

# Bird-Shots PAP Kit Assembly Instructions

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(Please Read Carefully BEFORE Starting)

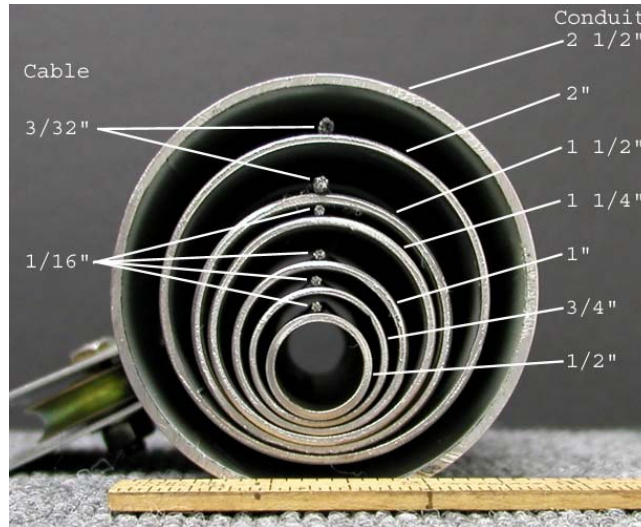
## Why a kit ?



Over the past several years I have tried several platforms to obtain commercial low-level aerial photographs...Kites, Balloons, and RC Planes. All have their limitations, the biggest problem being safety...crowds, power lines, etc. Therefore, I decided to design and build a telescoping pole to at least get the effect of aerial photography, but in a safe way.

The goal here is to provide everything needed...including images...to build a 50' telescoping pole. The only thing not provided is the EMT. The included CD contains real-time videos of various stages of assembly. Estimated time to complete the project...2 days.

Having built several versions of telescoping photography poles, I have decided that EMT...Electrical Metal Tubing (also known as Thin-wall Electrical Conduit) is by far the best for this application. It is readily available anywhere in the US...and all but the two larger sizes are available at Lowes and Home Depot. The result is a pre-engineered kit permitting those with limited skills and resources to enjoy Pole Aerial Photography as I have.



The above image illustrates the different sizes of commercially available EMT. Due to minimal clearance between the 1 1/4" and 1 1/2" sections, the 1 1/4" section was not used in the telescoping EMT. The major obstacle in this type pole is cable clearance. To eliminate the possibility of cable abrasion, special bushings were designed that provide sufficient clearance between EMT sections.

**NOTE: The kit was designed based on the inside diameter and wall thickness of EMT made to US Standard. Other tubing, such as aluminum, WILL NOT work with this kit.**

### **Safety:**

Although anyone can build this kit, its safe use is dependent on good common sense, and the use of a checklist similar to the one below.

## **PAP Checklist**

### **Pole**

#### **Setup**

- Cable (Condition, Crimps, etc)**
- Pulley assemblies**
- Pole bushings**
- Swivel pin**

- Trailer hitch pin
- Winch assembly
- Guy line attached for wind / height
- Attach plumb level
- Plumb to vertical
- Adjust safety cable
- Takedown
  - Set pivot pole to travel position
  - Attach compression cable
  - Cover pulley brackets with boot
  - Attach tie down cord
  - Secure swivel and lockdown pins
  - Adjust safety cable

The maximum recommended payload was established based on experience. Although the cable system will hold larger loads, the recommended safe height limitation is 3.5 lbs @ 50'. Therefore, the pole is rated as follows:

- 3.5 lbs – 50'
- 4.5 lbs – 45'
- 5.5 lbs – 40'
- 6.5 lbs – 35'
- 7.5 lbs – 30'

The pole should never be raised:

- more that 6'...shackle pulled down to fairlead
- above 40' in windy conditions without guy-wires
- near powerlines
- without using a checklist
- with a payload exceeding the recommendation herein
- on a trailer that is lighter or narrower than recommended
- unless plumbed properly
- in inclement weather

The following chart contains the design criteria used to size the cable.

**Example Cable Loading Chart:**

	Wt.	Accum Wt	(+) Load	(-) Load	Net	Cable
Cradle	3.5					
1/2"	3	6.5				
3/4"	5	11.5		6	6	1/16"
1"	7	18.5	6	18	12	1/16"
1 1/2"	12	30.5	18	36.5	18.5	1/16"
2"	15	45.5	36.5	67	30.5	3/32"
2 1/2"	22	67.5	67	112.5	45.5	3/32"
3"	27	0	112.5	180	67.5	3/32"
	94.5	180				

The breaking strength of 1/16" stainless 7x7 is 480 lbs and for 3/32" stainless 7x19 its 920 lbs. To ensure maximum sleeve strength...80% of breaking strength...each crimp is checked with a swage gage during assembly.



### **Tools you will need:**

Center Punch  
Hammer  
Phillips screwdrivers #2 & #3  
Drill  
Drill bits...1/16, 3/32, 1/8, 1/4, 5/16, and 3/8  
Dremel with cutoff wheel & 1/4" sanding drum or chainsaw file  
Wrenches...5/16, 3/8, 1/2 and 9/16  
3" 'C' clamp  
Bar type clamps (several)...I use Quick-Grip

(Optional)  
Vise  
Automatic center punch

### **Materials Shopping List**

You will need to purchase 7 sizes of EMT which comes in standard 10' sections: (\$150 estimated)

1 ea - 1/2"

2 ea - 3/4" (front pole rest brace)(plumbing assembly)

1 ea - 1"

2 ea - 1 1/4" (plumb arms)(front pole rest)

1 ea - 1 1/2" (1 piece for front rest)

2 ea - 2" (1 piece for pivot pole)

1 ea - 2 1/2"

1 ea - 3"

1 1/4" Couple - (to mount front rest saddle)

Most local hardware stores...including Lowes and Home Depot...carry sizes up to and including 2". The 2 1/2" and 3" are available at electrical supply houses.

Miscellaneous Hardware (\$5) - Nuts and bolts for mounting pole-rest and pivot pole, braces, etc to vehicle.

Electric ATV Winch w/remote switch (Hand winch not recommended): - Warn 2.5ci ATV winch or equivalent...(From - \$90 for a Warn clone to a \$290 Warn)

Extra long heavy duty (4 guage) jumper cables for the winch. (\$20 @ Walmart)

At least a 75 amp gel battery (\$75).