Keda Suremaker, Lingxiao Road North 555, Maanshan City, Anhui Province, China

Customized AAC equipment

In order to meet the various specific requirements of its customers, Keda Suremaker has developed customized plant and equipment for the manufacture of AAC – a transport platform for double moulds, a special additional tilting table for the packaging unit, an automatic reinforcement saddle frame cycle system and a central control room. During the development process of these systems, Keda Suremaker, with its head office in Maanshan City, Anhui Province, China, made use of its longstanding experience gathered from cooperation with its AAC customers.

In recent years, with the gradual improvement of living standards in many Asian developing countries, such as China, Indonesia, India and others, a new building system has gradually become popular and applied widely, resulting in new opportunities for the new wall materials industry. However, due to the various national conditions prevailing in developing countries, wall material specifications and construction backgrounds are different. As a result, corresponding customer demands vary as well. The key issue for the producers of building materials to be competitive in the market must then be the challenge of how to design and manufacture products that meet customer demands as precisely as possible.

It is a widely shared philosophy that customization as a mode of operation concentrating on meeting the wide variety of specific demands should represent the key operation mode against the background of the new industrial revolution. For this purpose, it is of salient importance to study and develop methods of how to determine common characteristics in the abundance of specific demands and to offer specifically customized solutions accordingly. As a result, the necessity of continual innovations and upgrades for achieving such customized solutions is another core issue that must be kept in mind at all times.
Keda Suremaker continually ensures its development of innovations especially when it comes to practical applications, paying attention to relevant industrial standards and analyzing market demands. The company's management team, comprising both technical and process experts, always visits the production sites of its customers to obtain the feedback necessary for the practical application of its solutions, with the ultimate goal of analyzing and determining the common characteristics existing in the variety of customer demands.

In recent years, it has increasingly been found that research on product customization can greatly improve product design activities to provide effective and practical solutions. In the following, some classic examples are given.

Fig. 1: Transport platform for two moulds (Source: Software design).

A customized solution to meet the demand for increasing capacities

Transport platform for double moulds

Occasionally, customers wish to increase the quantity of moulds and expand the space of pre-curing chambers to arrive at higher plant capacities. To achieve this, production cycles of 2.5 to 3 minutes per mould (double pouring mixer system) are needed. Conventional speeds of the transport platform in the pre-curing chamber, however, cannot meet such production demands. This has motivated Keda Suremaker to design a new transport platform equipped with two tracks and two friction wheels for double moulds.

This transport platform can convey two moulds synchronously in the pre-curing chamber to subsequently transport these moulds to the de-moulding section via a friction wheel system after pre-curing. This approach greatly improves the efficiency of the conveying process in the pre-curing chamber.
Driven by two reducers, the transfer platform carries out initial positioning operations via electrical control and accurate mechanical positioning. In doing so, an accurate connection between the transport platform track and the ground track can be ensured.

A customized solution to meet the demand for various packaging methods

Cake transfer machine

As freight standards in different countries and regions differ from one another, various packaging specifications are in existence (see tab. 1). In order to meet these different packaging specifications, Keda Suremaker has designed its cake transfer machine (fig. 2).

This cake transfer machine includes a crane-like structure which is capable of clamping and lifting white cake by means of hydraulic pressure.
The clamping system of this cake transfer machine is automatically adjustable. In its initial configuration, cakes with a length of 1.2m can be clamped and also adjusted to other lengths such as 1m.
The transfer machine is capable of stacking cakes with heights of 1.6m, 1.8m, and 2.4m, with the clamping grab rotating horizontally by 90° in order to perform cross-stacking operations
In cases when the cake length fails to be a multiple of the pallet length or if panels and blocks are produced together in the same mould, the cake transfer machine can clamp the remainder of cakes, that do not totally fill up the entire pallet, and subsequently place them on a transition platform in order to

Fig. 2: Cake transfer machine.

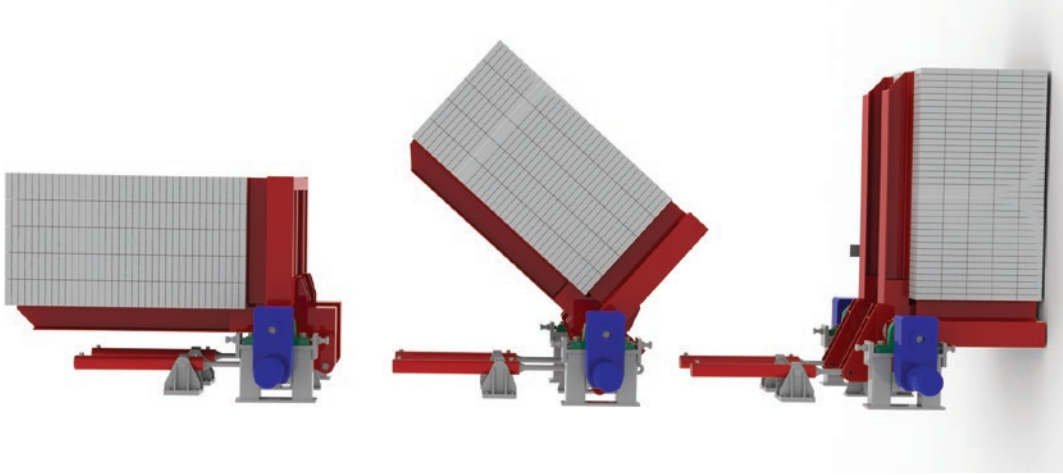

Fig. 3: Final product tilting table for packaging operations (Source: Software design).

Tab. 1: Packaging specifications

Width (m)	Length (m)	Height (m)
1.2	1.2	1.2
1.2	1.0	1.2
1.2	1.2	1.8
1.2	1.0	1.6
1.2	1.2	2.4

temporarily store them for later combination with other remaining cakes on another pallet that is afterwards transferred to the packaging section when totally filled.
The packaging mode can be switched automatically from "Packaging with pallet" to "Packaging without pallet", depending on the customer's requirements. In this way, pallet recovery, inconsistent pallet sizes and various transport heights no longer constitute a problem.

Final product tilting table for packaging

Thin blocks with thicknesses ranging from 75mm to 100mm are very prevalent in Indonesia. During the production process of these blocks, i. e., when the horizontal cutting machine cuts the cake to size, problems of separation or damages to blocks are likely to occur on account of an increased number of layers.

Also, if block thicknesses are arrived at by means of a cross-cutting machine, it is likely that the blocks will collapse during transport. In order to prevent this problem and to meet the demands of mass production of thin blocks in Indonesia, Keda Suremaker has designed a special solution. To minimize the risk of thin blocks collapsing during transport, a small final product tilting table has been added to the packaging line which vertically turns the freshly cut cake by 90° (see fig. 3).

Intelligent robot packaging system

In order to meet the requirements of automatic rotary product stacking and pallet distribution, Keda Suremaker has designed an intelligent robot packaging system.
As shown in fig. 4, this system arranges cakes on the packaging line while the robot rotates the pallets one by one to their designated position on the chain conveyor – with the pallet hole for forklift operations located perpendicular to the packaging line. Subsequently, the robot clamps the required layers of AAC blocks on the packaging line and rotates them to the empty pallets. The intelligent robot packaging system can be flexibly adjusted to meet a wide range of operating requirements. This advanced design operation ensures a substantially higher degree of efficiency.

Reducing equipment expenditure with customized solutions

Tilting machine for lateral plate exchange

In China, lateral plate moulds are normally identical to cake curing plates to simplify the flow of the production process. However, in order to save investments for autoclaves and production costs for steam consumption, an increasing number of customers is no longer satisfied with this type of standard configuration.
For example, when running an AAC production line with a mould size for the manufacture of cake with a size of 6m x 1.2m x 0.6m (length x width x height), numerous customers prefer to use smaller autoclaves instead of conventional ones with a diameter of 2.68m, while, at the same time, however, not reducing production capacity.

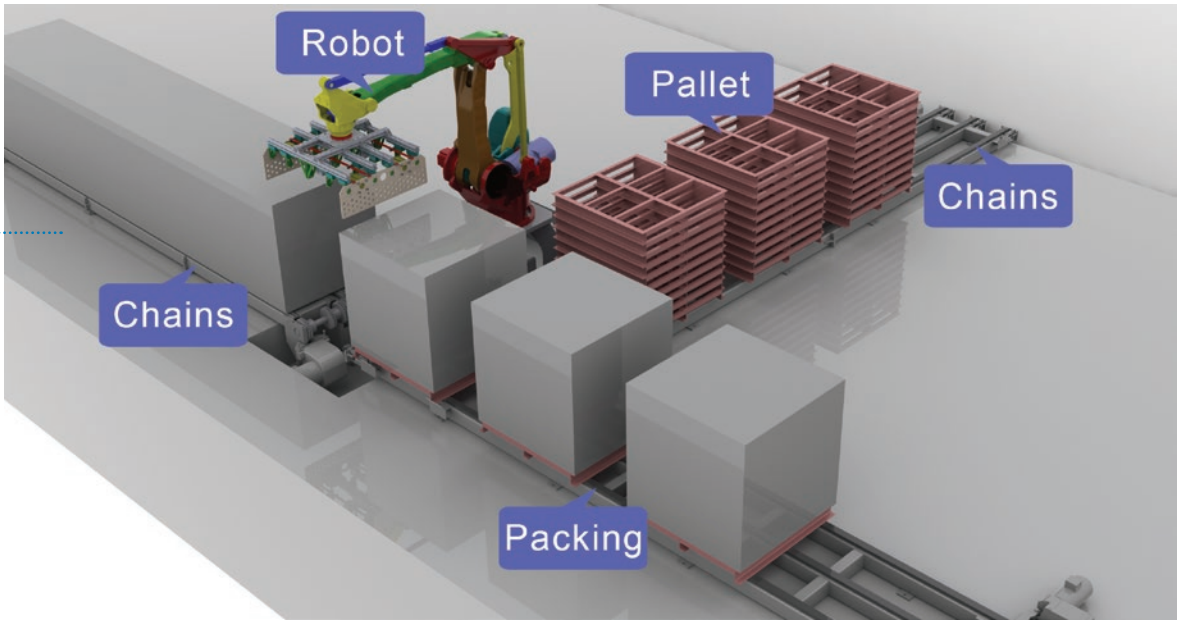

Fig. 4: Intelligent robot packaging system

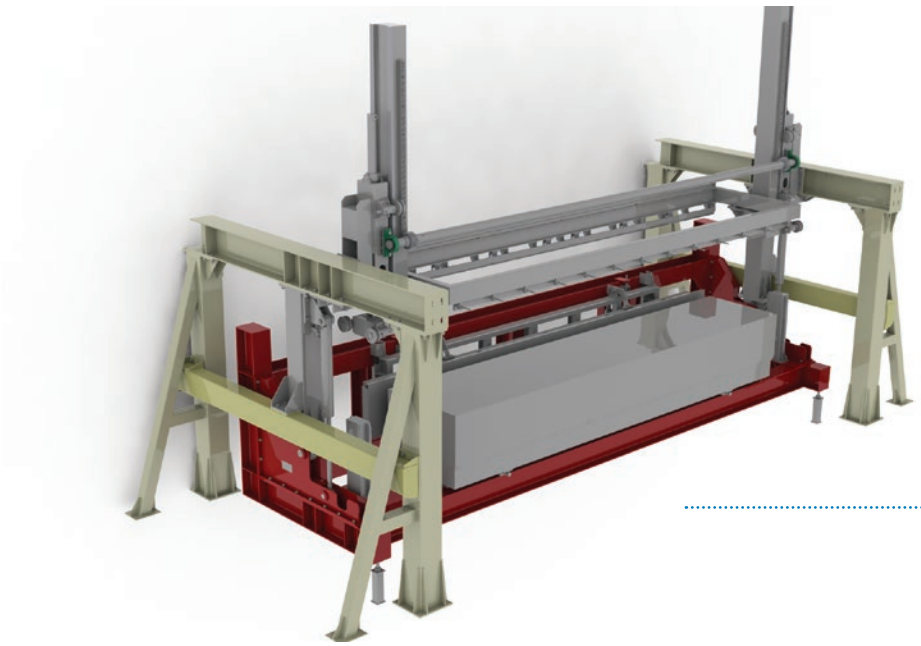

Fig. 5: Completely open tilting machine.

In order to meet the abovementioned customer demand, two plate types have been designed by Keda Suremaker: one consisting in a rather commonly used wider plate, another being a narrower plate for curing operations in the autoclave. As a result, after having transferred the AAC cake from a wider plate to a narrower one during the production process, an autoclave with a diameter of 2.5m can be used instead of the commonly employed autoclave with a diameter of 2.68m.

The completely open tilting machine is used to transfer the cake from the wider to the narrower plate and to exchange the cake plates (as shown in fig. 5). The main advantage of the totally open tilting machine that makes it possible to carry out the exchange process, is that both the big and the small tables of the machine can be opened and moved separately.

As a first step in the exchange process, the wider lateral plate with the cake standing on it in an upright position is transported by crane to the totally open tilting machine. Plate and cake together are then placed on the smaller table of the machine positioned horizontally. Once the plate and cake are placed on the smaller table, this table moves towards its bigger counterpart until small and big table form the typically L-shaped machine tilting unit. Then this unit turns 90° until the small table is in an upright/vertical position whereas the big table being in horizontal position with the cake lying on it. Now the big table will move away from the small one, leaving the wider lateral plate of the mould with the small table in a vertical position.

Now the small table featuring the lateral plate again tilts by 90° until table and plate are in a horizontal position. Subsequently, the wider lateral plate is lifted from the small table and returned to the mould. After the wider lateral plate has been removed, the narrow lateral plate is positioned on the small table. The small table with the narrow side plate then turns again by 90° until the small table and the narrow side plate are in a vertical position. Afterwards, the small table featuring the narrow lateral plate moves towards the big table and small and big tables again form the abovementioned L-shaped tilting unit. Once again, the unit turns by 90°, with the

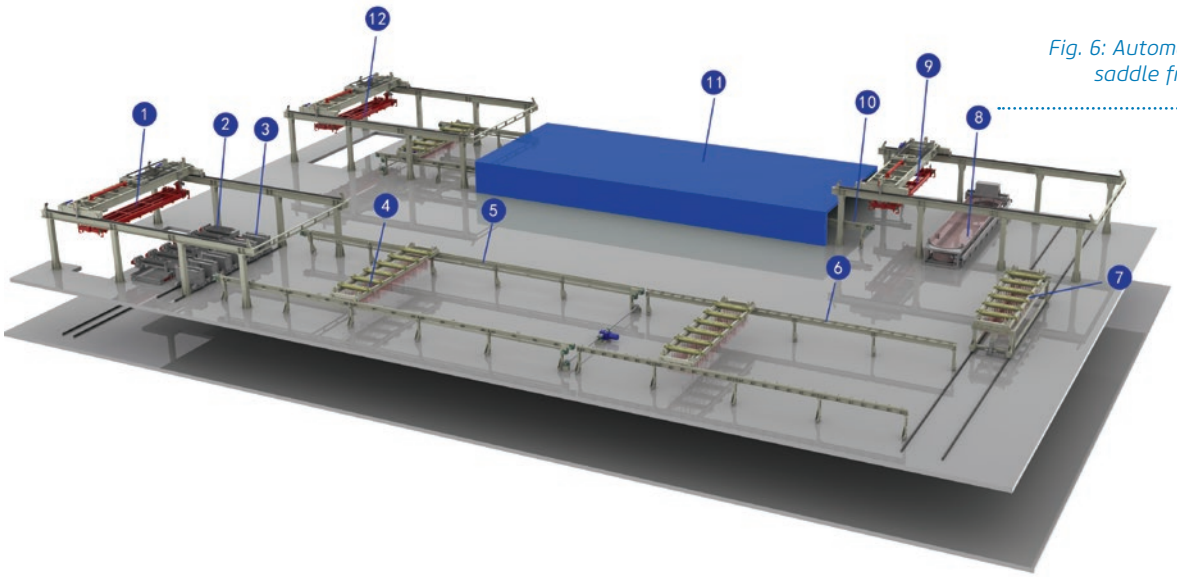

Fig. 6: Automatic reinforcement saddle frame cycle system

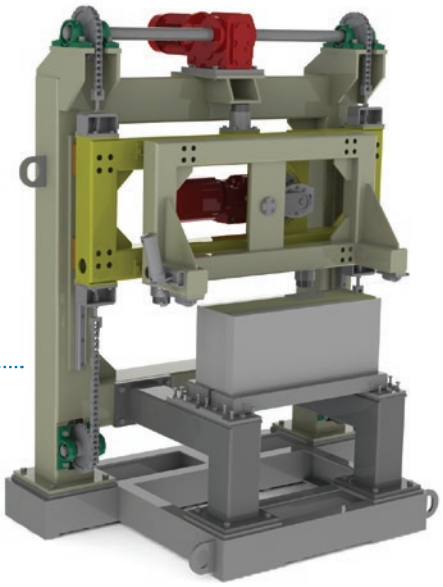

Fig. 7: Cutting performance testing machine.

result that the cake is now standing in an upright position on the narrow side plate. Finally, the exchange process is completed.

Customized solution for an automatic reinforcement system

Automatic reinforcement saddle frame cycle system

The automatic reinforcement saddle frame cycle system consists of a needle holder, needle cleaner, wax dipping tank, automatic saddle frame conveyor, mesh cage assembly conveyor, electric saddle frame transport platform, anti-corrosion section crane, anti-corrosion tank, dryer conveyor chain, drying box, inserting crane, and the like.

The saddle frame with the needles attached is lifted. This causes the needles to be pulled out of the green cake. The needle reception machine moves the needle frame to the needle cleaner unit and then to the wax dipping tank. The automatic saddle conveyor transfers the saddle frame with the needles to the mesh cage assembly conveyor where meshes are fixed to the saddle frame. Then the saddle frame containing the mesh cages is transported to the anti-corrosion section crane which conveys it to the anti-corrosion tank.

After the anti-corrosion process, the saddle frame containing the mesh cages is hoisted on a dryer conveyor chain ending up in the drying box, where the cages are dried. After drying, the cages are transferred to the inserting crane to wait for their introduction into the AAC slurry. After the mesh cages have been inserted, the mould is conveyed by a transport platform to the pre-curing chamber. The needles are pulled out of the green cake after pre-curing, and subsequently the saddle frame with the needles attached proceeds to the next cycle.

Compared to the traditional production process, the wax dipping, anti-corrosion and drying sections are integrated into the saddle frame cycle process, thus reducing ineffective material consumption, saving space and labour costs for these sections, and improving the efficiency of mesh cage assembly and recycling work.

Customized solution for performing cutting tests

Cutting performance testing machine

To carry out further research on the influence of steel wire swing frequencies, swing amplitudes, and lifting speed parameters of the vertical cutting machine for cutting AAC cakes produced with different raw materials, Keda Suremaker has designed a special cutting performance testing machine (fig. 7).

Keda Suremaker's cutting performance testing machine has been designed in accordance with the swing frame structure of vertical cutting machines. Swing frequencies, swing amplitudes and lifting speeds can be adjusted without limitation during the cutting experiments to be performed on local production sites in order to verify cutting performances with different parameter combinations. By continu-

Fig. 8: Central control room.

ously studying recorded parameters, Keda Suremaker carries on optimizing its cutting machines to further customize these machines to the best possible cutting control parameters for its various customers.

Customized solution for a central control room

Central control room

In the past, the control of an AAC production line was mainly decentralized with separate operating control tables located in different corners of the production facility – an unfavourable solution for the overall visual management and monitoring of the facility as a whole. In order to improve the monitoring, operation and management of the production process, Keda Suremaker has developed a central control room (fig. 8).
A visual man-machine interface in the central control room allows for man-machine separation, thus ensuring safety of labour, reducing labour costs, and improving the overall automation level of the production line.
The central control room is located above the pre-curing chamber and the grouping section for the autoclave, thus widening the visual perspective and a true display of modern technology.

Keda Suremaker's core company philosophy

Keda Suremaker is at all times dedicated to product innovation and relentless technical upgrades to meet its customers' demands for successful operation of their facilities. Through fruitful cooperation and continuous innovation based on thoroughly studying and using the practical experience gathered and communicated by its customers, Keda Suremaker is getting stronger day by day to promote the development of the industry. It is Keda Suremaker's promise and obligation to always strive at establishing a win-win relationship with its customers.

Keda Suremaker
Lingxiao Road North 555, Economic
and Technological Development Zone
Maanshan City, Anhui Province, China
T +86 0555 2113600
www.keda-suremaker.com.cn
www.sinokeda.com