

# Green construction in Shanxi building on success



Domes in Taiyuan Botanical Garden the winner of an international award

By YUAN SHENGGAO

The Taiyuan Botanical Garden Domes in the city of Taiyuan, capital of North China's Shanxi province, were recently announced the winner of the 2021 Structural Awards, the world's leading awards for structural engineering excellence, by the Institution of Structural Engineers based in the United Kingdom.

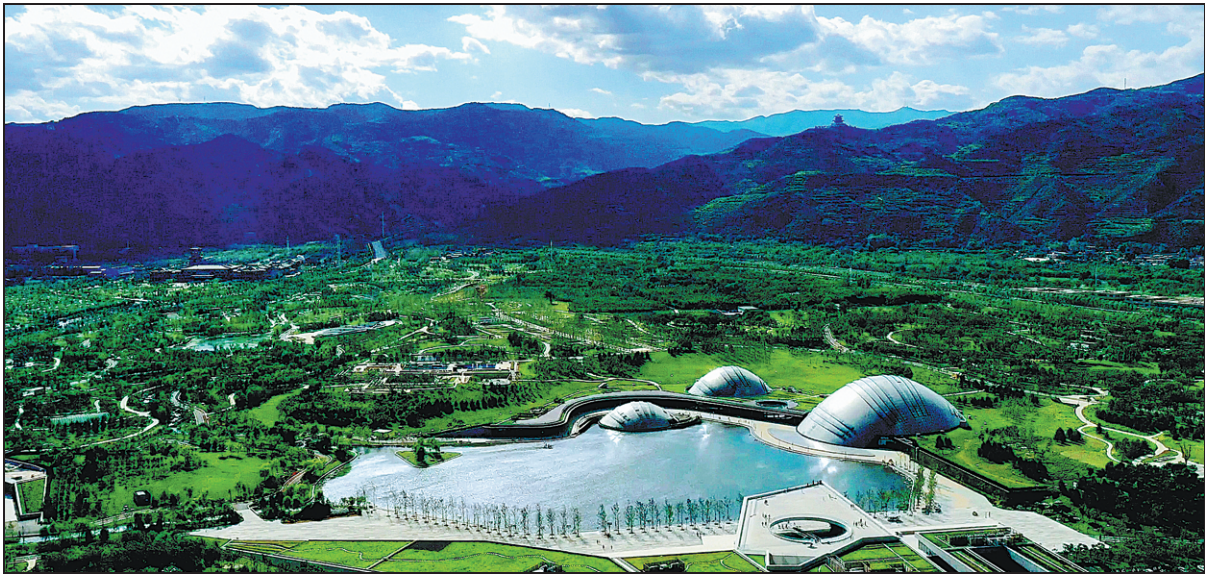
The award was granted for its structural design and innovative construction, according to the institution's announcement on Nov 12.

The award is not only a confirmation of the domes' unique aesthetics in design, but also an endorsement of the environmental value that the project upholds.

Designed by the Arcplus Institute of Shanghai Architectural Design & Research, the award-winning project is a greenhouse complex for floral exhibitions and features three dew-shaped domes by the Jinyang Lake.

It is the first large-scale exhibition greenhouse with a glue-laminated timber structure in China, as well as the largest span structure of its kind in the country.

The project was launched with the ambitious objective of transforming a former coal-mining area into a park, which is not only a mod-



The Taiyuan Botanical Garden Domes wins the 2021 Structural Awards for its innovative construction. GAO QIXIANG / FOR CHINA DAILY

el of landscape design, but also contains building infrastructure that can be used for research and offers people access to information about natural ecosystems.

The judges of the 2021 Structural Awards said the project's target in land restoration and the choice of environmentally friendly materials "create a harmony between nature, architecture and structure".

The Taiyuan Botanical Garden is only one example of the burgeoning green construction in Shanxi, which involves the concept of low-carbon-emission, energy and resources-conserving materials and technologies.

The Xiaohe International Convention and Exhibition Center, which is under construction in the south of Taiyuan, is another example of the use of green construc-

tion technologies and materials in Shanxi.

According to its design blueprint, the project will use about 70,000 square meters of solar panels on its roofs, which is expected to power lighting in an area of more than 650,000 sq m, as well as power its electric vehicle charging stations, according to Li Weijun, a technical executive at the Shanxi Construction Investment Group, the builder of the project.

Du Yanzhe, deputy chief engineer at the Shanxi Institute of Architectural Design and Research, the designer of the project, said the rooftop solar panels can generate about 8.4 million kilowatt-hours of electricity a year, meaning the saving of 2,600 metric tons of coal.

Xiaohe New City, where the Xiao-

he International Convention and Exhibition Center is located, is one of the province's test grounds for green construction.

An innovative solution offered by local building material manufacturers is that structures can be assembled, instead of being built.

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

These building elements are ready to be delivered to various sites in Xiaohe New City, as well as the rest of Shanxi, allowing structures to be assembled and completed at an astonishing speed and efficiency.

Buildings constructed this way are called assembled structures.

Compared with conventional ways of construction, assembled structures feature greater efficiency, save labor and resources, and promote better safety, according to Zheng Ligang, chief engineer at Shanxi Construction Industry.

"As building elements are manufactured in plants with smart, automated production facilities, the use of raw materials and other resources can be minimized," Zheng said. "And the assembly process at construction sites substantially reduces the use of sand, bricks and concrete, leading to a decrease in solid waste."

He added that many of the building elements can be recycled after the life cycle of a building expires. Thus assembled structures can offer a solution to the challenging task of solid waste disposal after tearing

down outdated buildings.

Compared with conventionally built structures, Zheng estimated that assembled structures can lead to a 60 percent reduction in construction time, save 60 percent of human labor, reduce 80 percent of waste and about 90 percent of the building materials can be recycled.

Datong Future Energy Exhibition Hall, located in the northern Shanxi city of Datong, has adopted the similar green approach as the Xiaohe International Convention and Exhibition Center in Taiyuan.

It also features solar panels on its roofs and the use of energy-saving materials and emission-reducing technologies.

Wu Yanli, chief designer of the project, said the rooftop solar panels, plus walling materials with high performance in heat insulation, can lead to a 92 percent reduction in energy use compared with other buildings of a similar size.

Backing the green construction industry's development are local universities and research institutions like Taiyuan University of Technology.

The civil engineering department of Taiyuan University of Technology has launched a smart green construction research program, aiming to train professionals and develop technologies and solutions for this emerging industry, according to Liu Yuanzhen, chief of the department.

Shanxi's authorities are optimistic about the industry's potential in the years to come.

According to a provincial action plan for green construction, the industry is expected to account for about 70 percent of all newly completed structures in 2022. The floor space of assemble structures is projected to reach 6 million sq m in the same year.

Wu Jia contributed to this story.

## Coarse cereals grow in importance to market

By YUAN SHENGGAO

Targeting consumer demand for diversified food, Shanxi province is shifting its farming focus to coarse cereals.

Local statistics show that Shanxi's planting area for coarse cereals, including millet, sorghum, buckwheat, oats, quinoa and beans, is approximately 1 million hectares, accounting for roughly 10 percent of the country's total.

One important base for coarse cereals is the city of Xinzhou in the central north of Shanxi. The city was recognized as China's "hub of coarse cereals" by the China National Association of Grain Sector in 2014.

"Xinzhou has more than 20 varieties of coarse cereals," said Wang Aiming, head of the Xinzhou Grain Industry Development Center. "Its total planting area of coarse cereals has surpassed 230,000 hectares, accounting for nearly one-fourth of the provincial total and its total annual output is about 300 million

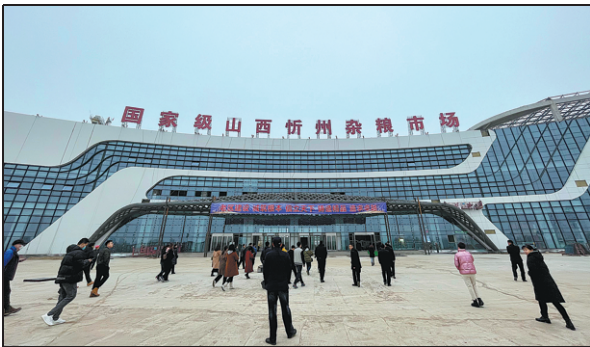
metric tons, about one-third of that of Shanxi."

The official highlighted kidney beans and quinoa, saying their outputs and planting area take up more than 80 percent of the provincial total and more than one-third of the national total.

Wang noted that Xinzhou is home to a number of products with geographical indications, including Xinzhou's sticky corn, yellow millet from Fanshi county, naked oats from Ningwu county and red kidney beans from Wuzhai county.

Xinzhou has a long history in growing coarse cereals. However, it is in recent years the coarse cereal sector has developed into a pillar farming industry and a major source of revenue for farmers in Xinzhou, according to local officials.

They said the turning point was the establishment of the Xinzhou Chinese Coarse Cereals Hub Industrial Park in 2018, which made it possible for developing an extended industrial chain for the coarse cere-



Xinzhou Coarse Cereals Market is a major wholesale facility for buyers and sellers in Shanxi province. PENG KE'ER / FOR CHINA DAILY

als industry, ranging from research, plantation, processing, logistics, marketing and financing.

A recent development in the park is that it is using blockchain technology to build a product tracing platform for all its products.

"Because the products' quality is traceable, Xinzhou's coarse cereals are gaining increasing popularity among consumers," Wang said. He added that the products have been exported to overseas regions including the United States and Europe.

The county of Kelan in Xinzhou is

a pioneer coarse cereal exports.

It was the first county in Shanxi to establish an overall quality control system for its coarse cereal producers, requiring their products to meet internationally advanced quality standards for exporting them to global markets.

The county is now the largest exporter of red kidney beans in China, with an annual export volume of more than 10,000 tons in recent years, according to local officials.

Li Shu contributed to this story.

## Elderly care services expand in community

By YUAN SHENGGAO

In an aging society, serving senior citizens has become the top priority for many community officials in Shanxi province.

In the Xiyu community in the provincial capital of Taiyuan, for instance, local officials are teaming up with volunteers to launch a range of services for elderly people.

The community is home to a great number of people aged over 80. As they are no longer able to cook, eating has become a challenge. This is especially true when they stay at home alone as their children are out working.

"Cooking a meal always takes more than an hour for an old woman like me," said Li Fumei, a senior resident in Xiyu. "I don't have the energy to stand in the kitchen for so long."

She added that she is reluctant to get deliveries from nearby restaurants as she thinks takeouts are not healthy.

The Xiyu community recently opened a not-for-profit canteen for senior citizens. Li said she sometimes eats at the canteen. "But dining is still a problem when the weather and my physical health keep me at home," she said.

The problem was solved by community officials by collaborating with local volunteers to deliver food from the canteen to the senior citizens' homes.

"The delivery is free and the food is still hot when it arrives at my home," Li said. "I'm very satisfied with their service."

In addition to food delivery, the community's officials and volunteers go to senior's homes to help them with housework, offer massages and other healthcare services, or simply chat with them.

At the elderly care center in the Binhe community in Taiyuan, the installation of stairlift chairs has become a sensation among the seniors.

As many old residential buildings in the community, as well as the rest of Taiyuan, are not equipped with lifts, climbing or descending staircases is a serious challenge to many elderly people.

"The automatically controlled movable chairs have been installed along the rectified stairway handrails, transporting people up and down," said Zuo Guilan, an 83-year-old resident of the Binhe elderly care center. "It makes it possible for us to bathe in the sunshine in the courtyard and visit our friends on other floors frequently."

The Binhe elderly care center was established in December 2020 in an old three-story building.

According to Zhao Zanhong, deputy chief of the community, the center mainly offers daytime care. The seniors stay at the center during the day and go back home when their children return from work.

"The seniors can enjoy various social activities. They can dine at the canteen and have a rest in the bedrooms at the center," Zhao said.

Gao Yanjie contributed to this story.



Virtual reality and live performances enhanced by lighting, acoustic and digital technologies are now standard at many Red tourism destinations in Shanxi. WANG PEI / FOR CHINA DAILY

By YUAN SHENGGAO

Red tour destinations — sites related to the revolutionary history of China over the past century — in Shanxi are becoming increasingly popular among younger tourists.

In addition to the enhanced patriotic education, the use of the latest digital technologies has contributed to improving the tourist experience and is another reason for the popularity among students and young people.

Mo Sisi, a student who was visiting the Pingxingguan Victory

Memorial Hall in Lingqiu county in the east of Shanxi province, was amazed by the virtual reality show of a battle that took place more than eight decades ago.

The battle at Pingxingguan, a Great Wall pass, was the first major victory of the Eighth Route Army led by the Communist Party of China during the War of Resistance Against Japanese Aggression (1931-45).

On Sept 25, 1937, the No 115 Division of the Eighth Route Army defeated the Japanese army at Pingxingguan Pass, which remains

a symbol of Chinese patriotism today.

"By watching the VR show, I have some realistic ideas about the war," Mo said. "It was a hard-won victory based on the formidable courage of our soldiers, who were so poorly equipped at that time. It is a sharp contrast to my former dramatic ideas of war."

Enhancing the visitor experience through lighting, videos and VR is an option that many Red tour destinations in Shanxi are now taking.

The Taihang Memorial Hall of the Eighth Route Army in Wuxiang

county in the city of Changzhi is a large and comprehensive exhibition center. It offers visitors an immersive experience with the help of lighting, acoustic and digital technologies.

Wuxiang county, located at the heart of the Taihang Mountains, used to be the headquarters of the Eighth Route Army and stood at the forefront of the conflicts between the Chinese army and the Japanese invaders.

The Eighth Army Cultural Park near the memorial hall provides tourists with battlefield experience through war games.

The venue uses various defense works, including tunnels, blockhouses and entrenchments as the games' settings, giving participants an experience of how war was fought some eight decades ago.

Tourism insiders said the use of digital technologies represents a new direction for Red tours and has won recognition among younger tourists.

The province's tourism authorities have planned 10 Red tourism routes, with themes related to the Red Army, the War of Resistance against Japanese Aggression and the War of Liberation (1946-49), and others.

Wang Pei contributed to this story.



A woman takes a ride on a stairlift chair at the Binhe elderly care center in the city of Taiyuan. Thanks to this device, residents are free to come and go as they please. MI GUOWEI / FOR CHINA DAILY