

Factories churning out houses

Innovative method of construction embraced by province as part of its economic transformation



By YUAN SHENGGAO

An innovative solution offered by a building material manufacturer at Xiaohe Industrial Park in Taiyuan, the capital city of North China's Shanxi province, is challenging people's conception of civil engineering: houses are not built but assembled.

At Shanxi Construction Investment Group's manufacturing plant in Xiaohe, building elements including steel columns, beams and building blocks are manufactured and rolling off its intelligent and automated production line.

These building elements are ready to be delivered to various sites in Shanxi, allowing structures to be assembled and completed at an astonishing speed and efficiency.

Buildings constructed this way are called assembled structures by industry insiders.

Lai Zhongyi, chief engineer at the Shanxi Institute of Architectural Design and Research, has praised this new method of construction.

"Compared with conventional ways of construction, assembled structures have unrivaled advantages," Lai said.

"The new way of construction features greater efficiency, saves labor and resources, and promotes better safety.

"As building elements are manufactured in plants with smart, automated production facilities, the use of raw materials and other resources can be minimized.

"And the assembly process at construction sites substantially reduces the use of sand, bricks and



Shanxi Construction Investment Group's manufacturing plant in Xiaohe is the largest producer of assembled steel structures in North China. WANG PEI / FOR CHINA DAILY

concrete, leading to a decrease in solid waste.

"More importantly, many of the building elements can be recycled after the life cycle of a building expires," Lai said. "Disposal of the solid waste after tearing down outdated buildings is a big challenge that the civil engineering sector must face in the future. And assembled structures can offer a solution to this challenge."

The Xiaohe manufacturing facility of Shanxi Construction Investment Group is currently the largest producer of assembled steel structures in North China, with a monthly capacity of 8,000 metric tons, according to Cheng Junhu, an executive of the company.

He said such a production scale is made possible by the use of intelligent technologies. The company is using digital technologies and robots in its manufacturing.

"With these cutting-edge technologies and devices in place, we are

capable of producing super-large steel structural elements for a wide range of projects," Cheng said.

The SCIG Xiaohe manufacturing facility is not alone in offering this revolutionary solution to civil engineering in Shanxi.

According to the Shanxi Department of Housing and Urban-Rural Development, there are 18 large-scale manufacturers for assembled structures throughout the province.

"One such manufacturer can supply assembled building elements to construction sites within a radius of 100 kilometers," said an official of the department.

Authorities in Shanxi are promoting such practices throughout the province with the aim to upgrade its construction industry and realize low-carbon development.

For this purpose, the provincial government has released a number of preferential policies for the emerging industry in recent years.

The advancement of the con-

struction industry is only one part of Shanxi's efforts in transforming its economy away from the coal-mining industry to the development of new drivers for local growth.

The transformation highlights such emerging industries as biological technology, new materials and advanced manufacturing powered by 5G communications, cloud computing, artificial intelligence, big data and blockchain.

Advanced equipment manufacturing is a key industry that Shanxi pins high hopes on for its economic transformation.

According to a recent plan, which was released by the provincial government in April, the advanced equipment manufacturing industry is expected to grow 12 percent annually to reach a combined business revenue of 450 billion yuan (\$69.86 billion) in 2025, becoming one of the economic pillars of Shanxi.

Guo Yanjie contributed to this story.



Project makes Wulongyu River a sightseeing belt

Thanks to a 10-month improvement project, the Wulongyu River in Haizhou township has become an attractive sightseeing belt in the city of Yuncheng that features clear water and lush vegetation on both banks. Wulongyu used to be a flood spillway during the Ming (1368-1644) and Qing (1644-1911) dynasties and became a dry river over the past century. The local government launched a project in November last year to increase water supply and plant trees and grasses. The revitalized 5.5-kilometer water course is now an important part of the Haizhou Guangong Cultural Industrial Park in Yuncheng.

YAN XIN / FOR CHINA DAILY

Cathay works together with Shanxi to promote low-carbon development

By YUAN SHENGGAO

When mentioning synthetic materials, people normally think of textiles, plastics and other things made from petroleum.

But many commonly seen biological substances, like corn, are also being used to make synthetic materials. And a biological technology company in Shanxi province is using corn to do just that.

At the showroom of Shanghai-based Cathay Biotech's branch company in Shanxi, a wide range of products, including scarfs, garments, handbags, eyeglass frames and badminton rackets, are on display.

According to Zang Huiqing, vice-president of Cathay Biotech, such finished products are mostly made from corn. The mass production of the company's products will begin in the near future in its manufacturing facility in the Shanxi Transformation and Comprehensive Reform Demonstration Zone.

At the showroom, Zang points to a set of eyeglass frames, saying that "the frames are made from biologically synthesized materials, which have a similar strength to metal and can be used for many products".

One of Cathay Biotech's largest production facilities in China is the



A number of core facilities of the Shanxi Synthetic Biological Industry Park are expected to begin operations at the end of this year. WANG PEI / FOR CHINA DAILY

Shanxi Synthetic Biological Industry Park. The park has a total funding of more than 60 billion yuan (\$9.3 billion) and is currently under construction in the zone.

The project was established in cooperation with the administrative committee of the demonstration zone.

Zang calls this facility the "dream works of both Cathay and Shanxi", as it helps to "fulfill Cathay's dream of active expansion and Shanxi's dream of low-carbon development".

"Unlike most of the synthetic materials made from petroleum, we make similar products from plants," the executive said.

She explained that the bio-based polyamide — the basic ingredient for producing a variety of products — is extracted from corn and the stalks of other crops.

"Such a technique can substantially reduce emissions of carbon dioxide and other polluting and greenhouse gases compared to production using petroleum," Zang said.

When talking about Cathay Biotech's dream of expansion, its board chairman Liu Xiucui said the company hopes to develop a bio-based materials industry as big as petrochemicals.

The Shanxi Synthetic Biological Industry Park is located in the town-

ship of Donghuangshui in Taiyuan's Yangqu county, which is part of the Shanxi Transformation and Comprehensive Reform Demonstration Zone.

Covering 11.43 square kilometers, the park began construction in October last year.

Liu Zhijie, deputy general manager of the park, said a number of core facilities are expected to begin operations at the end of this year, including plants for corn processing, production of polyamide and other downstream products.

Cathay's collaboration with Shanxi is not limited to the production sector. The company is partnering with Shanxi University to establish a school of biology for the research of fundamental sciences and training industrial professionals.

Cathay recently helped to launch a synthetic biology research academy in cooperation with the Shanxi Transformation and Comprehensive Reform Demonstration Zone. The academy is designed to develop new products and technologies while sharing its technologies with local players, in hopes of nurturing downstream businesses and promoting Shanxi's competitiveness in the biotech sector.

Shanxi's industrial officials said the synthetic biology industry is expected to become a huge industry with an annual output value surpassing 100 billion yuan in the next few years.

Wang Pei contributed to this story.

Wusu airport to be key engine after expansion

By YUAN SHENGGAO

Expansion of the Taiyuan Wusu International Airport will soon begin, with its third-phase upgrading plan recently approved by the National Reform and Development Commission.

According to the plan, construction on a new terminal building — the T3 with a floor space of 400,000 square meters — will be completed in 2025. Auxiliary buildings with floor space totaling 700,000 sq m are also included in the plan.

Upon the project's completion in 2025, the airport in the south-eastern suburbs of Taiyuan will have a substantial increase in its flight capacity.

Shanxi Aviation Industry Group, the operator of Wusu, predicts the expanded airport will be able to serve more than 284,000 takeoff and landings upon the completion of the project. It will also be able to handle 40 million passengers and 300,000 metric tons of cargo a year.

Chen Yang, general manager of the company, said the expansion project is poised to make Taiyuan a regional aviation hub.

"Its status as a regional hub will be made possible by opening more flight routes to domestic and overseas cities," Chen said.

Industry insiders are even more optimistic about its role in offering new business opportunities. They claim the increased flight traffic will help to spur the development of a near-airport economic circle.

They predict the enhanced near-airport economy will create more



A planned expansion project is expected to make Taiyuan Wusu International Airport a regional aviation hub. YANG KAIYUAN / FOR CHINA DAILY

than 350,000 new jobs and generate revenue of more than 200 billion yuan (\$31 billion).

Wang Jiangong, a professor at the economics school of Shanxi University, said the industries to be gathered around the expanded airport will include aviation-related services, logistics, processing for exports, tourism, high-tech manufacturing, real estate, finance, conventions and exhibitions.

An airport industry park is planned in an area some seven kilometers away from Taiyuan Wusu International Airport, which will initially focus on hosting businesses engaged in the manufacturing of aviation supplies, aircraft components as well as aviation maintenance.

Wang said the park will offer a base for more industries in the longer term, especially those featuring products and services that rely highly on airport logistics, including high-tech products like semiconductors and robots, cold-chain logistics, exhibitions and conventions.

Wu Jia contributed to this story.



The colored murals at Chongfu Temple are said to have been created in the Jin Dynasty (1115-1234). PENG KE'ER / FOR CHINA DAILY

Buddhist temple offers colorful cultural palette

By YUAN SHENGGAO

Located near the Great Wall of China, an ancient border between the Han people and the northern nomads, the city of Shuozhou in Shanxi province was at the forefront of exchanges between various ethnic cultures for millennia.

A silent witness to the exchanges is the Chongfu Buddhist Temple at the center of the city. Historical records show that Chongfu was first built in 665 in the early Tang Dynasty (618-907).

Major renovations were launched during the Liao (916-1125) and Jin (1115-1234) dynasties. The main structures of the temple, including the Grand Hall of Amitabha Buddha and the Hall of Avalokitesvara Bodhisattva, feature remains of this.

Both Liao and Jin were regimes established by the northern ethnic people of Qidan and Nyuzhen, respectively. So the preserved structures, murals, statues, sculptures, inscriptions and other relics can help researchers and tourists understand what the cultures, religions, architecture and arts of ancient ethnic people were like.

Standing at the center of the temple, covering 23,400 square meters of land, which is said to be the largest Jin building in Shanxi, is the Main Hall of Amitabha Buddha.

When showing this hall to tourists, Zang Xiaochun, a tour guide, explained the cultural characteristics of the hall and temple.

"Since the Northern Wei Dynasty (386-534), Shuozhou had been at the center of ethnic cultural exchanges," Zang said. "When the nomads established their regimes in northern China,

including Northern Wei, Jin and Liao, they showed a strong willingness to integrate with the local culture."

The tour guide said many of the ethnic people became followers of Buddhism, which had been popular among the Han people for centuries.

"Like the Han people, the ethnic people of Liao and Jin had a great enthusiasm in building Buddhist temples.

"The temples they built were generally similar with those built by the Han people. But there are still details to show the cultural traits of the nomads," Zang said.

She pointed to two color-glazed guardian statues on the rooftop of the hall, saying that they are Jin Dynasty remains.

"In Han culture, rooftop figures are usually auspicious animals," Zang said. "If there are any human figures, they are small in size."

But the figures are larger and show great strength and freedom in expression, Zang said. "That is because the nomads more respected strength and freedom in their own culture."

In the Hall of Avalokitesvara Bodhisattva, there is another interesting aspect showing a cultural evolution in Buddhist arts.

She pointed to the Avalokitesvara Bodhisattva statue, reminding people of its shape as a woman but with a bearded face.

"Avalokitesvara, the bodhisattva of mercy, was originally a man in ancient Buddhism," Zang said. "It was later transferred to a woman by Han believers as they believed women are more merciful than men."

So this statue, also created in the Jin Dynasty, shows it was in the middle of this evolution, the tour guide said.

Pe Ke'er contributed to this story.