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Given California's insatiable appetite for aggregate and British Columbia's bounty of reserves, it was only a matter of time before it made sense to ship material south. That time has come.

As permitted reserves near the booming San Francisco Bay area market dry up and the Canadian dollar's value drops, transporting large volumes of material from B.C. has finally become viable. By some estimates, the Bay area uses about 48 million tons of aggregate a year. Vancouver uses less than half that amount. British Columbia, with its thousands of miles of coast shaped by extinct volcanoes and later carved by millennia of glaciers and glacial runoff, has huge reserves of marine-accessible high-quality sand and gravel and quarry rock.

California aggregate suppliers are facing an already overcrowded highway system and increasing distances from the source to the

end user. Residents don't want gravel pits in their community. And haphazard community planning has been the curse of the industry as valuable reserves have been built over. (In fact, in parts of the U.K., subdivisions are being bought for the gravel reserves

tion Aggregates Ltd. (CAL), Vancouver, B.C., have been hoping to crack the California market. Transportation has been the roadblock in bringing the two together.

Construction Aggregates operates a 1,000-acre pit on the Sechelt peninsula located about 30 miles northwest of Vancouver. The quality of the Sechelt aggregate is superior to anything available in Hanson's mid-Pacific region, says Ray Collier, the vice president and general manager of Construction Aggregates. Using an identical concrete mix design, the concrete mixed with the Sechelt aggregate consistently breaks at about 1,500 psi higher than the cylinder made with a typical California aggregate, he says.

CAL has 40 years of permitted reserves at that pit and recently upgraded its bulk loading facility to meet some of California's demand. In fact the first ship made the four-day trip from Sechelt to

they are sitting on.) The status quo for meeting future demand in California is just not sustainable.

Companies like Hanson Aggregates have been considering importing rock into California for about 20 years. Meanwhile, companies like Construc-

Canadian aggregates set sail for San Francisco

BY TONIA JURBIN

Ship Ahoy

Canadian Ship Lines' Sheila Ann is the first full-size cargo vessel to load Construction Aggregates material bound for San Francisco. Photo by Dave Atlee

San Francisco in mid-October. The upgrade was crucial for CAL to enter the California market because of the volumes that state needs to import. CAL was previously only loading barges with capacities no larger than 4,400 tons for shorter trips.

"It's the transportation costs with aggregates that kill you, especially if you're building in a landlocked community," Collier says. "Vancouver doesn't have an aggregate supply problem because of the water access and short distance to the reserves. For markets that are farther away, loading 4,400-ton barges is not economical. It is the volume of business that was key to our expansion. Expanding our market financed the upgrade of our infrastructure. We can't raise the price of a product that is set by the market."

Scratching the other's back

In describing just how important a client Hanson is for CAL, Collier explains that the economy in British Columbia is so slow that the Sechelt pit had been operating at about half its capacity. This deal with Hanson will bring the pit back to operating at full capacity to ship somewhere between 1 million and 3 million tpy south. At full capacity, the quarry produces about 6.6 million tpy.

Hanson Aggregates Mid-Pacific Inc., Pleasanton, Calif., started out as Kaiser Sand & Gravel Co. in the San Francisco Bay area in 1923. With that kind of history and market position, the company can ill afford to run out of gravel.

Although Hanson still operates five pits near the metropolitan area, the largest of the five is nearing depletion and permits are getting more difficult to acquire in or near urban areas. "With the already overcrowded infrastructure in the Bay area, we had to start looking at bringing material in by water," explains Bill Butler, vice president and general manager of Hanson

Mid-Pacific. His region stretches from northern California to Santa Barbara, and sells about 10 million tpy.

"This is a real serious paradigm shift for us, we've had to really change our way of thinking," Butler says. "There are going to be more and more hurdles to jump over just to maintain our current market position."

Talk of importing began in the 1980s. But in the 1990s that talk got more serious, and in late 2000, Hanson bought some assets from the B.C.-based British Pacific Aggregates.

This acquisition secured the rights and entitlements for a quarry on Nelson Island along with some of its outdated infrastructure in B.C. Hanson is not presently mining the site. Of more immediate importance, the deal also included a port lease in San Francisco.

Hanson now has four port facilities in the Bay area and will unload the material from a Canadian Steamship Lines ship at pier 94 using a self-unloader, which is part of the CSL ship. Hanson is constructing a hopper and a shoreline conveyor at pier 94 to move and house the material.

But Hanson isn't the only aggregate company in the import/export business. Lafarge Canada Inc. has been doing business with several clients in the States for about two years now. Lafarge West Coast Vice President and General Manager Brian Saunders explains, "We are currently the largest Canadian supplier of imported material to the California market. We deliver to all of the major West Coast centers including Los Angeles, San Diego,

San Francisco and Seattle. Our material comes from Texada Island (in the Georgia Straight) where we have a deep sea loading facility."

Ship to shore

On the shipping side, things began coming together for CAL and Hanson in 1998. Canadian Steamship Lines was already shipping gypsum from Mexico to Seattle and Vancouver using the Panamax ships, but returning south with no backhaul. Sid Sridhar, president and CEO of Seabulk Systems Inc., offered to help his client CSL find a southbound cargo. Seabulk Systems is a logistics solutions provider for moving bulk volume material.

But before Panamax ships could haul loads south, a facility was needed that could load it. And that was no small order.

At that time, B.C. only had one 30-year-old deep sea loading facility. Sridhar proposed building a Sea Bulk-Transfer Vessel or STV. The STV is a 11,000-deadweight-ton floating transfer terminal capable of transferring 4,400 tph of bulk aggregates from smaller barges into Panamax or Cape-size ships anchored at a deep sea locations. The Panamax can also be loaded close to the dock in the deeper water—the STV extends longways from the dock to the ship, becoming an extension.

"Our original proposal was to build an STV, but even with the vessel acting as an extension of the existing loading facility, the water was still only marginally deep enough for the operation to work," Sridhar says. "We discussed dredging to provide a deeper draft. But in B.C., acquiring permits to do that kind of in-water work would have taken longer than other alternatives." The dredging would also have to be maintained and would always be under the scrutiny of the federal Department of Fisheries & Oceans and other provincial regulatory bodies.



Bill Butler



Ray Collier

"Ray [Collier] and I went back and fourth with this until he finally asked me to design and build a permanent extension to his existing system." The permanent structure was more expensive, but allows CAL to load any size ship without using an STV.

The end of Sechelt's conveyor was in water only 23 ft deep and had anchoring dolphins only heavy enough to anchor vessels with a maximum capacity of about 16,500 tons. The design vessel used for the extension was CSL's Panamax cargo ship, also designed by Seabulk Systems Inc.

The term 'Panamax' comes from the size restrictions of the Panama Canal; the maximum beam size is 105 ft. The ship has a capacity of about 78,000 tons, an overall length of about 738 ft, and has a draft of about 42 ft, which requires water depths of least 49 ft when fully loaded. The existing terminal also had to remain operational during the construction. Workers had only a two-week window to integrate the new the loader into the existing system—it was done in 10 days.

It takes as long as 24 hours to load the Panamax from Sechelt's new facility. But since Sechelt cannot operate around the clock, loading the vessel takes about 1½ days. So far, the maximum loading rate has been 5,425 tph.

That new loading system was the commitment Hanson needed to close the deal. CSL contracted with Hanson Aggregates to ship material south while Construction Aggregates contracted with Hanson to supply and load the material. Hanson's long-term goals is to move about 20 ships per year between Sechelt and San Francisco.

Full extension

The first phase of the extension was the marine works, which included the support structure for the conveyor belt and a new quadrant beam consisting of a pivot structure and eight bents (beams on the new terminal). The

Sechelt: Before Ship Loading

To feed both U.S. and Canadian demand, Construction Aggregates' Sechelt plant processes about 11,000 tons per shift. The quarry's load-and-haul operation is carried out with two Cat 375 excavators and four Cat 773 haul trucks. The material is transported to a 4260 Farrel Bacon primary jaw crusher and a 3042 Pioneer secondary that are arranged in series.

The material is stockpiled over a pit-run surge pile, then further processed at the primary screening plant—which processes 2,200 tph. At the primary screening plant, dry material is screened on ¼-in. Binder Bivi-Tec screens. The primary screening operation separates the material into three sizes: plus 1½ in., 1½ × 1¼ in., and minus ¾ in.

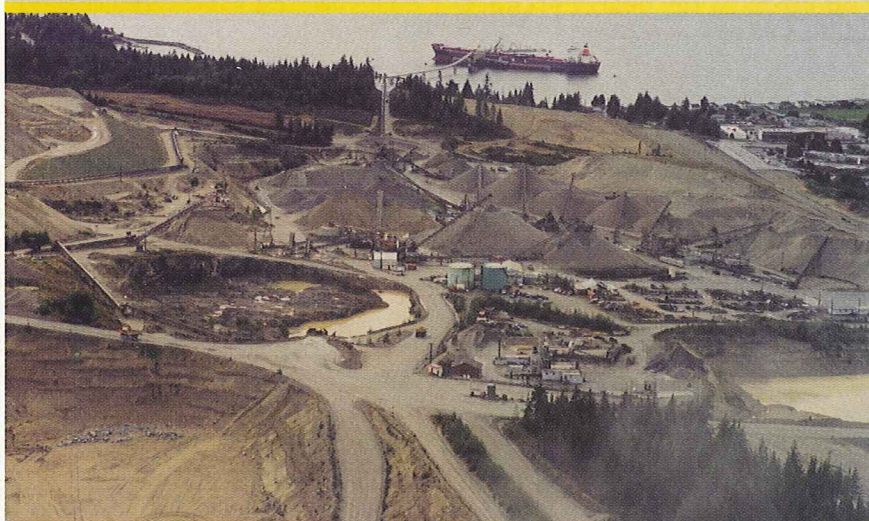
The rock is washed using 10- × 20-ft McLanahan rotary scrubbers, while the stone is washed on 8- × 14-ft McLanahan scrubbers. The primary screening plant also features a fine sand recovery system which uses a Krebs Cyclone and an Eagle fine-material washer to recover the sand.

The sand is screened on 7- × 26-ft Binder Resonance screens, and processed in a Mark V Eagle classifier tank and Eagle fine-material screw washers. The 1½- × ¾-in. is washed and screened on a 7- × 20-ft Binder Resonance screen and each product is further washed in Eagle coarse-material washers. The 1½-in. rock is processed at the secondary crushing plant using a 5½- × 5½-ft Symmons standard cone crusher as well as a Symmons 7-ft short-head cone crusher.

Screening at the crushing plant is done on 8- × 20-ft Nordberg screens and a 20-ft Binder Resonance screen. The ¾-in. and ½-in. rock is washed in Eagle coarse-material washers. All of the crushed sand and stone is stockpiled over reclaim tunnels where 48-in. conveyors are used to blend and load the material to the ships and barges.

The plant produces 12 individual products, any of which can be blended during the loadout operation. In addition, all of the rock and stone products can be washed a final time during the loadout over two, 8- × 20-ft Tyler rewash screens. A mile-long conveyor stretches from the quarry to the ship loading area.

—Tonia Jurbin



Construction Aggregates' Sechelt quarry sits on 1,000 acres about 31 miles northwest of Vancouver, B.C. and produces 6.6 million tpy at full capacity. Photo by Dave Atlee