Brecon Vibrationstechnik GmbH, 50933 Köln, Germany

Analysis and Upgrade of Vibration Technology of a Flexicore Production Line

In 1897, Molin Construction Services Company, located in Lino Lakes, Minnesota USA, was established and specialized in masonry construction with its main focus on stone foundation and bridge construction. In the early 1900s, they began manufacturing various precast concrete products and in the 1950s they acquired the rights to the Flexicore hollow core concrete manufacturing process producing over 50 million square feet to date. Today, the company also manufactures other precast products such as structural beams, columns and architectural precast. With over 100 years of experience and four generations, Molin Concrete Products has positioned itself to serve the industry into the next millennium.

To achieve and accomplish this task, Molin Concrete Products requested the guidance and advice of several companies that specialized in modernization of existing production lines. Their decision was to have Brecon Inc. Vibration Technology, located southwest of Chicago, Illinois USA, to become their working partner for the subjects pertaining to concrete consolidation.

Brecon analyzed the production requirements that were needed in order to modernize the Molin Concrete Products plant facility (**Fig. 1**). Together with the facilities manager, the expectations for an upgrade of the vibration system got defined.

Flexicore-Production line at Molin Concrete, Minnesota

For several decades, they had installed an electro-mechanical system for their concrete consolidation process. It contained motors which drove an eccentric shaft with a V-belt (**Fig. 2**). Each machine had 5 units installed under the entire form.

Former V-belt driven consolidation unit.

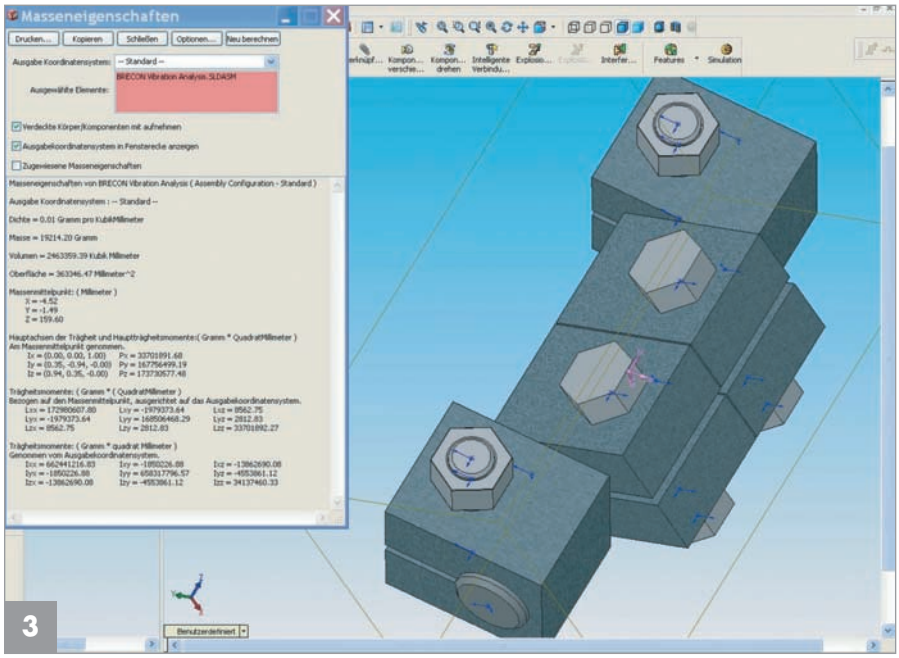
To achieve a good quality concrete product, it was necessary to run the existing non-adjustable application at longer vibration cycles. Because of the higher and longer vibration times, the noise was extremely loud due to the 3-part construction of the system.

The use of the V-belt system caused numerous unplanned breakdowns, which became extremely costly with down-time and mechanical repairs.

For an investment into modern vibration technology, the goals were therefore clear:

- Low Maintenance System
- Noise Reduction
- Frequency Controlled Concrete Consolidation
- 100% Operational

It was obviously clear that the existing system had some weaknesses, but by the end they were still very satisfied with the concrete quality. Therefore the first task for Brecon was to analyze the used vibration data. Because there wasn't any documentation of the old installation, Brecon measured the mechanical data of the drive motor, the drive of the V-belt and the eccentric shaft. The information was then entered into the CAD system at Brecon in Cologne, Germany. With the created 3-dimensional model they were able to receive all the vibration values.



Determination of the mass characteristic of the old vibration drive.

After assessment of the values Brecon could recommend two more improvements to the facility manager, Randy Molin:

(1) A vertical vectored vibration in pairs of Brecon License Bosch Vibrators instead of the eccentric shafts, and

(2) Optional higher consolidation forces and/or consolidation frequency.

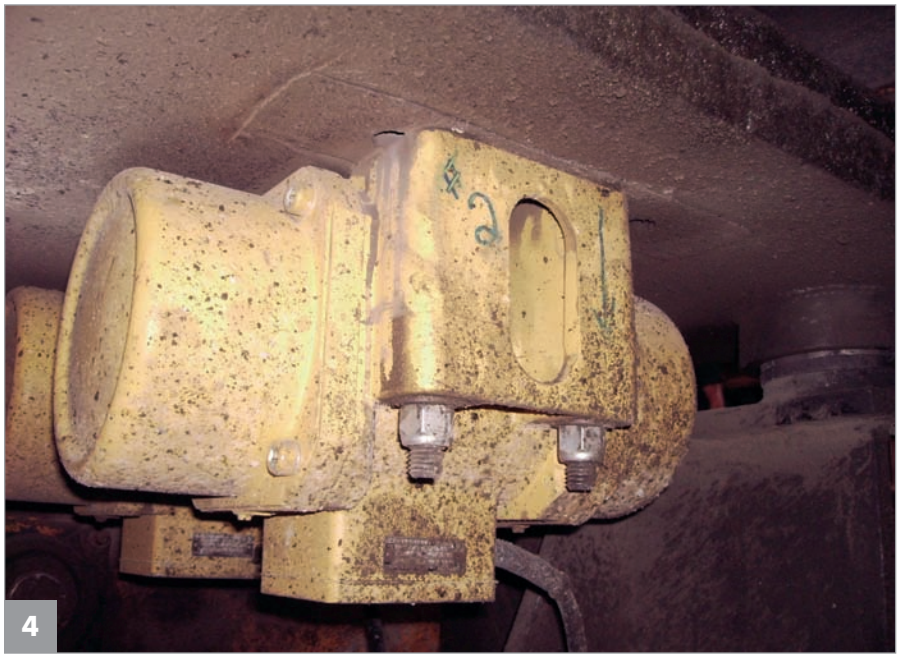
In the middle of 2006, Brecon delivered the new system to Molin Concrete Products, which consisted of ten external vibrators model Bosch 18120, one frequency-control unit EW560/2940 and one distribution box SV100502 (**Figs. 4 and 5**).

The electric and mechanical adaptation could be carried out without any interruption of the production by the staff of Molin Concrete Products.

After several test runs, together with Brecon Inc., Molin Concrete Products staffing optimized the new technology, where they noticed a tremendous quality improvement in relation to the concrete consolidation. Above all, the permanent reproducibility of superior results provided a significant difference to the old system.

Randy Molin, facilities manager of Molin Concrete Products, "Brecon closely collaborated with us in order to understand the previous system and our goals. Our expectations were exceeded with the new system. The decisive result is naturally the concrete quality. Simultaneously we obtained however also a clearly quieter working field for our colleagues. The investment of new Vibration-technology into the old unit was the correct decision."

Randy Molin, facility manager, next to the new control unit.



Vertical vectored vibration caused by two external vibrators model Bosch 18120.

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