Wehrhahn GmbH, 27753 Delmenhorst, Germany

East Mining Invest – Leading manufacturer of high-quality AAC products in Uzbekistan

East Mining Invest had a goal: The people in Uzbekistan should build advanced homes out of a high-quality, ecological building material - AAC - and were looking for a reliable and knowledgeable partner. So, East Mining Invest was introduced to Wehrhahn in early 2019 and quickly came to an agreement for cooperation. Visiting some of the many Wehrhahn reference plants in Russia and speaking to the owners, quickly convinced the investors to select Wehrhahn and to place the purchase order.It was decided to install the first and most modern AAC plant in Uzbekistan in the town of Akhangaran and call it 'Arton'. Today, 'Arton' is synonymous with autoclaved aerated concrete blocks of the highest quality. As it is common with many Wehrhahn clients, finance was organised through banks in Germany and the contract came into force.

Uzbekistan has a remarkably old construction culture honoured as "UNESCO world heritage".

Uzbekistan is located in Central Asia and has a population of 35 Mio. With an upward trend, the largest country in the region and has a remarkably old construction culture honoured as "UNESCO world heritage". Uzbekistan is rich on natural resources. There are fertile agriculture, large deserts and mountains up to 4,650 m, huge mineral deposits, but silica sand suitable for AAC production is extremely limited. Modern Uzbekistan and its very ambitious government are aiming to improve the construction industry and to gradually use green materials, such as AAC.

Investors vision

AAC products had hardly been used in Uzbekistan until then, but the investors of East Mining Invest were convinced that the many benefits of AAC compared to natural, unburned clay or clay bricks would quickly attract home builders. Still, East Mining Invest was cautious and decided to start small and grow with the market development. Consequently, they purchased the fully automatic Wehrhahn Smart plant for an initial daily capacity of 500 m³ only, however prepared to be upgraded to 1,500 m³ for blocks and panels.

The machines were supplied in time and installation works started in early 2020.

Hikmat Rakhmetov, Managing Director of East Mining:

"Over the past few years, Uzbekistan has experienced a boom in economic activities. This is especially noticeable in the development of the construction business and the growth in the consumption of building materials. The construction industry started to change along with the political situation and demanded more and more advanced modern building materials. The most common and popular wall material in Europe and Asia today is AAC. But until 2019, Uzbekistan did not have a single large plant for the production of autoclaved aerated concrete of European quality.

Within two years, despite all the difficulties of the Covid period, the plant was built and put into operation. Important to mention: It was the first time in the world, that engineers from Uzbekistan themselves were able to build, commission and start production of a plant with high German technology. This shows the high capability of local IT specialists and engineers in Uzbekistan, and we are proud of our achievement. Today in Uzbekistan, there is a plant that produces the most environmentally friendly building material of European quality. The name of this plant is 'Arton'.

Still, this is only the beginning of a long journey. For future projects in Uzbekistan 'Arton' plans to work together with the German company Wehrhahn and train Uzbek engineers into Wehrhahn technology so that they can continue to deliver high performance in IT, engineering and production."

The Smart plant starts with 500 m³/day and is currently extended to 1,500 m³/day.

Installation despite Covid restrictions: Remote Technical Service

While the foundation work was completed and the machine installation was about to begin, Covid heavily hit Uzbekistan and Europe and air travelling came to a standstill worldwide. Fortunately, all Wehrhahn machines had been supplied already pre-assembled and tested. This was the major advantage for successful installation and commission conducted by the local personnel under the guidance of Wehrhahn via Remote Technical Service (RTS).

East Mining´s installation group had never seen an AAC production plant before and had to learn and understand without Wehrhahn's presence on-site; what a new situation! Wehrhahn`s automation specialists quickly developed the solution: "Remote Technical Service". Specialists from East Mining installed a very powerful internet connection and all technical provisions for getting proper communication. The RTS could start.

The Wehrhahn engineers were working in Germany on their screen and the East Mining interpreter was in Uzbekistan 5,000 km away. Both sides tried their best, never gave up and finally after months of RTS, everyone involved celebrated the production of the first cakes. A great success!
Despite the lack of experience in installing equipment for a large AAC plant, East Mining specialists coped with the task and did a great job.

The Remote Technical Service has proven to be the perfect tool to lead and instruct an installation crew to build a complete production plant without direct presence of Wehrhahn. East Mining and the entire Uzbek installation crew can be very proud of the success of their works.

Peter Trumme, Wehrhahn Project Manager:

"Due to language barriers, Wehrhahn could only directly instruct the interpreter, and again the interpreter had to instruct the installation technicians on-site. And vice versa. So, misunderstandings could have been another source for failures.

Guided by the Wehrhahn installation documents, mechanical works were well understandable. No headaches. Cable connection works and I/O-check however proved to be more challenging. Trouble shooting and finding possible reasons are already difficult enough being on-site. But doing it over the distance, guiding the staff who is not yet familiar with the equipment is a whole other story. One wrong cable connection or misaligned switch will cause the automatic system not to work as it should. And in a plant of this size, it is quite normal to have these issues more than once in the beginning.

But the co-operation improved day by day. And thanks to the ambitious professionalism of the specialists from both sides, serious mistakes and time loss were avoided."

Raw materials: in different qualities

Quality, especially stable quality of raw materials is very important for good AAC. East Mining produces its own lime and can guarantee the proper quality. Cement is available on the market, but in varying quality. This was already a challenge for the production process. But the biggest challenge was the sand. Good silica sand, suitable for AAC production, could hardly be found in the Tashkent region.

Over thousands of years the desert winds had created very fine sand blended with a high percentage of clay. An efficient solution had to be found in the shortest time.

Sand washing? It was an option, but would wash out not only the clay content, but also the extremely fine sand particles, in total over 50 %! This solution was not satisfactory. Getting good sand from a deposit 400 km away? Also not a good solution.

East Mining jointly with Wehrhahn decided to continue working on machinery and process in order to produce high-quality AAC blocks with the available sand. The team of technologists from Wehrhahn and East Mining has done a great job in developing suitable mix formulations for top quality blocks. The challenges the team was facing in the beginning helped considerably to finally achieve superior results in the shortest possible time.

Gradually, continuous experimentation succeeded in improving the quality of AAC and today East Mining produces blocks known as the best in the region, both in dimensional accuracy and strength, as well as the best thermal and sound insulation.

Marketing

Parallel to the machine installation and prior to the production start, East Mining started marketing:

Visiting building authorities, architects, contractors, developers, preparing sales brochures, TV advertising, exposing material on exhibitions, preparing documents proving the benefits in comparison with red bricks, showing how to fasten loads to the walls by appropriate materials, conduct fire tests, etc. East Mining prepared everything.

Being the first on the market is always a big challenge. Innovative ideas have to be found to convince homebuilders to understand the benefits of using AAC, such as demonstrating differences in weight: brick 28.70 kg in comparison to AAC 8.90 kg.

Production

The factory

The factory has a compact design with rail access and a rail loading ramp, which allows to ship not only to the Tashkent region, but also to remote clients. The factory design was developed by Wehrhahn jointly with East Mining based on their wishes and considering the available space.

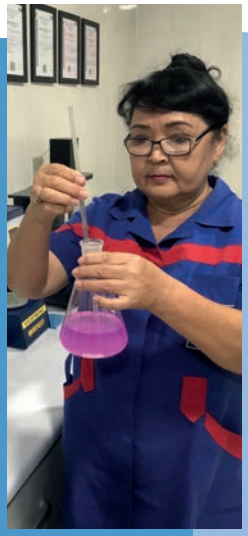
The main production building has two floors. The floor above the precuring space has been designed for panel reinforcement production and is now temporarily used for company administration.

East Mining insisted on having as few foundation pits as possible in order to facilitate cleaning and maintenance. Autoclaves and steam boiler are installed with access inside the main building of the factory and the body is located outside the building.

Dosing and mixing equipment is located on its own structure with silos and slurry tanks placed close. Wecomix – Wehrhahn`s unique dosing and mixing program controls all functions and measures temperatures of materials, CaO content, slurry densities and more. It can quickly react to changing raw material qualities.

Transparent office space with glass walls on top of the autoclave waiting tunnels – fully overlooking the production – accommodate production management, quality control and laboratory, all working hand in hand.

Moulds are filled fully automatically, shifted to the heated precuring space and finally to cutting. Perfectly organised precuring conditions ensure a stable production of top-quality blocks.



**Movzhuda Kurbankulov,
Laboratory expert of 'Arton':**

"Technology and software play an important role in the production of any product. For the production of AAC, it is important to have a reliable flexible dosing and mixing control system, since the quality of raw materials can vary. The Wecomix system has all the necessary functions for the operational control of the dosing of raw materials and provides a wide range of opportunities for process control. This is a very convenient system, in addition to dosing and mixing, it provides the ability to obtain statistical information about the amount of raw materials used, moulds filled etc. Wecomix helps us to quickly and automatically re-adjust the mixing formula according to varying raw materials. We use Wecomix to recalculate mixing formulas for different types of products. All important data are stored in the mixing report and are available for further analysis."

The mixing unit combines a large number of equipment and is controlled by a single system: Wecomix

The universal tilting machine is set on floor level, tilting the flat cake for cutting and tilting it back for autoclaving.

Cutting line with latest high precision thickness cutter.

Tilting and Cutting

East Mining operates the latest generation of the Wehrhahn Smart AAC plant. This has already encouraged visitors to invest into exactly this type of production plant. The cutting line is raised above floor level to facilitate maintenance and cleaning.

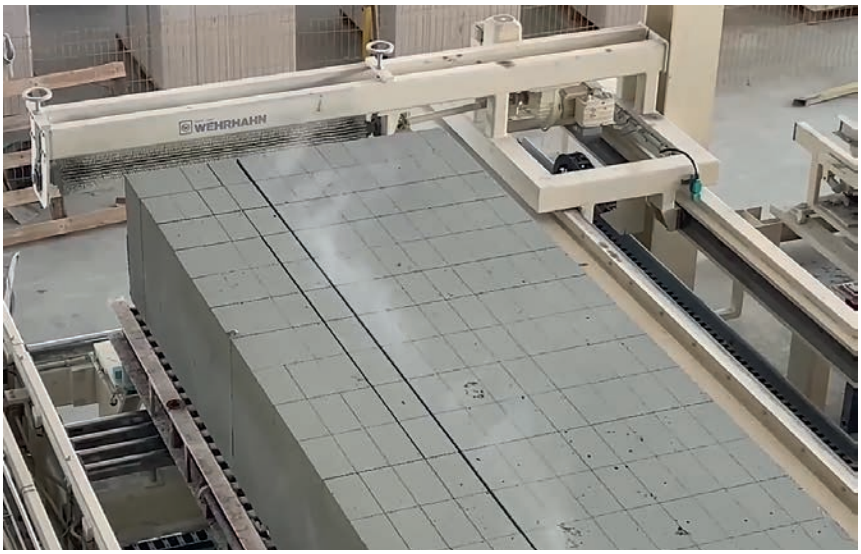
The cake is tilted and then lifted onto the cutting trolley and travels through the recently redesigned precision side trimmer to cut the block length and "tongue and groove". It continues through the latest high precision thickness cutter and finally through the cross cutter to cut the block height.

Once all six sides of the cake are cut, all cutting machines open and give way for the cake to return to the tilting machine to be tilted flat again and placed onto the pick-up trolley with the autoclave grid. From there, the cake moves to the bottom cut removal to the area of the loading machine. The Smart system operates with the universal tilting machine, both for gently tilting the flat cake into upright position for cutting and after cutting back to flat position. The Smart cutting line facilitates the immediate recycling of all cut-offs, decisively reducing raw material costs and keeping the environment clean.

Loading and green separation

The cake – all six sides cut – lies flat on the autoclave grid and is lifted by the automatic loading machine into the green separator to prevent sticking after autoclaving, and is then loaded onto the autoclave trolley, three per trolley.

Finally, nine trolleys, each loaded with three cakes are stored in the waiting tunnel before being shifted into the autoclaves to form the unique tobermorite crystal structure for high-quality AAC.



Green separator: one layer at a time is separated. The layers are prevented from sticking. Furthermore, this device is equipped with automatic cleaning.

Autoclaving and packing

Two long autoclaves are sufficient for a total capacity of 500 m³/day and are designed for 12 h cycle time. During autoclaving the AAC develops the necessary strength and the pleasant white colour. A forklift with a pallet grip and turner palletises the perfect blocks ready for dispatch.

Building a new plant is a very difficult task but the construction of a pioneering AAC plant in a country is even more ambitious, the solution of which requires the involvement of specialists and partners with a high level of competence.

Zair Aripov, 'Arton' General Manager AAC Business:

"We were able to successfully complete this complex project in a short timeframe because we chose the right partners for all phases of plant construction. We chose equipment from the leading European manufacturer Wehrhahn and received the most modern high-performance plant. In addition, we also attracted specialists from Turkey and Russia, who had already experience in the installation and operation of AAC plants. Thanks to this cooperation, we were able to minimise difficulties and to quickly enter the market with first-class AAC products."

Extension of existing plant to 1,500 m³

After successfully operating the first step, the plant is currently expanded to produce 1,500 m³ per day by the end of 2022. The capacity of 1,500 m³ means high-speed of the production process (1.7 min/pack)! Production stops are not allowed. The team of professionals is not afraid of possible disturbances as the production processes are already prepared for the increased production capacity.

The plant will feature a very advanced sorting and packing line. It enables:

- to sort the cake in different thicknesses, e.g. 7 block rows with 200 mm and one row with 100 mm,
- to easily remove a reject block from the cake,
- to stack pack heights according to demand for truck or rail with pack height from 1,400 to 11,800 mm.

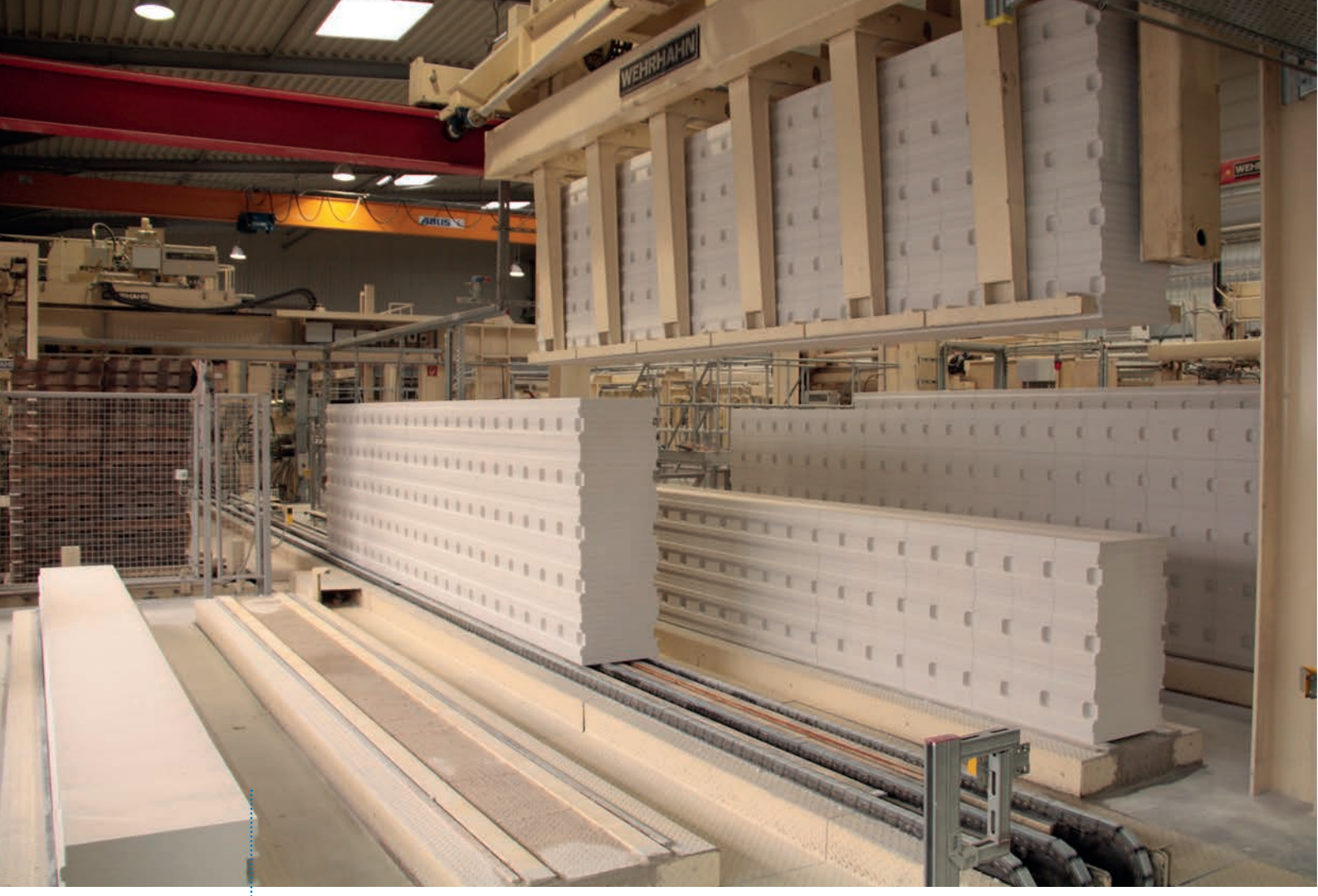
Expansion with the next factory – no.2

Together with Wehrhahn, East Mining is currently planning a second plant for AAC combined with a plant for fibre cement sheets in Navoi/Central Uzbekistan on a large industrial site. This will serve the construction market in Central Uzbekistan.

Conclusion

East Mining is a success story, proving that properly pre-assembled and tested machines considerably help to be installed by the buyer himself when guided by clever Remote Technical Service.

It is also an excellent example how success-oriented "newcomers" can build a showcase factory just with their own local personnel starting from zero grounds and zero knowledge to successfully producing AAC.



Advanced sorting and packing of different thicknesses.

RTS requires machines assembled as much as possible, reliable technical documentation, a methodical approach to each installation and plant situation and patience during training and instruction. It considerably helps when machines are put into operation as the investor's technicians gain a much better understanding. The commissioning of machines up to producing the first cake remains always adventurous, only crowned with success.

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SINCE 1892 WEHRHAHN

Wehrhahn GmbH
Muehlenstr. 15,
27753 Delmenhorst
Germany
T +49 4221 12710
mail@wehrhahn.de
www.wehrhahn.de

ARTON

JV LLC "EAST MINING INVEST"
Aralskoye street, house 19
Tashkent city
Uzbekistan
T +998 71 200 200 6
info@arton.uz
www.arton.uz