



form function

News & Information from Hamilton Form Company

Wells Concrete Products Company / Albany, Minnesota

Architectural Casting Tables Installed at State-of-the-Art Plant

New operation streamlines processes, enhances productivity and boosts capacity

In its more than 45 years of serving the prestressed/precast concrete industry, Wells Concrete Products Company has earned a reputation for producing high quality architectural and structural components. Their customers have responded by wanting more. To meet this growing demand, Wells has expanded its operations with a new plant in Albany, Minnesota. The plant will manufacture several prestressed/precast elements and significantly increase its production of architectural wall panels.

General Manager Gregg Jacobson describes the Albany site as “state-of-the-art with considerable focus in the areas of productivity and ‘lean management’.” According to Gregg, the planning team spent many hours studying workflow through the facility — from aggregate handling to product finishing — in order to enhance productivity and improve competitiveness. The new facility features all indoor production and a highly complex aggregate handling and batching operation.

All buildings at the facility were constructed using precast concrete elements, with the majority of the double tee members produced on site.

Wells Concrete's goal was to build and sustain a state of the art, lean facility. Many features have been built into the plant to attain that goal, including several state-of-the-art architectural casting tables from Hamilton Form. The tables have a self-stressing steel sub-frame and hydraulically operated side rails. The sub-frame is made up of two wide flange longitudinal beams that are topped with back-to-back channels. Stressing bars run through the channels to carry the prestress load. Wells installed 2x6s and a wood deck over the frame, followed with a self-leveling epoxy coating to create a glass-like finish for casting architectural panels. The table allows the casting surface to move independently from the frame, protecting it from stress cracks and checking. The surface is designed to remain durable and smooth, pour after pour, with no resurfacing required. *(continued)*



Architectural Casting Tables Installed at State-of-the-Art Plant *(continued)*

Jacking abutments are anchored to counter-weights at the end of the beds to resist the overturning moment caused by eccentric strand loading. To allow for flexibility in locating strand, jacking plate assemblies that move horizontally are located on each end of the bed. The jacking plates are made up of two vertical plates with a space between them so that strand can also be located vertically, as needed, throughout the slot.

Hydraulically operated side rails are attached to both sides of the tables. Rails hinge away from the table with built-in hydraulic cylinders for stripping. Once the product is stripped, the rails rotate back into position, reducing set-up time. For added flexibility, the side rails are designed to accept bolt-on risers for casting thicker products. When vibration is required, two lines of Vibrotrack are located under the table.



The surface of the self-stressing architectural casting table is installed and finished at the plant.

Wells Concrete is pleased with the table installation. Gregg Jacobson says the process went very well; "Each section was matched and marked by Hamilton Form and the sections went together easily. With the casting surface independent from the stressing frame, the deck will remain true and smooth. The hydraulically

operated side rails drop down to allow edge picking of the panels. This will greatly reduce the daily set-up and casting cycles." The new tables allow Wells to efficiently produce the high quality architectural panels that its customers have come to expect from them.

FORM WORK

Vault Form for Septic Systems



Hamilton Form recently built a 6'6" x 11'-11" x 4'-0" vault form with hinged sides that open hydraulically for set-up and stripping. The form was produced for CXT, Inc. in Hillsboro, Texas.

CXT is a Division of L.B. Foster Company, a leading producer of precast concrete restroom and utility buildings. The vault has two voids that form an in-ground receptacle for toilet buildings. A plastic liner is cast into the side walls of the vault to contain the waste. The walls of the vault are sloped so that waste will drain to the end of the vault where two hatches for pumping are connected to the building.

A precast restroom building is installed over the vault, using the walls of the vault as a footing. This design makes it possible to install a completed building within a day. The buildings are sold and installed in national, state and local park and recreation areas across the country.



Standard Concrete Products - Tampa Division

U-Beam Package with Adjustable End Voids

For the People Mover Guide Way at Miami International Airport



Project details:

The Miami International Airport People Mover is an automated system that currently connects the airport's terminals. A new addition to the system will connect the airport to the off-site airport rental car facility, and connect airport visitors to Miami Central Station, a major transportation hub; that includes a hub for Tri-Rail, Metrorail and Amtrak rail services; a bus depot, and access to taxis and other vehicles. The project is slated for completion in 2011.

The People Mover will reduce greenhouse gas emissions and improve air quality by eliminating the need for more than a half-million shuttle bus trips to off-site car rental lots each year. At the same time, it will relieve congestion by reducing vehicle traffic in and around the airport.

Automated vehicles will run along an elevated precast guide way. The guide way is being built with 78-inch U-beams supplied by Standard Concrete Products in Tampa, produced with formwork built by Hamilton Form.

Formwork details:

Hamilton Form delivered a complete U-Beam package to Standard Concrete for the project. A 4 x 66-inch extra-sturdy soffit was required due the size and length of the product. 78-inch sloped sideforms were built with Vibrotrack for exterior vibration. To allow for different product lengths, the interior voids were built in 20, 10, 8, 6, 4 and 2-foot sections.

The package also included a 4-foot and a 5-foot adjustable end void. The 4-foot section can be adjusted at any

increment from 4 to 5-feet. The 5-foot section expands up to 6-feet. This permits the internal end diaphragm to be adjusted anywhere from 9 to 11-feet.

An innovative combination top tie/void hold down was designed for use on the form. Combining the two saves labor, material cost and simplifies set-up. Instead of a bolted attachment, heavy-duty clamps are used so that the top tie/void hold downs can be located anywhere on the form. To make stripping easier, a vertical lifting apparatus was designed to lift a 100-foot section of sideform at once.

After arrival at Standard's plant in Tampa at the end of May, the form was quickly installed. Casting began in June. Air release valves were installed along the internal void centerline which aids in stripping the large tub voids. The girders are being cast with an SCC mix. They range in length from 89 to 133 feet and are highly stressed, using as much as 95 cables of .6 prestress strand. The longest girders will weigh 277,000 lbs each.

According to Standard Concrete Products, since taking delivery and beginning production of the guide way components, casting has been trouble free. The plant has experienced no problems with set-up, stripping or changeovers.



1. U-beam void with combination top tie/void hold down
2. Set-up for an end diaphragm
3. Voids in position for an internal diaphragm

Taking the Stress out of Detensioning

Detensioning a self-stressing form can be a challenge. Many variables are involved, and what works in one plant, doesn't necessarily work in another. The type of form, length of bed, amount of prestress force, mass of the concrete and environmental conditions all come into play. An understanding of these variables — and allowances for the movement associated with them — need to be considered when developing a successful detensioning process. Consequently, we always seem to be fielding questions about detensioning. The following are thoughts and a few guidelines about the process.

THE PROCESS

A self-stressing form is designed to withstand the compressive force introduced by prestressing as well as the hydrostatic force of the concrete pushing against the form. The compressive force transfers from the form to the concrete when strand is detensioned. The goal of detensioning a self-stressing form is to release strand in such a way that the movement of the member in the form is minimized. This is done by easing the form out of compression. Typically one strand is released at a time, simultaneously at both ends of the bed. The sequence for detensioning strand should be done in a pattern that keeps the stresses symmetrical around the vertical axis of the product.

SOME VARIABLES

Form type and bed length.

● Self-stressing forms can either have uniform or concentrated loading. For example, pile forms are designed to carry the prestress load through the entire cross section of the form. On the other hand, the bulk of the load in a double tee form is concentrated in the stems. In a stadia form, stress is carried at the corners or the inner section of the tread and risers; whereas a casting table is generally loaded uniformly. Understanding where the load is carried in the form helps determine a detensioning sequence that will evenly disperse the load.

● When a self-stressing steel form is stressed; it shortens. Depending on the amount of stress put on the form, it can shorten as much as one inch for every 100 feet of form. That means long-line forms

can shorten several inches. The only way to know how much your form shortens is to measure it. Measure how much your bed shortens so that you can make allowances when you detension.

● The type and number of headers should also be considered. Single surface headers are subjected to compressive force on one side only. Dual surface, one-piece headers have compressive force on both sides of the header. Headers in the form will move with the concrete. Some precasters prefer to use single surface headers, especially in long-line beds; while some prefer the convenience of one-piece, dual headers. After releasing strand at both ends of the bed, release the same strand at the headers.

Prestress force and concrete mass.

● Determine a pattern for cutting strand that will keep the stresses nearly symmetrical about the vertical axis of the member. Each strand should be released simultaneously at both ends of the bed. Then, cut the same strands between members in the set-up. Strand should be released in a manner as to eliminate any sudden shock or loading.

● To detension a double tee form, it is usually best to start by cutting the top strand, or the first 10% of the strand; *on both stems*, simultaneously at both ends of the bed. Then move in and cut the same strand at the headers. Then return to the ends, then the headers, and so on. Never cut all of the strand in one stem and then the other. If you can't work on both stems simultaneously, alternate from one stem to the other to gradually release the tension.

● When detensioning a dual pile form, detension both piles simultaneously not one and then the other. Like a double tee form, after detensioning approximately 10% of the load on both sides of the bed, cut the same strands at the headers before releasing more strand.

Environmental conditions.

● After the form is stressed and concrete is placed, heat from hydration or applied heat during curing will cause the form to expand. A one hundred foot steel form can move as much as an inch when subjected to temperature fluctuations of 125 degrees.

Make sure the form is free to move longitudinally as it expands.

● Concrete expands and contracts with changes in temperature. In fact, the reason steel-reinforced concrete works is because the coefficient of thermal expansion of concrete is very similar to that of steel. Make allowances for movement due to temperature changes. And, remember that the rate of expansion, especially when casting outside, will change with the seasons.

● Dimensional changes take place as concrete dries and cools which may cause cracks or undesirable stress build-up in the concrete. Concrete should not be allowed to dry and cool prior to detensioning. If blankets or curing covers are used, strand should be cut immediately after the covers are removed.

With so many variables to consider, detensioning is not an exact science and there are no perfect answers. If you encounter problems, feel free to call Hamilton Form or refer to the PCI Manual for Quality Control.

At Hamilton Form, our engineers bring years of experience to the table and may not have all the answers, but can let you know, through experience, what may and may not work.

If you have any tips that you are willing to share, please let us know and we'll include them in an upcoming edition of this Newsletter; *Form and Function*.

Anchored and Clipped

A form should be anchored at the centerline to help control the movement of the form by splitting the movement to each end. At the same time, because the form moves, it needs to be clipped down to keep the form straight and prevent uplift, but free to move as the form shortens and elongates. If the form is not installed straight and true, stripping can be difficult and the form and the product may become damaged.

B.A. "Skip" Plotnicki Jr., P.E. – Vice President, Engineering

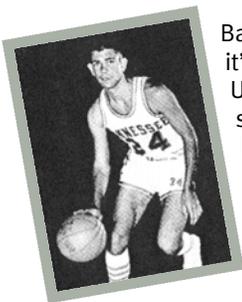
Every company has a few interesting characters.

Ours is Skip Plotnicki, who comes from a long line of interesting characters.

Skip's grandfather was both the Governor of South Dakota and a United States Senator. As Governor, he was involved in the construction of Mount Rushmore, hosted President Coolidge in the Black Hills and took his first airplane ride with Charles Lindbergh. While serving as Senator; his daughter Kathleen attended George Washington University in Washington D.C., where she was president of her sorority as well as president of the "Daughters of the Senate". It was at George Washington where she met and fell in love with a young football player, Ben Plotnicki. The romance between the Senator's daughter and the football star was well chronicled in the Washington papers. They were married in 1939. After graduation, Ben played professional football. One of his teammates was another young football star named Vince Lombardi.



In 1958, while completing his doctoral degree at Boston University, Ben became friends with a neighbor, Gene Stephens, a player with the Boston Red Sox. It was during this time that Ben's 14-year-old son, Skip got to ride with Gene and several other players to Red Sox games and hang out with them in the clubhouse. He even got to watch batting practice from the dugout at Fenway Park. One of Skip's biggest thrills at that time was when the legendary Ted Williams sat beside him!



Based on his early exposure to sports, it's little wonder that Skip attended the University of Tennessee on an athletic scholarship. As a freshman in 1962, he scored 20 points in a basketball game at Kentucky — without missing a single shot! In his senior year playing basketball, Tennessee finished the season ranked in the Top 20.

Skip, however, didn't earn a degree in basketball. He earned a B.S. in Civil Engineering and an M.S. in Engineering Mechanics. After graduation he landed a job as a structural engineer at General Dynamics in Fort Worth, Texas. While living in Fort Worth, Skip met his bride Amanda. The couple married in 1974. That same year, Skip joined Hamilton Form Company, coming on board when the company's new president, Bill Daily, engineer from Purdue, needed "some help" designing forms. Soon, Skip was managing the Engineering Department — a job he's been doing ever since.

Amanda and Skip raised two children, Amy and Ben. Amy lives in Fort Worth where she is a manufacturer's rep for an environmental clean-up company. Amy's dog was once featured on *The Dog Whisperer*, the National Geographic TV series that solves "dog issues". Ben lives in Jacksonville Florida where he manages the personal trainers at Lifestyle Family Fitness and regularly appears on the Jacksonville News 4 morning show.

Skip's wife, Amanda is a very talented and accomplished artist. Her paintings hang in several galleries and she has won "Best of Show" in consecutive years at the prestigious Artists Christmas event in Fort Worth. Amanda is also active in several fundraising events and charities in the Fort Worth area.



Basketball remains a big part of Skip's life. He plays basketball at the Fort Worth Club Athletic Center on weekends and still remains close to his friends and teammates from Tennessee. In addition to basketball, Skip is an enthusiastic fan of every major sport.



Skip has many varied interests beyond sports. An avid poker player, he competes annually in the World Series of Poker in Las Vegas. He loves old movies, especially musicals and westerns; and is proud of his collection of original recordings. And, to keep his keen mind sharp, he enjoys memorizing poetry.

Skip has seen Hamilton Form grow and change over the years. Although the company maintains records of the forms it has built, Skip remembers minute details as well as the "ins and outs" of many projects. He has a wealth of knowledge and enjoys working with people. Both our customers and the people here at Hamilton Form enjoy working with you too, Skip!

Hamilton Form Wins 2009 Best of Richland Hills Award

Facility upgrades and high-profile local projects earn U.S. Commerce Association recognition

Hamilton Form recently upgraded its production facilities, implemented a company-wide recycling program and has been involved in several high profile local construction projects. These actions contributed to the company being selected for the 2009 Best of Richland Hills Award, presented by the U.S. Commerce Association (USCA).

The USCA "Best of Local Business" awards program recognizes outstanding local businesses throughout the country. Each year, the USCA identifies companies that they believe have achieved exceptional marketing success in their community and business category. These are local companies that enhance the positive image of small business through service to their customers and community. The awards program focuses on quality, not quantity. Winners are determined based on the information gathered both internally by the USCA and through data provided by third parties.

"We're honored to receive this award from the U.S. Commerce Association and the City of Richland Hills. Local recognition is very important to us. Hamilton Form has always supported the communities where we live and work, and remains dedicated to providing a safe, healthy and respectful work environment," said William Daily, president of Hamilton Form. To achieve that goal, Hamilton Form's production facility recently completed several upgrades and enhancements.

According to Production Manager Bob Mills, "We added skylights across the entire roofline to provide natural day lighting in the plant, significantly reducing our electrical consumption. In fact, once the sun is high enough, we completely cut the lights in the plant. We took a light meter reading before and

after the skylights were installed that showed a brightness increase of over 400%! We also sprayed the roof with insulation and a reflective paint to reduce heat build-up. And, by installing high powered air circulation fans on the roof, we draw heat out of the roof, making the plant a more comfortable place to work."

Hamilton Form has been in business for more than 40 years and relocated from Hamilton, Texas to Richland Hills, near Fort Worth, in 1967. Since then, the company has built forms for many high-profile concrete construction projects around the country and has shipped formwork as far away as the Middle East and Australia. Recently, Hamilton Form provided formwork for several high profile local projects that helped the company gain local recognition. Local projects include stadium risers for the new Cowboys Stadium; bridge forms for the "High-Five" freeway connector; and, bridge and precast pavement forms for State Highways 161, 183, 114 and Loop 12.



Hamilton Form Company, Ltd

7009 Midway Road • Fort Worth, Texas 76118
Ph 817.590.2111 • Fx 817.595.1110
www.hamiltonform.com