

# Charity link brings footbridge to fruition

Villagers in a tiny village in Peru now have a new footbridge which will help them cross the river to tend their crops. The project was sparked after Alpin Technik boss Eric Kuhn saw an article in *Bridge design & engineering* about the charity *Bridges to Prosperity*, and decided to get more involved.

"Bridges are part of our everyday working life," he explained. "We proudly tell others that we have worked on some of the most well-known suspension bridges in the world, and are part of an engineering community that builds bridges designed to save 15 minutes' driving time in rush hours.

"But we never really think about those who cannot afford to build even the simplest river crossing due to their lack of knowledge and - of course - lack of money.

"This changed when we read about the work of *Bridges to Prosperity* in this magazine about a year ago," he explained. The non-governmental charity transfers engineering knowledge to developing countries and supports communities in bridge building. Kuhn contacted the charity, and was introduced to the Peruvian community of Tres Unidos.

The community is deep in the Amazonian rainforest on the edge of the Andes; villagers make their living from growing corn and sugar cane, but the fields are on the opposite side of the river to the village. When the water level is low, adults can easily cross the river by foot.



Above: Construction of the wooden footbridge deck. Below right: The bridge towers being erected

But the current is strong and small children cannot cross even the shallowest parts by foot; once the rainy season begins, it is impossible for anyone to cross. The nearest bridge is 45 minutes walk away.

"Their economic situation made it an easy decision for us to initiate a development project which we ran alongside our business, and we tried to involve our clients and partners, if not financially then at least ideally," said Kuhn. The project which Alpin Technik set up at the beginning of 2006 was intended to bring together the company's engineering experience and the Peruvian workforce. "We

provided the knowledge and the money to buy the material, and the villagers of Tres Unidos built the bridge," Kuhn said.

The suspension bridge consists of four steel cables with wooden towers as the load-bearing elements. The goal was to design a bridge to last more than twenty years, which would require almost no maintenance and be made of local and easily-accessible materials. "We had to compromise between modern influences and traditional construction methods and build the bridge in a way that could be understood by everybody, to enable the villagers to learn the skills to erect more



bridges of their own," Kuhn explained.

One example was the connection between the tower and the foundation; the task was to find a solution that kept the wooden tower separate from the soil or concrete in order to keep it dry so it would last longer. "Initially we wanted to do it completely without metal elements, because we weren't

sure whether this would meet our requirements for sustainability. In terms of reproducing the bridge, the steel might make it too expensive, elaborate and to need too much maintenance."

But the alternative design had to be abandoned because it would have been difficult for the villagers to understand, and hence to reproduce safely. The solution was a T-shaped metal element on four rods of reinforcement that was cast into the foundation. The tower log was slit in the middle, positioned onto the t-form and bolted with small pieces of reinforcement.

Communication was difficult; particularly when none of the local partners had any engineering experience. "Although we had a Peruvian partner, who translated into English, we found out that complicated technical decisions which required

discussion of several options in order to solve a problem, were impossible to transfer," said Kuhn. "There is just no easy way to explain the movement of forces and calculate critical masses. In these cases, we had to simply issue instructions and forget about the idea of involvement."

The whole project was carried out in four visits. The first visit was to evaluate the needs, check out the construction site, see what materials were available and meet the partners.

Back in Germany, the engineers of Alpin Technik did the initial planning and prepared the excavation works for the abutment, which were carried out in Tres Unidos after the second visit.

During the second trip, the team also did the surveying and taught the villagers how to produce the necessary reinforcement cages. "We spoke about the way the abutment had to be excavated safely, as the construction

pit was huge and we had to avoid accidental collapses," recalled Kuhn.

By the third visit, casting of the abutments was finished and they were thoroughly inspected before the excavation pits were filled in and construction of the tower foundations began.

The last visit was a two-week trip to carry out the final erection. Five Alpin Technik staff worked with the villagers to carry out the woodwork, erection of the towers, the cable stressing and bridge decking. The bridge was inaugurated on 18 January, and was named Puente Machingero, after the local name for the inhabitants of the Tres Unidos valley.

According to Kuhn, the project has been a big success in many ways, not just in terms of completing a new bridge. "When we look back on it, we feel deeply satisfied. The bridge will give the villagers access to more farm

land and will give them the opportunity to plant and harvest all year long. At least some of the families will improve their economic situation," he said. What's more, the technology transfer is already having benefits, as the villagers have started rebuilding a small footbridge that was previously washed away by floods.

"People now know the mistakes they made in the original construction, and they will be able to eliminate them this time," Kuhn said.

Flight costs for the project were paid by individual Alpin Technik employees, and the material costs of approximately US\$28,000 were covered by Alpin Technik and donations from its clients.

For information about the project visit [www.tresunidos.alpintechnik.de](http://www.tresunidos.alpintechnik.de) and for more information about *Bridges to Prosperity* visit [www.bridgestoprosperty.org](http://www.bridgestoprosperty.org)

## PROFILE PIECE

Thomas Telford is one of the historical figures being celebrated on a new set of stamps published by the UK's Royal Mail next month (*March*). The stamps are intended to celebrate the inventors and engineers who have changed our lives through technology, by means of the set of six self-adhesive stamps. *World of Invention*, is inspired by the 250th anniversary of the birth of engineering genius Thomas Telford. The stamps are being issued in time for the

UK's National Science & Engineering Week which starts on 9 March. The set includes three pairs of stamps and is illustrated by cartoonist Peter Till who has taken a quirky look at some of the UK's greatest scientific achievements. Thomas Telford is featured on one of the first-class stamps, with the other showing a steam locomotive.

The work of Alexander Graham Bell and John Logie Baird is featured on the 64p stamps, while the final pairing on the 72p stamps show Sir Tim Berners-Lee's



world wide web and a glimpse at the possible future of space travel.

Extra information on each image is printed on the reverse of the backing paper of each stamp.

*Bridge design & engineering* has ten special presentation packs to give away to its readers in a special competition. To win a set of stamps, send your contact details in an email to [h.russell@hgluk.com](mailto:h.russell@hgluk.com) with the answer to the following question: *What is the name of the village where Thomas Telford was born?* The closing date for entries is 9 April 2007: winners will be notified by email.