NC Department of Insurance
Office of the State Fire Marshal - Engineering Division
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Engineered Electrodes Permitted for Grounding

Code: 2017 Electrical Code **Date:** March 2, 2021
Section: 250.52(A)

Question 1:
Are there any engineered electrodes that the State Electrical Division allows in accordance with section 90.4 as equivalent to the electrodes described in section 250.52(A)(1) through (7)?

Answer 1:
The State Electrical Division accepts an engineered concrete-encased electrode that is designed and sealed by a registered design professional as equivalent to a concrete-encased electrode described in section 250.52(A)(3) if all of the following is provided:

(1) the registered design professional is licensed as a Professional Engineer or Architect by the respective North Carolina State Licensing Boards,

(2) the registered design professional provides a sealed design of the engineered concrete-encased electrode to the electrical inspector,

(3) the registered design professional provides documentation to the electrical inspector that the engineered concrete-encased electrode is installed within the concrete as specified in the sealed design, and

(4) the registered design professional provides a statement on the design or documentation that the engineered concrete-encased electrode establishes and will maintain an equivalent objective as that of a concrete-encased electrode described in section 250.52(A)(3) of the 2017 NEC.

Question 2:
Can a registered design professional inspect the connection of the engineered concrete-encased electrode to the grounding electrode conductor or bonding jumper?

Answer 2:
The registered design professional can only “engineer” the electrode itself. The connection of the engineered component to the other parts of the electrical system must be inspected by a certified electrical inspector for compliance with the State Electrical Code.

Question 3:
If a registered design professional is “engineering” a footing and concrete-encased electrode simultaneously but cannot inspect the connection of the electrode within the concrete to the grounding electrode conductor or bonding jumper, is there any method that allows the concrete for the footer to be poured without approval by a certified electrical inspector?

Answer 3:
Section 250.68(A) requires the point of connection between the electrode and the grounding electrode conductor or bonding jumper be either accessible, buried, or encased in concrete. If the design profession intends to pour the concrete without an electrical inspection, then the engineered concrete-encased electrode should extend out of the concrete where the connection to the grounding electrode conductor or bonding jumper can be made in either an accessible location or buried after approved by the electrical inspector.

It is common practice to extend the concrete-encase electrode and make a connection in accordance with section 250.8 to the grounding electrode conductor or bonding jumper above the sole plate in the wall cavity of an open wall or by providing an access panel in a finished wall. It is just as common to extend the concrete-encase electrode out the side of the footer and have the connection buried; except care must be taken to provide an opening for inspection before coving without disturbing any backfill needed to properly support the sides of the footing.