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A WIDE VARIETY OF PUTZMEISTER EQUIPMENT ASSISTS IN SEVERAL CONSTRUCTION ASPECTS OF THE MASSIVE EASTMAIN-1 PROJECT FOR HYDRO-QUÉBEC.

The ongoing energy development of Hydro-Québec is part of a \$2 billion project undertaken by SEBJ – Societe Energie de Baie James. For Hydro-Québec, SEBJ has been instrumental in the development of a very rich hydroelectric area via numerous power stations installed since the 1970's.

In particular, construction of the new Eastmain-1 hydroelectric power plant – located on the Eastmain River near James Bay – is designed to generate 480 megawatt of electric power for Hydro-Québec.

The project – underway in a desolate region in northern Québec – includes a powerhouse, a main dam across the Eastmain River, the spillway on the river's right bank, and 33 dikes for reservoir closure. Construction was broken down into five major contracts, awarded independently via open public bids.

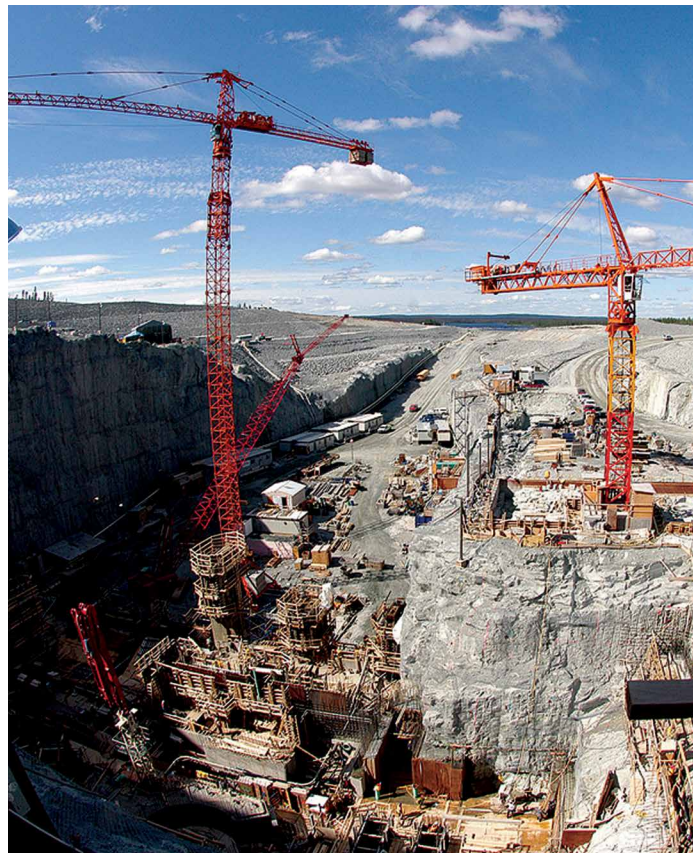
The largest of all structures being built is the 150 ft. (50m) tall, 410 ft. (125m) long and 180 ft. (55m) wide powerhouse – where three huge turbines will generate the power. This surface powerhouse, built into a rocky hill, is on the left bank of the Eastmain River. By the time the water exits through the tailrace, it will have dropped over 200 ft. (60m) from the water intake. This head, combined with the flow, develops kinetic energy that causes the turbines and generators to turn, producing electricity.

In particular, the major \$108 million Canadian powerhouse, penstocks, and water intake project were started in the spring of 2004 under the direction of Canadian contractor Aecon Hochtief. The Aecon Group is Canada's largest publicly traded construction company, and the group is 49 percent owned by German construction giant Hochtief (parent of US-based Turner).

To help place concrete more efficiently, Pompacktion, Inc. of Pointe-Claire, Canada is supplying the concrete placing equipment for the major feat.

Did You Know?

The web site - www.hydroquebec.com - offers detailed information along with photographs and animated illustrations, which help guide you through the entire and unusual construction process of Eastmain-1.



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In particular, the contractor needs reliable equipment, as Montreal is the closest inhabited area at over 750 miles (1200km) away. Therefore, if a machine fails in the job's isolated location, it costs an exorbitant amount in down time.

Project Manager Ken Chryssolor of Aecon Hochtief said, "For over 30 years, I've worked on huge jobs within James Bay so I know how difficult the abrasive granite mix is to pump. As we needed high performance equipment that could handle the tough aggregate mix, we're depending on all Putzmeister products."

For the specific powerhouse and water intake project, the mix of equipment includes two BSA 2109 H-D high pressure trailer-mounted concrete pumps, a JT 5000 jumbo trough mixer, and two PM towers for mounting specially modified MXR 30Z-150 separate placing booms. The two Putzmeister placing booms were originally standard MXR 34/38Z units modified by shortening the boom length to 30 meters to make up for the weight difference in using the six-inch pipe required.

Instead of typical five-inch pipe, six-inch was needed throughout the delivery system in handling the extremely harsh concrete mix supplied by the on-site batch plant. The brutal mix comprises crushed granite at one and one-half inches wide yet an inconceivable four inches long.

Due to the abrasive mix, high pressures, and up to 500 ft. (150m) pumping distances involved, Putzmeister ZX pipes and couplings are also being used.

Ken noted, "We needed heavy-duty pipe and couplings for handling the extremely hard aggregate mix and for long usage life. Putzmeister's special ZX pipe and couplings are completely leakproof and high pressure resistant. They definitely outlast any standard pipe and are an absolute necessity for this application."

Two Putzmeister BSA 2109 H-D trailer-mounted concrete pumps were also selected because of their field proven S-Valve for handling the coarse mix.

They would also help keep wear costs to a minimum with their inherently long 83-inch (2,100mm) stroke cylinders and up to 2205-psi (152 bar) high pressure capabilities.

Without a set pattern, pumping occurs on an irregular basis. Average outputs range between 25 to 80 cu. yds. an hour (20 to 60m³/hr) – with the rate of placement governed by the specifications and the complexity of the intricate forms, not by the equipment capabilities.

Of the two trailer pumps, one serves as the main production unit being fed via a Putzmeister JT-5000 jumbo trough – a surge hopper directly flanged to the pump's hopper. The jumbo trough allows a quick and full discharge of the mixer trucks into its large capacity hopper, which in turn allows concrete to be fed to the pump at any speed needed from 0 to 125 cu. yds. an hour (0 to 95m³/hr).



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The second Putzmeister trailer pump serves as backup because cold joints are absolutely forbidden or the powerhouse would be structurally deficient. Consequently, in case of an equipment malfunction, the second pump can finish a pour.

Ken said, “We basically have to almost duplicate equipment needs because of our remote location 15 hours away from Montreal. With 600 men on a job, we can’t afford down time. Fortunately, no major problems have resulted to date, and the equipment has performed to our demanding expectations.”

From April to November 2004, concrete work for the powerhouse took place. Two 75 ft. (24m) tall placing boom towers were anchored with bolts and had to be precisely mounted in specified locations so no cold joints would interfere with the flow of water upon project completion.

The two placing booms – each using their full 100 ft. (30m) horizontal reach – first provided full coverage to place concrete for both the walls of the huge turbines and the powerhouse structure itself.

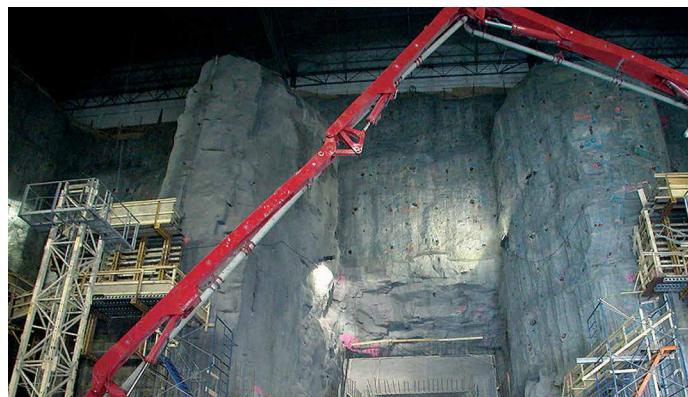
In November, the two towers were moved to handle the intake structure. This time, they were supported by 15 ft. by 15 ft. by 4 ft. high (4.5m x 4.5m x 1.2m high) poured concrete mats, and the placing booms still provided ample reach to all concrete placing areas.

Especially noteworthy is the placing boom’s Multi-Z boom configuration, which proved exceptionally maneuverable in working under the low roof of a temporary overhead steel structure. The structure was specially built so construction could continue during the frigid winter months.

Aecon Hochtief is also handling the horizontal concrete work for the penstocks. The three enormous penstocks are concrete-lined conduits excavated in the rock to channel water from the reservoir to the powerhouse turbines and are designed to maximize the head (drop in level). A Putzmeister BSA 2109 H-D trailer pump is pumping the concrete lining of these 350 ft. (107m) long penstocks, each at a 25 ft. (7.6m) diameter ranging from a 12-inch (305mm) to 4 ft. (1.2m) thickness.



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BESIDES THE EQUIPMENT'S PROVEN PERFORMANCE, SERVICE AND SUPPORT CAPABILITIES WERE A SIGNIFICANT FACTOR IN AECON HOCHTIEF SELECTING POMPACTION FOR THEIR EQUIPMENT NEEDS. POMPACTION ASSISTED IN SPECIFYING THE APPROPRIATE EQUIPMENT, HELPED TRAIN OPERATORS, AND IS MAKING SERVICE CALLS WHEN DEEMED NECESSARY.

And making service calls isn't easy. As a closed site, entry is by invitation only via SEBJ (Air Creebec) aircraft or a 15 hour drive from Montreal. That's why a specially developed work camp was built to house construction site workers, who in staggering shifts work 42 days followed by a ten day leave.

During a peak period last summer, nearly 2,400 workers were housed in dormitories. Similar to a small town, the site offers a variety of services such as cafeteria, hair salon, convenience store, post office and library along with indoor and outdoor recreational facilities. Once the project is complete, the approximate one-half square mile work camp will be dismantled and transported to another job site.

Besides building the concrete intensive powerhouse, other construction projects on site are also utilizing various Putzmeister models, resulting in a monopoly of Putzmeister equipment on Eastmain-1. This includes a BSA 1409 electric-powered trailer pump being used by Norascon-Hebert, a joint venture between two established businesses in Quebec. The unit is competently placing concrete for all incline work associated with the penstocks.

In addition, a Telebelt® TB 105 belt conveyor was utilized for placing concrete on the main dam across the Eastmain River. The contractor, Hamel Construction of Québec City took full advantage of the conveyor's special functionality to place unusually tough mixes and other aggregates such as sand, gravel and rock with ease.

For construction of the numerous dams, various Thom-Katt® trailer-mounted pump models were utilized for shotcreting by Norascon-Hebert and also by EDM Construction of Québec City, who were subcontracted by CCDC in Montreal. In addition, a Putzmeister SP-11 diesel-powered rotor/stator pump handled injection grouting for EBC, Inc. of Québec City.

Even the PWT high pressure washers – the latest addition to the Putzmeister America product line – were on-site working six months for Neilson Construction of Québec City. Next to the dam, two 500th models sprayed water at high 7,500 psi (520 bar) pressures to thoroughly clean selective areas of rock before concrete placement was possible.

In summary, Francis Gagnier, Vice President at Pompaaction said, "We've sold several different pieces of Putzmeister equipment to various contractors working on this enormous and demanding project complex. That alone is valid testimony to the value placed on the equipment's performance and reliability within such a remote location." Plans are for the facility to be operational by late 2006.

Contractor Specs

Concrete placing equipment dealer

Pompaaction, Inc. Pointe-Claire (Montreal), Canada

General contractor for powerhouse and water intake structure

Aecon Hochtief

General contractor for penstocks

Norascon-Hebert – Québec, Canada

General contractor for Eastmain dam

EBC Inc. – Québec City, Canada

General contractor for spillway

Hamel Construction – Québec City, Canada

General contractor for dikes – reservoir closure

Neilson Construction

EBC Inc.

CCDC (EDM Construction)

Fernand Gilbert Excavation

Putzmeister Equipment

- BSA 2109 H-D trailer pumps (2)
- JT 5000 jumbo trough mixer
- PM towers (2)
- MXR 30Z-150 separate placing booms (2)
- Putzmeister ZX pipe and couplings
- BSA 1409 E trailer pump
- Telebelt TB 105 belt conveyor
- SP-11 rotor/stator pump
- Thom-Katt trailer-mounted pumps
- PWT 500th high pressure washers (2)
- Putzmeister ballasted base