

A new state-of-the-art AAC plant for the Sichuan region

With the strong support of the Chinese government, the prefabricated construction industry entered a “Golden Age” of rapid development. It is estimated that up to 15% of new buildings will be prefabricated buildings until the end of 2020 and up to 30% until the end of 2025. Sichuan Province of China is actively promoting the innovation of construction, in which some enterprises with strong comprehensive strength are vigorously promoting the application of new prefabricated construction. With the development of prefabricated steel structures, the production and application technology of AAC panels gradually plays an important role in the construction market.



Entrance area of the Headquarters of Gaoyu Group

The Sichuan based Gaoyu Group Co., Ltd. was established in the 1970s. Today the group owns twelve sole proprietorship enterprises and two joint ventures. Gaoyu Group has always adhered to the concept of “Scientific Outlook on Development” following the sustainable development path of environmental protection. The company mainly focuses on three business segments: the construction industry including

construction, building materials and exploitation of real estate; the industrial circular economy industry including chemical energy and mining industries as well as the modern service industry with finance, medical treatment and education as the main industries.

Plant design

To speed up resource integration, Gaoyu Group decided to vigorously develop the prefabricated green building materials business and establish Sichuan Gaoyu building materials Co., Ltd. in Chengdu, Sichuan Province, to produce AAC products. After intensive investigation and research, in 2019, Gaoyu signed an agreement with Keda Suremaker to purchase an automatic AAC block/panel production line with an annual output of 300,000 m³. Since the company already has a dry mixed mortar production line, the new AAC production has to be built in an area separated from the original plant. Ingenious planning is highly encouraged for the plant layout design.



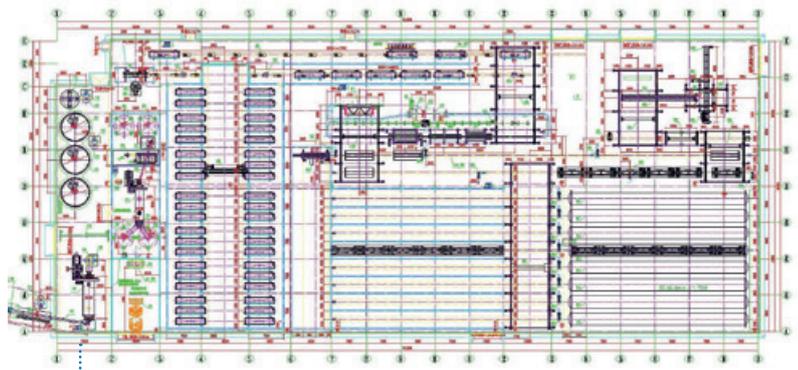
The new plant of Sichuan Gaoyu building materials Co., Ltd. in Chengdu, Sichuan Province of China

After site investigation and careful study, the Keda planning team made a customized design with single head autoclaves. A closed grouping area heated by steam in front of the autoclaves was designed to ensure the temperature of the green cake before autoclaving, which improves the heating efficiency of the autoclave and ensures high quality of the AAC panels.

Pre-curing and cutting

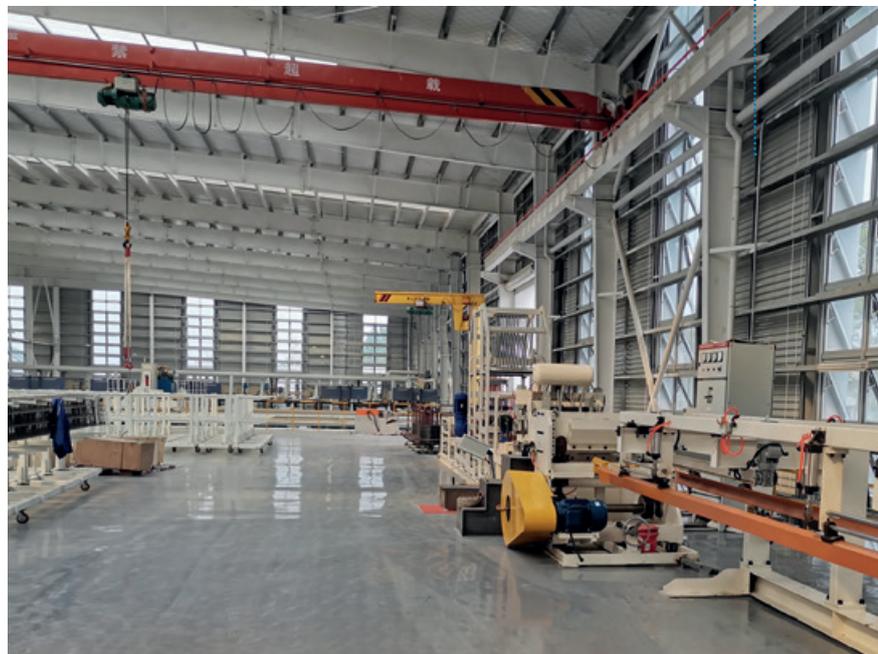
The roofs of the pre-curing room and the closed grouping room are designed as working area, where the mesh cages are processed. The steel coils can be lifted by cantilever crane to the roof of the closed grouping room and then be transferred by a single beam crane to the section where the mesh cage will be welded and fabricated automatically. After assembly the whole mould mesh cages can be dipped automatically into anti-corrosion paint and be dried on the roof of the pre-curing room by an automatic reinforcement saddle frame cycle system; the steel needles can be cleaned and waxed there automatically after they have been pulled out of the green cake. The whole process reduces material consumption and labour costs effectively.

The cutting system of the plant can cut all six sides of the green cake. Four sets of cutters can be adjusted according to different production requirements and grooving sizes, automatically and without shutting down the whole cutting system. Panels and blocks are produced in one mould at the same time, the cutters can partially groove the cake for panels. Waste material can be fed through the cutting pit into the slurry recovery system and then be recycled. The grooving of the green cake can greatly improve the efficiency of panel production and reduce the investment for equipment and civil construction work for the white cake processing section. It also avoids waste material, noise, and dust, that is caused by white cake processing.



Design plan of the new plant in Chengdu

Mesh cage processing area



Grooving device with four sets of cutters that can be adjusted automatically without shutting down according to different grooving sizes (left) and surface cutting device (right).





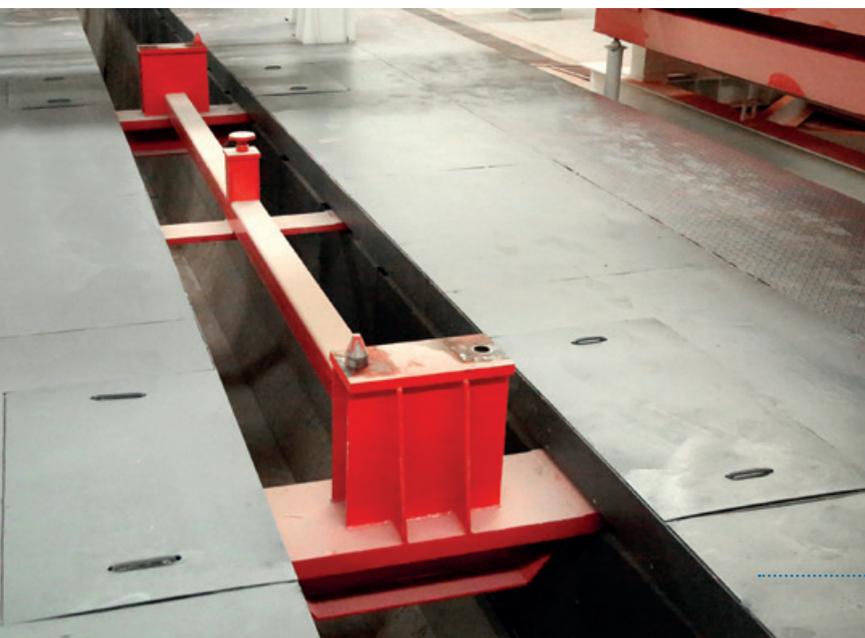
The horizontal cutting machine

The horizontal cutting machine has two cable-stayed beams aligned parallel to each other. On each one of these two beams several small columns are lined up in regular intervals to each other. A steel cutting wire is attached to a small column on one beam and stretched to the respective small column that is positioned at the same height on the other beam. Accordingly each “pair of small columns” on the two beams is used to hang only one steel wire, which means that there will be only one cutting kerf settlement (0.6~0.8 mm) on one vertical plane during the cutting process, so that the gravity settlement crack impact will be lessened when producing thin panel. Even when producing 5 cm thin panel and therefore cutting the cake over the entire length of the mould, only one steel wire is needed to be hung on each pair of “wire hanging columns” – the settlement at the same position has only one cutting gap, which effectively solves the defect of cutting crack of thin panel. In addition, obviously less friction will be caused when the cutting wire is about to leave the cake.



The vertical cutting machine combines a large swing frame with low swing frequency to ensure a smooth cutting surface. The swing guide of the swing frame adopts the slide structure of the guide rail with high precision. With the mechanical synchronous lifting frame structure, the side plate exchange is done smoothly and without shaking.

The cutting conveyor adopts chain drive traction mode and the transmission device is placed at the end of the cutting pit to avoid pollution by sludge. For this same purpose, the cutting track can be covered with special cover boards.



Packing system solves problem of product damage

When block and panel are produced in the same mould, and there are not enough blocks for one whole pallet, the packing system can combine blocks from several moulds/production cycles onto one pallet without manual intervention of the machine operator. The new packing system solves the problems of product damage, single packing specification and limited transportation of a traditional packing system. The stacking specification can realize 1.2 x 0.6 m, 1.2 x 1 m, 1.2 x 1.2 m, 1 x 0.6 m multiple stacking, and the height of the stacking can be 1.5 m, 1.8 m and 2.4 m.

Vertical cutting machine (top) and cutting conveyor (bottom)



The packing line



Central control room for the monitoring of the whole production process

As a leading brand in China's AAC industry, Keda Suremaker is committed to advanced technical innovation and customized design to achieve a win-win situation for its clients all over the world. With its special R&D test center, Keda Suremaker can do raw material analyses and offer its customers a customized concrete mix.

The design of a customized production plant is adapted to the real conditions at the respective company premises. All the equipment will undergo pre-delivery commissioning. Keda Suremaker will also provide professional training for the local staff of the customer, project installation supervision and operation support during initial operation.



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