Amstetten, January 2013

Press release

**Diamonds for the Orinoco**

Taking a road and rail link across one of the biggest rivers in South America, together with its swamps and flood-plain, calls for a new crossing of truly superlative dimensions. Two 135.5 m pylons for the third bridge across the Orinoco River in Venezuela are taking shape with a formwork solution and automatic climbing technology from Doka.

The Venezuelan government is investing in this showcase project at Caicara del Orinoco. The bridge will have an overall length of 11.125 km on completion, which is scheduled for 2015. The main bridge is 2.28 km long, and the roadway is 55 m above the water-level of the Orinoco. The two identical diamond-shaped pylons of the 360 m main span will be the centrepiece of this high-capacity road and rail link. The formwork solution for both the North and South Pylon comes from Doka. A leading international supplier of formwork technology, Doka is represented in Latin America by subsidiaries in Brazil, Chile, Mexico, Panama and Peru.

When the contractors Odebrecht first approached Doka Brasil, the forming operations for the South Pylon had already commenced. By this time, however, it had become clear that the local crane-jumped formwork originally fielded here was no longer up to the task. Following initial discussions with Odebrecht, Doka developed a solution based on the crane-independent Automatic climbing formwork SKE100. This had many advantages: “The formwork solution presented by Doka convinced the client in terms of both safety and cost-efficiency, as well as speedy construction progress”, explain Markus Kamleithner and Nikolaus Eder, the Doka project managers.

**Flexible formwork solution needed**

The 135.5 m tall pylons are basically identical, but with certain minor design differences. They incline at an 18° angle below the cross-beam, and at 13° above it. The most difficult aspects to deal with in the planning work were the changes in the cross-section, the catwalk between the legs of each pylon, and incorporating an extra suspended platform to provide access to the passenger hoist.

With significant changes in cross-section between the foundations and the cross-beam, and a continued upward taper until the point where the pylon-legs meet, the structure geometry demands a great deal of adaptability from the formwork systems. Automatic climbing formwork SKE100 and the versatile Large-area formwork Top 50 system meet these requirements without needing time-consuming adaptation work. The load capacity of 10 t per bracket allows work to proceed simultaneously on several levels. An extra work-deck level has been provided above the pouring platform, for mounting the reinforcing cages. This allows the forming and reinforcing operations to run in parallel.

**Safety writ large**

A protection screen has been deployed to ensure workplace safety. The working platform and Level +1 are enclosed with trapezoidal sheeting, and all other levels safeguarded by standard handrails. A catwalk is the main route for site-traffic between the legs of each pylon. It is attached to the automatic climbers and is raised along with them up to the next section. An extra – third – telescopic suspended platform provides access to the passenger hoist.

**On-site technical expertise**

After an approx. five-month planning stage, work on pre-assembling the SKE100 units began in September 2011. Doka took over the forming operations on the South Pylon from the 17th casting step onward; on the North Pylon, Doka automatic climbing technology was used right from the outset. Two sets of Automatic climbing formwork SKE100 with 54 units in total, a catwalk and Large-area formwork Top 50 are in use here. Doka supplied all the systems for on-site pre-assembly and installation. In the crucial assembly phase, both project manager Markus Kamleithner and international Formwork Instructors were on the site. They gave professional introductory training to the site crew and made sure that the formwork systems were properly assembled, installed and handled. A Formwork Instructor has been on-site ever since, to assist the project team with his technical expertise.

After seven cycles on one pylon and eight on the other, the Doka automatic climbers had climbed to heights of 65.7 and 33.8 m respectively by the beginning of 2013. The Odebrecht company, which has worked closely with Doka on projects in Brazil and other countries, is very satisfied with its choice of self-climbing solution. “Doka convinced us with a well thought-out formwork solution. Both the all-in package and the level of detail in the offer documents were truly impressive. The help the Doka Formwork Experts gave us with on-site assembly laid down an important basis for the project to progress smoothly”, notes Vicente Rodrίgues.

**In brief**

**Third bridge over the Orinoco River**

(Tercer puente sobre el Rίo Orinoco)

Location: Caicara del Orinoco, Venezuela

Contractors: Odebrecht Venezuela

Start of construction: 2007

Completion scheduled for: 2015

Start of planning work at Doka: March 2011

First formwork deliveries: September 2011

Type of structure: Diamond pylons

Structure height: 135.5 m

Systems in use: Products: Automatic climbing formwork SKE100, Large-area formwork Top 50

Services: Engineering, Formwork Instructors, on-site engineering support

**About Doka:**

Doka is one of the world leaders in developing, manufacturing and distributing formwork technology for use in all fields of the construction sector. With more than 160 sales and logistics facilities in over 70 countries, the Doka Group has a highly efficient distribution network which ensures that equipment and technical support are provided swiftly and professionally. An enterprise forming part of the Umdasch Group, the Doka Group employs a worldwide workforce of more than 5600.

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**Captions:**

Doka\_2013\_01\_Orinoco\_IMG\_01

A mega-worksite: an 11.125 km long road and rail link is being built here across the Orinoco River. Two diamond pylons are taking shape with a formwork solution and automatic climbing technology from Doka.

Photo: Doka

Doka\_2013\_01\_Orinoco\_IMG\_02

Automatic climbing formwork SKE100 and the versatile Large-area formwork Top 50 system meet the requirements regarding changes in the cross-section without needing time-consuming adaptation work.

Photo: Doka