

SOLDERING

Discussion notes on how to in the context of Model Railroading

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Disclaimer: Please note that the discussions below refer to the use of electricity as well as tools, which pose a danger of electric shock and/or getting burnt if not handled correctly and/or with care. Although I have taken every care to cover all points of safety if you are not sure of the correct procedures required you are advised to let a more experienced person execute your soldering requirements.

So what is soldering?

It is a method of sticking 2 pieces of METAL together to achieve a mechanical and/or electrical connection by means of melting metal.

Types of solder joints in MRR:

- Details Parts on Brass Locomotives
- Rail to Rail – Fig A
- Wire to rail – Fig B
- Wire to PCB – Fig C
- Wire to Wire
 - a. In line – Fig D
 - b. Parallel – Fig E
 - c. Cross – Fig F

Tools required:

- Soldering Iron
- Solder
- Flux
- Cleaning agent
- File
- Emery paper
- Abrasive rubber (BrightBoy)

Soldering Iron:

Points to consider when choosing the right Iron for the job

- Wattage – Irons are available in ratings from 15W –500W
 - Generally the bigger the job the bigger the wattage
 - Fixed
 - Adjustable
- Tip Shape
 - Point – Fig G
 - Chisel – Fig H
 - Spade – Fig J
 - Interchangeable
- Stand with Sponge Tray
- Ergonomics
 - Weight
 - Size – Diameter/length
 - Heat insulation on grip

- How does it feel in my hand?
- Usually the smaller the better
- Conclusion – You'll need more than one!
- Is it properly earthed?
 - Safety of worker & work piece

Solder:

All the work we do on our pike or workbench requires –

Rosin Core Solder

Resin Core Solder is available in various diameters to suit the job on hand. Choose the size that will flow sufficient solder in the recommended time to make a solid yet lean joint (discussed later)

Flux:

The ROSIN in the core of the above described solder is all the flux we need for the MRR soldering jobs we are discussing here, however NOTE – many of the liquid flux sold in HW shops are acid based and as such are an absolute NO-NO for electronics as well as MRR equipment!

What makes a good solder joint?

It is possible to create a solder joint which is mechanically sound yet electrically inefficient or incapable of passing any current, referred to as COLD solder joint.

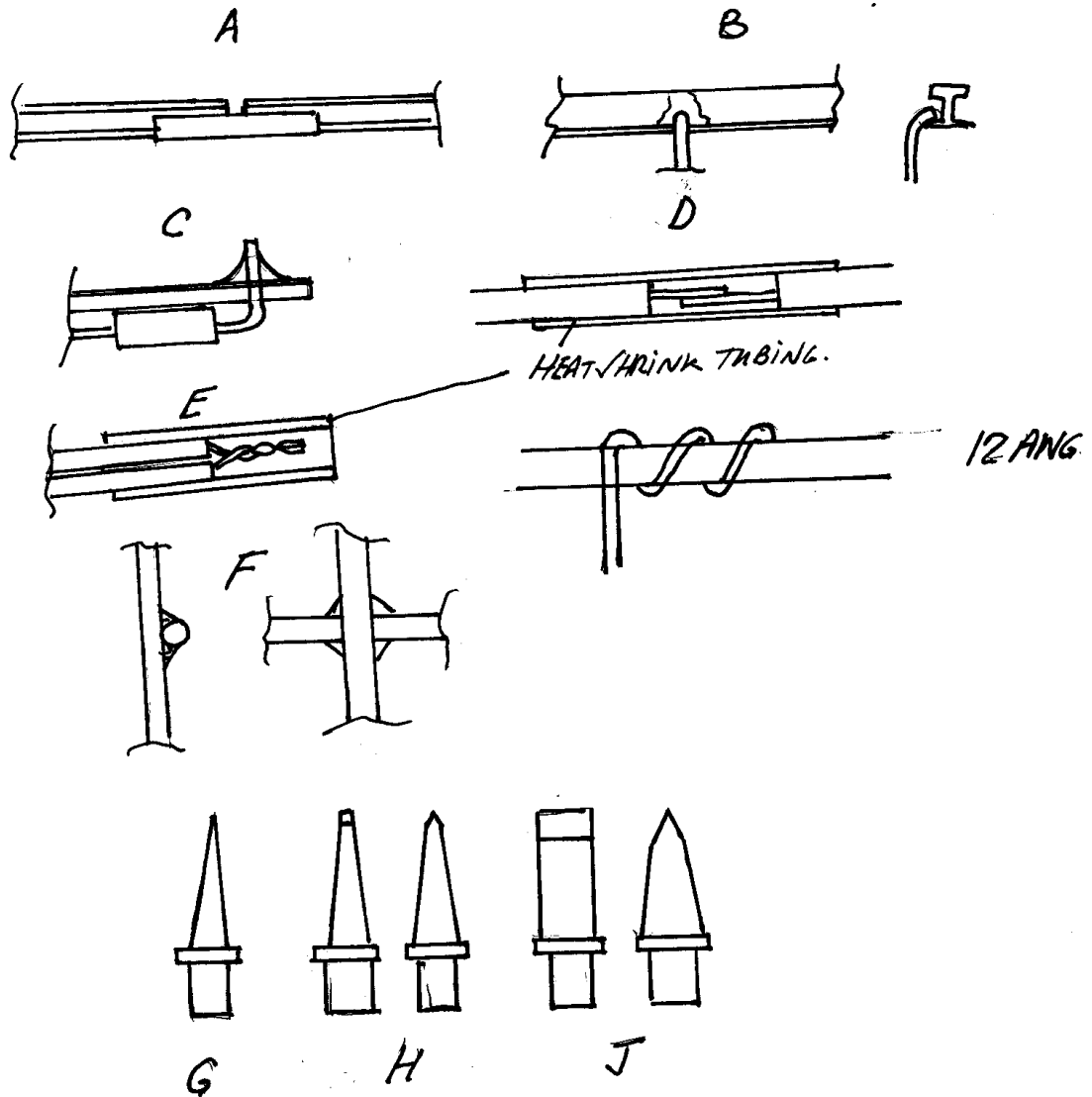
To make a satisfactory joint in all respects it is important that both the work pieces to be joined **FIRST** attain a temperature to be conducive for the subsequently molten solder to flow freely around all the surfaces in the joint area.

So it is important to observe a few principle rules during preparation to making a successful joint:

- Make sure these surfaces are free of any Grease, Oils, Paints or Lacquers - the surfaces must be shiny.
- Use cleaning agents or appropriate tools to achieve this
- Ensure that the Iron tip is the correct size/shape and is clean
- This is important, as we want to get maximum heat into the smallest area for the minimum time necessary, and here the wattage choice in iron is also important.
- That is why a to low wattage iron can cause more harm than a large one!
- If possible (in almost all cases it is) pre-tin the pieces to be joined
- Investigate what can be harmed by heat during the solder operations, and take measures to protect that area from excessive heat exposure (heat sink). Even then limit the time you apply heat – if not successful at first rather come out, let it cool and try again.
- Determine which of your work pieces to be joined will likely display the greater heat absorption/dissipation, i.e. rails vs. feeder wire, and apply heat to that piece first.

- Last - touch the tip with your rosin core solder, if the solder applied in the pre-tinning operation is not sufficient to produce the desired joint.
- How do you know you have good joint? – It will look shiny and have a perfectly smooth surface naturally contoured as a result of flowing metal.
- If it is an ugly blob, and/or has a rough or porous surface the chances are that it is a cold solder – the remedy is to re-heat for a short period.

Believe me: Practice makes perfect!



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