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REINFORCING NEWS

AUGUST 2005 VOLUME 2 ISSUE 2

Canadian and American codes for reinforcing bars, rebar material and welding are similar

By George T. Biro, P.Eng.

To consistently produce quality welded reinforcing components for reinforced concrete construction, precast producers should adhere to national standards for rebar, and for structural welding of rebar. If applicable, their company should be certified. In Canada, the Canadian Standards Association (CSA), with input from industry and technical experts, develops and updates national standards. In the United States, the American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI), and the American Welding Society (AWS) publish technical standards, thereby serving a similar roll as CSA.

StelCrete supervisors and welders are certified by the Canadian welding Bureau (CWB)

The Canadian Standards Association publishes standard CAN/CSA G30.18 – M92 "Billet-Steel Bars for Concrete Reinforcement" metallurgy. This standard specifies the requirements for hot-rolled deformed billet-steel bars for regular and weldable grades.

Canadian standard CSA W186-M1990, "Welding of Reinforcing Bars in Concrete Construction," applies to the design, fabrication and inspection of welded connections using deformed reinforcing bars, and to the certification of companies involved in such work. This standard covers the requirements for welding rebar together, and to welding of rebar to structural members. Certification of a company to this standard is administered by the Canadian Welding Bureau (CWB). Clause 8,

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QUICK PICK

Canadian and American codes

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"Certification of Companies," requires that companies demonstrate to the Bureau that the following resources are available:

- ⇒ engineering personnel, whether employed or retained, that are qualified to the standard,
- ⇒ supervisory personnel that are qualified to the standard,
- ⇒ welders who are qualified to the standard,
- ⇒ approved welding procedures, and
- ⇒ adequate welding and auxiliary equipment.

Companies are certified to welding processes based on the preparation of specific welding procedures which must be approved by the Bureau. The certification is based on ensuring that the personnel, materials, methods, procedures, equipment and record keeping meet the requirements of the standard. Welders are certified to the standard through training, and carrying out welding test samples. A CWB inspector witnesses the preparation of test samples and completes the required inspection and testing.

The AWS standard ANSI/AWS D1.4-98, "Structural Welding Code-Reinforcing Steel" applies to the welding of reinforcing steel to rein

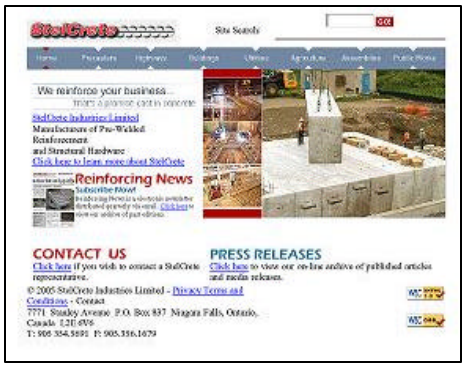
forcing steel, and reinforcing steel to carbon or low-alloy structural steel. The code is used in conjunction with prescribed general building code specifications and is applicable to all welding of reinforcing steel performed as part of reinforced concrete construction. The code stipulates material requirements for the rebar to ASTM A615/615M, "Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement" and ASTM A707/A706M, "Specification for Low Alloy Steel Deformed Bars for Concrete Construction."

Both the Canadian and American standards recognize the importance of using proper materials for welded construction. A key factor in ensuring ease of welding and good quality is to use steel rebar with low carbon content. Bars that are supplied to CSA G30.18 grade W, and to ASTM A706 are characterized as weldable and require minimal preparation to produce quality welds. Both standards use the same formula to define the carbon equivalent (CE) of the reinforcing bars. The CE number calculation is based on summing the percentages of constituent materials in the steel multiplied by given fractions. The CE number is used to determine the preheat and interpass temperature requirements for welding bars. Both the Canadian and American codes allow bar sizes up to 35M (No. 11) be welded with no minimum temperature, if the CE number of the steel is less than or equal to 0.40. The same size bars require a minimum temperature of 10 degrees C (50 degrees F), if the CE number is less than or equal to 0.55. There are minimal preheat requirements, if the temperature of the bars is less that 0 degrees C (32 degrees F). The steel producing mills in North America carry out quality testing of rebar and indicate the metallurgical, physical and mechanical properties of steel heat used to roll the rebar in Mill Test Reports. If a chemical analysis is performed on representative bar samples and the CE determined, rebar that does not bear the designating standard or grade marks may also be classified as weldable, or used considering the preheat requirements under the standard.

In addition to certification and material requirements, both Canadian and American standards present technical requirements for the shape, size, position, and integrity of welding performed. Many of the instructive figures are the same for both codes. Another point of commonality is that all rebar material produced in Canada by steel producer Gerdau Ameristeel does in fact meet the requirements of ASTM standards.

See StelCrete's
Product Information Sheet
on
Welding Information
at
www.stelcrete.com

StelCrete's Interactive Web site launched in May www.stelcrete.com



StelCrete's Web site is now fully operational and working hard for the company. The site was built to keep StelCrete's business doors open 24-7-365. It is a site built for business to business interaction with ease of navigation for any individual seeking information about products and services.

Featured on the site is an archive of articles and newsletters to learn about applications and new products. The core business of StelCrete is highlighted in seven sections of the site that identify products and services provided to precasters, and used in highways, buildings, utilities, agriculture, custom assemblies and public works.

Within each section, visitors to the site may view Representative Project Sheets and Product Information Sheets. The Representative Project Sheets detail projects where product has been supplied to reinforce precast or cast-in-place structures. The product Information sheets describe specific products and assemblies manufactured by StelCrete that can be mass produced for efficiencies in precasting or construction.

When someone wants to contact StelCrete, its coordinates are easily found at the bottom of every page. On the Contact Us page, there is a form that people can use to send a detailed inquiry that is designed to save time of the person making the inquiry and the staff at StelCrete who will respond.

There is a "Links" page that can take visitors to sites that may be of interest when undertaking extensive searches.

There are hotlinked titles on the Home page that takes visitors to a page that briefly describes StelCrete's corporate profile and its affiliation with Salit Steel. Anyone wishing to move to the Salit site may do so by clicking on the Salit logo.

The site has numerous images of production activity and completed products that will be refreshed as new products and projects are completed.

The site has no animation so that it can be accessed easily and quickly by low or high tech computers of any screen size. StelCrete staff clearly understand that business sites are used primarily for accessing information and communicating.

It's time to get to know the new site on the Web and bookmark it for information related to steel used for reinforcing in precast and cast-in-place concrete structures. The site is user friendly and built to last.

www.stelcrete.com

Pre-welded reinforcing segments used on clarifier rehab project

By George T. Biro, P.Eng.

Rehabilitation of the first of six digesters at the Humber Wastewater Treatment Plant in Toronto, Ontario commenced in February 2005. The entire $46 million project is being phased to allow the facility to keep operating without disrupting the city's wastewater treatment system. StelCrete is part of an innovative approach to supply and place reinforcing steel in segments to reduce the amount of field-placing time. The approach was presented by Mr. Richard Francis, detailing manager for Salit Steel rebar division and accepted by Kenaidan Contracting Ltd., MacViro Consultants Inc. (the project's prime consultant) and CH2MHill, the project's structural consultant. Rehabilitation of the digesters is expected to be completed in 2008.

Segment lowered into position

Once the existing slab base of the first digester was ready for rehabilitation, the contractor drilled and installed rock anchors and rebar shear ties to ensure that the new 200 mm-thick base slab would be well secured on top of the existing base.

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clarifier rehab project

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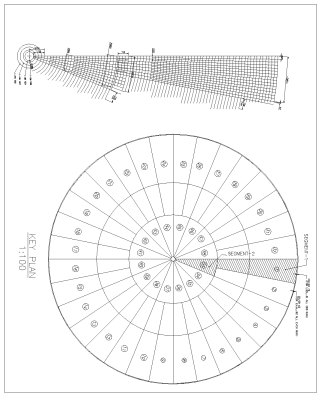

Sketch showing polar reinforcing pattern for rebar mat segments

The polar reinforcing pattern was accomplished with 32 outer segments and 16 inner segments. The plan diameter of the base slab is 32 metres. The maximum length of the circumferential bars was limited to 3580 mm. This was done to allow the prewelded units to be trucked to the job site without requiring special wide-load hauling permits. Bars not supplied with sufficient lap length were field-spliced with loose bars. Only 10 bars were required for splicing the 32 outer segments and a small number required for the 1600 mm inner circle centre.

See Project Information Sheet at www.stelcrete.com

Central Precast and StelCrete products used to complete paving slab rehabilitation project at Toronto City Hall

Nathan Phillips Square is the City of Toronto's premier square and event venue and the City's largest and most used public space.

The floor of the Square is composed of precast concrete paving slabs that are supported on the roof of the underground parking garage. The original paving slabs were constructed of precast concrete having a specified 28-day cylinder strength of 5000 psi. Each of the 6 1/2 x 6 1/2 ft. slabs was grouted in position on precast concrete pedestals. A 3/8-in. gap between the slabs permitted rain to drain to the roof surface below, thus preventing the accumulation of surface water.

After 40 years of service, the original pavers needed replacement. In 2001, the City began a 5-year project to replace the slabs with reinforced concrete slabs produced by Central Precast Inc. of Ottawa, Ontario. Products for the replacement differed from the original slabs as they were reinforced with galvanized steel mats

Pallet of galvanized pre-welded reinforcing mats ready for shipment to Central Precast.

and the concrete mix has a strength of 45 MPa. StelCrete provided approximately 5,000 pre-welded mats for the project.

The Square is named for Nathan Phillips, who was Mayor of Toronto from 1955 to 1962.

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WE REINFORCE YOUR BUSINESS… *THAT'S A PROMISE CAST IN CONCRETE*

StelCrete Industries Limited
7771 Stanley Avenue P.O. Box 837
Niagara Falls Ontario L2E 6V6 Canada

T: 905.354.5691 Toll Free: 800.263.7110
F: 905.356.0809

www.stelcrete.com

StelCrete's core business is to supply precasters with fully pre-assembled, pre-welded reinforcing cages for all types of products