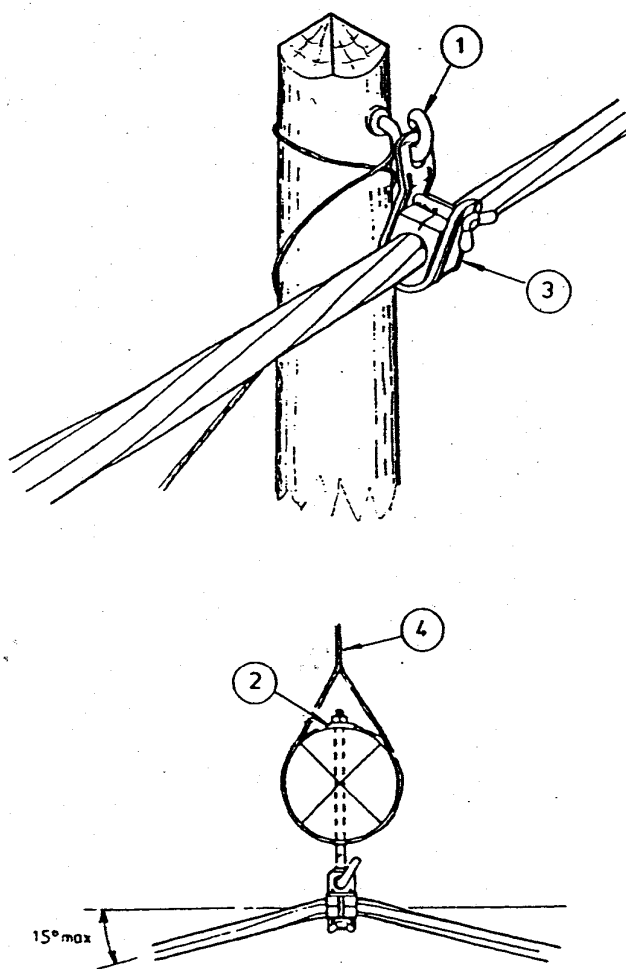
**Chart 6- Stayed Pole Selection Chart For 95 and 120 sq mm ABC  
Exposed Locations (F.O.S = 3.0)**



**Notes:-**

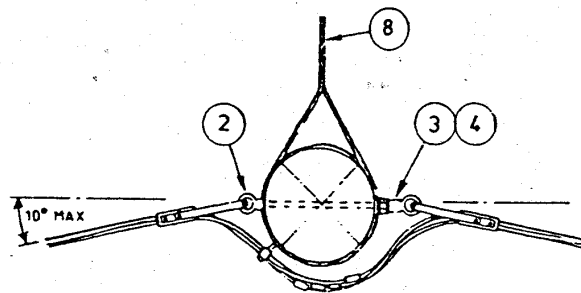
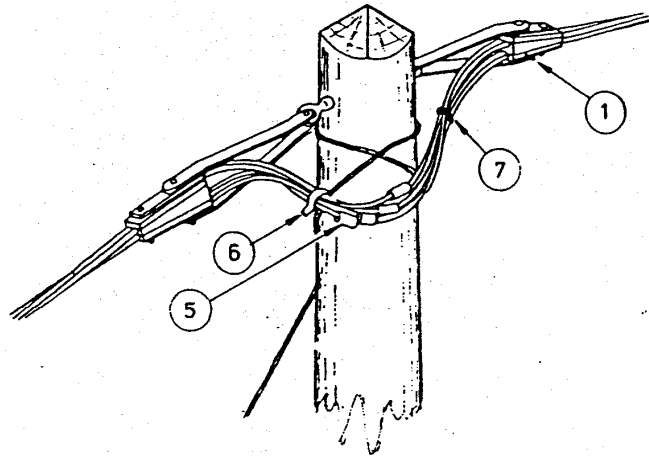
1. The stay slope should always be the greatest possible up to  $45^\circ$
2. No stay slope shall be less than  $20^\circ$

**Chart 7 - Stay Setting Chart**



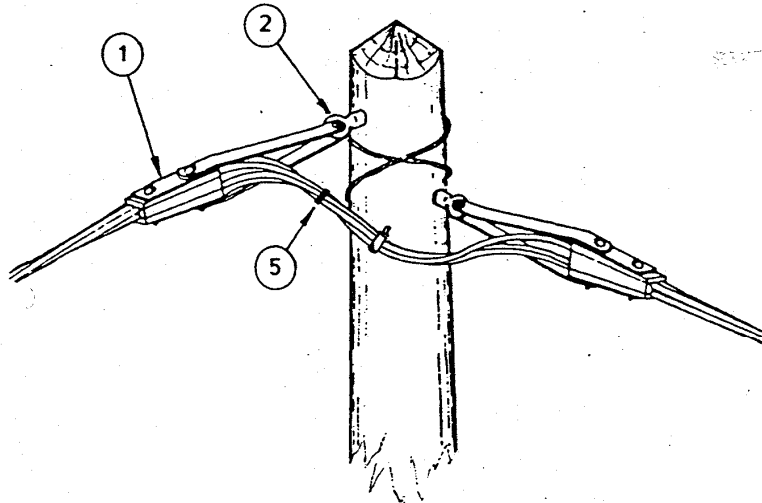
SCHEDULE OF COMPONENTS			
Item No	Description	Shops No	Quantity
1	Pig Tail Hook (200 mm) or Pig Tail Hook (300 mm)	37328	1
2	Square Washer Curved	30522	1
3	Suspension Clamp (50) or Suspension Clamp (95)	30195 30196	1
4	Stay Assembly		As required

**Fig 1 ABC Intermediate Pole, 0° - 30° Line Deviation**

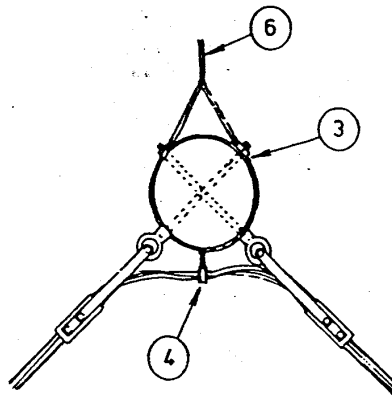


SCHEDULE OF COMPONENTS			
Item No	Description	Shops No	Quantity
1	Anchor Clamp (50) or Anchor Clamp (95)	30193 30194	2
2	Eye Bolt (200 mm) or Eye Bolt (300 mm)	30130 30131	1
3	Square Washer Curved	30522	1
4	Eye Nut	30138	1
5	Non- Tension Joint (50-50) or Non- Tension Joint (95-95)	30314 30315	4
6	Cable Tie Support	30210	As Required
7	Cable Tie		As Required
8	Stay Assembly		As Required

**Fig 2 ABC Running Section Pole, 0° - 20° Line Deviation**



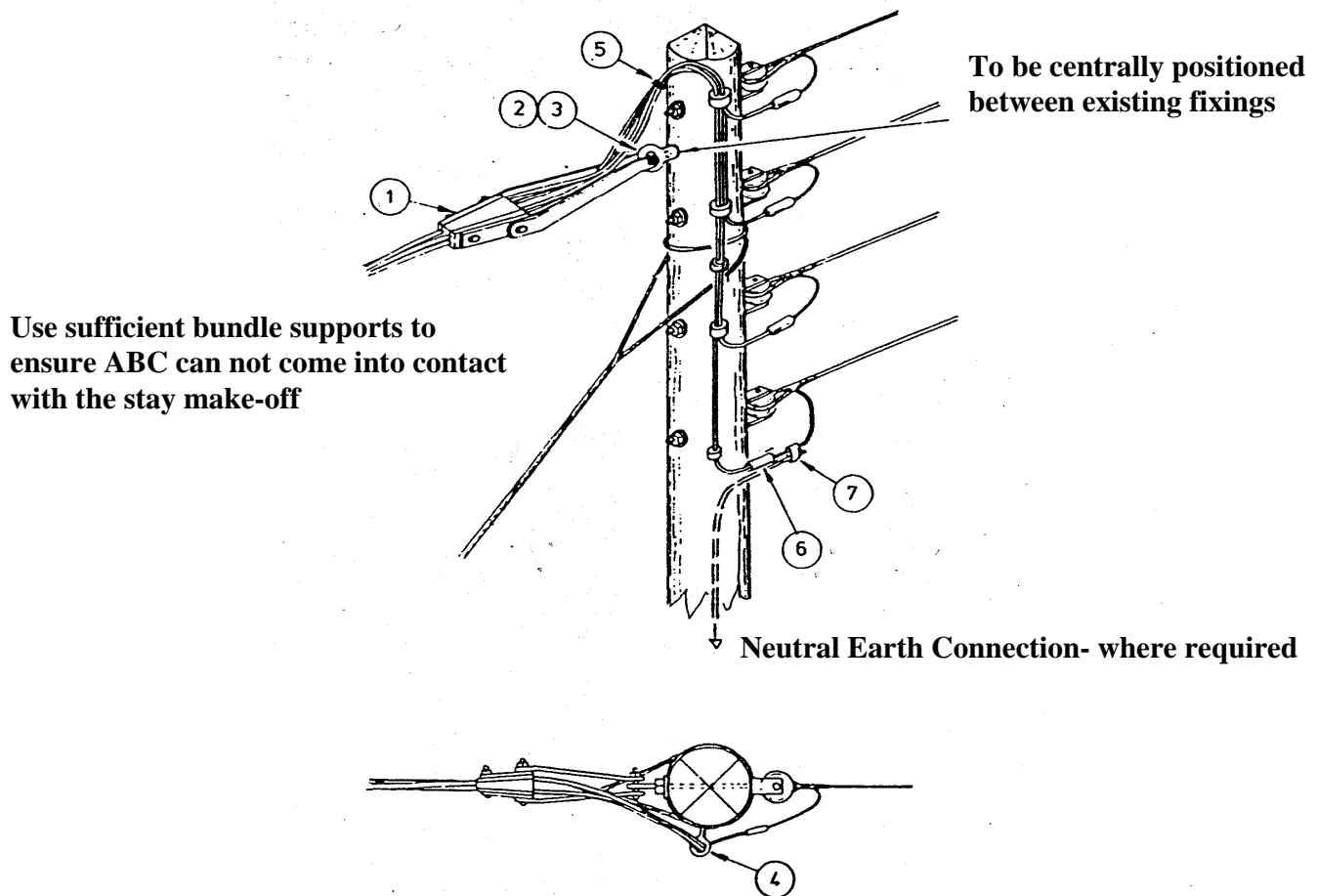
Separation of cross drillings to be a minimum distance of 100 mm between centres.



SCHEDULE OF COMPONENTS			
Item No	Description	Shops No	Quantity
1	Anchor Clamp (50) or Anchor Clamp (95)	30193 30194	2
2	Eye Bolt (200 mm) or Eye Bolt (300 mm)	30130 30131	2
3	Square Washer Curved	30522	2
4	Cable Tie Support	30210	As Required
5	Cable Tie		As Required
6	Stay Assembly		As Required

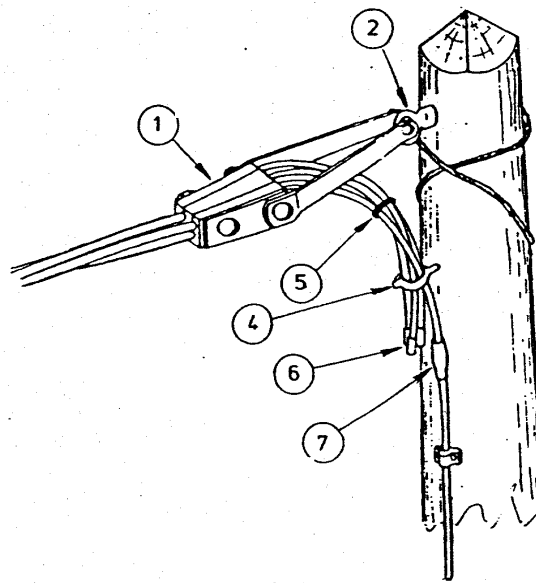
**Fig 3 ABC Running Section Pole, 20° - 90° Line Deviation**



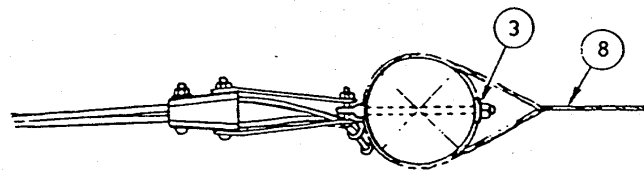


SCHEDULE OF COMPONENTS			
Item No	Description	Shops No	Quantity
1	Anchor Clamp (50) or Anchor Clamp (95)	30193 30194	1
2	Eye Bolt (200 mm) or Eye Bolt (300 mm)	30130 30131	1
3	Square Washer Curved	30522	1
4	Cable Tie Support	30210	As Required
5	Cable Tie		As Required
6	Non-tension Comp Joint		4
7	Crimp Comp Joint for Earth		1

**Fig 4 ABC to Open Wire Transition Pole**

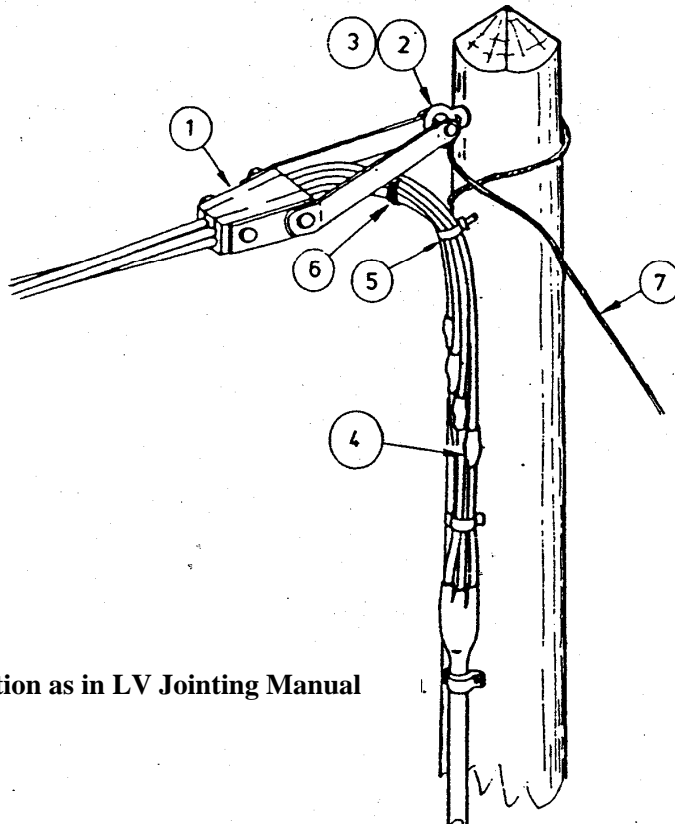


**Neutral Earth Connection- for PME System**



<b>SCHEDULE OF COMPONENTS</b>			
<b>Item No</b>	<b>Description</b>	<b>Shops No</b>	<b>Quantity</b>
<b>1</b>	<b>Anchor Clamp (50) or Anchor Clamp (95)</b>	<b>30193 30194</b>	<b>1</b>
<b>2</b>	<b>Eye Bolt (200 mm) or Eye Bolt (300 mm)</b>	<b>30130 30131</b>	<b>1</b>
<b>3</b>	<b>Square Washer Curved</b>	<b>30522</b>	<b>1</b>
<b>4</b>	<b>Cable Tie Support</b>	<b>30210</b>	<b>As Required</b>
<b>5</b>	<b>Cable Tie</b>		<b>As Required</b>
<b>6</b>	<b>Comp End Seal</b>		<b>3</b>
<b>7</b>	<b>Non-tension Comp Joint</b>		<b>1</b>
<b>8</b>	<b>Stay Assembly</b>		<b>As Required</b>

**Fig 5 ABC Terminal Pole**

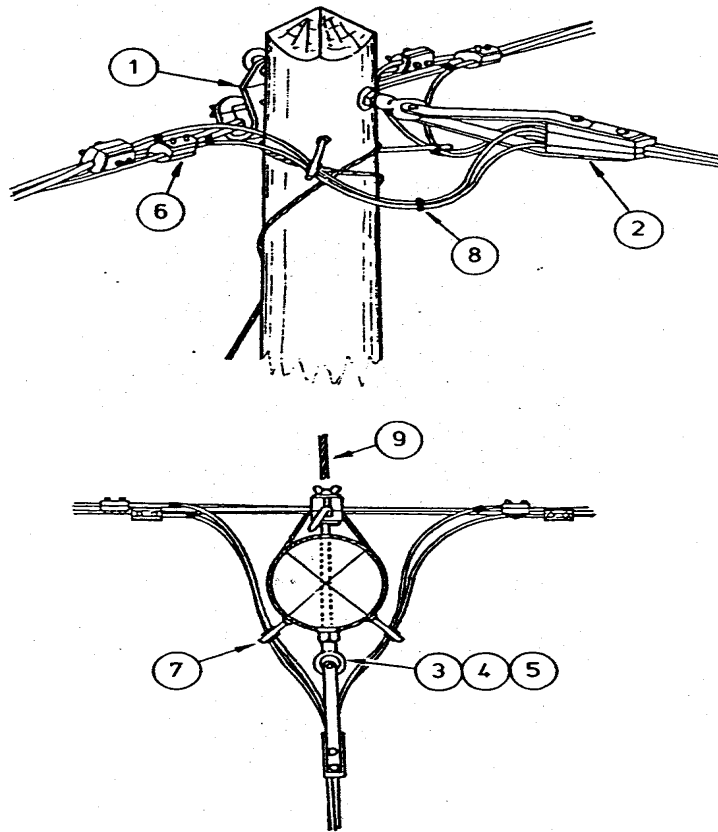


Cable Termination as in LV Jointing Manual

SCHEDULE OF COMPONENTS			
Item No	Description	Shops No	Quantity
1	Anchor Clamp (50) or Anchor Clamp (95)	30193 30194	1
2	Eye Bolt (200 mm) or Eye Bolt (300 mm)	30130 30131	1
3	Square Washer Curved	30522	1
4	Pole Termination 95ABC/70cu Pole Termination 50ABC/32cu	30319 30316	4
5	Cable Tie Support	30210	As Required
6	Cable Tie		As Required
7	Stay Assembly		As Required

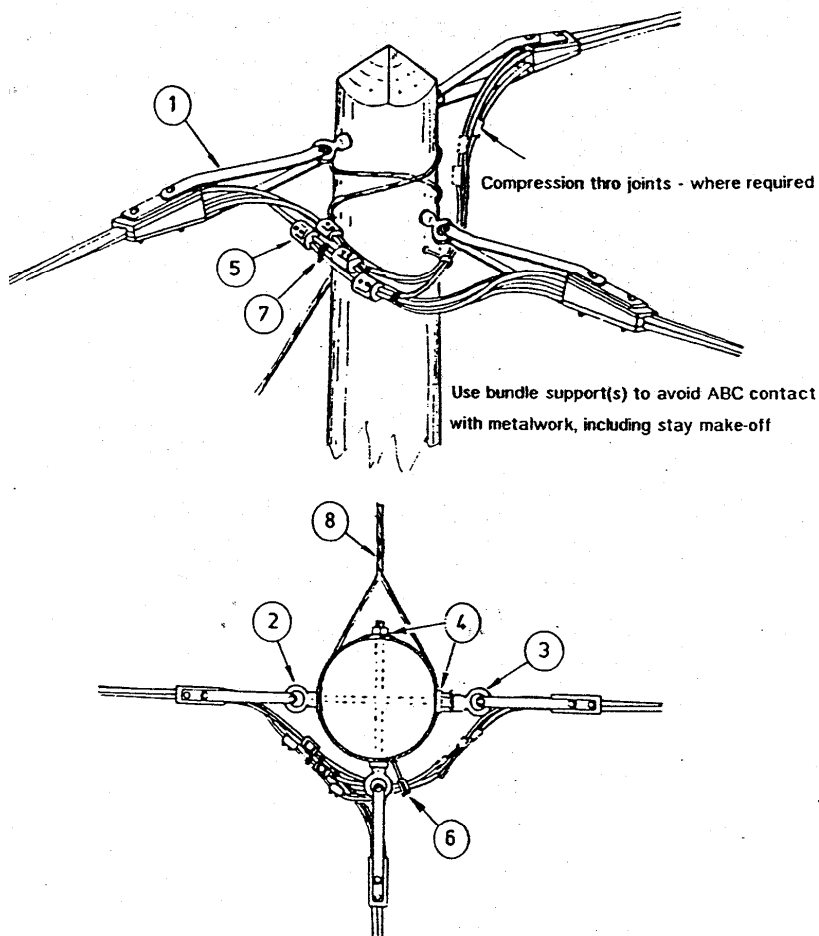
Fig 6 ABC Cable Pole

*Page Revised 10<sup>th</sup> November 2010*



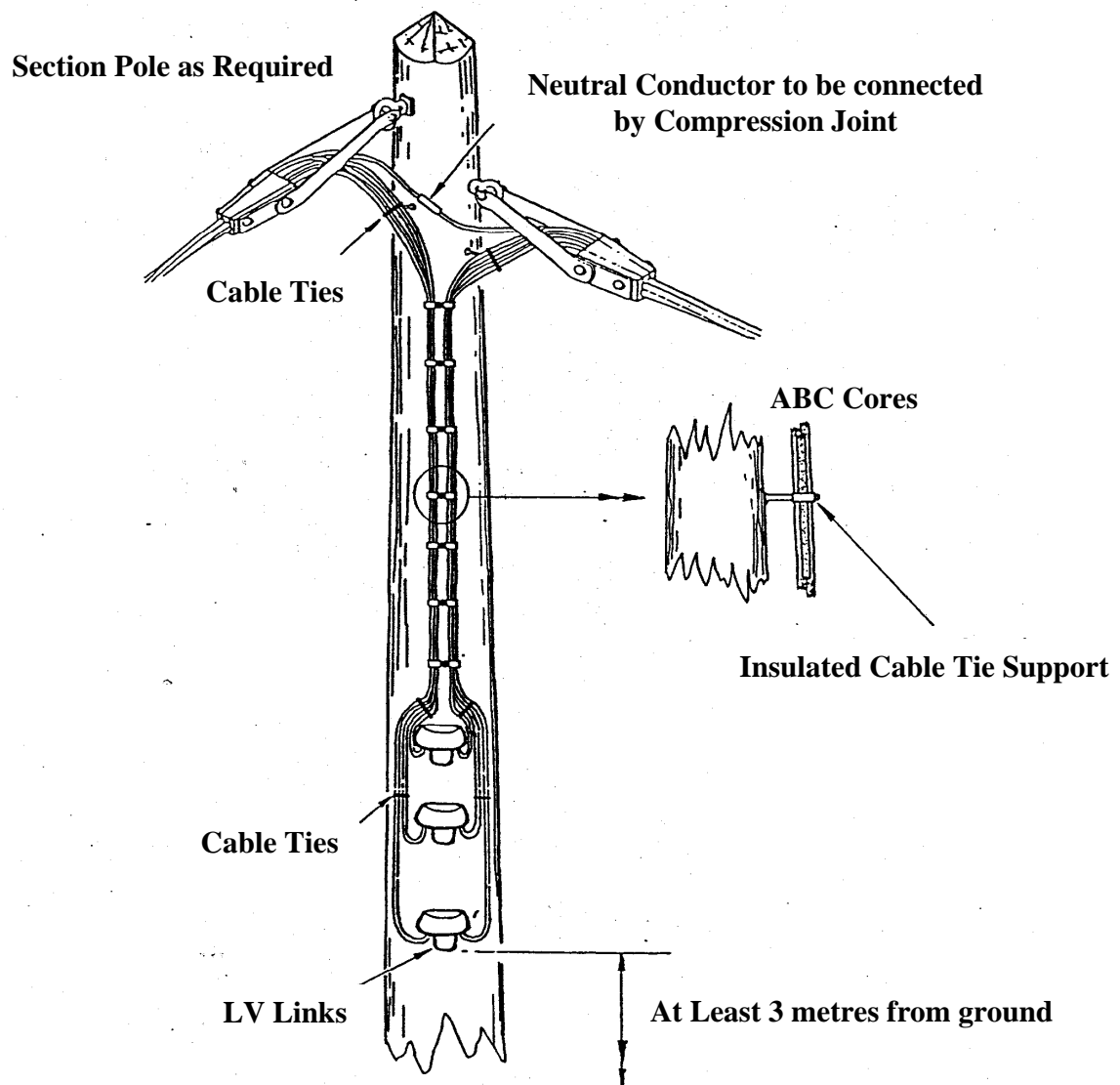
SCHEDULE OF COMPONENTS			
Item No	Description	Shops No	Quantity
1	Suspension Clamp (50) or Suspension Clamp (95)	30195 30196	1
2	Anchor Clamp (50) or Anchor Clamp (95)	30193 30194	1
3	Pig Tail Hook (200 mm) or Pig Tail Hook (300 mm)	37328	1
4	Eye Nut	30138	1
5	Square Washer Curved	30522	1
6	Insulation Piercing Connector		4
7	Cable Tie Support	30210	As required
8	Cable Tie		As required
9	Stay Assembly		As required

**Fig 7 ABC Tee-Off Intermediate Pole**



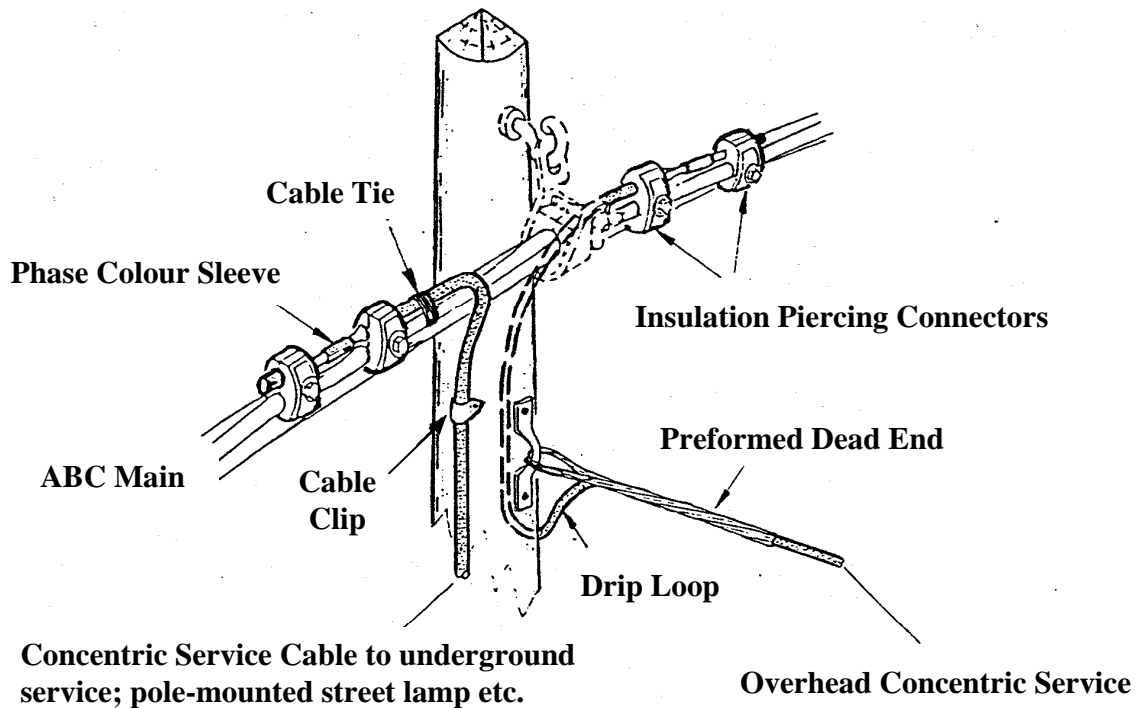
SCHEDULE OF COMPONENTS			
Item No	Description	Shops No	Quantity
1	Anchor Clamp (50) or Anchor Clamp (95)	30193 30194	3
2	Eye Bolt (200 mm) or Eye Bolt (300 mm)	30130 30131	2
3	Eye Nut	30138	2
4	Square Washer Curved	30522	2
5	Insulation Piercing Connector		4
6	Cable Tie Support	30210	As required
7	Cable Tie		As required
8	Stay Assembly		As required

**Fig 8 ABC Tee-Off Section Pole**



**Note:-** Plastic Cable Guard can be used to protect cables down the pole in place of insulated supports as illustrated above.

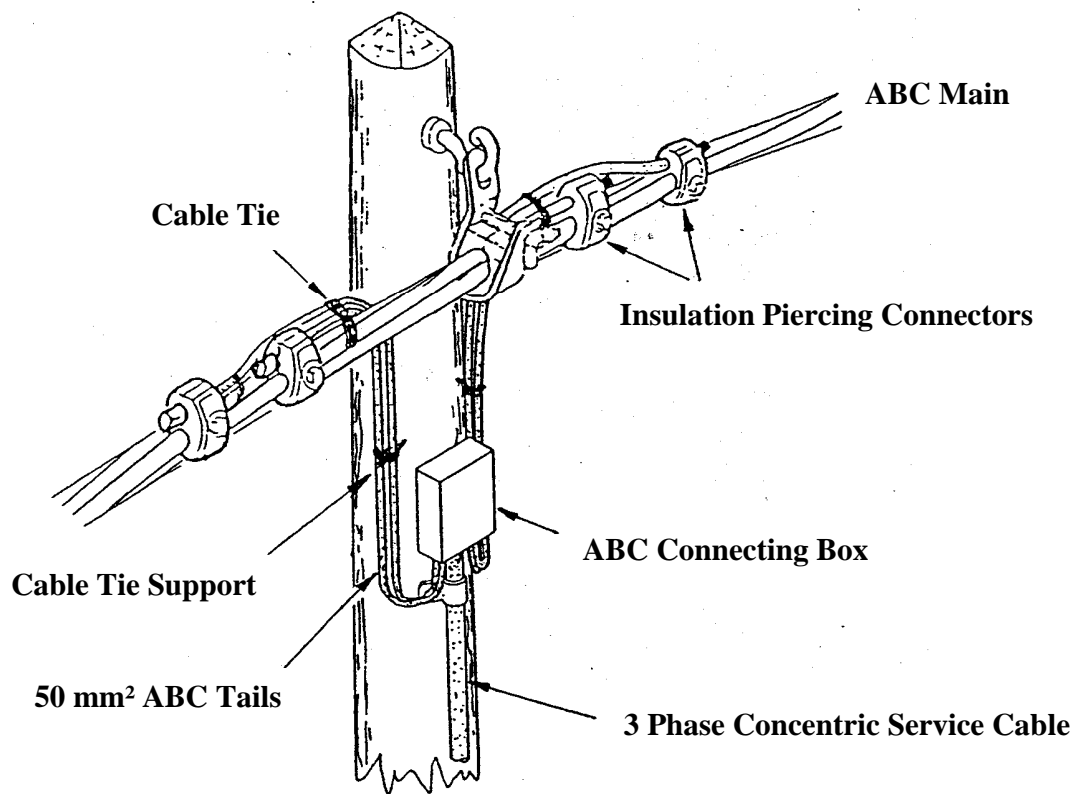
**Fig 9 ABC Fuse / Link Pole**



**Notes:-**

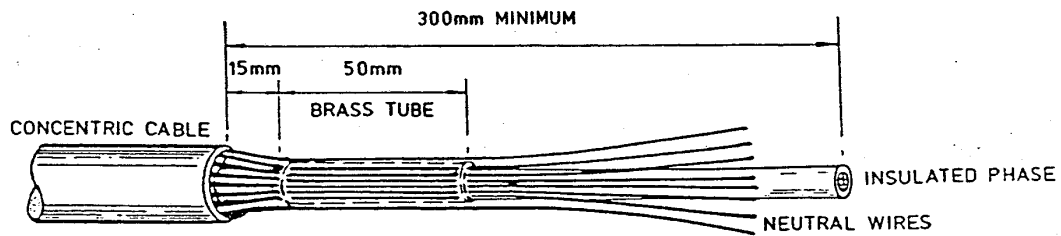
1. A maximum of two insulation piercing connectors can be fitted on either side of the pole. Where more connections are required a Service Connection Box shall be used.
2. Single phase cable connections are shown in fig 13 and 14.
3. Overhead service cables are to be attached to a bracket or coach screw insulator using a preformed dead end.

**Fig 10 Single Phase Service Connection from ABC Pole**

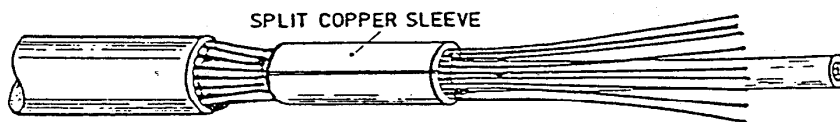


**Fig 11 Three Phase Service from ABC Pole**

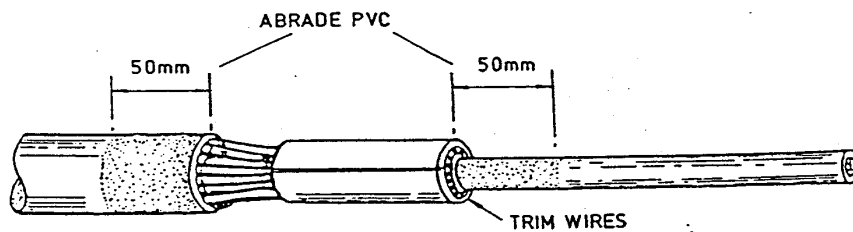




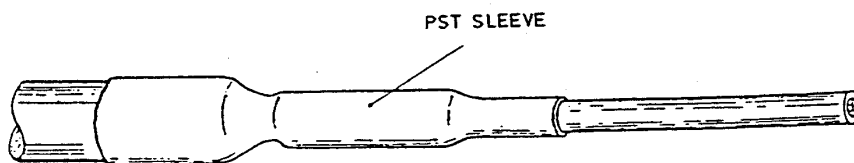
**1 - Apply Brass Tube over Phase core and under Neutral wires**



**2 - Apply Split Sleeve over neutral wires and brass tube**



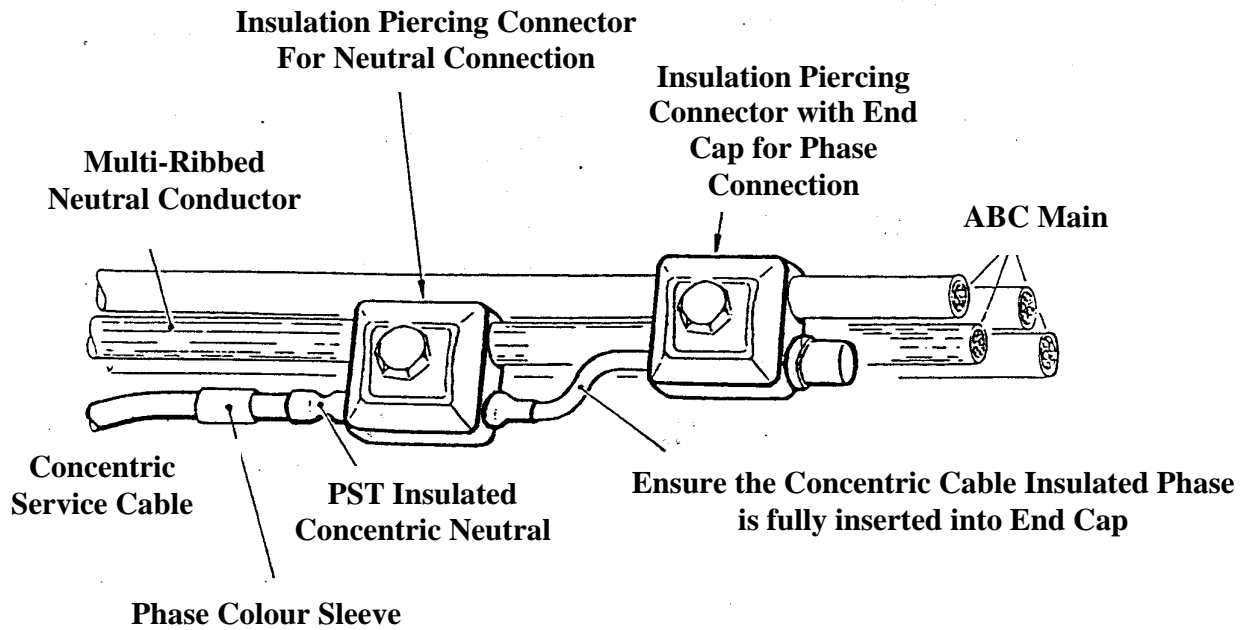
**3 - Trim Neutral Ends and Abrade Insulation**



**4 - Apply PST Cold Silicon Shrink Insulation**

**Note:- For details of the complete joint see fig 13**

**Fig 12 Stripping Diagram for Concentric Service Cable**



**Note:-** For stripping details see fig 12

**Fig 13 Jointing Details for Single Phase Concentric Cable**

## **APPENDIX D**

### **SUPERSEDED DOCUMENTATION**

This ST supersedes ST:OH4K dated September 2006 which should now be withdrawn.

## **APPENDIX E**

### **ASSOCIATED DOCUMENTATION**

POL: OH 1

ST: OH 6A

## **APPENDIX F**

### **IMPACT ON COMPANY POLICY**

Section 11.1 Planning - paragraph added to clarify the requirements when retaining 'G', 'S' and 'L' poles.

Section 11.2 Replacement of Poles - paragraph added to clarify why S and L poles shall normally be replaced.

## **APPENDIX G**

### **IMPLEMENTATION OF POLICY**

Team Managers to review clarifications with their staff.

## **APPENDIX H**

### **KEY WORDS**

ABC, Design

## **APPENDIX I**

*Page Revised 26<sup>th</sup> February 2013*