Fall Crop Makeover

MAJOR EXPANSION AT UNITED GRAIN PORT TERMINAL MAKES WAY FOR CORN, SOYBEANS

United Grain Corp.
Vancouver, WA • 360-693-1521

Founded: 1969
Storage capacity: 14 million bushels at six locations
Annual volume: 160 million bushels
Annual sales: $1.3 billion
Number of employees: 56
Crops handled: Hard red spring, hard red winter, and white wheat; corn; soybeans
Services: Grain handling and merchandising

Key personnel:
- Gary Schuld, CEO
- John Todd, vice president-operations
- Augusto Bassinini, vice president-marketing
- Anthony Flagg, vice president-business development

Supplier List

Bearing sensors .. Electro-Sensors Inc.
Bin sweeps ..... Laidig Systems Inc.
Bridges/towers ... Warrior Mfg. LLC
Bucket elevators ..... Hayes & Stolz Ind. Mfg. Co. Inc.
Bulk weigh scales ..... Intersystems
Bulkweigher controls ..... Cultura Technologies Inc.
Cleaners ..... BM&M Screening Solutions
Contractor/engineering/millwright .. Younglove Construction LLC
Control system ..... Interstates Companies
Conveyors ..... Hi Roller Conveyors
Distributors ..... Hayes & Stolz
Ductwork ..... Aircon Corp.
Dust collection system .. Donaldson Torit
Elevator buckets ..... Tapco Inc.
Gates/valves .. Industrial Fabrication
Grain temperature system ..... Rolfes@Boone
Leg belting ... RBH Mill & Elevator
Level indicators .... BinMaster Level Controls, Endress+Hauser Inc.
Magnets ..... Magnetic Products Inc.
Manlift ... Schumacher Elevator Co.
Motion sensors ..... 4B Components Ltd.
Samplers ..... Intersystems
Suspension scale ..... Cardinal Scale Mfg. Co.
Telescoping spout ..... DCL

A 2.25-million-bushel slipform concrete annex at United Grain Corp.'s export terminal on the Columbia River in Vancouver, WA stands 346 feet tall, making it the second tallest grain elevator in the world. A second annex with 1.75 million bushels of storage capacity is visible lower right. All photos courtesy of Younglove Construction LLC, unless otherwise noted.

Since it began operations in 1969, United Grain Corp.'s huge export terminal at Vancouver, WA has been a wheat facility. That changed this year, with the completion of an $80 million expansion adding 4 million bushels of storage capacity, in order to begin handling corn and soybeans.

In doing so, United Grain was making three big bets, says Anthony Flagg, vice president-business development.

1. China's growing middle class would continue to increase resulting in more demand for meat.

2. Research would continue to generate improved, genetically modified corn hybrids that can produce higher yields with a shorter growing season and resistance to drought. That, in turn, would continue to push the Corn Belt north and west, with more bushels produced in the Pacific Northwest's main drawing area for grain.

3. Investments will continue to be made in transportation infrastructure. This includes

Ground-level view of the terminal from the west, with two new annexes visible in the foreground and a pair of 303-foot Warrior bridges connecting them. Photo by Ed Zdrojewski.

not only the Port of Portland (OR) but the Burlington Northern Santa Fe and Union Pacific railroads, as it relates to continuing to enhance their system, and the U.S. Army Corps of Engineers, as it relates to maintaining and enhancing the Columbia River channel.

According to Flagg, who rejoined United Grain in 2008 from Pendleton Flour Mills after serving with United Grain for 10 years in the 1970s and 80s, some of that investment is taking place at the Port of Vancouver. The port is spending $275 million on rail improvements that could triple the number of trains port tenants can handle *(see page 42)*.

Taller, Longer

To build the project, United Grain named Younglove Construction LLC, Sioux City, IA (712-277-3906), as general contractor and millwright.

"We put out a design-bid proposal," says Flagg, "which would allow some of the work to begin before the permitting process was completed. Younglove had the most workable proposal for the least expense. We ended up finishing this month (December 2012), after 25 months of work."

The original proposal was for a smaller project involving a 2.25-million- bushel slipform concrete annex, with 29 tanks averaging 92,000 bushels each, a 60,000-bph cleaning house, and up to 80,000 bph in grain handling capacity. The order later was changed to add a second annex with three 80-foot-diameter slipform concrete tanks for an additional 1.75 million bushels of storage. Each of these tanks is large enough to hold more than a shuttle train's worth of grain, adding to the efficiency of rail unloading.

"The goal is to unload up to three trains a day," Flagg says.

The project had several unique aspects. For one, in order to minimize the potential for damage to incoming corn and soybeans, Younglove placed the cleaning house on top of the slipform concrete shipping bins. This resulted in a structure 346 feet tall, reportedly the second tallest grain elevator in the world. (The tallest is in Germany.)

As a result, the bucket elevator supplier, Hayes & Stolz Ind. Mfg. Co., Inc., manufactured the two tallest legs it has ever built. The 335-foot-tall legs are outfitted with three rows of 18x8 Tapco low-profile buckets on 8-inch centers, mounted on a 60-inch belt from RBH Mill & Elevator. The legs are powered by single-SEW-Euro-drive, 600-hp Toshiba motors, more horsepower than some locomotives.

Another challenge was moving grain back and forth between the two annexes. To accomplish this, Warrior Mfg. LLC constructed twin 303-foot-long bridges, 12 feet tall by 15 feet wide, and weighing 275,000 lbs. each to carry a 54,000-bph Hi Roller enclosed belt conveyor.

Lifting those bridges into place was another major feat. "I watched them doing it," says Flagg. "It took four huge cranes working together to make the lift. They had to lift each bridge over 150 feet in the air, align them exactly, and drop them onto more than a dozen steel bolts. It was amazing to see."

Both bridges were set in a single eight-hour shift. The four cranes involved included two tower cranes with 240-foot and 275-foot booms and two hydraulic cranes with 119-foot and 130-foot booms.

He applies the term "amazing" to Younglove's performance, as well. "They were on time and under budget, and you can't beat that."

Project Specifications

The expansion required United Grain to extend a new lease hold with the Port of Vancouver, which required the company to demolish existing flat storage buildings on the new property to make room for the new annexes. Listed below are details of each annex.

• Twenty-four 35-foot-diameter-x-140-foot-tall concrete silos, with a receiving capacity of 3,000 tph and a reclaim/blending capacity of 2,400 tph. All receiving and reclaim conveyors were Hi Roller Hi Life enclosed belt conveyors supported by Warrior bridges and towers.

The average silo capacity is approximately 92,000 bushels. The annex also includes 10 interstice bins with an average capacity of 15,000 bushels. Silos are equipped with 45-degree steel cone hoppers, designed for 100% gravity cleanout, with linear gates, BinMaster point level detection, and Endress Hauser continuous level detection.

• Three 80-foot-diameter-x-140-foot-tall flat-bottom concrete silos, with a receiving capacity of 1,500 tph and a reclaim/blending capacity of 800 tph. Again, all conveyors are Hi Roller enclosed belts. These silos are equipped with 16-cable Rolfes@Boone tempera-

Anthony Flagg

Pair of 303-foot-long bridges are the longest ever manufactured by Warrior Mfg. LLC and carry a set of Hi Roller 54,000-bph enclosed belt conveyors.

ture detection, linear gates, BinMaster point level detection, Endress Hauser continuous level detection, and Laidig Clean Sweep bin unloaders.

• A unique 346-foot-tall slipform concrete tower/silo complex designed to house the cleaning, weighing tower, and shipping bins all in one structure due to space limitations and to minimize grain re-elevation, which can cause grain breakage and splits. The tower includes 1,800 tph cleaning capacity for corn and soybeans, 2,400 tph weighing capacity, 265,000 bushels of concrete grain storage in the form of five shipping bins, and 2,400 tph shiploading.

The cleaning house equipment includes two 335-foot-tall Hayes & Stolz bucket elevators, eight BM&M gyratory cleaners, an Intersystems rotary sampler, two Intersystems bulkweighers, and a six-hole Hayes & Stolz rotary distributor.

Shipping silos are equipped with 45-degree steel cone hoppers designed for 100% gravity cleanout, with linear gates, BinMaster point level detection, and Endress Hauser continuous point level detection. These bins are reclaimed for shipping to a series of Hi Roller Model 60 Hi Life enclosed belt conveyors supported by Warrior bridges and towers.

• An enclosed screening and dust loadout driveway consisting of two 35-foot-diameter-x-140-foot-tall concrete screening bins and one 12-foot-diameter-x-40-foot-tall Younglove-designed, custom-built steel dust tank. These tanks are equipped with 45-degree steel cone hoppers for 100% gravity cleanout, BinMaster point level detection, and Endress Hauser continuous level detection. This area is completely enclosed to reduce dust emissions and is equipped with a 120-tph weigh lorry suspended by a Cardinal SH-5 hopper suspension scale and a DCL telescoping spout for truck loading.

Ed Zdrojewski, editor @GrainJournal

Some of the eight BM&M cleaners in United Grain's new 60,000-bph cleaning house, which has been placed on an annex roof to reduce the number elevations required for grain and minimize damage to the kernels.