Steel Home Alabama

Above: Schwing KVM 32 pours a portion of the production line that is 3/4-mile long, 150 feet wide and 60 feet deep.

Below: Cherokee Pumping's S 58 SX uses the maximum reach thanks to the machine's curved Super X outriggers.

Setting company records of more than 73 piles installed in a day with one drill rig, Morris-Shea Bridge Co., Inc. (MSB), Irondale, Alabama, is drilling and pumping more than 30,000 continuous flight auger (CFA) and DeWaal piles on the ThyssenKrupp Steel USA site in Calvert, Alabama, using up to 12 drill rigs at a time. The $5 billion plant is spread over 3,750 acres and includes a 3/4-mile production line for carbon steel with a similar line for stainless steel to be built at a later date. A fleet of stationary pumps is supplying the drill rigs and a dozen long booms are being used to pump the production facilities.

Piling It On

The clay and sand mixture of the southern Alabama site necessitates the large number of piles. The CFA piles range in diameter from 14–18 inches and depths up to 65 feet deep. The slabs that will be installed on these piles will support everything from parking lots to furnace buildings and processing equipment. By March 2010, more than seven million square feet of manufacturing and office space will be constructed.

Piles are installed using augers driven by fixed mast drills. The equipment allows relatively fast advancement of the auger, resulting in less soil disturbance.

SPECS

Project: **ThyssenKrupp Steel Mill**—Calvert, Alabama
Owner: **ThyssenKrupp Steel USA**—Mobile, Alabama
General Contractor: **ThyssenKrupp Steel USA**—Mobile, Alabama
Piling Contractor: **Morris-Shea Bridge Co., Inc. (MSB)**—Irondale, Alabama
Concrete Pumping Contractors: **Cherokee Pumping, Inc.**—Hampton, Georgia
Equipment: **Schwing KVM 32, S 45 SX, KVM 52 and S 58 SX truck-mounted concrete pumps with placing booms and Schwing SP 1250 trailer pumps.**

Pull down capability of the drill rig and the use of special tooling allows penetration into the dense sand present at the site. The use of a plastic concrete instead of grout minimizes bleed potential and reduces integrity issues in the soft soils and fill materials. "The power of the rigs allows piles to be formed rapidly," explains Morris-Shea's equipment manager, Steve Shea. "The result is a higher capacity pile because it creates less soil disturbance during installation."

Rough Terrain

Morris-Shea owns and operates more than 30 stationary pumps manufactured by Schwing. The company has standardized on SP 1250 stationary pumps, rated at 70 cubic yards per hour and 1100 psi, which are towed around the site to supply the piling rigs.

One method being used for filling each borehole created by the auger includes pumping concrete fast enough to match the retraction rate of the drill. This is accomplished by pumping through the auger's hollow shaft. Another method, used when the soil is stable enough, allows the drill rig to move on to the next pile and the pump feeds a tremie pipe supported by a crane.

Reliability is a high priority since any delay in the pile casting schedule affects the entire construction schedule. "When an owner invests this amount of capital in a project, they want to become operational as soon as possible," explains Shea. "That's the reason we have so much equipment dedicated to this project and are completing the work as fast as safely possible."

Rough terrain forklifts tow the concrete pumps to the pile casting locations on-site. The company uses five-inch hose for maximum volume and usually pumps out each single pile in three–five minutes. When the drilling is concentrated in one area, the pump will be strategically positioned and the hose laid out to pump multiple piles from one location. "With a six-square-mile site, we are constantly moving," Shea notes.

Time Saving

The all-hydraulic, twin-cylinder concrete pumps utilize the exclusive Rock Valve,™ which offers several advantages to the quick-hitter approach used on the steel mill project. Because the valve housing is not that large by design, less cleanup is needed for the pump between pours, saving both concrete and time. "We are using only one mix design for piles on this project," said Shea. "But the good thing is that if you occasionally get a large ungraded rock in the hopper, these pumps don't mind. We can't afford to plug up and experience the delays, not to mention safety issues from cleaning out the plugged-up hose."

Although each pump can normally move concrete hundreds of feet while maintaining the required volume with its 133 horsepower rated diesel engine, its combination of output and pressure was able to overcome the higher resistance of the rubber hose being used to pump the multiple piles. Rubber hose has three times the resistance of steel pipe in pumping applications.

Pouring It On

Following up on the cast piles is a 3/4-mile production line for carbon

Long booms are pumping the carbon steel production line, which will have an annual capacity of 4.1 million tons when completed.

A S 45 SX pumps out parts of the production line which will consume more than 400,000 cubic yards.

steel. The excavation for the line is 150 feet wide and 60 feet deep to contain a 10-foot thick slab. ACPA member Cherokee Pumping, Hampton, Georgia, is supplying the fleet of truck-mounted concrete pumps with placing booms ranging from 32- to 58-meters for pumping the slabs that can range up to 4,000 cubic yards.

"We have been averaging 15,000 – 20,000 yards per week on the project," said Cherokee owner, Wayne Bylsma. "In one massive pour, we had two pumps run continuously for 70 hours." The production line will eventually house 105 overhead cranes.

Cherokee is using a variety of Schwing pumps on the project including 32-, 45-, 52- and 58-meter booms from their fleet. "With the Super X front outriggers, we can set up close to the pour and get maximum boom reach, minimizing the number of set-ups," Bylsma states. "The operators usually pump from five o'clock at night until seven or eight in the morning." The night pours help facilitate ready mix supply of the 6,000-psi mass concrete from five on-site batch plants with production capability of 1,200 yards per hour. The pumping company currently has 12 pumps on the site and anticipates pumping 400,000 cubic yards for the

Drill rigs shown installing piles using trailer-mounted concrete pumps to construct more than 30,000 piles for the steel mill production facilities.

carbon steel line. Another 400,000 yards could be required if the company builds a production line for stainless steel.

Optimistic Outlook

The new plant is employing more than 29,000 workers during construction and will provide 2,900 high-paying jobs upon completion. The choice to position a steel plant in North America bodes well for the economy. "Our investment in Alabama is a central element of the ThyssenKrupp Stainless strategy. The NAFTA stainless steel market has great potential, and we are committed to significantly expanding our business in this growth region. It will create major advantages in terms of quality, costs and access to a customer base with a demand greater than current supply," noted Juergen H. Fechter, chairman of the executive board of ThyssenKrupp Stainless and member of the executive board of ThyssenKrupp AG.

Throughout construction and operation of the new facility, ThyssenKrupp is committed to meeting the most stringent environmental protection standards. The plant will employ the most technologically advanced protection measures, and it will use clean-burning natural gas and electricity.

When completed, the facility will include a hot strip mill, which will be used primarily to process slabs from ThyssenKrupp's new steel plant in Brazil. It will also feature cold rolling and hot-dip coating capacities for high-quality end products of flat carbon steel. The facility will have an annual capacity of 4.1 million metric tons of carbon steel end products. In addition, a stainless steel melt shop will be built with an annual capacity of up to one million metric tons of slabs, which will also be processed on the hot strip mill. A cold rolling facility is to be built, which will be designed initially to produce 350,000 tons of cold strip and 125,000 tons of pickled hot strip. In addition, the stainless steel plant will provide ThyssenKrupp Mexinox in San Luis Potosi (Mexico) with its required pre-material (340,000 metric tons of hot band).

Born of a merger of Thyssen and Krupp in 1999, ThyssenKrupp AG is one of the top 10 companies in Germany with $61 billion in annual revenue. Based in Dusseldorf, it is a conglomerate with 188,000 employees at more than 700 companies worldwide, 90,000 outside of Germany. ❑

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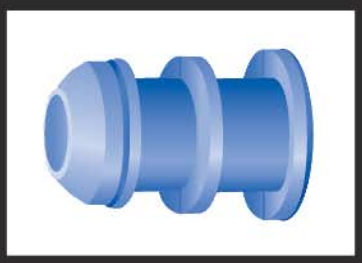
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