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AAC Autoclaved Aerated Concrete

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Complex upgrades made easy: A holistic approach for enhanced capacity

When choosing the right technology and the right technology partner, an investment in an AAC factory is quite a long-term investment. There are many real-life examples of successfully operating factories for more than 50 years that are still producing today. Of course, the right level and frequency of maintenance and cleaning are important to ensure the plant keeps on running well.

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However, given the smooth characteristics of the AAC production process, the equipment has a very long lifetime with relatively very limited wear (as opposed to the production of for example traditional concrete, where vibrating in the production process demands a lot from the equipment). Over time, a change in market demand may require a shift in product portfolio (e.g. the global trend visible today,

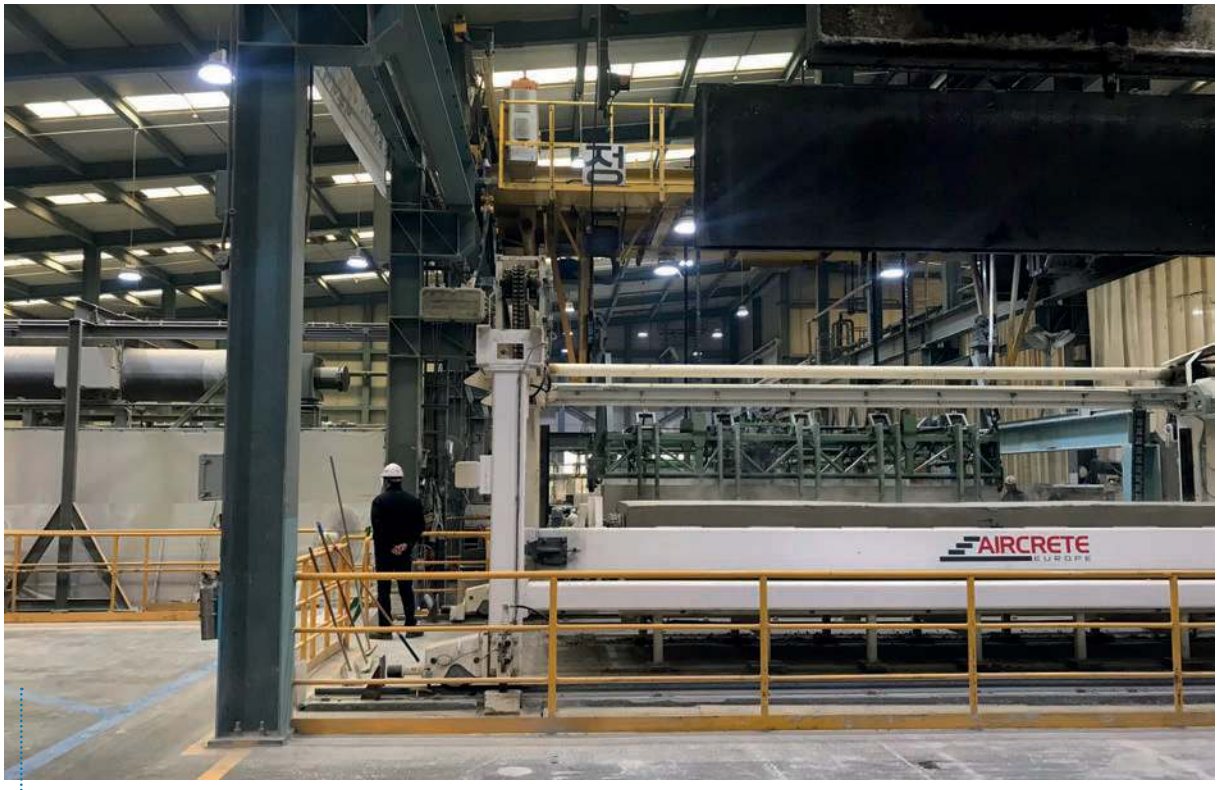

Fig. 1: Aircrete Europe was also engaged as SYC's technology partner in 2013 for the upgrade project from a Hebel to a Durox flat-cake cutting system.

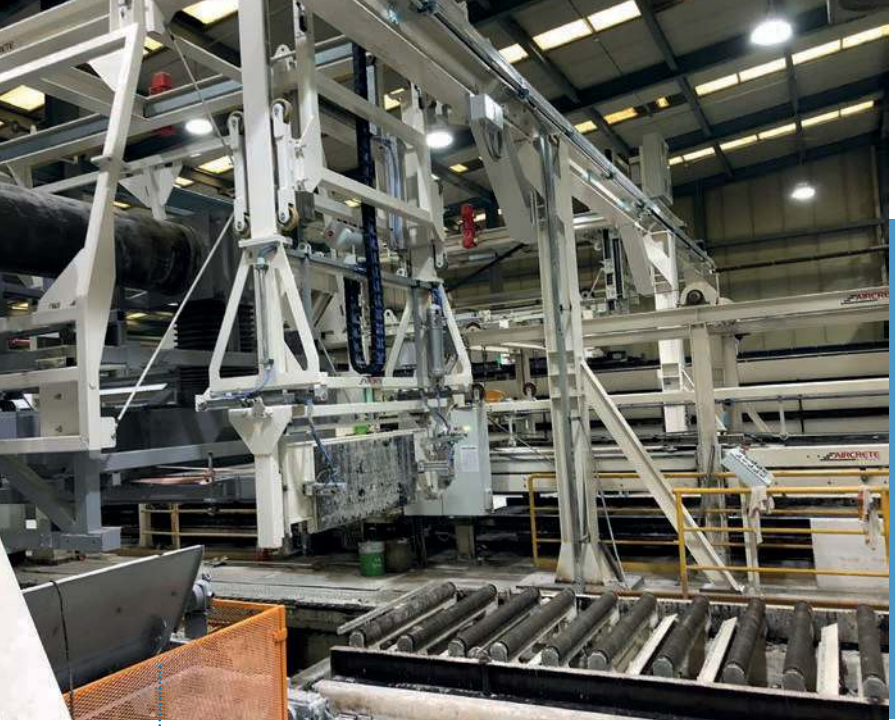

Fig. 2: The new fully automated end crust removal system.

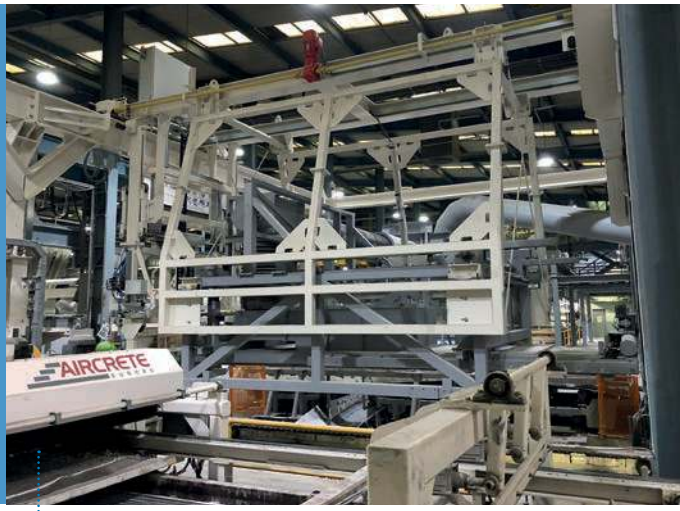

Fig. 3: The vacuum crane is repositioned and attached to a new vacuum hood crane for efficient top waste collection.

with a shift from AAC blocks to AAC panels) or simply could require an increase in the production capacity. Often, in order to adapt to these opportunities, a more fundamental change in the equipment and operations is required. This change results in with the upgrade or modernization of equipment, level of automation, control systems and even full production areas. This article shows how one of the leading AAC producers in South Korea recently realized a successful upgrade of their factory with a well-designed and well-executed upgrade project to increase the capacity of their plant.

Expansion opportunity

Started production in 1993, SYC ALC Co. (SYC) is a leading AAC producer located in the city of Asansi, South Korea. The factory is based on a flat-cake Durox line, which was upgraded from a Hebel cutting line by Aircrete Europe in 2013 (fig. 1). As a result of that upgrade project, SYC is currently the only producer in Korea that is able to produce AAC elements with a Super Smooth surface as a result of to the double-oscillating wire cutting technology from Aircrete Europe.

South Korean residential construction accounts for about 40% of the total construction market in Korea. As a result of the government incentive plans that focus on affordable public housing and increasing the supply of rental public housing in the country, this market has a prosperous outlook in terms of growth figures [1].

Anticipating the future demand increase within the light of these developments, SYC decided to execute an upgrade of their existing factory to increase the production capacity, together with the automation of several existing machines. As for every large modernization project, a customized solution was required, and the installation had to be executed flawlessly in a very short time frame in order to minimize the production down time. Looking for a technology partner that was associated with the flat-cake technology and that, besides supplying the equipment, understands the production process of its customer, SYC engaged Aircrete Europe as their technology partner to execute this challenging project.

The project started with detailed discussions between all stakeholders, to understand the exact objectives of the customer and translate into an innovative design that spanned several areas of the production process, starting from mould handling to all the way to the packing area, including an automation upgrade of the autoclave traverser. In addition, three new autoclaves were added to the factory to also increase the autoclaving capacity. The entire project resulted in a capacity increase of nearly 60% and installation was executed in a very short time frame of two weeks only.

The SYC upgrade project

To significantly reduce the cycle time in the cutting area, the cutting machine has been extended to have the possibility to have several cakes at the same time in the cutting line. Also, the side, end and top- waste removal (fig. 2) as well as the stacking of maximal three cakes on an autoclave trolley has been fully automated within the process. Previously, only one cake at a time could be handled in the cutting line and the green waste was being removed manually.

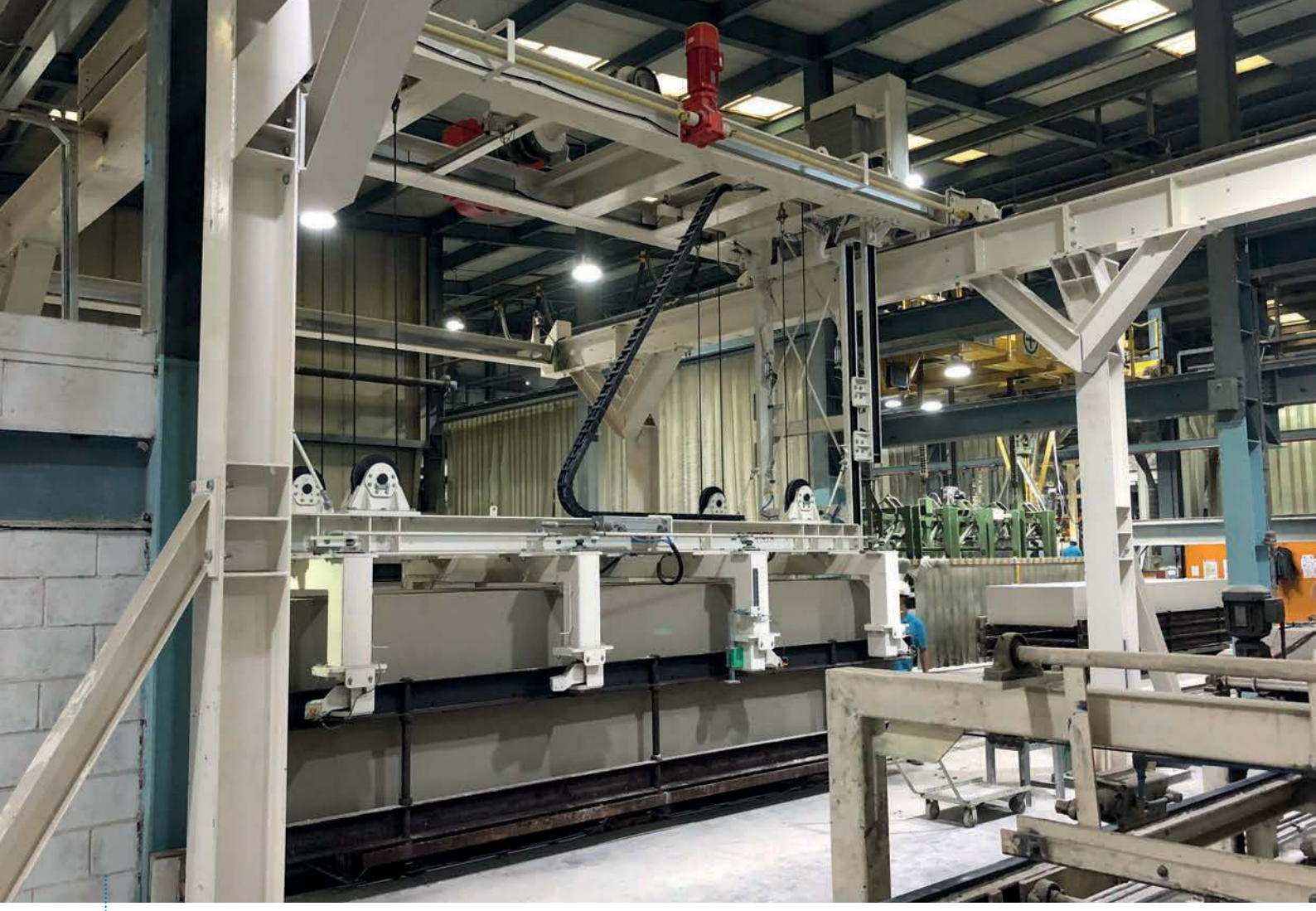

Fig. 4: The new frame stacking crane picks the cake automatically and stacks it two or three high as per the autoclave height.

In the new cutting process, the cake is put on a retractable table where the Aircrete Inclined Cross Cutter cuts the length of the panels (or the height of the blocks). After the cross-cut, the cake is put on the first section of the cutting line by the existing crane, which is since this project now operational in automatic mode. Once placed on the first section, the cake is pushed through the Aircrete High Speed Cutting Frame, where a horizontal cut is made. Double oscillating wires provide a vertical cut at the same

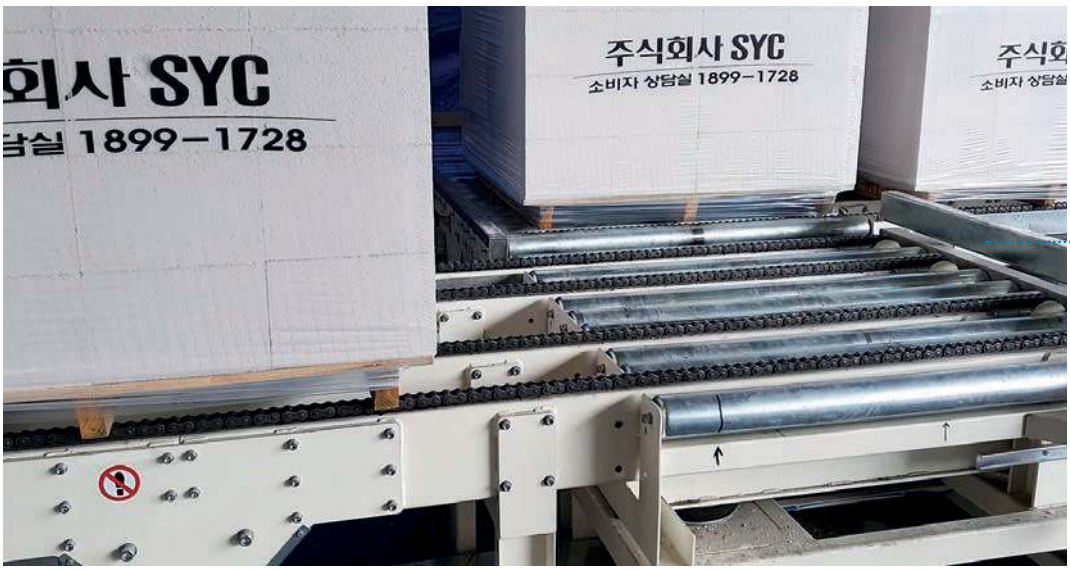

Fig. 5: A close-up view from the new outfeed conveyor.

time, creating AAC products with a Super Smooth surface that reduces finishing requirements when applied in construction projects. After the cutting, a vacuum hood that is repositioned and attached to a new wagon, removes the end and top crusts efficiently (fig. 3). The new frame stacking crane picks up the cake and stacks it two or three high (depending on the diameter of the autoclaves) on trolleys that are standing on buffer tracks towards the autoclaves (fig. 4).

Additionally, the entire process of loading and unloading of the autoclaves has been automated, resulting in significant cycle-time and labor cost reductions. SYC originally started production in 1993 with six smaller autoclaves, each with a capacity of ten cakes at once (stacked 2-high). In 2010 and 2013, additional autoclaves were added, with 15-cake capacity per autoclave (stacked 3-high). With this recent modernization project, three additional autoclaves are added, each with a capacity of 18 cakes. As a result of the various dimensions of the autoclaves, the upgrade project required some flexibility in the stacking of the cakes before autoclaving. The traverser car is reinforced to handle the higher loads for the additional cakes per autoclave. In addition, the horizontal movement and the push-pull mechanism of the traverser are also upgraded to become fully automated.

Another important area of the upgrade project was the replacement of the packing line. The newly installed equipment and significant modifications to the existing packing crane resulted in significant cycle time and labour cost reductions. The new tilting table is now able to tilt two cakes concurrently on the pallets, which are automatically fed in by a new automated pallet insert system. From the tilting table, the packs are automatically transported along a strapping and foiling machine before they are buffered outside the building on a large conveyor (fig. 5). This new design results in less dependency on the availability of the forklift driver. A semi-automatic crane is also installed to enable operators to efficiently remove products that do not meet the quality standards.

Mission accomplished

With a careful and intensive design and engineering phase, the installation of all the upgrades are completed in just two weeks onsite. This required very strong cooperation and excellent planning capabilities between all project stakeholders involved. Both SYC and Aircrete Europe teams worked together in multiple shifts with extraordinary dedication, which was a major contributor to a successful project.

Mr. Yoo, proud owner of SYC, commented “Aircrete Europe’s role as a partner, not just a machine supplier, was tremendously important in this project. They truly understood the challenges and objectives of us as an AAC producer and have managed to translate this very well into an innovative design and very efficient installation.”

As a global leader in AAC panel applications, Aircrete Europe possesses the right technology and process know-how to execute complex upgrades and modernization projects. Whether it is to increase capacity, upgrade plant automation, optimize the unloading logistics or even upgrade from an existing tilt-cake cutting line to a flat-cake cutting line in order to make AAC panels, Aircrete Europe is a reliable technology partner throughout every modernization project.

[1] South Korea Construction Market Trends, Shraddha Sarvankar, July 23, 2019, Medium.com

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