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Customized production machinery automates and streamlines on-site, high volume, deck slab production

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Hamilton Form Company Ltd, Fort Worth, Texas 76118, U.S.A.

Customized production machinery automates and streamlines on-site, high volume, deck slab production

In the world of high volume infrastructure projects, automation is the key to enhancing productivity, improving profitability and trimming schedules. To this end, Hamilton Form has evolved from designer and builder of custom steel forms for the precast/prestressed concrete industry into a full-service manufacturer of custom, concrete plant production machinery and utility equipment that complements the company's form offering. This innovative, versatile single source approach not only streamlines production, improves performance, contains costs and adds value, but also helps maximize crew safety.

Major road construction projects, like State Highway 161 in Dallas, represent an ideal venue for the application of automated machinery and processes to expedite and facilitate highway completion in an efficient and cost-effective manner.



Hamilton Form designed and produced this multitasking Form Cleaning, Sprayer, Strand Puller Machine to help prepare beds for casting.

State Highway 161 in Dallas, is an 11.5-mile toll road that will relieve congestion and provide a vital north to south link from the Dallas/Fort Worth International Airport to the area's stadium and entertainment district in nearby Arlington, Texas. Designed as an all-electronic toll road, it is scheduled to open in phases beginning in August 2009.

Williams Brothers Construction Company of Houston, TX won the \$215 million contract. The majority of the project consists of bridgework, including 45,000 feet of drilled shafts; 60,000 cubic yards of concrete substructure; 384,000 feet of concrete beams; 10 million pounds of structural steel; and, 3.1 million square feet of bridge deck.

Valley Prestress Products, Inc. of Eagle Lake, TX is supplying the precast concrete products for Williams Brothers. Bridge girders are produced in the company's Eagle Lake facility and shipped to the jobsite. The deck slabs are being produced near the construction site to expedite manufacturing, and to save on both shipping costs and transportation time.

Hamilton Form Company, Ltd of Ft. Worth, TX developed the formwork for the girders and deck slabs. To streamline and facilitate deck slab production, the company also designed three utility machines that not only automate production but also improve jobsite safety. Each machine – which can be moved by crane from bed to bed – performs various functions and is easily

operated by a single crewmember to reduce labor costs.

Five 400-foot self-stressing casting beds were installed at a site near the jobsite to produce the 8-foot deck slabs. Forms were designed for easy installation and feature wide shelf angles to support the utility machines. For convenient storage, a run out track was installed at the end of each casting bed.

The Automation & Process

Form Cleaning, Sprayer, Strand Puller Machine

This versatile machine, driven by a diesel engine over hydraulic power, performs all necessary form cleaning, spraying and strand pulling operations to expedite production, and reduce set-up costs.

Two side wall brushes clean the sides of the form, while an 8-foot wide deck brush cleans the deck and pushes debris to the end of the bed. Brushes are raised and lowered hydraulically. The double brush configuration allows the sides and the flat surface to be cleaned in a single pass. The speed of the machine can be adjusted depending on the amount of debris present. A single operator safely controls all functions from a seat at the top of the machine, cutting manpower requirements – and costs – by as much as 75% and reducing total set up time.

After the casting surface is cleaned, the machine makes a pass down the bed using a sprayer installed on the other end to evenly distribute the release agent. The



Hydraulic double brushes allow the form side walls and flat deck surfaces to be cleaned in a single pass.



As many as 8-to-10 prestressing strands are pulled and dropped simultaneously into each header along the 400-foot bed.

spray is shielded from the wind with vinyl skirts installed in front and on the sides of the spray deck.

Next the strand puller, on the same machine, pulls 8-to-10 prestressing strands simultaneously, dropping strands into each header along the 400-foot bed. Depending on the number of strand packs at the end of the bed, the puller – operated again by a single man – can make a second or third pass to complete the operation, helping to further reduce labor costs, minimize safety risks and improve productivity.

Vibratory Screed and Finishing Machine

The next piece of equipment to go to work on the bed is a finishing machine with a high frequency pneumatic vibrating screed to consolidate and level the concrete. The screed raises and lowers hydraulically. Controls are located on the side of the machine. The operator walks along the bed to observe the process and gauge the amount of vibration required to complete consolidation. The machine also has a drag broom attachment for finishing. Once the concrete is partially set, the machine makes a final pass along the bed with the drag broom to create the longitudinal brushed finish

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HAMILTON FORM CREATES FUNCTION

CASE STUDY

Multi-Function Utility Machines Improve Cost and Efficiency



"Major road construction projects like Highway 161 are the ideal application for automation. The equipment that Hamilton Form designed for us has been very effective in decreasing production time and improving costs — and that's the name of the game in high volume production."

*Brian Malaer, Plant Manager
Valley Prestress Products, Inc.*

State Highway 161 in Dallas County will provide a vital link between the airport and the stadium and entertainment district in Arlington, Texas. Valley Prestress is supplying bridge girders, beams and 3.1 million square feet of deck slabs for the project.

Hamilton Form provided formwork for the project, including five, 400-foot self-stressing deck slab forms, and three different multi purpose utility machines to streamline production.

Operations that took 4 or 5 men working the beds are accomplished in 1/4th the time with a single man running a machine. Some of the most difficult manual operations are automated, improving safety and productivity.



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When your precast plant need new formwork or equipment to automate production, call on Hamilton Form to deliver. Call 817-590-2111 or visit www.hamiltonform.com



Controls for the finishing machine are located along the side for easy access.



A high frequency vibrating screed raises and lowers hydraulically.

specified by the State's Department of Transportation.

Tarp Roller/Dispenser

Finally, a single operator drives a tarp roller down the form and dispenses a custom-made curing tarp to cover the bed. When the bed is ready for stripping, the tarp is easily re-rolled and stored on the reel, saving room at the end of the bed and extending tarp life for future applications.

The Result

The use of these three utility machines, designed and produced by Hamilton Form, has significantly reduced Valley Prestress' setup time. Operations that traditionally took four or five men per bed can now be accomplished in a fraction of the time with just one operator. Some of the most difficult, tedious manual operations have been automated, improving safety and



A dedicated tarp roller services each bed.

reassigning crew to more important tasks. By virtue of automation, total manpower requirements have been reduced to a fraction of the time and cost.

Conclusion

Working with Hamilton Form, Valley Prestress Products opted to automate many of its production processes, a practical move and smart business decision – especially for long line, high volume operations such as the new Dallas toll road. Improved efficiencies, equipment multi-tasking capabilities, enhanced safety and reduced production time were evident almost immediately – further justifying their capital investment. ■

FURTHER INFORMATION



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