Crimp Connections.

Far too many of us are chasing electrical gremlins. I'll wager that 90% of the hair-pulling going on is due to poor connections. The other 10% is truly a defective component.

Basically there are 2 types of electrical connections:

Physical
Mechanical

Physical: A "Physical" connection is an electrical connection achieved by "bonding" the conductors via welding or soldering. The two (or more) conductors are *permanently connected* by melting or bonding. The joint cannot go bad unless the point of connection physically fails or is broken.

Mechanical: A "mechanical" connection is an electrical connection achieved by friction, crimping, or contact. The connection relies on the contact (touching) of two conductive mediums to make a circuit. Herein are most of the problems.

(Failure of a "physical" connection is obvious. You have a broken wire or connection point at a device. Most of this text will deal with "mechanical" connections, which brings us to….)

What makes a good "Crimp Terminal Connection", and how to do it!!

Crimp Connector 101

Crimp connectors are wonderful things. An easy, inexpensive way to make what would be a difficult or expensive connection. We all have the remnants of a $ 1.99 assortment pack floating around the workshop. There are also 199 ways to make a WRONG connection with a crimp terminal or 99 cent tool.

****** "Scotch-Lok" Connectors******

These things should be banned. They are the plastic things you stick one wire through, the other into, and squeeze with a pliers. They were designed so U-Haul could make quick connections for trailer rentals, and have NO PLACE ANYWHERE for making a good, permanent electrical connection. Now that my personal pet-peeve has been aired…..

Crimp/Stripper Tools:

Just about everyone has an "electrical connector multi-tool" in their kit. They will have an assortment of stripper gages, and crimping dies. They usually fall into one of two types:

A. A cutter, and 2 or 3 "elliptical" crimp dies at the tip, with stripping dies after the hinge.
B. Pliers, then stripping dies, a cutter, then 2 or 3 "peg and ½ circle" crimping dies after the hinge.

Look for a tool that has what I call the "peg and ½ circle" crimping dies. It's usually the "B" type (Craftsman #82563) and has a rounded "peg" on ½ the tool, and a mating ½ circle on the other half.

Stay away from the tools that use the "1/2 ellipse - smash" type dies. They won't produce reliable crimps and are junk! Look and buy a good tool!

Stripping Wire:

This seems to be an overly-simplistic thing, but too many people do it WRONG!

A. Choose the strip die to match the wire gage
B. Look at your connector – only strip off as much insulation as needed to expose copper to the mating surfaces of the connector.
C. Close the tool squarely around the wire
D. Squeeze (cutting the insulation)
E. Let up a bit on the "squeeze" and pull the insulation off.

A properly stripped wire will have only as much insulation needed removed (bare copper won't be visible outside the connector), the copper strands will still be compacted, and not have any nicks or strands cut loose!

Crimp Connectors:

A. If a properly stripped wire won't slide into the hole of a connector, *you have the wrong gage connector!* DO NOT cut off wire strands to make the wire fit into the connector – get the proper size connector!
B. Don't try and use an oversize connector for a small size wire – you won't get a reliable connection.
C. ***There is an "upside" and an "upside-down" to a crimp connector***. Look at the connector or inside the round hole. The round hole is formed by rolling flat metal into a circle, and you will usually see a seam (remember this – see Crimping).

Crimping:

A. Properly strip your wire.
B. Insert the bare conductors into the connector (make sure there are no "strays" hanging out).
C. Orient the connector with the seam "up".
D. Put the crimp tool on the connector, with the **"peg"** on the OPPOSITE side of the seam, in the middle of the crimp area.
E. Squeeze firmly.
F. Tug on the connection to verify a good crimp.

This is why I prefer the "peg & ½ circle" crimp. By design, the crimp pushes the "meat" of the connector up into the wire, and "rolls" the seam down into the center. It results in a very firm mechanical connection.

The "1/2 ellipse" crimp dies just smash the connector down on the wire, not "rolling" the connector's metal around the wire. The "ellipse"style crimp allows the wire to slide to the sides and not get mechanically crushed to the connector body.

(Most factory crimp connections are made with a specialized tool/die that form a "B" shaped crimp, with a secondary crimp on the insulation (stress relief) of the wire. This is done with an automated machine, and the connectors are on a strip or "gun belt" feeding the machine. These connectors and corresponding crimping tools are available on a "one'sey – two'sey" basis through specialized outlets, but are ***expensive!*** A hand tool with dies to crimp 18ga. and 20ga. wire is about $95.00, and you'll have to buy about 200 connectors.)