MINUTES

Orange Empire Division
International Association of Electrical Inspectors

Date: 05July2011.
Location: Santa Ana Elks Lodge, 212 S. Elk Lane, Santa Ana, California.
Called to order by Henry Martinez at 11:57 a.m.

New attendees introduced themselves. Among them was Rick Schultz of Schultz Controls.

Minutes of last month's meeting accepted without dissent.

Membership Comm. Rep.
Postponed.

Treasurers Report
Treasurer's Report was postponed until next month.

Old Business
None conducted.

New Business
None conducted.

Code Questions
None posed.

Consultant Time
Saum Nour announced that he can take items for new cycle of the Green Code.

Testing Lab Time
Mel with Intertek/ETL announced that Intertek/ETL is now certified for lightning-protection , post-installation analysis.

Contractor Time
None taken.

Manufacturer Time

None taken.

Utility Time
None taken.

Inspector Time
Scott commented that, in times past, inspectors had more question. He urged attendees to bring questions to this forum.

An attendee announced that the ICC Los Angeles Basin Chapter is looking for input on a standardized PV-system, plan-check form that they are developing. He recollected without full certainty that the website to which input can be sent is "icclabasin.com". Henry Martinez added mentioned that Orange County ICC has such a check list.

Education Program: Transformers.
by Scott Davis.

Scott touched on the following addressing only xfmrs for standard power, 600 Volts or less.

Electrical Code section 450 addresses xfmrs, but 100, 240, 250, and 408 also address xfmrs. Xfmrs must be solidly grounded or bonded. See Art 100 Definitions: Solidly Grounded(Bonded); System Bonding Jumper (changed from "Main Bonding Jumper").

450.1 Transformer Installations. It's about the xfmrs only.

- Accessibility
- Suitability
- Seismic: In Santa Ana, xfmrs over 200 lbs and installed above grade require structural engineer calculations.
- Weight

The Green Code requires higher xfmr efficiency than ever before.

Accessibility. Xfmrs must be accessible rather than readily accessible for dry type, <600V. Ladders are okay. Pre-engineered designs can be found in the back of the Kindorf (Thomas and Betts) catalog for supporting xfmrs above the floor. (City of Santa has accepted some of these.) The engineer of record may have to approve the anchoring. Don't ever hang on sub-purlins.

Dry-type xfmrs, 50 kVA or less can be above suspended ceilings; must have ventilation; must be in a metal enclosure. Dry-type xfmrs in a metal enclosure can be installed in a return-air plenum space, must have appropriate smoke and flame characteristics (most xfmrs are not listed this way); non-metallic okay only when listed for installation in a plenum. 300.22(C)(2) is the code section.

Installation up to 112.5 kVA: At least 12" separation from combustible surface; exception for Class 155+ insulation & totally enclosed transformers. If the bottom of the xfmr is open, made of expanded metal for example, the xfmr may not be installed on a wooden floor.

For transformers rated more than 112.5 kVA (dry type), need 1-hour-fire-rated wall. Exception for Class 155 or better insulation and totally enclosed except vents. 450.21(B)(Ex1) & (Ex2). The insulation Class is shown on the xfmr nameplate and UL White Book (where the rules are). NFPA Plus merges the UL White Book information with the NEC.

Ventilation requirements vary depending on the height and type of construction.

Protection: two schemes: primary only or primary and secondary. Table 450.4(B), Note 1 for next size. 125% for primary if no secondary protection; 250% for primary if secondary overcurrent protection provided.

(480V/208V)(0.3333)(overcurrent-protection device rating = 70A) = 54 A. Thus, #4 min size. Xfmrs can transmute more power than the rating for a particular period of time. (This is one reason xfmrs fail.)

Attendee: If one fuse fails, the load side of that fuse will be hot through the load.

Russ Helmick told the group that old xfmrs are likely built to ANSI standards, so this can be used to evaluate old transformers; user will provide the standard.

240.21(C) Secondary-Conductor Protection has protection rules for:

1. Primary overcurrent protection.
2. 10 ft Secondary.
3. Industrial 25 ft Secondary.
4. Outside Secondary.
5. 25-ft Secondary.

3-phase, non-linear loads. 450.3(B). Approximation: Third harmonics yields 9X (3^2) heat in xfmr; fifth harmonics yields 25X (5^2) heat in xfmr. See the manufacturer's installation instructions for ventilation requirements. See publications about handling harmonic currents. E.g., a separate neutral for each branch conductor. Design of switch-mode power supplies has improved to reduce the harmonics.

450.9 Ventilation

1. Install per manf's installation instructions.
2. Ventilation opening in case is usually the same size as the min distance from non combustible wall.
3. Saum: Chap 5 of Mech'l Code defines combustible wall.
4. Gary Gluck (Siemens): When xfmr is in an integrated swbd, swbd can be installed against a wall.
5. Ventilation openings must not be blocked.
6. Heating is proportional to the square of the harmonic-current numeral.
7. Harmonics on the secondary conductors create heat in the primary of the transformer.

Grounding and Bonding 250.30.

1. Check that hardware removed that secures winding frame to enclosure is removed so that the windings are supported only by the shock mounts (isolating pads).
2. System Bonding Jumper sized per 250.66. If multiple sets of secondary conductors, use the sum of the areas to determine the size of the largest ungrounded conductor.
3. Bond neutral to ground at only one place, or you'll get objectionable currents.
4. Grounding Electrode: Metal water pipe at entrance to building or structural steel.
5. 250.104(D) Bonding to Water Piping.
6. 2011 NEC will not allow using an oversized equipment-grounding conductor run with the circuit conductors as a grounding-electrode conductor. *
7. Silver-soldered, main water piping exposed through a building, in some cases, may be used as a grounding-electrode conductor.

Using a xfmr backwards?

UL2010 White Book XQNX:

1. Wire bending space not investigated.
2. Includes step-up and step-down.

Gary Gluck (Siemens): Xfmrs are not labeled for backwards connections; more importantly, our experience is that there is excessive inrush current when a transformer is connected backwards. Scott: The standard says that the transformers can be used in both directions.
Scott: inrush will apply torque to the conductors and terminations in the transformer.
Scott: Testing is done at a max of 40 deg C ambient unless otherwise marked.
Scott: If there are special precautions beyond NEC, special instructions will be on the xfmr.

*2011 NEC does not allow the installation of a GEC in the same conduit as circuit conductors. Code requires a metal-water-pipe bond at sub-panels in a multi-occupant building at each sub panel even if there is only one water service to the building.

Announcement

Tom Griffith announced that this month's Chapter-meeting program is Fuel Dispensing; in Downey.

Meeting adjourned at 2:12p.m.