

TOP STORY 14 August 2010

Heat and cold from the bowels of the earth

Prestige project at the Expo 2010 in Shanghai:
Piping systems from Georg Fischer deliver geothermal power.



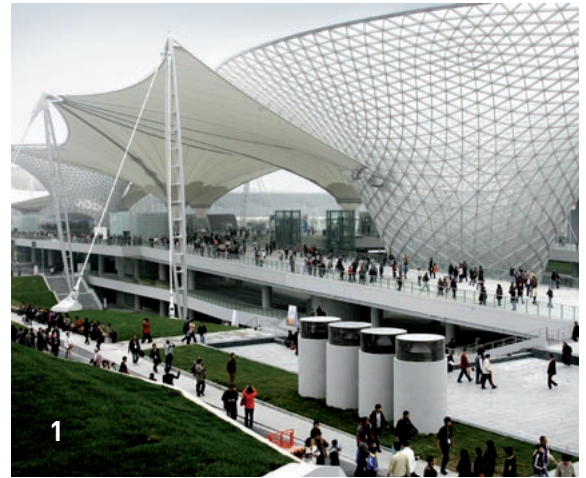
Xinhua/Landov/interTOPICS

Urbanisation, one of the major challenges of the 21st century, is the guiding theme of the Expo 2010 in Shanghai. As people flock to cities in their millions, rethinking our approach to traffic, utilities and energy consumption has become essential. The Expo's main building, known as The Axis, is, appropriately, cooled and heated with an environmentally friendly geothermal system, a next-generation technology for which GF Piping Systems supplies the piping systems.

For some years now, the world has looked on China with both incredulous astonishment and admiration. It is as if this emerging economic power has set its sights on getting into the Guinness Book of Records in as many categories as possible. China has the biggest land surface of any country in East Asia, and its population of 1.3 billion is the world's largest. Many regions of China are among the world's most densely populated. The breakneck pace of industrialisation, along with the rise in the standard of living for many Chinese, has created a host of challenges that the People's Republic has to surmount. Among these are urbanisation, population growth and the rise in energy consumption. China's conurbations have to cope with energy bottlenecks time and again. Companies and citizens alike are called on to save energy. The state is investing in technologies to develop wind, solar and hydro power. Last year, for the first time, China spent more than any other G20 country on clean energy, investing 34.6 billion US dollars. That is almost twice what the United States spends in this area.

Living better – in a better city

Given these pressing issues, the sustainable use of resources in China is becoming ever more crucial. It is therefore no surprise that the motto of the Shanghai Expo is "Better City, Better Life". The Expo's main building is 100 metres wide and 1,200 metres long; oriented along an East-West axis, it is called simply the Axis. The structure is a benchmark for modern urban development. A futuristic, 40-metre high, cone-shaped steel-glass construction sits atop the building with its two underground and two overground layers. This central boulevard will be used by virtually every Expo visitor, and after the Expo closes it will become a shopping mall. Maintaining constantly pleasant temperatures for Expo visitors and future mall users on the 350,000 sq. metres of floor space of the Expo Axis is a challenge for which the architects have chosen cutting-edge technology: geothermal power with piping systems from GF Piping Systems.



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1 A walk on the roof For Expo visitors, The Axis basically has the feel of a boulevard: they stroll around on the 1,200-metre long building under its bold tent construction.

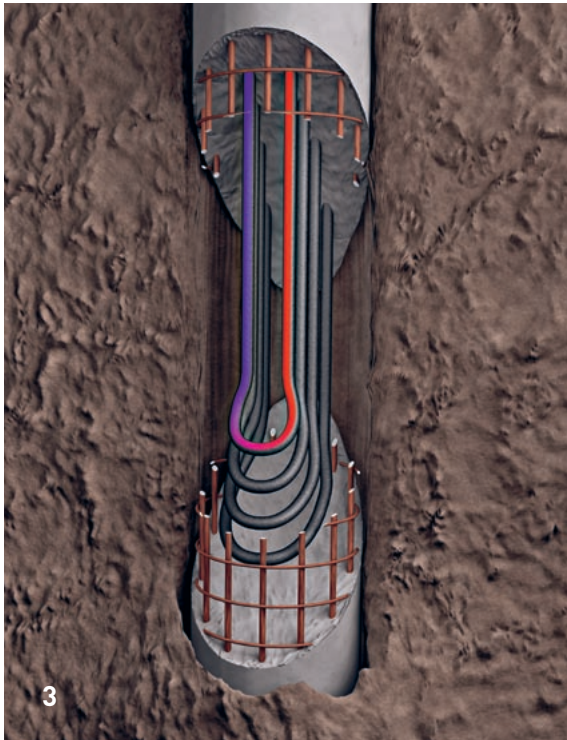
2 Lively interest Chinese customers are keen to know how the pipes are secured in the reinforcing steel of the concrete piles.

New plant for China

GF Piping Systems is strengthening its position in China where it is opening its tenth plant. The new factory in Beijing will officially start production of pipes and fittings on 14 August.

In the first half of 2010 alone, sales of the Corporate Group in China soared by 45 percent. Pietro Lori, head of the Corporate Group, is pleased to report that "in 2009, the Chinese market accounted for 14 percent of sales at GF Piping Systems". The initial production capacity will be 20,000 kilometres of pipes a year, and this will rise to 80,000 kilometres by the end of 2011. By then, about 160 people will work in the plant, for which Georg Fischer has invested some nine million Swiss francs.





3 Heat exchangers The concrete piles on which the building rests go dozens of metres down into the earth and – as shown in this diagram – may be fitted with several piping loops. As the water passes down the loop and then up again, its temperature varies in line with that of the surrounding ground.

4 Pipes behind bars In the assembly process, workers secure the black pipes – here seen from the lower end – to the steel reinforcements and then encase them in concrete along with the cage surrounding them.

Geothermal technology for heating and cooling

To use the heat inside the Earth for the Axis, a heat exchange system was installed in the concrete piles, which at the same time serve as the building's foundation. In winter, from December to the end of April, a heat pump provides heating by transferring the Earth's warmth from a depth of 25–40 metres into the building. In summer, the heat pump channels heat from the building into the Earth in order to cool the structure. A cycle is created in which heat that is superfluous in summer disappears into the Earth and is then retrieved in winter when it is needed again. The heating and cooling functions are natural opposites. But geothermal power is more than just heating and cooling; it can also be used to generate electricity.

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GONG YINBIN, *Sales Manager Building Technology*

The circulation medium is water. The water is channelled through polyethylene pipes from GF which the construction workers attached to the reinforcing cages that buttress the concrete piles. “All told, there are some 800,000 metres of pipes in 6,000 shafts,” says Yuan Lihui, Managing Director of GF Piping Systems Shanghai. “The Axis project is an important reference for environmentally friendly energy generation and sustainable construction,” adds Gong Yinbin, Sales Manager Building Technology.

An inexhaustible energy source

The World Exhibition 2010 Shanghai gives companies an opportunity to reach large numbers of people from all over the world as well as trade specialists within a very short period of time. And, what's more, in a country where the use of geothermal power is bound to be a major factor in the long term. After all, geothermal power is a renewable energy source which would seem to be inexhaustible.

In Europe, too, geothermal technology is gaining ground. Many commercial buildings, for instance furniture outlets that have large surfaces, employ this technology. The sustainable use of resources is becoming increasingly crucial worldwide, and efforts are being made in many places to realize the Expo motto of “Better City, Better Life”.



It isn't just the heat pumps from GF Piping Systems that make the Shanghai Tower an environmentally friendly building. The combination of glass exterior and interior façade insulates the tower rather like a thermos bottle.

A sustainable skyscraper

The futuristic skyline of Shanghai with its many skyscrapers symbolises China's emergence as an economic power. The 88-storey Jin Mao Tower and the 101-storey Shanghai World Financial Center, currently the tallest building in China, are about to be joined by a big brother right next door. The Shanghai Tower is now under construction. At 632 metres and with 128 floors, it will be the tallest building in China and one of the tallest in the world.

The building, which will have 380,000 sq. metres of floor space, is scheduled for completion in 2014. Its roof will house the world's largest open air observation deck. The Shanghai Tower will be enclosed by a glass façade, which gently rotates upwards. The double-skin façade, reminiscent of a gigantic thermos bottle, will save energy. The rotation will also be used to collect rain water for cooling and heating.

As with the world's tallest skyscraper, the Burj Chalifa in Dubai, which opened at the beginning of 2010, the Shanghai Tower's owners are banking on technology from GF Piping Systems. For the geothermal and water pump system, GF Piping Systems is supplying more than 92,000 metres of piping for horizontal installation and 127,000 metres for vertical installation in shafts. The pipes will help heat and cool some parts of the building such as the service area with the entrance lobby, restaurants, the business centre and offices. The geothermal system is identical to that used in the nearby Expo 2010. "The Shanghai Tower will be a landmark in China," says Yuan Lihui, Managing Director of GF Piping Systems Shanghai. "The use of our products in this project will certainly enhance our brand image and accelerate sales growth in China."