

For both companies, there is clearly no better choice for transmitting power throughout China. Lines made with Dyneema®:

- Are strong yet lightweight.
- Enable easier handling for faster, more efficient operations.
- Are ideal for varied, difficult terrain, such as river and mountain valley crossings.
- Improve overall safety.
- Help protect local environments, including farmlands and congested urban settings.

Find out how lines made with Dyneema® can power your operation. Visit www.dyneema.com

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Lightweight pulling lines help two companies transmit power throughout China

Strong, lightweight lines made with Dyneema® improve operations in Shanghai and Shandong province

As the Chinese economy grows – and will inevitably continue to grow – the need to reliably supply electric power remains paramount. Generating that power is one story. This story, however, is about transmitting that power throughout the Chinese landscape. It's a landscape that extends over 9.5 million square kilometers, and is comprised of dense forests, urban and agricultural areas, wide spans and rough terrain.

Constructing power grids in these challenging and varied environments is the work of many companies, including the two featured here: Shanghai Power Transmission and Transformation Construction Company, and Shandong Power Transmission and Transformation Construction Company.

Each company faced a specific challenge.



Shanghai Power was engaged in the second expansion of the Shanghai Wai Gao Qiao power plant. They needed to pull power transmission cable from the Wai Gao Qiao power plant to the Shanghai Nan Hui power transformation station. The total distance is about 40 km. The line is a 500 kV, Alternating Current (AC) grid.

For Shandong Power, the project operation was from Binzhou transformation station to Dongyin transformation station, also a distance of about 40 km and 500 kV, AC.

For several years, both companies have relied on messenger, pulling and safety rig lines made with Dyneema® to get the job done.

Compared to lines made with steel or common synthetics, the traditional materials, those made with Dyneema® are just as strong yet are significantly lighter, easier to handle and much safer. This enables faster, more efficient operations – even in the most challenging terrains – making it easier to reliably transmit power throughout China.

The following case study profiles how lines made with Dyneema® have impressed these two companies.

Two different companies

Founded in 1956, with over 900 employees and a turnover of more than RMB 1 billion (2008), Shanghai Power Transmission and Transformation Construction Company is one of the major players in the Chinese market.

Mr. Gong Miao, Project Chief Engineer at Shanghai Power for the Wai Gao Qiao project, summarizes the many advantages of using lines made with Dyneema®. “The company first started using ropes made with Dyneema® about six years ago,” he says. “Now they are widely used in power-on crossings (that is, adding new power lines with the power still on existing lines nearby). This is especially important, given the huge increase in high-voltage line construction.” He continued: “Personally, I think lines made with Dyneema® will have a bright future in the power transmission industry, because of their low weight, high strength and low elongation.”

Shandong Power Transmission and Transformation Construction Company, founded in 1958, has approximately 1700 employees and a turnover of RMB 1.5 billion (2008). The company operates in the power transmission and transformation industry, both in China and overseas.

Mr. Li Jia Chen, Project Manager for Shandong Power said



this about working with the lines made with Dyneema®: “Our company started using lines made with Dyneema® in 2004. They are widely applied in different kinds of crossings. The workers accepted lines made with Dyneema® and like working with them very much.” “Generally speaking, by using lines made with Dyneema®, we have increased efficiency, reduced operational costs, and sped up projects.”

Why both companies prefer lines made with Dyneema®

As different as the companies - and their respective projects - may be, they both face similar challenges. They also share an appreciation for the many benefits of working with lines made with Dyneema®.

Strength plus light weight for easy handling

The unique combination of strength and light weight make these lines incredibly efficient and easy to handle. Compared to an equally strong steel wire a line made with Dyneema® is up to seven times lighter.

Mr. Li Jia Chen: “Because of the light weight, high strength and easy handling of lines made with Dyneema®, they are safer and more efficient to use. This is especially true in areas with lots of agricultural activity, in the mountains and in areas that present difficult crossings, such as over rivers and canyons.”

Mr. Gong Miao: “Lines made with Dyneema® are very helpful in bad conditions and rugged terrain. Heavy steel wire rope and other heavy ropes are very difficult for transportation. In most cases, it is even difficult to reach our working field. The lines made with Dyneema® can be brought in by manpower. With steel wire rope you need cranes or other heavy equipment.”

More productive in all kinds of terrain

Due to the light weight of these lines, the entire line-pulling operation becomes faster, with fewer steps involved. Thin lines made with Dyneema®, for example, can pull progressively heavier lines in fewer steps, to accomplish the job faster.

How else do these lines boost efficiency?

Mr. Li Jia Chen: “When operating in complicated terrains, or involving large span crossings, Dyneema® is always the first choice. Even in normal conditions, we use messenger lines made with Dyneema®. In one case, we shot a 3.5 mm messenger line made with Dyneema® from an ultralight. Messenger lines made with Dyneema® have properties of good insulation and easy handling. This significantly boosts efficiency compared to using traditional materials.

“Project timing is affected by weather conditions and the number of crossings. Using lines made with Dyneema® greatly reduces the interference and difficulties described. Like our operation to cross a highway, we use a powered ultralight to shoot 3.5mm messenger lines made with Dyneema® to the towers. We then use the messenger line to pull 11mm pulling line made with Dyneema®. This line has the strength of over 12 tons and pulls the steel wire rope in stages. When crossing farm areas, this same kind of operation will reduce damage to the crops below, especially to high value fruit farm.”



Mr. Gong Miao: “Because of the low tension in lines made with Dyneema®, the efficiency of crossing is greatly improved. The low weight of Dyneema® also simplifies transportation. In addition, these lines make easy work of pulling out the safety net.”

Mr. Gong Miao: “It’s very difficult to deal with heavy lines or objects high above ground. Lines made with Dyneema® help because of the low weight. I think lines made with Dyneema® will be more and more popular in power-on crossing, highway crossing, and messenger-line shooting.

More safety overall

Worker safety, both on the ground and in the air, is vitally important to the successful completion of every operation. The light weight of lines made with Dyneema® significantly reduces accidents related to carrying and positioning the lines.

Here’s how lines made with Dyneema® have helped improve safety in other ways.

Mr. Gong Miao: “Due to the low elongation, safety nets made with Dyneema® are ideal for effectively preventing accidents. For example, if a power transmission cable breaks, the nets will prevent the cable from touching the power-on lines underneath. Secondly, because of the light weight of Dyneema®, tension is very low in loadtaking lines. A steel wire line would have extremely high tension for the same suspension. Thirdly, when crossing power-on lines with wire rope, electrostatic induction will occur. This will not happen with lines made with Dyneema®. Finally, a line made with Dyneema® is very stable in operations, unlike nylon lines or other synthetic lines that stretch much more.”