

Aerolift Industrials, The Netherlands and CTI Inc., Green Bay, Wisconsin, USA

# A useful corporation to introduce vacuum handling in the USA

The use of devices based on vacuum principles and technology for handling precast elements and other materials has been around for quite some time and is well established in Europe. The technology has found its way into many industries including steel pipes and steel fabricators, paper, windmill blades, concrete prefabrication and tunneling. The story is quite different in North America where devices built on this technology are quite rare and few producers have made use of the many benefits in productivity that this technology offers.

The first exposure of the Dutch company Aerolift Industrials B.V. to the North American precast market came several years ago with a sale to Concrete Industries of Lincoln, Nebraska who specified and purchased a vacuum handling device to handle wall panels. The device allowed them to strip and turn the panels 90 degrees in a fast and safe manner while eliminating the lift inserts and the flexural stresses associated with typical methods. Based on the success achieved and enthusiastic comments of the customer, Aerolift decided to actively promote their technology in the Americas by securing the services of CTI, Inc. of Green Bay, Wisconsin to represent them.

Hanson Structural Precast Midwest is a large structural precaster based in Maple Grove, MN part of the Minneapolis/St. Paul urban area. Hanson Structural Precast is part of Hanson/Heidelberg Group, one of the largest construction materials conglomerates in the world. Hanson is a full line producer with the ability to offer total precast structures including beams, columns, hollow core floor elements, wall panels, double tees, and spandrel beams. Hanson became aware of the technology through



*Aerolift handling device inside the Hanson production factory, de-moulding and 90 degrees turning*

seeing the technology at trade shows in the US and the recent Bauma fair in Munich, Germany. General Manager Matt Westgaard, Production Manager Mike Lewis,

and Support Services Manager Tom McGregor visited plants in Europe as well as Concrete Industries and saw the technology in action. They came away with a firm



*Concrete cast with no inserts on either side as with conventional lifting*





Vakuum lifting devices provide an optimal handling solution of pre-cast concrete



Aerolift vacuum handling devices are engineered to the strictest standards and designed with safety and productivity always in mind

understanding of the possibilities that the technology could bring to their factory.

It was at this time that Hanson became involved with efforts to secure the precast stadia riser elements on two new stadiums in their market, one for the University of Minnesota football team and one for the professional baseball team, the Minnesota Twins. Hanson envisioned using vacuum technology for the entire project from the

earliest stage, and worked with Aerolift through CTI to specify a vacuum unit for the plant and two units for erecting the elements at the project site.

Upon securing the contract for the stadium work with General Contractor M.A. Mortenson of Minneapolis, MN; Hanson immediately finalized the details of the lifts and placed the order. The final specifications were made with the desire of using the devices for



1.

# Handle with air

## vacuum handling devices

1. Construction equipment at a 5 ton cantilever arm
2. Lifting precast tunnel elements up to 20 tons
3. Pipe demoulding and rotating, 20 tons
4. Handling up to four piles simultaneously, 10 tons
5. Lifting and 180° rotation of various products
6. Installation aid during construction



4.



2.



3.



5.



6.



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*Thanks to the vacuum handling devices, Hanson was able to cast the units with no inserts on either side for conventional lifting*

handling other elements both in the plant and on project sites, therefore the lifts were supplied with special extensions and a capacity of 9000kg (20,000 lbs).

Aerolift vacuum handling devices are engineered to the strictest standards and designed with safety and productivity always in mind. The devices utilize a large vacuum reservoir to provide for instantaneous suction to the element to be handled and a large "reserve" which allows the element to be held by the device even if power is lost. Additional safety elements include audio alarms for loss of vacuum, lights that indicate whether the vacuum is at a sufficient level, and gauges to see exactly the level of vacuum. In this way the operator always has full knowledge of the system status.

The plant device was delivered first and placed into service in November of 2007. This unit is designed to strip the riser sections, rotate them 90 degrees, and place them on the plant floor. The ends of the elements are then finished, and the vacuum device then comes along and picks up the element on the other side, i.e. the side that was against the form liner in the mold, and rotates 90 degrees again so that the element is now a full 180 degrees from the casting position. The form liner produces a broomed type surface which is not a problem for the vacuum device. This allows Hanson to cast the units with no inserts on either side for conventional lifting. This saves time and cost from the engineering department all the way through the field erection, where there are no insert recesses

to patch. With the first project having more than 4,000 precast risers and the second project having 2,800 elements, the savings and efficiencies are quite apparent.

The design for the field units needed to take into account several aspects of the geometry of the units. The stadia risers are a single riser design with a T shape. The center of gravity is offset and the amount of offset varies since there are four basic units. The units were designed with a special offset connection between the suction pad and main frame. This allows the riser sections to hang very close to vertical and then a special pad was designed in to allow weight to be added to one side to balance the unit perfectly if necessary. The suction pads also have a centered connection point so after the project is over the pads can be reconnected at this point for handling elements with more typical gravity points.

According to Tom McGregor of Hanson, "these units have been very exciting for us, and have proven to be simple to use, fast, and we have made with more than 8,000 picks with the plant unit with no problems. The ability to handle and rotate the elements quickly and safely with the elimination of inserts are some of the major factors for us in utilizing the Aerolift technology. We are looking forward to using these devices for handling other elements in the plant once these stadium projects are over."

**FURTHER INFORMATION**



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