Consider first, the mechanical strength curve. Pull strength increases slowly as deformation begins. At this point the mechanical strength arises from the friction forces between the conductors and the terminal as the terminal body presses in on the conductors. Cold welding, and the cold welded area, increases as deformation increases and the rate of increase of

INSPECTING CRIMPED CONNECTIONS

Crimped connections are inspected using three methods:

- visual inspection
- crimp height measurement
- crimped connection pull strength

----------Continued on next page

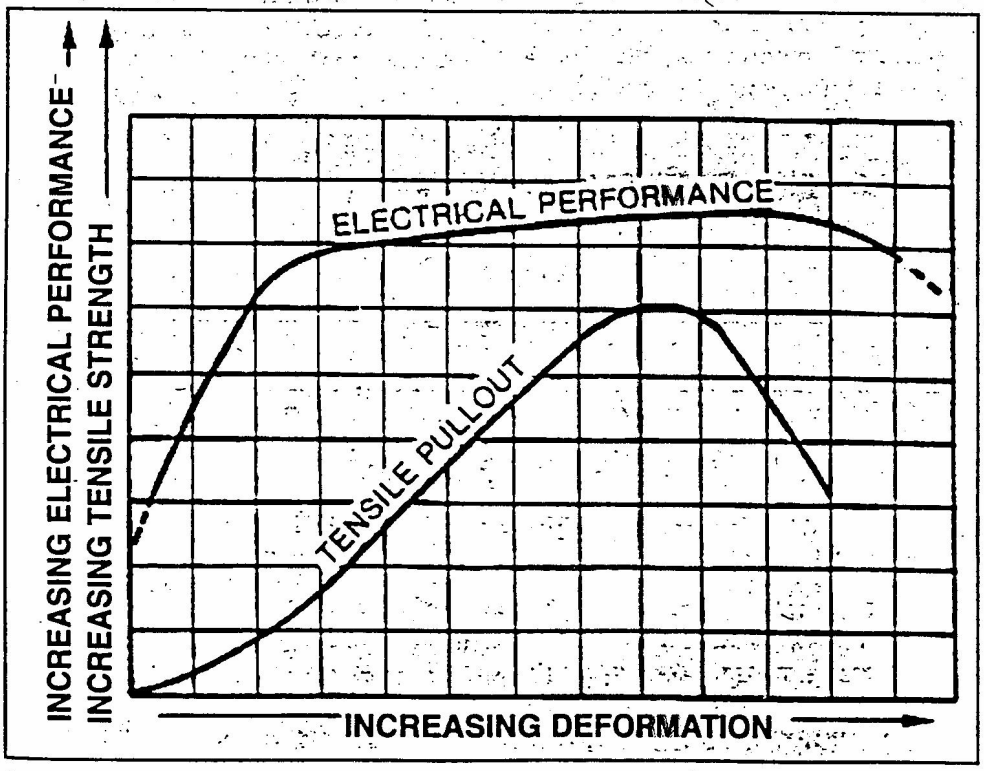

Illustration 3: Schematic illustration of crimp mechanical and electrical performance as a function of the deformation during crimping.

Continued from previous page

Visual Inspection

Criteria for visual inspection of crimped connections are shown in illustration four. There are criteria for both the wire and the crimped connection. Wire criteria include the strip length of the wire and the position of the wire in the crimp barrel.

example of a procedure for measurement of crimp height is illustrated as an inset in Figure 4. While the measurement is straightforward, attention to detail is important.

Pull Strength

The pull strength of a crimped connection is another measure of connection integrity. Obviously, since pull testing is a destructive test, it is

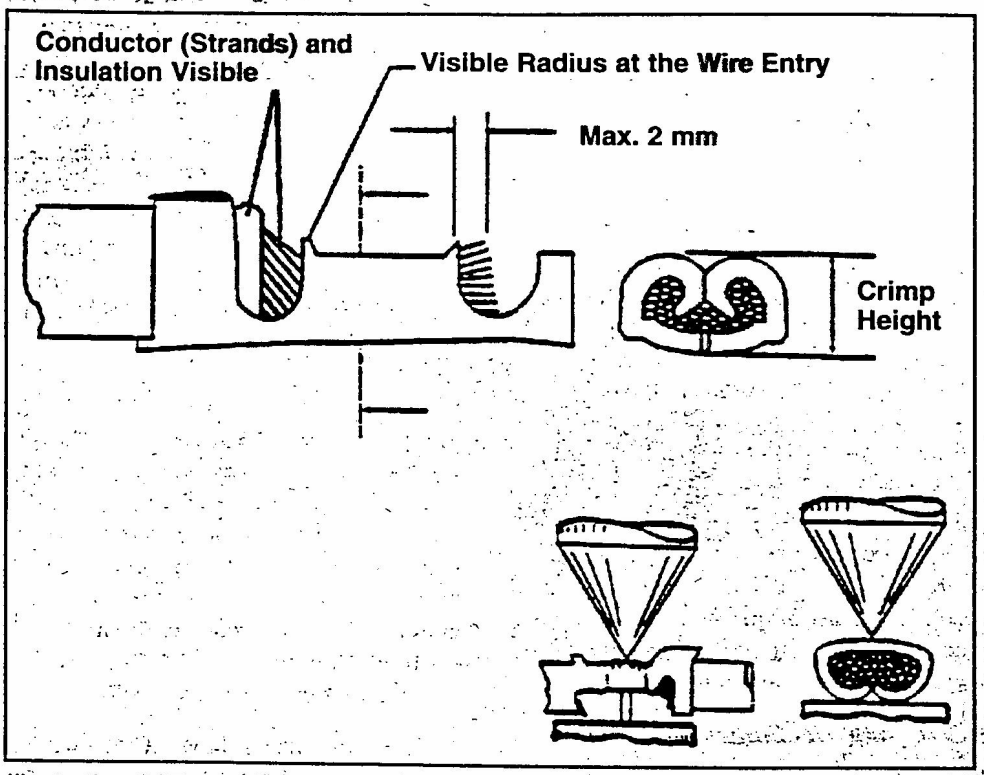

Illustration 4: Example of crimp inspection criteria, the crimp heigh and a crimp height measurement method are also shown.

The positioning requirements are intended to ensure that the stripped conductors extend fully through the crimp barrel (brush visible beyond crimp barrel) and that no insulation has been included in the crimp barrel) and that no insulation has been included in the crimp barrel (wire strands and insulation visible between the crimp barrel and the insulation grip). Both insufficient insertion of the conductor and including insulation in the crimp barrel could affect the deformation process/kinetics and, therefore, the performance of the crimp.

The visible radius at wire entry requirement is intended to promote the retention of the longitudinal residual force as well as enhancing the pull strength of the crimped connection through the same frictional forces which retain the residual force.

Crimp Height

AMP Incorporated recommends crimp height as the appropriate monitor of the crimping process. The rationale behind this recommendation is based on the consistent geometry of the crimping system, wire/terminal/tooling, such that the crimp height serves to verify that the proper amount of deformation has been achieved in the crimped connection. An recommended at intervals as a secondary process monitor.

Summary

Inspection of crimped connections involves visual examination of the crimp and measurement of crimp height. Pull strength is recommended on audit basis. It should be noted that crimping equipment is available which provides measurements of crimp height, and, in some cases, crimping force, to provide both an inspection and process control capability on line.

CONCLUSION

"Good crimps don't just happen, they're designed that way!"

Repeatable, reliable crimped connections result from the proper crimping system of wire, terminal and tooling. Such systems produce the "appropriate" amount of conductor deformation necessary for generating a *metallic contact interface* with acceptable values of electrical resistance and mechanical strength. They also produce an "appropriate" residual stress distribution which provide residual forces which maintain the integrity of the interface against the anticipated stresses, mechanical, electrical and thermal, of the intended application.