

Piles of work

By Correspondent Tonia Jurbin



PHOTOS BY DAVID ATLEE

The insatiable appetite for construction aggregates in California has sparked a big opportunity for Construction Aggregates in Sechelt, British Columbia.

With American sources of permitted and operating aggregate pits near the booming California market drying up, and a low Canadian dollar, transporting large volumes of material from BC has become viable.

Construction Aggregates' pit on the Sechelt peninsula (located about 50 km northwest of Vancouver) has the permits and reserves in place to last about 40 years, and they are gearing up to meet some of the demand from California and the rest of the world.

However, to move the volumes of material needed to make transporting it over long distances economical, the loading facility has to be

upgraded to accept cargo vessels.

"It's the transportation costs with aggregates that kill you, especially if you're building in a landlocked community. Vancouver doesn't have an aggregate supply problem because of the water access and short distance to the reserves, but for markets that are farther away, loading 3500 to 4000 tonne barges is not economical," says Ray Collier, general manager of Construction Aggregates.

About a kilometer from the conveyor extension project is the site of a community public pier that had been destroyed years earlier. One of the requirements of the building permit for the extension was that the owners provide a facility to the Sechelt community worth \$400,000, or about 10% of the contract.

Construction Aggregates, having had a long history in the community,

proposed rebuilding the pier that had been in the Downtown Business Association plans for at least 10 years. The suggestion was in recognition that a huge saving could be realized by having the construction of both projects carried out with only one contractor's mobilization cost.

The end of the existing

conveyor sits in about 5 metres of water, and the existing anchoring dolphins are only heavy enough to anchor vessels with a maximum capacity of about 15 000 tonnes. The average barge currently being loaded has a capacity of about 5000 tonnes.

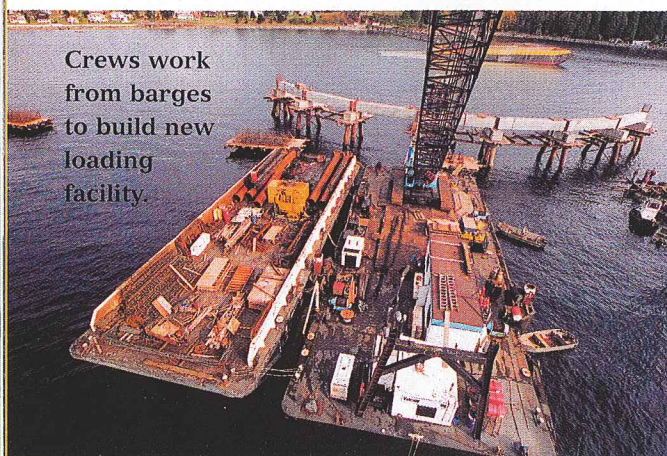
The design vessel for the extension is a Panamax cargo ship with a capacity of about 70 800 tonnes, an overall length of about 225 m, and a draft of about 13 m which requires water depths of least 15 m.

Heavier anchoring dolphins were also required for the bigger ships.

The first phase of this project is the marine works for the extension that includes the support structure for the conveyor belt, and a new quadrant beam consisting of a pivot structure and 8 bents.

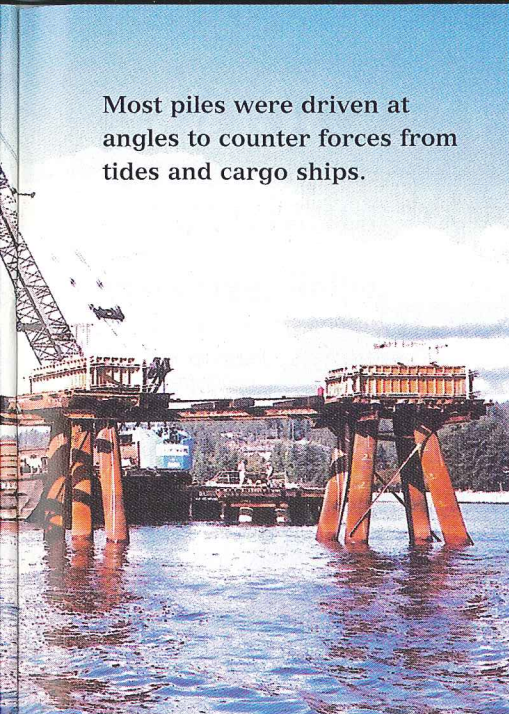
The quadrant beam is about 45 m long and is the part of the structure along which the barges and cargo ships will dock. Also included in this \$3.5 million contract, awarded to Vancouver Pile Driving, is all of the new fender (protection) piles and panels, ship berthing dolphins, buoys and the foundation work for the public pier.

A total of 104 piles were driven for the extension project, only four of which were vertical with pile lengths ranging from 25 to 42 m. A total of 15 vertical piles were driven at the site of the public pier.



Crews work from barges to build new loading facility.

Most piles were driven at angles to counter forces from tides and cargo ships.



All of the piles for these projects were open ended and filled from the tip to 4-6 m below the cutoff with sand supplied by Construction Aggregates. A concrete plug fills the top 4-6 m. Geotechnical information was obtained from three becker hammer drill holes that indicated dense sands and gravels with occasional cobbles and boulders at about 11 m below the mudline.

Since the driving criteria for the piles was for the tip to be embedded at least 14 m, VPD was free to determine the installation method. They went with a vibrating hammer set on Berminghammer leads which gave the crews good control when setting and installing the battered piles.

The main groups of piles for this job (excluding the public pier) were the conveyor platform support piles, the quadrant, ship berthing dolphins and the fender piles. A total of 24, 600 mm x 22 mm piles were driven for the conveyor platform support. Some 35, 762 mm x 12 mm piles were driven for the ship loader quadrant beam (including the pivot structure and the eight bents).

To berth a Panamax ship, three ship birthing dolphins each made up of 10, 914 mm x 19 mm piles averaging 42 m were required. The barge berthing dolphin is made up of four piles. Eleven 400 mm fender piles and

steel fender panels were installed to protect the dolphins and the quadrant beam. Interestingly enough, none of the piles for the extension have corrosion protection because they are designed for light short-term loading of a non-corrosive product.

Most of the piles went down to the required tip elevation without any problems. When a pile did hit refusal shy of the requirement, a diesel hammer was used to advance the tip, or at least to demonstrate that the pile wasn't going anywhere.

"The vibrating hammer works well in this dense granular material, but we have to demonstrate to the client that we can get the bearing capacity that they want," says Sue Laforest, project manager for Vancouver Pile Driving. "We did a test program for the client where we drove four piles using our proposed method that were fitted with Pile Driving Analyser (PDA) equipment to show that we could get the capacity. It saved us from having to interrupt production for PDA testing during construction, and it also allowed us to firm up our orders for the steel early on."

The equipment for both sites, the public pier and the conveyor extension, included two derricks on spud barges (a barge that is outfitted with

piles that are dropped into the mudline and act as anchors).

The first rig was outfitted with a 4600 Manitowoc 200 tonne crane which did all of the pile driving. The second rig was outfitted with a 4100 W Manitowoc 230 tonne crane which did all of the service work for building the concrete pile caps which essentially means moving personnel, equipment and materials.

"Pouring the pile caps was a bit of a challenge here because we had no land access, everything has to come in on barges," says Laforest. Another consideration in their scheduling and tender price was the fact that the equipment had to be towed in behind the breakwater and secured every night because of the high winds that blow into Trail Bay. That round trip chews up about one hour a day.

With aggregates being consumed about 8 to 10 times faster (by volume) than permits are being issued, Construction Aggregates has placed a good bet. The project will not only benefit Construction Aggregates in terms of improving the overall efficiency of their operation and increasing their foreign revenues, it will also bring real US dollars to the small coastal community in the near future, and world markets to their shoreline shortly thereafter. ♦

New loading facility will help Construction Aggregates keep up with demands for product.

