MINUTES
NFPA 70-2014 TASK GROUP (TECHNICAL SYSTEMS SUBCOMMITTEE)

January 19, 2016

Kentucky Expo Center | Louisville, KY

NFPA 70-2014 Task Group (Technical Systems Subcommittee)

The NFPA 70 Task Group of the Technical Systems Subcommittee met during the MHCC meetings in January 2016 in Louisville, Kentucky. The MHCC meeting adjourned at 2:04 p.m. on January 19th to allow for the NFPA 70 Task Group to meet.

John Weldy acknowledged the contributions from the task group members that included:

Frank Brubaker
James Demitrus
Don Iverson
Jason McJury
Rick Mendlen
Sean Oglesby
Manual Santana
Lois Starkey
Mark Weiss

Mr. Weldy provided some background on NFPA 70. He stated that there have been a significant number of changes to the standard since 2005. The charge of this task group is to identify how manufactured housing is affected by these changes. He reviewed the documents that were circulated to the task group prior to the meeting (see Appendix A) and asked if there were any additional changes that the task group should review. None were brought up. Mr. Weldy noted that the task group should cross out the 2011 section of the IBTS document because it involved retrofitting a house. Everything in the Clayton list is in the 2014 NEC. If it states a different year, that's just the year that it was introduced. Mr. Weldy Introduced the 50 state adoption list and explained how this document provides information on the electrical code adopted by each state and their amendments. He asked the group if there were any items that needed to be added or removed.

Don Iverson, NEMA, noted that the State of Ohio Board of Building Standards had tasked them with a cost analysis to determine the cost impact of all of the changes in the home. When questioned about the missing labor costs for 2014, Mr. Iverson stated that labor cost was assumed to be insignificant. The task group decided to put together an independent cost impact study.

Mr. Iverson reviewed the Clayton Home Building Group document and provided a non-technical explanation of all of the changes. He further provided an explanation of the differences between GFI and ARC fault. The GFI protects people from shock. The AFCI includes a small chip that knows what sine waves are acceptable, and what ones are not. It will trip if it does not recognize the sine wave signature.

The task group identified what they consider to be large impact items within the significant change document. Items within the updated significant change list have been indicated with an "important" stamp within the attached Appendix A.

Mr. Weldy encouraged the task group members to really dig into these items and get it right the first time and noted that they had a nice opportunity to do some good work here. He asked the task force to do their homework by reading Subpart I starting at 3280.801 to find potential items of conflict and start preparing proposed updated code language for the electrical subpart.

The NFPA Task Group concluded its session at 3:55 p.m.

MHCC MEETING

January 19, 2016

APPENDIX A:
ADDITIONAL INFORMATION

Current Status of NEC® GFCI & AFCI Amendments

State	Current NEC*/Factory Built	AFCI/GFCI Amendments
1. Alabama	2011	No amendments
2. Alaska	2011	No amendments
3. Arizona	2002/2008	Local adoption
4. Arkansas	2014	Amended out Kitchens and Laundry
5. California	2011	No amendments
6. Colorado	2014	No amendments
7. Connecticut	2011	Bedrooms only – in process for 2011(2011 adopted with same amendment to limit AFCI protection to only outlets in bedrooms supplied by 120 volt, 15- and 20-ampere branch circuits.)
8. Delaware	2011	Smoke Alarms not permitted to be AFCI Protected
9. Florida	2011	No amendments
10. Georgia	2014	No amendments
11. Hawaii	2008	No amendments
12. Idaho	2008	Bedrooms only
13. Illinois	2011/2003 IRC	Local adoption
14. Indiana	2008/ 2003 IRC	No AFCIs
15. Iowa	2014	Amended out the OBC Device/Amended GFCI - Garage Door/Sump Pump
16. Kansas	2011	Local adoption
17. Kentucky	2014	No amendments
18. Louisiana	2011	No amendments
19. Maine	2011	No amendments
20. Maryland	2011	No amendments
21. Massachusetts	2014	No amendments
22. Michigan	2014	No AFCI Requirements for One & Two Family Dwelling. 3-family and larger no amendments – full AFCI requirements.
23. Minnesota	2014	No amendments
24. Mississippi	2005/2011	Local adoption
25. Missouri	2008	Local adoption – City of St Louis-2011 NEC®-no amendments
26. Montana	2014	No amendments
27. Nebraska	2014	No amendments
28. Nevada	2011	One & Two Family - Bedrooms only
29. New Hampshire	2011/ 2009 IRC	No amendments
30. New Jersey	2011/ 2014 NEC	No amendments
31. New Mexico	2014	No amendments
32. New York	2008	No amendments –in process for 2011
32a)New York City	2008	No amendments-2011 NYC Electrical Code is based on the 2008 NEC®
33. North Carolina	2011	No AFCI Amendments. GFCI was amended on Sewage Lift Stations.
34. North Dakota	2014	Amended out Kitchen & Laundry
35. Ohio	2014 / 2011 NEC	AFCI – One, Two & Three Family Dwellings - The Kitchen countertop receptacles was amended out. GFCI – One & Two Family sump pump

		was amended out. However, must install GFCI receptacle with in 6ft of sump pump of the 2014 NEC. All apartment buildings have full AFCI requirements in place.
36. Oklahoma	2014	No amendments
37. Oregon	2014	**Amended out Kitchen & Laundry Receptacles. See following amendments.
38. Pennsylvania	2008	No amendments
39. Rhode Island	2011 /2014 NEC	No amendments
40. South Carolina	2011	Branch circuit dedicated to supplying only Smoke Alarms Not Required to be AFCI Protected.
41. South Dakota	2014	No amendments
42. Tennessee	2008	Protection of outlets in bedrooms mandatory, protection of outlets supplied by 15- or 20- amperes branch circuits installed in other areas of a dwelling unit is optional.
43. Texas	2014 /2011	No amendments
44. Utah	2011	Bedrooms only for one & two Family Dwellings
45. Vermont	2011 /2014	No amendments
46. Virginia	2011	AFCI - Bedrooms only
47. Washington	2014	No amendments
48. West Virginia	2011	No amendments
49. Wisconsin	2011	No amendments
50. Wyoming	2014	No amendments

* The adoption cited is by an agency or board that is considered to have primary responsibility for building construction regulations in that state. There may be other adoptions by agencies and boards that have a more focused/less comprehensive regulatory scope.

** The following are Oregon State Amendments to the 2014 NEC as applicable for dwelling units:

2014 Oregon Electrical Specialty Code Changes: (2014 NEC with *State Amendments*)
Complete OR Amendments can be found at: http://www.nfpa.org/codes-and-standards/document-information-pages/free-access?mode=view

Article 210 - Branch Circuits A GFCI is now required for all 125-volt, single phase, 15-and 20-ampere receptacles installed:
Exception: A single receptacle labeled as "not GFCI protected" supplying only a permanently installed fire alarm or burglar alarm system shall not be required to have ground-fault circuit-interrupter protection.

210.8(A)(7): within 6 feet of the outside edge of a dwelling unit sinks (now including Kitchen sinks and will require garbage disposals to be on GFCI). *[General note]*
Exception: A single receptacle for each appliance or a duplex receptacle serving two appliances within a dedicated space that, in normal use, is not easily moved from one place to another, that is cord-and-plug connected, and the receptacle is labeled as "not GFCI protected".

210.8(A)*(9)&(10):* on all receptacles located within 6 ft of the outside edge of a bathtub or shower stalls and in all laundry receptacles.

Exception to (10): A single receptacle for each appliance within a dedicated space that, in normal use, is not easily moved from one place to another, that is cord-and-plug connected, and the receptacle is labeled as "not GFCI protected".

210.12: Arc-fault circuit-interrupter locations have been expanded to include ***Kitchen,*** *Alcoves and laundry areas*.

Exceptions:

1. *Where an individual branch circuit to a fire alarm system installed in accordance…*
2. *AFCI not required on GFCI protected receptacles installed in dining rooms.*
3. *AFCI not required for optional, dedicated outlets that supply equipment known to cause unwanted tripping of AFCI devices [see Statewide Code Interpretation for 2012(A)]*
4. *AFCI not required on branch circuits supplying receptacles or appliances fastened in place located in hallways, kitchens and laundry areas.*

210.52(E)(3): At least one receptacle ***accessible from*** Balconies, decks and porches shall be placed not more than 6-1/2 ft. above ***walking*** surface. (any size porch or deck).

Exception: Decks or porches located at grade level with an area of less than 20 sq. ft. are not required to have an additional receptacle installed.

210.52(G)(1): At least one receptacle outlet shall be installed in garages *with electric power* ***for each car space. The supply branch circuit shall not supply outlets outside the garage.***

Exception: A 20 Ampere branch circuit is permitted to supply the outlet(s) specified in 210.52E.

210.52(I): In dwelling units, alcoves shall have at least one receptacle installed. These outlets shall be in addition to required hallway outlets. Alcove is area extending from, and returning to, the common wall of hallways, foyers, entries, and landings with depth of not less than 2' and length of not less than 3'.

Residential Code of Ohio Regulated Dwelling Unit Cost Impact Based on 2014 NEC	*Cost Impact
Cost of typical dwelling unit based on minimum code requirements	**$151.47**
Optional upgrades include laundry areas, dishwasher, additional garage car space, and a receptacle located within 6' of a kitchen sink not installed to serve countertops.	**$169.31**

* This Cost Impact Analysis does not include labor. See Cost Analysis breakdown below.
****Cost Impact for Optional Upgrades:** The cost impact is only invoked when optional upgrades are made to a dwelling unit. Accordingly, upgrades are characterized as added comforts and not mandated for meeting minimum construction safety codes. However, to ensure a minimum level of safety for occupants is maintained when these optional upgrades are employed, requirements have been included to address these in the 2014 NEC.

Cost Analysis breakdown for RCO regulated dwelling units based on the minimum 2014 NEC requirements

2014 NEC Code Section	Description of Code Change	*Cost Impact	
	GFCI protection for receptacles installed in laundry areas in dwellings	**Materials**	**Cost**
210.8(A)(10)	New requirements for GCFI protection of 15 and 20 amp 125-volt receptacles located in laundry areas. The 2011 NEC only required GFCI protection in these areas when a receptacle was installed within 6' of a laundry sink per 210.8(A)(7).	TR GFCI receptacle: **Cost Impact:**	$14.67 - **$14.67**
	AFCI protection expanded to laundry and kitchen areas	**Materials**	**Cost**
210.12(A)	New requirement to expand The AFCI protection of branch circuits supplying the outlets and devices in kitchen and laundry areas. This includes both the two required small appliance branch circuits (210.11(C)(1) and one required laundry area branch circuit (210.11(C)(2).)	AFCI breaker: Replaces standard breaker: **Cost Impact:** :	$46.40 -6.44 (3 Branch Circuits total) **119.88**

	15 and 20 ampere Receptacles in wet locations	Materials	Cost
406.9(B)(1)	New revision requires the use of an "extra duty" outlet box hood for all receptacles installed in a wet location. Receptacles are required on the front and back of one and two family dwellings in accordance with 210.52(E)(1).	Extra Duty" weatherproof cover: Standard in-use weatherproof cover: **Cost Impact:**	$13.22 -6.52 (2 covers) **13.40**
	Receptacle Outlets required in garages	**Materials**	**Cost**
210.52(G)(1)	New requirement to install a receptacle outlet for each car space in a dwelling unit garage. Only required for an attached or unattached dwelling unit garage with electric power.	Single gang new work box: Tamper resistant 15 amp receptacle: Duplex receptacle cover: Average 10' of 14-2 WG type NM-B cable: **Cost Impact per garage space in excess of one:**	$ .35 1.04 .24 1.92 **$3.52**
	GFCI protection for dishwashers in dwellings	**Materials**	**Cost**
210.8(D)**	New requirement to require GCFI protection for dishwashers installed in dwellings. Dishwashers are not required and may be installed as an option. This cost is included as most dwellings include a Dishwasher.	TR GFCI receptacle: Replaces standard 15 amp TR receptacle: **Cost Impact:**	$9.96 -1.04 **$8.92**
	GFCI Protection for receptacles in kitchens other than countertops	**Materials**	**Cost**
210.8(A)(7)**	Revised to require GFCI protection of 125-volt, 15 and 20 ampere receptacles installed within 6 Ft. of a kitchen sink that are not covered by the countertop rule in 210.8(A)(6). These receptacles are not required and could be installed for optional equipment.	TR GFCI receptacle: Replaces standard 15 amp TR receptacle: **Cost Impact:**	$9.96 -1.04 **$8.92**

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1	INTWP3100C	WP IN USE OUTLET COVER CLEAR	6.5225 EA	6.52
1	INTWP1010MXD	WP IN-USE DIE-CAST VERT 1G	13.2188 EA	13.22
1	PNS1595TRI	GFCI REC TPR-RES 5-15R 15A IV	14.6666 EA	14.67
1	ALM1096N	BOX FG NAIL ON 1G SW 18CU	.3470 EA	.35
1	PNS3232TRI	REC 5-15R DPLX TR 15A 125V IV	1.0448 EA	1.04
1	PNSTP8I	WALLPLATE 1G DUPLEX NYL IV	.2393 EA	.24
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Changes from the 2005 to 2014 NEC for One and Two Family Dwellings:

Code change identification 2008, 2011 & 2014.

Article 100 - Definitions

The definition of *bathroom* has been revised to include areas with a basin and such things as a urinal, a bidet, or similar plumbing fixtures*(2011)*
Accessible, Readily accessible has been clarified to not require the use of tools. Access panels, hydro massage tub access panels can no longer be mechanically fastened.

110.26(A)(3): Height of working space in front of equipment must not be less than 6 ½ ft, measured from the grade, floor, platform, or the equipment height, whichever is greater.

200.2(B) Continuity. The continuity of a grounded conductor shall not depend on a connection to a metallic enclosure, raceway, or cable armor.

200.7(C)(1):Reidentified switch loops can used only for the supply to the switch but not as a return conductor from the switch to the outlet (i.e., light). In other words, If used for single-pole, 3-way or 4-way switch loops, the reidentified conductor with white or gray insulation or three continuous white stripes shall only be used for the supply to the switch *but not as a return conductor from the switch to the outlet (i.e., light). (2011)*

Article 210 - Branch Circuits

210.4(A) – Multiwire branch circuit: All multiwire branch circuits shall be provided with a means to simultaneously disconnect all ungrounded conductors. This change removed the limitation that simultaneous disconnect applied only to circuits that supply more than one device on the same yoke or strap.

210: A GFCI is now required for all 125-volt, single phase, 15-and 20-ampere receptacles installed:
210.8: All GFCI devices (with test/reset buttons) shall be installed in a *readily accessible location.* This will affect devices that are installed behind refrigerators, beds, dressers, etc.

210.8(A)(7): within 6 feet of the outside edge of a dwelling unit sinks (now including Kitchen sinks and will require garbage disposals to be on GFCI).

210.8(A)*(9)&(10):* on all receptacles located within 6 ft of the outside edge of a bathtub or shower stalls and in all laundry receptacles.

210.8(D): (receptacle or hardwired) outlets that supply dishwashers in dwelling units.

210.12: *Arc-fault circuit-interrupter shall be installed in a readily accessible location.*

All 15 & 20 amp branch circuits that supply outlets to Family Rooms, Dining Rooms, Living Rooms, Parlors, Libraries, Dens, Bedrooms, Sunrooms, Recreation Rooms,

closets, hallways or similar area. Arc-fault circuit-interrupter locations have been expanded to include *Kitchen and laundry areas*.
210.12(A)(2): When a branch/feeder-type AFCI is installed in combination with AFCI branch-circuit outlet the first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
210.12(A)(4): When an AFCI is used at the first outlet to protect a branch the following must be met:

a. Branch-circuit wiring shall be continuous from panel box to outlet.
b. Maximum length of wire from panel to outlet shall not exceed 50 ft. for 14 AWG or 70 ft for 12 AWG.
c.The first outlet box is marked to indicate it is the first outlet in the circuit.
d. The combination of the branch-circuit overcurrent device and outlet branch AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.

210.52 – Wall switched controlled receptacles no longer meet the wall space requirements. Duplex recepts that have been split are acceptable or an additional receptacle is required.

210.52(A)(4): Receptacles installed for countertop surfaces as specified shall not be considered as receptacles required to serve wall space.

210.52(C): In kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units, receptacle outlets for countertop spaces shall be installed in accordance with 210.52(C)(1) through (C)(5).

210.52(C)(4): Clarification is given to how sinks, range or counter-mounted cooking unit's are considered to divide a countertop space.

210.52(C)(5): Receptacle outlets which are listed for the application are permitted to be installed in countertops. Note: 406.5(E) prohibits countertop receptacles from being installed in a face-up position.

210.52(E)(1): At least one receptacle outlet *readily* accessible *from grade and not* more than 6-1/2 ft. above grade *level* shall be installed at front and back of dwelling. *(2014)*

210.52(E)(3): At least one receptacle *accessible from* Balconies, decks and porches shall be placed not more than 6-1/2 ft. above *walking* surface. (Exception for useable spaces <=20 sq. ft. as been removed. Now applies to any ALL porch and decks).

210.52(G)(1): At least one receptacle outlet shall be installed in garages *for each car space. The supply branch circuit shall not supply outlets outside the garage.*

210.52(I): Foyers that are not part of a hallway in accordance with 210.52(H) and that have an area that is greater than 60 s.f. *shall have a receptacle(s) located in each wall space 3 ft or more in width* and unbroken by doorways, floor to ceiling windows, and similar openings.

250.8 – Connection of grounding conductors and bonding jumpers: Sheet metal screws are no longer accepted for attaching grounding conductors and bonding jumpers.

310.15(B)(7) – 120/240-Volt, Single-Phase Dwelling Services and Feeders: For a service, or feeder conductors supplying the entire load associated with a one-family dwelling, rated 100 through 400 A, the service or feeder conductors shall be permitted to have an ampacity not less than 83 percent of the service or feeder rating. This is in place of the former Table 310.15(B)(7) that was removed.

Table 310.15(B)(16): Revisions were made to some of the ampacity values in Table 310.15(B)(16)(formally Table 310.16). The allowable ampacity values as used for duration have increased on #3 AWG Copper (90 degree C) insulated conductors from 110 to 11 5 amps and decreased from 150 to 145 amps on #1 AWG Copper (90 degree C) insulated conductors.

314.16(B)(2): *Clamp assembly that incorporates a cable termination shall be listed and marked for use with specific nonmetallic boxes. Conductors that originate within the clamp assembly shall be included in conductor fill calculations as though they entered from outside the box. The clamp assembly shall not require a fill allowance, but the volume of the portion of the assembly that remains within the box after installation shall be excluded from the box volume as marked in 3124.16(A)(2).*

314.16(B)(4) – Device or equipment fill: A device wider than a single two-inch device box requires double conductor volume allowances for each gang required (i.e., a single-phase dryer receptacle device installed in a single gang outlet box)

314.25: *Screws used for the purpose of attaching covers, or other equipment to the box, shall be either machine screws matching the thread gauge or shall be in accordance with MFG. Instructions.* Application: Drywall screws are not permitted to be used to attach box covers or other equipment fastened to a box.

314.27(A)(1): Wall boxes used to support luminaire or lampholder outlets in a wall must indicate the maximum weight of the luminaire that it can support if other than 50 lbs.

314.27(A)(2): Every ceiling outlet used exclusively for lighting must be in a box rated to support 50 lbs. A Luminaire that weighs more than 50 lbs. shall be supported independently of the outlet box, unless the outlet box is listed and marked *on the interior of the box to indicate* the maximum weight to be supported.

314.27(C): Where spare, separately switched, ungrounded conductors are provided to a ceiling-mounted outlet, in a location acceptable for a ceiling-suspended (paddle) fan in single or multi-family dwellings, the outlet box or outlet box system shall be listed for sole support of a ceiling-suspended (paddle) fan.

Note: If the maximum weight isn't marked on box, and the fan weighs over 35 lb, the fan must be supported independently of the outlet box. Ceiling fans over 70 lbs. must be supported independently of the box.

334.40(B): Self-contained receptacles and interconnectors that are listed can now be used for *repair* wiring in existing buildings.

334.80 – Ampacity adjustment factors: Where more than two NM cables containing two or more current-carrying conductors are installed, without maintaining spacing between the cables, through the same opening in wood framing that is to be fire- or draft-stopped using thermal insulation, caulk, or sealing foam, the allowable ampacity of each

conductor must be adjusted in accordance with Table 310.15(A)(2) and Table 310.15(B)(3)(a)

338.10(B) Branch Circuits or Feeders
338.10(B)(4) Installation Methods for Branch Circuits and Feeders
(a) Interior Installations. In addition to the provisions of this article, Type SE service-entrance cable used for interior wiring shall comply with the installation requirements of Part II of Article 334.
Clarification of Item (a) above; the same criteria used in determining the ampacity rating for NM cable will be applied to SE cable, i.e. use of the 60 degree column of Table 310.16.

352.10(F) – PVC Conduit: PVC conduit shall be permitted for exposed work. Schedule 80 is required to be used where subject to physical damage.

404.2(C): Grounded circuit conductor for the controlled lighting circuit shall be provided at light control switches for other than the following: Added a few additional exceptions as follows:

(3) Where snap switches with integral enclosures comply with 300.15(E).
(4) Where a switch does not serve a habitable room or bathroom.
(5) Where multiple switch locations control the same lighting load such that the entire floor area of the room or space is visible from the single or combined switch locations.
(6) Where lighting in the area is controlled by automatic means.
(7) Where a switch controls a receptacle load.

406.8 – Receptacles in damp or wet locations must be listed weather resistant (WR).

406.9(B)(1): Extra duty covers are now required for all 15 and 20-ampere receptacles installed in a wet location.

406.11 – All 15 & 20 Amp recepts must be listed tamper resistant (TR).

406.12: An exception providing three locations (in new construction) where Tamper-Resistant Receptacles are not required has been provided:
(1) Receptacles located more than 5 1/2 ft above the floor.
(2) Receptacles that are part of a luminaire or appliance.
(3) A single receptacle or a duplex receptacle for two appliances located within dedicated space for each appliance that in normal use is not easily moved from one place to another and that is cord and plug connected.
All nonlocking type, 125-volt, 15- and 20-ampere receptacles located *in guest rooms and guest suites* (Hotels, Motels, etc.) shall be listed tamper-resistant receptacles

406.15: *A receptacle supplying lighting loads shall not be connected to a dimmer unless the plug/receptacle combination is a nonstandard configuration type that is specifically listed and identified for each such unique combination.*

Article 410 - Luminaires, Lampholders, and Lamps
410.10(D)- Bathtub and Shower Areas. …… . Luminaires located within the actual outside dimension of the bathtub or shower to height of 8 ft. vertically from the top of the

bathtub rim or shower threshold shall be marked for damp locations, or marked for wet locations where subject to shower spray.

410.16: Revisions were added to clearly permit surface-mounted LED luminaires in clothes closets.

410.64(A), (B) & (C): Luminaires listed and marked for use as a raceway or through-wiring can be used as raceway.

Article 680 – Hydromassage Bathtub

680.73: Where a hydromassage bathtub is cord-and plug-connected with the supply receptacle accessible only through an access opening, the receptacle must face toward the opening and be within 1 ft. of the opening.

680.71 – Branch circuit for hydromassage bathtubs: Hydromassage bathtubs and their associated electrical components must be on an individual branch circuit and protected by a readily accessible ground-fault circuit interrupter. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 6 feet measured horizontally of the inside walls of a hydromassage tub shall be protected by a ground-fault circuit interrupter.

800.156 – A min. of one (1) communications outlet must be provided per dwelling.

The information provided is not inclusive of all 2014 NEC changes but rather summarizes typical residential construction. The full code text must be consulted on all One and Two Family residential electrical designs and installations.

Ohio Chapter IAEI

Understanding the Cost Impact of the 2011 NEC

The 2011 *NEC* addresses the latest advances and green technologies. New Article 694, Small Wind Electrical Systems, updates to solar power requirements in Article 690, and revisions to Article 625 to address charging systems for plug-in hybrid electric vehicles, are what headline the major changes. Additionally, several minor revisions have been made to the 2011 *NEC* in an effort to clarify requirements, improve readability, and enhance usability of the *Code*.

The NEC establishes the minimum requirements for the safe electrical operation of a home. Many of the changes in the 2011 *NEC* impacting dwelling occupancies primarily affect those portions of the electrical system in the home that are characterized as optional upgrades and only apply when optional upgrades are made to a dwelling. These optional elements include GFCI protection for receptacles located in close proximity to optional sinks, electric radiant in-floor heating cables and requirements for ceiling fan support. These new requirements ensure a minimum level of safety for occupants are maintained when these upgrades are made. These are upgrades similar to windows, countertops or brick vs siding.

The following report is a case study utilizing a 2,348 square foot dwelling that will clearly illustrate the important safety enhancements and minimal cost impact based entirely on the 2011 NEC requirements.

The cost impact for this dwelling is as follows:

Minimum Code Cost Impact:
Deletion of 20 sq ft exception for balcony, porches & decks: **$0**
Large Foyer receptacle requirement: **$22.92**
Ground Rod Requirements: **$23.05**
Grounded conductor at switch locations
Unfinished Basement: **$0**
Slab on Grade/no attic: **$22.40**
Tamper Resistant Receptacle (new exception) Credit: **$1.44**

Total Minimum Code Cost Impact:
w/unfinished basement: **$44.53**
w/slab/no attic: **$66.93**

<u>Optional</u> Upgrades and Cost Impact:
GFCIs for sinks: **$9.98**
Ceiling fan boxes: **$25.20**
Heating cables for kitchen masonry floor: **$140.32**
Total <u>Optional</u> Upgrades: **$175.50**

*Cost Analysis for a sample new dwelling based on the minimum 2011 NEC requirements (2348 sq ft)			
2011 NEC Code Section	**Description of Code Requirement**	**Cost Impact**	
	Receptacle requirements for porch, balcony, or deck	**Materials**	**Cost**
210.52(E)(3)	Requires a porch, balcony, or deck to have at least one receptacle outlet installed within its perimeter. Depending upon the location of the outdoor receptacle as required by 210.52(E)(1) and (E)(2), the required receptacle as prescribed by this section could serve both requirements.	Single gang box: WP/TR GFCI receptacle: WP cover: 14-2-G per ft: **Sample Code House:** Receptacles on the front and rear meet the requirements of 210.52(E)(1), (2) & (3) **Cost Impact:**	$.41 $15.25 $4.17 $.39 **$0**
	Receptacle requirements for large foyers greater than 60 sq	**Materials**	**Cost**
210.52(I)	Foyers that are not part of a hallway in accordance with 210.52(H) and that have an area that is greater than 60 ft2 shall have a receptacle(s) located in each wall space 3 ft or more in width and unbroken by doorways, floor-to-ceiling windows, and similar openings. Layout of will vary from dwelling to dwelling. Cost analysis provided is for a worst case scenario for the sample code house	Single gang box: TR Receptacle: Cover: 14-2-G per ft: **Sample Code House:** Single gang boxes @ $.41 X 3 TR Receptacle @ $1.17 X 3 Receptacle Cover @ $.21 X 3 14-2-G $.39 per ft X *45 ft **Cost Impact:** * Conductor lengths are estimates and can vary from project to project	$.41 $1.17 $.21 $.39 $1.23 $3.51 $.63 $17.55 **$22.92**
	Ground Rod Requirements	**Materials**	**Cost**
250.53(A)	A single rod, pipe or plate electrode is required to be supplemented by an additional electrode as specified in 250.52(A)(2) through (A)(8) unless the rod, pipe or plate electrode meets 25 ohms resistance or less to earth in accordance with the exception.☐	8 ft ground rod: 8 ft #4 CU Conductor: Ground Clamp: **Sample Code House:** **Cost Impact:**	$11.50 $10.33 $1.22 **$23.05**
	Grounded Conductor requirements at Switch locations	**Materials**	**Cost**
404.2(C)	404.2(C) requires a grounded conductor be provided at most switch locations. Exception # 2 Cable assemblies for switches controlling lighting loads enter the box through a framing cavity that is open at the top or bottom on the same floor level, or through a wall, floor, or ceiling that is unfinished on one side.	14-2-G per ft: 14-3-G per ft: **Cost impact:** **Sample Code House:** 404.2(C) Exception #2 **Unfinished Basement: Cost Impact:** **Slab on Grade/no attic: Cost Impact** 14 switch locations x *10 ft per run = 140 ft 14-3-G x .11 per ft *This measurement will vary depending upon layout of wiring system, i.e., supply located at switch, close proximity of outlet to switch location, etc.	$.39 $.55 **$.16** **$0** **$22.40**
	New Exception for Tamper Resistant Receptacle	**Materials**	**Cost**
406.12	New Exception relaxes the tamper resistant receptacle requirement under the following conditions: 1) Receptacles located more than 1.7 m (5½ ft) above the floor; (2) Receptacles that are part of a luminaire or appliance; (3) A single receptacle or a duplex receptacle for two appliances located within dedicated space for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug connected in accordance with 400.7(A)(6), (A)(7), or (A)(8); or (4) Nongrounding receptacles used for replacements as	Standard 15 amp duplex receptacle Tamper Resistant Receptacle **Cost <u>reduction</u> per device location:** **Sample Code House:** refrigerator receptacle laundry receptacle **Total savings**	$.45 $1.17 **$.72** $.72 $.72 **$1.44**

	permitted in 406.4(D)(2)(a).	This relaxation in the rule will vary in savings from house to house. Additional locations may include garage door opener receptacles, other fixed in place appliances such as dishwasher, microwave oven, etc	
	***OPTIONAL UPGRADES**		
	GFCI Requirements for Sinks	**Materials**	**Cost**
210.8(A)(7)	The 2008 NEC requires laundry; utility and wet bar sinks to have GFCI protection under this section. the 2011 NEC will require receptacles within 6 ft of <u>all</u> sinks to have GFCI protection (other than kitchens which require GFCI protection per 210.8(A)(6) The only sinks mandated by the residential building code are kitchen and bathrooms. Therefore, the cost impact will only affect those dwellings where the option to add an additional sink is provided; similar to other non code related upgrades like countertops, brick veneer, etc.	**<u>Optional Upgrade</u> cost increase:** Standard receptacle: GFCI receptacle: Difference per receptacle: **Sample Code House:** One <u>optional</u> sink: two receptacles-GFCI (feed through one to another) =	 $.45 $10.43 $9.98 **$9.98**
	Ceiling Fan Box Requirements	**Materials**	**Cost**
314.27(C)	Ceiling-mounted outlet boxes in dwellings with "spare" switch-leg conductors installed require a ceiling box listed for sole support of a ceiling fan.	**<u>Optional Upgrade</u> cost increase:** Standard Ceiling Box: Box Listed for fan support: Difference per box: **Sample Code House:** Four <u>optional</u> boxes $6.30 X 4	$1.11 $7.41 $6.30 **$25.20**
	GFCI Protection of Electrical Heating Cables in Kitchen	**Materials**	**Cost**
424.44(G)	The 2008 NEC requires GFCI protection under this section for bathrooms and hydromassage tub locations. The change in the 2011 NEC will require kitchen masonry floors with electric radiant heating cables to have GFCI protection.	**<u>Optional Upgrade</u> cost increase:** Standard 20 amp 2-pole circuit breaker: GFCI circuit breaker: Difference per breaker: $140.32 **Sample Code House:** One breaker:	 $9.53 $149.85 **$140.32**

*Cost Impact Analysis does not include labor. Attached materials quote is based on over the counter prices. Purchase in larger quantities may warrant further savings.

Total Cost Impact for Sample Code House:

Unfinished Basement: **$44.53**

Slab/no attic: **$66.93**

<u>Optional Upgrades</u> and Total Cost Impact for Sample Code House:

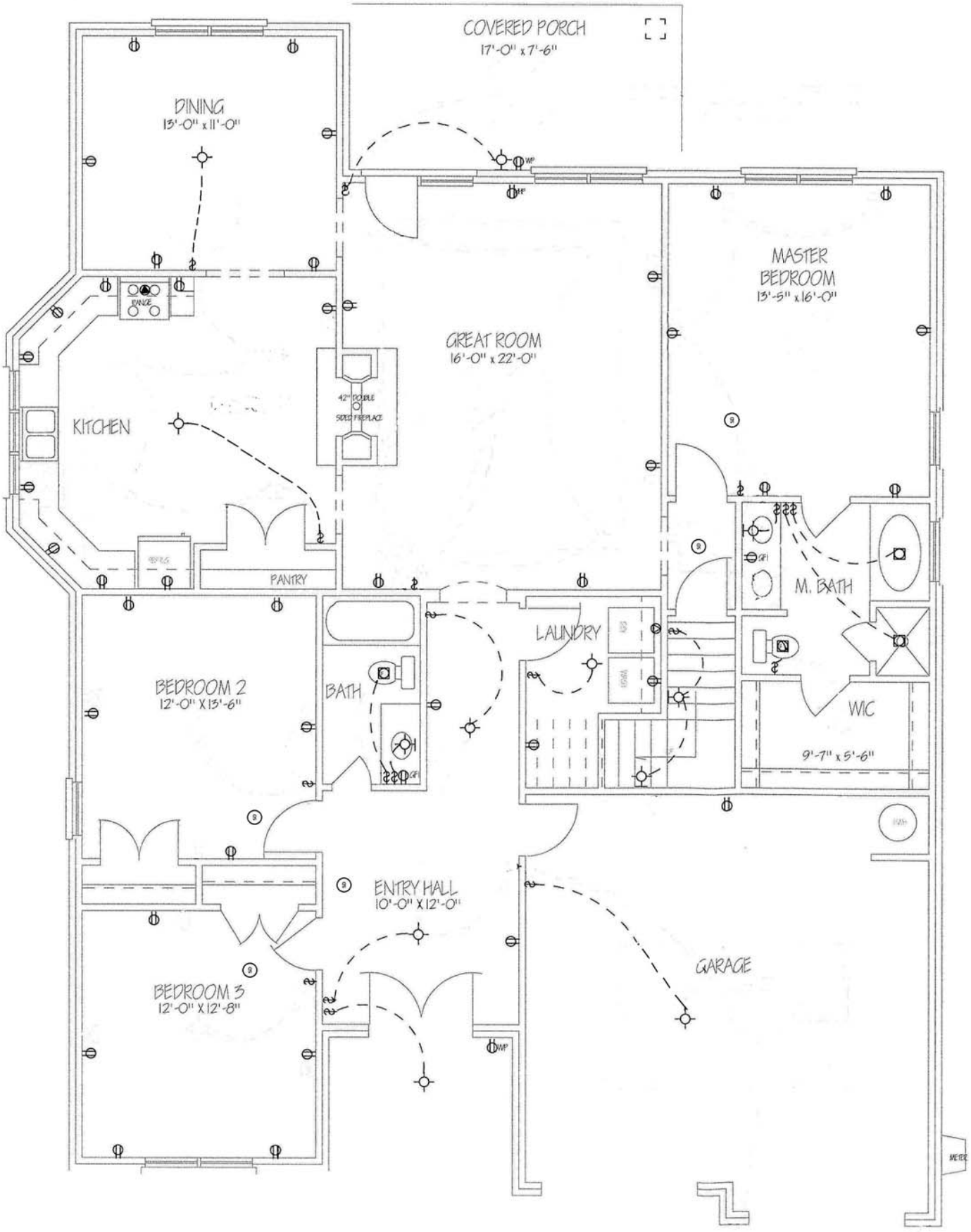
The cost impact is only invoked when optional upgrades are made to a dwelling. Accordingly, upgrades are characterized as added comforts and not mandated for meeting minimum construction safety codes. However, to ensure a minimum level of safety for occupants is maintained when these optional upgrades are employed, requirements have been included to address these in the 2011 NEC.

GFCIs for sinks: **$9.98**

Ceiling fan boxes: **$25.20**

Heating cables for kitchen masonry floor: **$140.32**

Total <u>Optional Upgrades</u>: **$175.50**


COVERED PORCH
17'-0" x 7'-6"
DINING
13'-0" x 11'-0"
MASTER BEDROOM
13'-5" x 16'-0"
GREAT ROOM
16'-0" x 22'-0"
RANGE
42" DOUBLE SIDED FIREPLACE
KITCHEN
PANTRY
M. BATH
LAUNDRY
BEDROOM 2
12'-0" X 13'-6"
BATH
WIC
9'-7" x 5'-6"
ENTRY HALL
10'-0" X 12'-0"
GARAGE
BEDROOM 3
12'-0" X 12'-8"
WP
GFI
METER

Quote No. 00079006

WOLFF QUOTATION

WOLFF BROS. SUPPLY INC.

SOLD TO

WOLFF-WOO CNTR TRADE -CASH *
565 N APPLECREEK RD
WOOSTER OH 44691-9599

SHIP TO

NEC PRICES *
WOOSTER OH 44691-9599

Quote Prepared By: MIKE HUTTINGER (330) 264-5900 EXT. 225

CUSTOMER NO.	CUSTOMER ORDER NO.	SLSM.	ENTRY DATE	WHS	PRINT DATE	ORDERED BY	PAGE
31345	NEC COST IMPACT	2	01/14/2011	WOO	01/14/2011	TIM M	1

Qty.	Item Number	Description	Price	Ext. Price
1	ALM1099N	BOX FG NAIL ON 1G SW 22.5CU	.4134 EA	.41
1	LEVTWR15W	TR/WR 15A 125V COMM DUP REC WH	9.3103 EA	9.31
1	LEVW7599TRE	GFCI RECP 15A 125V TR/WR BLACK	15.2500 EA	15.25
1	LEV5320ICP	15A DUPLEX RECP IVORY	.4507 EA	.45
1	LEVPJ8I	PLATE 1G DUP MID NYL IV	.2107 EA	.21
1	MUL30550	WP DUPLEX RECEPTACLE CVR VERT	4.1667 EA	4.17
1	WCNMB14/2GCT	14/2 W/GRD NM-B CU WIRE X PC	392.7300 MF	.39
1	LABWCNMB14/2G	CUT CHARGE-14/2 W/GRD NMB CU	.0003 EA	.00
1	WCNMB14/3GCT	14/3 W/GRD NM-B CU WIRE X PC	545.9700 MF	.55
1	LABWCNMB14/3G	CUT CHARGE-14/3 W/GRD NMB CU	.0003 EA	.00
1	PP8438	5/8X8FT CU CLAD GRD ROD 10MIL	11.4974 EA	11.50
8	WCBARES4CT	4 BARE SOLID COPPER WIRE XPC	1291.8100 MF	10.33
1	LABWCBARES4	CUT CHARGE-4 SOLID BARE COPPER	.0004 EA	.00
1	NERRC625	5/8"BZ 10SOL-2STR GRD ROD CLMP	1.2188 EA	1.22
1	LEV7599I	GFI RECP 15A 125V SLPRO IV	10.4268 EA	10.43
1	ALM9351NK	BOX FG NAIL ON RND 4IN SPDKLMP	1.1143 EA	1.11
1	RAC294	BOX STL CEIL/FAN 4"OCT 2-1/8DP	7.4100 EA	7.41
1	QOHOM220	06528 2P 20AMP BREAKER	9.5294 EA	9.53
1	QOHOM220GFI	2POLE 20AMP GFI BREAKER	149.8533 EA	149.85
1	LEVT5320I	TR RECEPT DUPLEX 15A 125V IV	1.1699 EA	1.17

*Quotation does not include **SALES TAX** if applicable.*

Subtotal 233.29
Plus Tax
Total

Prices are subject to change without notice. # Special order items may not be returnable.
DELIVERY CHARGES: A delivery charge will be added to deliveries that are less than $500; deliveries $500 and over will be prepaid. UPS and special freight charges will also be invoiced.

Medina
6078 Wolff Rd
Medina, OH (330) 725-3451
(330) 225-2240 (330) 773-1020

Wooster
565 N Applecreek Rd
Wooster, OH (330) 264-5900
1-800-233-5717

Akron
1200 Kelly Ave
Akron, OH (330) 773-0200
1-800-444-1446

Sandusky
2800 W. Strub Rd
Sandusky, OH (419) 626-1996
1-800-626-1993

QCP1

"Let the Code Decide"

OHIO CHAPTER
International Association of Electrical Inspectors

Understanding the Cost Impact of the 2008 NEC

The impact of additional Arc-Fault Circuit Interrupters and the new Tamper Resistant Receptacles in the 2008 NEC has prompted controversy driven by the misunderstood cost impact of moving from the 2005 NEC to the 2008 NEC. The NEC provides for the safe use of electricity from fire and shock. Technology over the years has enhanced that protection with minimal cost impact. Circuit breakers protect the home from overloaded circuits to prevent fires and GFCIs are well recognized in the safe use of electricity to protect us and our children from shock hazards. The GFCI entered the home in the 1970s, AFCIs became part of the NEC in the 1999 NEC and the tamper resistant receptacle in the 2008 NEC.

We will show that the impact of adding AFCI protection and Tamper Resistant Receptacles will have minimal impact on affordable housing. Keep in mind the NEC establishes the requirements for the safe electrical operation of a home. Additional circuits that include extra lighting, specific known loads, or a desire to separate circuits for isolation purposes is an additional cost that may be incurred that is once again not driven by the NEC. The additional lighting loads or appliances are not code driven, they are upgrades similar to windows, roofing configuration, or brick vs siding.

This report has been prepared by the following Ohio Chapter Board of Director Members; Oran P. Post, Electrical Inspector for the City of Tallmadge, Ohio and Thomas E. Moore, Electrical Inspector for the City of Beachwood, Ohio and Tim McClintock, Building Official/Electrical Inspector for Wayne County, Ohio. All three Board Members have extensive experience with the code development process.

This report provides an impact statement based entirely on the 2008 NEC requirements for three different homes. The first is a 900 sq ft home to help understand the impact to affordable housing. The other two homes are typical size homes and will include a 1700 sq ft home and a 2100 sq ft home.

The findings are based on prices obtained at a local electrical distributor and other verifiable resources as follows:

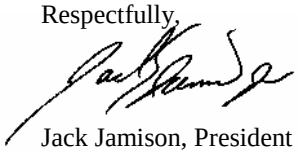
Combination AFCI	$36.34
Standard Receptacle	$.50
Tamper Resistant Receptacle	$1.25
Standards GFCI Receptacle	$8.00
Tamper Resistant Receptacle with GFCI	$14.85

Results

900 sqft Home	$160.18 for 900 sq. ft. dwelling unit or $.18/sq. ft.
1700 sqft Home	$205.27 for 1700 sq. ft. dwelling unit or $.12/sq. ft.
2100 sqft Home	$241.36 for 2100 sq. ft. dwelling unit or $.11/sq. ft

The 2008 NEC impact is minimal at less than a 20 cents per sq ft.

Respectfully,



Jack Jamison, President

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (900 Sq ft)					
2008 NEC Code Section	**Description of Code Requirement**	**Total Required Branch Circuit/Devices**	**Cost per 2005 NEC**	**Cost per 2008 NEC**	**Cost Difference**
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	900 sq. ft. X 3VA = 2700 VA/120 Volts = 22.5 Amps = 1.5 or 2 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	2	$3.25	$36.34	$33.09
			$25.00[1]	$36.34	$11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 6 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$4.50
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI recptacle required for bathroom	1	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI Installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	32	$.50	$1.25	$24.00
				TOTAL	**$160.18**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG……$114.66
250ft NM-B-14/3-CU-WG……$75.87
250ft NM-B-14/2-CU-WG…..……$54.13

$160.18 for 900 sq. ft. dwelling unit is a cost of $.18/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (1700 Sq ft)					
2008 NEC Code Section	**Description of Code Requirement**	**Total Required Branch Circuit/Devices**	**Cost per 2005 NEC**	**Cost per 2008 NEC**	**Cost Difference**
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	1700 sq. ft. X 3VA = 5100 VA/120 Volts = 42.5/15 Amps = 2.8 or 3 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	3	$3.25	$36.34	$66.18
			$25.00[1]	$36.34	$11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 8 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$6.00
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI recptacle required for bathroom	1	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI Installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	46	$.50	$1.25	$34.50
				TOTAL	**$205.27**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG……$114.66
250ft NM-B-14/3-CU-WG……$75.87
250ft NM-B-14/2-CU-WG…..……$54.13

$205.27 for 1700 sq. ft. dwelling unit is a cost of $.12/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

*Cost Analysis for a new dwelling based on the minimum 2008 NEC requirements (2100 Sq ft)					
2008 NEC Code Section	**Description of Code Requirement**	**Total Required Branch Circuit/Devices**	**Cost per 2005 NEC**	**Cost per 2008 NEC**	**Cost Difference**
	GENERAL LIGHTING LOADS				
220.12, Table 220.12 & 220.14(J)	2100 sq. ft. X 3VA = 6300 VA/120 Volts = 52.5/15 Amps = 3.5 or 4 circuits. 2 general purpose 15 Ampere circuits which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas is required.	4	$3.25	$36.34	$99.27
			$25.00[1]	$36.34	$11.34
	DINING ROOM				
210.52(A), 220.12, 220.14(J)	210.12(B) requires the dining room outlets to be protected by an arc fault circuit interrupter. 210.52(B)(1) requires this circuit to be on a 20 ampere circuit.	1	$3.25	$36.34	$33.09
	KITCHEN				
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 2 Tamper Resistant GFCI Receptacles serving the kitchen countertop.	2	$8.00	$14.85	$13.70
210.52(C), 210.11(C)(1), 220.14(J), & 406.11	2 Kitchen small appliance branch circuits supplying 8 Tamper Resistant receptacles located as required by 210.52(B)(1)	6	$.50	$1.25	$6.00
	BATHROOM				
210.52(D), 210.11(C)(3), 220.14(J), & 406.11	1 Tamper Resistant GFCI recptacle required for bathrooms	2	$8.00	$14.85	$6.85
	GARAGES				
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI receptacles required for attached garages & unattached garages with power.	1	$8.00	$14.85	$6.85
	OUTDOOR & BASEMENT RECEPTACLES				
210.52(E), 220.14(J), & 406.11	2 Tamper Resistant/Weather Resistant receptacles (front & rear of Dwelling)	2	$.50	$7.03	$13.06[2]
210.52(G), 220.14(J), & 406.11	1 Tamper Resistant GFCI required for unfinished basements	1	$8.00	$14.85	$6.85
	LAUNDRY				
210.52(F), 210.11(C)(2), 220.14(J), & 406.11	1 Tamper Resistant GFCI Installed for the Laundry within 6 feet of laundry sink	1	$8.00	$14.85	$6.85
	GENERAL PROVISION RECEPTACLE OUTLETS				
210.52(A), 220.12, 220.14(J), & 406.11	which includes family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, or similar rooms or areas	50	$.50	$1.25	$37.50
				TOTAL	**$241.36**

Footnotes

1. Standard AFCI breakers as required by the 2005 NEC
2. Alternative method protecting outdoor receptacles fed from basement GFCI receptacle

This analysis is based on 2-wire home runs for branch circuits. The following consists of alternative wiring methods and their respective prices;
250ft NM-B-14/2/2-CU-WG……$114.66
250ft NM-B-14/3-CU-WG……$75.87
250ft NM-B-14/2-CU-WG…..……$54.13

$241.36 for 2100 sq. ft. dwelling unit is a cost of $.11/sq. ft.
Not a whole lot to pay for safety!
Any extra wiring or devices above and beyond this is the choice of the builder and not mandated by the NEC.
***Prices obtained from Leff Electric Supply (see attached quote), Lowes, & Home Depot**

LEFFELECTRIC
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
Fax: 330-379-9865

Quotation

QUOTE DATE	QUOTE NUMBER
02/26/08	S1269245

ORDER TO:
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
330-379-9800

PAGE NO. 1

QUOTE TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

SHIP TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

CUSTOMER NUMBER	CUSTOMER P/O NUMBER	RELEASE NUMBER	SALESPERSON
6056	post		House Account

WRITER	SHIP VIA	TERMS	SHIP DATE	FREIGHT ALLOWED
Pat Hinman		Cash On Delivery	03/22/08	No

ORDER QTY	DESCRIPTION	Net Prc	Ext Prc
1ea	LEV T5320-I IVY NEMA5-15R DPLX RCPT	125.00/c	1.25
1ea	LEV T7599-I IVY 15A-125V GFCI RCPT	1485.00/c	14.85
1ea	GE THQL1115AF 15A PLUG IN AFCI CB	36.34/ea	36.34
1ea	LEV TWR15-GY 15A WTR RST DLXRCPT	703.13/c	7.03

LEFFELECTRIC
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
Fax: 330-379-9865

Quotation

QUOTE DATE	QUOTE NUMBER
02/26/08	S1269261

ORDER TO:
Leff/Akron Electric
711 Johnston St
AKRON OH 44306
330-379-9800

PAGE NO. 1

QUOTE TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

SHIP TO:
CASH ACCT TAXABLE (AKRON)
711 JOHNSTON STREET
AKRON, OH 44306

CUSTOMER NUMBER	CUSTOMER P/O NUMBER	RELEASE NUMBER	SALESPERSON
6056	post		House Account

WRITER	SHIP VIA	TERMS	SHIP DATE	FREIGHT ALLOWED
Pat Hinman		Cash On Delivery	03/29/08	No

ORDER QTY	DESCRIPTION	Net Prc	Ext Prc
1ea	P&S 1595-TRWR 15A 125V RCPT	18.48/ea	18.48
1ea	P&S 3232-TRWR 15A 125V WR RCPT	2.32/ea	2.32