



Part 4D:

60 kV Suspension & Dead-End

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DV-DE

Vertical Dead-End 60 kV

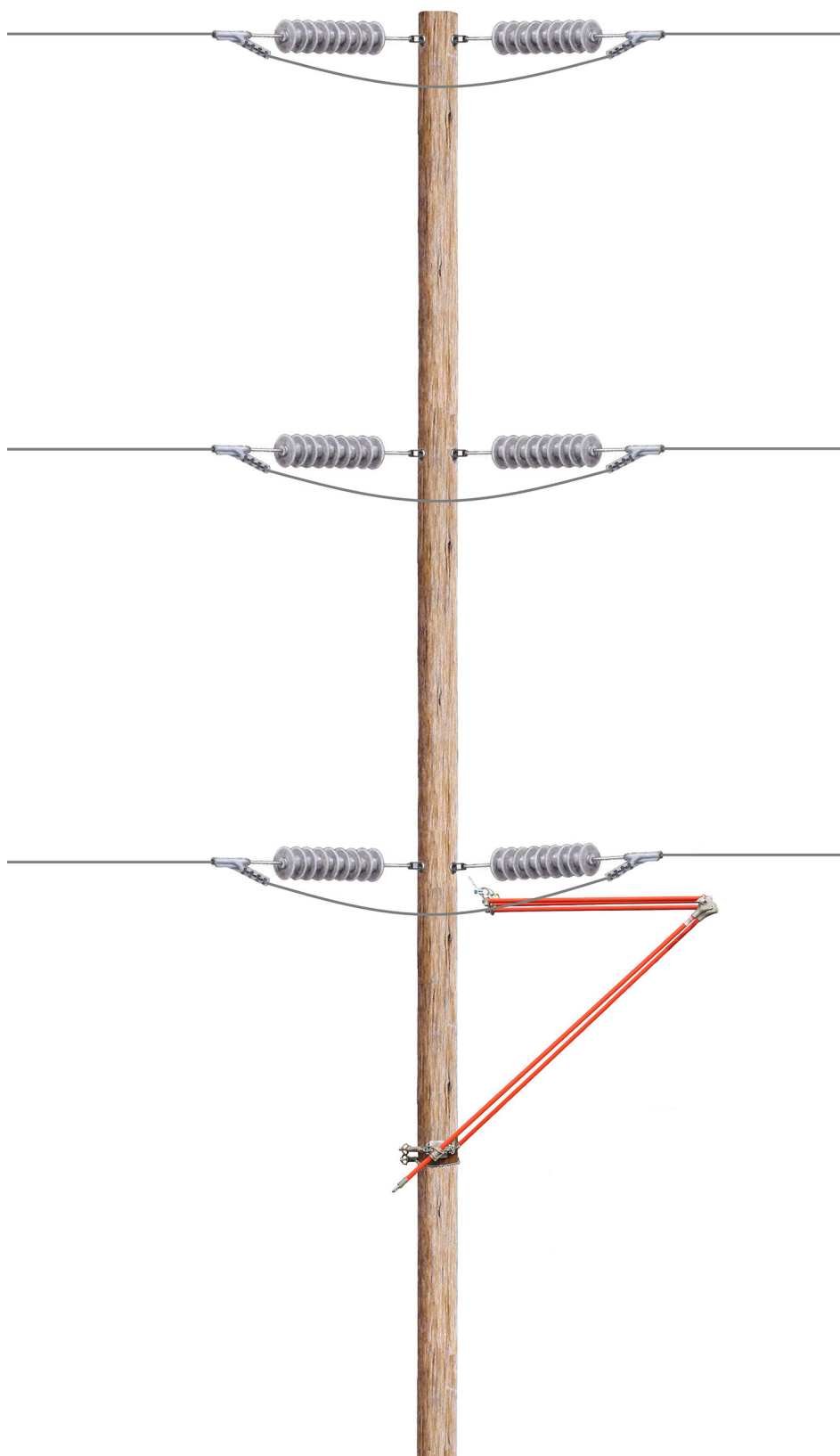
Insulator Replacement Procedure

Before removing any conductors from an existing pole, the condition of the adjacent poles, conductors and tie wires must be visually inspected and determined to be in good condition before starting this procedure.

The condition of all involved poles must be determined safe to rig on or climb, if required.

Procedure

1. If a distribution circuit or conductors are located on the pole, they must be covered or relocated in order to make a clear working space on the pole to install rigging, climb through or send tools up and down a hand line.
2. Assemble a two pole strain carrier and an insulator cradle on a tarp. Place the assembled strain carrier on two hot line tool racks.
3. Attach the cold end yoke to the pole behind the insulator string to be removed. Usually, the cold end yoke is attached to the back of the pole opposite the insulator string and secured to the pole with the pole strap. If hardware or space does not permit this, the cold yoke can also be attached to the front of the pole with a chain.
4. Utilizing a universal pole, one lineman can install a wire grip on the conductor approximately where the hot yoke can hook onto it.
5. Remove one strain pole from the hot yoke of the two pole strain carrier. Attach the hot yoke with the other strain pole engaged to it to a 4-foot link stick on the end of a split hand line. Have the ground help raise the assembly on the hand line and hold the weight of the assembly while one lineman guides the hot yoke into place on the conductor by grasping the cold end of the strain pole. Straddle the conductor with the yoke until the hot yoke hooks the wire grip. Rotate the hot yoke until it is in a horizontal position and install the threaded strain jack at the rear end of the strain

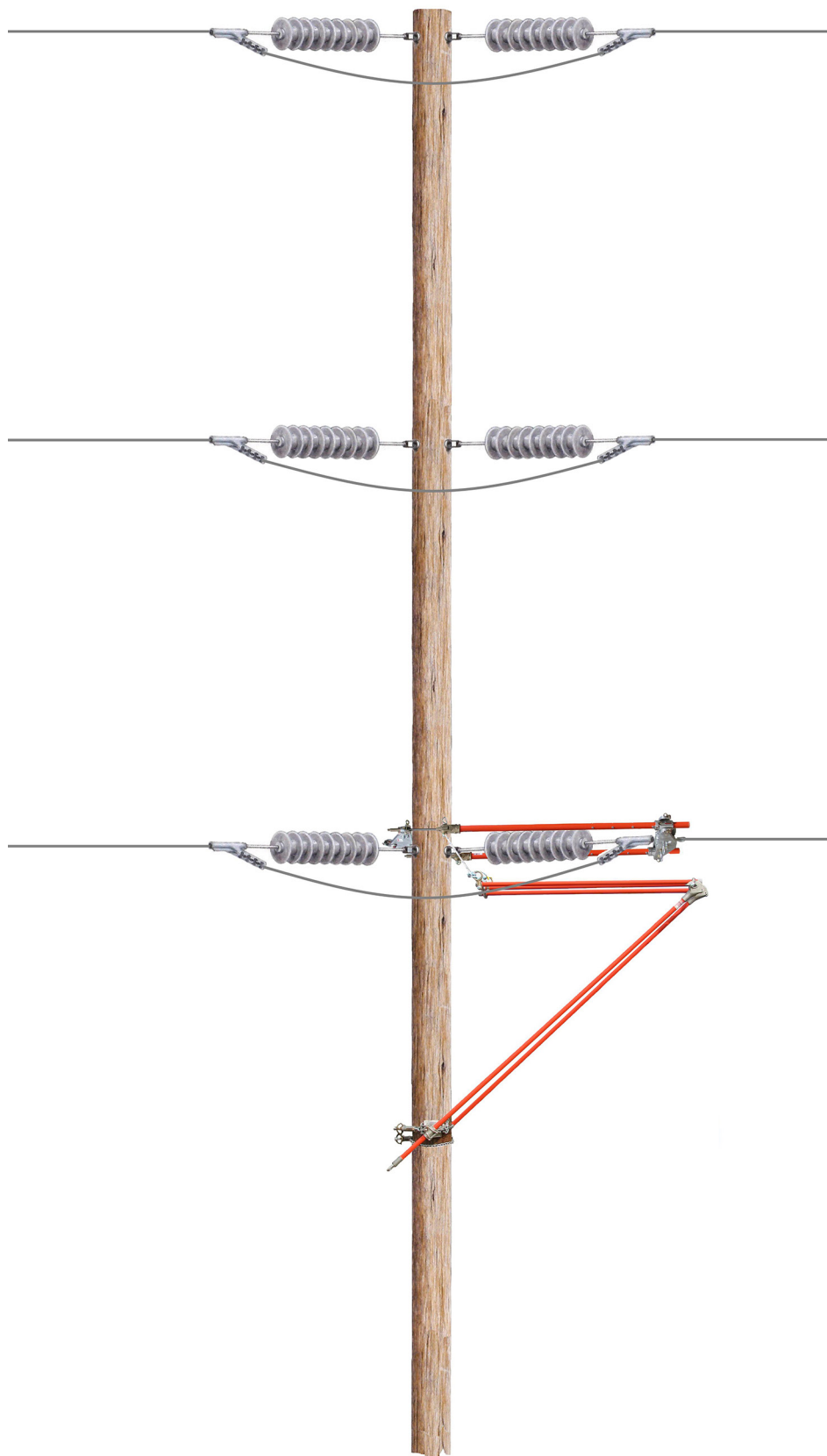


Insulator Replacement, DV-DE Vertical Dead-End — 60 kV



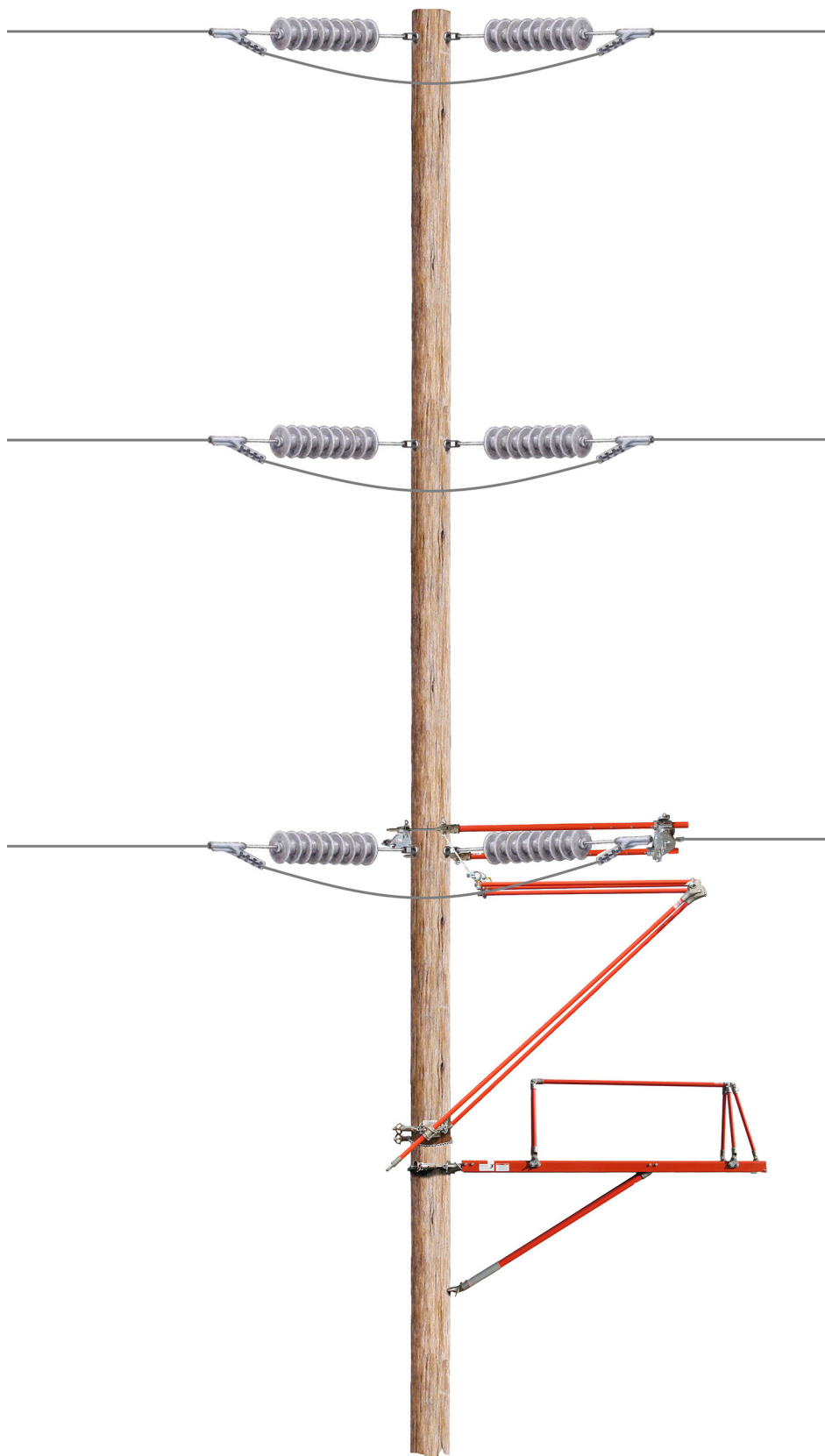
pole into the slot on the cold yoke on the same side of the pole. Remove the link stick and hand line from the strain carrier assembly with a universal pole.

6. Again utilizing the strain link stick on the split hand line to raise and position the remaining strain pole, place the pole clamp of the remaining strain pole in the slot of the hot yoke and make certain that it is secure. Install the threaded strain jack into the remaining slot on the cold end yoke. Utilizing a universal pole, push the wire grip out on the conductor until it is in tension with the hot end yoke hook. Hand tighten both trunnion nuts until the strain poles are even.
7. Install the insulator cradle on the pole by tying it to the pole just below the insulator string. Attach two 1-1/2" wire tong pole saddles to opposite sides of the pole in a position that will allow two 1-1/2" x 10' wire tongs to support the insulator cradle.
8. Clamp the 1-1/2" wire tongs to the lugs on each side of the insulator cradle bracket at the hot end of the cradle. Place the wire tongs into the saddle clamps on each side of the pole and loosely tighten the clamps. Slide the wire tongs through the saddle clamps, lifting the insulator cradle until it is in position against the insulator string, then tighten the saddle clamps securely. The insulator cradle can also be supported by the hot yoke with eye bolts if there is limited space between phase attachments.
9. Install the ratchet wrenches on the trunnion nuts and begin to turn the nuts until the strain is relieved from the insulator string. The two nuts should be tightened alternately, keeping the strain pole assembly in proper alignment and equalizing the strain on both poles of the strain carrier.
10. When the strain has been relieved from the insulator string, release the cotter key on the ball socket joint at the dead-end clamp. Utilizing a cotter key puller or pusher installed on a universal pole. Continue relieving the strain on the insulator string until the ball socket joint is loose.
11. Separate the ball socket joint with a ball-socket adjuster mounted on a universal pole. A second lineman with a second universal pole can assist with the separation of the ball socket joint.
12. When the ball socket joint is separated, grasp both 1-1/2" wire tongs, loosen the saddle clamps, and lower the insulator cradle until the hand line can be tied on to the cold end of the string. Continue lowering the string until adequate clearance has been achieved to change a bad insulator in the string or remove the insulator string from the pole. The insulator string can be lowered to the ground for replacement.





13. When insulator replacement is complete, place the insulator string in the cradle and attach the insulator string to the pole. Raise the insulator cradle with the wire tongs and tighten the saddle clamps securely.
14. Two linemen, each utilizing a universal pole, one with a ball socket adjuster attached, can now reconnect the ball socket joint. When the hot end of the insulator string is attached to the dead-end clamp, begin to slowly release the strain carrier by reversing the trunnion nuts. When the insulator string is supporting part of the weight of the conductor, tap the cotter key back into position with a ball-socket adjuster mounted on a universal pole.
15. Lower the insulator cradle to a vertical position and remove the holding wire tongs from the saddle clamps. Send the wire tongs and 1-1/2" wire tong pole saddles to the ground. Untie the cold end of the insulator cradle from the pole and send the cradle to the ground.
16. Continue to loosen the trunnion nuts on the strain carrier until the weight of the conductor is carried by the insulator string. Use a universal pole to attach the split hand line with link stick attached to the first strain pole to be removed.
17. While holding one pole of the strain carrier, disengage the pole supported by the hand line from first the cold end and then the hot end of the strain carrier. A second lineman should assist with a universal pole. Send the free pole to the ground.
18. Controlling the hot end yoke with the cold end of the remaining strain pole, rotate the hot end yoke so that it is straddling the conductor. Utilizing a universal pole, remove the wire grip from the conductor and send it to the ground.
19. Utilizing a universal pole, attach the link stick on the hand line to the hot yoke. Have the ground help support the weight of the strain pole assembly and guide it free of the conductor with a universal pole, being careful not to nick the insulator string. Send the assembly to the ground.
20. The cold end yoke can be removed from the pole and sent to the ground.
21. Remove the hand line from the pole.





DV-DE

Vertical Dead-End 115 kV

DWG .015084

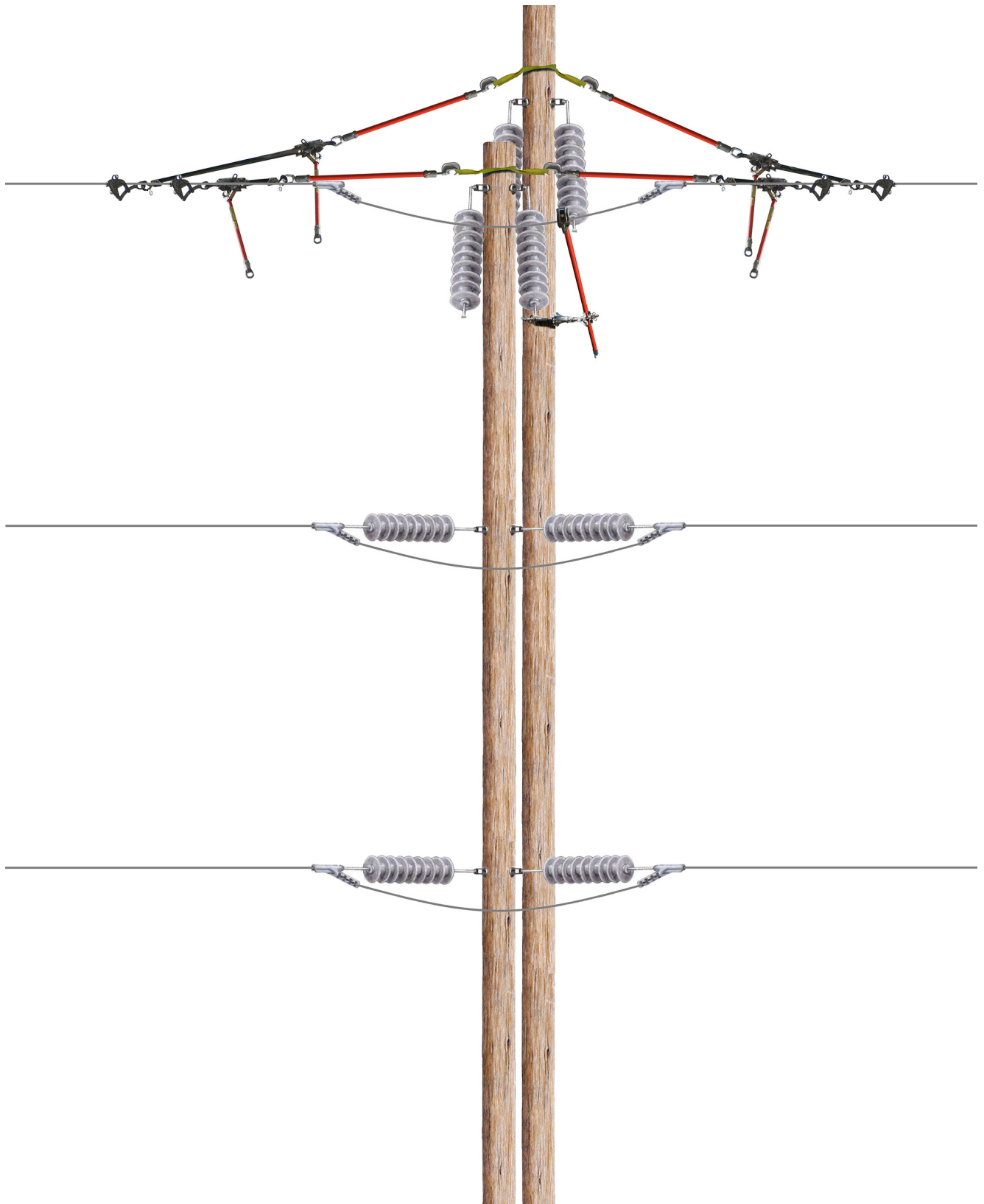
Pole Change Procedure

Before removing any conductors from an existing pole, the condition of the adjacent poles, conductors and tie wires must be visually inspected and determined to be in good condition before starting this procedure.

The condition of all involved poles must be determined safe to rig on or climb, if required.

Procedure

1. If a distribution circuit or conductors are located on the pole, they must be covered and then relocated or completely removed from the existing cross arm or pole. A clear working space must be created in order to install rigging, climb through, or make room to set a new pole. If a new pole is to be installed, plan to set it just behind and as close to the old pole as possible. Set a new pole in line with the existing anchors if possible.
2. If a new pole has been installed and all conductors will be relocated to the new pole, begin with the top phase conductors. Install permanent or temporary guy wires on the new pole to support the conductor.
3. Install two nylon slings on both the old and the new pole just above the top phase insulator attachment points on both poles. Attach a 1-1/2" x 6' strain link stick to each nylon sling on both poles. Attach an appropriately rated strap hoist to each strain link stick.
4. Attach a 1-1/2" wire tong saddle with 1-1/2" clamp on the new pole about 1' below where the existing insulators are attached to the old pole. Install a 1-1/2" x 10' wire tong on the conductor. Put the holding tong in the wire tong saddle clamp, push out

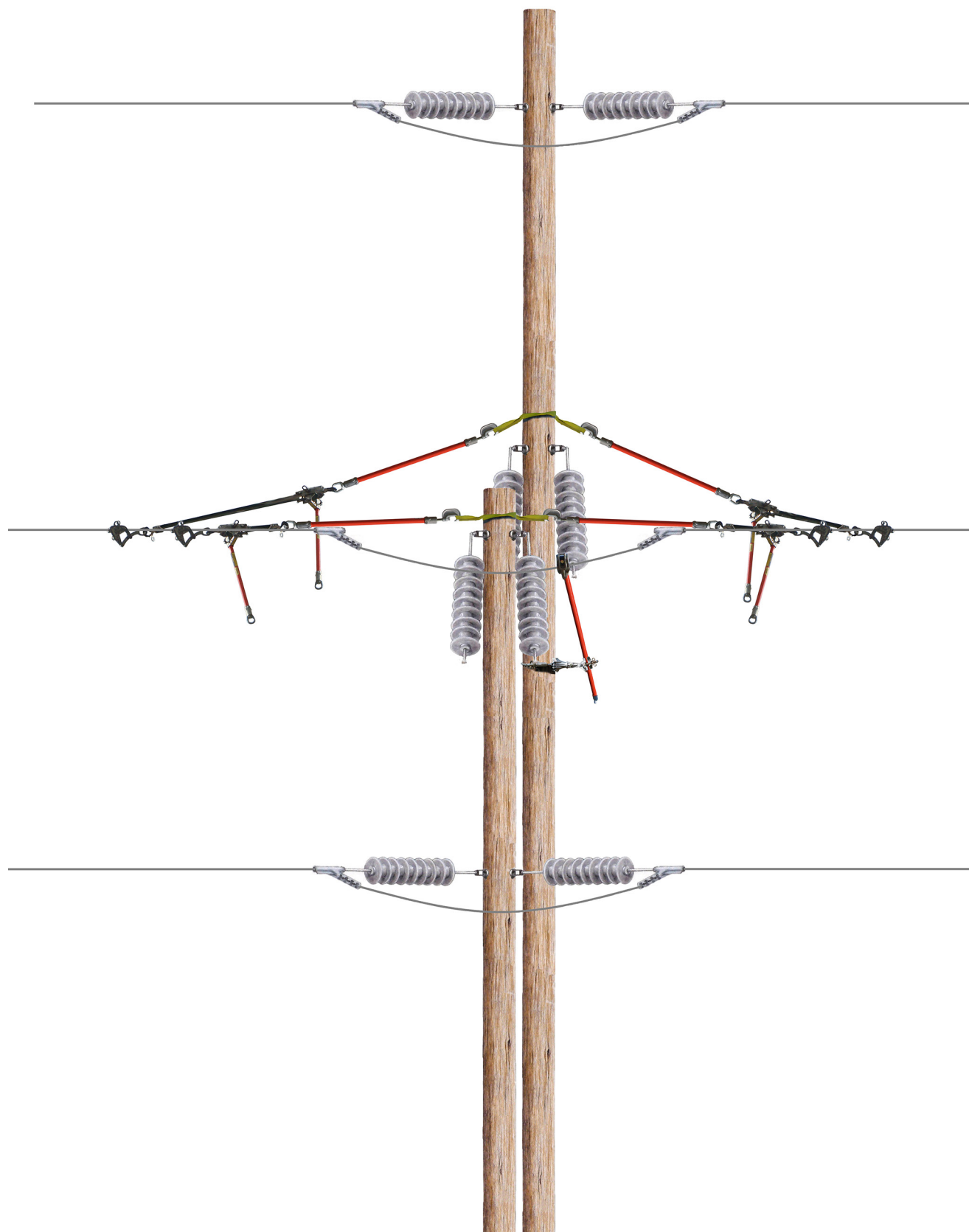


Pole Change, DV-DE Vertical Dead-End — 115 kV



slightly and tighten. This wire tong will help to hold the jumper away from the old pole while moving the conductor.

5. Place a wire grip on the conductor on each side of the dead end insulator strings approximately 12" out from each dead end clamp. Hang a strap hoist on each of the two wire grips. Remove the slack from the hoists.
6. Mount a cotter key puller or pusher on a 1-1/4" universal pole and release the cotter key in the ball and socket joint. Do not pull the key completely out. Take up on both strap hoists evenly until both insulator strings are slack.
7. While one lineman holds the bottom insulator of one insulator string with an adjustable insulator fork mounted on a universal pole, another lineman can disconnect the ball and socket joint on the dead end clamp socket with a ball socket adjuster mounted on a universal pole.
8. Lower the insulator string to a vertical position against the pole.
9. Repeat these steps on the other top phase insulator string.
10. Place two more wire grips on the conductor about 18" outside the wire grips holding the strain of the conductor. Hang a strap hoist on each wire grip and remove the slack from each hoist.
11. Working carefully, take up on the top two hoists while letting off on the lower two hoists. Adjust the holding tong as needed to maintain minimum working distance from the old pole.
12. When the conductors have been raised sufficiently to be attached to the top insulator strings, remove the lower two strap hoists and wire grips from the conductors. Working on one side of the dead end, raise the top insulator string with an adjustable insulator fork mounted on a universal pole, or by using hot blocks attached between a sling on the insulator string and a wire grip on the conductor. Connect the socket on the dead end clamp with the ball on the bottom insulator using a ball socket adjuster.
13. Slack the strap hoist until the insulator string is supporting the weight of the conductor. Tap the cotter key back in place. Completely slack the hoist and remove from the conductor. Remove the wire grip from the conductor.

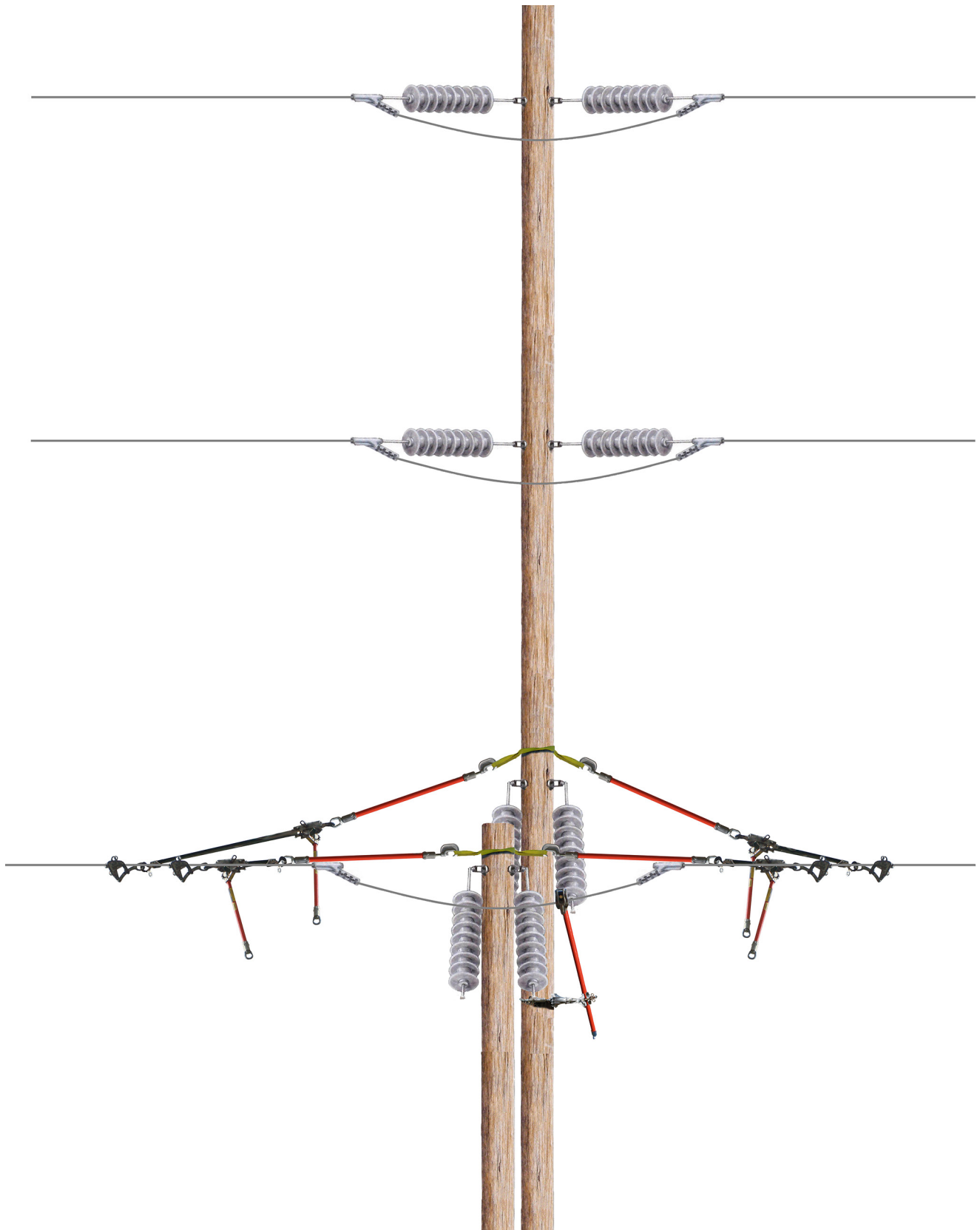


Insulator, Cross Arm or Pole Change Procedures

**Live-Line Procedures Manual**

Pole Change, DV-DE Vertical Dead-End — 115 kV continued

14. Repeat these steps on the other side of the dead end.
15. Remove the old insulator strings. Being careful to maintain minimum working distance, saw off the top of the old pole in small pieces. Remove the pole top down to about 1' above the middle phase dead end insulator string attachment points.
16. Repeat these steps on the middle and lower phase dead end assemblies.
17. When all three phases have been safely moved to the new pole the old pole can be removed.





Running Corner SV-1 115 kV

DWG .015084 • Maximum Line Angle 30 Degrees

Insulator, Hardware or Pole Change Procedure

Before removing any conductors from an existing pole, the condition of the adjacent poles, conductors and tie wires must be visually inspected and determined to be in good condition before starting this procedure.

The condition of all involved poles must be determined safe to rig on or climb, if required.

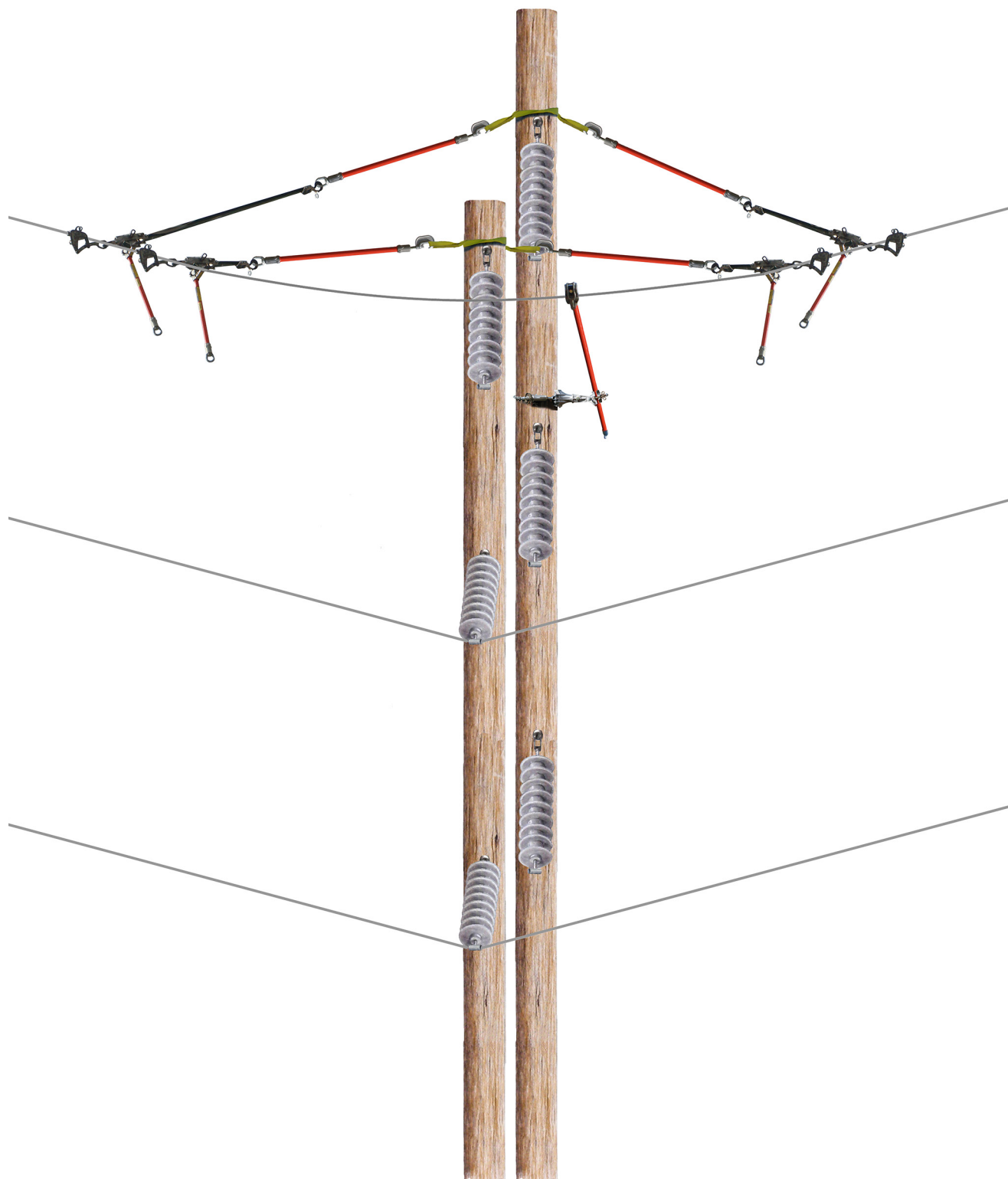
Procedure

1. If a distribution circuit or conductors are located on the pole, they must be covered and then relocated or completely removed from the existing cross arm or pole. A clear working space must be created in order to install rigging, climb through, or make room to set a new pole. If a new pole is to be installed, plan to set it just behind and as close to the old pole as possible. Set a new pole in line with the existing anchors if possible.
2. If a new pole has been installed and the conductors must be relocated to the new pole, begin with the top phase conductor. Install permanent or temporary guy wires on the new pole to support the conductor. Install two nylon slings on both the old and the new pole just above the top phase insulator attachment points on both poles. Attach a 1-1/2" x 6' strain link stick to each nylon sling on both poles. Attach an appropriately rated strap hoist to each strain link stick.



Insulator, Cross Arm or Pole Change Procedures

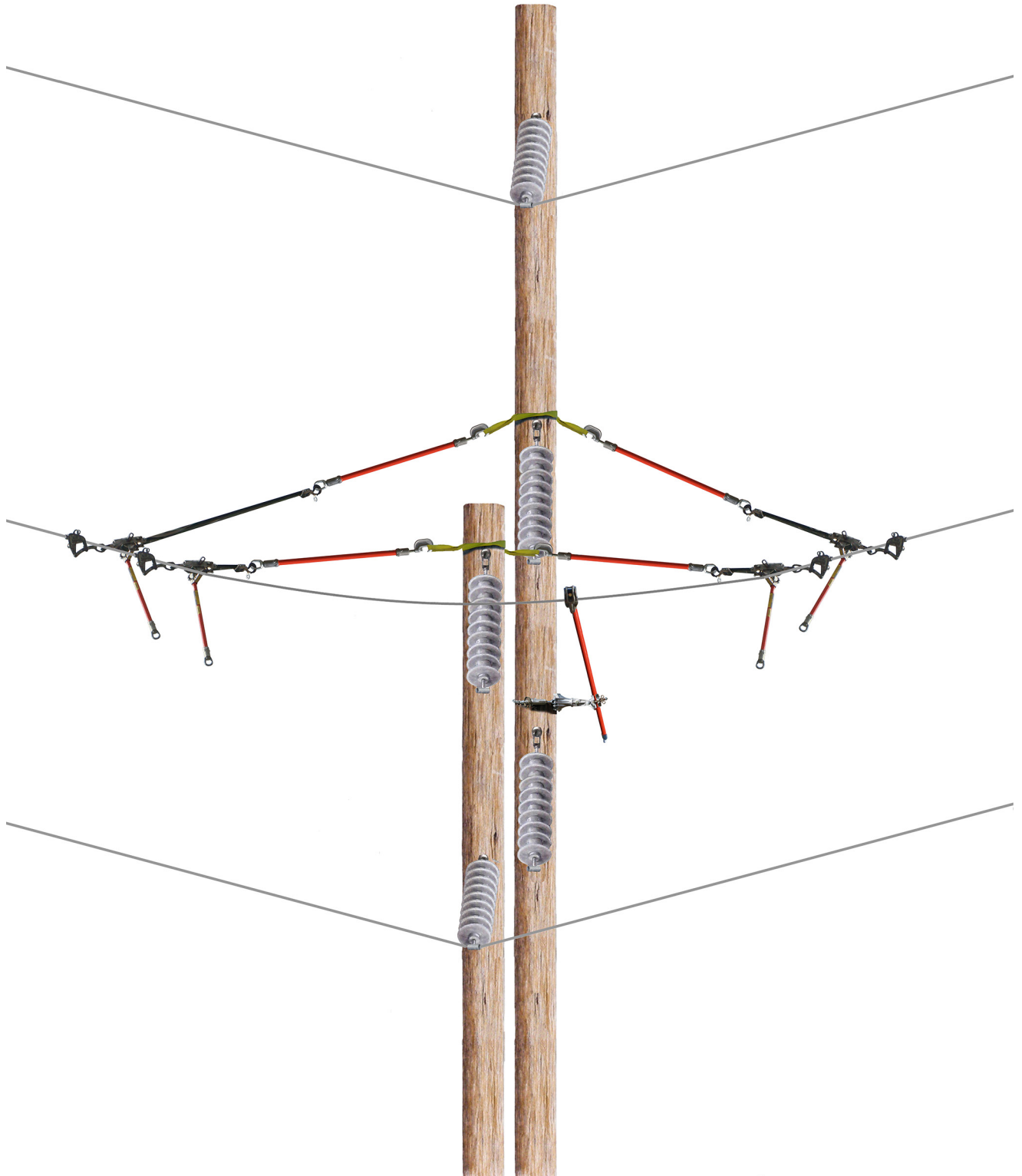
Running Corner — SV-1 115 kV continued



Running Corner — SV-1 115 kV



3. Attach a 1-1/2" wire tong saddle clamp on the old pole about 18" below where the existing insulators are attached to the old pole. Install a 1-1/2" x 10' wire tong on the conductor. Put the holding tong in the wire tong saddle clamp, push out slightly and tighten. This wire tong will help to hold the jumper away from the pole while moving the conductor.
4. Place a wire grip on the conductor on each side of the insulator string approximately 2 feet out from the conductor clamp. Hang a strap hoist on each of the two wire grips. Remove the slack from the hoists.
5. Mount a cotter key puller or pusher on a 1-1/4" universal pole and release the cotter key in the ball and socket joint. Do not pull the key completely out. Take up on both strap hoists evenly until the insulator string is slack.
6. While one lineman holds the bottom insulator of the string with an adjustable insulator fork mounted on a universal pole, another lineman can disconnect the ball and socket joint on the insulator clamp socket with a ball socket adjuster mounted on a universal pole.
7. Lower the insulator string to a vertical position against the pole.
8. Place two more wire grips on the conductor about 18" outside the wire grips holding the strain of the conductor. Hang a strap hoist on each wire grip and remove the slack from each hoist.
9. Working carefully, take up on the top two hoists while letting off on the lower two hoists. Adjust the holding tong as needed to maintain minimum working distance from the old pole.
10. When the conductor has been raised sufficiently to be attached to the top insulator string, raise the top insulator string with an adjustable insulator fork mounted on a universal pole. Connect the socket on the conductor clamp with the ball on the bottom insulator using a ball socket adjuster.
11. Slack all strap hoists until the insulator string is supporting the weight of the conductor. Tap the cotter key back in place. Completely slack all hoists and remove from the conductor. Remove all wire grips from the conductor.

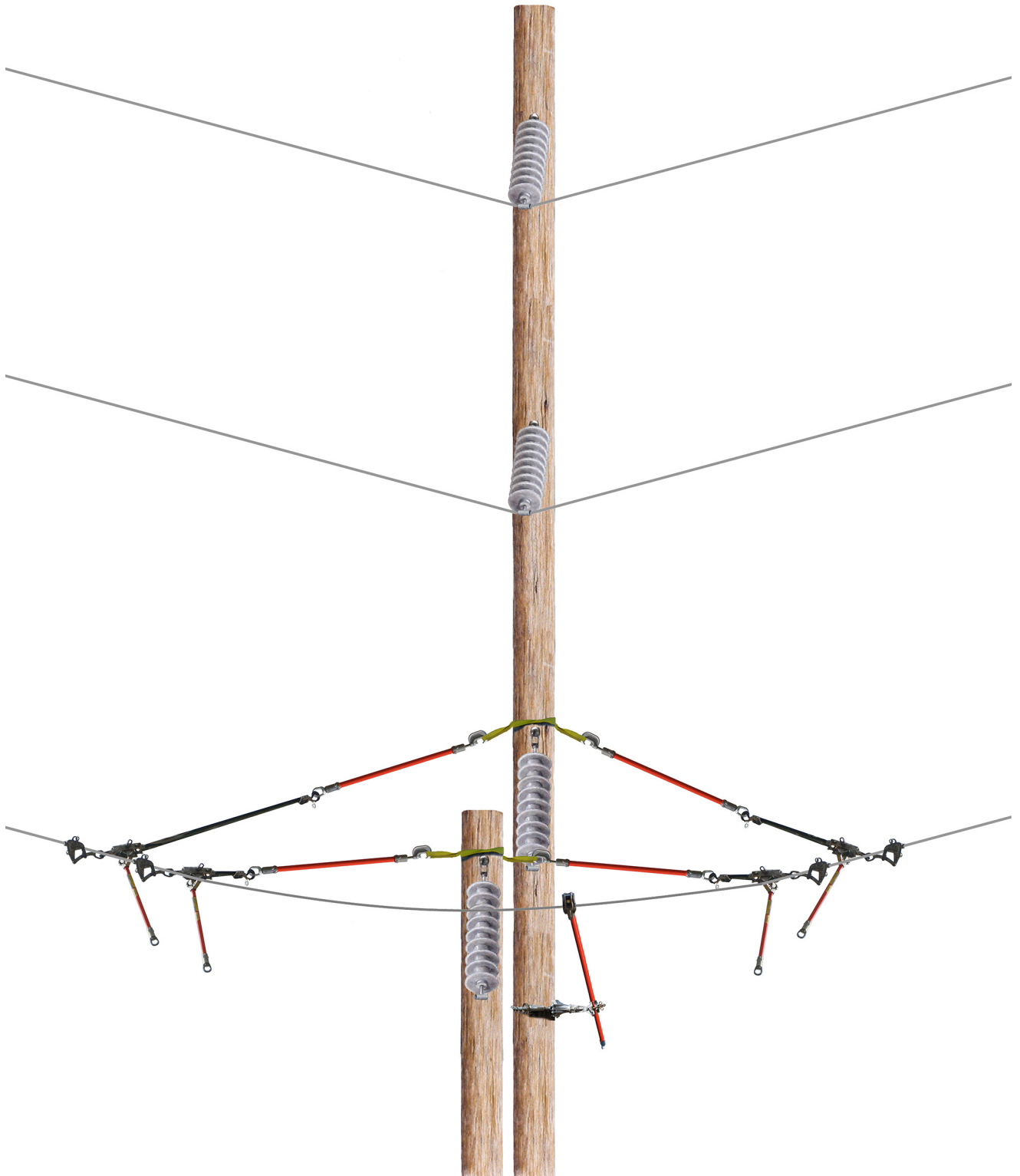


Insulator, Cross Arm or Pole Change Procedures

**Live-Line Procedures Manual**

Running Corner — SV-1 115 kV continued

12. Remove the old insulator string. Being careful to maintain minimum working distance, saw off the top of the old pole in small pieces. Remove the pole top down to about 1' above the middle phase insulator string attachment point.
13. Repeat these steps on the middle and lower phase conductors.
14. When all three phases have been safely moved to the new pole the old pole can be removed.





Double Circuit SS-2 Construction 60 kV

DWG. 052108

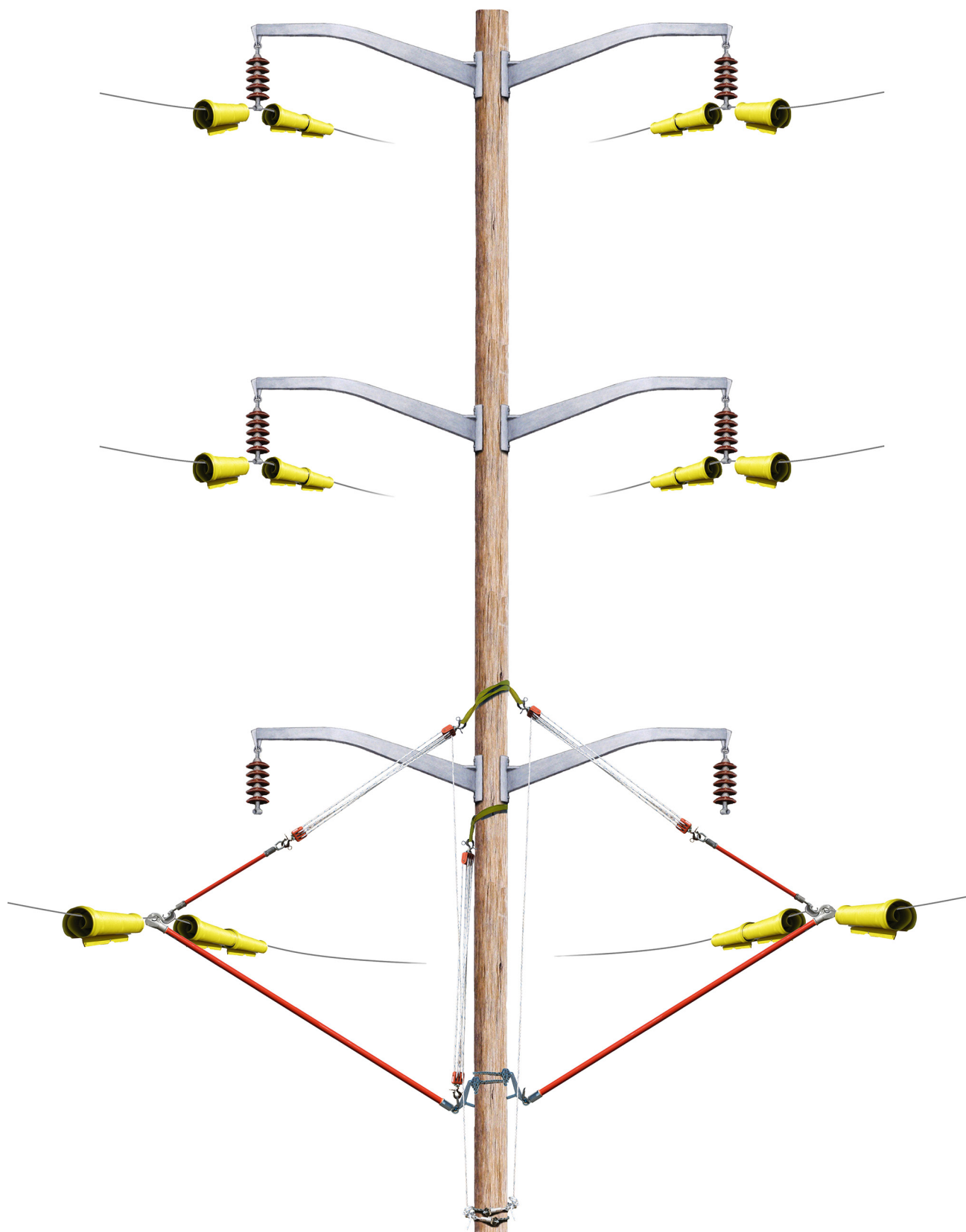
Insulator, Arm or Pole Change Out

Before removing any conductors from an existing pole, the condition of the adjacent poles, conductors and attachments must be visually inspected and determined to be in good condition before starting this procedure.

The condition of all involved poles must be determined safe to rig on or climb, if required.

Procedure

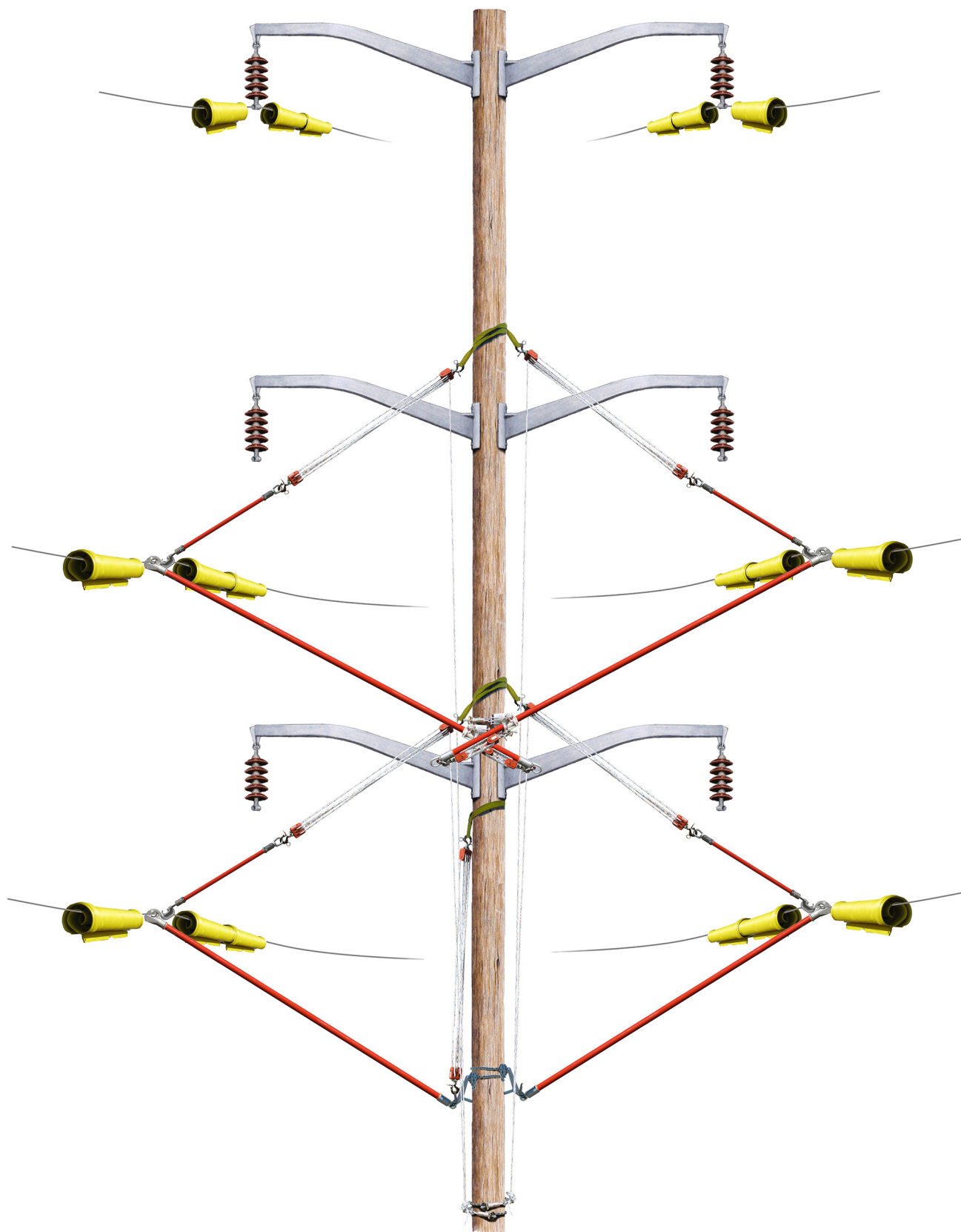
1. If a distribution circuit or conductors are located on the pole, they must be covered and then relocated onto extension arms or completely removed from the existing cross arm. A clear working space must be created in order to install rigging, climb through, or make room to set a new pole. If a new pole is to be installed, plan to set it as close to the old pole as possible.
2. On the first lower transmission phase to be moved, attach a 2-1/2" x 10' lifting tong to the conductor with the jaw opening facing the pole.
3. Attach a lever lift to the swivel ring on the wire tong. Swing the lever lift and lifting tong butt to the pole and attach the lever lift to the pole in line with the wire tong attached to the conductor.
4. Attach another 2-1/2" x 10' lifting tong on the opposite phase conductor and attach a lever lift to the swivel ring of the wire tong and attach it to the pole just above the other lever lift.



Double Circuit SS-2 Construction — 60 kV



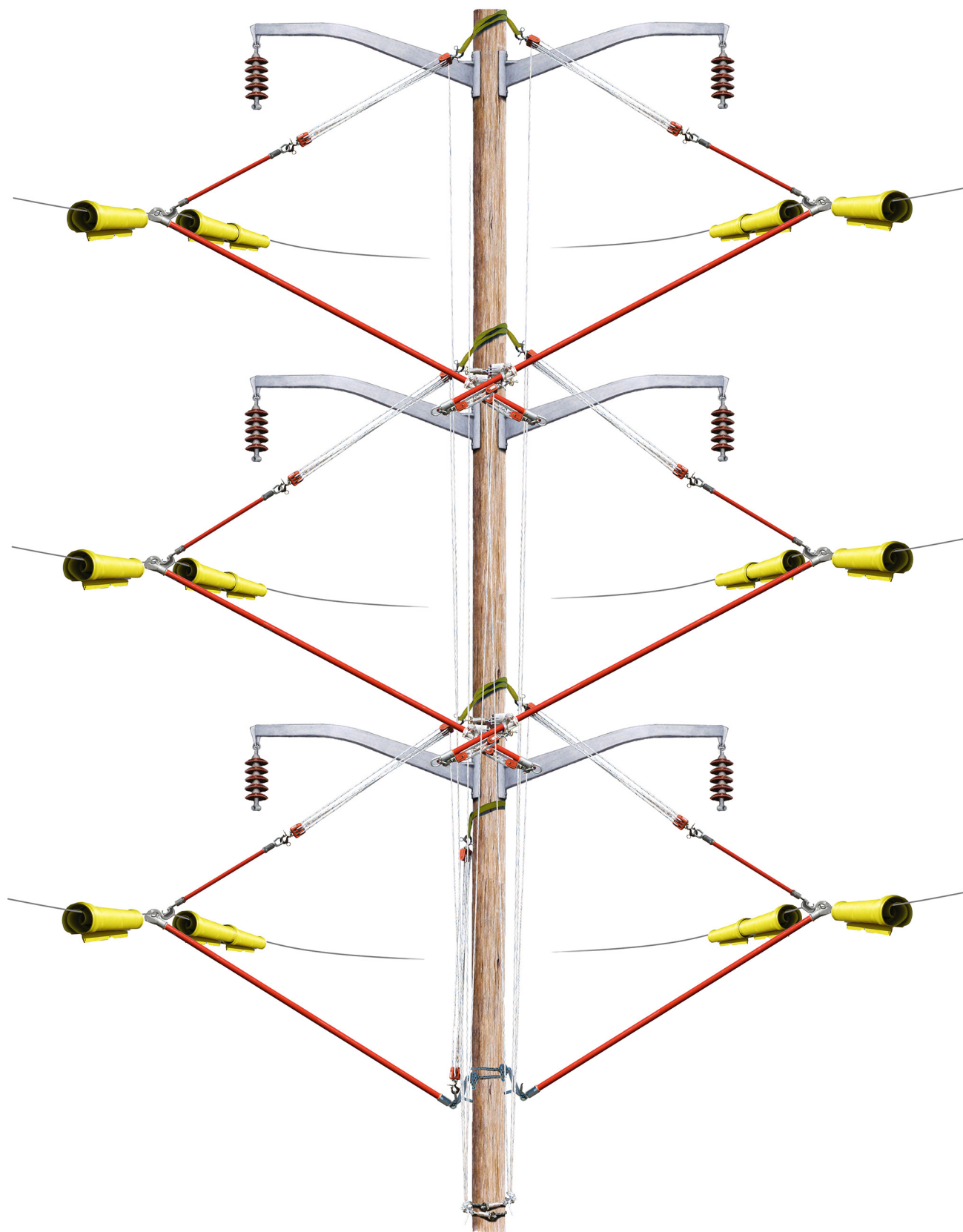
5. Install a nylon sling on the pole just below the arm. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the clevis on the lever lift of the first conductor to be moved. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket mounted on the pole about 4' above the ground.
6. Install a nylon sling on the pole approximately 3' above the arm. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the butt ring of a 1-1/2" x 4' strain link stick. Attach the strain link stick to the conductor alongside the wire tong. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket.
7. If setting a new pole or removing and replacing the cross arm, the conductor should be covered before removal from the insulator string. The cover should be placed on the conductor on the side of the old pole where the new pole will be located, or both sides if removing and replacing an arm.
8. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull on the lever lift rope blocks fall line and raise the conductor slightly. The second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
9. When the conductor is free, have the ground help slowly release the tension on the strain link stick rope blocks. Working together, move the conductor out away from the pole until adequate working clearance is achieved. Have the ground help secure the strain link stick rope blocks fall line in the rope snubbing bracket. The set of rope blocks attached to the lever lift can be slacked to facilitate their removal.
10. Repeat these steps on the opposite lower phase conductor.
11. Move up to the center phase conductors. On the working side of the pole, attach a 2-1/2" wire tong saddle to the pole face above the bottom arm bracket. Install a 2-1/2" x 12' lifting tong on the conductor. Place the lifting tong into the wire tong saddle clamp. Tighten the saddle clamp just enough to allow the wire tong to slide through the clamp. Hang a set of rope blocks between the wire tong saddle clevis





and the swivel ring on the bottom of the lifting tong. Have the ground help remove the slack from the rope blocks fall line and secure the fall line in a rope snubbing bracket.

12. Install a nylon sling on the pole above the center phase arm mounting brackets. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the butt ring of a 1-1/2" x 4' strain link stick. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket.
13. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull on the lever lift rope blocks fall line and raise the conductor slightly. The second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
14. When the conductor is free, have the ground help slowly release the tension on the strain link stick rope blocks. Working together, move the conductor out away from the pole until adequate working clearance is achieved. Have the ground help secure the strain link stick rope blocks fall line in the rope snubbing bracket. The rope blocks attached to the lever lift can be slacked.
15. Repeat these steps on the opposite phase conductor.
16. Repeat these steps on the top two phase conductors.
17. When all six conductors have been safely removed from the pole and securely supported, the insulators and arms can be removed safely. A new pole can now be installed if required.
18. When all replacement work is complete, move the conductors back into position or on to a new pole by reversing the removal procedure.





Double Circuit SS-2 Construction 115 kV

DWG. 052108

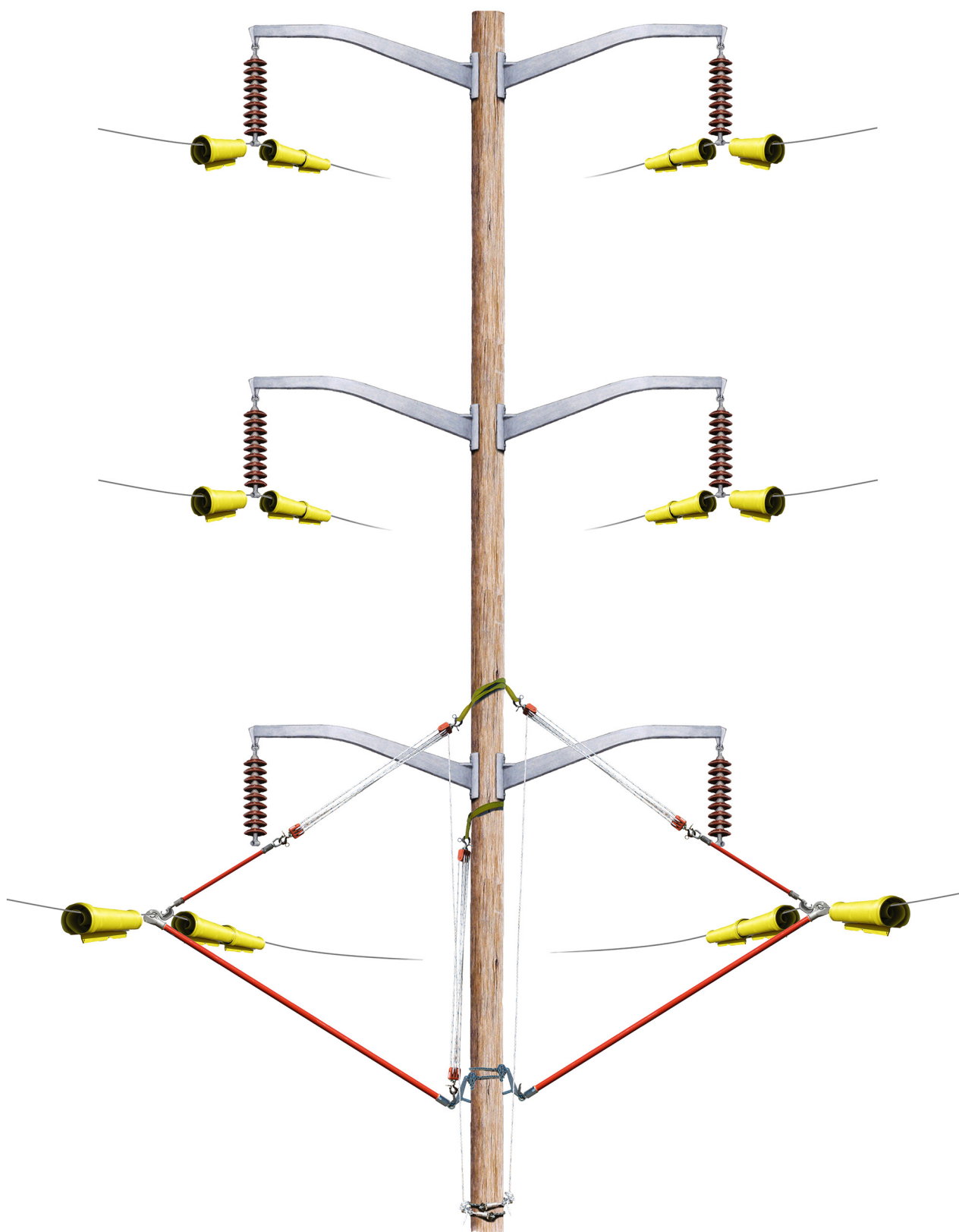
Insulator, Arm or Pole Change Out

Before removing any conductors from an existing pole, the condition of the adjacent poles, conductors and attachments must be visually inspected and determined to be in good condition before starting this procedure.

The condition of all involved poles must be determined safe to rig on or climb, if required.

Procedure

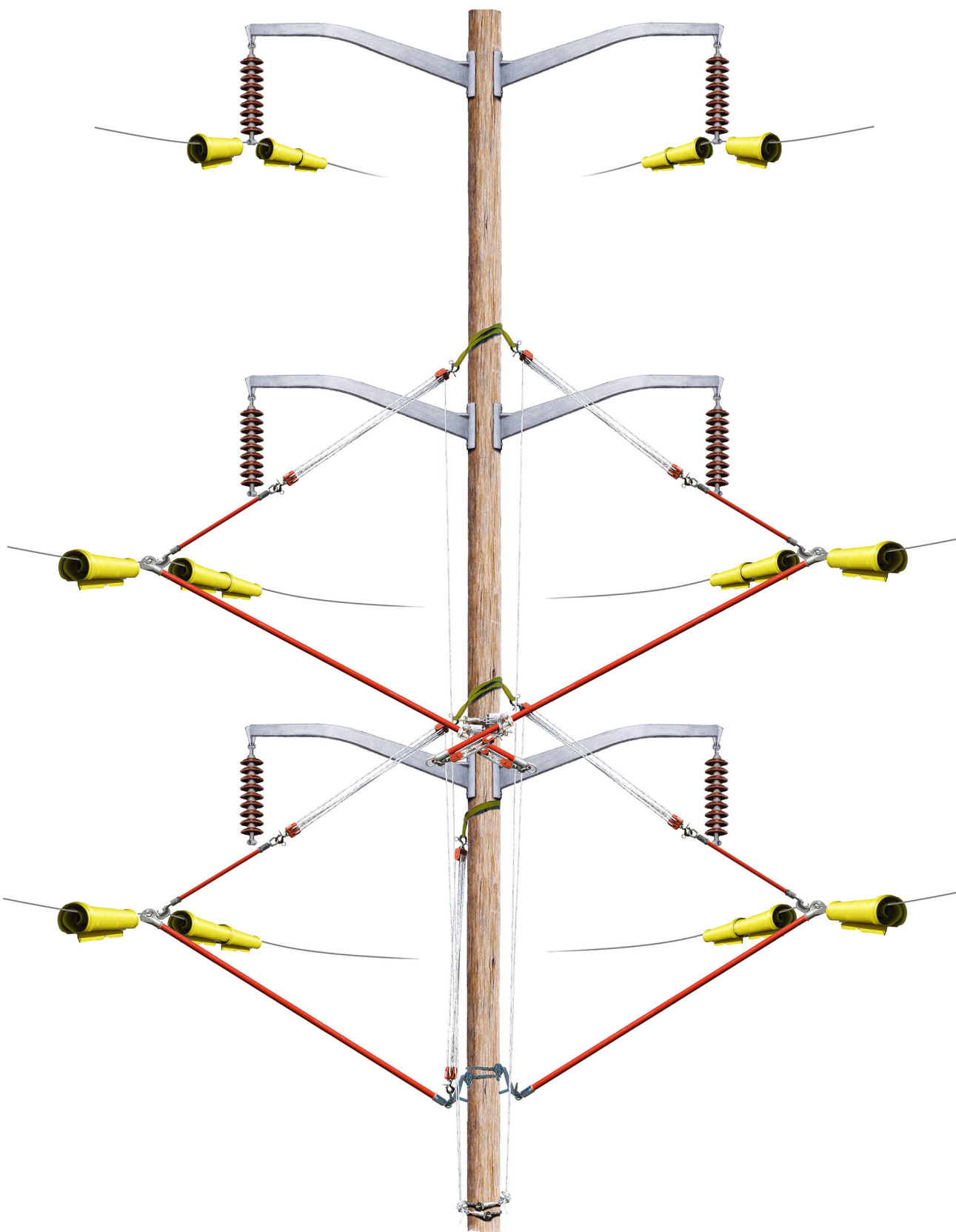
1. If a distribution circuit or conductors are located on the pole, they must be covered and then relocated onto extension arms or completely removed from the existing cross arm. A clear working space must be created in order to install rigging, climb through, or make room to set a new pole. If a new pole is to be installed, plan to set it as close to the old pole as possible.
2. On the first lower transmission phase to be moved, attach a 2-1/2" x 10' lifting tong to the conductor with the jaw opening facing the pole.
3. Attach a lever lift to the swivel ring on the wire tong. Swing the lever lift and lifting tong butt to the pole and attach the lever lift to the pole in line with the wire tong attached to the conductor.
4. Attach another 2-1/2" x 10' lifting tong on the opposite phase conductor and attach a lever lift to the swivel ring of the wire tong and attach it to the pole just above the other lever lift.
5. Install a nylon sling on the pole just below the arm. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the clevis on the lever lift of the first conductor to be moved. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket mounted on the pole about 4' above the ground.



Double Circuit SS-2 Construction — 115 kV

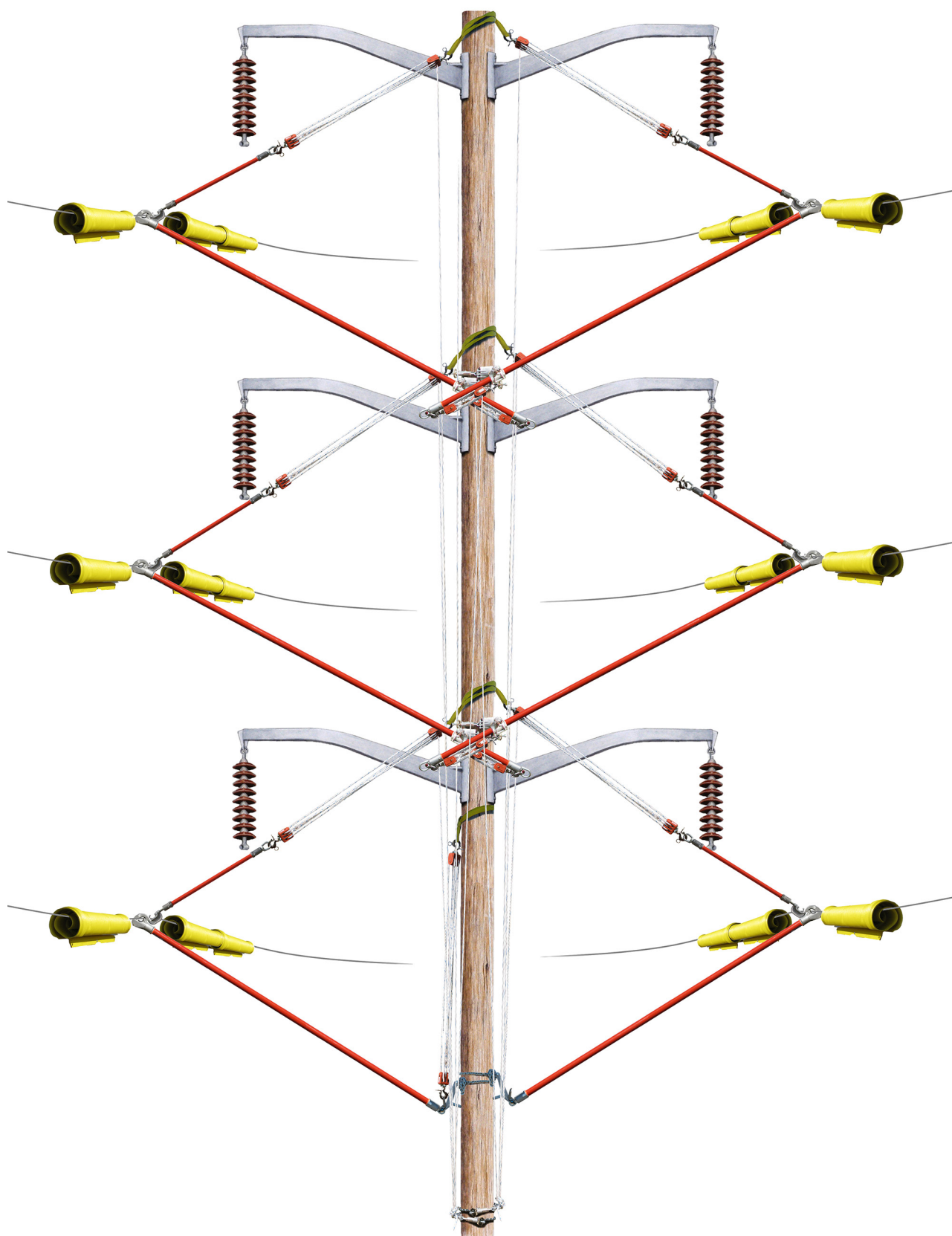


6. Install a nylon sling on the pole approximately 3' above the arm. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the butt ring of a 1-1/2" x 6' strain link stick. Attach the strain link stick to the conductor alongside the wire tong. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket.
7. If setting a new pole or removing and replacing the cross arm, the conductor should be covered before removal from the insulator string. The cover should be placed on the conductor on the side of the old pole where the new pole will be located, or both sides if removing and replacing an arm.
8. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull on the lever lift rope blocks fall line and raise the conductor slightly. The second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
9. When the conductor is free, have the ground help slowly release the tension on the strain link stick rope blocks. Working together, move the conductor out away from the pole until adequate working clearance is achieved. Have the ground help secure the strain link stick rope blocks fall line in the rope snubbing bracket. The set of rope blocks attached to the lever lift can be slacked to facilitate their removal.
10. Repeat these steps on the opposite lower phase conductor.
11. Move up to the center phase conductors. On the working side of the pole, attach a 2-1/2" wire tong saddle to the pole face above the bottom arm bracket. Install a 2-1/2" x 12' lifting tong on the conductor. Place the lifting tong into the wire tong saddle clamp. Tighten the saddle clamp just enough to allow the wire tong to slide through the clamp. Hang a set of rope blocks between the wire tong saddle clevis and the swivel ring on the bottom of the lifting tong. Have the ground help remove the slack from the rope blocks fall line and secure the fall line in a rope snubbing bracket.





12. Install a nylon sling on the pole above the center phase arm mounting brackets. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the butt ring of a 1-1/2" x 6' strain link stick. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket.
13. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull on the lever lift rope blocks fall line and raise the conductor slightly. The second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
14. When the conductor is free, have the ground help slowly release the tension on the strain link stick rope blocks. Working together, move the conductor out away from the pole until adequate working clearance is achieved. Have the ground help secure the strain link stick rope blocks fall line in the rope snubbing bracket. The rope blocks attached to the lever lift can be slacked.
15. Repeat these steps on the opposite phase conductor.
16. Repeat these steps on the top two phase conductors.
17. When all six conductors have been safely removed from the pole and securely supported, the insulators and arms can be removed safely. A new pole can now be installed if required.
18. When all replacement work is complete, move the conductors back into position or on to a new pole by reversing the removal procedure.





SS-1 Construction 60 kV

DWG. 052108

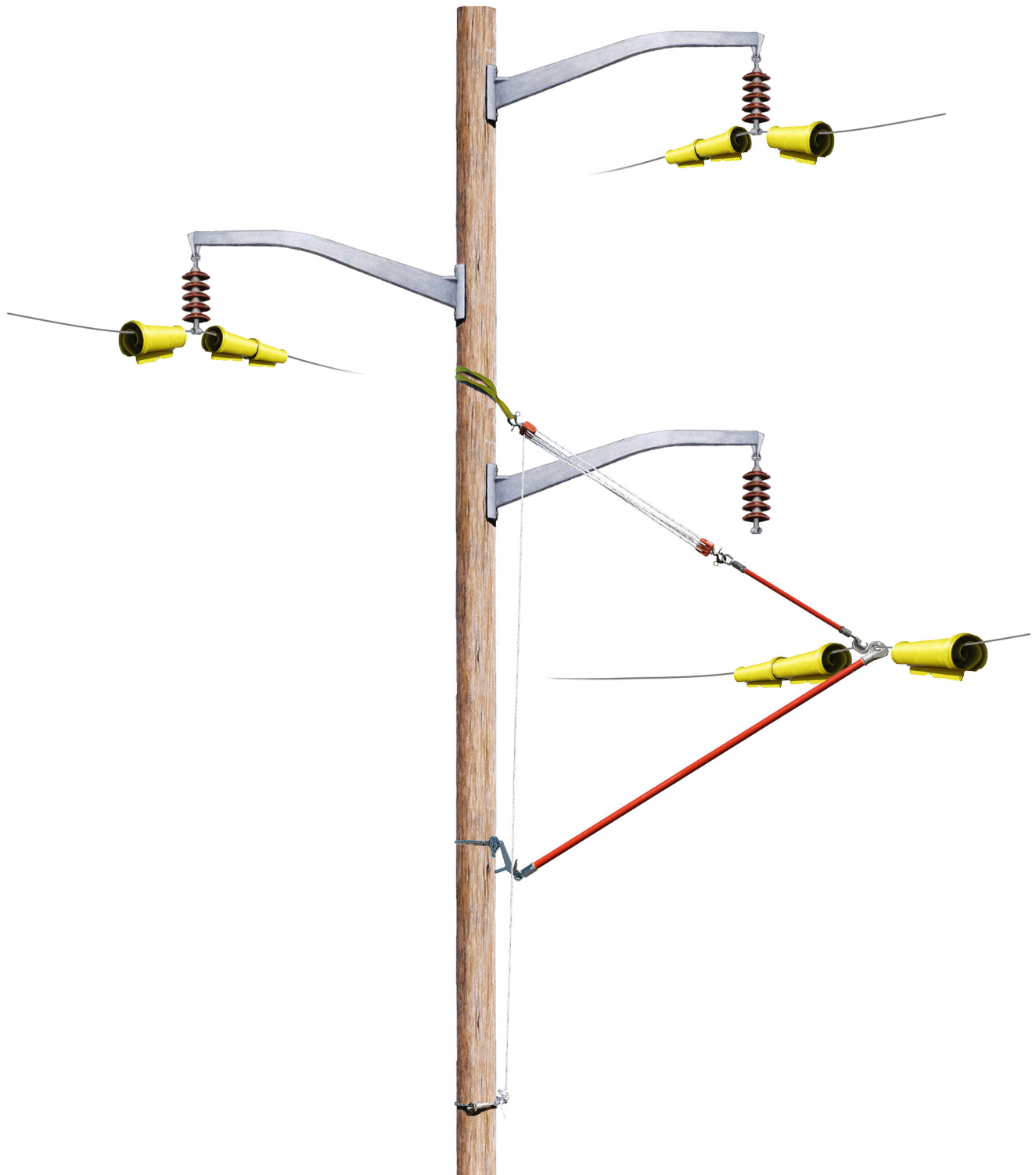
Insulator, Arm or Pole Change Procedure

Before removing any conductors from an existing pole, the condition of the adjacent poles, conductors and attachments must be visually inspected and determined to be in good condition before starting this procedure.

The condition of all involved poles must be determined safe to rig on or climb, if required.

Procedure

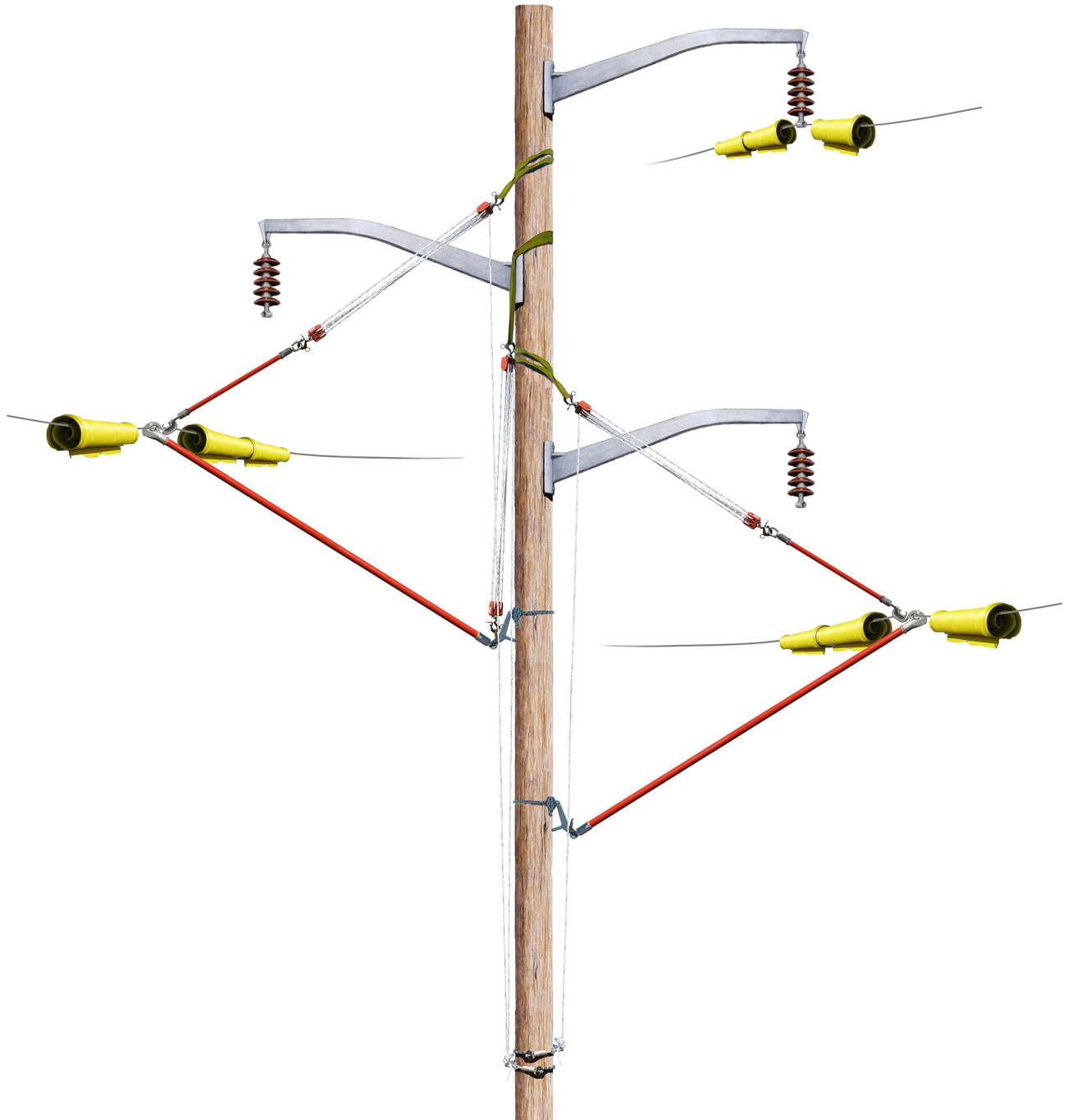
1. If a distribution circuit or conductors are located on the pole, they must be covered and then relocated onto extension arms or completely removed from the existing cross arm. A clear working space must be created in order to install rigging, climb through, or make room to set a new pole. If a new pole is to be installed, plan to set it as close to the old pole as possible.
2. On the bottom transmission phase conductor, attach the head a 2-1/2" x 12' lifting tong to the conductor with the jaw opening facing the pole.
3. Attach a lever lift to the swivel ring on the wire tong. Swing the lever lift and lifting tong butt to the pole and attach the lever lift to the pole in line with the wire tong attached to the conductor.
4. Install a nylon sling on the pole just below the arm. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the clevis on the lever lift. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket mounted on the pole about 4' above the ground.



SS-1 Construction — 60 kV

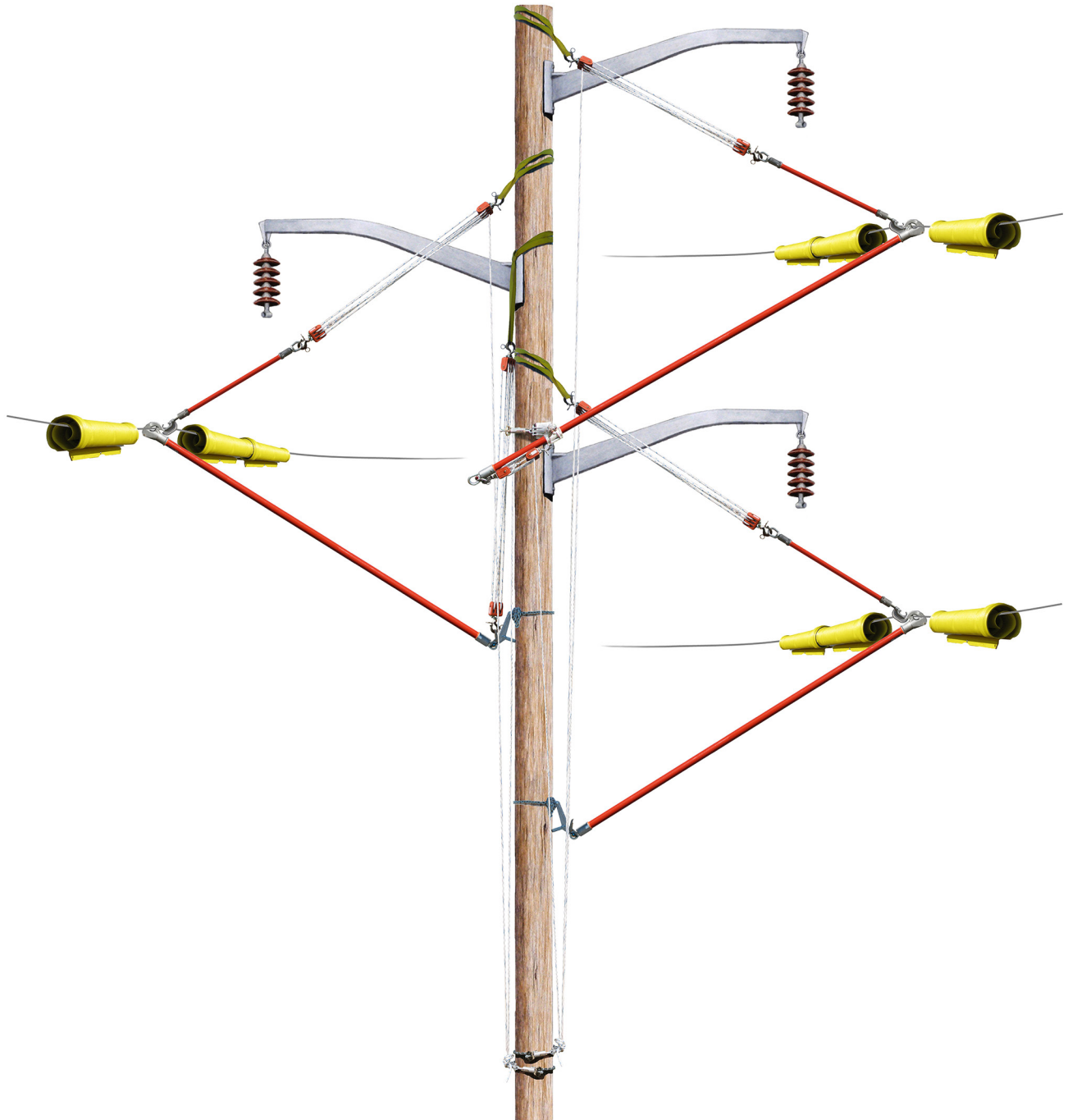


5. Install a nylon sling on the pole approximately 3' above the arm. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the butt ring of a 1-1/2" x 6' strain link stick. Attach the strain link stick to the conductor alongside the wire tong. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket.
6. If setting a new pole or removing and replacing the cross arm, the conductor should be covered before removal from the insulator string. The cover should be placed on the conductor on the side of the old pole where the new pole will be located, or both sides if removing and replacing an arm.
7. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull on the lever lift rope blocks fall line and raise the conductor slightly. The second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
8. When the conductor is free, have the ground help slowly release the tension on the strain link stick rope blocks. Working together, move the conductor out away from the pole until adequate working clearance is achieved. Have the ground help secure the strain link stick rope blocks fall line in the rope snubbing bracket. The set of rope blocks attached to the lever lift can be slacked to facilitate their removal.
9. Move up to the center phase and repeat these steps.
10. Move up to the top phase conductor. On the working side of the pole, attach a 2-1/2" wire tong saddle to the pole face above the bottom arm bracket. Install a 2-1/2" x 12' lifting tong on the conductor. Place the lifting tong into the wire tong saddle clamp. Tighten the saddle clamp just enough to allow the wire tong to slide through the clamp. Hang a set of rope blocks between the wire tong saddle clevis and the swivel ring on the bottom of the lifting tong. Have the ground help remove the slack from the rope blocks fall line and secure the fall line in a rope snubbing bracket.





11. Install a nylon sling on the pole, as high as possible, above the top arm mounting bracket. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the butt ring of a 1-1/2" x 6' strain link stick. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket.
12. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull on the lever lift rope blocks fall line and raise the conductor slightly. The second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
13. When the conductor is free, have the ground help slowly release the tension on the strain link stick rope blocks. Working together, move the conductor out away from the pole until adequate working clearance is achieved. Have the ground help secure the strain link stick rope blocks fall line in the rope snubbing bracket. The rope blocks attached to the lever lift can be slacked.
14. When all three conductors have been safely removed from the pole and securely supported, the insulators and arms can be removed safely. A new pole can now be installed if required.
15. When all replacement work is complete, move the conductors back into position or on to a new pole by reversing the removal procedure.





SS-1 Construction 115 kV

DWG. 052108

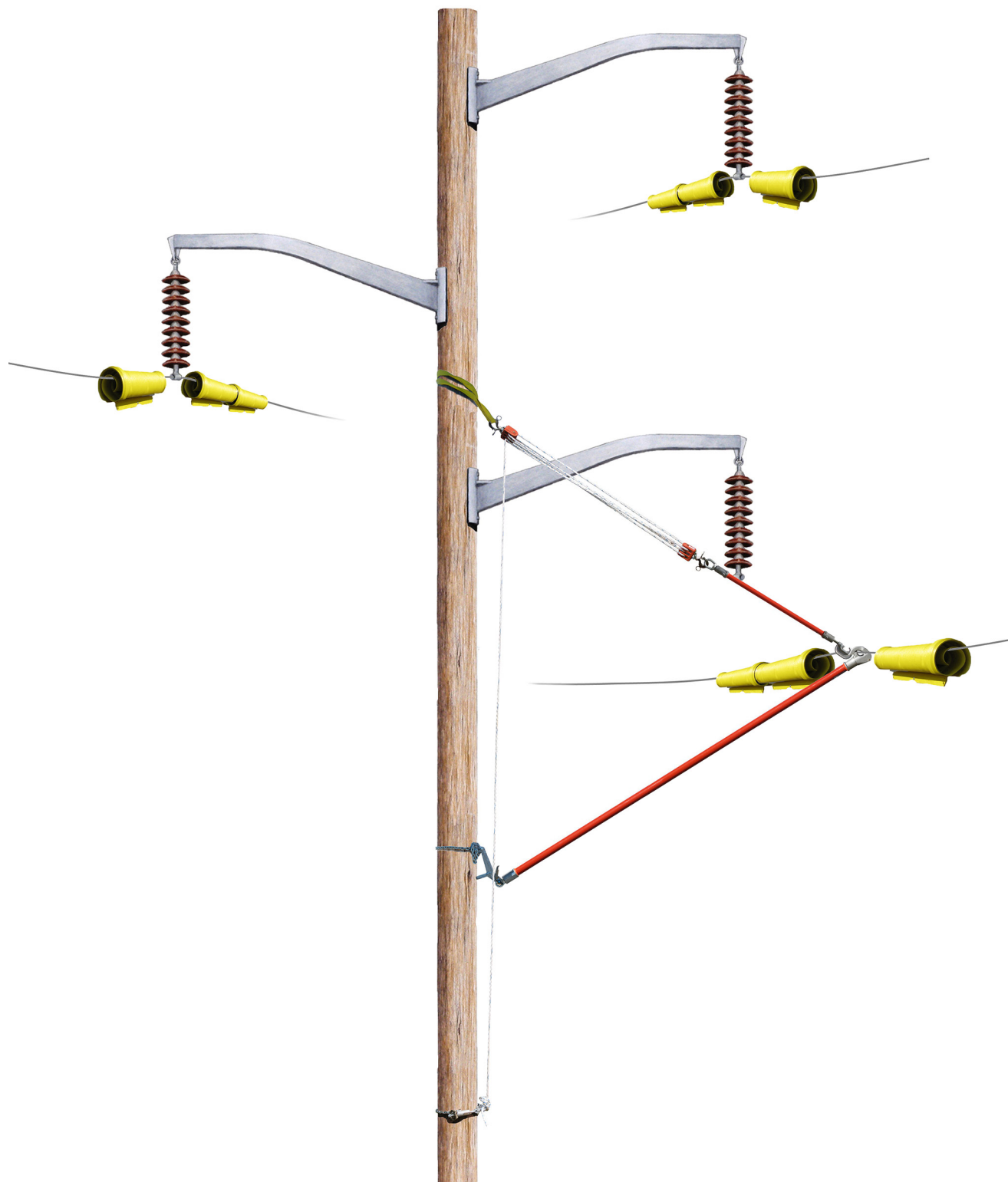
Insulator, Arm or Pole Change Procedure

Before removing any conductors from an existing pole, the condition of the adjacent poles, conductors and attachments must be visually inspected and determined to be in good condition before starting this procedure.

The condition of all involved poles must be determined safe to rig on or climb, if required.

Procedure

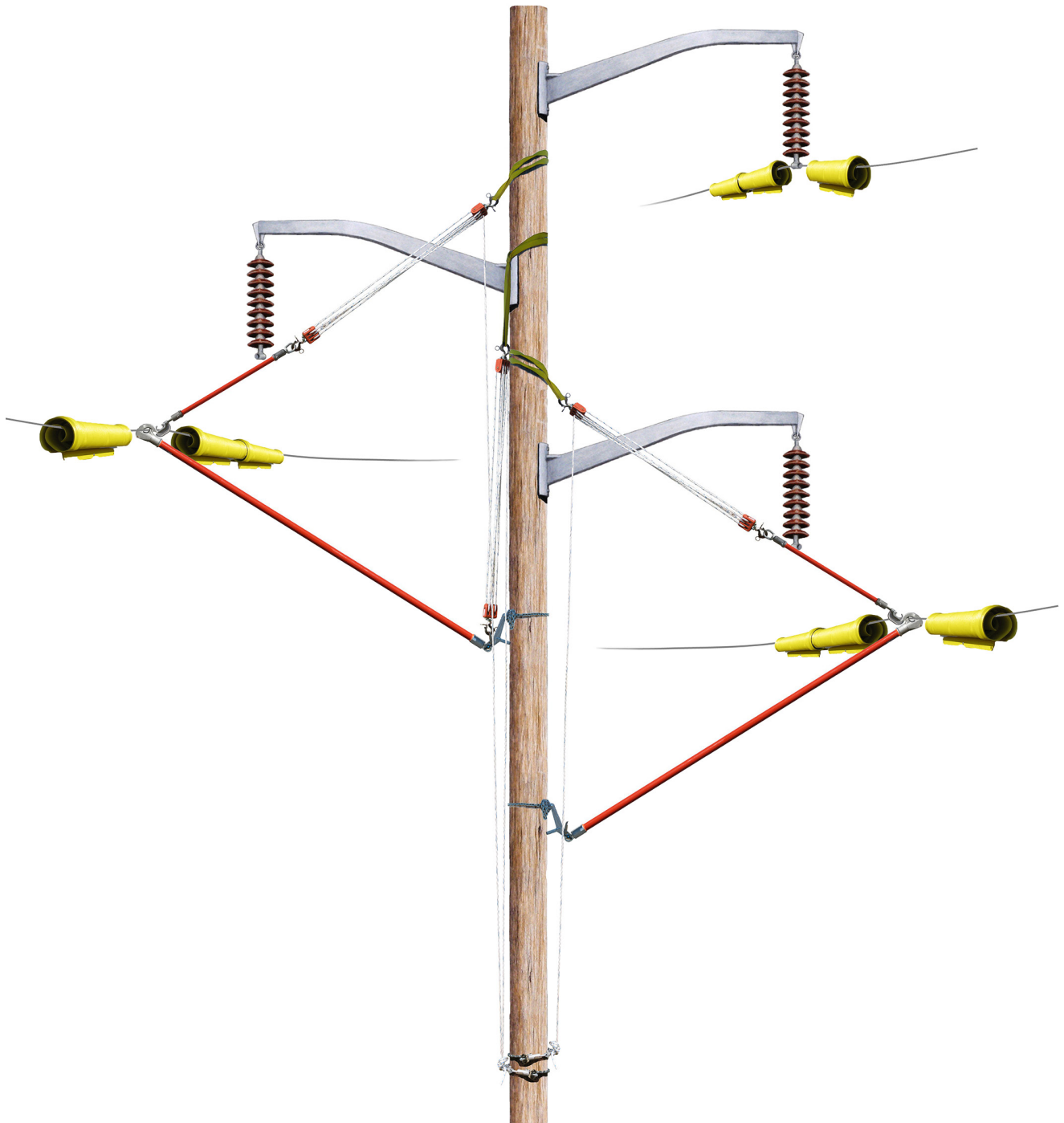
1. If a distribution circuit or conductors are located on the pole, they must be covered and then relocated onto extension arms or completely removed from the existing cross arm. A clear working space must be created in order to install rigging, climb through, or make room to set a new pole. If a new pole is to be installed, plan to set it as close to the old pole as possible.
2. On the bottom transmission phase conductor, attach the head a 2-1/2" x 12' lifting tong to the conductor with the jaw opening facing the pole.
3. Attach a lever lift to the swivel ring on the wire tong. Swing the lever lift and lifting tong butt to the pole and attach the lever lift to the pole in line with the wire tong attached to the conductor.
4. Install a nylon sling on the pole just below the arm. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the clevis on the lever lift. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket mounted on the pole about 4' above the ground.



SS-1 Construction — 115 kV

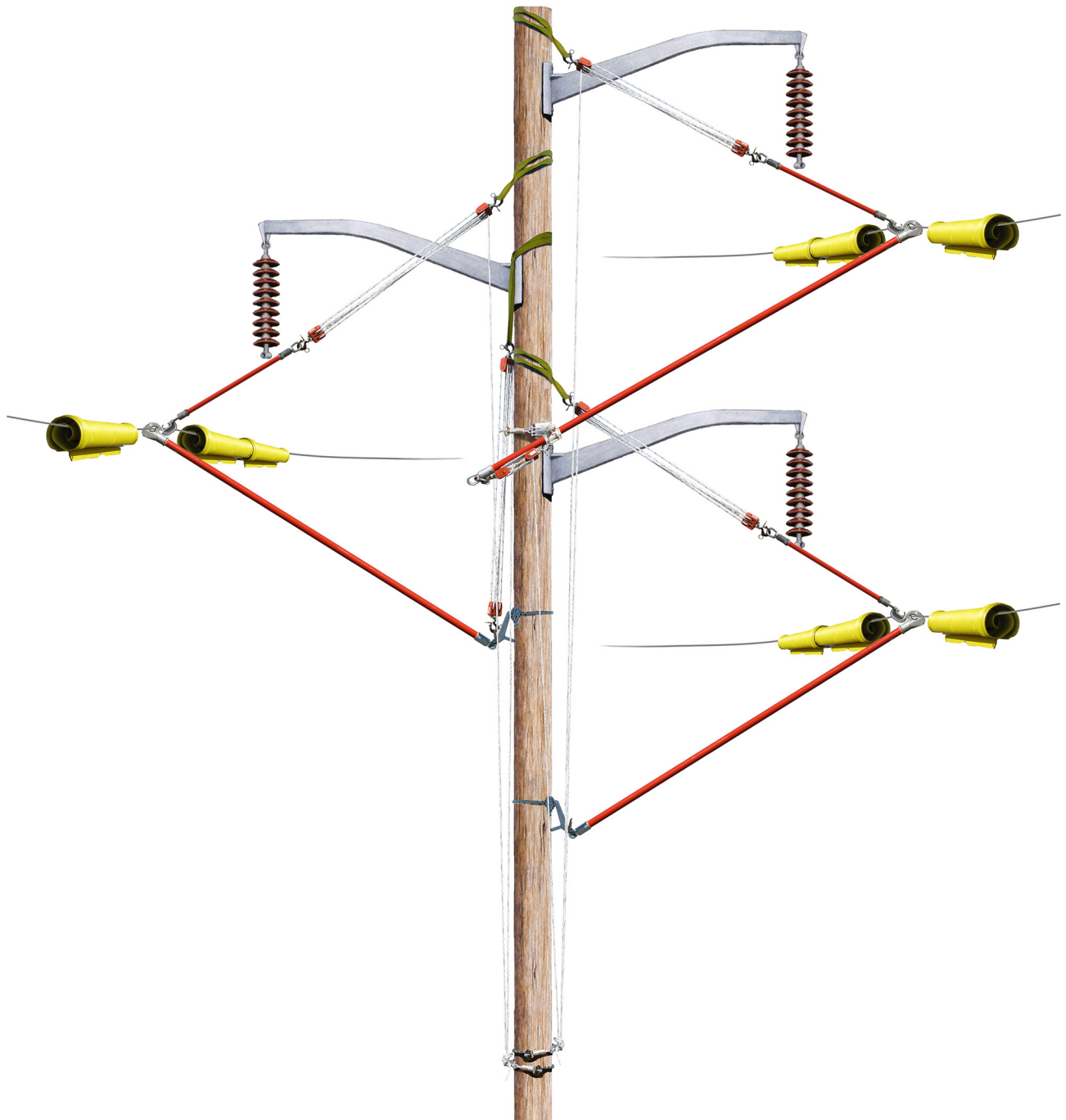


5. Install a nylon sling on the pole approximately 3' above the arm. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the butt ring of a 1-1/2" x 6' strain link stick. Attach the strain link stick to the conductor alongside the wire tong. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket.
6. If setting a new pole or removing and replacing the cross arm, the conductor should be covered before removal from the insulator string. The cover should be placed on the conductor on the side of the old pole where the new pole will be located, or both sides if removing and replacing an arm.
7. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull on the lever lift rope blocks fall line and raise the conductor slightly. The second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
8. When the conductor is free, have the ground help slowly release the tension on the strain link stick rope blocks. Working together, move the conductor out away from the pole until adequate working clearance is achieved. Have the ground help secure the strain link stick rope blocks fall line in the rope snubbing bracket. The set of rope blocks attached to the lever lift can be slacked to facilitate their removal.
9. Move up to the center phase and repeat these steps.
10. Move up to the top phase conductor. On the working side of saddle to the pole face above the bottom arm bracket. Install a 2-1/2" the pole, attach a 2-1/2" wire tong x 12' lifting tong on the conductor. Place the lifting tong into the wire tong saddle clamp. Tighten the saddle clamp just enough to allow the wire tong to slide through the clamp. Hang a set of rope blocks between the wire tong saddle clevis and the swivel ring on the bottom of the lifting tong. Have the ground help remove the slack from the rope blocks fall line and secure the fall line in a rope snubbing bracket.





11. Install a nylon sling on the pole, as high as possible, above the top arm mounting bracket. Place a set of rope blocks in the sling and attach the other end of the rope blocks to the butt ring of a 1-1/2" x 6' strain link stick. Have the ground help remove the slack from the rope blocks fall line and secure the line in a rope snubbing bracket.
12. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull on the lever lift rope blocks fall line and raise the conductor slightly. The second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
13. When the conductor is free, have the ground help slowly release the tension on the strain link stick rope blocks. Working together, move the conductor out away from the pole until adequate working clearance is achieved. Have the ground help secure the strain link stick rope blocks fall line in the rope snubbing bracket. The rope blocks attached to the lever lift can be slacked.
14. When all three conductors have been safely removed from the pole and securely supported, the insulators and arms can be removed safely. A new pole can now be installed if required.
15. When all replacement work is complete, move the conductors back into position or on to a new pole by reversing the removal procedure.





H-Frame Suspension Structure 115 kV

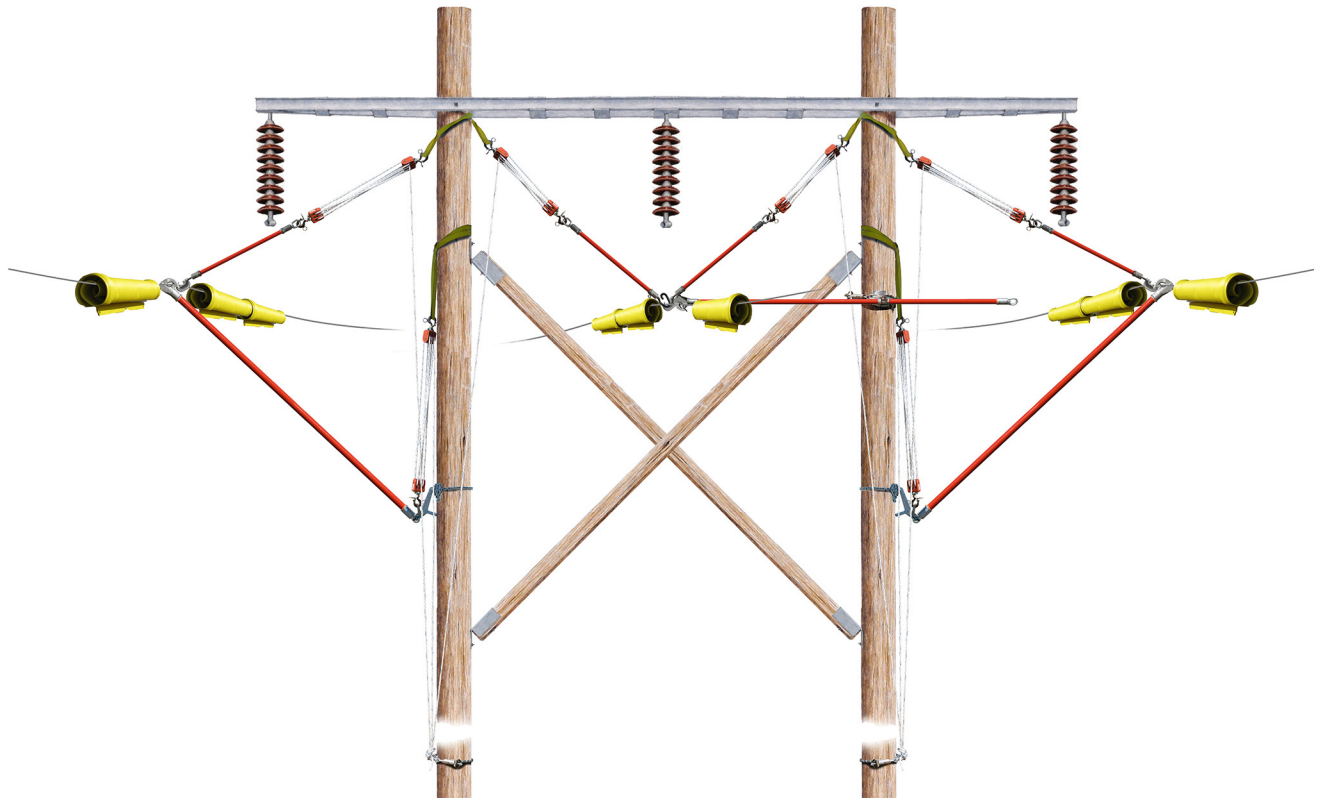
Insulator, Cross Arm or Pole Change Procedure

Before removing any conductors from an existing pole, the condition of the adjacent poles, conductors and attachments must be visually inspected and determined to be in good condition before starting this procedure.

The condition of all involved poles must be determined safe to rig on or climb, if required.

Procedure

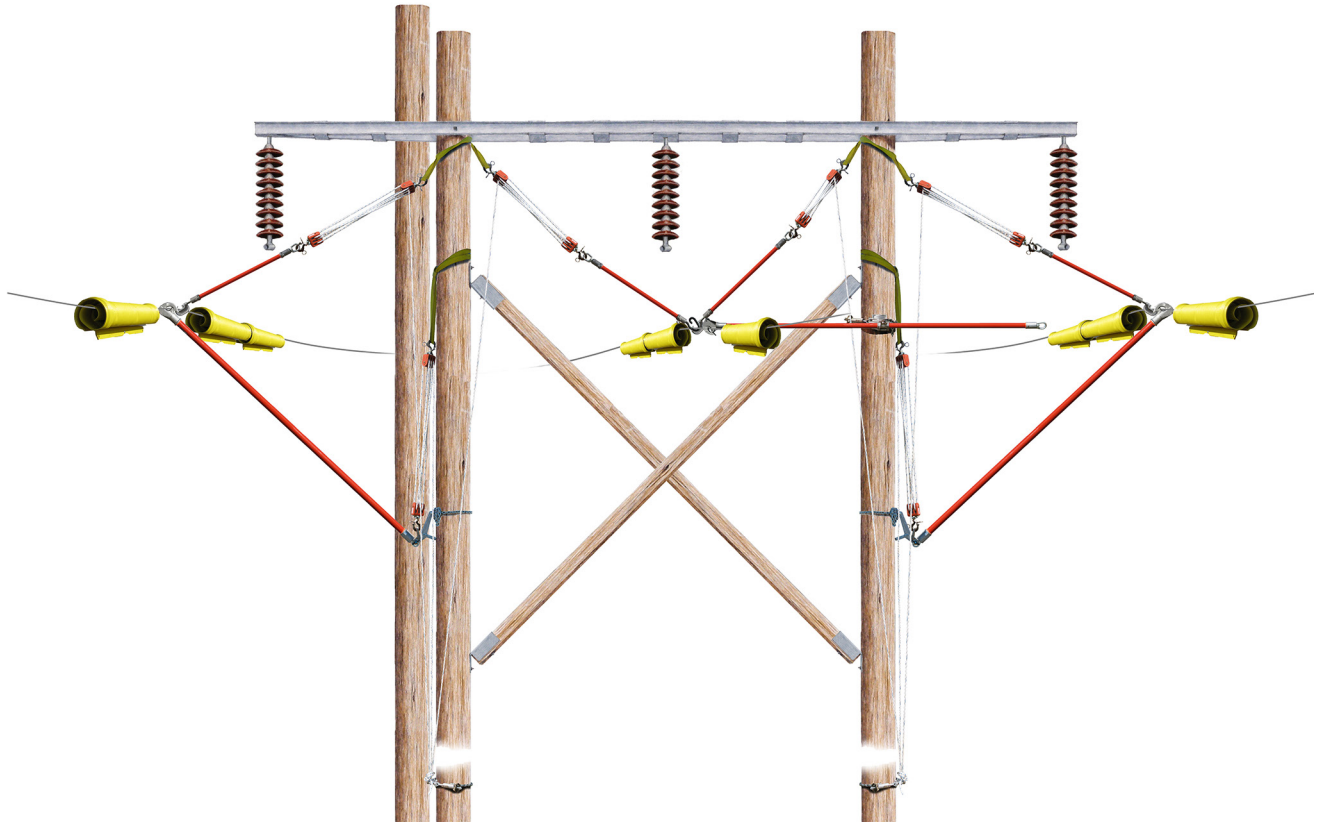
1. If a distribution circuit or conductors are located on the pole, they must be covered and then relocated onto extension arms or completely removed from the existing cross arm. A clear working space must be created in order to install rigging, climb through, or make room to set a new pole. If a new pole is to be installed, plan to set it as close to the old pole as possible.
2. On the first outside transmission phase conductor to be moved, attach a 2-1/2" x 12' lifting tong to the conductor with the jaw opening facing the pole.
3. Swing the lifting tong butt to the pole to locate and mark the mounting position on the pole for a lever lift.
4. Attach the lever lift to the pole in line with the wire tong attached to the conductor a few inches above the position marked on the pole by the wire tong swivel butt ring. Swing the lifting tong butt to the pole and lift the wire tong and pin it to the lever lift. This will push the conductor out slightly.



H-Frame Suspension Structure — 115 kV

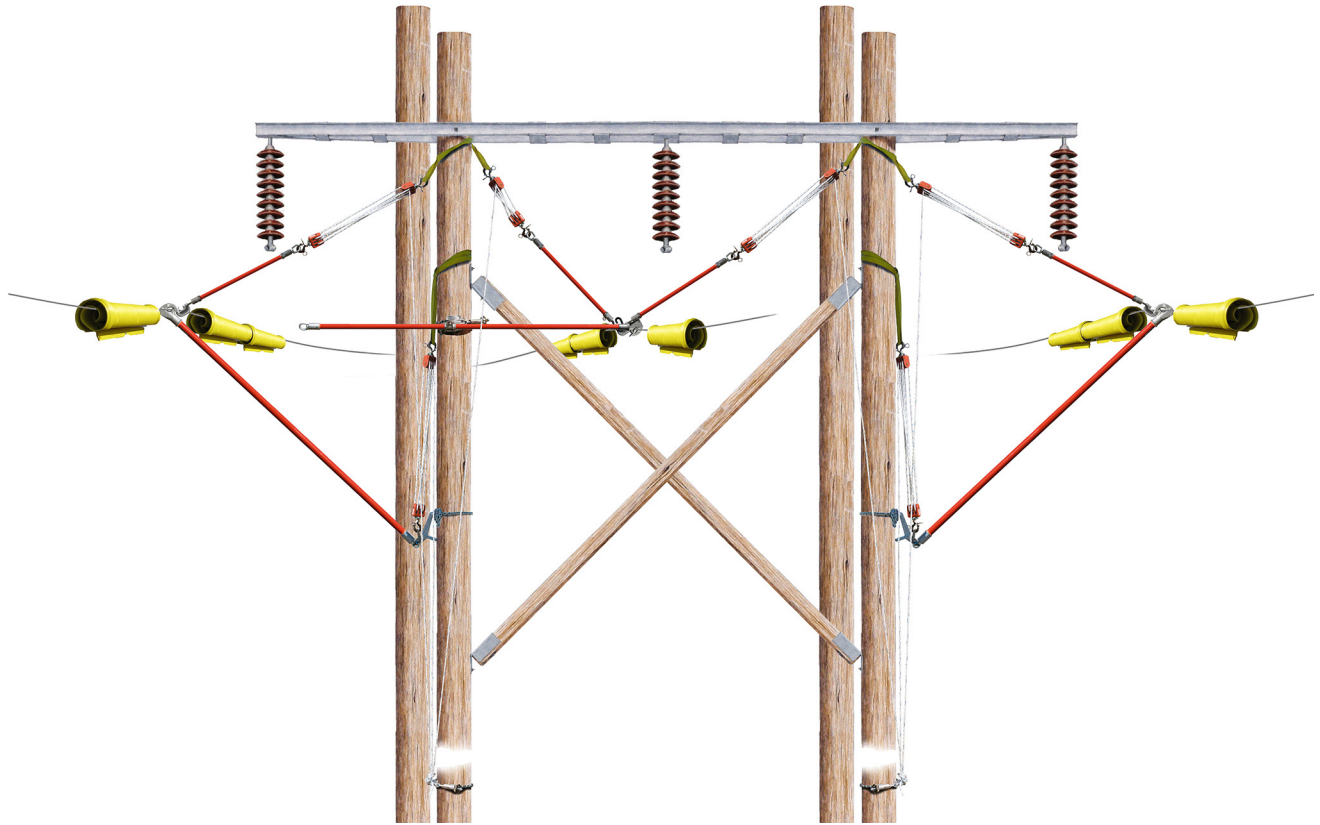


5. Use a universal stick and shotgun stick to choke a nylon sling around the pole top as high as possible with the sling eye facing the conductor to be moved. Make certain that the sling doesn't lay on any sharp edges or bolts on the arm. Hang a set of rope blocks in the sling and attach the rope blocks to the butt ring of a 1-1/2" x 6' strain link stick. Attach the strain link stick to the conductor alongside the wire tong. Have the ground help remove the slack from the rope blocks fall line and secure the fall line in a rope snubbing bracket mounted about 4' above the ground. If setting a new pole or removing and replacing the arm, the conductor should be covered before removal from the insulator string. The cover should be placed on the conductor on the side of the old pole where the new pole will be located, or both sides of the pole if removing and replacing the arm.
6. A lineman using a universal stick with a cotter key puller attachment can release the cotter key in the ball joint connected to the conductor clamp. This lineman can now clamp the bottom insulator in the string just above the bell with an adjustable insulator fork attached to the other end of the universal pole. Have the ground help pull the rope blocks fall line attached to the strain link stick to raise the conductor slightly. A second lineman utilizing a ball and socket adjuster mounted on a universal pole can disengage the ball-socket joint.
7. When the conductor is free, the ground help can slowly release the tension on the strain link stick rope blocks. Use a universal stick to guide the conductor away from the pole. Move the conductor out away from the pole until adequate working clearance is achieved.
8. Repeat these steps on the opposite outside transmission phase conductor.
9. Prepare to move the center phase conductor. Choke a sling around each pole top as high as possible. Hang a set of rope blocks from each sling. Attach a 1-1/2" x 6' strain link stick to each set of rope blocks.
10. Attach the strain link sticks to the center conductor. Have the ground help remove the slack from both of the rope blocks fall lines and secure each fall line in a rope snubbing bracket mounted about 4' from the ground on each pole.





11. If replacing one or more poles, install a 1-1/2" wire tong saddle on one of the poles just below the center conductor. Attach a 1-1/2" x 10' holding tong to the center phase conductor and put the holding tong in the wire tong saddle clamp. Close the clamp and tighten.
12. If conductor cover is required, install it now. Release the cotter key. Have the ground help raise the conductor slightly, and then disengage the ball-socket joint. Loosen the wire tong saddle clamp. Working with the ground help, lower the conductor and push the holding tong through the wire tong saddle clamp to move the conductor out and away from the old pole where the new pole will be set. Working together, control the conductor and move it until adequate working clearance is achieved.
13. With all three conductors removed from the insulators and securely supported, the insulators and arm can be removed safely. A new arm, new insulators or poles can now be installed if required.
14. When all replacement work is complete, move the conductors back into position or on to a new pole by reversing the removal procedure.



Insulator, Cross Arm or Pole Change Procedures



Live-Line Procedures Manual