PASCAGOULA RIVER Audubon CENTER

Manual

# Video Installation for Chimney Swift Towers

*"A Guide for Interpretation and Scientific Monitoring"*

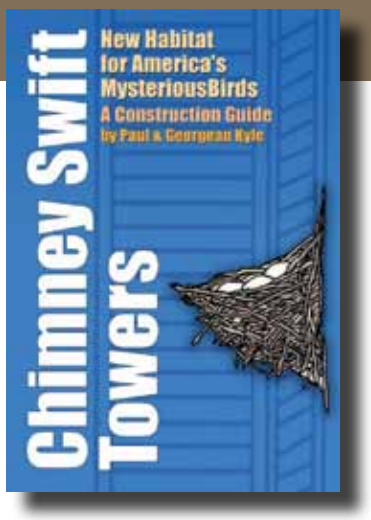
By Mozart Mark Dedeaux

# CONTENTS



Installing video cameras in Chimney Swift towers not only creates the opportunity to see the wonders of nature up close and personal, but it gives us the tools we need to closely monitor the activity of the birds thus increasing our knowledge of their behavior and nesting activity. Towers equipped with video connections are a fantastic addition to nature centers, but scientific monitoring of towers allow us to determine if additions or modification to the structure will help with nesting success or failures, and details that were previously impossible. The use of video allows us to gain incredible knowledge about the habits of the birds and their chicks while they nest. This was normally data that had to be collected after the birds had migrated and the findings were lacking in detail compared to collecting data in real time through video. Paul and Georgean Kyle established the ***North American Chimney Swift Nest Site Research Project*** to poll data from towers throughout North America. This valuable research project helps all of us track the success of Chimney Swifts through out the "network" and brings together information and data that we can use to see a measurable outcome. Habitat loss and human indifference has placed a severe toll on these birds, and their numbers have decreased dramatically. The construction of towers with video camera observation will not only be a treat for nature center visitors, but a valuable conservation tool for the twenty first century and beyond. While conducting research via video or traditionally, please use the data sheet that is included on pages 15-16 of this manual and report your findings.

# OVERVIEW




The information contained in this manual is for video installation with the Kyle twelve foot, free standing Chimney Swift Tower. For complete building instructions and additional information on video surveillance and monitoring please refer to the book, *"Chimney Swift Towers-New Habitat for America's Mysterious Birds"* by Paul & Georgean Kyle. Please visit ChimneySwifts.org for ordering information.

*Figure 1*

There are several ways to determine occupancy of Chimney Swifts towers. The most obvious way is to observe birds coming in and out of the tower, or specifically observing birds near or at dusk as they enter the tower to roost. During early migration when the Chimney Swifts arrive from South America, they can be seen in groups or pairs flying around towers and displaying different types of flight patterns which usually indicate mating rituals or territorial display. Before nesting occurs, these towers can be used by returning adults, fledglings from the previous year, and other migrating swifts that have not yet arrived at their established nesting sites. **(Figure 1)** The Kyle tower can accomadate over one hundred birds easlily, and the longer a tower exsist the chances of it becoming an historical roost site increases.

Another way to determine if swifts are present or if they have nested is by physical evidence. This data must be collected after juvenile swifts have fledged and adult birds have migrated. Because of an important design feature of the Kyle's tower, droppings and egg shells can be collected by removing the bottom air vent of the tower. **(Figure 2)** This debris and the presence of a nest obviously indicate that swifts have used the tower. Egg shells will also be present if eggs hatched and unfortunately carcasses of chicks that might have fallen out of the nest may also be present. Please refer to the chapter "Monitoring Roost and Nesting Sites" in the Kyle's book for more detailed information about how to determine the number of chicks that may have been present that particular nesting season.

*Figure 2*

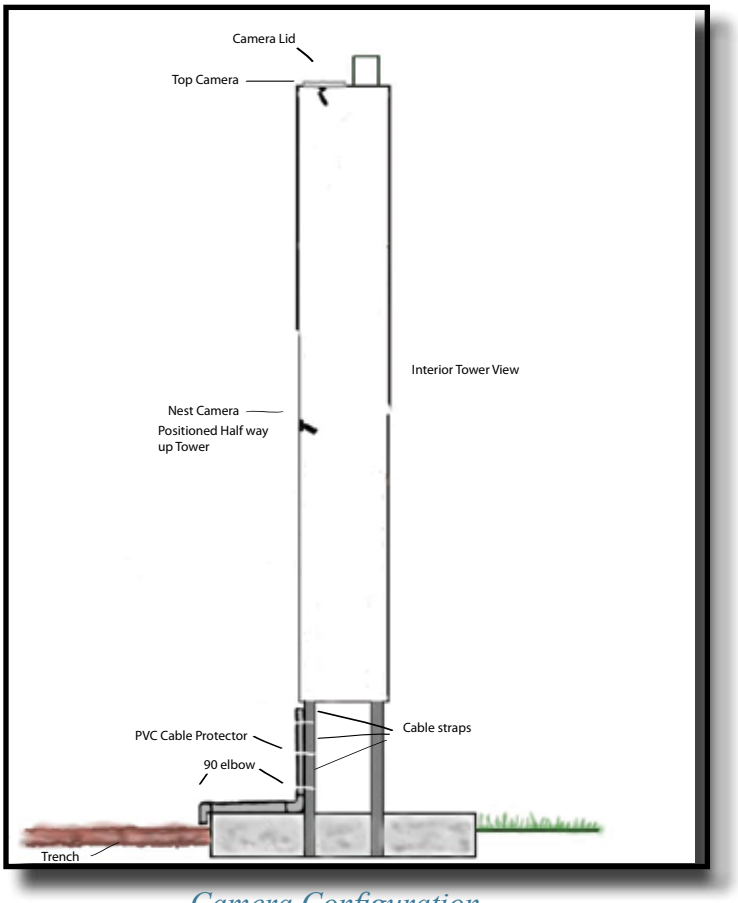
Because of the advancement of surveillance video technology, towers can now be outfitted with low lux (low light) cameras that are inconspicuous and can provide incredible detail. Once again, it is very important to install these cameras prior to swifts arriving back to North American in the spring. Any disturbances in or around the tower during their crucial mating ritual and nest building time may cause the birds to abandon the site completely. As we will discuss later, a camera located in the middle section of the tower for a closer nest view requires manipulation of the camera after the birds have started to build thier nest. This can be a risky, but well worth it as it offers more visible views of the nest and can provide much better data for nesting observations.

Although it is not completely necessary, we have determined that a two camera system for towers allows for a detailed view of the birds entering and leaving the tower, roosting behavior, and more accurate observation of nest activity. This dual camera setup should be used if one plans on implementing detailed scientific observation, and reporting the data to the North American Chimney Swift Nest Site Research Project. If only one camera will be used, the easiest and most logical location is the top of the tower. This camera location will show birds entering and exiting the tower and roosting, but will not show clearly visible views of nest activity. **(Figure 3)** Swifts build their nest in the bottom third of the tower so in a standard twelve foot tower, the top camera is approximately 6 to 7 feet away. It is possible to see the number of eggs present when lighting conditions allow, but detail is very lacking. A better view of the nest does occur with overcast conditions or when less light is entering the tower. This happens because the low lux aperture of the camera actually shows more detail in low light conditions which is usually the case in the bottom section of the tower.

*Figure 3*

The second "nest" camera is mounted approximately half way up the tower from the bottom. **(See Camera Configuration)** The installation procedure of this camera will vary depending on the exterior sheathing of the tower. This placement presents a good opportunity to capture a detailed view of the nest and all associated activity, but manipulating the camera to adjust the field of view must be done carefully. Once again, timing is crucial because one can not risk disturbing the birds for fear of abandonment. This operation is somewhat risky because the camera must be adjusted after the swifts have started to build the nest. Obviously, one side of the tower must be chosen to mount the camera on which gives the viewer the choice of three possible sides to observe. We have noticed that the swifts don't mind the camera at this position and luckily for us, they have not chosen to nest on the same wall as the camera.

Once the birds have committed to the majority of the nest construction, the camera can be repositioned to capture the best field of view. Give the swifts at least a week to firmly establish the nest location. Inexperienced first time nesters have a tendency to be indecisive about committing to a permanent location and glue sticks in multiple locations within the tower. During the nest building period, the birds will frequently leave the tower to feed and procure nest material. This is the perfect time to readjust the camera with a team of at least two individuals (with two-way communication i.e. cell phones or radios.) One person manipulates the camera while the other views the monitor and dictates how to position it. This should be done as quickly as possible so activity in and around the tower is keep to a minimal.




*Camera Configuration*

# EQUIPEMENT AND COST

Because of low light conditions inside the tower, black and white, closed circuit video surveillance cameras are the ideal choice for monitoring Chimney Swift activity. Color cameras are more expensive and will not give the detail that black and white cameras provide. More specifically, low lux cameras will allow even greater detail in dark conditions. We have found a B&W camera with extreme low lux qualities that produces fantastic results at a minimal cost. Its specification is 600 lines resolution with 0.003 lux low light rating. (See equipment list for details) In addition to its specifications, this camera is also very small which is ideal for the interior of the tower because it presents a low profile as not to spook the birds. It is very important to NOT use infra red cameras as they emit a faint light that has proven to scare the birds and has caused failure with towers in the past. For successful video monitoring within towers, I suggest the use of this particular camera and no other. Below is a list of equipment and peripherals to establish a dual and single camera swift tower surveillance system. We have used "Super Circuits" www.supercircuits.com for all our cameras, wiring, and peripherals. The following list reflects their current inventory and pricing.

## Dual Camera Equipment List

**(2)** High Resolution Outdoor Security Camera (PC88WR) $129.99

**(2)** 12 Volt DC 500 Milliamp Regulated Power supply ( DC12-500R) $9.99

**(1)** RG59 Siamese cable (video and power cable combined) (CAB-RG5918-500) 500ft roll **$143.99

** This price reflects a bulk roll at 500 feet. Depending upon the location of the tower, where the video monitor is located, and the number of cameras one plans to use, it may be more practical to seek out a local source for this cable. In most cases, these local sources (electronic supply stores) may be able to cut the cable at desired lengths. With either case, make sure that you purchase more cable than you will need. It is easy to cut unused cable and discard it, but impossible to produce more length if one needs it..

**(4)** Twist on BNC Male connectors for RG59 (CON-11) $1.99 (link)

**(2)** 12 volt Male Power Pigtails (Male-POW) $1.29

**(2)** 12 volt Female Power Pigtails with Quick Connect terminals $1.36 (Female-POW)

**(1)** Video Quad processor (QS-29) $109.99

**(1)** 3' BNC to BNC cable (CAB-BNC-3) $2.99

**(1)** Male RCA to Female BNC adaptor (Con-2) $1.99

**(2)** ½"x4" heat shrink tubing (CAT# HUG-12B) $2.40

**(1)** ¾"x4" heat shrink tubing (CAT# HS-341) 5 for a $1.00

**(1)** ¾" roll of electrical tape (CAT# PET-1) $0.95

**Total: $ 558.93** (price will vary according to cable needs)

***additional supplies from http://www.allelectronics.com

When using a dual camera setup, the quad processor is necessary to view multiple cameras. The unit can display up to four camera inputs simultaneously, individually, or a rotation of the inputted cameras. The three foot BNC cable with the BNC to RCA adapter is used to connect the processor to the video monitor of your choice.

# EQUIPEMENT AND COST

## Single Camera Equipment List

(1) High Resolution Outdoor Security Camera (PC88WR) $129.99

(1) 12 Volt DC 500 Milliamp Regulated Power supply ( DC12-500R) $9.99

(1) RG59 Siamese cable (video and power cable combined) (CAB-RG5918-500)

500ft roll $143.99

** This price reflects a bulk roll at 500 feet. Depending upon the location of the tower, where the video monitor is located, and the number of cameras one plans to use, it may be more practical to seek out a local source for this cable. In most cases, these local sources (electronic supply stores) may be able to cut the cable at desired lengths. One does have the option of purchasing cable that has the video connector and power pig tails pre installed, but this presents a more challenging installation and it increases the cost. With either case, make sure that you purchase more cable than you will need. It is easy to cut unused cable and discard it, but impossible to produce more length if one needs it.

(2) Twist on BNC Male connectors for RG59 (CON-11) $1.99

(1) 12 volt Male Power Pigtails Quick Connect terminals (Male-POW) $1.29 (no link available)

(1) 12 volt Female Power Pigtails with Quick Connect terminals $1.36 (Female-POW)

(1) Male RCA to Female BNC adaptor (Con-2) $1.99

(1) ½"x4" heat shrink tubing (CAT# HUG-12B) $2.40

(1) ¾"x4" heat shrink tubing (CAT# HS-341) 5 for a $1.00

(2) (1) ¾" roll of electrical tape (CAT# PET-1) $0.95

**Total: $296.94 (price will vary according to cable needs)**

***additional supplies from http://www.allelectronics.com

## Digging the Trench

Choose the location where the video cable will enter the building and dig a narrow trench that is approximately 6 to 9 inches deep. (The depth of a common shovel) **(Figure 4)** Before digging, make sure there is no existing electrical or gas lines in the immediate path to the tower. Also before digging, decide which corner of the tower the trench will lead to. The target location for where the trench meets the tower is next to the foundation form, directly adjacent to the chosen angle iron support. **(Figure 5)** When the path as been determined, dig the trench and move to the next section **"Installing and Running the Siamese Cable"**

*Figure 4*

*Figure 5*

## Installing and Running the Siamese Cable

The structural support 1x4 lumber that is used on all the corners of the tower creates an excellent channel that the video cable can be feed through for the camera installation. **(Figure 6)** Exterior sheathing covers this channel so it is the perfect pathway for the cable to be feed through without mounting the cable on the sheathing of the tower. This is more esthetically pleasing and reduces the possibility of vandalism and predation.

**Start from the top of the tower** and feed the cable through this channel. When the cable reaches the bottom, feed out the length of cable that it will take to run the cable into the building. This should include the distance from the interior wall of the building to where the monitor is located, plus 10 additional feet for safety. Remember, it is highly important to over estimate on the length of cable needed because falling short on the distance will create headaches and more work. It is easy enough to cut away extra cable, but very difficult to feed more cable through the channel, the PVC protective pipes, and the exterior wall of the building.

Next, install the PVC protective pipes for the bottom of the tower (on the angle iron leg supports and over the foundation.) Using ¾" PVC and two ¾" 90 degree angle pieces, build the channel that the cable will travel through as it exits the bottom of the chamber and exits out into the trench which leads to the monitor. **(Figure 7)** This channel is composed of a straight piece that is connected to the angle iron closest to the channel that the cable was feed through, which is then connected to one of the 90 degree angle pieces which is parallel to the foundation and resting on the concrete itself. Next, cut another piece of the straight PVC that will travel out to the edge of the slab where another 90 degree angle piece (facing downwards) will be fitted for the cable to exit into the trench. Make sure all the measurements are correct and the PVC channel is snug with the angle iron and the concrete. When this is finalized, glue all the pieces together with PVC glue. Allow the glue to dry for a few minutes and then feed the cable from the tower channel into the PVC protection pipe.

*Figure 6*

*Figure 7*

## Installing and Running the Siamese Cable

Once all the cable is feed through the PVC, connect it to the angle iron and concrete.
First, position the vertical piece of PVC snug to the angle iron and strap the PVC to the angle iron using 3 cable ties evenly spaced across the piece. **(Figure 8)** Next, position a PVC pipe strap to the middle of the horizontal piece. Mark the spot where the screw of the strap will meet the concrete. Move the PVC slightly to the side and drill a hole into the concrete using a masonry drill bit and power drill. Clean the concrete dust from the hole, reposition the strap and screw it into place. The PVC protection channel is now secured. **(Figure 9)** Feed the remaining cable into the trench all the way to the building.

*Figure 8*

*Figure 9*

Using a hammer drill, drill a 5/8" hole through the exterior of the building and the corresponding interior wall. This process will vary according to the type of sheathing your building has in place. After the hole is complete, feed the cable through a ¾" 90 degree angle piece (in a downward position) then into a PVC or metal exterior outlet box and out of the knockout hole on the back of the box. Make sure to feed the remaining length of the cable through this knockout. After this, feed the cable through the hole in the wall and pull through all the remaining cable. When the cable is through the wall, connect the 90 degree PVC to the bottom of the box with the vertical piece of the PVC and mount the box on the exterior wall of the building over the hole. This box will cover the hole and protect the cable from the elements and possible vandalism. After all the cable is through the wall, connect a cover plate to the box using the hardware that comes with the cover. A similar box can be used on the interior wall where the cable enters the building or there are other sleeve type materials that can be used for a more finished look. Install the BNC twist on video connector on the video portion of the cable, and a 12 volt **Female** Power Pigtail using a quick connect terminal to the cable. **(See connections section).** Cable installation is now complete.

## Mounting the Top Video Camera

During the construction phase of the tower, the top piece of the tower must be modified to accommodate the installation of the video camera. If the camera is being installed on a pre-existing tower, remove the top of the tower to modify it for the video camera installation. The entrance to the tower which is located on the top piece is cut according to the specifications in the Kyle's book. This entry hole is 6"x 11" and should be located on the northern side of the tower to reduce the amount of sunlight entering the interior. This hole is surrounded by the sun collar which also helps reduce light entering the tower. This leaves plenty of space on the southern side of the top to cut another hole similar to the entry hole. **( Figure 10 )** An additional piece of exterior ¾"ply-wood (camera lid) is then cut to cover the hole on which the video camera will be mounted to its underside and positioned just inside the tower itself. **( Figure 11 )**

*Figure 10*

*Figure 11*

Mount the camera bracket centered on the underside of the lid using the screws that come with the camera and connect the camera to the bracket. ( Figure(s) 12) Using a 1/2" wood paddle bit; drill an offset hole into the camera lid adjacent to the mounting bracket. This hole is where the cable will enter the lid to connect to the camera. Feed the cable through the hole allowing 18 to 20 inches of cable to extend through the hole.

*Figure(s) 12*

Physically separate the video section and the power section of the Siamese cable to allow more room to make connections. **( Figure 13 )** Cut one of the ½"x 4" shrink tubing in half and slide the piece onto the video section of the cable. Then, slide one of the ¾" shrink tubing pieces over the power section of the cable. Connect the BNC twist on and the **MALE** 12 volt power pig tail connector to the cable. **(See connections section)** Bunch together the cables and secure them to the underside of the lid using metal staples and a hammer. The goal is to reduce the amount of cabling that may dangle or hang from the underside of the lid. Be sure to leave enough slack in the cable around the BNC connection and the nine volt connection to later wrap with electrical tape. After the connections are made and the cabling is secured, place the lid over the hole, and position the camera in an estimated, approximate position. The goal here is to have a field of view that shows all of the walls of the interior of the tower **(Figure 14 )**. Use a sharpie permanent marker, and trace the outside edge of the lid onto the top of the tower.

## Mounting the Top Video Camera

*Figure 13*

*Figure 14*

*Figure 15*

This is to insure that the position of the camera and the lid stays where you intend it to be before it is screwed into its permanent position. It is best to have two individuals performing this task while communicating on cell phone or radio, one person should manipulate the camera while the other is viewing the field of view from the monitor inside. After the desired field of view is achieved when the lid is placed in its final resting place, lift the lid back up and spray liquid wrench silicon spray on the BNC connection and nine volt pig tail connections. (Not the quick connect terminal) Be sure to NOT spray the lens of the camera. Allow these to dry for several minutes, and then wipe the excesses off with a rag. Next, move the pre positioned ½"shrink tubing over where the BNC connectors meet.

Using a heat gun or cigarette lighter, heat the tubing until it shrinks up around the connection snugly. **( Figure 15)** Next position the ¾" shrink tubing over the quick connect terminal and heat the tubing until is shrinks up snugly around the terminal. If you're using a lighter, do not let the flame stay on one area for an extended amount of time.

Next, wrap several layers of electrical tape around the BNC connection and around the 12 volt power pig tails. Also wrap several layers around the quick connect terminals and the lead power wires that are connected to the terminal. **( Figure 16**) Wrap where the lead wires enter into the shrink tubing to create a seal. **( Figure 17)**

Be careful not to pull the leads out of the screw terminals. **(These processes will be covered in more detail in the connection section)** At this point, have your partner triple check that the camera is still operational. If the connections are still good, staple any remaining slack of cabling to the underside of the lid. Place the lid back into position lining up the outside edges with the pre marked lines on the top piece. **( Figure 18)** Once again check that the field of view is to your liking, and then screw the top of the lid to the tower top using 1 1/4" deck screws. The top camera installation is now complete

*Figure 16*

*Figure 17*

*Figure 18*

## Installing the Nest Camera

Swifts generally nest somewhere within the lower third of the tower, so positioning the camera approximately half way up from the bottom ventilation area should produce good results. As we will discuss, getting a good field of view of the nest is a matter of luck, but the odds are in our favor because swifts will not usually nest on the same interior wall where the camera is installed. The installation process for this important camera will vary greatly depending on how your tower has been skinned or sheathed. The example photos are from an existing tower that was sheathed with recycled fence board using the classic "board and baton" technique. **(Figure 19)** Because we used the material with minimal waste, the bottom fence boards where installed from the lower end of the tower with the dog-ears facing upward. A decorative piece was then used in a horizontal position to cover the seam that was created where the dog ear boards from the lower section meet the bottom of the fence boards that are positioned above. This creates the perfect location to install the camera because the decorative trim piece covers the installation spot after the camera is installed and it is roughly half way up the tower. **(Figure 20)**

*Figure 19*

*Figure 20*

First, remove the decorative horizontal board from the sheathing of the tower on a side of your choice. Mark the approximate center on the center fence board just above the dog-ear. Using a 3" hole saw **(Figure 21)** and a power drill, drill through the fence board sheathing, the insulation board, and the T-111 board. After you have drilled through, retain the core of the material by removing it from the hole saw. This is sometimes difficult as you may have to wedge the three layers out of the hole saw. Once the material as been removed from the hole saw, line the "circles" back up. Then, using a small drill bit, drill two pilot holes into the material on each side of the circle. Using two 2 1/2" screws, secure the three pieces together to form one solid, 3 ply circle. **(Figure 22)** (Photos of this procedure show slightly different materials, but the concept is the same) Next mark a spot just off center of the piece and drill a ½" hole completely though all the layers. This is to accommodate the cable for the video camera. Next, mount the camera onto the camera mount that is supplied with the camera. Feed the video and power plugs through the hole in the circle material and secure the camera mount to the circle using the screws that came with the camera. **(Figure 23)**

*Figure 21*

*Figure 22*

*Figure 23*

## Installing the Nest Camera

You will have to run the cable though the offset space that is provide on the base of the camera mount  Be sure to position the camera itself in the proper upright position so the field of view is correct when viewing on the monitor. The sticker that is present on the camera usually indicates the correct orientation of the field of view, but you will always have to manipulate it somewhat.  Next,  place a Simpson Strong-Tie wood to steel flat strap on the back of the circle material.  Feed the video and power plugs though the larger hole on the left side of the strap. Using two 1" deck screws position the tie at a 20 degree angle and secure it to the circular piece. Once again, be sure to pre drill the holes with a small drill bit so the circular wood does not split.  Positioning the tie at this angle will allow you to adjust the video camera and not allow the strap to protrude out beneath the decorative horizontal trim piece.

Insert the camera through the hole in the tower and place the circle piece into the hole as well. **(Figure 24 )** The strong tie serves multiple purposes. It allows you to rotate the degree of the circular piece to achieve the desired field of view and it prevents the circular piece from falling into the interior of the tower.

The seam area of the sheathing also creates the perfect "channel" for the camera cable to run through and connect to the Siamese power and video cable that leads to your monitor. **(Figure 25)** Carefully feed the cable though this seam and down the outside channel to the Siamese cable and make your connections (See connections section). Once the camera is connected, have your partner view the monitor for the correction position. Since this camera should be installed in advance of the swift's migration, the positioning is not that important at this time because ultimately you will be manipulating the camera to view the nest. You many want to practice manipulating the strong tie strap to get a relative position based on the grooves of the T-111 siding material inside the tower.  When the camera is operational and the position is set, secure the decorative trim piece back into place. **(Figure 26 )**

*Figure 24*

*Figure 25*

*Figure 26*

## Positioning the Nest Camera

After the Chimney Swifts have arrived and are actively using the tower. Confirm that nest building has started by monitoring through the top tower camera. Once again, if you are only installing one camera, the top camera is the best choice for overall observation and it will allow you to determine which wall the birds are building on. It is very important to allow the swifts to begin the building process without any disturbances around the tower so it is safe to allow five to six days of building before trying to manipulate the nest camera position. Unfortunately, the birds have a tendency to start building in one spot, stop and start in another. Do not rush into positioning the bottom camera until you are certain of the nest position.

## BNC Twist On Video Connection

Making BNC video connections may seem overwhelming, but it is relatively easy.
First, separate the video cable from the power cable(s) by carefully cutting into the outer sheathing with a sharp knife. Peel this sheathing back to expose the red and black power lead wires and the video cable. **(Figure 27)** Separate the video cable from the two power cables apart at a length of 12 inches. This will give you ample room to make the connections. Next, using wire cutters cut a straight slice from the end of the video cable. This is done to insure that the interior copper wire of the video cable has a straight end. This is important for the proper, secure connection of the BNC twist on connector because the interior copper wire is the lead that carries the video signal. Measure 9/16th inches from the end of the video cable and mark the outer sheathing with a pen. **(Figure 28)** Using a sharp knife or wire cutters, carefully cut into the outer sheathing of the cable completely around the diameter only **(Figure 29)** and strip the sheathing away. This will expose the ground wiring and the wax coated interior video lead. **(Figure 30)** Next, carefully peel the ground wiring back onto the outer sheathing. **(Figure 31)** This exposed wire acts as the ground for the video send and its circuit is complete when the BNC connectors sleeve comes in contact with it.

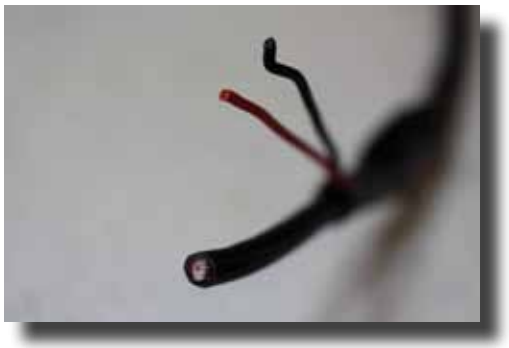


*Figure 27*

*Figure 28*

*Figure 29*

*Figure 30*

*Figure 31*

Next, measure and mark ¼ inch on the wax coating video lead starting from the cut outer sheathing. **(Figure 32)** Score the wax coating on the mark in a similar fashion to the outer sheathing using a sharp knife or wire cutters. Be careful not to cut into the interior copper wire and peel away the separated end of the wax coating to expose the cooper video wire. **(Figure 33)**


*Figure 32*

*Figure 33*

Cut one of the ½"x 4" shrink tubing pieces in half and slide the piece onto the video section of the cable. Next, connect the BNC male twist on connector **(Figure 34)** by carefully inserting the exposed copper video lead into the base of the BNC connector. Do not push to hard but make sure that the sheathing of the cable meets the base of the BNC connector. Next twist the base of the BNC connector with one hand while securing the cable with the other hand. Twist the connection in a clock wise direction if you are looking down the barrel of the BNC connector, or twist it away from you if the BNC connector is positioned facing to the right. Twist the base until is tightens up and stops. Do not over tighten. Next, slide the shrink tubing up over the base but not onto the connection area of the BNC and leave approximately one inch of tubing below the base covering the wire. Using a cigarette lighter or heat gun, shrink down the tubing so that it tightens on the base of the BNC connector and on the video cable to form a tight, sealed connection. **(Figure 35)** Finally, wrap the end of the shrink wrap connection on the cable end with electrical tape to seal the shrink tubing to the cable. **(Figure 36)**

*Figure 34*

*Figure 35*

*Figure 36*

Additional tools for connecting BNC and quick connect pigtails to Siamese video cable:
Wire cutters
Multi gauge wire strippers
Heat gun or cigarette lighter
Mechanical screw driver set.
Sharp Knife

## 12 Volt Power Connection

Power connections are made easier using Quick Connect Terminals. **(Figure 37)** It is possible to solder the wires which may give you a more secure connection, but because installation is usually done remotely where a power source may not be available, the use of quick connect terminals makes things more manageable. After the two power leads have been separated from the video cable within the Siamese cable, slide a cut 2 inch piece of ¾" shrink tubing over the two power leads and push it down away from the ends of the wires. Next, using wire strippers, strip approximately ¼" of outer sheathing off of each wire (red and black). **(Figure 38)** For power connection at the camera end, be sure to use a **MALE** 12 volt with a Quick Connect Terminal **(Figure 39)** and for power connection at the adapter/monitor end use a **FEMALE** 12 volt with a Quick Connect Terminal. **(Figure 40)**

*Figure 37*

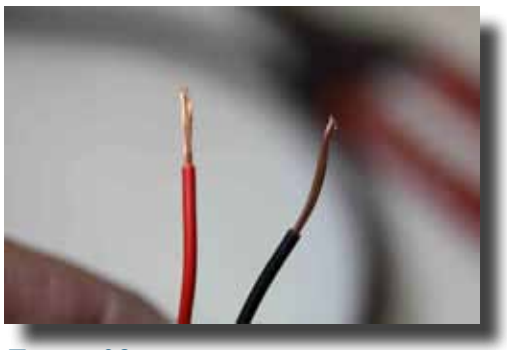


*Figure 38*

*Figure 39*

*Figure 40*

Using a mechanical screwdriver, loosen the screws on the open side of the terminal and push the bare wires of the power leads into the terminals. **(Figure 41)** Then tighten the screws to make the connection. **(Figure 42)** Be EXTREMELY CAREFUL and make sure that the red power cable is screwed into the POSITIVE (+) side of the terminal. If the polarity is reversed, the camera can easily be "fried" when the power is activated. With this in mind, do not make any power connections while the wires are hot. Occasionally, the sticker that indicates the positive side of the terminal may fall off. **(Figure 43)** Before that happens, mark the positive side with a permanent marker so the polarity stays correct. If the male or female pigtail happens to come loose from the terminal, you will be able to find the positive wire by looking closely at the sheathing. Here you will see a white line running the length of the wire. This symbol indicates the positive wire. Once the terminals on both sides are secured, slide the shrink tubing up and over the terminal. Using a cigarette lighter or heat gun, shrink the tubing around the terminal so it forms a tight seal. Be careful to not pull the lead lines out of the terminal. To help secure the lines, carefully use electrical tape to seal both ends around the shrink tubing. **(Figure 44)** Also, wrap several layers of electrical tape over the pig tail connections.

*Figure 41*

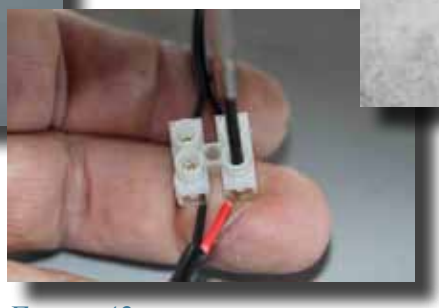


*Figure 42*

*Figure 43*

*Figure 44*

**North American Chimney Swift Nest Site Research Project**
SITE REPORT FORM
*Please use feet and inches for all measurements*

It is important to gather as much information on structures that were not used as well as those that were. By comparing the characteristics of both categories of structures we will learn what new box features are important to the nesting success of Chimney Swifts.

Please fill out one form per nest structure. Duplicate this form as needed. We are interested in all nesting attempts both in structures made purposely to attract Chimney Swifts and in structures such as chimneys, silos, and natural cavities.

Name_____

Street Address_____

City_____ State _____Zip Code_____

Phone: _____E-mail_____

**Nest Structure Characteristics**

Please provide a detailed description of nesting structure (attach a photo or drawing if possible):
Inside Dimensions: _____
Outside Dimensions: _____
Is there an air space: _____ How wide? _____
Height: _____
Type of Material: _____
Color of Material: _____

When was the structure erected (month / day / year)?_____/_____ /_____
Is the structure free-standing or attached to a building? _____
If attached, please elaborate_____
_____
What compass direction is the wall of the structure facing that supports the nest box? _____
What were the maximum / minimum temperatures (0F)_____/_____

**Habitat Around Structure**

Is the structure in a clearing or wooded area? _____
Distance from the nearest tree that is as high or higher than the top of the nest structure?_____
What percentage of an imaginary 200 foot circle around the nest structure is covered by tree canopy as high or higher than the top of the nest box? _____

# SITE REPORT FORM

**Use of Structure by Swifts**

Did Chimney Swifts ever enter the structure? _____
Was the structure used as a roosting site? _____

**SUMMARY OF OBSERVATIONS**

First day swifts were sighted in the area: _____/_____/_____
First day swifts roosted in the structure: _____/_____/_____
Last day swifts roosted in the structure: _____/_____/_____
Maximum number of swifts roosting at one time: _____
Date of maximum roosting flock: _____/_____/_____
Number of days the structure was occupied: _____

NOTE: Disturbance during nest-building may cause Chimney Swifts to abandon the site. The following data should be collected only after the nesting season is over.

Did Chimney Swifts nest in the structure? _____ Was the nest successful?_____
Height of nest from bottom of structure: _____
Height of nest from top of structure: _____
Height of nest above ground: _____
What was the nest attached to?_____
What compass direction was the wall of the structure facing that had the nest attached?_____
If the nest failed what were the likely causes for that failure? (predators, rain, disturbance, etc.)_____
_____
_____
If predators were responsible for nest failure, please identify species of predator and elaborate: _____
_____
_____
_____

Additional Comments (use back of pages if needed):
_____
_____
_____
_____

Thank you for your participation. Please return completed forms to:

Paul and Georgean Kyle
Driftwood Wildlife Association
14246 Hunter's Pass
Austin, Texas 78734

# NOTES