



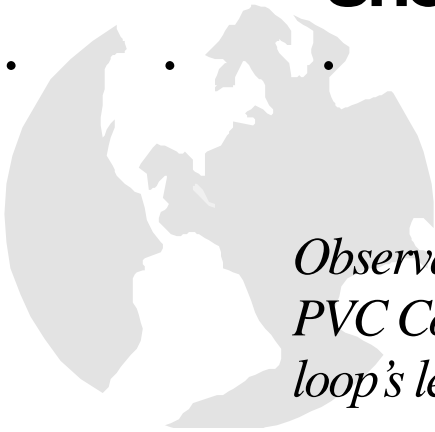
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# **BD Loops**

## **PVC Conduit and Jacketed Wire “Shovel” Test**



*Observations of the added protection of  
PVC Conduit when used to protect the  
loop’s lead-in*



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# PVC Conduit and Jacketed Wire “Shovel” Test

*Observations of the added protection of PVC Conduit when used to protect the loop’s lead-in*

## **Purpose:**

- Observe and record the possible damage a shovel can do to PVC conduit, BD Loops jacketed wire, and other manufacturer’s preformed loop jacketed wire.

## **Hypothesis 1 (Jacketed Wire):**

If a shovel is dropped on Jacketed (PVC, PE, and XLPE) Wire the wire will become damaged enough to cause a short to ground. (copper exposed)

## **Hypothesis 2 (PVC Conduit):**

If a shovel is dropped on (rigid schedule 40) PVC Conduit then the shovel will not pierce the PVC Conduit.

## **Materials:**

- 6” section of BD Loop’s preformed Direct Burial Loop wire (Flat PVC Jacket, PE Insulation)
- 6” section of BD Loop’s preformed Direct Burial Lead-in wire (Round PVC Jacket, PVC Insulation)
- 6” section of BD Loop’s preformed Saw-cut Loop (and lead-in) wire (Flat PE Jacket, PE Insulation)
- 6” section of XLPE preformed Loop wire (manufacturer identity to remain anonymous) (Round XLPE Jacket, XLPE Insulation)
- 10’ piece of ½” schedule 40 rigid PVC conduit
- Modified compact shovel with attached weights to weigh 6lbs. Added a 12” structured bolt to allow a controlled drop through guides. Overall Shovel length 44”
- “Shovel Guillotine” base to control drop height and direction. Made of wood, 4” eye hooks, and screws of various length.

**Procedure:**

The “Shovel Guillotine” was positioned in an open space. Several test drops of the shovel were done to insure the drop height and positioning were the same for each drop. Drop height is 6” (+/- 1/2”).

The 6” section of BD Loops Direct Burial wire (flat PVC Jacket, PE Insulation) was positioned within the shovel drop zone. Shovel was raised and dropped. Damage was pictured and documented. The above process was repeated for all other wire types.



*Example of Drop Height with XLPE wire in position*



*BD Loop's Preformed Direct Burial Loop Wire*



*BD Loop's Preformed Direct Burial Lead-in Wire*



*Example of Drop Height with PVC conduit in position*



*BD Loop's Preformed Saw-cut Loop (and lead-in) Wire*



*XLPE Preformed Loop Wire*

The 10' piece of 1/2" schedule 40 rigid PVC conduit was positioned within the shovel drop zone. Shovel was raised and dropped. Damage was pictured and documented. Little damage was sustained and so the shovel drop was repeated 2 more times. Damage was pictured and documented.



*1/2" schedule 40 rigid PVC conduit*

Results:

Wire Results:

Wire Manufacturer/Type	Material	Jacket Pierced?	Insulation Pierced?	Copper Severed?
BD Loop's Preformed Direct Burial Loop Wire	Flat PVC Jacket, PE Insulation	Yes	No	No
BD Loop's Preformed Direct Burial Lead-in Wire	Round PVC Jacket, PVC Insulation	Yes	No	No
BD Loop's Preformed Saw-cut Loop and lead-in Wire	Flat PE Jacket, PE Insulation	Yes	Yes, Copper Exposed. Would short to ground.	No
Anonymous Manufacturer	Round XLPE Jacket, XLPE Insulation	Yes	Yes, Copper Exposed. Would short to ground.	No

*Wire Results Recorded.*

Results show a jacketed wire cannot withstand a direct drop of a shovel. If copper is ever exposed once installed the loop could possibly short to ground resulting in a failure, or intermittent problems.



*BD Loop's Preformed Direct Burial Loop Wire*



*BD Loop's Preformed Direct Burial Lead-in Wire*



*BD Loop's Preformed Saw-cut Loop (and lead-in) Wire*



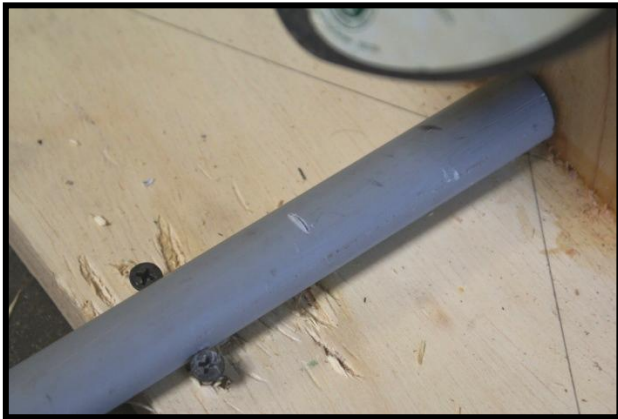
*XLPE Preformed Loop Wire*

## PVC Conduit Results:

Material/Type	Drop 1 Peirce?	Drop 2 Peirce?	Drop 3 Peirce?
½" schedule 40 rigid PVC conduit	No	No	No

*PVC Conduit Results Recorded.*

Results show PVC Conduit can easily withstand a direct drop of a shovel. This added protection provided by the PVC conduit could prevent failures and intermittent problems.



*½" Schedule 40 Rigid PVC Conduit after the **first** drop.*



*½" Schedule 40 Rigid PVC Conduit after the **third** drop.*

### Conclusion 1 Jacketed Wire:

Jacketed Wire cannot reliably withstand a drop of a shovel which can result in a loop shorting to ground, failure, and possible intermittent problems.

### Conclusion 2 PVC Conduit:

PVC Conduit can withstand a drop of a shovel providing more protection than jacketed wire alone.

### What this means, **BD Loops** comments and Overall Conclusion:

The result of our testing shows that the loop lead-in should always be run through conduit because PVC conduit adds more protection to the loop than a loop's jacket and insulation alone. To protect against construction crews, gardeners, and even annoying rodents. Running the loop lead-in through conduit and properly sealing the joint is an inexpensive way to add a lot of protection to the loop. Regardless of which loop or preformed loop is being used the lead-in run should be run through conduit for the added protection. If we all continue to follow best installation practices your installations, company, and our industry will have a better reputation and payoff in the long term.