

# Doka Xpress

The Formwork Magazine

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**Multi-purpose solution  
to handle a tough job**

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**doka**  
The Formwork Experts



**Editorial**



After several consecutive years of spectacular construction activity in the UAE, Doka Gulf has thoroughly and completely adapted to the radically changed market conditions. Even during this challenging period, we have remained a reliable partner for our clients by improving our service flexibility, promptness and sustainability. Doka is a resilient firm that has not been as badly affected by the global recession as many of its main competitors - in fact, we have even expanded our clientele and market share!

The centralisation of our yards, warehouses and offices in a new 50,000 m<sup>2</sup> state-of-the-art facility at Jebel Ali South Free Zone will further strengthen Doka Gulf's customer service capabilities.

With a team of young, capable and highly motivated professionals in each department, Doka Gulf is well prepared and able to stand behind its technological advances and market leadership for the coming years, which - according to the predictions of economists in the UAE - will still present challenging market conditions.

Sincerely,  
Peter Vogel  
General Manager Doka Gulf

**Doka News**

**World's tallest clock tower ►**

**KSA** – the world's tallest clock tower has been completed in record time. The Makkah Clock is positioned on top of the fifth tower of the King Abdulaziz Endowment project in Makkah, at a height of 603 metres. Doka Saudi Arabia delivered a fully customised solution and an unbeatable range of services.



**▲ Progress at Sukoon Tower**

**Bahrain** – the 45 storey luxury residential development Sukoon Tower is set to become an iconic addition to the Bahrain skyline. Work on the project are progressing within schedule, and to the highest quality standards. The 4600m<sup>2</sup> of Dokaflex table system in use here permit fast and efficient slab-forming operations.



**▲ Major bridge project in UAE**

**Abu Dhabi** – the 1,3 km long Hodariyat bridge will connect Abu Dhabi's east coast with Hodariyat Island. Doka Gulf has supplied the formwork for the precast elements of the piers. These are being cast on land using Top 50 and Dokaflex, and then taken to the construction site. The two pylons will be cast in 12 steps using MF 240 climbing formwork.

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◀ **Doka expertise is contributing to maintaining the tight timeline for Manipal University's Phase 1 completion by mid-2011.**

### *The facts*

**JOBSITE** Manipal University Science & Technology New Campus Phase 1

**LOCATION** Dubai, U.A.E.

**CUSTOMER**  
Sobha Contracting LLC

**PRODUCTS USED** Dokaflex 1-2-4, Large-area formwork Top 50 and Staxo 40

# *The ultimate load-bearing solution*

**Doka Gulf's Dubai Branch Office** partnered with Sobha Contracting LLC to execute construction of the first phase of the new Manipal Science and Technology University Campus.


Manipal is a name famous throughout India for its excellence in science and engineering. Its new Dubai campus site, with over 25,425 m<sup>2</sup> of infrastructure and a project value of AED 100 million, is situated in Dubai Academic City.

Dokaflex 1-2-4, Large-area formwork Top 50 and Staxo 40 systems were deployed here. On-time completion was the top priority, as a deadline of mid-2011 was specified for Phase 1. Also, the slab-support requirements were for up to 12.0 m in height in many areas, making Staxo 40 the ideal solution.

#### **Versatility for slab-support requirements**

Time and costs were tremendously reduced because Staxo 40 assembly required less labour than other competitor systems, especially on the high

slabs. Two sets of slab formwork were utilised in two blocks totalling 8000 m<sup>2</sup> of Dokaflex. Simultaneously, a forming area of approximately 2000 m<sup>2</sup> was shored by Load-bearing towers Staxo 40 with an average height of 10 m. A special cantilever slab support design was required for the terrace floor of the building, which had a slab cantilever of 2.10 m.

The deadline for finishing the structure was very tight, and Sobha had to procure large quantities of formwork in addition to the vast number of labourers they employed on site. As usual, Doka Dubai delivered formwork equipment to Sobha at short notice, and provided the appropriate consultancy and foreman instruction services to ensure that Doka systems paved the way for timely completion of this project. 

### *The solution!*

The simplicity of the Dokaflex system, and the speed with which it can be erected, made it possible to form slabs in a less than 7-day cycle, while its versatility meant that the crew had no trouble dealing with the curved shapes of the building. Speedy erection of Staxo 40 towers by the site-crew made forming of high slabs almost 50% faster than with the traditional cuplock system.



*Mr. V.K. Prasad,  
Project Manager,  
Sobha LLC*

### *The professional*

“ Doka's pathbreaking Staxo 40 system was ergonomical to handle and our crew put it together with no difficulty. The time saved in erecting the shoring system certainly contributed to the maintained project schedule.”





Doka formwork was used to cast the walls of both the Screen Chamber and Lifting Pumping Station shafts

*The facts*

**JOBSITE**

Doha North Sewerage Treatment & Associated Works, PS70 & Pumping Mains

**LOCATION** Doha, Qatar

**CUSTOMER** VINCI Construction-Grands Projets-QDVC-Entrepose Contracting JV

**CHALLENGE** A very confined site requiring extremely precise work scheduling and safety measures.

**PRODUCTS USED** D22 dam formwork, Climbing platform MF 240, Guided climbing formwork Xclimb 60, Framed formwork Frami and Framax Xlife, Staxo 40 load-bearing tower, Stair tower D2

# Doha sewage mega-project on progress

**Over the next four years,** Qatar will spend more than \$140 billion on infrastructure development. One of these major projects is the Doha North Sewerage Treatment & Associated Works.

**Doka dam formwork rises to a massive challenge**

The pumping station (PS70) is part of the Doha North Sewerage Treatment & Associated Works program. The PS70

project includes the construction of two 40 m deep shafts: the 20 m diameter “screen chamber” shaft and 40 m diameter “lifting pumping station” shaft. Doka formwork was used to build the



walls of both the “screen-chamber” and “lifting pumping station” shafts. For this massive structure with its very confined site conditions, the high load capacity and operational safety of Doka's Dam formwork D22 made it the ideal choice.


The outer walls of the pump station were formed from one side with 412 m<sup>2</sup> of Large-area formwork Top 50 and 74 D22 cantilever brackets, thus fulfilling the very high safety requirements imposed by the contractors, VINCI Construction. Doka D22 dam formwork was also used for the outer circular walls of the screen chamber. The climbing formwork started from the raft and the walls were done in 11 lifts with a typical casting height of 3.40 metres. On both structures, the outer walls were cast 3-4 casting steps ahead of the inner walls to enable fast progress and avoid any interruption during the forming operations.

#### Multi-purpose formwork solution

A combination of Top 50 wall formwork, MF240 climbing platforms, telescopic shaft platforms and the guided climbing

platform Xclimb 60 was used for the inner walls. On account of the limited available craneage (only 2 cranes on the site), the number of platforms was optimised so that they could be shifted with a minimum of crane-lifts.

Doka also provided formwork equipment for all the remaining works. The Staxo 40 load-bearing tower system supported the floor slab, with an area of 323 m<sup>2</sup>. Doka framed formwork Frami combined with Supporting Construction Frames was used to cast a wall area of 258 m<sup>2</sup> on the mass concrete blocks in the pump station. In the adjacent Motor Control Centre 2 building, the contractors used Dokaflex 20 and Staxo 40 systems for the 246.00 m<sup>2</sup> of slabs, and Framax Xlife wall & column formwork for 70.00m<sup>2</sup> of two-sided walls

Exact planning, technical assistance and continuous training and support directly on the construction site made it possible to achieve this enormous output with clockwork precision and without any unexpected incidents whatsoever. 



*Christian Tricoire,  
General Project  
Manager,  
Vinci Construction  
Grands Projets*

### The professional

“ Working on the shafts required very careful planning and safety deliberations. Doka provided and excelled at both. The choice of Doka technology was the right decision for our project. The Doka team delivered – on time – the tools that our production team was looking for to construct both shafts within the project schedule. Together with Doka engineers, we found solutions that gave us the confidence to achieve good-quality works with the necessary safety for our workers.”



### The solution!

A 40 m deep water treatment plant. Doka's combination of different climbing platform systems allowed simultaneous casting of inner and outer walls with maximum cost efficiency and an extremely high degree of safety – and all within an exact time schedule.

◀ **Doka's multi-purpose solution enabled simultaneous casting of inner and outer walls with maximum cost efficiency and an extremely high degree of safety.**



### *The facts*

#### JOBSITE

Algiers metro extension

LOCATION Algiers, Algeria

CUSTOMER Gaamex Group

PRODUCTS USED Large-area formwork Top 50, Load-bearing towers Staxo 100, Dam formwork D15&D22, MF 240 Climbing formwork, Framed formwork Frami, Column formwork RS

### *The solution !*

The Large-area formwork Top 50 system proved its huge versatility once again, as it was the key solution for a variety of uses including walls, slabs, viaduct piers, columns and foundations. More than 6000 m<sup>2</sup> of Top 50, supported by 3000 m<sup>2</sup> of Load-bearing towers Staxo 100, easily dealt with the complex geometry and special requirements of this project.



## ***Doka excels on metro project***

**Algiers continues to boom.** This brings with it constant growth in traffic volumes, and so the city's transport infrastructure is having to undergo a substantial makeover.

The extension works on the Algiers metro line between Hai El Badr and El Harrach (4 km) are due to be completed before the end of 2011. The extension includes an over 3.7 km tunnel, a 280 m viaduct, four stations and numerous underpasses.

Gaamex Group, a joint venture of Cosider, Trevi and Dywidag, is tackling this challenging venture, efficiently supported by Doka Algérie in cooperation with

Deutsche Doka. The Formwork Experts were the only company capable of providing an instant supply of large quantities of formwork equipment together with competitive engineering support and services.

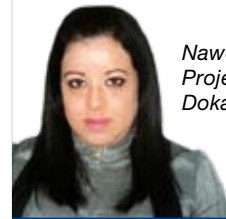
#### **Extremely versatile formwork**

The Large-area formwork Top 50 system proved to be the perfect solution to deal with the geometrical complexity and





◀ Doka offered instant supply of large quantities of formwork, together with strong engineering support, enabling this project to move ahead swiftly



Nawel Merzoug,  
Project Manager,  
Doka Algérie

### The professional

“ The client was able to achieve its target and realise the project on schedule by benefiting from Doka’s planning, overview of the required formwork quantities, and the deployment plan which was prepared for each defined cycle by our technical staff”


other special requirements of the various metro stations, including fair-face quality. Known for its adaptability to changing and unusual designs, Top 50 is the universal product for all uses including single- and double-sided walls, heavy slabs, viaduct piers and abutments, columns and foundations. More than 6000 m<sup>2</sup> of Top 50 provided easy and efficient forming sequences. To meet the fair-faced concrete requirements, the Top 50 was fitted with Dokaplex sheeting. Thanks to its tight tolerances and superior format accuracy, the Dokaplex formwork sheet delivers smooth, top-quality concrete surfaces.

#### Safe forming of single-sided walls

In 4 stations, 2 caverns and 2 junction tunnels, on single-sided walls of up to 8.33m in height, Doka’s supporting construction frames ensured that the concrete forces were safely and reliably transferred. With ready-to-use platforms at all heights, they provided safe access for work inside the construction. Doka’s extremely versatile high-capacity

Dam formwork D15 and D22 was a key solution when it came to achieving safe and efficient climbing of the single-sided walls.

#### Heavy-duty shoring job

3000 m<sup>2</sup> of heavy-duty Staxo 100 load-bearing towers were used to provide dependable support for the slabs. These had an average height of 6 m, in some cases extending as high as 13 m. 

▼ High-load-capacity Staxo 100 load-bearing towers combine high safety with a versatile range of use.





► The massive new grain silo consists of 140 individual storage cells, each measuring 5 x 5 m<sup>2</sup> and with a total height of approx. 80 metres.

### *The facts*

**JOBSITE** Kuwait Flour Mills & Bakeries Co. S.A.K.

**LOCATION** Kuwait

**CUSTOMER**  
Al Ghanim Intl Gen. Trading and Contracting Company

**REQUIREMENTS**  
Construction of a 150,000 tonne grain silo

**PRODUCTS USED**  
Large-area formwork Top 50



# *Middle East's largest grain silo*

**Construction of a new 150,000 tonne grain silo and processing facility, which will be one of the largest of its kind in the Middle East, is moving ahead in Kuwait.**


### *The solution* !

Doka supplied 6000 m<sup>2</sup> of Large-area Top 50 formwork to cast the 140 storage cells of this massive grain silo project while ensuring the required fair-faced concrete quality. The crane-jumped climbing system 150 F was the most-efficient solution for forming the 80 m high walls and maintaining maximum safety for the site crew.

There are currently four concrete silos on the huge site complex in Kuwait and the new investment saw two of these demolished to make way for the massive new silo to be constructed alongside an existing silo.

Doka Kuwait was awarded the contract to supply the entire formwork design and all related equipment. In winning this order, Doka drew upon its in-depth knowledge to devise the most effective formwork solution for meeting the tight construction schedule. The contractor, Al Ghanim International, had previously partnered with Doka on a similar project, where it was extremely satisfied with Doka systems and technical support. Furthermore, Al Ghanim already has a large quantity of Doka formwork which it was able to re-use on the silo project.

#### **Huge wall-formwork challenge**

The massive new grain silo consists of 140 separate storage cells, each 5 m<sup>2</sup> x 5 m<sup>2</sup> and with a total height of approx. 80 m. As well as the Doka equipment already owned by the contractor, the site is also using made-to-measure Large-area formwork Top 50 and the Climbing system 150 F for the walls. Top 50 is ideal for forming the fair-faced concrete required on this project. 70 of the 140 cells have so far been cast using 4 sets of Doka formwork plus 1 additional set for the 3 m high hopper walls. The 80 m high walls without any intermediate slabs are being cast using the Doka crane-lifted climbing system 150 F. Easy to set up and to operate, 150 F is equipped with railed-in working platforms and an integrated ladder system, ensuring the necessary safety for working at heights. 



# Staxo 40 debuts in Qatar


**Only a few months after being launched, Doka's latest addition to its range of economical shoring systems – the Load-bearing tower Staxo 40 – is demonstrating its benefits once again.**

The Shemoukh Twin Towers in Doha will each be 22 storeys high and will have total floorspace of 107,000 m<sup>2</sup>. The contractor, S.E.G. Qatar, opted for Doka shoring systems in preference to all the alternatives.

#### Extra-short assembly times

8000-plus frames of the Load-bearing tower Staxo 40 system, as well as the Staxo 100 system, are driving fast, safe forming operations on this site. The newly developed Load-bearing tower Staxo 40 stands out for being extremely easy to handle. With its optimised lightweight H-frames, Staxo 40 can be erected in half of the time that a standard single-leg system would take. Low unit weight and the small number of separate components enable the site crew to assemble each tower in a very short time. Here, at the Shemoukh Towers, erection times of less than 20 minutes for the Staxo 40 towers, each 7.75 metres high, are being achieved on site by a three-man crew.

The system has proved to be very safe to erect and dismantle, even at large shoring heights, thanks to its extensive safety accessories such as integrated universal U-bracket for personal fall-arrest harnesses, and platform brackets for enhanced safety at slab edges. With all these features, Doka Qatar was able to offer its customer the most economical and rapid shoring solution there is in the building-construction segment.

Known for its very high-load capacity, the Load-bearing tower Staxo 100 is being used to support transfer beams at a height of more than 7 m. The variable inter-frame spacing of the Load-bearing tower Staxo 100 means that it can be optimally adapted to the loads that need to be transferred, and this ensures optimum cost-efficiency. 262 rugged Staxo 100 steel frames are in service at both towers, delivering exceptionally economical and safe shoring of the heavy loads. 



## The facts

#### JOBSITE

The Shemoukh Twin Towers

LOCATION Doha, Qatar

CUSTOMER S.E.G.

REQUIREMENTS 22-storey twin high-rise buildings with total floorspace of 107,000m<sup>2</sup>

#### PRODUCTS USED

Automatic climbing formwork, Large-area formwork Top50, Load-bearing towers Staxo 40 and Staxo 100, Dokaflex 20



Miled El Dada, S.E.G. Construction Manager

## The testimonial

“The possibility to erect the towers horizontally has given us big time savings, greater flexibility in our time scheduling and a very safe way of working”

◀ **Lightweight Staxo 40 load-bearing towers provide extra-fast assembly and safety, even at great shoring heights**

## The solution!

8000-plus frames of the Load-bearing tower Staxo 40 system, as well as the Staxo 100 system, are driving fast, safe forming operations on this site. The Staxo 40 towers, each 7.75 m tall, are being erected in less than 20 minutes by a three-man crew.



Due to Doka's technical support and on-time deliveries, the project is progressing well ahead of schedule





# Forming business lifestyle

**A very ambitious project** is being undertaken by Al-Latifia Trading & Contracting Company in Riyadh to construct a business park which will represent a new-age facility for the thriving Riyadh business community.

The US\$ 400 million project started on 1<sup>st</sup> January 2009 and is expected to be completed by 31<sup>st</sup> December 2011. It consists of six 22-storey towers plus two 17-storey and two 15-storey buildings. The business park also has four medium-rise (seven and five-storey) buildings.

## Versatile formwork solution


The biggest challenge presented by this structure was its mix of sloped, curved, elliptical and circular beams, which needed a customised Doka formwork solution to do the job properly. Two sets of Dokaflex tables are in use here to form the large slab areas (1200 m<sup>2</sup> for a typical floor). Large-area formwork Top 50 and framed formwork Frami have been deployed for the vertical forming jobs.

The client specified fair-faced concrete surfaces, a requirement which was easily met by the systems Doka proposed. The client has been extremely satisfied with the functionality of the formwork systems, as they have enabled the forming tasks (especially the large-area ones) to be tackled very swiftly and efficiently. The tried-and-tested tableforms were fast to assemble and easy to handle, thus cutting the forming times. Large-area formwork Top 50 has been fielded for an astonishingly wide range of applications on this site.

Doka Top 50 was used for the foundations of the towers, covering an area of 1302 m<sup>2</sup>. The retaining walls of the car parks were formed with 1076 m<sup>2</sup> of Top 50 supported by 3.30 m high Doka load-bearing towers d2. The Top 50 system was also used with great precision for the 208 m<sup>2</sup> of core walls, and

on the towers' 564 m<sup>2</sup> of retaining walls. In addition, the contractor deployed 940 m<sup>2</sup> of Doka framed formwork Frami for the tower shafts. Lightweight Frami panels can be erected very quickly by hand and combine high-performance safety with optimum adaptability to all job-site conditions.

## Customer satisfaction

The systems supplied by Doka proved to be ideal, and met the contractor's expectations in full. Being so easy to install, they delivered a significant boost to efficiency, as the tableforms were quick to assemble, the wall shuttering was very stable during casting, and the joints were strong and durable. Doka systems comprising workplace accessories provided safe working conditions for the labourers. The client is also very satisfied with the sound technical support and well-trained site supervisors who always help resolve any complexities related to the formwork. Apart from the detailed drawings, a very transparent site delivery system has made it easy for the client to handle the materials. Two towers have been already completed and work on the remaining jobs is on schedule. 



Ahmed Rady  
– Formwork  
Coordinator –  
Al Latifia Trading  
and Contracting

## The professional

“We prefer Doka formwork solutions because they are fast, safe, and easy to assemble, and the technical support is very good”

## The facts

### JOBSITE

Granada Business Park

LOCATION Riyadh, KSA

CUSTOMER Al Latifia Trading & Contracting Company

CLIENT General Organisation for Social Insurance (GOSI)

REQUIREMENTS A complicated structure with a mixture of sloped, curved, elliptical and round beams, as well as fair-faced concrete finishes.

## The solution!

Doka was chosen as it offered a combined practical solution with Doka's wall and slab formwork, to meet both the design and concrete-quality specifications and the safety requirements.

▼ When completed, Granada Business Park will provide a state-of-the-art facility for many different businesses.





- To meet the ambitious 5-days-per-cycle timetable, Doka designed a crane-independent system for the exterior columns, beams and slabs.

### *The facts*

JOBSITE Elite Residence

LOCATION Dubai, U.A.E.

CUSTOMER Arabian Construction Company (ACC)

REQUIREMENTS 381 m high luxurious residential tower to be built at record speed.

PRODUCTS USED Automatic climbing formwork SKE 100, Large-area formwork Top 50, Table Lifting System TLS, Dokaflex tables



*Practical Tip*

### *Special solution for the façade*

In co-operation with the cladding company Cladtech and the main contractor ACC, Doka designed an innovative method of installing the façade panels on the existing concrete structure. Doka provided an additional suspended working platform to enable Cladtech to integrate their dual-rail system and also to use the platform for preliminary works i.e. installation of adapters for the façade panels.





# Elite Tower Dubai rising in 5-day cycle

**Tameer's 91-floor Elite Residence**, ideally located in the heart of Dubai Marina, is destined to become one of the most exclusive and sought-after addresses in the Middle East.


The post-tensioned slabs, downstand beams and exterior columns have been built at record speed using the efficient Dokaflex tables combined with Doka large-area formwork Top 50, which is lifted using the high-capacity Automatic climbing system SKE 100. To meet the ambitious timetable of a five-day cycle, Doka's Abu Dhabi branch worked with the main contractor Client Arabian Construction Company (ACC) to design a forming workflow which would allow the punctuated façade to be split into two zones by climbing one zone always one floor ahead of the other. This high-speed workflow, in conjunction with a well-organised construction site, made for the most effective method for erecting this high-rise building. Different work teams were shifted from one zone to the other without any "standby time".

## Customised formwork design saves time

For this challenging construction project, Doka planned a flexible solution which allowed the formwork to be quickly and easily adjusted to the changing geometry of the structure.

With the versatile Large-area formwork Top 50, the constant changes in geometry were incorporated into the formwork design and so were accomplished very easily, in only a short time. Furthermore, the formwork for the outside of the downstand beam and the entire column formwork consist of the same formwork element. The L-shaped side panels for the columns were integrated into this element and can be hinged back to facilitate climbing and shifting of the formwork.

## Craneless slab forming

With only two different sizes of Dokaflex tables for the slab and one for the bottom support beam, Doka optimised its formwork solution to have a simple system that kept work on-site moving rapidly throughout the project. With the Doka shifting trolleys for horizontal repositioning and two Table Lifting Systems TLS, the tableforms could be moved up to the next floor quickly and safely, independently of the crane. By making the crane unnecessary, the entire site workflow was optimised for maximum speed and efficiency. 



Dean Corke,  
Project Manager,  
Arabian  
Construction  
Company (ACC)

## The professional

“The Doka SKE 100 system has proven to be an invaluable formwork solution. We were initially attracted to the system due to its flexibility, speed and safety attributes. Its flexibility has also allowed a dual-rail system (for façade panel installation) to be integrated. The co-operation and support received from the Doka UAE team has always been first-class, with all challenges met!”

## The solution!

Automatic climbing formwork SKE 100 combined with Top 50 and Dokaflex tables for casting the slabs, downstand beams and columns of this 381 m tall tower. TLS enables craneless repositioning of tableforms. With the versatile Large-area formwork Top 50 used for downstand beams & columns, all geometry changes of the columns were accomplished without difficulty and in very little time. An innovative method was used to install the façade panels using the SKE 100 system.



◀ A dual-rail system for façade-panel installation was integrated into the SKE 100 system.



### The facts

Established in 1980, Doka Saudi Arabia is one of the pioneering suppliers of formwork solutions in the Kingdom and over the last three decades it has established a strong presence in the market as a reliable formwork partner. The debut of its Ready-to-Use Service was very well received by clients and it has already been used on several major projects in KSA.

### The solution !

Ready-to-Use Service is a perfect solution for non-standard formwork requirements. Doka specialists pre-assemble the formwork units and deliver them ready for rapid deployment on site. The Service also includes the option of just-in-time deliveries. It is the ideal solution when complex structures need to be built within a short timeframe.

# Service at its best

**Doka Saudi Arabia** has successfully launched its Ready-to-Use Service, offering its customers a brand-new service experience.

#### Market-oriented approach


It is Doka's priority to offer customers new and cost-efficient solutions. The new service offered by Doka Saudi Arabia was welcomed by many clients as it reflects a type of reliable support that is almost unique in the region. Some of the main reasons for launching the service were the insufficiently qualified labour force and lack of requisite equipment often found on-site. Furthermore, the Ready-to-Use Service is also the perfect remedy for jobsites located in built-up areas where available working space is very limited.

#### Customer feedback

Doka Saudi started the Ready-to-Use Service in Jeddah at the beginning of 2010. To ensure a professional market launch they put together a team

of experienced engineers, technical experts, technicians and site managers and set up the necessary infrastructure. The market has reacted very positively to this extra service and Doka has successfully supported some of the biggest projects in Saudi Arabia such as Shamiyah in Mecca, Lamar Towers in Jeddah, Burj Rifaal in Riyadh and Capital Monetary Authority (CMA) Tower in Riyadh.

#### Service benefits

Doka customers profit from smooth project processing, significant time savings and shorter hire periods. Also, site logistics are greatly optimised, as is the need for specialised personnel and equipment. The exactly fitting finished formwork units significantly accelerate the work procedures and make an overall contribution to cost reduction. 



▲ **Pre-assembly of column forms.** Custom formwork is very precisely crafted to ensure smooth assembly on site.

► **Extension of Holy Mosque in Makkah - Shamiyah Project** supported by Ready-to-Use Service.







◀ These hammer heads are being concreted using Doka supporting construction frames at a height of over 40 metres.

### *The facts*

#### JOBSITE

The main link road between Wadi Adai and Al Amerat

LOCATION Muscat, Oman

#### CUSTOMER

Nagarjuna Construction Company International LLC

CONSULTANT Parsons International and Company LLC

#### PRODUCTS USED

Large-area formwork Top 50, Doka supporting construction frames

## *Innovative pier head formwork*


**The main link road** between Wadi Adai and Al Amerat in Muscat, Oman was completely destroyed by flooding in 2007. The government was looking for a solution that will be safe from flood water.

The solution that they decided on was a 7.5 km road that touches the flood-endangered valley of Wadi Adai in just two places. It will start from Al Nahda Hospital, and end at the first Amerat roundabout. Although a mere 7.5 kilometres long, this project has become one of the most technically challenging to be undertaken in the Sultanate in recent years. It will involve moving over 6 million m<sup>3</sup> of rock over an 18-month period, demolishing the old road and spanning the Wadi Adai with two 50 m high viaducts. Costing approximately RO 56.549 million, this project will rank among the most expensive infrastructure undertakings of its kind.

#### **Custom-made formwork solution**

The project involves the construction of two new wadi-bridges of differing lengths, and nine box culverts. Given the ruggedness of the terrain

through which the new link road will run, accessibility has been a major constraint for the nominated contractor Nagarjuna Construction Company International LLC (NCCIL).

Doka Muscat is supplying the ideal formwork solution for this major project. For Madhusudhan P., the chief executive officer of NCCIL, construction of the hammer heads of the two piers at a height of over 40 m was a special challenge where The Formwork Experts really came into their own. Doka designed and supplied three tailor-made support structures and formwork sets for the ten hammer heads, each 16 m long, 4.50 m wide and 2.80 m high. Doka supporting construction frames were fixed to the bridge piers and used in the horizontal to serve as the platforms for the Top 50 formwork at this lofty height. 

### *The solution!*

Doka has supplied tailor-made support structures and formwork sets for the ten pier heads, each with a length of 16 m, a width of 4.50 m and a height of 2.80 m. Doka supporting construction frames, used horizontally, served as the platform for safe casting at a breezy height of over 40 metres.



V.R. Mehta,  
Project Manager  
NCCIL

### *The professional*

“ The pier-head support structure designed and supplied by Doka meets all technical & safety requirements and was immediately approved by the consultant. It helped us to work with utmost safety, quality and economy – and on schedule. We appreciate the Doka team for their support and expertise”



### *The facts*

**JOBSITE** Al Reem Island, Abu Dhabi, U.A.E.

**CUSTOMER** Arabian Construction Company (ACC)

**PRODUCTS USED**

Automatic climbing SKE 50 & SKE 100, Climbing formwork 150F, Large-area formwork Top50, Dokaflex 20 and Dokaflex tables

► Two sets of Dokaflex tables allow the contractor to cast a typical slab, covering an area of 1988 m<sup>2</sup>, in only 5 days.

▼ Al Shams district will have a significant impact on Al Reem island's burgeoning skyline.



## *Doka rises to challenge on Al Reem Island*

**The Sun and Sky Towers, and with the Gate Towers,** are part of the stunning Shams Abu Dhabi district, a mega-project on Al Reem Island, a natural island 600 metres off the coast of Abu Dhabi.

### *The solution* !

Two sets of pre-assembled Dokaflex tables are being quickly and easily repositioned with Doka's shifting device, enabling a smooth 5-day cycle for a typical slab covering an area of 1988 m<sup>2</sup>.

Al Shams Abu Dhabi, translated into English as "The Sun of Abu Dhabi", will eventually house around 100,000 residents. This impressive urban development will have a significant impact on Al Reem island's burgeoning skyline. The landmark Sun and Sky Towers have already been completed, and construction on the Gate Towers complex is cur-

rently progressing on target with Doka. Three of the Gate Towers that form part of Shams Gate are rising steadily toward their 2012 completion deadline.

#### **Sun and Sky Towers erected in record time**

The Sky Tower is a 74 storey commercial and residential space. The 64 storey Sun





**Safe. Fast. Efficient**  
**Top 50 for shear walls and columns**

The 1800 x 1200 mm columns and 5500 x 800 mm shear walls on the typical floors are formed using the high-strength column formwork Top 50 in conjunction with Climbing formwork 150 F. Using only a very few standard components, this system can tackle just about any column.

Tower, located next to the Sky Tower, is an elliptical structure. Both these futuristic urban towers were built vertically around a central core. To deliver the towers on time, lead contractor Arabian Construction Company utilised a specially designed formwork solution from Doka to meet the project-challenges.


Doka delivered a full range of systems enabling the contractors to reach great heights safely and on schedule. Automatic climbing formwork SKE 50 and SKE 100 were used to lift Large-area formwork Top 50 units together with the climbing scaffold in one single step and without any crane assistance, one casting section at a time. This was an optimal method for most of the climbing assignments. A tight schedule was maintained for both the 300 m tall Sky Tower and the 244 m Sun Tower.

**5-day cycle for Gate Towers with Doka's high-speed systems**

Construction on Shams' Gate Towers is progressing on schedule. Once finished, the Gate Towers will reach a

height of 65 storeys. Doka's wall, slab and climbing solutions were selected to meet the rigid schedule.

The formwork methodology uses two sets of Dokaflex tables allowing the contractor to cast a typical slab, covering an area of 1988 m<sup>2</sup>, in just 5 days. The pre-assembled "site-ready" Dokaflex tables are easy and practical to set up and can be repositioned very quickly using Doka's shifting devices, resulting in a cost-effective and efficient way of carrying out large-area slab projects. These systems have a smaller number of separate components, making for higher speeds as the formwork assembly and striking times are greatly accelerated. A meticulous forming plan, short delivery times and the non-stop support given by Doka all assure timely progress.

Doka's versatile Top 50 system, combined with Climbing formwork 150 F, is being used to enable faster forming of the shear walls and columns, at reduced cost to the contractor. 

▼ The Sun and Sky Towers were erected in record time using the Doka automatic climbing system SKE







▲ A high-performance, fully hydraulic Doka tunnel formwork traveller is being used to construct the two Y-branch structures in the Erstfeld section of the Gotthard Base Tunnel.

## Fully hydraulic formwork for tunnel construction

**Two Y-branch structures** of Switzerland's Gotthard Base Tunnel are being constructed in record time using a fully hydraulic and highly adaptable Doka tunnel formwork traveller.

Beat  
Blindenbacher,  
Project Manager  
AGN Strabag



### The professional



The professional support provided by the Doka site foremen significantly speeded up assembly of the formwork traveller and ensured smooth forming progress”

The AGN consortium of Strabag AG Tunnelbau Schweiz and Strabag AG Spittal/Drau is working on the Amsteg and Erstfeld contract sections. The Doka tunnel formwork traveller is in round-the-clock use for casting the inner shells of two Y-branch structures in the 7400 m long Erstfeld section. The contractor is relying on this machine to maintain extremely short cycle times.

#### The systematic approach to versatility

A significant change in cross-section from 5.72 m wide by 7.92 m in height in the first concreting section to 17.65 m in width and 10.40 m in height in the last concreting section is a crucial design feature of the Y-branch structures. Construction work is big-end first, so the Doka tunnel formwork traveller, consisting of rentable sys-

tem components, has to be "trimmed down" for each successive concreting section, 37 in all. Each time it has to adapt to the newer, tighter cross section. The tunnelling specialists at Doka planned an all-hydraulic formwork traveller attuned in every detail to the project specifics but with rentable system components nevertheless accounting for 75% of the make-up.

#### Tremendously strong and totally safe

As the name says, Doka's SL-1 heavy-duty supporting system is built for heavy loads and provides the torsionally rigid bearing structure for the two-part crown-arch formwork for the tunnel roof. The formwork traveller has fully railed-in platforms on all working levels and ladders with integral cages to maximise safety for the entire crew.





## The facts

**JOBSITE** Gotthard Base Tunnel

**LOCATION** Switzerland

**CUSTOMER** The AGN consortium of Strabag AG Tunnelbau Schweiz and Strabag AG Spittal/Drau


**CHALLENGE** The huge dead-weight of the traveller must be carried safely. Continuous changes in cross-sections, very limited site space and difficult geological conditions.

**PRODUCTS USED**

Large-area formwork Top 50, HD supporting system SL-1

The crown-arch formwork consists of Top 50 beam formwork sections and is carried by a total of 144 heavy-duty screwjacks. Adaptation of the formwork to the structure's changing width has to be easy and practical, so the large-area formwork assemblies that make up the two halves of the crown-arch retract inward section by section on powerful hydraulic rams. The superfluous formwork segments are then removed and the arched formwork is precision-closed. This solution ensures that rapid and regular working routines can be maintained through each concreting section in turn.

### 170 tonnes repositioned at the touch of a button

16 high-performance hydraulic rams make forming-up and stripping-out, and lowering and moving the huge formwork traveller, fully automatic operations with straightforward pushbutton control. Each routine advance moves a supporting structure and formwork weighing 170-plus tonnes rapidly and accurately into position for the next concreting section. The heavy-duty roller units designed for this project and built to handle the traveller's tremendous dead-weight are propelled by four powerful hydraulic motors. 



## The solution!

A high-performance, fully hydraulic Doka tunnel formwork traveller is being used to construct the two Y-branch structures. 16 high-performance hydraulic rams make forming-up and stripping-out, and lowering and moving the huge formwork traveller, fully automatic operations at the touch of a button.

◀ Forming-up, stripping-out, lifting, lowering and advancing are all fully hydraulic, pushbutton-control operations with this 170-tonne Doka tunnel formwork traveller.



## In brief

### News, dates, media, awards



▲ A Doka team assembled a Staxo 40 tower at record speed during the customer event



▲ The Doka Saudi Arabia team did a fine job of presenting the company at Saudi Build 2010

#### STAXO 40 CUSTOMER EVENT

More than 50 decision-makers from construction companies in the UAE attended a customer event organised by the Dubai Branch in 2010. The event was part of the Staxo 40 market launch and aimed at showing all the benefits of this system. Doka Formwork Instructors gave a live demo of how easy to handle and fast-working this system is, by assembling and dismantling a Staxo tower on the evening. The participants then took an active part in the closing round of discussions and exchange of experience.

#### DOKA DEMONSTRATES ITS COMMITMENT TO SUSTAINABLE DEVELOPMENT

Doka Qatar took the opportunity to showcase the company's leading products and smart solutions for infrastructure at the "Humanisation Of Cities of Tomorrow" Summit in Doha. Held in September, this high-profile conference was dedicated to Qatar's sustainable infrastructure development. Doka presented detailed information on the company's contribution to sustainability and

resource-efficient production technologies.

#### SAUDI BUILD 2010

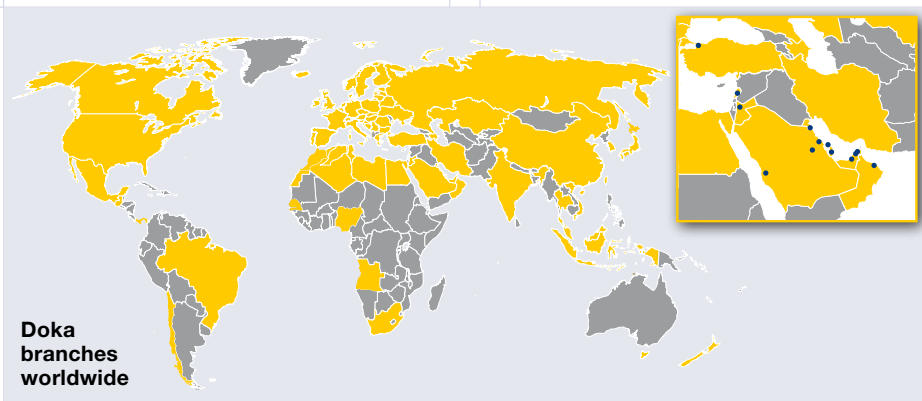
Doka Saudi Arabia participated in the 22<sup>nd</sup> annual Saudi Build fair from 18<sup>th</sup> - 21<sup>st</sup> October in Riyadh. The 72 m<sup>2</sup> exhibition area was set up in the Austrian Pavilion and showcased Load-bearing system Staxo 100, Dokaflex Table, Frami Xlife, Framax Xlife, Doka H20 top beams and eco props. Doka also presented its unique "Ready-to-Use" service in the Kingdom. The response from the exhibition was overwhelming reflected in the many enquiries received.

#### HSE IN CONSTRUCTION, 5<sup>TH</sup> DEC., DOHA

Organised by the industry's leading trade journal in the region and co-hosted by Doka, the "HSE in Construction" conference saw the leaders of Qatar's construction industry gathered to discuss and debate ways to increase both safety and efficiency on site. The event demonstrated the GCC perspectives on the subject of health and safety on site.

**Doka GmbH**  
Josef Umdasch Platz 1  
A 3300 Amstetten, Austria  
Tel. +43 (0)7472 605-0  
Fax +43 (0)7472 64430  
E-Mail: info@doka.com  
Internet: www.doka.com

[www.doka.com](http://www.doka.com)  
E-Mail: [editors@doka.com](mailto:editors@doka.com)



Doka  
branches  
worldwide

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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.**

<b>Algeria</b>	Doka Algérie	Tel. +213 (0)770 112 540
<b>Bahrain</b>	Doka Bahrain	Tel. +973 17 402 810
<b>Egypt</b>	Doka Egypt Office	Tel. +20 (0)2 22 677 216
<b>India</b>	Doka India	Tel. +91 (0)22 402 644 35
<b>Jordan</b>	Doka Jordan	Tel. +962 (0)6 554 55 86
<b>Kuwait</b>	Doka Kuwait	Tel. +965 2 482 24 62
<b>Lebanon</b>	Doka Branch Lebanon	Tel. +961 (0)1 612 569
<b>Oman</b>	Doka Muscat	Tel. +968 244 844 45
<b>Qatar</b>	Doka Qatar, Doha	Tel. +974 445 00 628

<b>Saudi Arabia</b>	Doka main office Jeddah	Tel. +966 (0)2 669 10 08
	Branch office Riyadh	Tel. +966 (0)1 479 10 03
	Branch office Dammam	Tel. +966 (0)3 832 06 06
<b>Tunisia</b>	Doka Tunisia	Tel. +216 (0)71 977 350
<b>Turkey</b>	Doka Kalip-Iskele	Tel. +90 (0)262 751 50 66
<b>U.A.E.</b>	Doka Gulf, Dubai	Tel. +971 (0)4 870 87 00
	Doka Emirates, Abu Dhabi	Tel. +971 (0)2 676 58 55
	Doka Emirates, Sharjah	Tel. +971 (0)6 556 28 01