

Proposed Changes to Section 74 of CEC – Draft 4

Rule No.	Present Wording	Proposed Wording	Comments
Title	Section 74 – Airport Installations	Section 74 – Aeronautical Ground Lighting	The title is changed to harmonize with IEC terminology.
74-000 Scope	(1) This Section applies to the installation of runway, taxiway, and approach lighting and wiring.	(1) This Section applies to the installation of runway, taxiway, approach lighting and wiring airport visual aids systems using series type constant current circuitry.	The definition has been modified to expand the scope while limiting the focus to series type circuitry. It is understood that constant voltage lighting systems are installed at smaller airports and for specific pieces of equipment at larger airports. In these instances, Section 74 is only applicable to burial depths of cables.
	(2) The requirements of this Section are supplementary to, or amendatory of, the general requirements of this Code.	(2) The requirements of this Section are supplementary to, or amendatory of, the general requirements of this Code.	No change required.
74-002 Special Terminology. In this Section the following definitions apply:	Ground anchor means a steel post set into the ground and supporting the lighting fixture. Ground counterpoise means a grounding conductor installed over lighting cables for the purpose of interconnecting the system ground electrodes and providing lightning protection for the cables.	(1) Ground anchor means a steel post set into the ground and supporting the lighting fixture. (2) Ground counterpoise means a grounding conductor installed over lighting cables for the purpose of interconnecting the system ground electrodes and providing lightning protection for the cables. (3) Pullpit means a below grade junction box used as a cable pulling point, to house transformers or series lighting cable splices. (4) Isolating transformer means a transformer used in airfield series lighting circuits to maintain continuity of the primary circuit when the continuity of the secondary circuit is interrupted. (5) ASLC is an abbreviation for Airfield Lighting Series Cable	Expand list of items unique to airfield lighting terminology.
74-004 Conductors Buried in Earth		74-004 Wiring Methods	The title is changed to match titles used in other sections of the code. In addition, the title scope is broadened to include conductors pulled in raceways as well as direct buried conductors.
		(1) Type ASLC is for use only in accordance with section 74.	This new Subrule is copied from note 21 of Table 19. ASLC has been used for general purpose power and lighting loads contrary to conditions of use stipulated in Table 19. Including this clause in

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			section 74 will promote proper application of ASLC.
		<p>(2) The wiring method shall be: (a) ASLC installed in raceway suitable for underground installations in accordance with the requirements of Section 12, Wiring Methods. (b) Direct buried ASLC</p>	This new Subrule is added to identify current practices, which include installing ASLC in raceways, as well as direct buried installations.
	(1) For aircraft and vehicle visual aid systems on public areas of airports, or which extend beyond the airport property, the installation of buried cables shall be in accordance with the requirements of Rule 12-012.	(1 3) For aircraft and vehicle visual aid systems on public areas of airports, or which extend beyond the airport property, the installation of buried cables shall be in accordance with the requirements of Rule 12-012.	Subrule 1 renumbered to Subrule 3.
	(2) For installations covered by this Section of the Code, Part I, in areas not accessible to the public, single conductors and cable assemblies shall be of the type indicated in Table 19 as suitable for direct earth burial and shall be installed as follows: (a) In a trench not less than 450 mm deep and with a layer of sand or screened earth extending at least 75 mm above and below the conductors, if in rocky or stony ground; (b) Under runways, taxiways, aprons, and roads, with a minimum mechanical protection of rigid conduit or a system of concrete encased underground raceways installed a minimum of 600 mm deep.	(2 4) For installations covered by this Section of the Code, Part I, in areas not accessible to the public, single conductors and cable assemblies shall be of the type indicated in Table 19 as suitable for direct earth burial and shall be installed as follows: (a) In a trench raceway not less than 450 mm deep. and. (b) Direct buried cables shall be installed with a layer of sand or screened earth extending at least 75 mm above and below the conductors, if in rocky or stony ground; (bc) Under runways, taxiways, aprons, and roads, with a minimum mechanical protection of rigid conduit or a system of concrete encased underground raceways installed a minimum of 600 mm deep.	Subrule 2 renumbered to Subrule 4 Scope is expanded to permit cables in raceways. Cables in raceways are protected by the raceway and do not normally require sand protection from rocks and stones.
	(3) Series cables for 6.6 A systems directly buried in a trench shall have at least: (a) 75 mm lateral separation between cables of different series circuits; and (b) 300 mm lateral separation from low-voltage and control cables; and (c) 75 mm vertical separation in cross-overs on the same system; and (d) 300 mm vertical separation from	(3 5) Series cables for 6.6 A systems directly buried in a trench shall have at least: (a) 75 mm lateral separation between cables of different series circuits; and (b) 300 mm lateral separation from low-voltage and control cables; and (c) 75 mm vertical separation in cross-overs on the same system; and (d) 300 mm vertical separation from low-voltage cables crossing over, with the low-voltage cables in	Subrule 3 renumbered to Subrule 5.

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	low-voltage cables crossing over, with the low-voltage cables in the upper position.	the upper position.	
		(6 Wiring to inset lights or other apparatus embedded in concrete or asphalt aprons or runways shall be installed in raceways. The raceway shall be installed in a saw cutmade in the concrete or asphalt. The depth of the saw cut shall not be less than 100 mm. The raceway shall be secured to the bottom of the trench and the top of the trench sealed with sealing compound.	ALSC cabling embedded in asphalt or concrete must be protected from damage and yet be accessible for maintenance or replacement. Current practice is to install the raceway by sawcutting into the apron, runway or taxiway surface. The depth of burial is reduced from requirements of section 12 to minimize any structural damage to the runway, taxiway, or apron in which the cable is installed. Due to the specialized location of the cables, trenching or excavating near the cables is unlikely. In the event of excavation, the location of the cables after installation is readily apparent by visual inspection. Securing the raceway to the bottom of the trench and covering with sealing compound ensures the raceway is protected from traffic by the narrow width of the sawcut. The narrow width also minimizes disturbance to aviation traffic passing over the trench.
74-006 Direct Burial Transformers	(1) Series isolating transformers shall be installed in the trench so that a minimum depth of 450 mm is provided for the points of entry of the primary cable.	(1) Series isolating transformers shall be installed in the trench so that a minimum depth of 450 mm is provided for the points of entry of the primary cable. when installed in a trench, shall be installed such that the transformer body and primary leads are a minimum depth of 450 mm below grade.	The change results from two issues: 1) Isolation transformers are commonly installed in pulpits in addition to being direct buried. 2) In the past, isolation transformers were constructed so the primary cable plugged directly into receptacles in the transformer body. Typically, modern isolation transformers have leads molded into the body and the receptacles are installed at the ends of the leads. The change ensures the primary high voltage wiring remains 450 mm below grade when the isolation transformer is direct buried.
	(2) The secondary conductors shall be colour coded, one conductor being identified.	(2) The secondary conductors shall be colour coded, one conductor being identified.	No change.
	(3) The secondary connectors shall be polarized with the identified conductor connected to the larger pin or receptacle.	(3) The secondary connectors shall be polarized with the identified conductor connected to the larger pin or receptacle.	No change.
	(4) The identified conductor shall be	(4) The identified conductor shall be grounded.	No change.

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	grounded.		
74-008 Series Lighting Systems.	Series lighting systems shall be installed with a ground counterpoise.	Series lighting systems shall be installed with a ground counterpoise.	No change.
74-010 Ground Counterpoise	(1) Ground counterpoise conductors shall be soft copper wire not smaller than No. 8 AWG, and shall be: (a) Solid, bare wire where installed in earth; or (b) Insulated and have a green finish if installed underground in raceways.	(1) Ground counterpoise conductors shall be soft copper wire not smaller than No. 8 AWG, and shall be: (a) Solid, bare wire where installed in earth; or (b) Insulated and have a green finish if installed underground in raceways.	No change.
	(2) The ground counterpoise when installed in earth shall be: (a) Placed 75 mm above all cable in a trench; and (b) Run in a zigzag pattern when outer cables are more than 150 mm apart, crossing cables at 300 mm intervals measured along the trench; and (c) Placed 75 mm over nonmetallic conduit containing groups of cables; and (d) Placed under any protective covering used.	(2) The ground counterpoise when installed in earth shall be: (a) Placed 75 mm above all cable in a trench; and (b) Run in a zigzag pattern when outer cables are more than 150 mm apart, crossing cables at 300 mm intervals measured along the trench; and (c) Placed 75 mm over nonmetallic conduit containing groups of cables; and (d) Placed under any protective covering used.	No change.
	(3) The counterpoise shall be connected to: (a) The ground anchor of each anchor-mounted light unit; and (b) The grounded secondary conductor of each series isolating transformer; and (c) The sheath of metal sheathed and the armour of armoured cables where used to supply light units; and (d) The ground electrodes at all regulators, towers, and lighting equipment that the counterpoise system serves; and (e) The ground electrode in each maintenance hole through which the	(3) The counterpoise shall be connected to: (a) The ground anchor of each anchor-mounted light unit; and (b) The grounded secondary conductor of each series isolating transformer; and (c) The sheath of metal sheathed and the armour of armoured cables where used to supply light units; and (d) Except as permitted in Subrule (5) the ground electrodes at all regulators, towers, and lighting equipment that the counterpoise system serves; and (e) The ground electrode in each maintenance hole manhole through which the counterpoise conductor passes; and (f) Metallic pullpit lids or covers; and	See comments under proposed new Subrule (5) The term maintenance hole changed to manhole. There are reports of maintenance staff receiving electric shocks when they have lifted pullpit covers and inset lights that had become energized

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	counterpoise conductor passes.	(g) Non-current carrying metallic parts of inset lights.	through accidental contact with live conductors. Grounding these components minimizes the risk of shock injury.
	(4) Where counterpoise conductors of different systems come together or cross each other they shall be bonded together at those points.	(4) Where counterpoise conductors of different systems come together or cross each other they shall be bonded together at those points.	No change.
		(5) Notwithstanding Subrule (4), where sequence flashing electronic control equipment of and lighting systems is susceptible to damages from surges and transients from lightning, a separate ground rod shall be installed at each unit.	The manufacturer of these systems will not warranty its equipment if it is grounded by connection to the counterpoise. The manufacturer claims the electronic equipment is susceptible to damage from surges and transients from lightning strikes. Instead of being attached to the counterpoise, the manufacturer recommends a separate ground rod at each unit.
74-012 Electrical Manholes		(1) An unobstructed working space of not less than 1000mm horizontally and not less than 1800mm vertically shall be maintained from the face of racked cables, splices or isolation transformers.	Manholes are frequently used on airfield lighting systems at congested cable locations as cable pulling points, cables splicing points and location for isolation transformers. It is crucial to provide adequate working space having safe clearances.
		(2) Access openings shall be free of protrusions and be located so that safe access can be provided. Round access openings shall be not less than 600 mm in diameter. Rectangular access openings shall have dimensions not less than 650 mm by 560 mm. Where fixed ladders are provided they shall not obstruct the opening or prevent quick and safe egress by personnel.	Manholes are confined spaces and egress must be unobstructed to permit safe egress if hazardous conditions exist.
		(3) Manholes shall be kept free of water by connecting them to the airfield drainage system where practical. As a minimum manholes shall be constructed with a drain and back-water check valve.	
74-014 Airfield Lighting and Visual Aids Control Wiring		(1) Installation of airfield lighting and visual aids control wiring shall be in accordance with the requirements of Rule 12-904(2)	Control of individual elements of airfield lighting and visual aids equipment is becoming more prevalent as airports continue to intensify their operations in low visibility environments. This increase in control wiring in the proximity of high voltage lighting cables requires that installers remain vigilant of the inherent dangers this can create.

