Systems
Solutions
CASE STUDY

Steel-Rolling Mill Rises from Former Washington Swamp

Huge new plant manufactures cold-rolled coils of steel on-site

When a manufacturer of building materials sets out to construct a new factory, it just makes sense that the company would want to use its own products in the new structure. Such was the case when The Broken Hill Proprietary Co. Ltd., a manufacturer of steel construction products, made plans to build a $280 million steel-rolling mill in Kalama, Wash., for its BHP Coated Steel Corp. business group.

Broken Hill Proprietary, a $16 billion company based in Melbourne, Australia, supplied its own roofing and siding for the 357,000-sq.-ft. mill. The mill is located on a 75-acre parcel at the Port of Kalama on the Columbia River, about 30 miles north of Portland. Besides its steel plants, Broken Hill Proprietary operates copper, petroleum, mineral and service divisions throughout the Pacific Rim.

On-site processing

At the Kalama plant, coils of steel are cold-rolled into a consistent thickness for use in roofing and siding products. About half of the plant's rolled steel is processed on-site to produce corrosion-resistant Zincalume. The rest is shipped to another BHP facility in Cucamonga, Calif., for Zincalume processing. BHP also operates roll-forming plants in Eugene, Ore., Tacoma and Spokane, Wash.

Raytheon Engineers & Constructors Inc. served as the project's general contractor and performed its own site preparation, concrete work and equipment installation. Garco Construction of Spokane subcontracted to build the factory shell, including steel erection, siding and roofing. A freestanding 22,000-sq.-ft. administration building on the site was built by Oregon contractor Cole Construction.

Five metal buildings are connected train-like to form the heart of the new mill. They point toward the new Port of Kalama dock on the Columbia River. From one end to the other, the mill measures just over 2,000 linear feet.

Farthest from the river is the Pickle Line building, where the incoming coils of steel begin the process that transforms them into finished products. The gable clear-span building is more than 435 ft. long, 70 ft. wide and 38 ft. high. Next is the Cold Mill building, which is gabled with an interior column and houses overhead cranes of 50-, 55- and 33-ton capacities. It measures over 451 ft. long, 223 ft. wide and 55 ft. high. The gabled clear-span Zincalume Line building, tallest in the mill, follows. Measuring more than 362 ft. long, 86 ft. wide and 95 ft. high (105 ft. at the ridge), it contains a 22-ton overhead crane.

The Paint Line building and the Finished Product Line building stand next to each other, sharing a common wall. They measure, respectively, 705 ft. long, 63 ft. wide and 69 ft. high, and 776 ft. long, 85 ft. wide and 43 ft. high.

Site was a swamp

The mill site is a former swamp that was filled with dredge spoils, much of it volcanic ash produced by the 1980 eruption on nearby Mount St. Helens. Compaction on the site is 95 to 98 percent, according to Pete Grimes, project safety/ security manager for Raytheon. A 30-ft. excavation was required for a basement under one section of the plant, and Raytheon had to use seven wells with sump pumps to drain it during the wet winter months.

Steve LaRue, project superintendent for Garco Construction, says much of the site work, including all the foundations for the Pickle Line, was ready when his crew began work. Two weeks later, the crew was able to start on the Zincalume building. Work on the Paint building and Finished Products building began several weeks later, with construction of the Cold Mill building commencing last.

LaRue calls the project "a nice, straightforward job." Still, it was the biggest his company has completed in the Spokane area in terms of steel tonnage. His crew, which peaked at 58, used 75- and 100-ton truck-mounted cranes for most of the steel installation. Raytheon's bigger Manitowoc crane was employed for about 12 picks over the basement area, where the crawler's longer reach and greater capacity were needed. BHP metal roofing and siding were installed on the exterior surfaces.

LaRue says the biggest problem faced by his group during the project was posed by the sandy soil during rainy weather. "It was a real challenge getting around," he says. "Every time you turned around, you got stuck."

He praises the effort put forth by Raytheon to manage a clean construction site. As part of that process, cleanup crews circled the site constantly to pick up debris and remove it to trash and recycling receptacles.

"Raytheon did a real good job of policing the area, which made a good work environment," says LaRue.

Grimes believes neatness and safety go hand in hand. "To keep it clean, you've got to get these guys to take the extra time to think through what they're doing," he explains. "We've got a real good crew."

The site itself also helped in the safety effort. Having a large, flat space provided plenty of room for lay down. This meant work crews didn't get in the way of each other.

Tool rooms and temporary shops were constructed for carpenters, electricians, pipe fitters, surveyors and other specialists. Further adding to safety and convenience was a 15-kV loop with seven transformers around the building that provided temporary electrical power for the entire project. Having plug-ins close by greatly reduced the length of electrical cords draped across the project area, a significant safety factor.

A large volume of steel was required for the plant — 3,058 tons in the five main buildings and 12 secondary structures.

Metal building systems technology met the plant's stringent physical requirements

Metal building systems selected

The structural design had to accommodate strict interior-clearance requirements for equipment, utility trays and cranes, while maintaining the exterior dimensions defined

by the plant designers. The selection of metal building systems for the structures fulfilled all of the necessary requirements.

The custom-engineering of the metal building system provided greater flexibility and was less expensive than other construction methods. In addition, the metal building systems construction method lent itself more readily to the project's logistical requirements. This was especially vital in delivering the necessary materials to the construction site, erecting the system elements and staging the work as the project moved along.

In all, 445 truckloads of steel were loaded or unloaded during construction of the project.

With the project completed in 10 months and mill operations rolling along, the metal building systems manufacturer is a customer for steel coming from the mill it helped build.

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