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April 4, 2013

Overhead Hoist/Crane/Gantry/Monorail Systems Grounding Requirements as required per release of NEC 2008.

Current NEC Publication as of this letter: NEC 2011.

The grounding requirements are best outlined verbatim per NEC Article 610, Part VII.

610.61: Grounding.

All exposed non-current-carrying metal parts of cranes, monorail hoists, hoists, and accessories, including pendant controls, shall be bonded either by mechanical connections or bonding jumpers, where applicable, so that the entire crane or hoist is a ground-fault current path as required or permitted by Article 250, (grounding) Parts V and VII.

Moving parts, other than removable accessories, or attachments that have metal-to-metal bearing surfaces, shall be considered to be electrically bonded to each other through bearing surfaces for grounding purposes. ***The trolley frame and bridge frame shall not be considered as electrically grounded through the bridge and trolley wheels and its respective tracks. A separate bonding conductor shall be provided.***

The requirements of 610.61 are not intended to allow the trolley or bridge frame to serve as the equipment grounding conductor for electrical equipment (such as motors, motor controllers, lighting devices and transformers) on a crane or monorail. Metal to metal bearing surfaces of moving parts are considered to be a suitable grounding and bonding connection. (As in collectors on conductor systems, hard wired festoon grounding, etc.) ***The bridge and trolley wheel contact with their tracks is not permitted to be used as a reliable grounding and bonding connection.*** Due to dirt or other foreign surfaces impeding the effectiveness of the wheel-to-track contact as a reliable grounding and bonding connection, the bridge and trolley frames of an electric crane are now required to be bonded through the use of a separate conductor.

Most Frequently Asked Questions

As a manufacturer/supplier of controls and conductor systems for the Overhead Hoist and Crane Industry, Duct O Wire customers often ask what the grounding system requirements are. The most frequently asked questions are as follows:

1. What does the NEC 610 Overhead Crane/Hoist Grounding code mean?
2. What is the adherence date?
3. Who requires adherence?
4. Implementation.

An attempt at clarification follows, with article references from NEC 2011 and explanations from an engineering/adherence perspective in order as listed.

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1. The meaning of NEC Article 610.

A collector conductor shoe or collector wheel surface in contact with the respective conductor type across a bridge or along a runway, is a form of a metal to metal bearing surface as described in the NEC Section notes explaining what type of movable bonding pathway is suitable for grounding. A hard-wired conductor grounding lead in a festoon, for example, is self explanatory.

Other fixtures described as removable accessories or attachments that have metal to metal bonding surfaces refers to the mounting method of installation such as bolted connections with metal to metal contact that is suitable for grounding conductance.

As referenced in the article numbers and listings below: NEC Article 610.61 and the applicable sections of NEC Article 250 explain the basic requirements of crane grounding. However, the NEC *Handbook* annexes as listed are contained in NEC Handbooks 2005 through 2011, and afford the relevant details regarding the regulations of building occupancy, code enforcement, etc.

1. The adherence date is the date of the original 'code' publication. In this case, NEC 2005 is applicable.
2. The requiring of the implementation of the 'code' is mostly up to the state, but in some areas also local judicial and regulatory bodies. Of note: As of the date of this letter if not all, *nearly* all states have ratified acceptance and adherence of the 'code' as have several international bodies.
3. The implementation of the code is best described, verbatim, in NEC 2005 through 2011 Handbooks, Informative Annex H, Administration and Enforcement Article 80.9 sections (A) through (C), 80.11 sections (A) through (B), and 80.13.

80.9: Application.

This article explains when the NEC grounding code is in effect, who enforces adherence, and what the structuring references are, relevant to compliance.

80.11: Occupancy of Building or Structure

This article explains occupancy requirements for buildings, as regards to code adherence. IE: When occupancy can or cannot be allowed.

Basic Summation:

Retroactive:

Several of our customers have been told by others the NEC 2005, 2008 and 2011 code requires addition of a grounding conductor retroactively on all existing systems. ***Fact: Nowhere in the NEC Code or any other publication is there a requirement for a retroactive addition of a grounding conductor on any existing overhead hoist, crane, gantry, or monorail electrification system, unless the existing system has been altered or designated as dangerous by local permitting and/or judicial agencies.***

Additions/Modifications:

The 'Code' is explicit in requiring the addition of a grounding conductor if any structural changes are made to the building or system, including extending the crane runway, modifying or changing the control system, or effecting any alteration to the electrical feeder for the overhead hoist, crane, monorail, or gantry. This includes any addition of a new hoist/trolley on a bridge, monorail, or gantry. It also includes adding a new bridge to an existing runway.

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80.13: Authority

In all applications, the authority to require changes to any crane electrification system lies with the chief electrical inspector or other individuals designated by the state, county, or local authority, as representing the respective governing body.

With respect to the written intent as illustrated and outlined in NEC 2005, 2008 and NEC 2011, an existing system left as originally installed, unless deemed hazardous, does not require the retroactive addition of a grounding conductor. However, any regulatory or judicial body governing the area of the installation can require the addition of a grounding conductor to an existing system, if the responsible or designated person of that agency and/or the agency itself, determines the addition necessary.

If in doubt as to the jurisdictional requirements in any given area, it is always best to contact the local authority and/or agency for clarification of what is required regarding adherence to NEC grounding requirements within the respective jurisdiction.

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