Electrodes and Other Current-Carrying Members

The electrodes of a spot welding system and other current-carrying members are the third main component. They conduct the current from the welding transformer secondary to the work parts.

In order to minimize weld defects, the electrodes must apply the correct pressure (force) to the work parts. The electrodes must also pass the current through the work in a concentrated area and, then, cool the weld area after the welding current has ceased to flow. Each electrode must have sufficient strength to withstand the transmitted force; have a high electrical conductivity in order to minimize resistance to flow of electrical current through the electrode material; and have a high thermal conductivity to facilitate rapid heat dissipation from the weld area once the current has terminated. The material which fulfills these requirements is a copper-base alloy. Water-cooling is almost always used to maintain relatively cool electrodes. Overheating of the electrodes will result in mushrooming, reduced electrode life and produce poor or missing welds.

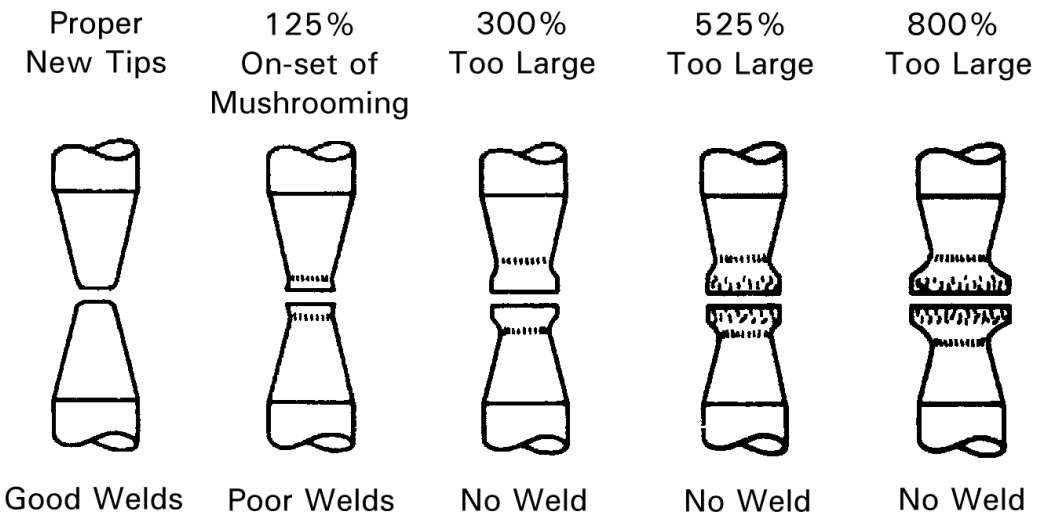

Figure 2-4. Mushrooming Development

Other current-carrying members include the electrode holders, adapters, and shunts, which connect the transformer secondary to the electrodes. All members are fabricated from copper-base alloys to provide the required electrical conductivity. Any resistance through these members will reduce the weld heat and cause component heating and defects.

These components must be in good condition, free of slag and have clean tight connections. The guns must be in good alignment with proper face size and gun force. The electrode faces must be smooth and parallel with the panel being welded.

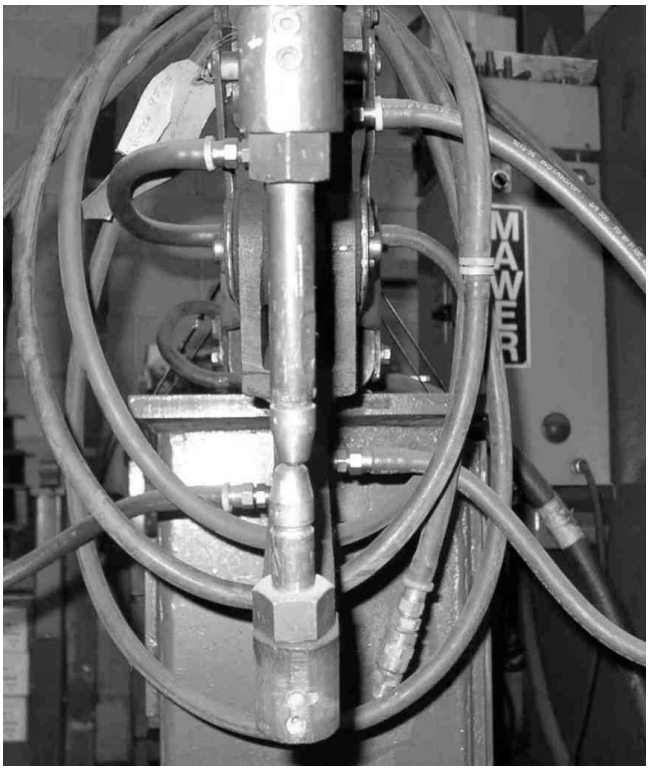

Figure 2-5. Poor Alignment