



# Metro Codes

E—News For Professionals

Metropolitan Government of Nashville and Davidson County

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Codes joins other cities across the nation to celebrate the importance of building codes and building safety.

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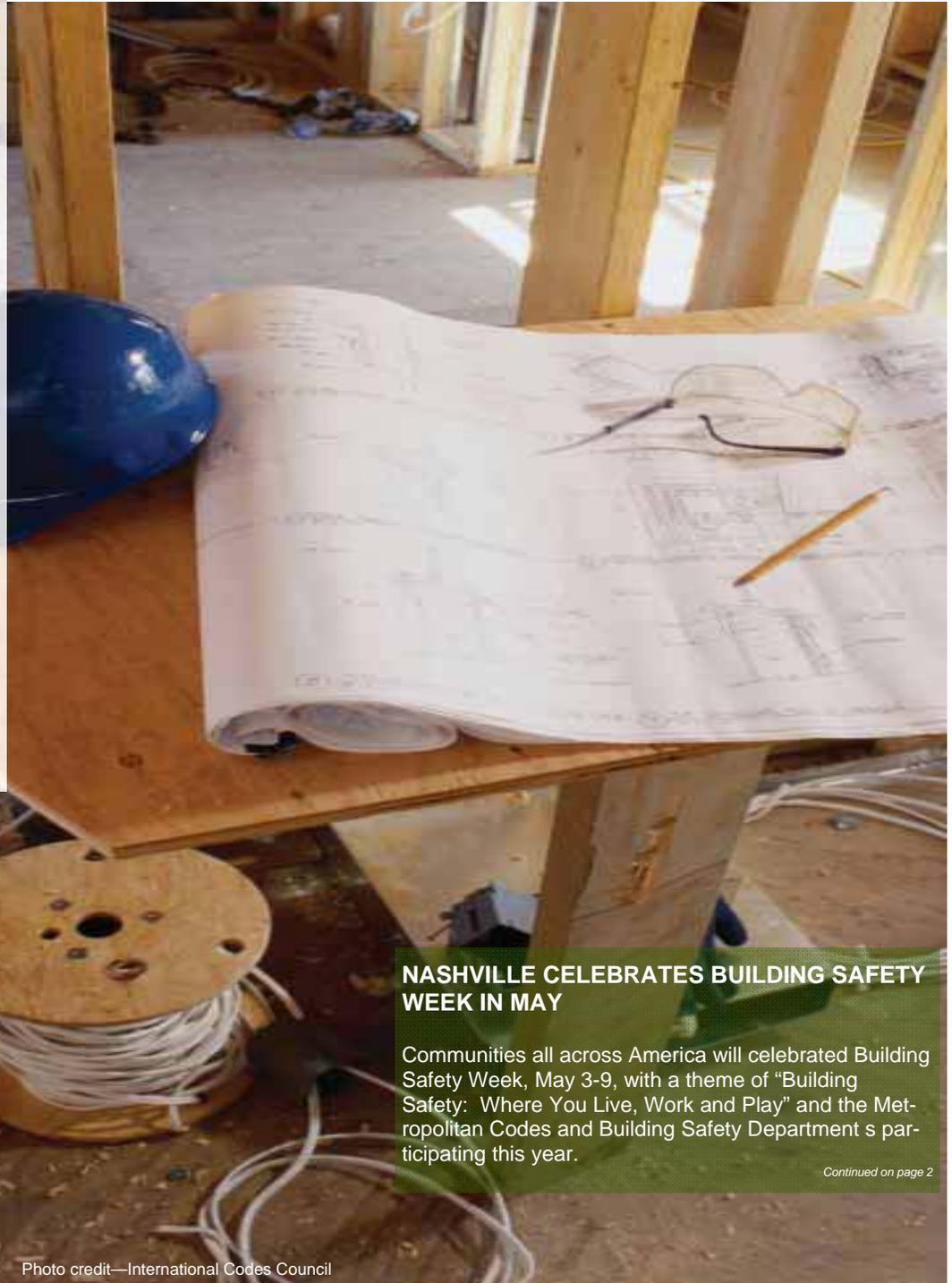
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## NASHVILLE CELEBRATES BUILDING SAFETY WEEK IN MAY

Communities all across America will celebrated Building Safety Week, May 3-9, with a theme of "Building Safety: Where You Live, Work and Play" and the Metropolitan Codes and Building Safety Department's participating this year.

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## NASHVILLE CELEBRATES BUILDING SAFETY WEEK IN MAY

**"Our staff provides the first line of defense against building disasters."**

Terry Cobb, Director, Codes & Building Safety

Building Safety Week, first observed in 1980, is sponsored by the International Code Council, a membership organization dedicated to building safety and fire prevention, of which Nashville-

Davidson County is an active member. The International Code Council develops the codes used to construct residential and commercial buildings, including homes and schools. Most U.S. cities, counties and states choose the International Codes—building safety codes developed by the International Code Council.

According to Terry Cobb, Director, Metro Department of Codes & Building Safety, building safety and fire prevention codes address all aspects of construction, such as structural soundness of buildings, reliability of fire prevention and suppression systems, plumbing and mechanical systems, and energy efficiency and sustainability. To ensure buildings are safe requires the active participation of building safety and fire prevention officials, architects, builders, engineers, and others in the construction industry, as well as property owners.

"Public safety is our number one concern," said Cobb. "During Building Safety Week and all year long, building safety and fire prevention officials are here to help protect the citizens of Metropolitan Nashville-Davidson County."

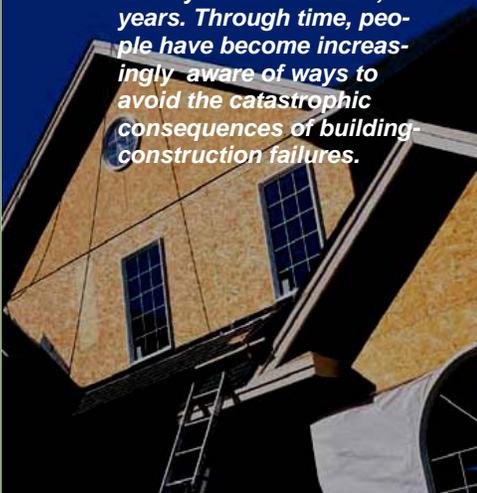
"We are silent but vigilant guardians who work daily to ensure safety in the built environment," he said.



Photo and logo courtesy of International Codes Council

### Building Codes— How They Help You

*The regulation of building construction is not a recent phenomenon. It can be traced through recorded history for more than 4,000 years. Through time, people have become increasingly aware of ways to avoid the catastrophic consequences of building construction failures.*



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### Who Needs Building Codes?

We all do—whether in our homes, offices, schools, stores, factories, or places of entertainment. We rely on the safety of structures that surround us in our everyday living. The public need for protection from disaster due to fire, structural collapse, and general deterioration underscores the need for modern codes and their administration.

#### HOW RELIABLE ARE THEY?

Most aspects of building construction—electrical wiring, heating, sanitary facilities—represent a potential hazard to building occupants and users. Building codes provide safeguards. Although no code can eliminate all risks, reducing risks to an acceptable level helps.

#### WHAT IS A BUILDING CODE?

Practically, it is the government's official statement on building safety. Technically, it is a compendium of minimum safety standards arranged in a systematic manner (codified) for easy reference. It embraces all aspects of building construction—fire, structural, plumbing, electrical, and mechanical.

#### WHAT IF I WANT TO DO A BUILDING PROJECT MYSELF?

Building departments have pamphlets and brochures explaining, in detail, how to obtain permits and design and construct a safe building. Inquire within your local community.

#### WHY SHOULD CODES APPLY TO MY OWN HOUSE?

For several reasons:

- For your personal safety, and that of your family, and the guests invited into your home.
- To ensure the economic well-being of the community by reducing potential spread of fire and disease.
- For the conservation of energy.
- To protect future home purchasers who deserve reasonable assurance that the home they buy will be safe.

From the brochure  
"Building Codes, How They Help You,"  
published by the  
International Codes Council.

**Mayor Delivers 46th Annual State of Metro Address  
 “Manage Through Today, Plan and Invest in Our City’s Future”**

Mayor Karl Dean delivered the 46<sup>th</sup> Annual State of Metro Address Thursday morning from the upper level plaza of Nashville’s new downtown transit station Music City Central, next to the historic Municipal Auditorium.



Photo Credit—Gary Layada

Dean acknowledged the local impact of the current down economy, but said the city can manage through by making sound fiscal decisions and planning for when times improve.

“Just like families and businesses in our community, we will have to manage with the resources we have. Therefore, I will not ask for a property tax increase,” he said. “As we look forward, our resources may be limited in the short term, but our goals should not be.”

International Country Music Star [Keith Urban](#) gave an unannounced performance at the start of the State of Metro Address. Urban sang two songs, including "Better Life," adding to the lyrics "a big convention center's coming."

“Keith and his wife could live anywhere in world, but they chose to make their home here. They, like the rest of us, recognize that this is a great place to live and a great place to raise a family. And our goal should be to make sure it stays that way now and for future generations,” Mayor Dean said.

Mayor Dean said during the speech that a new downtown convention center, which will be paid for entirely by visitor-related taxes and fees, is the most important capital investment the city can make for future growth.

The Mayor was up beat as he discussed our community.

“As you have heard me say many times before, I truly believe our best days are yet to come. Nashville’s future is bright. But to see that future come to pass, to reap the full benefits of all that past leaders have built, we must make sound financial decisions

today, stay focused on our priorities and yet, not be afraid to be bold, dream big and invest in our city’s future,” Mayor Dean said.

Then he added, “As we look forward, our resources may be limited in the short term, but our goals should not be. We have a history of this in Nashville – of daring to achieve great heights, of making progressive decisions that set our city up for future success, even when times are tough. Let me give you two examples.”

Mayor Dean said during the speech that he will implement two significant recommendations from the [Green Ribbon Committee's](#) recently completed report – greening Metro's fleet with the addition of more hybrid, electric and bio-diesel vehicles, and retrofitting Metro buildings for energy efficiency. The Mayor has set a goal to make Nashville "the greenest city in the Southeast."

Mayor Dean announced during the [State of Metro Address](#) that he would file his administration’s first capital spending plan next month. The plan will include projects for each of his priorities – education public safety and economic development, including classroom renovations at elementary schools to remove the use of 40 portable buildings, planning for the addition of two new police precincts, and planning for the construction of the 28<sup>th</sup> Avenue Connector, a bridge over railroad tracks behind Centennial Park to connect North Nashville to West End.

**“As we look forward, our resources may be limited in the short term, but our goals should not be.”  
 Mayor Karl Dean**

“As I have said for two years now, it’s all connected. Education, public safety and economic development – if we get the first two right, the third will follow. Our national economy presents a challenge, but it’s nothing our city hasn’t managed through before. And while managing through today, we can still plan and invest in our future. It’s what our city has always done – kept an eye on what lies ahead, and by doing so, we will be an even greater city when the economy improves,” Mayor Dean said.

“As I have said for two years now, it’s all connected. Education, public safety and economic development – if we get the first two right, the third will follow. Our national economy presents a challenge, but it’s nothing our city hasn’t managed through before. And while managing through today, we can still plan and invest in our future. It’s what our city has always done – kept an eye on what lies ahead, and by doing so, we will be an even greater city when the economy improves.” Mayor Karl Dean

**Terry Cobb and Wade Hill** welcome your feedback on our e-newsletter. Please send your comments to [Wade Hill](mailto:wade.hill@nashville.gov), at [wade.hill@nashville.gov](mailto:wade.hill@nashville.gov)  
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 Pass the word about our newsletter! We would be honored if you would share our newsletter with your colleagues and co-workers. If anyone would like to sign up to receive it themselves, they just need to send us their email, and we will be happy to “Pass It On” to them.

## Top 25 Revisions To The 2005 National Electrical Code

### Metro Codes

E—News For Professionals

The National Electrical Code 2005, which is under consideration by the Metropolitan Council for adoption, has many changes from the previously adopted codes. While there are many new requirements, the following is a list of the "top 25 Changes" from the NEC 2005. To review the ordinance under consideration, go to:

[http://www.nashville.gov/mc/ordinances/term\\_2007\\_2011/bl2009\\_435.htm](http://www.nashville.gov/mc/ordinances/term_2007_2011/bl2009_435.htm)

#### #1. 210.8 GROUND FAULT CIRCUIT INTERRUPTER PROTECTION

NEC 2005 requires all 15A and 20A, 125V receptacles within six (6) feet of the dwelling unit laundry or utility sink to be GFCI protected. Irons, hair dryers, and similar items with ungrounded polarized and non-polarized cord caps are commonly used in this area and present the same shock hazard found in other areas where the NEC currently requires GFCI protection.

#### #2. 210.8 GROUND FAULT CIRCUIT INTERRUPTER PROTECTION

The GFCI protection requirement for commercial kitchens was clarified by adding a definition of a kitchen. This new requirement expands the GFCI protection requirements for 15A or 20A, 125V receptacles to include receptacles that are located outdoors and accessible to the public

#### #3. 210.8 GROUND FAULT CIRCUIT INTERRUPTER PROTECTION

NEC 2005 has added text which calls for the installation of GFCI-protected receptacles in all outdoor public spaces accessible to the public.

#### #4. 210.12 ARC-FAULT CIRCUIT-INTERRUPTER PROTECTION

All dwelling unit bedroom now must have branch-circuit AFCI protection devices listed as a "Combination Type AFCI," effective Jan. 1, 2008. In addition, new exception permits AFCI protection by a device that isn't a circuit breaker, such as a receptacle, but only if it meets stringent requirements.

#### #5. 250.104 BONDING OF PIPING SYSTEMS AND EXPOSED STRUCTURAL METAL

The structural metal member bonding requirements that were located in 250.30(A)(3)(d) and 250.104(A)(1) were combined and relocated to 250.104(D) to improve NEC usability.

#### #6. 250.2 DEFINITIONS

NEC 2005 has new text added to the definition of an effective ground-fault current path is intended to help the Code user understand that its purpose is to help clear a ground fault by

facilitating the operation of the over-current device. Effective Ground-Fault Current Path. An intentionally constructed, permanent, low-impedance conductive path designed to carry fault current from the point of a ground fault on a wiring system to the grounded (neutral) point at the electrical supply source.

#### 7. 250.4 GENERAL REQUIREMENTS FOR GROUNDING AND BONDING

This change clarifies that swift operation of an over-current protection device in the presence of a ground fault depends upon the existence of an effective ground-fault current path from the point of the fault to the power supply neutral. The last sentence was revised to make it clear that the earth cannot be used as the effective ground-fault current path. It will not facilitate the opening of the circuit protection device from a ground fault.

#### 8. 250.50 GROUNDING ELECTRODE SYSTEM

The words "if available" have been replaced with "are present." The effect is that a concrete-encased electrode (Ufer) is always required for new construction, because it is present. However, a new exception adds clarity that a concrete-encased electrode [250.52(A)(3)] isn't required for existing buildings or structures

#### #9. 250.52 GROUNDING ELECTRODES

The language in the 2002 NEC was vague and subject to wide interpretation as it described when the metal frame of a building or structure could serve as a grounding electrode. The new text establishes the requirement for the structural metal electrode. In addition, listed galvanized rods of the 0.5-inch diameter are now permitted.

#### #10. 250.52 GROUNDING ELECTRODES

(5) Ground Rod Electrodes. Ground rod electrodes must not be less than 8 ft long and must have not less than 8 ft of length in contact with the soil [250.53(G)].

#### #11. 310.10 INSULATION TEMPERATURE LIMITATION

A new FPN alerts the designer to consider elevated ambient temperatures when raceways are installed outdoors in direct sunlight in close proximity to rooftops. Conductors cannot be used where the operating temperature exceeds that designated for the type of insulated conductor involved.

#### #12. 314.30 HANDHOLE ENCLOSURES

This new section contains the requirements for handhole enclosures. Handhole enclosures must be designed and installed to withstand all loads likely to be imposed.

#### #13. 400.14 PROTECTION FROM DAMAGE

This new paragraph permits flexible cords to be installed in

*Continued from page 4*

aboveground raceways in industrial environments in lengths up to 50 feet, but only under restricted conditions. Flexible cords must be protected by bushings or fittings where passing through holes in covers, outlet boxes, or similar enclosures. In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons will service the installation, flexible cords not exceeding 50 ft can be installed in above ground raceways.

#### **#14. 406.8 RECEPTACLES IN DAMP OR WET LOCATIONS**

The wording has been revised to clarify where a receptacle isn't permitted in a bathroom.

#### **#15. 410.73 GENERAL**

This new rule specifies when luminaires with metal halide lamps are to be provided with a method to help contain the arc at end-of-life arc-tube failures.

#### **#16. 410.73 GENERAL**

This rule was added to require disconnecting means for fluorescent luminaires that have double-ended lamps and contain ballasts. However, it isn't effective until Jan. 1, 2008.

#### **17. 422.51 CORD-AND-PLUG-CONNECTED VENDING MACHINES**

This new section requires GFCI protection for cord-and-plug-connected vending machines. Cord-and-plug-connected vending machines manufactured or re-manufactured on or after January 1, 2005 must include a ground-fault circuit interrupter as an integral part of the attachment plug. Cord-and-plug-connected vending machines not incorporating integral GFCI protection must be connected to a GFCI-protected outlet.

#### **18. 513.12 GFCI-PROTECTED RECEPTACLES**

This new section requires GFCI protection for 15A and 20A, 125V receptacles where aircraft might undergo service, repairs, or alterations.

#### **#19. 680.26 EQUIPOTENTIAL BONDING**

The term "equipotential bonding" was added to the title to clarify that the purpose of bonding is to reduce electric shock from stray voltage. In addition, a Fine Print Note was converted into a Code requirement to specify that "equipotential bonding conductors aren't required to extend to any panel board, service equipment, or an electrode."

#### **#20. 680.26 EQUIPOTENTIAL BONDING**

This change requires an equipotential bonding grid to be installed to reduce voltage gradients in and around permanently installed pools, outdoor spas, and outdoor hot tubs.

#### **#21. 695.4 CONTINUITY OF POWER**

A new sentence clarifies that the "carry the locked rotor current indefinitely" requirement only applies to sizing the fire pump

circuit protective devices, not the circuit conductors to the fire pump motor.

#### **#22. 695.6 POWER WIRING**

This text was revised to alert Code users that the branch-circuit conductors for a fire pump motor are sized in accordance with 430.22. In addition, branch-circuit conductors must be sized to accommodate the voltage drop requirements of 695.7.

#### **#23. 700.27 COORDINATION**

The overcurrent protective device of an emergency power system must now be selectively coordinated. This means circuit protection schemes confine the interruption to a particular area. For example with selective coordination, if a short circuit or ground fault occurs in a branch circuit, the only protection device that will open will be the one protecting just that branch circuit. Without selective overcurrent protection coordination, the feeder circuit protection device might open, leaving the entire system without power.

#### **24. 760.21 GFCI AND AFCI PROTECTION**

This new rule prohibits AFCI protection of the 120V circuit that supplies power for a nonpower-limited fire alarm system.

#### **#25. 800.24 MECHANICAL EXECUTION OF WORK**

A new FPN alerts the Code user to a comprehensive standard that identifies what "installed in a neat and workmanlike manner" means. Equipment and cabling must be installed in a neat and workmanlike manner.

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## **Green Notes**

### **Our Future Is Found In Our Water!**

WaterSense, a partnership program sponsored by the Environmental Protection Agency, seeks to protect the future of our nation's water supply by promoting water efficiency and enhancing the market for water-efficient products, programs, and practices.

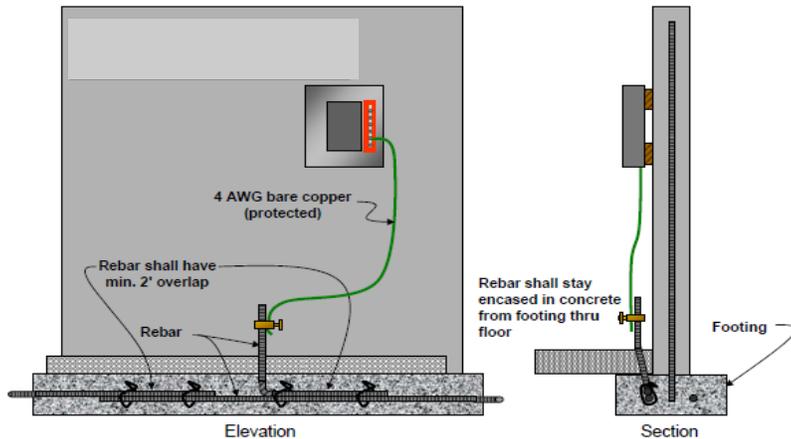
WaterSense will help consumers identify water-efficient products and programs. The WaterSense label will indicate that these products and programs meet water efficiency and performance criteria. WaterSense labeled products will perform well, help save money, and encourage innovation in manufacturing.

WaterSense is partnering with irrigation professionals and irrigation certification programs to promote water-efficient landscape irrigation practices. WaterSense is also partnering with manufacturers, retailers and distributors, and utilities to bring WaterSense products to the marketplace and make it easy to purchase high-performing, water-efficient products.

For more information, go to their website at: <http://www.epa.gov/owm/water-efficiency>

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## NEC 2005 Change: UFER Grounding



Effective with the adoption of the 2005 Edition of the National Electrical Code (NEC) the Metropolitan Electrical Code will require a *Ufer ground* (NEC 250.52 (3) concrete-encased electrode) with no smaller than a four (4) AWG bare copper conductor connected to a rebar that is bent up out of the footing. This rebar shall be connected to one or more bars tied together within the footing to provide a minimum of 20 feet of continuous direct contact with the earth. This *Ufer ground* is in addition to all other electrodes within the building being bonded together to form the grounding electrode system. The grounding electrode connection (GEC) shall be protected from physical damage. This new requirement is perhaps the single-most significant change in the 2005 edition of the National Electrical Code.

## Ufer Grounding Technique Dates Back To World War Two

The 2005 National Electrical Codes has many changes from the previously adopted code, but an interesting new requirement revolves around grounding specially the use of a Ufer ground.

The term "Ufer" grounding is named after a consultant working for the US Army during World War II. The technique Mr. Ufer came up with was necessary because the site needing grounding had no underground water table and little rainfall. The desert site was a series of bomb storage vaults in the area of Flagstaff, Arizona.

During World War II, a retired Vice President of Underwriters Laboratories, Herbert G. Ufer, developed it for the U.S. Army. Igloo shaped bomb storage vaults were being built, and possible static and lightning induced detonation problems were of concern. Ground conductivity was poor, and to be effective enough, ground rods would have to be driven several hundred feet.

After much research and testing Mr. Ufer advised the Army to make connection to the steel bar that would internally reinforce the concrete foundation. He had determined that concrete was more conductive than all but the best soil, and that this improved semi-conducting characteristic would enhance surface area contact with the surrounding soil. The wire ties normally used would be extra secure, and attention would be given to bonding or welding the lattice- type network together. The Army adopted the idea, and built the vaults as specified. After construction ground resistance tests were made. No measurement exceeded five ohms. This value was considered extremely low for the local soil conductivity. Later tests confirmed stability. Mr. Ufer went on to develop the concept of concrete encased grounding electrodes.

The principle of the Ufer ground is simple: it is very effective and inexpensive to install during new construction. The Ufer ground takes advantage of concrete's properties to good advantage.

Concrete absorbs moisture quickly and loses moisture very slowly. The mineral properties of concrete (lime and others) and their inherent pH means concrete has a supply of ions to con-

duct current. The soil around concrete becomes "doped" by the concrete, as a result, the pH of the soil rises and reduces what would normally be 1000 ohm meter soil conditions (hard to get a good ground). The moisture present, (concrete gives up moisture very slowly), in combination with the "doped" soil, make a good conductor for electrical energy or lightning currents.

Ufer techniques are used in building footers, concrete floors, radio and television towers, tower guy wire anchors, light poles, etc. Copper wire does not function well as a "Ufer" ground due to the pH factor of concrete (+7pH is common).

The use of steel reinforcement as a "Ufer" ground works well and concrete does not chip or flake as has been found with copper. The use of copper wire tied to the reinforcement rods outside the concrete shows none of these problems.

The minimum rebar necessary to avoid concrete problems depends on:

1. The type of concrete, its content, density, pH factor, etc.
2. Amount of concrete surface area in contact with the soil.
3. Soil resistivity and ground water content.
4. Size and length of the reinforcement rod, wire, or plate.
5. Size of the lighting strike current.

The NEC states that all available grounding sources must be used including the foundation reinforcement steel. Contractors should provide either a section of re-bar at least 20' long that is turned out of the footing to allow connection or an approved connector and conductor to the footing re-bar.

When this is not possible then it is acceptable to replace the UFER ground with two grounding electrodes installed per the NEC. Note that when the UFER (or other acceptable) ground is used then a grounding electrode is NOT required.

**Department of  
Codes & Building Safety**

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## Save The Date—Codes Announces Annual Golf Tournament

The 13th Annual Metro Codes Charity Golf Tournament will be held on October 17, 2009 at the Ted Rhodes Golf Course.

Last year's tournament, through the support of 128 golfers and 99 sponsors, resulted in yet a new record \$28,000 being donated to three local charities through the Metro Employees Consolidated Charities Campaign (MECCC).

This year, all proceeds will again go to the MECCC for the benefit of local charities.



## New Residential Construction Tree Requirements Changes

The Metropolitan Council recently expanded the requirements of the Metro Tree Ordinance to require trees to be planted during all new one- and two-family residential construction. Previously, the tree ordinance did not apply to the construction of one- and two-family homes.

Although the amended ordinance contains several new requirements for residential developments and new home construction, the three basic concepts to remember is this:

- 1) All new residential construction, must have at least one two-inch caliper tree for each thirty feet (or portion thereof) of public street frontage.
- 2) If built on a cul-de-sac, the new residences must have a at least 2 two-inch caliper trees for each thirty feet of public street frontage (or portion thereof).

- 3) If the lot is long and narrow, and has a width less than 25 percent of the lot's depth, enough trees shall be planted to achieve at least 7 tree density units (TDU's) per acre. Refer to the zoning code for information concerning TDU's.

To review the entire "ordinance" and "all" the new requirements, go to: [http://www.nashville.gov/mc/ordinances/term\\_2007\\_2011/bl2008\\_328.htm](http://www.nashville.gov/mc/ordinances/term_2007_2011/bl2008_328.htm)

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