

# CONSTRUCTING THE PARASITIC ELEMENTS

## 5-BAND SPIDERBEAM

### Cutting the Wire Elements:

You will need to cut 9 wires for this task.

It is VERY IMPORTANT that you cut these wires EXACTLY the length specified in the table on page 30 of the Construction Guide, under 5.2.2. This table is Labeled “Reflectors & Directors”.

Here is that table:

BAND	REFLECTOR	DIRECTOR 1	DIRECTOR 2
20m	1028 cm	959 cm	---
17m	798 cm	---	---
15m	683 cm	639 cm	---
12m	579 cm	---	---
10m	519 cm	478 cm	478 cm

**BEFORE YOU BEGIN CUTTING WIRES,  
MAKE SURE YOU HAVE A STRAIGHT, FLAT SURFACE TO WORK ON.**

**PLEASE USE A LONG TAPE MEASURE FOR MEASURING WIRES.** (at least 11m long)

Do not try to measure the wire with a short ruler, which requires you to move the ruler along the wire and take many measurements. This is certain to cause inaccuracies in the measurement.

**It is always best to perform this task with two people.** One person will hold the end of the wire and the end of the tape measure together; the second person will stretch the wire and tape measure in a straight line (along the ground) and measure and cut the wire.

#### MEASURE TWICE, CUT ONCE!

It is suggested that you cut only one element at a time. Then attach an insulator to both ends and label the insulator with the name of the element. The best way to label an insulator is with a marker with permanent white ink. These are available from “Edding” or “Sharpie”.



- **BEGIN with 20m**, then 17m, 15m, 12m and finally 10m.
- Cut the REFLECTOR first, then cut the DRIVEN ELEMENT(s).
- Then go to the next band and repeat the work for that band.

# WORK SHEET

## Cut the Wire Elements:

- Cut 20m REFLECTOR (1028 cm) - - -
- Cut 20m DIRECTOR (959 cm) - - -
- Cut 17m REFLECTOR (798 cm) - - -
- Cut 15m REFLECTOR (683 cm) - - -
- Cut 15m DIRECTOR (639 cm) - - -
- Cut 12m REFLECTOR (579 cm) - - -
- Cut 10m REFLECTOR (519 cm) - - -
- Cut 10m DIRECTOR-1 (478 cm) - - -
- Cut 10m DIRECTOR-2 (478 cm) - - -

## Attach & Label the 2 Insulators

- 2X Insulators attached & labeled "20REF"
- 2X Insulators attached & labeled "20 DIR"
- 2X Insulators attached & labeled "17 REF"
- 2X Insulators attached & labeled "15 REF"
- 2X Insulators attached & labeled "15 DIR"
- 2X Insulators attached & labeled "12 REF"
- 2X Insulators attached & labeled "10 REF"
- 2X Insulators attached & labeled "10 DIR1"
- 2X Insulators attached & labeled "10 DIR2"

## Cut the PVDF Monofil Lines:

- Cut 2x 20m REFLECTOR Lines (255 cm) - - - -
- Cut 2x 20m DIRECTOR Lines (288 cm) - - - -
- Cut 2x 17m REFLECTOR Lines (264 cm) - - - -
- Cut 2x 15m REFLECTOR Lines (287 cm) - - - -
- Cut 2x 15m DIRECTOR Lines (337 cm) - - - -
- Cut 2x 12m REFLECTOR Lines (299 cm) - - - -
- Cut 2x 10m REFLECTOR Lines (318 cm) - - - -
- Cut 2x 10m DIRECTOR-1 Lines (364 cm) - - - -
- Cut 2x 10m DIRECTOR-2 Lines (476 cm) - - - -

## Attach 2x Lines to Insulators:

- 2X Monofil Lines attached

# ATTACHING WIRE ENDS TO INSULATORS:

Required Tools for this task:



Tape Measure (11m or longer)



Work Gloves



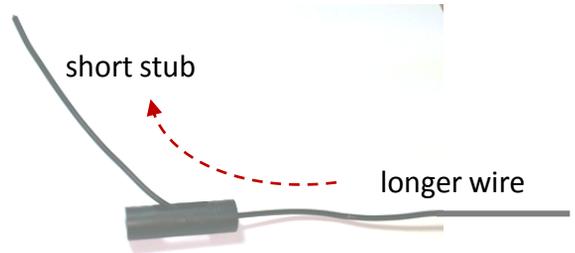
Wire Cutters



Pliers

## (Example: 20m REFLECTOR)

- ❑ Push one end of the 1028cm wire through the end of an insulator and pull it out the slot in the middle.



- ❑ Tie a simple "overhand knot" near the end of the wire.



- ❑ Next while pulling the knot tight, continue to push the knot towards the end of the wire. The goal is to have the knot positioned about 3cm from the end of the wire when it is fully tightened. It will be tightened to its final tightness in the next step.



- ❑ For the final tightening of the knot, we will use the gloves and the pliers. Pull the wire through the insulator such that about 1 meter is extended past the insulator. Hold the wire with one hand, near the insulator, and wrap the end of the wire around your hand about 3 or 4 times, such that about 10cm of wire (with the knot) extend beyond your hand.





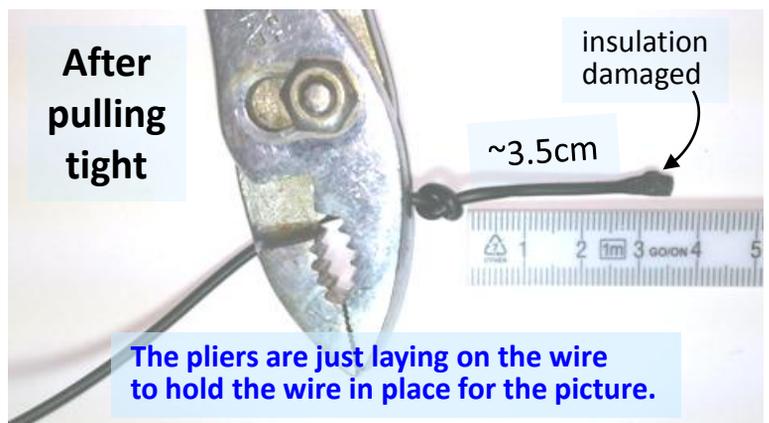
- Grasp **the last centimeter** tip of the wire with the pliers, and while holding the wire wrapped around your hand, pull the end of the wire with the pliers as hard as you can. This will pull the knot to its final tightness.

Note: this step will damage the insulation where the pliers are gripping.

**Be sure the pliers are only holding the last cm.**

- When the knot is fully tight, it should be about 3 to 4 cm from the end of the wire.

Note: the pliers have damaged the insulation, but we will cut that piece off in the next step.



- Next you must cut the outer 2 cm of the wire off using the diagonal cutters. Read below before cutting.

Note: although the instructions say to leave “3cm” behind the knot and cut 2cm off, as you see on the right, this time we had 3.7cm after the knot. That is close enough.



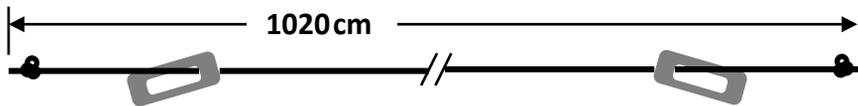
**The overall length of the wire is important, not the distance from the knot to the end of the wire. SEE NEXT PAGE.**

- Cut the outer 2cm of the wire off using the diagonal cutters.

Note: although the instructions say to leave “3cm” behind the knot and cut 2cm off, 1.7cm after removing 2cm is close enough. **The overall length of the wire is important, not the distance from the knot to the end of the wire.**

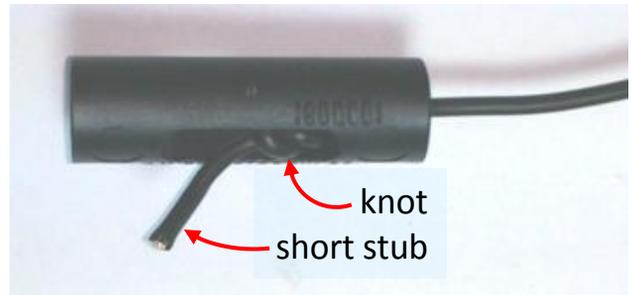


- Prepare the other end of the wire exactly the same way as you prepared this end.
- BEFORE you continue, control your work. Lay the wire out on a straight, flat surface and measure the end-to-end length with the tape measure. Again it is better to have a friend help you measure. The overall length is now 8cm shorter than the length that you originally started with. For the 20m Reflector it is now:  $1028 - 8 = 1020\text{cm}$ .  
Tip: push the insulators out of the way while you are measuring.



**Note: all wires are measured from end-to-end.**  
(There is no benefit in measuring between the knots.)

- AFTER you have confirmed that the wire is the correct length, pull each end of the wire back through the insulator, such that the knot is inside of the slot. The short stub will stick out of the slot. Pull the knot all the way against the tiny hole.



- Using a marker (i.e. Eding or Sharpie) with permanent white ink, write the name of the element on both insulators.  
Tip: write it twice on each insulator.



- When you have finished, don't forget to tick the box for this element in the **WORK SHEET** on page 2 of this document.

## ATTACHING THE PVDF MONOFIL LINES TO THE ELEMENTS:

**Note: the PVDF Monofil lines “measurements” are from “knot-to-knot”.  
(IMPORTANT: CUT THE LINES AT LEAST 40cm LONGER THAN THE KNOT-TO-KNOT LENGTHS!)**

The knot-to-knot measurements for each element are shown on page 30 of the original Consturction Guide, under paragraph 5.2.2. “Fabricating the Wire Elements (Reflectors/Directors/Drivers).

REMEMBER: these measurements are NOT the “cut length”, they are the length between the two knots. Each line must be left about 20cm longer (on each end) behind the knots to allow for possible adjustments later.

**Here is that table of Knot-to- Knot Measurements:**

BAND	REFLECTOR Knot-to-Knot	DIRECTOR 1 Knot-to-Knot	DIRECTOR 2 Knot-to-Knot
20m	215 cm	248 cm	---
17m	224 cm	---	---
15m	247 cm	297 cm	---
12m	259 cm	---	---
10m	278 cm	324 cm	436 cm

**CUT TABLE:** Cut each line 40cm longer than the lengths shown above.

BAND	REFLECTOR Cut Length	DIRECTOR 1 Cut Length	DIRECTOR 2 Cut Length
20m	255 cm	288 cm	---
17m	264 cm	---	---
15m	287 cm	337 cm	---
12m	299 cm	---	---
10m	318 cm	364 cm	476 cm

## ASSEMBLY:

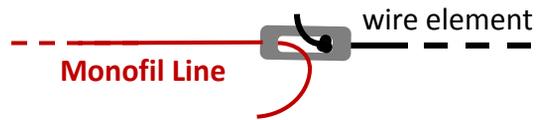
Note: because it is difficult to photograph the thin Monofil lines, I will use drawings in some cases instead of pictures.

Note: EACH parasitic element requires TWO (2) pieces of Monofil Line, one on each end.

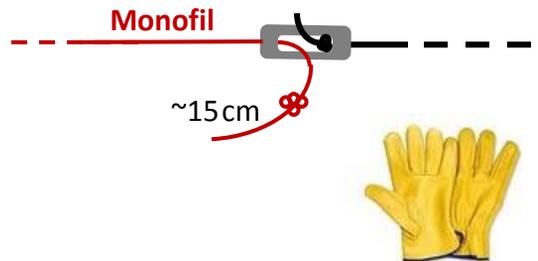
### (Example: 20m REFLECTOR)

- ❑ Cut 2 pieces of Monofil Line to the length specified in the “CUT TABLE on page 6 of this document. In this case (20m REF) it is 255cm.

- ❑ Take one piece of Monofil Line and insert it in the end of one of the insulators of the 20m reflector, pulling the end out through the slot in the center of the insulator.

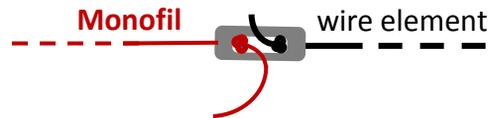


- ❑ Tie 3 or 4 overhand knots about 15cm from the end of the line, pulling it tight. Check to be sure that the final (big) knot is large enough that it does not pull back through the hole in the insulator.

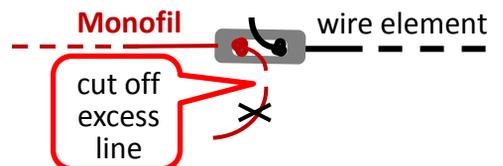


TIP: Use work gloves for pulling knots tight.

- ❑ Pull the knot as tight as you can, then pull the Monofil Line back through the insulator until the knot rests against the tiny hole inside the slot. Pull hard and make sure that the knot will not slip through the hole.



- ❑ Cut the excess line with diagonal cutters, leaving a stub of about 2 or 3cm.



Next you will attach another insulator to the other end of the Monofil Line, forming a “Rope Tensioner”, as shown on page 9, paragraph 2.2.1 (Fabricating the Plastic Insulators) in the original Construction Guide.

- Insert the other end of the Monofil Line which you just attached to the wire element’s insulator into the slot in the middle of the insulator, through the hole, and pull it out the end of the insulator.



- Tie 3 or 4 knots about 20cm before the end of the Monofil Line. The EXACT position is the knot-to-knot distance from the knot at the other end (by the wire) REMEMBER: You will later adjust the tension of the elements on the beam by adjusting this knot, **so do NOT tie it too tight at this time.** You will probably have to adjust it later.



- Pull the Monofil Line back through the insulator until the knot rests against the outside of the hole of the insulator. Make sure it does not slip through the hole.



- Now control your work. Measure the Knot-to-Knot distance and make sure it is the value shown in the top table on page 6 of this document; in this case (20m Reflector) it should be 215cm.



- Attach the second piece of Monofil Line and a second insulator to the other end of the wire element, exactly like you attached the first one.
- Now control your work. Measure the Knot-to-Knot distance of this line.
- This completes the construction of this wire element. Do NOT forget to check the box in the **WORK SHEET** (page 2) to mark that this part of the work is complete.

## NOW PROCEED TO THE NEXT ELEMENT ON THE LIST

And build it exactly as you have built this element.

Each time you complete an element, check the box in the **Work Sheet**. 8

**THIS COMPLETES CONSTRUCTION OF THE PARASITIC ELEMENTS.**