Subject: Re: [c-a] crimping or soldiering electrical terminals
Date: Sun, 27 Oct 2002 08:56:00 -0700
From: "Scott Derrick" <scott@tnstaafl.net>
To: "Len Johnson" <lgjohnson@adelphia.net>, <Canards@tnstaafl.net>,
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Len,

Great expo on soldering.

Though I do think the judicious use of a torch on very large connections is acceptable. It does require a delicate touch or you will overheat the wire at the connection. Using a large wattage iron on large connections can take overly long to get the joint up to the solder's melting point that the heat wicks up the wire and you cook the insulation.

As in all things that have to do with soldering, as you and Bob N. agree, it takes practice. Crimping with a ratchet type crimper can be done by just about anybody with a minute of practice. Soldering on the other hand requires a longer learning curve. And some folks just aren't willing to take the time.

Scott

From: "Len Johnson" <lgjohnson@adelphia.net>
| It's worth noting that, at least with smaller wiring, the 'experts' are
| split. King terminals remain crimp-on, while Garmin and others utilize
| pins with solder cups. The latter simply can't be crimped. I've seen
| King terminals pull loose during Avionics upgrades. Properly soldered
| terminals won't do that. Nor do properly soldered wires become brittle.
|
| Here's my technique:
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| 1) Make sure wires to be soldered are perfectly clean. If you stripped
| them yesterday, cut and strip again today. Don't handle bare wire with
| dirty hands- wash first. No grease, no oil, no nothing.
|
| 2) Use liquid flux on the bare wire and terminal and apply it with a
| small, clean brush wherever you want solder to stick. The
| brush-in-bottle kind is perfect. Use flux designed specifically for
| electronics that does not leave a residue after soldering. It will say
| so on the bottle.
|
| 3) Immediately tin the wire and terminal, or both wires if it's a
| wire-to-wire joint. (Tinning means to apply just enough solder to coat
| the area to be soldered on a terminal, or to turn the stripped portion
| of the wire a bright silver prior to actually putting the two pieces
| together.
|
| Wire will 'wick' the solder up; you don't have to move it around.) Use
| a damp sponge to clean the iron, put a small dab of new solder on the
| tip, and transfer heat through that dab of solder. If the liquid flux
| had time to dry before you tin, start over.
|
| 4) Use an appropriate wattage; 40 for larger wires and terminals, 25 for
| everything smaller. If you need a torch for electrical work, you don't
| need solder. Be patient with your iron and give it time to properly
| heat. Never solder with a warm iron.
|
| 5) Don't use too much solder or take too long at it. It really doesn't

take much of either to tin using this technique. You should not have blobs of solder anywhere, nor should you singe any insulation.

6) You never have to put a curve in a solder joint. The wire is always tinned straight. To solder two pieces of wire together, just place the tinned ends side by side and heat briefly. No additional solder is needed.

7) I prefer 63/37, because it has a very narrow liquid to solid heat range. If you move a solder joint after removing the heat and before it's solid, you may have fractured the joint. This may not be visible externally.

8) Even though there is no requirement to clean the residue after soldering, I try to keep a small bottle of alcohol and some qtips and cotton swabs handy to clean the area afterwards. Not neccessary, but professional. The liquid flux becomes sticky and whatever it drips on will hold dirt.

9) Always use shrink tubing to protect your solder joints wherever possible. Use the good stuff that starts out very flexible. The stiff, shiny radio shack stuff becomes too brittle after heating. If you forget to slide it on before soldering a joint and can't get it on afterwards, take the joint apart and start over.

Don't use electrical tape for any reason on any solder joint; it will not age well. Don't use a match or torch on heat shrink; use a heat gun, and use just enough heat. You don't want the shrink tube to become brittle or to split. If a joint has sharp edges, smooth these before applying the shrink tube so the edge doesn't work through the tube over time.

10) As in all skills, practice makes perfect. Practice on loose bits of wire when you aren't trying to install a $7,000 radio in time to impress your friends at that really cool fly-in.

11) Finally, use heat sinks whenever you are working around delicate equipment. I usually use forceps.

I should also note that 63/37 solder has a melting point of 361 degrees Farenheit; CHT's routinely exceed this in an air-cooled engine, and pretty much all exhaust systems do. That's why I wouldn't use a solder joint close to the engine or exhaust.

Apart from the heat aspect, solder connections on really large wires are not neccessary. When you're working with large hunks of metal and big wires crimping is effective, and for really large joints you'd have to use a torch. That's OK for plumbing, not for electronics. You never want to heat insulation or components that much.

Just my opinions, for whatever they're worth. I know others with equal experience feel differently about some aspects. That's what makes it an interesting world.

-- Len