

2018-11-30

## CCMC TECHNICAL BULLETIN

# Auger-Installed Steel Pile Foundations:

It has come to CCMC's attention that there may be concerns with the manufacturing and installation of auger-installed steel screw foundation piles used on Canadian job sites. As identified in CCMC evaluations' conditions and limitations, every project is required to have: helical blades, approval of a registered professional engineer, welding that conforms to standards; required corrosion protection, and a certified installer. CCMC has been informed that these conditions and limitations may not be applied in all cases and consequently this can compromise the load carrying capacity and serviceability of the corresponding load bearing foundations.

### Supporting Information

The Canadian Construction Materials Centre (CCMC) has been involved in the Canadian auger-installed steel pile industry for more than 20 years. CCMC has actively participated in the development of the technical criteria to support the industry. This bulletin is intended to be disseminate to authorities, engineers, and users of these products the importance of the criteria specified below in order to achieve installations that meet the building code.

### Helical Blades

Auger-installed steel piles are considered earth anchors constructed of helical-shaped, circular steel plates welded to a steel shaft. The plates are constructed as a helix with a carefully controlled pitch. The diameter of the plate is chosen based on the bearing pressure of the soil and the load the auger-installed steel pile is designed to support. The anchors can have more than one helix located at appropriate intervals on the shaft.

The central shaft is used to transmit torque during installation and to transfer axial loads to the helical plates. The central shaft also provides a major component of the resistance to lateral loading. These anchors are screwed into the ground using mechanized equipment. The applied loads may be tensile (uplift), compressive (bearing), shear (lateral), or a combination. Helical anchors are rapidly installed in a wide variety of soil formations using a variety of readily available equipment. They are immediately ready for loading after installation.

### Installer

Every installer of the proposed auger-installed steel pile must be certified by the manufacturer using approved equipment. The installer must follow the manufacturer's installation instructions and the uses and limitations specified in the CCMC Report. Each installer must carry a certification card bearing their signature and photograph. In addition, each auger-installed steel pile shall be identified with a label that contains the manufacturer's information, reference to the material standards specified above and the phrase "CCMC XXXXX-R".

### Welding

The structural base steel must meet the requirements of CSA G40.20/G40.21 or ASTM A 500. All welds shall conform to CSA W59-13 and be produced by certified welders in accordance with the Canadian Welding Bureau. The steel piles must have sufficient

The Canadian Commission on Construction Materials Evaluation (CCCME) has directed CCMC to issue this (and other) technical bulletins to inform CCMC's audience, and the Canadian public, of matters of interest related to construction products.



strength and stiffness to resist effectively all loads and effects of loads as well as such influences as may reasonably be expected during the service life and designed in accordance with CAN/CSA-S16.1. The structural design of the steel piles must be performed by a professional engineer skilled in such designs and licensed to practice under the appropriate legislation.

### **Corrosion**

The determination of the presence of corrosive conditions and the specification of the corrosion protection shall be carried out by a registered professional engineer licensed to practice under the appropriate provincial or territorial legislation. If the determination of the presence of corrosive conditions is not completed before installation, the product, including all its accessories, is required to be hot-dipped galvanized, meeting the requirements of CAN/CSA-G164 or ASTM A123/A123M with a minimum thickness of 610 g/m<sup>2</sup>.

### **Registered Professional Engineer**

In all cases, a registered professional engineer skilled in such design and licensed to practice under the appropriate provincial or territorial legislation must determine the number and spacing of the auger-installed steel piles required to carry all the loads. A signed and sealed certificate attesting to the conformity of the installation and the allowable loads for the piles must be provided by the engineer to the authority for every project.

### **CCMC**

With the instructions that lie within our CCMC Reports, it is our goal that manufacturers, authorities, and users of these products will consider the information presented in this bulletin when making decisions about the sale, installation, approval and use of auger-installed steel piles in Canadian construction.



### **CCMC BUILDING OFFICIAL HELPDESK**

Any building official or authority having jurisdiction (AHJ) with questions about auger-installed steel piles or any other CCMC evaluation can contact CCMC's Building Official Helpdesk at 613-993-6189 or [const.ccmcbuildingofficialhelpdesk@nrc-cnrc.gc.ca](mailto:const.ccmcbuildingofficialhelpdesk@nrc-cnrc.gc.ca)



### **CCMC MANDATE**

At the request of the Provinces and Territories, the regulators of construction across Canada, CCMC was created as Canada's official evaluation service for building officials and the construction industry in 1988. Formalizing this relationship was a Memorandum of Understanding between Canada's Federal Government and Provincial and Territorial Governments (PTs). Also at the request of the PTs, CCMC was centralized at the National Research Council of Canada (NRC) a federal government organization, in Ottawa, working closely with Codes Canada and research expertise. CCMC's mandate is to provide a technical opinion that a product or system complies with the requirements of Canada's Building Codes as an 'alternative solution' and to provide verification that a product conforms to a recognized product or material standard. As a Federal Government organization and part of the NRC, CCMC's due diligence on all evaluations is impartial, neutral and science-evidence based, intended to protect the health and safety of Canadians first and foremost. CCMC applies the same objective, factual and rigorous process on all evaluations and provides an expert, unbiased opinion on Code and Standard compliance without commercial interest in the products evaluated. Also as a federal government entity, CCMC stands behind all of its technical evaluations

For further information, questions, or inquiries, please contact CCMC at [ccmc@nrc-cnrc.gc.ca](mailto:ccmc@nrc-cnrc.gc.ca) or (613) 993-6189.

Martin Thériault, P. Eng.  
Director, Built Environment Regulations and Specifications  
Construction Research Centre