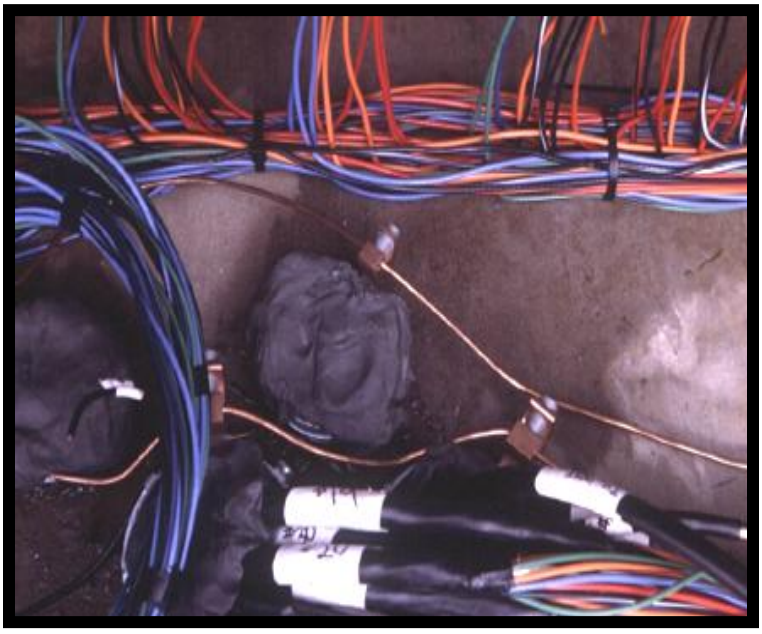
BONDING & GROUNDING

All Bonding & Grounding must be in accordance with the National Electrical Code (NEC).

Bonding is defined in the NEC as the permanent joining of metallic parts required to be electrically connected. In a traffic signal, the term is used to describe the electrical and mechanical connection of conduit, metal poles, cabinets, and service equipment.



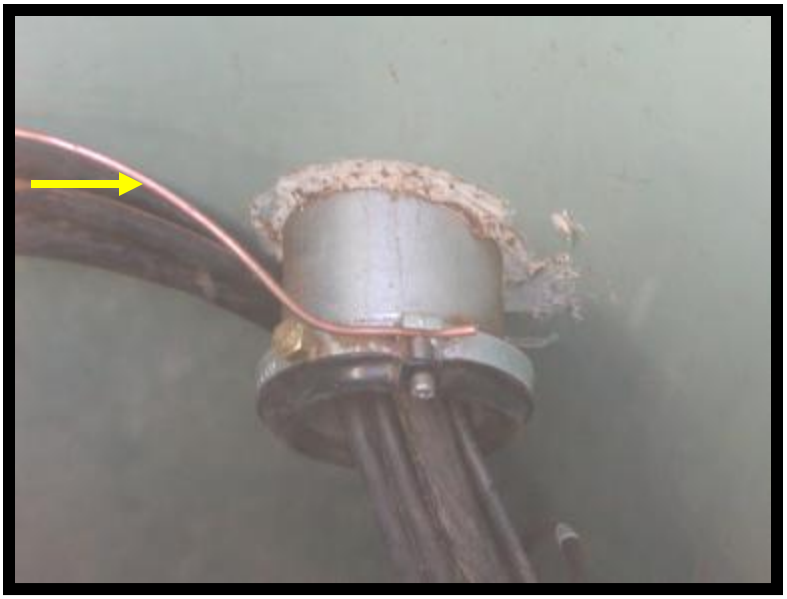
Grounding is defined in the Code as a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conductive body that serves in place of earth. By directing current along a path to earth, bonding and grounding reduces, but does not eliminate, the danger of unwanted electrical current reaching the surface of equipment, causing damage and electrical shocks to anyone working on the system.

Ground rod electrodes are installed at all service points, in the handhole adjacent to the mast arm pole bases, and within pedestal concrete foundations as specified in the contract documents.

Rigid steel conduit runs are tied together by screwing each length of conduit together so that the ends of the conduit must butt or come together for the full circumference to provide an electrically bonded and grounded connection throughout the entire length of the conduit run.

Care must be taken that field cuts are made square and reamed to insure conduit ends butt properly together.

Rigid steel conduit runs are bonded together in handholes by a solid #6 bare copper wire attached to the lug on thread bushings which are installed on the open ends of conduit at the end of the run. A #6 green stranded insulated conductor is also ran through rigid steel conduit as indicated in the Contract documents.

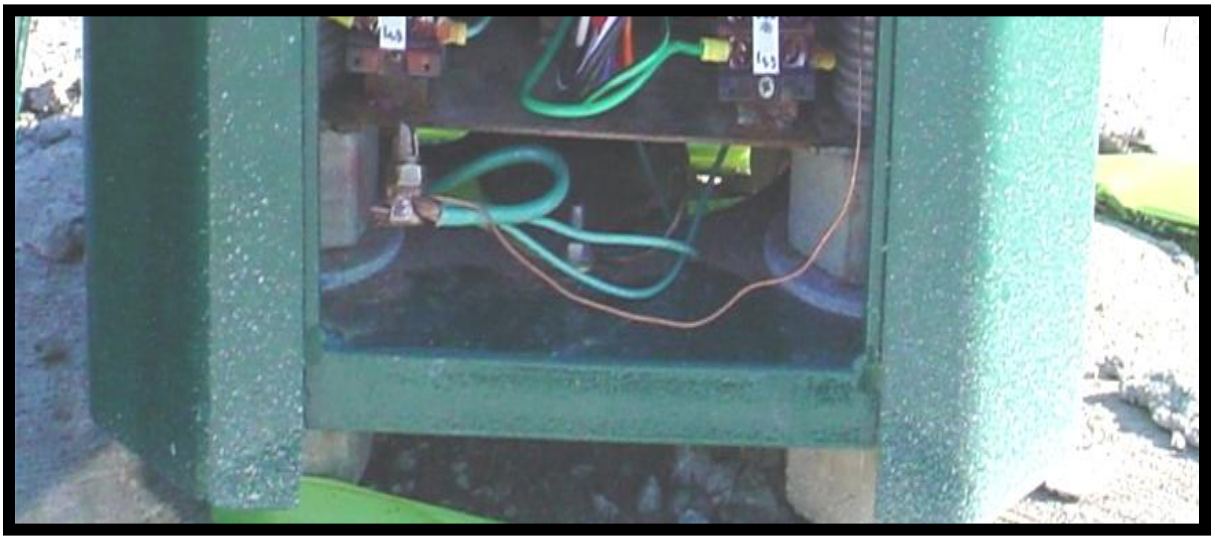


In pole bases, the rigid steel conduit is tied to the grounding lug provided in the metal base utilizing a active clamping grounding lug with mounting tang.

On an equipment pad**,** the ground rod and grounding connection is located in the signal service cabinet.

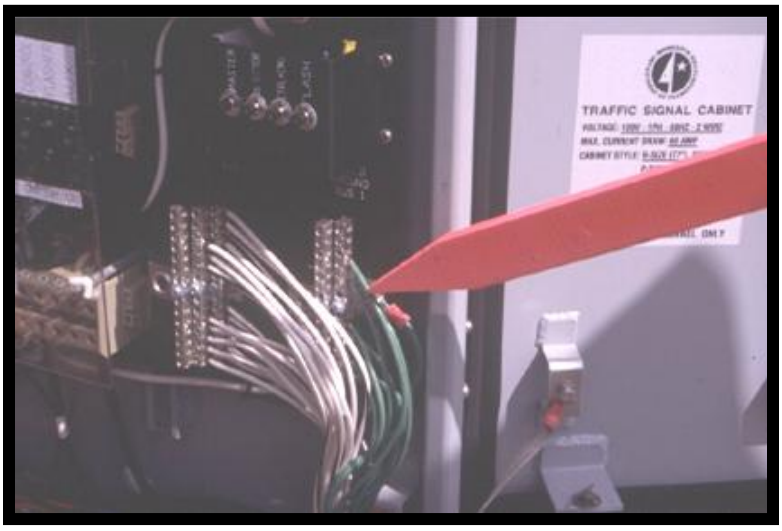
Bonding of all ground rod electrodes to the #6 AWG stranded insulated green ground wire must be accomplished by exothermic welding**.**

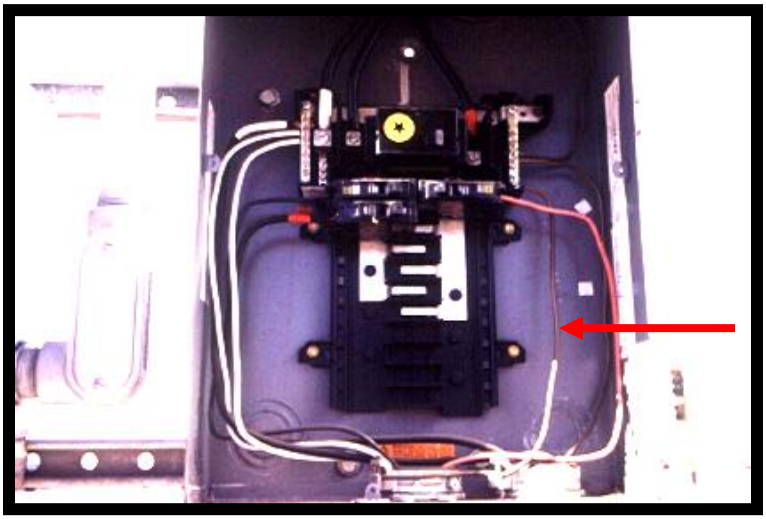
Service equipment is tied to a ground rod if the service is not on the equipment pad.



All new signal systems must have a #6 AWG green insulated stranded grounding wire installed from the signal cabinet to each pole base. This grounding wire may be daisy chained from signal pole base to signal pole base. Consult the field wiring diagram for details. Each signal pole must have its own ground rod located in the handhole adjacent to the signal base. A #6 green insulated stranded grounding wire must run from the ground rod to the pole base. The ground wire coming from the ground rod will be spliced to the grounding wire running to the signal cabinet and to the #6 grounding wire running to the ground lug on the transformer base using exothermic welding.

The Equipment Ground Bus must be grounded to the source of power ground rod with a #6 green insulated stranded ground wire.

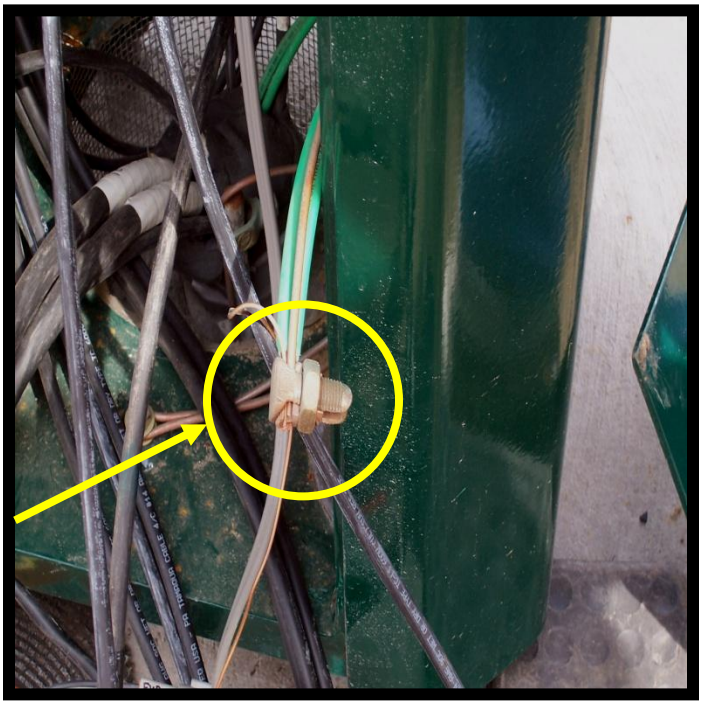




At Service Equipment, a #6 equipment grounding wire must be properly connected from the Equipment Ground Buss in the cabinet to the neutral bonding bar of the service equipment and to each incoming conduit grounding bushing lug.

A separate No. 6 green conductor is ran through the conduit system and used for equipment ground purposes. The separate No. 6 green conductor is used in both non-metallic conduit (N.M.C.) and rigid steel conduit (R.S.C.) systems.

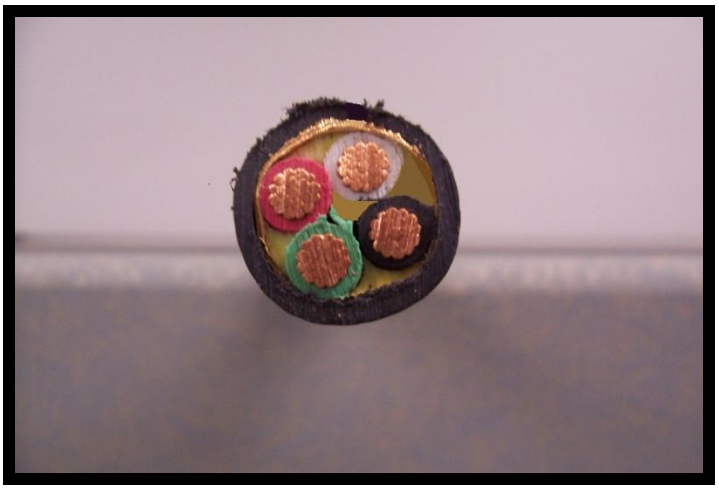
Oxide inhibitor agent must be applied to all No. 6 grounding connections after both assembly and final connection.



When existing conduit is incorporated into a new system, the Contractor must furnish and install new bonding and grounding jumpers and new threaded conduit bushings on open ends of in place conduit as directed by the Engineer.

Additional details on this subject are in the contract documents and must be reviewed.

Armored Cable



Armored cable must be 4/C #4 and meet the specifications in the Contract documents. The armored cable must be grounded and bonded as follows:

The bronze armor must be terminated on the equipment ground buss in the cabinet.

The green conductor must be terminated on the equipment ground buss in the cabinet.

In the pole base or light pole base, the bronze armor and grounding conductor must be bonded together with the use of a split-bolt connector, or other approved connecting means, and grounded to the pole base and ground rod (if present).