Concrete Plant International
North America Edition

2 | 2019

www.cpi-worldwide.com

REPRINT | CONCRETE PRODUCTS & CAST STONE

Innovative producers meet growing demand for alternative masonry products

AUTOMACAD INC

Automacad inc., Candiac, QC, J5R 6X1, Canada

Innovative producers meet growing demand for alternative masonry products

Hank Giles, Giles Associates, USA

Natural and manufactured stone veneers have been adding value to homes and commercial properties for over a hundred years. While natural stone is undeniably beautiful and durable, installation requires significant time and the skills of a professional mason to achieve the desired results. Unfortunately, finding skilled masons has become increasingly difficult. In a July 2018 survey of its members, the National Association of Home Builders (NAHB) found that 65 percent of respondents experienced difficulty in finding masons. A 2015 study by the Associated General Contractors of America found that 55 percent of masonry contractors had trouble filling vacancies. A 2018 study by the Business Development Bank of Canada found that 48 percent of construction firms found it difficult to hire the skilled workers they needed, including masons.

Even non-load bearing masonry, such as natural or manmade stone veneer typically requires the skills of a mason for proper installation. To overcome this requirement, some producers have developed products that provide the variety and beauty of natural stone, yet are manufactured using dry and wet cast methods and can be installed by do-it-yourselfers or almost any construction crew.

Fig. 1: Manufactured stone veneer such as Beonstone panelized stone veneer siding screws onto almost any type of wall. Color variation is built in and a single simple panel solves most installation challenges. Accessory pieces such as sills, power boxes, and keystones complete the project.

Hank Giles, Giles Associates hankgiles@meganet.net

These relatively new products—appearing within the past ten years or so—offer a viable alternative to traditional masonry. So-called alternative masonry products take many forms, but typically provide a complete—often panelized—system that allows fast and efficient installation over almost any wall surface (fig 1). Perhaps most importantly, the best of these systems provide built in moisture control that solves a heretofore crit-

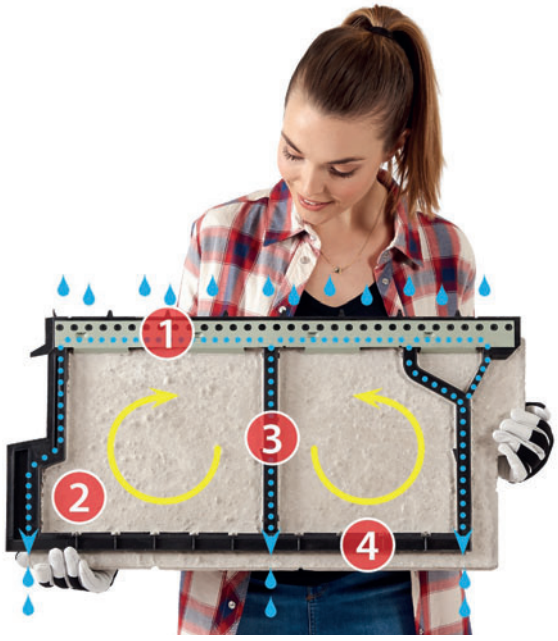

Fig. 2: Moisture management is built in on the back of the Beonstone panelized stone siding

Fig. 3: An entire wet cast automated production plant for alternative masonry can be seen in this photo, including conveyor lines, automated filling stations, stacking and destacking, and other production equipment.

Fig. 4: Computerized control system coordinates operation of entire wet cast alternative masonry production facility. Operator control panel can be seen at right. An Automacad Color-I robotic coloration system is in orange in the park position.

ical problem that has plagued 'lick and stick' stone veneer for years (fig 2). In its 2018 Cost versus Value Report, Remodeling Magazine found that manufactured stone veneer returns 97.1 percent of its cost, one of the highest returns of any remodeling project.

Wet cast innovators

One firm that is helping new and existing precasters tap into the rapidly growing market for alternative masonry is Automacad. The firm, based near Montreal, Canada, develops industrial automation systems for a variety of industries. Custom-designed equipment for dry and wet cast precasters is an important specialty for Automacad (fig 3). The firm has supplied automation solutions to precasters throughout North America, including the Color-I robotic coloration system (fig 4), fully automatic demolding and packaging, intelligent washing systems, automatic volumetric filling, and variable frequency vibration tables that optimize production and quality while reducing downtime and variation.

"We see alternative masonry as an exciting new segment of the manufactured stone veneer market," notes Automacad founder and president Louis Hébert. "Each client we work with presents a unique challenge. We adapt our standard and custom automation solutions to match the goals of each manufacturer. It's not unusual for start-ups to choose a mix of automated and manual systems to provide the most affordable initial configuration. Later, once they are established, these producers can add additional, modular systems. For instance, new wet casters often use forklifts initially to move molds to and from the production line, but later may add automatic mold handling systems. The same is true for color and release agents."

Automacad's Hébert also notes, "Our Performance Modules (fig 5) provide a way for alternative masonry startups or established producers looking to add alternative masonry as a new product line to automate what they need now and add more as they grow and expand their operations. Wet cast alternative masonry provides many advantages for the producer, installer and building owner. They offer versatility for exterior and interior applications, lower cost for materials and installation, a large target market in residential and commercial sectors, less labor, and increased profit thanks to reduced weight, less storage space and faster installation."

Alternative masonry pioneers

Beonstone, based in Bromont, Quebec, Canada, was founded in 2010 and has an exclusive agreement with Oldcastle to distribute its wet cast panelized stone siding throughout North America. Beonstone has worked closely with Automacad over the years to continually refine the wet cast manufacturing processes it uses in its 35,000 square foot (3,252 m^2) facility.

"When we started our company in 2010, there were already many producers of dry cast veneer products on the market," notes Beonstone co-founder Pierre Wilkie. "The majority of what was available was adhered stone and brick variations, but almost all of them used mortar and required a mason or skilled tradesperson to install the product correctly. We saw a need for a high performance product that was easy to install, did not require a mason, could be used over any surface, and offered built-in moisture control. We saw our product as an intelligent alternative to conventional masonry; in other words, alternative masonry."

Beonstone panelized stone siding is a seemingly simple system where one panel allows you do to almost anything—inside

Fig. 5: Joy-stick controlled (inset) two-color filling system makes it easy to adjust and modify colors to create a variety of products.

corners, outside corners, flat walls and accessories to finish the job (fig 6). The firm's system also includes simplified logistics, including shipping, distribution, inventory tracking, ordering, and jobsite installation. Pallets of product are premixed so installers take it off the pallet and install it on the wall without worrying about maintaining a pattern or color lots.

Wet cast 2.0

"The wet cast process we have developed I like to refer to as wet cast 2.0," says Wilkie. "It took us a couple of years to perfect our processes. It also took real teamwork to solve production challenges and quite a bit of trial and error. We use a pretty simple batching system based on a mixer from Advanced Concrete Technologies (ACT) / Wiggert; however, for our mix design, we worked with civil engineering department at the University of Sherbrooke to create a lightweight but strong product that can also be adjusted based on certain variables."

Fig. 6: Beonstone sample section

Fig. 7: Before and after – renovation with Beonstone panelized stone siding.

continues, "For instance, our plant is near Montreal so our temperatures can vary dramatically. You need consistency in color, dimensions, curing times, and every other factor. Some product profiles have more detail than others—more angles, more texture—and require us to adjust the mix accordingly. It's more complicated than it may appear. Developing durable, yet flexible molds was a huge challenge. The product we designed required very precise dimensions and details in order to hide joints and achieve a natural look. We have a full-time quality control person who conducts tests all day using laser dimensioning and evaluating color consistency.

Wilkie stresses that the Beonstone product requires precision and consistent quality, which they have been able to achieve with the help of critical partners. From mold development and mix design to automation equipment, the firm has worked and learned continually from some of the best in this business.

"A start-up is a huge challenge, but choosing the right partners makes it easier and fun," Beonstone's Wilkie emphasizes. "For instance, we have worked closely with Automacad to achieve a cost-effective mix of automated and manual processes. Automacad has supported us by adding features and developing new features that have improved our productivity and output."

Beonstone's operation uses an automated conveyor system, an automatic stacker and destacker, automated mold release spray system, volumetric dosing, and vibration table. Molds are moved to and from the curing room using a forklift. The product base mix is colored with a base color and then the

firm applies highlight colors directly to the mold manually before it is filled with an automatic volumetric filling system from Automacad.

Moisture management has long been a critical issue plaguing adhered stone veneer. "All masonry products are susceptible to moisture infiltration by various means—moisture vapor, capillary action, absorption and so on," Wilkie explains. "There must be an air gap and drainage plane that allows moisture to drain out and air to circulate in order to dry the air space. We believe we were the first panelized stone veneer product to incorporate a moisture control system directly in the product. When applied to a wall protected by a waterproof barrier, our panels allow air to circulate freely and water to drain out." He notes, "There are many horror stories out there about poorly installed stone veneer that traps moisture resulting in tremendous damage to the structure. We have tested our product extensively and as we expand our market throughout North America, we are confident that our product can be applied to many substrates and structures and provide excellent performance (fig 7)."

Start-up taps industry experts

Stone Creek Products, based in Arthur, Illinois, USA, was founded in 2008 and is currently a distributor of adhered dry cast stone veneer and working with Automacad to develop its own production system for wet cast panelized veneer products.

"We are a long-time distributor of conventionally installed manufactured stone veneer products," says Dave Witbeck, co-founder of Stone Creek Products. "I have been involved in both wet and dry cast production with previous companies. While we are still working with Automacad to build out our plant, we will soon be producing a panelized stone veneer product that will use a plastic framework that interlocks the panels and provides proper water drainage."

Traditional masonry using individual bricks and stones—either natural or manufactured—requires a high level of skill and a lot of time and effort to install correctly. It is also heavily dependent on the individual skill of the mason involved, for better or worse. According to Witbeck, alternative masonry offers a way to achieve the look of conventional masonry, but at a lower cost in most cases, faster installation time, and can even be done by a do-it-yourselfer or any general contractor. Since the product is produced in molds created using natural stone, you essentially get a professionally laid product for less money and faster installation, he emphasizes.

Fast entry possible

Alternative masonry products is a fast growing new segment. Masons are becoming increasingly hard to find and general contractors are having to schedule them further and further out. "We see our biggest market, here in the United States, in the commercial sector such as large office buildings, retail

Fig 8: An automatic conveyor line runs next to a small batching system that feeds and automated filling system, leading to a curing conveyor at the far end.

stores, and hotels," Witbeck notes. "We are hoping it will catch on in the residential market as well. We have worked with and spoken to a lot of smaller contractors and they are excited about the possibilities that alternative masonry offers."

To achieve a fast entry into the new alternative masonry market, the team at Stone Creek Products spent a week with an Automacad automation consultant, to review plans for the new facility and determine the best approach and where to apply automation for the most cost-effective results.

"Automacad worked closely with both our curing system provider and mold maker to help optimize our processes," Witbeck notes. "Concrete is a wild animal. Concrete produced in the winter tends to cure darker than concrete cured in the summer. By investing in an automated curing system, we are confident that we can produce the same product year-round and give us an edge in quality. We chose a flexible solution from Automacad that provides us with the most cost-effective initial configuration and allows us to scale up our automation as we grow."

Guaranteed growth

The desire to use both natural and manmade stone and brick in commercial, institutional, and residential structures has been part of the human experience for thousands of years. Even when the budget or design does not call for stone or brick to be used as a load bearing element, it is still often used as siding or rain screen.

With the ongoing decline in availability and increasing cost for skilled masons continuing, it has opened the door for alternative masonry solutions that offer the same look and value as natural stone or brick, but at a fraction of the cost and weight, and offering superior installation speed, including do-it-yourself possibilities.

"Along with Beonstone and Stone Creek Products, we are working with several other innovators and early adopters who are really blazing a new trail in the market for alternative masonry products, including wet cast manufactured stone veneer and landscaping systems," notes Automacad's Hébert. "This new wave of products is typically a panelized system that enables fast installation with the look of natural stone, yet also offers the opportunity for innovative new styles and colors as well. The wet cast process, in combination with modular automation systems (fig 8) allows for scalable growth and fast time to market—usually within 12 months." ■

FURTHER INFORMATION

Beonstone
15, Atlantique, Bromont, Quebec J2L 2R3, Canada
pwilkie@beonstone.com, www.beonstone.com

Stone Creek Products
366 E State Route 133, Arthur, Illinois, 61911, USA
T +1 217 5433875
info@stonecreekproducts.com, www.stonecreekproducts.com

Automacad inc.
240, Liberte Avenue, Candiac, QC, J5R 6X1, Canada
T +1 450 6326323, F +1 450 6326335
info@automacad.com, www.automacad.com