

Doka Xpress

The Formwork Magazine

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The Formwork Experts



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doka
The Formwork Experts

Editorial



Dear Customers and Colleagues,

As we begin a new year, we are thankful for the opportunity to continue to work with customers throughout North America. We have worked on a broad range of projects from the large monolithic pour, at the coke battery plant near Pittsburgh to the landmark Mississippi River Bridge. We are pleased to see our solutions are helping contractors deliver their projects in a safe, fast and cost effective manner.

As one of the only formwork companies with vastly experienced in-house engineers in each of our branches, we take our mantra "The Formwork Experts" seriously. While many companies have been cutting corners during these tough times, we continue to invest into new products and in providing excellent customer service. Many contractors depend on our Field Service support, and our local branch team expertise in the bidding and design process. In addition, customers are utilizing our preassembly and reconditioning services to gain a competitive advantage on projects.

We invite you to continue to explore how we can help you succeed on your next project by taking full advantage of our high-performing products and services along with our determination and commitment to providing safe, fast and efficient solutions for your projects.

We thank you for giving us the opportunity to work with you and we wish you the greatest success throughout 2012 and beyond.

Andrew Mair
Chief Executive Officer
Doka USA, Ltd. /
Doka Canada, Ltee

Doka news

Properly Forming Concrete

Learn how to erect wall formwork safely and economically with our on-line education course through Hanleywood University. Visit <http://tiny.cc/LearnFormwork>



hanleywood
UNIVERSITY



▲ Colorado River Bridge Underway

Located in Marble Falls, Texas, the Colorado River Bridge replacement project consists of the demolition of a steel truss bridge that will be replaced with twin segmental bridges. The project is using Doka's large area Top 50 wall formwork and Staxo 100.



▲ Bahamas Mega Project

The \$2 billion Baha Mar project will be utilizing a variety of Doka formwork solutions and services. The project is expected to be complete in 2014 and will be the largest destination resort in the Caribbean.

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Keeping the Mississippi River Bridge Project on Track

The Mississippi River Bridge project will create a new gateway between Illinois and Missouri to provide better connections to and through St. Louis. The project includes a landmark bridge structure, and the realignment and reconstruction of Interstate 70.

▲ The Mississippi River Bridge is a cable stay bridge construction with two pylons. The bridge design includes two pylons projecting vertically from the Mississippi river bed with 20 ft. deep footings. The tower elevates to 402 ft. above the footing.

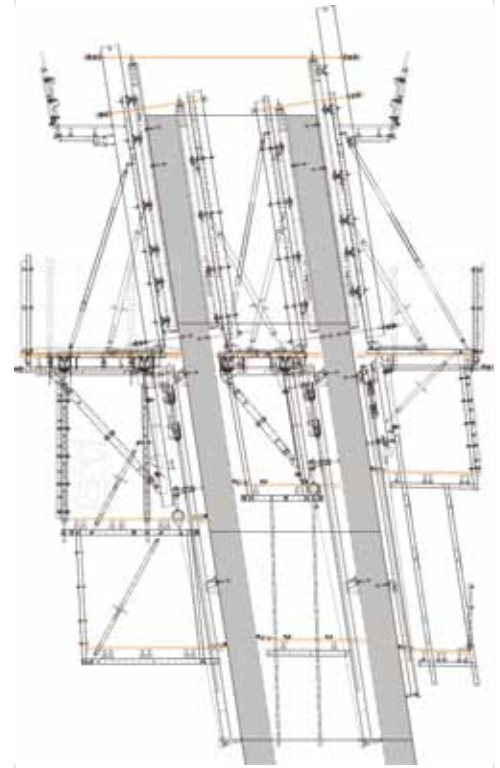


▲ A custom protection screen was used on the outside face of Doka's SKE self-climbing systems, as a method to cocoon working platforms and also keep workers safe and comfortable during harsh weather.

The project is a joint venture between Massman Construction, Traylor Brothers, and Alberici Constructors (MTA). The main focus of the contractor is to stay on track while providing a safe working environment.

The Mississippi River Bridge will be a cable stay bridge. The bridge design includes two pylons projecting vertically from the Mississippi river bed with 20-ft. deep footings. The lower pylon is 68 ft. high x 22 ft.-2 in. wide x 129 ft. long, projecting from the river in a Y configuration. The tower elevates to 402 ft. above the footing.

MTA incorporated Doka's D22 dam formwork for the lower portion of the pylon. This consisted of seven lifts with gangs fabricated by Doka for nearly every lift. The formwork provided a working platform with ample space for the laborers to work from, as well as an area to stage equipment. The D22 forms were suspended on climbing shoes that encompass the entire perimeter of both pylons. Twenty-two lifts utilizing automatic climbing systems SKE 100 and SKE 50 were used for all four tower legs. Using the automatic climbing systems allowed for faster overall completion time because raising the formwork could proceed in all weather and wind conditions (up to 40



▲ Flexibility of Doka's climbing formwork system easily adapted to the bridge geometry and contractor's requirements.

mph) and allowed gangs to lift independent of a tower crane.

Girder Formwork

To provide an area to pour footings, MTA had to install a coffer dam and pump the Mississippi River water out of it. The contractor used Doka's Steel Girder Forms to form a 88 ft. x 55 ft. x 20 ft.-deep footing. All standard Girder forms are the same depth, which eliminates shimming form joints. Doka's Steel Girder forms are modular, and can be ganged and picked in large sections. With capabilities to form concrete and support concrete loads on structures such as beams or bridge pier caps, the Steel Girder form will span large distances without any additional support or shoring. The biggest advantages of Doka's formwork was that the Girders for the footings offered MTA a heavy duty gang system that was easily installed and required a minimal number of form ties.

Doka's Heavy Duty Spindle Struts along with custom channels provided for maximum security when hanging forms from the pylon face. There were areas located at the eyebrow where the concrete face projected out at a 35 degree angle. At lifts five through seven of the lower pylon eyebrow, separate



◀ Heavy Duty Spindle Struts along with custom channels provided maximum security when hanging forms from the pylon face. There were areas located at the eyebrow where the concrete face projected out at a 35 degree angle.



◀ The new Mississippi River Bridge will be a 1,500 foot cable-stayed bridge across the Mississippi River between Metro East and St. Louis.

large-area Top 50 gangs had to be assembled for all three lifts at the haunch area.

Design of custom support brackets for single sided walls required involvement of two engineers and the use of sophisticated engineering design programs to develop the most economical solutions. Doka worked closely with MTA to ensure there were no conflicts with the form design and provide the most efficient forming system on the market.


Both tower legs were converted from a tie solution to a tieless solution in order to eliminate all interference with the heavy reinforcing steel and to minimize labor costs. Automatic climbing systems SKE 100 and SKE 50 were incorporated on the tower legs together with Framax Xlife for the interior core, and Top 50 gangs for the exterior leg face.

Custom steel brackets and splice plates were used to connect gang forms together. Additionally, a custom aluminum pouring platform was incorporated, which MTA in-

stalled above +1 platform. The +1 platform provided a secure, lightweight surface and allowed laborers to work safely and easily well above gangs, while pouring concrete into each wall cell.

Safety & Flexibility

A custom protection screen was used on the outside face of Doka's SKE climbing system as a method to cocoon working platforms and also keep workers safe and comfortable during the harsh weather during winter months. Doka's SKE climbing systems offered MTA a method to easily climb all four legs safely, efficiently and independent from using a crane, therefore saving the contractor valuable time and money.

The flexibility of Doka's climbing formwork systems easily adapted to the bridge geometry and contractor's requirements. Engineering support, know-how and experience on previous and current bridge projects all over the globe reassured the contractor's decision to go with Doka. 

The Facts

JOBSITE

Mississippi River Bridge

LOCATION

St. Louis, MO

CUSTOMER

Joint Venture between Massman Construction, Traylor Brothers, and Alberici Constructors (JV: MTA)

FORMWORK USED

Doka Steel Girder Forms, Large-Area Top 50, Framax Xlife with stripping corners, D22 formwork, Shaft Platforms, Automatic climbing SKE 100 and SKE 50



Doka Sets The Bar In Monolithic Pouring

Did You Know?

Self Compacting Concrete (SCC) is a type of concrete that is highly fluid allowing it to self-level and penetrate into complicated areas of formwork. Despite its increased fluidity, self compacting concrete maintains the high quality demanded by today's building industry, presenting both flexibility and incredible strength. Its flexibility lies in the fact that there are multiple admixtures that can be added when designing the mix to create a final product that is suitable for the end result.

The construction at a Coke Battery plant, southeast of Pittsburgh, Pa., is designed to lower one-third of the soot emissions for better pollution control as well as allow federal air quality standards to be met.

The industrial steel contractor's primary goals are achieving environmental standards along with higher production rate of coke for making steel. As part of the ongoing upgrades, concrete contractor Mascaro Construction was brought on the job to perform parts of the concrete foundation work.

Large Monolithic Pour

One of the challenges included selecting a system that would allow a 50-ft. x 56-ft. monolithic pour, with six columns at the base, numerous haunches, corbels, pilasters, and a 5-ft. deep step-out at the top of the wall. The formwork system had to be able to form around all corbels, ranging in



depth from 2-ft. to more than 4-ft. In addition, a solution had to be found on how to support the top of the wall as it steps back out from a 1-ft. to a 6-ft. wall thickness.

Framax Xlife formwork was used to form around all areas of this structure. One of the main advantages of the system is its flexibility that comes with the many different panel sizes. The 5-ft. step-out at the top of the wall was supported by 10kip shoring towers, which in turn were resting on a custom steel frame which became part of the concrete wall. This lost steel frame transferred the loads from the top of the wall directly to the foundation slab. Staxo shoring towers located in between the base columns supported the concrete wall above the soffit areas.

Supporting Heavy Loads

The 50-ft. tall forms had to withstand wind speeds of up to 90 mph and meet strict safety standards. With safety an absolute priority on this jobsite, the formwork had to remain absolutely stable even during winds

up to 90 mph and vibrations caused by workers and machinery.

A combination of supporting frames and Eurex 60-550 props were used to brace the forms in all directions, along with horizontal and vertical walers that were attached to transfer all the loads into the bracing.

“The supporting frames were designed to withstand winds of up to 90 mph. They are extremely stable and the combination with the Framax system makes the entire set-up quick, safe, and reliable,” said Robert Caruthers, Doka Engineering Project Manager.

Framed Wall Formwork

The sheer size and complicated shape of this pour made conventional concrete vibration unfeasible. Therefore, the contractor opted for Self Consolidating Concrete. In addition, the concrete manufacturer did not permit a concrete drop of more than 7ft. in height, which meant that a number of pour windows had to be integrated into the formwork. It was essential that these windows

▲ The concrete was poured all in one shot for this 50-ft. x 56-ft. pinion wall.

The Facts

JOBSITE
Coke Battery plant,
Pennsylvania

TOTAL FORMWORK USED
9,000 sq. ft. for each wall,
which totaled 18,000 sq. ft.

GENERAL CONTRACTOR
Mascaro Construction

PRODUCTS USED
Framax Xlife wall formwork,
supporting A-Frames,
Eurex 60-550 props



Greg Bowers,
Pinion Wall
Foreman,
Mascaro
Construction

The Professional

“It was a challenge that took a lot of planning and combined efforts from everyone involved. When you get a challenge like this, it definitely has to be a teamwork effort on all parts. A combined effort with the Mascaro Construction team, the Doka Engineering/Site service team, and everyone involved is what made this project a complete success!”



Framax Xlife formwork and supporting Eurex props are designed to take the concrete pressure of the self consolidating concrete and withstand the lateral loads.

The Solution!

Strategic planning and teamwork together with wall formwork Framax Xlife & Eurex supporting props.

could be closed quickly and safely before moving up to the next location, to ensure there was no delay of the pour.

As for the finish of the concrete, no additional steps were needed. The Framax panels are already assembled with an Xlife facing, producing a great concrete finish, meeting the owners' requirements.

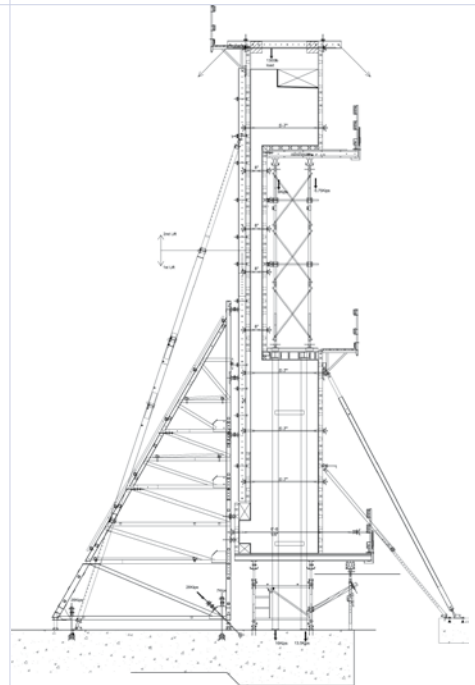
Highest Safety

Mascaro and Doka worked together to ensure that all safety procedures were followed. The Framax Xlife system is designed with the integration of highest level of safety, such as the built in tie-off points in multiple locations on each panel. A Doka field service technician was present during all key stages of erection, pouring and stripping to answer questions and guarantee correct setup.

“Safety is always our number one priority. All forms had to be braced and even tied down,” said Caruthers.

Setting The Bar In Monolithic Pouring

Mascaro Construction is very pleased with the quality of engineering and site service that Doka provides. This was the first pinion wall that was placed on this project and may well be the first time a monolithic pour of this magnitude and shape was ever attempted.



▲ A combination of supporting frames and Eurex 60-550 props were used to brace the forms in all directions.

“The entire concept and the success of the overall project has set the bar of pouring concrete to another level. The use of SCC concrete and the way the pour windows were integrated into the formwork set an impressive bar in pouring SCC and formwork design,” stated Caruthers. □

Practical Tip Self Consolidating Concrete

The Framax Xlife Universal Panel SCC makes it easy to pour self consolidating concrete via the integral side valve. The concrete is pumped in under pressure through the built-in connection point, minimizing air-void inclusions and de-mixing in the concrete.





Staxo 100 Shoring Reaching New Heights

Doka's load-bearing tower supports concrete slabs on the 12-story University of Baltimore project.

▲ With its rugged steel frames, Staxo 100 is designed for large shoring heights and high loads.



▲ Using Staxo 100 provided safety, ease of erection, speed and the ability to build very high towers, few parts, and short delivery times.



Robert Caruthers, EIT
Structural Engineer,
Doka USA, Ltd.

The Professional

“ Due to the number of shoring areas involved that had heights ranging from 60'-150', Staxo 100 was determined to be the best system to use because it is a lightweight system that can be easily handled.”

The University of Baltimore (UB) School of Law is the sixth-largest public law school in the country. The project consists of 190,000 sq. ft. of new construction at a height of 12 stories. Included in the scope of the work was a commitment to recycle at least 50 percent of construction materials and to use at least 10 percent of recycled materials in the building.

One of the biggest challenges for Schuster Concrete, the subcontractor on this path-breaking new structure, was to find a way to support the numerous cantilevering slabs, some of which are up to 160 ft. above solid ground. Doka came up with a solution by using its new load-bearing shoring system, Staxo 100, which makes it possible to erect shoring in even these extreme heights quickly and safely.

Staxo 100 offers many advantages as com-

pared to other systems on the market. To begin, it has very few parts and can be assembled safely and quickly. Further, the shoring towers can be assembled in a horizontal or vertical position and can be lifted into place where they can be easily stacked-up, one section at a time. This proved to be very beneficial on the project because there was very little lay down area. Another big advantage of Staxo 100 is that it has a built-in ladder system that makes climbing the towers safe and easy, as well as its high load capacity even at these great heights.

The Doka engineering department first identified the 22 areas where the shoring height exceeded the typical floor-to-floor height and where Schuster wanted to use the Staxo 100 system. Once all areas were located, Doka worked closely with Schuster Concrete's virtual construction engineer who created a 3D model of the entire build-



◀ The biggest challenge of this project was to understand the geometry with the many cantilevering slabs in the innovative design. The highest slab was located 160 feet high and was supported by Doka's Staxo shoring system.

Construction Web Cam

Watch live progress of the construction on the new John and Frances Angelos Law Center.

Images refresh every 60 seconds from now until the building is finished in late 2012.

<http://tiny.cc/staxo100>



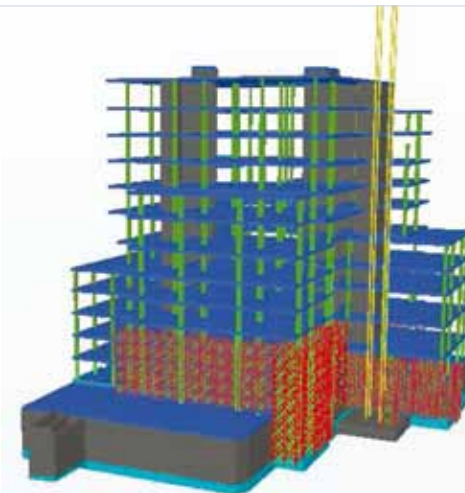
ing. The Staxo layout was imported into the 3D model so that any possible shoring/slab interference could be handled prior to the start of the construction phase. This eliminated any problems in the field and the erection went very smoothly, saving them even more time.

One of the biggest challenges for the Doka engineering department was to make best use of the available floor space, while keeping the construction sequence in mind.

Some of the shoring towers that were used for working platforms on lower slabs subsequently had to be extended in height to support cantilevering slabs on upper floors. For this reason, it was crucial that all shoring towers were positioned in the exact location shown on the drawings.

The shoring essentially had to be designed from the top down to ensure towers that were needed in upper floors were already in the correct place during construction of the floors below. In order to divert any horizontal loads, e.g. from wind or the pouring operation, Doka's drawings specified exactly where the shoring towers needed to be braced and tied back to existing slabs. Schuster Concrete implemented this carefully in the field and even the highest shoring towers provided a stable and safe work area.

Although this was the first big U.S. high-rise job using Staxo shoring, the project pro-



▲ Doka worked with Schuster Concrete's virtual construction engineer to layout the concrete. When the concrete was finished and all cantilevered areas were identified, Schuster Concrete used a BIM modeling program to visualize the building.

gressed flawlessly, and Schuster Concrete was very pleased with the system and how easily it went together. Thanks in part to how fast the Staxo system was erected, Schuster Concrete was able to expedite the construction schedule by several weeks.

The building is scheduled to be finished ahead of schedule, in late 2012, at an overall project cost of \$107 million. The new John and Frances Angelos Law Center is destined to be one of the greenest buildings in Baltimore and the metropolitan region. □

The Facts

JOBSITE

University of Baltimore Law Building

LOCATION

Baltimore, MD

GENERAL CONTRACTOR

Whiting & Turner, Inc.

ARCHITECT

Behnisch Architekten & Ayers/Saint/Gross

CONCRETE CONTRACTOR

Schuster Concrete

PRODUCTS USED

Load-bearing tower Staxo 100, 10k shoring

The Facts

JOBSITE
McCarran ATCT / TRACON
Building

LOCATION
Las Vegas, NV

CUSTOMER
Archer Western

PRODUCTS USED
Super Climber, Automatic
climbing SKE 50 Plus,
Large-area Top 50 wall
formwork



▲ At 354 ft. high, the control tower is expected to be completed in 2014.



▲ With only three system components, large-area formwork Top 50, is a customizable construction kit where shape, size, tie-hole pattern and form-facing elements can be adapted to suit any requirement.



▲ The Top 50 wall system together with self-climbing SKE 50 plus, provides faster completion, maximum safety and a superior architectural concrete finish.

Self-Climbing System Debuts in Las Vegas

The McCarran International Airport is the primary commercial airport serving Las Vegas and Clark County, Nevada.

In 2010, the airport recorded an estimated 39 million passengers passing through the terminal. With the growing need for expansion, the McCarran Airport Authority devised a plan for a new air traffic control tower to accommodate a terminal radar approach control (TRACON).

Rising for Efficiency

Doka's formwork solutions were chosen for the construction of the air traffic control tower because of their ability to provide efficiency and safety. Having previously used

the Super Climber on an 800,000-sq. ft. condo project in Chicago, Ill., the contractor, Archer Western, felt the Super Climber would be a good fit, in combination with Doka's SKE 50 Plus.

Doka's Super Climber system, in use on the interior walls, is supporting high live loads on the main work deck. By raising the entire working deck and formwork from floor to floor with a push of a button, the Super Climber allows fast and safe construction. A hanging stair tower is also integrated into



▲ With features such as automatic brakes and a spring-loaded suspension wedge to eliminate manual placements of the climbing shoe, the new self climbing SKE 50 plus system offers faster completion time and maximum safety in all phases of the project.



*Dave Monnot,
Key Account
Manager, Doka
USA, Ltd.*

The Professional

“Doka was selected for this project because of the contractor’s experience with our solution and the variety of self-climbing products offered. Doka’s ability to supply not only the formwork, but also the formliner and installation, was another benefit we offered.”


the Super Climber. This five-story stair tower was built with Doka’s Staxo 100 to allow the carpenter safe access to the top of the forms and climbing system.

Introducing SKE 50 plus

Climbing the outside walls, Doka’s SKE 50 Plus provided a versatile solution. The SKE 50 Plus is a new system and is being used for the first time in the U.S. on the McCarran Airport project. With features including automatic brakes and a spring loaded suspension wedge to eliminate manual placements on the climbing shoe, faster completion time and maximum safety are possible in all phases of the project.

The exterior walls feature an architectural finish that varies at random plank depths,

uses fair-faced formliner concrete, and will change colors three times. The special pattern formliners were supplied by Doka and attached to the Top 50 formwork. Pour heights reached about 19 ft. high with the system.

For each lift on this project, more than 12,000 sq. ft. of formwork is in use. Changing conditions will require the SKE 50 plus to be removed at level 14 because of a slab projection, but the interior core will remain intact. With 23 lifts on the project, there is an overall height of 354 ft. In addition, the unique design of the flared wing walls, on all four sides, not only made this a challenging formwork job, but it will help make the air traffic control tower at McCarran one of the most modern looking towers in the country. 



◀ Dokaflex tables are easy to set up and provide fast and efficient repositioning for multiple pours.

▼ The new Ikea will be a two level commercial store with a total of 334,000 sq. ft. of space.



High-Speed Concrete Slabs


The Ikea store in Richmond, British Columbia, Canada has outgrown the capacity of its original 33-year-old location. To meet their growing needs to expand their services and retail space, Ikea purchased the land adjacent to their existing store. The new Ikea will be a two-level commercial store with a total of 334,000 sq. ft. of space. One of the biggest challenges on this project was the extremely tight deadline due to a quick scheduled store opening.

Concrete contractor Whitewater Concrete Ltd., chose Doka to provide the horizontal formwork required for this project. There were several factors that were involved in Whitewater's decision including the tight deadline, a high lift of 16 ft. and pouring tables on compacted gravel. Dokaflex tables were the optimal choice since it allowed them to pour at a high lift safely, cycle quickly and overcome the obstacle of pouring on gravel rather than concrete. The Dokaflex tables were easy and practical to assemble and were shifted and adapted to

a variety of situations very quickly. Whitewater found Dokaflex to be a cost-effective and efficient method to carry out such a large slab project.

Since the tables could not be accessed with a traditional tower crane, all 45,000 sq. ft. of tables were cycled with the use of a zoom boom and Doka's stacking frame. This quick and safe solution, allowed pouring over 300,000 sq. ft. of suspended slab.

Dokaflex tables are easy to set up, fully compatible with pre-assembled Dokamatic table forms, and provide speedy and efficient repositioning for multiple pours. The system itself is comprised of very few components which makes for a shorter learning curve for new users and tracking of site material at the same time giving maximum flexibility for a variety of forming situations.

"We were very pleased with the ease of use and design of the system," said Craig Smith, owner of Whitewater Concrete Ltd. 

The Facts

JOBSITE

Ikea

LOCATION

Richmond, British Columbia, Canada

CUSTOMER

Whitewater Concrete Ltd.

FORMWORK USED

Dokaflex Tables, Pre-assembled Dokamatic Tables



Craig Smith,
Owner,
Whitewater
Concrete Ltd.

The Professional

“ We were able to exceed our scheduled expectations, safely and with a good quality finish. We have subsequently made the decision to purchase the system and are currently using it on our next project.”



Building 3 of the Novartis project consist of large architectural concrete cores that were cast in 16-ft. lifts using self consolidated colored concrete.

Unique Structures Demand Innovative Solutions

Constructing in a tight space is always a challenge, but the Novartis Oncology Consolidation project involved effectively building four structures at the same time, within feet of each other.



▲ The Top 50 modular gang form system is constructed out of standard parts that can be assembled in any configuration for a wide range of applications.

*Photo Credit: John Waters,
Doka Field Service Manager*

This massive project is due to the expansion of the Novartis Pharmaceutical Corporation. The project was a high profile, fast paced job.

Building 3

Building 3 has five stories above grade, a full basement with a loading dock, ground floor amenities and office space for approximately 800 employees in the floors above. The building perimeter encompasses approximately 287,000 sq. ft. and is structurally designed to be supported by a concrete deck on a steel frame with spread footings. This frame is designed with large spans that provide open and clear floor plates. The exterior curtain wall is a custom structurally glazed system that employs vertical fins as both lateral structural support and solar shading.

This building has large architectural concrete cores that were cast in 16-ft. +/- lifts using self consolidated colored concrete. The architect's vision for this structure was an office building that continuously wraps around an exposed architectural core. To achieve the demanding requirement, 16,500 sq. ft. of Doka's Top 50 formwork integrated with MF 240 climbing platforms were assembled in Doka's preassembly warehouse and delivered to the jobsite. Since the architect required very tight tolerances, a double layer of plywood including HDO as the backing and Finn form as the surface was meticulously installed on every preassembled gang. Top 50 is a large area customizable "construction kit" formwork system. The shape, size, tie-hole



◀ Building 2 utilized 45,000 sq. ft. of pre-assembled Dokamatic Tables and over 7,000 supporting Eurex props.



◀ The architects' vision for this structure was an office building that continuously wraps around an exposed architectural core.

The Facts

PROJECT NAME
Novartis Oncology Consolidation Buildings 2 and 3

LOCATION
East Hanover, NJ

GENERAL CONTRACTOR AND/OR ARCHITECT
Turner Construction / Fumihiko Maki Design

CONCRETE CONTRACTOR
Nordic Contracting

PRODUCTS USED
Framax Xlife wall formwork, large-area Top 50 wall formwork, 10k shoring, Pre-assembled Dokamatic Tables, Climbing system MF-240



The Professional

“Due to our experience and vast selection of solutions offered, we were able to supply the right materials needed for each unique project.”

pattern and form-facing of the elements can be adapted to suit any requirement. Meanwhile, the MF-240 climbing formwork permits controlled, regular working cycles on all tall structures.


Building 2

Building 2 is a large post-tensioned structure that is designed to optimize final work space. The building has five stories above grade, a partial basement encompasses approximately 185,000 gross sq. ft. The building is a cast-in-place post tension concrete superstructure with cantilever floors supported by internal columns and shear walls on spread footings. The exterior wall is clad with a custom curtain wall system. In the building, the slab tapers at the perimeter from a 20-in.-thick slab to an 8-in.-thick slab.

Nordic Contracting had used another supplier for years, but for buildings 2 and 3 of this project, they chose to use Doka instead. The contractor found that Doka was able to provide a wide range of products that met their needs. Doka was also able to provide the required engineering, experience, field service and preassembly requirements these two projects demanded to make Nordic

comfortable with the change.

To construct the pile caps and foundation walls of Building 2, Nordic chose 7,000 sq. ft. of Doka's Framax Xlife wall formwork system. This was the wall formwork system of choice because Framax is designed to reduce labor requirements through fast assembly and also provide a great concrete finish with its integrated Xlife plywood. To construct the slabs, Nordic chose preassembled Dokamatic high speed table forms, and 10 kip per leg shoring. Dokamatic table forms were delivered to the jobsite fully assembled with plywood to meet the fast paced jobsite schedule and reduce jobsite labor force requirements. Since space was limited on the jobsite, this design allowed up to 162 sq. ft. of slab formwork to be lifted off the delivery truck and immediately installed in its location for forming. Then after each pour was complete, Dokamatic tables were moved in a complete unit to its next casting location.

The difficult construction project with unique nuances in each building is achievable by the use of the customizable Doka formwork. Nordic Contracting is pleased with the results so far on this high profile project. 

The Facts

JOBSITE
 Bridge at Port
 of Miami Tunnel

LOCATION
 Miami, FL

SQUARE FOOTAGE
 6,500 sq. ft.

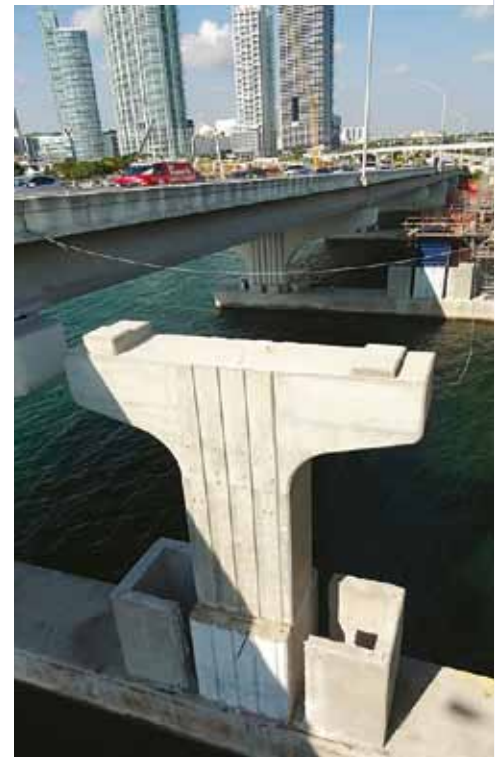
CUSTOMER
 Bouygues Civil

**START DATE AND SCHEDULED
 END DATE OF WORK**
 May 2010 to May 2014

PRODUCTS USED
 Doka Steel Girder Forms



▲ Concrete was poured during night hours when temperatures were cooler to ensure the concrete reached the right strength.



▲ Steel Girder forms allow for clean construction joints and a great finish.



▲ The three main parts of the columns on the water included the stub wall, column, and pier cap, all formed using steel girder formwork.

Bridge is Widened with Steel Girder Forms

The new tunnel access and bridge widening at the Port of Miami will provide a direct connection to the MacArthur Causeway on Watson Island and the Port of Miami on Dodge Island, which will facilitate traffic flow, increase accessibility for local cruise terminals and expedite freight handling.

A Demanding Project

Known as the second below-grade tunnel in the state of Florida, the Port of Miami Tunnel had several hurdles involving soils and water intrusion. The bridge widening required intermediate piers between existing structures so girders could be added, which was difficult due to the proximity of the active roadway. Work was conducted in tight settings with only 16-ft.-wide work zones in between access points. To combat this issue, Doka worked in conjunction with Bouygues Civil Works Florida to get the job done efficiently and safely.

Due to limited access to the columns over the water, Doka's Steel Girder Forms were used. These forms are designed with a pour pressure of up to 1,500 psf for faster pour rates, and to provide faster assembly by eliminating the need for walers and torqing of bolts at corner bolting blocks. All standard Girder forms are the same depth, which greatly reduces or eliminates shimming form joints. Doka's Steel Girder forms are modular, and can be ganged and picked in large sections. With capabilities to be used to both form concrete and support concrete loads on structures such as beams or bridge pier



▲ Doka's Steel Girder forms easily stripped in two sections.



▲ Unlike a typical hammerhead cap, this cap had rustication tying into it from the column requiring a three step stripping process.



▲ Doka's Steel Girder Form is capable of forming large columns up to 12'-0" x 12'-0" completely tieless.

caps, the Steel Girder form will span large distances without any additional support or shoring.

Doka's southeast engineering team also worked in conjunction with Bouygues to solve problems outside of the typical scope of the original contract.

Widening the Bridge

The bridge widening required 20 piers with columns and caps, which were set in narrow spaces for construction. The four piers on land were 34 ft. high. The 15 piers over water were placed in three stages: stub wall, column and then pier cap. Since weather can greatly affect the quality and strength, the concrete for column footings was poured with a concrete pump during night hours when temperatures were cooler to ensure the concrete reached the right strength. The stub walls used a water cooling system, which required running bay water through pipes within the walls, and an electronic temperature control monitoring system to keep the

water and concrete cool.

The pier cap proximity to the existing bridges prevented the use of excess formwork. Further, large chamfers and reveals required the design of detailed stripping sequences. This required Doka to work with the customer to come up with a design that provided the adjustment to allow the cap to be set and stripped in minimal picks. In summary, approximately 43 cubic yards of concrete was poured in three hours and the outcome proved a beautiful finish.

The Results

Doka worked closely with Bouygues on the jobsite to ensure safety and forming efficiency. "Our engineering expertise, experience in bridge formwork design, along with our product innovations, helped complete the project under budget and ahead of schedule," said Dinesh Patel, Static Manager, Doka USA, Ltd.

The Port of Miami Tunnel and Bridge widening will be complete and open to the public in the spring of 2014. [o](#)



Gerry Kreger, Bridge Superintendent, Bouygues Civil

The Professional

“Doka was able to provide an efficient formwork solution to fit the design criteria, pour rates necessary, and setting and stripping special requirements.”

Doka in the US and Canada

news, dates, media, awards


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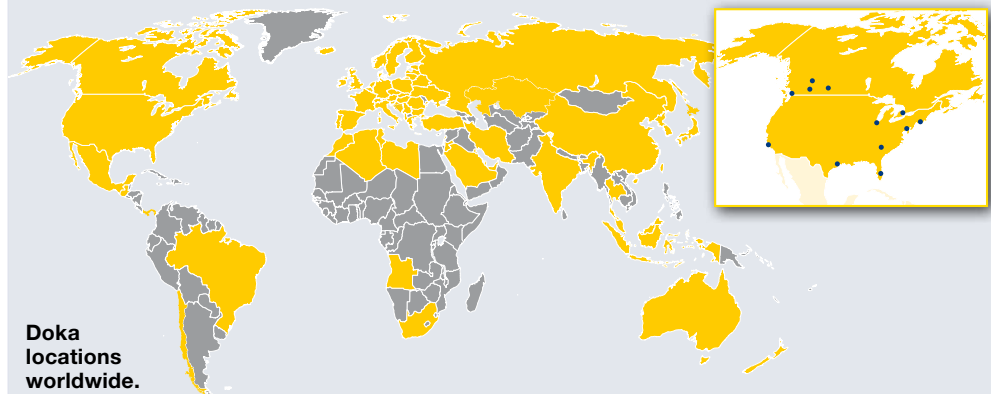
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In some cases the site photos show the situation during formwork assembly and are therefore not always complete from the point of view of safety.

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