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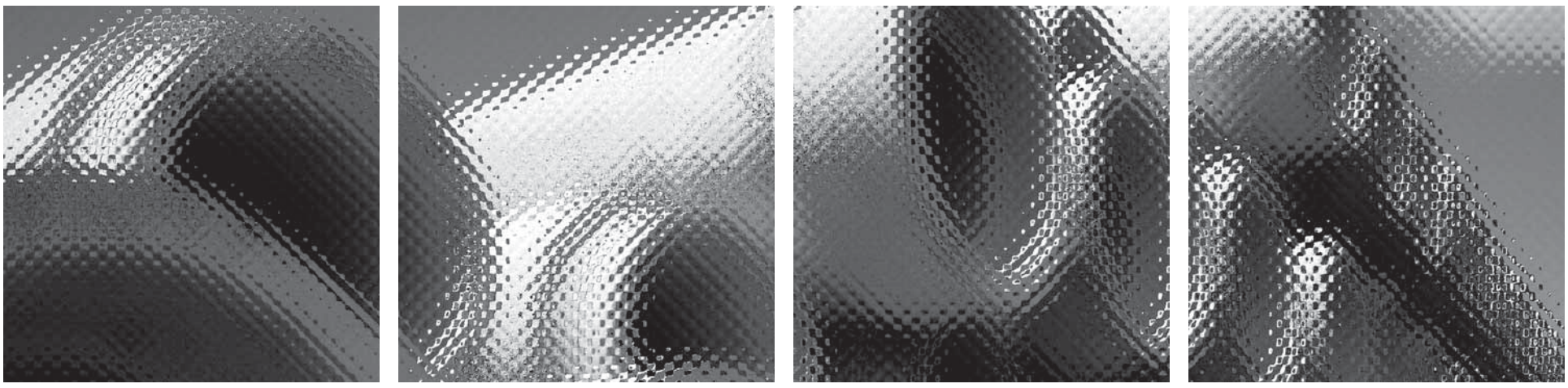

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in this issue

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CALENDAR OF EVENTS

World of Concrete 2005 (Jan.18-21)
Las Vegas, Nevada
www.worldofconcrete.com

ACPA Production Short Course School/MCPX (Feb.9-11)
Indianapolis, Indiana
www.concrete-pipe.org
www.mcpx.org

OCPA Annual General Meeting (Feb.18-19)
Pillar & Post Inn and Conf. Centre
Niagara-on-the-Lake, Ontario
www.ocpa.com

Ontario Good Roads Association Conference (Feb.20-23)
Royal York Hotel
Toronto, Ontario
www.ogra.org

ACPA 97th Annual Meeting (Mar.13-16)
Las Vegas, Nevada
www.concrete-pipe.org

CONEXPO-CON/AGG (Mar.15-19)
Las Vegas, Nevada
www.conexpoconagg.com

Lined Reinforced Concrete Pipe a first for London

By Neil Wyatt
Hanson Pipe & Products Canada, Inc.

A 675 mm diameter concrete sanitary sewer commissioned in the late 1960s was replaced with a specially designed 590-metre precast concrete system to improve the environment of a London, Ontario neighbourhood, and solve major structural problems caused by sulphuric acid (H_2S0_4). Inspection of a major maintenance hole at the intersection of Commissioners Road and Gordon Avenue revealed that the sanitary sewer had been aggressively attacked by H_2S0_4 and sections were in need of replacement. The length of the Gordon Avenue trunk sewer is approximately 4,500 metres with pipe sizes from 675 mm to 1200 mm diameter.

Concrete pipe installed through I-beams used to support existing buried services.

The line of reinforced concrete sanitary sewer installed around 1967 had been designed to receive effluent from the Dingman pumping station. Although the concrete pipe had significant damage to the crown of the pipe, it was still structurally sound, but too costly and almost impossible technically to repair. The new sewer was designed with an increased diameter to reduce the velocity of the effluent and the turbulence that contributes to the production of H_2S0_4.

The maintenance hole at the intersection of Commissioner Road and Gordon Avenue contributed significantly to the premature deterioration of the sanitary sewer in two ways. First, the 90-degree bend in flow for the sewage created a very turbulent situation, which combined with other environmental conditions in the sewer to generate H_2S0_4. Flows into the structure were expected to be in the range of 2.5 to 3.5 million gallons per day. In fact, the flows were found to be in excess of 6 million gallons per day. Secondly, the inspections of the system discovered a 2-inch x 4-inch timber about 8 feet long that appeared more like a railway tie because of the build up of debris on it. The timber had had lodged in the flow-through maintenance hole which was also creating turbulence and helping generate H_2S0_4.

Crew homes concrete pipe with liner flaps in place.

The solution that engineers devised to protect the new reinforced concrete sanitary sewer was to enhance its structural performance with a liner. Installation of this product is a first for the City of London, and one of only a few in all of Canada. Small diameter reinforced concrete pipe does not need to be lined to collect and carry common sanitary sewage.

Hanson worked with Elgin Construction to devise a technique for joining the liner in the field with 10-inch flaps covering the joints, after the sealed joints of the concrete pipe had been properly homed. Hanson produced 260 units of lined 900 mm and 1200 mm diameter pipe in its

continued on page 4

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Pre-welded reinforcing assembly contributes to efficiency of Quick Span

By George T. Biro, P.Eng.
StelCrete Industries Limited

Hanson Pipe & Products Canada, Inc. has introduced the precast Quick Span with a pre-welded reinforcement assembly. It was installed in Waterloo, Ontario immediately north of the University of Waterloo campus by E & E Seegmiller Limited, contracted in March 2004 to undertake the Regional Road 50 (Northfield Drive) widening. Included in the $5.6 million contract was the Westmount Road extension from Northfield Drive to Bearinger Road. The four-lane extension passes through the southern extremity of the Laurel Creek Conservation Area and crosses Laurel Creek. The width of the travelled road and design elements required by the Grand River Conservation Authority made a three-sided precast concrete structure the best alternative for the crossing.

Reinforcement assemblies for the Laurel Creek Quick Span were fabricated on a specially designed jig at StelCrete's Fort Erie plant, so that all assemblies were consistent including 30M rebar spaced at 150 mm on centre around the exterior corner of the bridge sections. The leg sections were additionally reinforced with wire stirrups, specially fabricated on the MEP automatic stirrup machine at Ronco Steel, StelCrete's affiliated plant in Burlington, Ontario. Precast concrete units were designed in accordance with the Canadian Highway Bridge Design Code to support significant loads from trucks and approximately 1.4 metres of earth fill. The assemblies were shipped to the precaster, as required, to speed production and to help make best use of floor space and human resources at the plant.

StelCrete is fully certified by The Canadian Welding Bureau (CWB) to CSA Standard W186M, "Welding of Reinforcing Bars in Reinforced Concrete Construction," and to CSA Standard W47.1, "Fusion Welding of Steel Structures." The first standard governs rebar assembly products produced, and the second standard covers products that incorporate structural shapes, such as

Pre-welded reinforcing assembly for Quick Span mould.

cast-in hardware for concrete work. Domestic steel is used in the assemblies and is CSA-certified under standard G30.18, "Billet-Steel Bars for Concrete Reinforcement."

Design flows of Laurel Creek through all seasons, as well as wildlife passage is accommodated by the structure. It was designed with a light portal in the centre for placement in the road median, and a cobble bed to enhance the aquatic ecosystem of the stream. StelCrete delivered two special assemblies for the cast-in place portal as well as assemblies for the concrete barrier walls with rebar dowels pre-attached to the reinforcing cages. Hanson's casting method meant that expensive dowel bar couplers could be substituted with normal rebar projecting through the top of the precast deck. Assemblies were also provided for 8 wing wall units, 20 typical units, and two narrow units to meet the overall culvert length specified on this project.

The culvert was installed in less than two days once the footings were poured in place. Pre-welded reinforcement assemblies contributed to meeting both the production schedule of the precaster and the installation schedule of the contractor. Combining precast products with outsourced reinforcement assemblies has proved the efficiency and economy of this form of production and business practice.

Students given opportunity to excel with new OCPA scholarships

For more than a decade, the OCPA has financially supported university and college students through annual contributions to existing scholarships of Consulting Engineers of Ontario and the Ontario Association of Certified Engineering Technicians and Technologists. Now the OCPA has its own scholarships aimed at supporting outstanding students enrolled in the second year of an undergraduate civil engineering university program, and second year civil engineering technicians or technologists enrolled in an Ontario college. The two scholarships were offered in the 2004-2005 academic year. University students competed for a $1,500 award, while college students vied for a $1,000 prize. The contest for the scholarships ended on October 29.

In each case, students were invited to prepare a 500-word essay on a topic selected by the OCPA. Their marks, extra-curricular activities, and contributions to society complemented their essay for judging. The OCPA values the technical excellence of the concrete pipe industry's future employees as well as their sensitivity to community needs and their communication skills.

Students were asked to provide their thoughts on the following statement: "Concrete pipe has been used as buried infrastructure in my hometown for sanitary and storm systems since _____, and has been treated as 'out of sight, out of mind.' Future generations are entitled to the same level of confidence in their buried infrastructure as we are, and for that reason concrete pipe should be used to replace our deteriorating sewers."

The winners of the scholarships are Kevan Peters, a 3rd year Construction Engineering student at Niagara College and Tyler Brake, a 4th year Civil Engineering student at Lakehead University.Their submissions are posted on the OCPA Web site at www.ocpa.com.

York-Peel Feedermain expands product line for Munro

By John T. Mokrzycki, P.Eng.
Munro Concrete Products

Immediately following the award of two separate competitions for the $104-million York-Peel Feedermain to Dufferin Construction Company in July 2003, engineers at Munro Concrete Products began a fast-track design and construction project to meet the scheduling demands of the Dufferin design-build team assembled to construct the feedermain. Already recognized as a pioneer in fully robotic concrete pipe production, Munro teamed with its equipment suppliers, to build a new automated concrete pressure pipe plant.

Hydraulically–activated mould jacket elevated over curing chambers.

In little more than 45 days, while Dufferin's consultants were preparing the necessary engineering plans and reports for construction of the Peel and York contracts, Munro and its partners had designed the plant and decided on the equipment suppliers. By August 18 2003, construction of the new plant was underway. Six months later on January 23 2004, the first pressure pipe was produced and by February 19 2004, the plant was in full production.

The new 8,550 square meter (92,000 square foot) plant is capable of producing pipe sizes from 400 mm to 3000 mm inside diameter, with a standard length of 6,096 mm (20 feet). The large 1800 mm and 2100 mm diameter Schlüsselbauer moulds would be the first moulds used in the new casting station.

The $72 million design-build contract for York Region is the first portion of the project that was awarded. This section of the 1800 mm diameter (72-inch) feedermain and associated road works, running 13 kilometres from the York-Peel boundary at Highway 50 to the Maple Reservoir in Vaughan, is one of several projects that compromise the Water and Sewer York-Peel Agreement signed in February 2002.

The $32 million design-build contract for the Region of Peel is the second portion of the project that was awarded. This 8-kilometre section involves the design and construction of a 2100 mm (84-inch) diameter concrete pressure pipe along Airport Road in Brampton from Queen Street to the new Airport Road Pumping Station and Reservoir and an 1800 mm diameter feedermain from the Airport Road Pumping station along Castlemore Road to the Peel-York boundary at Highway 50, where it joins up with the York Region contract.

Dufferin Construction Company of Oakville is overseeing the design-build of the 21-kilometre transmission line and associated road and civil engineering works. Its consultants include Earth Tech Canada, Marshall Macklin Monaghan, URS Canada and John Emery Geotechnical Engineering Ltd. Six 10-member crews have worked simultaneously on the project at peak construction periods, installing pipe along various sections of the two contracts. The feedermain design portion of the project is jointly managed by Joe Sframeli, P.Eng. of Marshall Macklin Monaghan and John Bourrie, P.Eng. of Earth Tech Canada. Larry Lorusso, P.Eng. is the senior project manager from Dufferin Construction Company, a division of St. Lawrence Cement Inc.

Shipment of 1800 mm (72-inch) pressure pipe leaving plant.

Pressure pipe being produced from the Munro facility contributes to the local economy through construction and maintenance of the new plant itself, and the many plant jobs that were created by the massive feedermain project. Both Regional governments and the Province will have a feedermain asset that adds physical value as well as social, economic and health benefits to a rapidly growing region of North America.

Earth Rangers Centre officially opened

In addition to being one of Canada's most energy efficient buildings, the Earth Rangers Centre in Woodbridge, Ontario, is a wildlife hospital and education centre for children. This facility incorporates a world class veterinarian research and training hospital, Canada's only oil spill response unit dedicated to wildlife, and interactive educational displays for the public. The Centre officially opened October 7, 2004 with numerous public and private sector dignitaries present.

The centre, built almost entirely of concrete uses at least 61% less energy than a similar building designed to the Model National Energy Code of Canada. It sets a new standard for sustainable design in Canada.

Concrete pipe was used as "concrete earth tubes" to reduce energy requirements associated with heating and cooling the facility. The 900 mm diameter x 20-metre long lines of pipe provide heat transfer in an area covering 1200 square metres of surface area. At two metres below the surface, temperature of the earth remains relatively constant at 10 to 12 degrees Celsius year round. As a result, air moving through the concrete earth tubes will be pre-heated or pre-cooled depending upon the season.

The Ontario Concrete Pipe Association is joined in its support of the Earth Rangers project by the Cement Association of Canada (CAC). Both the CAC and OCPA have made a five-year funding commitment in addition to ongoing promotional support.

Lined reinforced pipe

continued from page 1

Cambridge plant. Installation crews were able to enter the pipe and weld liner flaps to the liner of the homed pipe to provide a completely sealed interior space with little impact on hydraulics of the system.

Delcan, the consulting engineering firm for the project had to design the project so that the flows would not be interrupted until it was time to decommission the old line and connect the new. Engineers called for the construction of a larger diameter parallel line, complete with lined maintenance holes, to a location where the new line would cross over the trench to connect with the existing sewer, approximately 590 metres upstream from the maintenance hole at the intersection of Gordon Avenue and Commissioners Road. As the new system was being constructed, a 300 mm reinforced concrete storm sewer was also installed. The sanitary sewer maintenance hole at the crossover has a drop structure built into the invert to eliminate or reduce turbulence in the line.

Engineers redesigned the new maintenance hole at Commissioners Road and Gordon Avenue so that the benching directs the inflow to the outflow at a wider angle, thereby significantly reducing the opportunity for turbulence of the sewage to occur. The maintenance hole is also lined to enhance the performance of the structure.

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