Cutting the wire

Problems with cable harness and connector systems often begin with improper or accidental cutting of wire strands while stripping cable insulation. Each strand is important, and all of them must be included in the terminal to avoid unnecessary problems. Shortcuts can lead to wire failure. When removing insulation from any wire for connection or termination, nicking the conductor is all too possible, and it has serious consequences. There are enough problems with connections. Why cause a problem because the connection to the terminal is poorly stripped?

For cutting wire it is best to use a shear-type cable cutter, in which the blades pass by each other. The scissor cut produces a nice squared-off end instead of mashing and distorting the wire. The way the wire is cut may affect subsequent stripping operations. Diagonal cutters (where the blades contact each other) are commonly used for wire cutting and tend to “bite” the wire in half. This action distorts the conductor and flattens the ends of the strands which increases strip force and the tendency for the strands to splay during stripping.

IDEAL wire cutters produce a clean cut through the insulation

Diagonal cutters do not cut cleanly and decreases the quality of the strip

Stripping the Insulation

A wire-stripper may actually remove a strand or two along with the insulation, leaving a shortage of conductors at the termination. This creates a bottleneck, overburdening the unimpaired conductors and making them prone to failure with possibly intermittent strands — all of which can produce extra heat, circuit noise, and/or changes in resistance. With vibration or even a small amount of stress, a "mere" nick can develop into a crack which may break and fail, almost always long after the connection has been made.

You cannot "fix" a nicked or broken conductor: cut it off and start fresh, and when you do, be sure to use tools which will sever only the insulation, staying clear of the conductor below.

Stripping Tools

The purpose of a wire stripping tool is to remove the insulation from around the copper core of a cable without damaging the cable

Thermal strippers are the kindest to the wire and will soften most insulation materials, and are available in hand-operated or bench types.

Motorized hand and bench strippers have a spinning collet, which receives the wire. Adjustable blades can be set to a uniform insulation depth and will slice and then remove the "slug" of insulation without damage to the conductor.

Pliers or scissor action strippers, with one or a range of slots for different gauge diameters, are inexpensive, handy, and perform ok, provided the correct slot is chosen, the wire is well centered in the slot, and the cycle is smoothly performed. Inexpensive stripping pliers may also have one or more sharpened notches, often V-shaped, they are a poor choice, requiring considerable care, and some means of limiting their closure. Side or diagonal cutters are always handy but also a poor choice, relying on just the opposing edges (usually dull and better at holding than cutting insulation). Diagonals grab and stretch the insulation to the breaking point in order to remove it. This process also leaves the length of the strip rather unpredictable due to the stretching. This tool is truly designed for simply cutting wire, but even so, it is inferior for that purpose.

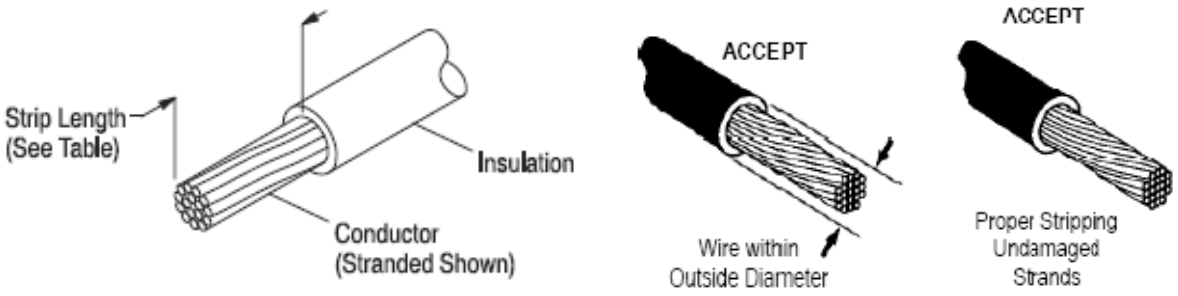
Always use the “shear type” stripper as these tend not to damage or crush the conductors. Mechanical die type blades for precision stripping are preferred. These blades come with a wedge shaped or counter bored cutter blades that lead towards nick free strips. They are designed specifically for the insulation material and construction of each wire.

The Ideal Stripmaster is the recommended tool for manual wire stripping:
Model 45-092 (10-22 gauge) or
Ideal Custom Stripmaster:
Model 45-170 (10-14 gauge) and 45-171 (16-26 gauge)

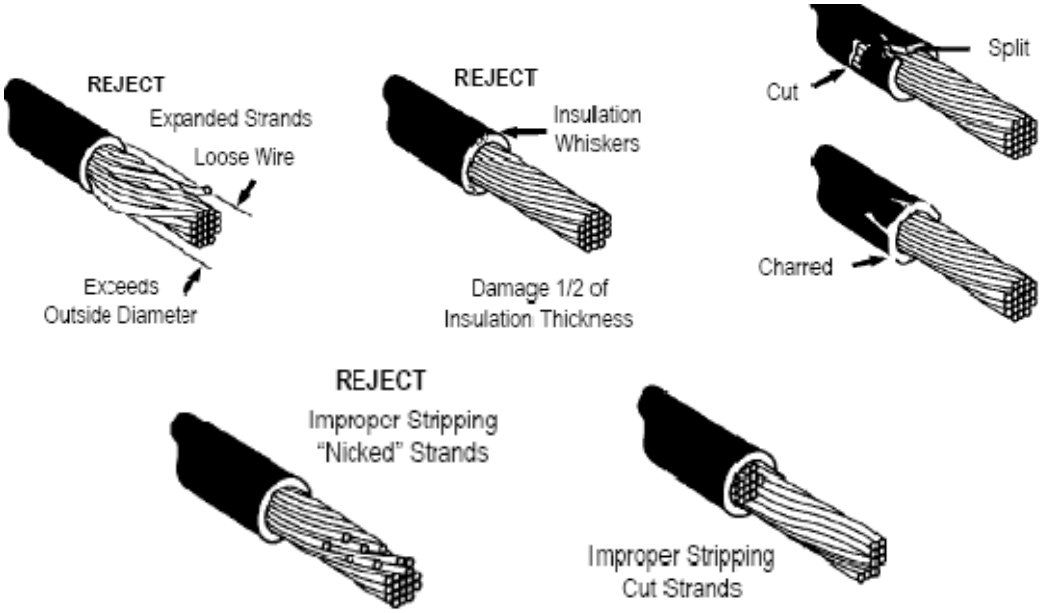
Select the Correct Gauge Hole

Select the hole in the wire stripper that is closest to the diameter of the core in the cable to be stripped. Counter bored die-type blades help greatly in centering the wire.

Place the cable in the hole, and close the jaws firmly around it to cut the insulation. If you have selected the right gauge, this will cut through the insulation but not through the copper core. Only remove as much insulation as specified for the terminal **strip length**. The insulation jacket has been neatly trimmed, with no edge flash and no mechanical damage to the conductor or insulation. Conductor stranding exhibits a normal twist pattern (lay).



Loose wire strands are common cause of crimping problems. If all the wire strands are not fully enclosed in the conductor Crimp Section, both the strength of the crimp and the current carrying capability may be greatly reduced and the crimp will not perform to specifications. Generally, the problem of loose wire strands is very easy to solve by simply gathering the wires back into a bunch before inserting them into the terminal to be crimped. The strands may have been inadvertently separated during the handling or bundling process if stripping the insulation from the wire is done as a separate operation. Using a "strip and retain" process for insulation removal, where the insulation slug is not completely removed from the wire until it is ready to have a terminal crimped onto the wire, helps minimize the problem.



REFERENCES for this paper

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