and that are within 0.3 m (1 ft) of each other or (2) one duplex receptacle.

(D) Multiwire Circuits, Not Permitted. An individual office furnishing or groups of interconnected office furnishings shall not contain multiwire circuits.

Informational Note: See 210.4 for circuits supplying office furnishings in 605.7 and 605.8.

ARTICLE
610 Cranes and Hoists

Part I. General

610.1 Scope. This article covers the installation of electrical equipment and wiring used in connection with cranes, monorail hoists, hoists, and all runways.

Informational Note: See ASME B30, *Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings*, for further information.

The requirements of Article 610 should be closely followed when providing power to electric cranes to help ensure overall electrical safety. Electric cranes, such as the ones shown in Exhibit 610.1, present unique challenges to ensuring that electrical safety is maintained. Constant movement of the crane requires flexibility of power and control wiring or the use of contact conductors installed along the crane runway or bridge. The duty cycle of crane motors is addressed in Table 610.14(A), which covers conductor ampacities for short-time rated crane and hoist motors.

610.3 Special Requirements for Particular Locations.

(A) Hazardous (Classified) Locations. All equipment that operates in a hazardous (classified) location shall conform to Article 500.

EXHIBIT 610.1 Example of crane installations and the electrical equipment and wiring used. *(Getty Images)*

(1) Class I Locations. Equipment used in locations that are hazardous because of the presence of flammable gases or vapors shall conform to Article 501.

(2) Class II Locations. Equipment used in locations that are hazardous because of combustible dust shall conform to Article 502.

(3) Class III Locations. Equipment used in locations that are hazardous because of the presence of easily ignitible fibers or flyings shall conform to Article 503.

See also

503.155 commentary for more details on cranes and hoists in Class III, Divisions 1 and 2, locations

(B) Combustible Materials. Where a crane, hoist, or monorail hoist operates over readily combustible material, the resistors shall be located as permitted in the following:

(1) A well ventilated cabinet composed of noncombustible material constructed so that it does not emit flames or molten metal
(2) A cage or cab constructed of noncombustible material that encloses the sides of the cage or cab from the floor to a point at least 150 mm (6 in.) above the top of the resistors

(C) Electrolytic Cell Lines. See 668.32.

Special precautions are necessary on electrolytic cell lines to prevent the introduction of exposed grounded parts. Conductive surfaces of cranes in the cell line work zone are to be insulated from ground as described in 668.32.

Part II. Wiring

610.11 Wiring Method. Conductors shall be enclosed in raceways or be Type AC cable with insulated equipment grounding conductor, Type MC cable, or Type MI cable unless otherwise permitted or required in 610.11(A) through (E).

For Type AC cable, an insulated wire-type equipment grounding conductor (EGC) terminated on the grounding terminals of crane- and hoist-associated equipment is required to ensure the continuity of the grounding and bonding connection to equipment that is frequently subject to vibration.

(A) Contact Conductor. Contact conductors shall not be required to be enclosed in raceways.

(B) Exposed Conductors. Short lengths of exposed conductors at resistors, collectors, and other equipment shall not be required to be enclosed in raceways.

Short runs of open conductors facilitate connection to resistors, collectors, and similar equipment. Each conductor is required by 610.12 to be provided with separately bushed holes in boxes as well as in cable and raceway fittings used where the transition to open wiring is made.