HCAI: 2022 California Electrical Code
Webinar Questions and Answers
March 22, 2023

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1. Is GFI switch allowed to protect receptacle serving equipment?

Yes, a readily accessible blank face GFCI device can be wired ahead of standard receptacle behind vending to meet CEC 422.5(A)(5) requirements. Note: For vending machines all of the following are acceptable means of providing GFCI protection: 1) GFCI protection provided as an integral part of the attachment plug 2) Within the supply cord not more than 12" from the attachment plug 3) Within the branch-circuit OCPD 4) A device or outlet within the supply circuit.

2. Can a transformer be installed above the panel it serves, within the dedicated panel space? Would it violate 110.26(3)?

CEC 110.26(E)(3) states "The space equal to the width and depth of the equipment and extending from the floor to a height of (6 ft) above the equipment or to the structural ceiling, whichever is lower, shall be dedicated to the electrical installation. No piping, ducts, leak protection apparatus, or other equipment foreign to the electrical installation shall be located in this zone." As long as the transformer is part of the electrical installation (associated with equipment in the room) it can be installed in the dedicated workspace above the panel that it serves. Note: The code mandated clear working space required 110.26 shall be maintained including the Height of Working Space. The working space shall be kept clear and shall extend from the grade, floor, or platform to a height of (6½ ft) or the height of the equipment, whichever is greater. Within the clear working space requirements of this section, other equipment (including transformers) or support structures, such as concrete pads, associated with the electrical installation and located above or below the electrical equipment shall be permitted to extend not more than (6 in.) beyond the front of the electrical equipment.

3. If we install GFCI receptacle located on wall on top of vending machine. Would this meet readily accessible requirement?

CEC 422.5(A) requires GFCI protection for vending machine branch circuits. CEC 422.5(B) requires GFCI interrupter to be installed in a readily accessible location. The definition of readily accessible is "Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to take actions such as to use tools (other than keys), to climb over or under, to remove obstacles, or to resort to portable ladders, and so forth." Installing a receptacle on wall higher than top of vending machine would not be readily accessible as this would require a ladder to access.

4. **You mentioned PoE lighting when you reviewed 517-80. Would you confirm that 517-80 also applies to DC LV lighting that not PoE?**

   No, CEC 517.80 specifically states "Class 2 and Class 3 signaling and communications systems [OSHPD 1, 2, 3, 4 & 5] Class 2 circuits that transmit power and data to a power device, and power-limited fire alarm systems shall not be required to comply with the grounding requirements of 517.13, to comply with the mechanical protection requirements of 517.31(C)(3)(5), or to be enclosed in raceways, unless otherwise specified by Chapter 7 or 8." This does not include DC LV lighting that is not PoE.

5. **The handout is not in the same order of the presentation and many slides are missing. Will an updated handout be published?**

   Updated handouts are available on the website.

6. **Where can I get a copy of the HCAI Regulations?**

   HCAI CAN 1-0 lists all enforceable codes and year of application. You can google the codes listed to determine how to obtain a copy. HCAI also publishes an Electrical Guide for Health Facilities Review, which helps identify code requirements for electrical construction.

7. **Is short circuit label on panel required for new and existing, or for new panels only?**

   CEC 408.6 Short-Circuit Current Rating requires switchboards, switchgear, and panelboards to have a short-circuit current rating not less than the available fault current. The available fault current and the date the calculation was performed shall be field marked on the enclosure at the point of supply. When new loads are added to existing equipment that will affect the AIC values, new AIC values will need to be calculated and labeled on the affected equipment. Determining if new loads affect AIC values will require engineering judgement, and may be required to be demonstrated with calculations.

8. **Can all lighting wiring be flex?**

   No, life safety and critical branch circuiting conduits are required to be mechanically protected, which would prohibit the use of flexible wiring systems. There is however an exception CEC 517.31 which allows listed flexible metal raceways and listed metal sheathed cable assemblies in luminaires installed in ceiling structures. We interpret this to also allow listed flex for 6' (max) whip from j-box to fixtures installed in ceiling structures.

9. **Can integral/battery be used as a source of power for emergency lighting?**

   No, integral batteries are not acceptable sources of essential power for emergency lighting in OSHPD-1 (Hospitals) and OSHPD-2 (SNFs) facilities. Note: CEC 517.31 requires that hospital essential electrical systems be comprised of 3 separate branches (Life safety critical and

equipment). The essential electrical system infrastructure will need to be installed to provide (2) independent sources and pathways for all emergency loads in hospitals and SNFs. Per 700.12(B) the minimum duration for essential power full-demand operation is 72 hrs for hospitals and 6 hrs for SNFs.

10. **We recently had a project where we needed to install (4) breakers inside an active emergency critical distribution board. Board will need to be shutdown to install breakers, this is typical coordinated between hospital and contractor and submitted to design team as an MOP. However, recently an HCAI ACO had required that this MOP be shown as an ACD in drawing set even though this is really means and methods. Does this MOP for this situation need to be included in design drawings as an ACD?**

    HCAI does not review MOPs. Please note that CEC 517.30 requires (2) independent sources for essential loads at all times. If a proposed design will take the facility out of compliance with this requirement, the design submitted will need to demonstrate what steps will be made to minimize this period of non-compliance during construction. This can be either included in the original design or listed as a deferred approval item, that can be addressed later during construction prior to any interruption of power feeding essential loads. Proposed designs that interrupt either one or both of the power sources for essential loads will need to provide a construction sequence that includes proposed outages, or instances when (2) independent sources are not available to all essential loads and durations of these instances, so this can be reviewed and forwarded to CDPH for acceptance. Design can be approved when periods of non-conformance with CEC 517.30 are avoided (of if not possible to avoid, identified and minimized).

11. **Do storage batteries on open racks require an OSP?**

    As Identified in CBC 1705.13.3.1 certain components installed in SNFs require Special Seismic Certification (SSC), these include life-safety components, such as emergency and standby power systems, and resources provided to meet new PIN 74. In hospitals this requirement is identified in CBC 1705A.13.3.1. UPS and batteries are listed here as requiring SSC. No equipment actually requires an OSP – it's a voluntary program but can be used to meet SSC requirements.

12. **Do batteries on open racks require a 2-hour fire-rated battery room or can the open battery racks be installed behind a chain link fence with accessible gate? If so, does the gate need to have panic or listed fire exit hardware?**

    Facilities required to house batteries depends on the type of battery, energy capacity and the type of housing unit. See CFC 1207 & for specifics as they apply to your condition. The CEC also has requirements for panic hardware and direction of swing of exit door(s) to match path of egress.

13. **Is there any difference or clarification in the code between battery storage systems and UPS systems?**

The codes are written to provide safety for property and personnel. Both the UPS units and battery storage systems have batteries as their main energy storage devices. The building code used to have different sections, but now requirements for all batteries can be found in CBC Chapter 12.

14. **For OSHPD 1 facilities, the lighting switch (low voltage) that has multiple switch legs for normal and emergency power has to be separated per power source? Lighting switch is low voltage.**

    The question is vague, but here are some relevant code sections for emergency lighting. (1) CEC 517.33 Illumination of Means of Egress - ...Switching arrangements to transfer patient corridor lighting in hospitals from general illumination circuits to night illumination circuits shall be permitted, provided only one of two circuits can be selected and both circuits cannot be extinguished at the same time. (2) CEC 700.20 Switch Requirements. The switch or switches installed in emergency lighting circuits shall be arranged so that only authorized persons have control of emergency lighting. (3) CEC 700.10(B) Wiring. Wiring from an emergency source or emergency source distribution overcurrent protection to emergency loads shall be kept entirely independent of all other wiring and equipment. (4) 700.23 Dimmer and Relay System. A dimmer or relay system containing more than one dimmer or relay and listed for use in emergency systems shall be permitted to be used as a control device for energizing emergency lighting circuits. Upon failure of normal power, the dimmer or relay system shall be permitted to selectively energize only those branch circuits required to provide minimum emergency illumination 5) 700.24 Directly Controlled Emergency Luminaires. Where emergency illumination is provided by one or more directly controlled emergency luminaires that respond to an external control input, or loss thereof, to bypass normal control upon loss of normal power, such luminaires and external bypass controls shall be individually listed for use in emergency systems.

15. **Does the electrical code still dictate the height of Nurse call device heights? This was previously in conflict with the grab bar requirements in a restroom where mounting of the device is 3'- 4' AFF.**

    Yes. CEC 517.123(C) provides requirements for nurse call bath stations, the code reads, "At toilets, the call station shall be located to the side, within 12 inches of the front of the toilet bowl and shall maintain a clearance of 12 inches (304.8 mm) above the horizontal grab bar." Pull cords shall be provided that extend to within 12" of the floor.

16. **Have you seen/heard of any solutions to the GFCI requirement for vending machines, in alcoves?**

    Readily Accessible GFCI blank face device can be provided to protect receptacle serving equipment, and GFCI protection can be provided at the Over Current Protection Device (OCPD) for branch circuit(s) feeding vending machines. Note: For vending machines all of the following

are acceptable means of providing GFCI protection: 1) GFCI protection provided as an integral part of the attachment plug. 2) Within the supply cord not more than 12" from the attachment plug. 3) Within the branch-circuit OCPD. 4) A device (the GFCI switch is a device) or outlet within the supply circuit.

17. **Are there any modifications to 760 Fire Alarm Systems or modifications related to fire alarm we should be aware of?**

    There are always many changes sprinkled throughout each code update. The CEC generally adopts all of the national updates, and sometimes makes California Amendments. I recommend that you could look at the NEC and compare changes from the 2017 - 2020 codes to get a good sense of what changed, and then go thru the CEC and take note of all of the italicized print to learn what the CA amendments are.

18. **Is Part 6 for people hooking up to charging station to with EV's to send power into a building?**

    Yes. Section 90.2(A) lists what is covered by the code and item (6) was added which addresses installations used to export electric power from vehicles to buildings.

19. **The slide for 210.8 is missing from the handout.**

    Please check the updated handout page 6 and 7, on the website webinar page.

20. **Are there new items for Lithium Ion yet?**

    You can find code requirements related to battery installations in CBC 1207.

21. **Do transformers require 6-foot dedicated clear vertical space above the equipment?**

    CEC110.26 (E) requires dedicated Equipment Space for all switchboards, switchgear, panelboards, and motor control centers. This equipment shall be located in dedicated spaces and protected from damage. Transformers are not listed in this requirement so no, the dedicated space above electrical equipment does not apply to transformers.

22. **With our supply chain opportunities, has HCAI seen a significant increase in using re-conditioned switchgear on Healthcare Projects?**

    We have not seen a significant increase in reconditioned switchgear on healthcare projects.

23. **Regarding electrical panel overhead clearance, are electrical conduits from other panelboards considered "foreign systems" and not be allowed to be within the 6ft overhead clearance?**

Not necessarily, as long as the conduits are part of the electrical installation associated with equipment in the room, they would not be considered foreign systems. Note: it is recommended that j-boxes, pull boxes, conduits and lighting fixtures not be installed in this dedicated space above equipment to avoid personnel from climbing or standing on equipment.

24. **For GFCI protection, if the vending machines need GFCI protection and accessible. Does this mean we need to provide GFCI breakers?**

    CEC 422.5 (B) identifies acceptable type and location for GFCI protection. Readily Accessible GFCI faceless devices can be provided to protect receptacle serving equipment, and GFCI protection can be provided at the Over Current Protection Device (OCPD) for branch circuit(s) feeding vending machines.

25. **Based on HCAI PIN 70, Does CEC have any revision on providing selective coordination and TCC for existing spare emergency circuit breaker that is being utilized in a new project?**

    No, this would not be consistent with the national code requirements which we adopt in CA.

26. **Can transformers be stacked for HCAI?**

    As long as installation is code compliant transformer stacking is acceptable. Will need to meet structural requirements, and permit proper venting required by the manufacturer. We recommend that you also get mechanical engineers involved to make sure that the acceptable room temperatures are maintained.

27. **Are light switches and receptacles connected to the equipment branch in hospitals still allowed to be red in color, similar to the life safety & critical branches?**

    Yes, while CEC 517.31 recently changed the requirements from essential to life safety and critical branch devices requiring distinctive color or marking, it will also be acceptable to have red devices for the equipment branch. If located in the same area as life safety and critical devices some additional distinctive marking will be required (label) to distinguish from devices circuited to the life safety and critical branch(es).

28. **What is the required accessible space for low voltage equipment (101.26)?**

    CEC 110.26 identifies the depth of working space as 3'-0" for equipment with nominal voltage to ground of 0-150V, the width required is the width of the equipment or 30" whichever is greater, the height is 6'-6".

29. **So, the GFCI receptacles in elevator pits would need to be accessed every month to test?**

No. Article 620 modifies chapters 1-4 of the CEC and 620.6 requires that each 125-volt single-phase receptacle installed in pits, in hoistways, ... shall be of the ground-fault circuit-interrupter type. 620.6 also states, "A permanently installed sump pump shall be permanently wired or shall be supplied by a single receptacle that is ground fault circuit-interrupter protected." The requirement to comply with CEC 110.3 (i.e., follow manufacturer's instructions) is overridden by the requirement for elevator pit receptacles to be installed in elevator pits.

30. **For the grounding exclusion of ethernet connected lighting switch/control, is that specifically written in code? We had an inspector that required us to provide the additional grounding after everything was said and done.**

    As of January 1, 2023, the CEC 517.80 Patient Care Spaces states "Class 2 and Class 3 signaling and communications systems [OSHPD 1, 2, 3, 4 & 5] Class 2 circuits that transmit power and data to a power device, and power-limited fire alarm systems shall not be required to comply with the grounding requirements of 517.13. Note: 517.13 requires redundant ground path for branch circuits that feed patient care spaces, so this requirement would still need to be met for branch circuit feeding the PoE hub that is powered by 120V circuit.

    Is sprinkler pipe permitted 6" above the required Dedicated Electrical Space identified in CEC 110.26 (E)?

    Yes, CEC 11026 (E)(1)(b) states "The area above the dedicated space required by 110.26(E)(1)(a) shall be permitted to contain foreign systems, provided protection is installed to avoid damage to the electrical equipment from condensation, leaks, or breaks in such foreign systems.

31. **Is the requirement to label the switchgear with the available fault current going to require updating by each EEOR on each project that might affect SCCR?**

    Yes, calculations will need to be provided with the submitted designs, and new values with instructions for labeling will need to be called out on the contract documents.

32. **Discuss new 410.118 Access to Other Boxes. Luminaires recessed in ceilings, floors, or walls shall not be used to access outlet, pull, or junction boxes or conduit bodies, unless the box or conduit body is an integral part of the listed luminaire. We've heard that if any existing fixture with this condition is touched in construction, it needs to be corrected. Or would all existing conditions within a project area need to be corrected? thx**

    CEC 410.118 reads "410.118 Access to Other Boxes. Luminaires recessed in ceilings, floors, or walls shall not be used to access outlet, pull, or junction boxes or conduit bodies, unless the box or conduit body is an integral part of the listed luminaire. In regard to how this will affect proposed work, please note: new work will need to meet code. If new work does not affect existing installation existing installation will not need to be brought up to current code requirements. This is typically a judgement call so new work as it relates to existing conditions

will need to be evaluated on a case-by-case basis. Please contact HCAI's Compliance Officer, Senior Electrical Engineer and/or Supervisor for the region that you are working in prior to design and/or construction to discuss for individual projects.

33. **517.31 marking of life safety and critical branch conductors: we'd assume this includes underground feeders, and also assume the 25ft interval would not be required on conductors in raceways with more than 25ft between boxes.**

    Agreed, CEC 517.31(C)(1)(a) reads "(a) Raceways, cables, or enclosures of the life safety and critical branch shall be readily identified as a component of the essential electrical system (EES). Boxes and enclosures (including transfer switches, generators, and power panels) shall be field- or factory-marked and identified as a component of the EES. Raceways and cables shall be field- or factory- marked as a component of the EES at intervals not to exceed 7.6 m (25 ft)." The labeling will be required only where raceways/conduits/boxes/etc. are accessible which is defined as "Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in by the structure of finish of the building." Wires inside conduits would need to be identified where they leave the conduits, and underground conduits would only need to be identified where they transition to above grade (if not terminated directly in essential equipment).

34. **590.6 Temporary Installations - is the intent of TIO item B-E14 (Temporary Installation Grounding) to provide the paperwork for the assured equipment grounding conductor program?**

    Yes, Per CEC 590.6 Ground Fault Protection for Personnel, and assured equipment grounding conductor program, it is required for the contractor to implement, document and keep on hand (have available) documentation of this program for the authority having jurisdiction to review. As this is listed on the TIO it is required to be presented to and verified by the IOR/CO.

35. **517.19 Category 1 (Critical Care) Spaces. (A) Patient Bed Location Branch Circuits. Each patient bed location shall be supplied by at least two branch circuits, one or more from the critical branch and one or more circuits from the normal system.**

    For 517.19 - this is not a code change but we understand there is an HCAI policy change as there are several hospitals which have equipment branch receptacles rather than normal or optional/standby receptacles at the patient bed locations. We understand this is no longer approvable as it does not meet the model code. Can you confirm instances where this will need to be corrected as part of project work?

    It is our intent to only enforce the written code. All new work will need to meet code. If new work does not affect existing installation, the existing installation will generally not need to be brought up to current code requirements. This is typically a judgement call so new work as it relates to existing conditions will need to be evaluated on a case-by-case basis. Please contact HCAI's

Senior Electrical Engineer and/or Supervisor for the region that you are working in to discuss for individual projects.

36. Is there a 2022 electrical guide available?

We are still working on this. It should be released soon.

37. How is the 'as required by the governing body' applied?

I am not sure what the question is, but I recommend that you work with the owner's rep and/or Architect of Record to determine how to engage the hospitals governing body for any instances where their input is required.

38. 1)Does the transformer have dedicated space requirement on top?

Transformers are not listed in CEC 110.26(E)(1) as equipment required to have dedicated space, so none is required. The manufacture's requirements for ventilation and the new code requirement in 450.9 Transformers with ventilating openings will need to be met which read "shall be installed so that the ventilating openings are not blocked by walls or other obstructions. The required clearances shall be clearly marked on the transformer. Transformer top surfaces that are horizontal and readily accessible shall be marked to prohibit storage - will need to be adhered to for code compliant design/installation."

2) Do the disconnect switches needs dedicated space?

Disconnect switches are not listed in CEC 110.26(E)(1) as equipment required to have dedicated space, so none is required.