



doka

Understanding
how to build high faster.
Formwork solutions for your highrise project

The Formwork Experts.

_Understanding your highrise project as a partner

_Understanding the construction process truly and being knowledgeable about it is the prerequisite for being a partner in the construction industry. We have this understanding from the initial planning stage through to completion of construction.

_Understanding such as this is based on more than 40 years' experience in self-climbing technology and more than 1,000 highrise projects successfully realised worldwide. Construction of the world's tallest building, the Burj Khalifa in Dubai, 828 metres tall, is an outstanding example.

With this comprehensive know-how, we are well-qualified to be your high-performing and reliable partner in highrise construction.





Doka is able to look back on a long history of understanding.

Listening intently, understanding the world as seen through the eyes of our customers, learning to understand all aspects and thinking ahead. We are passionate about not being satisfied with the first solution that might get the job done. Rather, we continue fine-tuning it until we come up with a true benefit for our customers. This is the only way a small woodworking shop could grow into a globally operating formwork company, known by the brand name Doka since 1956.



"Thanks to the reliable technology and efficient on-site support provided by Doka, we were able to meet the schedule of Colombo Costruzioni S.p.A. with its detailed plan for completion of the Torre Isozaki build in Milan. As a result, we were able to shorten the original schedule for finishing the building shell by approximately three months."

Gianfranco Cesana,
Engineering Manager for Colombo
Costruzioni

Important information: Always observe all relevant safety regulations (e.g. as issued by construction-industry employee safety organisations) applying to the use of our products in the country in which you are operating. In addition, the User Information booklets (Instructions for Assembly and Use), which contain information on standard system set-up and on compliant utilisation of Doka formwork systems, must also be observed. The illustrations in this brochure show the situation during formwork assembly and are therefore incomplete from the safety aspect. It could be dangerous to combine our formwork equipment with equipment from other manufacturers. If you intend combining different systems, please contact Doka for advice first. Subject to change without notice in the course of technological development. © Copyright by Doka GmbH

Understanding requirements

Sound advice begins during the project development stage of the structure. Because from this point on, it's all about cost efficiency and having a leg up on your competitor. Which is why our internationally experienced experts make a point of advising you very early, and very thoroughly.

Doka technicians work to put together the most suitable formwork solutions in combination with high-performing service packages, exactly tailored to each individual construction project and method.

Regardless of how different and unique, one thing holds true for all highrise projects: our commitment to the entire project solution has one common denominator – to design a construction process that is fast, safe and as good as it can be.

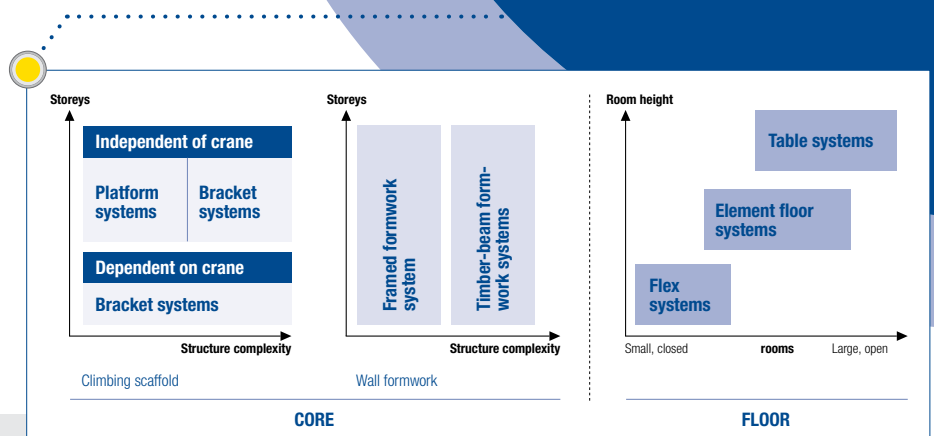


WHAT is being built?

Construction project

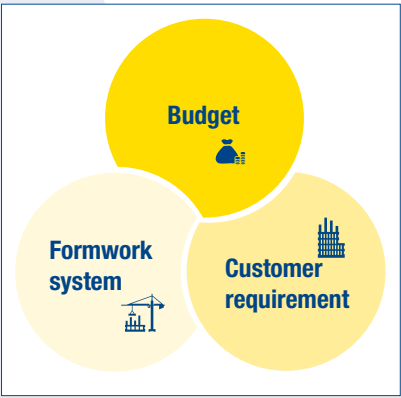
Building construction

Based on your project's unique requirements, Doka provides comprehensive solutions for all cast-in-place concrete components in your highrise project. This refers, in particular, to the areas of core, floor, props and façade. Load-bearing designs for façade construction support the subsequent systems.



Geometry of structure

The building's footprint and its development as it gains height are unique to every project. These geometric boundary conditions such as changes in wall cross-section or inclination and the resulting complexity, as well as the number of storeys, are crucial for selection of the right formwork systems.



Budget

The investment in formwork systems pays dividends. A solution customised to meet your project's unique requirements saves resources, as well as time and money. We achieve all this with quality-tested formwork systems and an all-inclusive project solution.

Site infrastructure

Smooth and efficient construction progress depends on functioning site infrastructure. Good formwork solutions ease the workload, support concrete placement and provide a sufficient amount of storage space and load capacity.

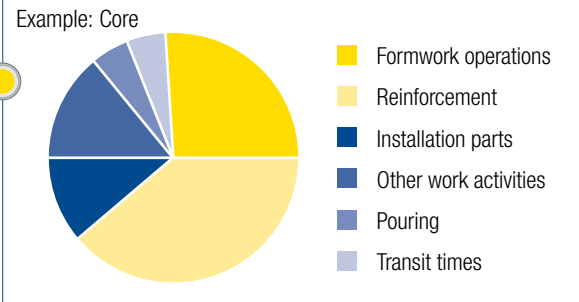
Safety in every situation

We work with our customers to develop project-specific safety concepts. From operating and implementing the formwork to stair towers, safeguarding floor edges and enclosing the climbing scaffold.



Construction method

HOW is it being built?



Installation of reinforcement

On a core build, 25-50% of the time in a cycle is spent on reinforcement activities. With a formwork solution designed specifically for your project, you'll benefit from the following: a large workspace between the reinforcement and formwork, or additional working platforms that allow you to perform formwork and reinforcement activities in parallel and further advance your construction schedule.

| | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|-----------------------|-------|-------|-------|-------|-------|
| Floor | | | | | |
| Forming | | | | | |
| Placing reinforcement | | | | | |
| Pouring | | | | | |
| Core | | | | | |
| Climbing profile | | | | | |
| Forming | | | | | |
| Placing reinforcement | | | | | |
| Pouring | | | | | |

Workflow planning

Observing cycle times – usually 3-5 days – has considerable impact on the progress of the entire project. Detailed planning of system formwork, commissioning quantities and personnel resources is critical for ensuring complete success.

Understanding effective consultation right from the start

Your project success depends not only on selecting the right formwork solutions. The close support of our experts from the start produces a comprehensive solution concept for your highrise project. And we provide a single-source supply from products, services and planning through to project management and logistics.



Every highrise is unique – as is the associated formwork solution. The starting point for developing a tailor-made formwork solution is the discovery meeting. This is when you discuss your requirements in detail with our experts for the first time.

Structural analysis

The projected structure and the development of its geometry as the building rises in height are important for selecting the right formwork concept. Only a solution based on a fundamental analysis of the entire project supports the best possible construction process.



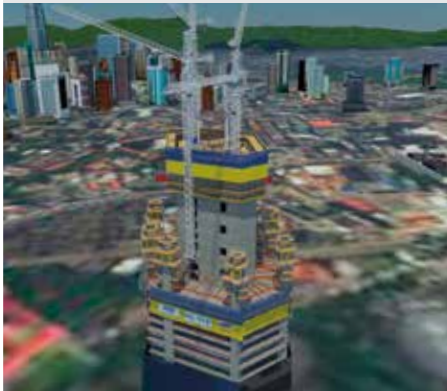
Developing the optimal formwork solutions

- Structural analysis
- Determining general conditions
- Feasibility study
- BIM – bid planning supported by simulation



BIM – bid planning supported by simulation

Intelligent networking of data, reliable planning and significant savings on time are the biggest advantages of the BIM method. We enable 3D design of formwork in Revit and Tekla and 4D simulation of progress from one defined work cycle to the next throughout the construction sequence. The net results are less labour, a better overview and more transparency throughout construction.



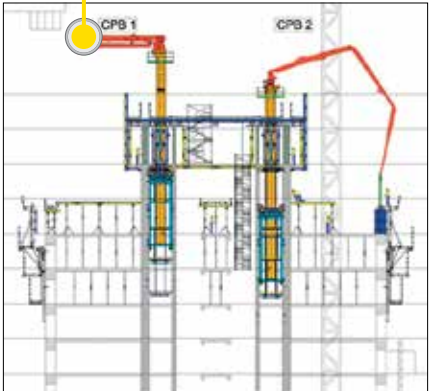
Determining general conditions

Your site-specific conditions such as required cycle time and number and positioning of the cranes are the basis for focused bid planning.



Feasibility study

The ideal formwork solution developed by our highrise experts not only includes concepts for all cast-in-place concrete components but also the services to ensure the project is cost-effective.



Understanding engineering: Efficient planning for a safe project sequence

Efficient formwork solutions can only be developed economically if there is an understanding of project requirements and construction processes. This understanding is the basis of Doka engineering services.

Approval planning

Final formwork solutions are created based on the most recent version of the planning documents. They are then submitted for a walk through and/or approval.



Execution planning 2D/3D

The execution planning stage is used to create the plans approved for construction. They include the necessary data for implementing the formwork solution and are created in 2D and, if required, in 3D in accordance with applicable standards and regulations.



Engineering

- Approval planning
- Execution planning 2D/3D
- Pre-assembly planning
- Cycle planning
- Quantities commissioned
- Statics calculations



Pre-assembly planning

The plans created and approved by Doka provide you with the detailed arrangement of individual parts for a self-assembled fixed formwork unit.



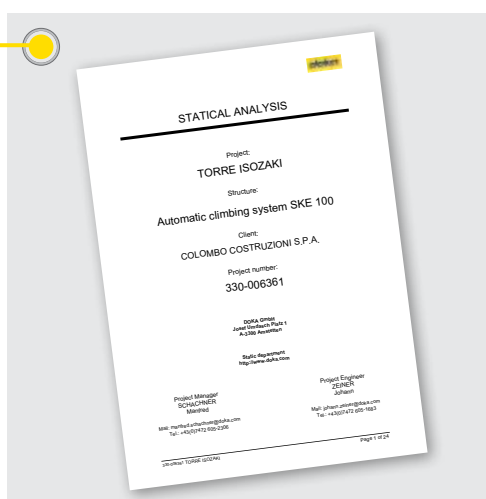
Cycle planning

When the cycles are planned the pertinent execution plans are created taking into account all specified pouring cycles.



Quantities commissioned

Based on specified pouring cycles and the resulting cycle planning, the optimised formwork quantity is determined for a predefined section.



Statics calculations

Project-specific statics calculations ensure stability and the suitability of the individual formwork units for the intended use. Depending on project progress, statics calculations range from a simple project structural analysis to exact dimensioning to local standards including documentation through to certification that they were checked by a civil or testing engineer (verified structural analysis).

_Understanding: Customised formwork solutions

Formwork solutions tailored to meet your needs for all cast-in-place concrete components from the foundation to the top storey of your highrise project.





Core, shear walls, closed facades 12

Automatic climbing formwork

| | |
|----------------|----|
| ▪ Platform SCP | 12 |
| ▪ SKE plus | 14 |
| ▪ Xclimb 60 | 16 |

Crane-lifted climbing formwork

| | |
|-------------|----|
| ▪ Xclimb 60 | 17 |
| ▪ MF240 | 18 |

Floors 20

Tableforms

| | |
|-------------------|----|
| ▪ Dokamatic table | 21 |
| ▪ DokaTruss table | 23 |

Panel floor formwork

| | |
|--------------|----|
| ▪ Dokadek 30 | 22 |
|--------------|----|

Walls, columns 24

| | |
|-------------------|----|
| ▪ Wall formwork | 24 |
| ▪ Framed formwork | 26 |
| ▪ Column formwork | 27 |

Open facades 28

| | |
|---|----|
| ▪ Protection screen Xclimb 60 | 28 |
| ▪ Vertical repositioning of floor formwork, open-facade structures | 30 |
| ▪ Special applications in facade work facade construction / building demolition | 30 |
| ▪ Safety net fan SNF | 31 |
| ▪ Edge protection system XP | 31 |

Concrete monitoring 32

| | |
|--------------|----|
| ▪ Concremote | 32 |
|--------------|----|

Platform SCP

The self-climbing forming and working platform for any highrise core

Platform SCP has room for all the site equipment needed and is fully enclosed for safe, weather-shielded working, even at great heights. Powerful hydraulic cylinders cranelessly raise the platform, formwork, equipment containers and concrete placing boom to the next casting section in a single lift.

Quickly repositioned

- the suspended formwork only has to be eased back slightly clear of the concrete for the lifting operation
- the entire platform is raised hydraulically in a single lift

Universal application specifically for highrise cores

- for 'advancing core' and 'floor and walls cast in one pour' construction methods
- several lifting unit versions permit ideal adaptation to the individual geometry of the structure

High load and lifting capacity

- the system is designed for high live loads consisting of equipment storage and site infrastructure
- ideal system solution for integrated concrete placing booms

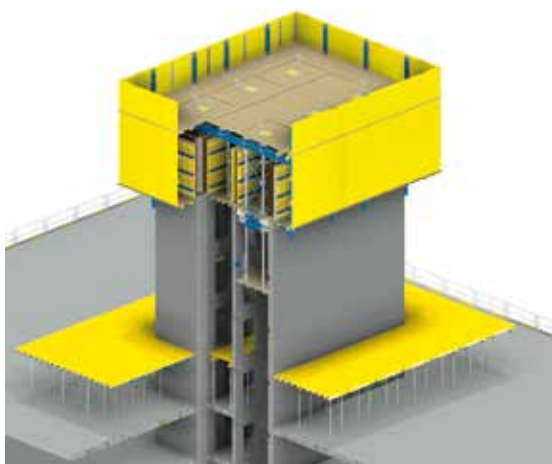


Platform SCP in use at 150 m high Mediapark office building in Cologne. ▲

One system – two construction methods

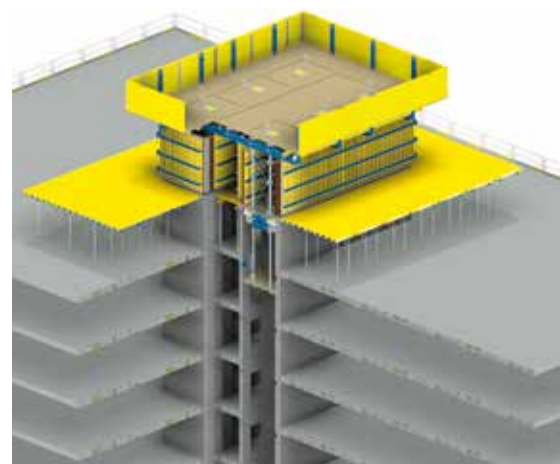
Advancing core

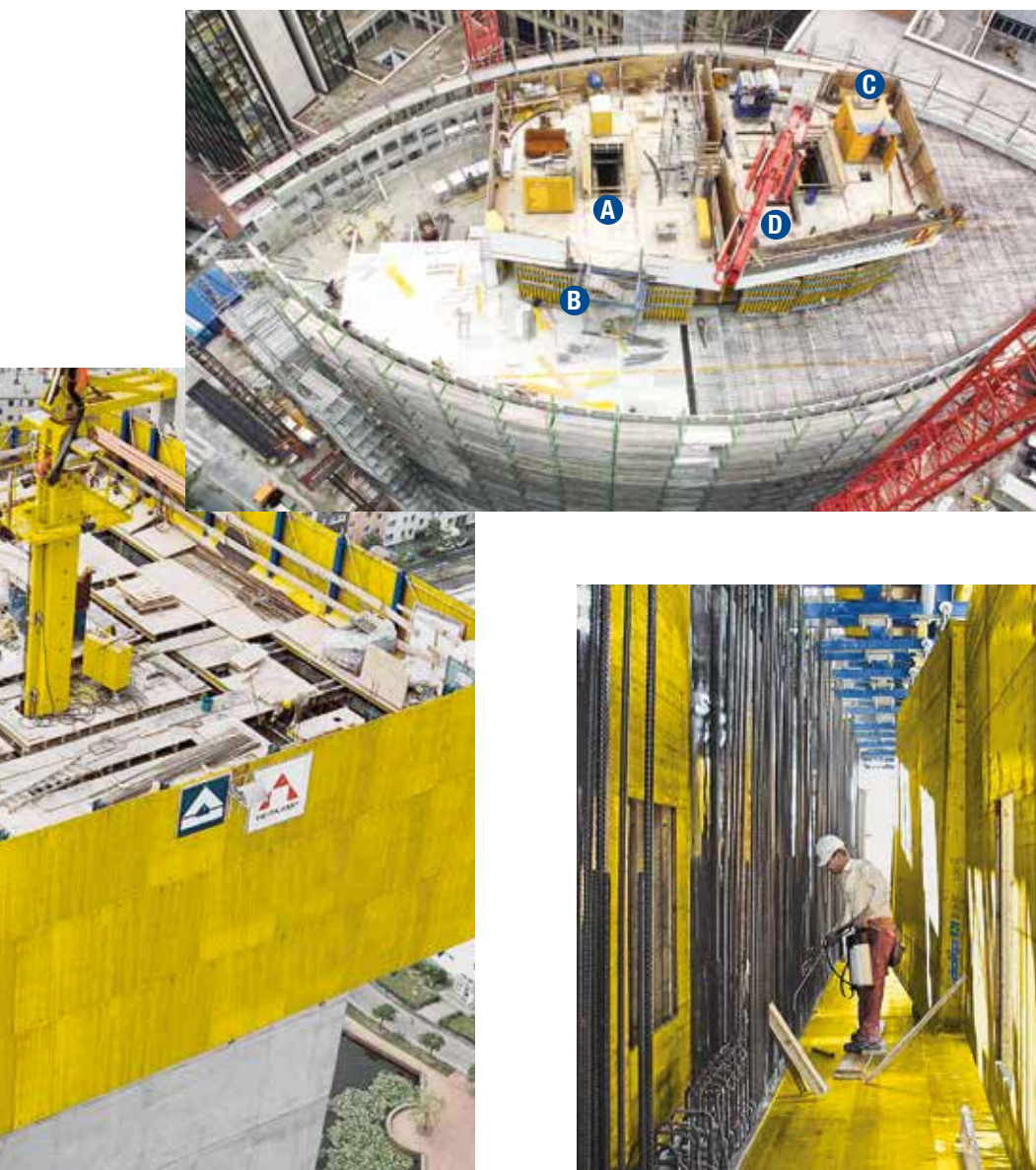
With this construction method, the core is formed in advance of the floors. Producing walls and floors separately allows for a simpler construction workflow with focus on the individual component.



Floors and walls cast in one pour

Floors and walls are produced in one step (monolithic). With ideal planning, short distances for site crew and crane speed up progress even more.





System solutions for smooth construction workflows

- A** easy site logistics made possible by openings in the decking, for equipment handling or fitted components such as stairways
- B** safe access routes by using stair towers both on and inside the platform
- C** short distances for crew to cover thanks to nearby storage areas with high live-load rating for rebar and site installations
- D** construction workflow is optimised by integrating concrete placing booms



▲ Working just like on the ground thanks to enclosed platform levels and wide stripping paths.



TECHNICAL DETAILS

- lifting capacity: 40 metric tons/lifting unit, load capacity: 60 metric tons/lifting unit
- hydraulics allow for climbing in a single lift and without noise
- weather-shielded working made possible by the fully enclosed workspace
- fully hydraulic climbing from the first casting section upward
- formwork positioning by roller suspension and spindles

Variants – anchoring to the structure

- 1** Lifting unit fixed on both sides: standard variant for a rapid start to the lifting process; gravity pawls for anchoring on each of the two opposing shaft walls.
- 2** Lifting unit fixed on one side: when walls are missing or have openings and with shear walls, for adapting to complex layouts; anchoring on one side using climbing cones and stop anchors.



More insights
in our video:

www.doka.com/platformscp-video

Automatic climbing formwork SKE plus

The crane-independent climbing formwork for structures of any shape and height

With its modular design, SKE offers an efficient solution for any type of structure and any requirement. The fully hydraulic configuration supports the construction workflow by enabling fast and safe climbing.

System variants

SKE50 plus



- ▲ For highrise cores and building facades, with 5 metric tons lifting capacity per parallel lifting unit

SKE100 plus



- ▲ For more stringent requirements such as stronger influences, extra working platforms or live loads, with 10 metric tons lifting capacity per parallel lifting unit

Smooth construction workflow

- simultaneous repositioning of many climbing units on the exterior with platforms always enclosed
- flexible cycle times of the interior gang-forms for optimum installation of the reinforcement

Adaptable to any area of use

- optimised for highrise cores and facades thanks to a flexible, system-based 'construction kit'
- adaptable to structural changes such as inclinations, wall returns and extra-high pouring sections

Practical standard solutions

- system variants with different lifting capacity for load-optimised use
- several design variants combinable for ideal project solutions



Variants of SKE plus

- 1 with **travelling unit** – more efficient and comfortable installation of reinforcement thanks to wall formwork that can be rolled back 1 m
- 2 with **rising working platforms** – separation of forming and reinforcing operations with work proceeding on several levels shortens the cycle time
- 3 with **shaft system** – a centrally positioned climbing drive allows easy forming and stripping in small-cell shaft groups
- 4 with **mast system** – load-bearing mast carrying suspended formwork for ample working space, especially for shafts
- 5 as **platform system** – for monolithic casting of floor and walls of slim structures



▲ SKE100 plus in use during the Torre Isozaki project in Milan. A combination of beam formwork and framed framework was used for the wall panels.



Safety and logistics specifically adapted to the project

The following project requirements demanded special consideration on the Tour CMA project in Marseilles:

- well-engineered safety concept
- automatic climbing formwork for concrete placing booms
- easy way to lift in prefabricated reinforcing cages
- integrated building-site container



▲ SKE50 plus and SKE100 plus climbing units in all their design variants were ideally combined on the Fountain View project in the United Arab Emirates.



TECHNICAL DETAILS

- **SKE50 plus:** lifting capacity: 5 metric tons/vertical-profile assemblage, load capacity: 6 metric tons/vertical-profile assemblage
- **SKE100 plus:** lifting capacity: 10 metric tons/vertical-profile assemblage, load capacity: 13 metric tons/vertical-profile assemblage
- weather-shielded working on the fully enclosed working platforms
- formwork positioning by travelling units or roller suspension and spindles
- for changing wall inclinations up to $\pm 15^\circ$
- single-cone anchoring of suspension shoe without reduced load capacities
- weight-optimised Suspension shoe SKE50 plus 11 kg
SKE100 plus 25 kg
- fully hydraulic climbing from the first casting section upward

Automatic climbing formwork Xclimb 60

The crane-independent climbing formwork for structures of regular shape and any height

Automatic climbing formwork Xclimb 60 is a hydraulically climbed system that can also be lifted quickly by crane. It is guided on the structure at all times, so the system can be repositioned even in windy conditions.



More insights
in our video:

www.doka.com/xclimb60-video

Design variants Xclimb 60

- 1 with **travelling unit** – more efficient and comfortable installation of reinforcement thanks to wall formwork that can be rolled back 1 m
- 2 with **telescopic shaft beams** – telescoping shaft beams for easy adaptation to shaft widths up to 6.50 m
- 3 **SKE50 plus** with **shaft system** – for shaft widths up to 3.0 m. Because they use the same hydraulic units, Xclimb 60 and SKE50 plus combined are an efficient alternative, especially for small-cell shaft groups.

Safe and fast repositioning

- because secured to the structure at all times
- crane lifts or repositioning by mobile hydraulic system

Practical standard solutions

- optimised for highrise cores and facades thanks to a flexible, system-based 'construction kit'
- ideal for grid-type facades in hybrid construction, because there is only one point of contact with the structure in each segment

Innovative, mobile hydraulic system

- double-acting hydraulic unit can climb up to 8 climbing units at once
- easy to operate by radio remote control



▲ The cores of the 40-storey office highrises 4G10 and 4G11 in Malaysia were cast using the multi-functional Automatic climbing formwork Xclimb 60.

▼ Automatic climbing formwork Xclimb 60 used to build the 'basket-grid' facade of the tallest residential building in the western hemisphere: Park Avenue in New York, 426 m high



More insights
in our video:

www.doka.com/xclimb60shorttrack-video



TECHNICAL DETAILS

- lifting capacity: 6 metric tons/vertical-profile assemblage;
load capacity: 6 metric tons/vertical-profile assemblage
- guided climbing – by crane or hydraulics
- weight-optimised guiding shoes (19 kg) and
hydraulic cylinders (24 kg) for ergonomic work
- formwork climbed by travelling units or roller suspension
and spindles
- wall inclinations up to $\pm 7^\circ$
- double-acting mobile hydraulic system with optional radio
remote control



▲ Lightweight, quick-mount hydraulic cylinders reliably lift the climbing scaffold complete with the formwork.

Automatic climbing formwork Xclimb 60 Short track

The crane-independent climbing formwork for the formed/poured in advance cores of medium-high structures.

Compact version of the Automatic climbing formwork Xclimb 60 with short, one-piece climbing profile. Mounting the climbing scaffold on the structure is a one-step operation. From the second pouring section upward, Xclimb 60 Short track climbs without crane assistance.



Guided climbing formwork Xclimb 60

The crane-lifted climbing system guided along the structure

Optimised system variant for repositioning by crane. Climbing scaffold and formwork are climbed quickly and safely in a single crane cycle, even at high wind speeds. Suspension shoes with automatic bolt-locking device make the repositioning process easier.

Climbing formwork MF240

The crane-lifted formwork for structures of any shape and height

Climbing formwork MF240 consists of wall formwork, working platforms and load-transferring brackets with travelling unit. It is lifted quickly and easily by crane.



More insights
in our video:

www.doka.com/mf240-video

Sample design, building core

1 Climbing formwork MF240

– to support the anchored wall formwork, especially on the outside of the building core. The fully enclosed platform system offers plenty of space for fast, safe working.

2 Shaft platform

– to support the wall formwork of stair-cases and lift shafts. Easing the wall formwork slightly back from the concrete is all that is necessary for climbing both platform and formwork.



Intuitive operation

- climbing platform and formwork are climbed as a single unit
- effortless manual closing and opening of the formwork by means of travelling unit and ratchet

Broad range of applications

- flexible system-based 'construction kit' permits adaptation to structures of any shape
- high-capacity brackets for large climbing units with few suspension points

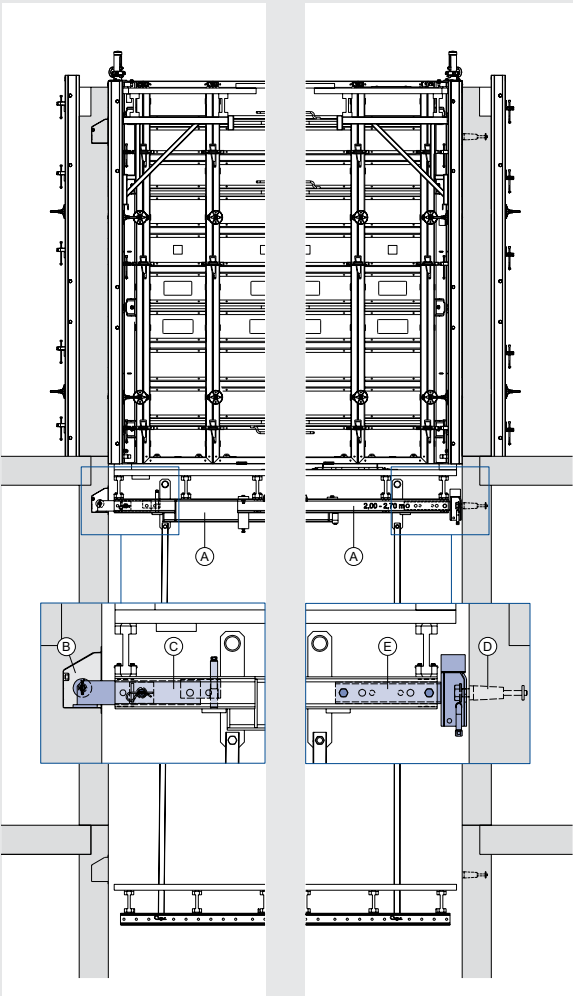


TECHNICAL DETAILS

- width of working platform: 240 cm
- roll-back of the formwork: up to 75 cm
- for wall inclinations up to +/- 15° and forming heights up to 6.0 m (anchored)
- vertical and horizontal adjustments for precision alignment of the formwork
- trailing platform with integrable ladder system for free access to the wall

Shaft platform

The climbing formwork for inside-shafts



Intuitive operation

- Stripping corner I makes quick work of forming and stripping without a crane
- shaft platform and formwork are climbed as a single unit

Broad range of applications

- telescoping shaft beams allow for easy adaptation to the width of the shaft
- practical suspension variants with gravity pawl or main beam head

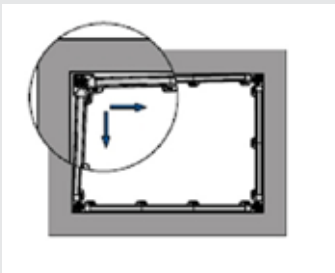


TECHNICAL DETAILS

- Shaft platform design variants
 - with gravity pawl without expendable anchoring components
 - with main beam head
- telescoping shaft beams, up to 6.14 m inside shaft width
- suspended platform equipped with ladder system for free access to wall
- choice of platform beams

Shaft formwork with Framax stripping corner I

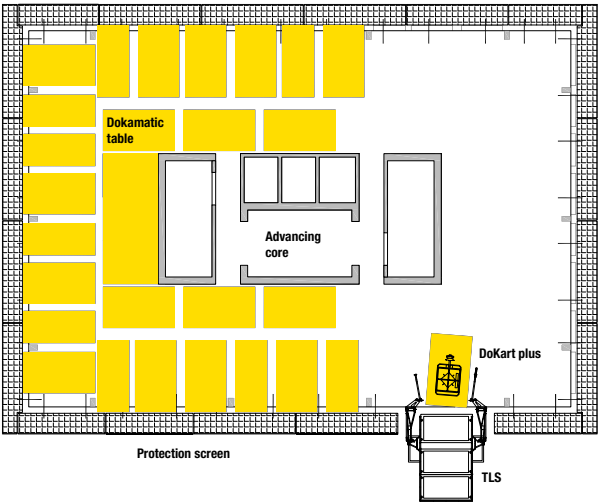
Framax stripping corner I is designed especially for shafts and combines easily with Doka framed formwork and wall formwork. The formwork is closed and opened without crane assistance, either by hand or at the push of a button with hydraulic drive. Gang-forms are lifted as single units, saving crane time.



Formwork solutions for floors

The right forming method for any type of building

The individual requirements of highrise projects call for floor systems that adapt to different circumstances in the best possible way. The floorplan and the available transport routes are crucial factors in selection of the right formwork solution. The right system contributes significantly to accelerating the construction workflow.



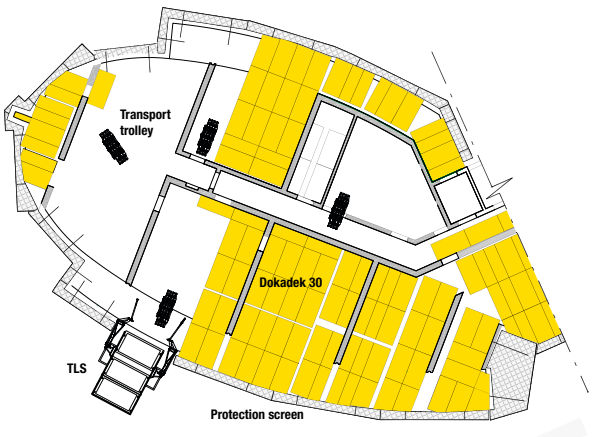
Floorplan 1 – tableform with repositioning unit

Characteristics:

- large spaces, few walls, continuous floor areas

Solution:

- using large-area tableforms reduces the number of work steps
- horizontal transport by self-propelled repositioning unit
- vertical transport with table lifting system for repositioning without crane lifts



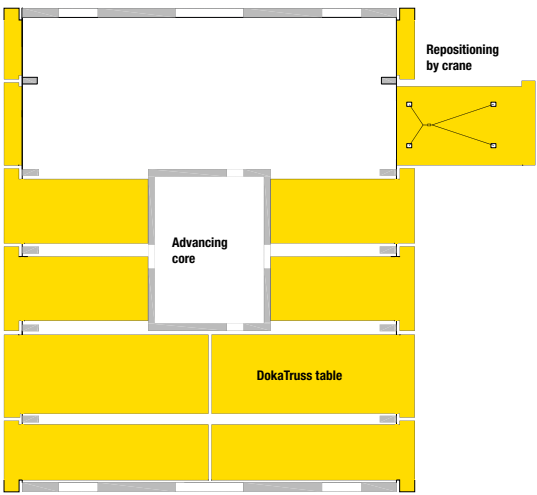
Floorplan 2 – Panel floor formwork

Characteristics:

- small to mid-size spaces, many walls, separate floor areas

Solution:

- ergonomic formwork panels for handset forming
- horizontal transport of gang-forms from one area to another with a repositioning unit
- vertical transport with table lifting system for repositioning without crane lifts



Floorplan 3 – large-area tables

Characteristics:

- large spaces, parallel walls, regular prop spacing

Solution:

- use of tableforms offering largest possible surface area adapted specifically to the structure in order to reduce the number of gang-forms to a minimum
- vertical transport with few crane lifts

Dokamatic table

Ideal interaction of formwork and transport equipment for rapid progress without crane lifts

Dokamatic tables are ideal for fast forming of large floor areas. Tableforms are quickly moved from one section to the next with the mobile DoKart plus repositioning unit and the TLS table lifting system. The self-climbing TLS table lifting system makes vertical lifts of floor formwork completely crane-independent. So the crane is freed up for other jobs.



A combination to help speed up construction workflows

- the Dokamatic table system is optimised for short forming times and varying statics and geometric requirements
- crane-independent lifts of complete units saves labour
- the self-climbing table lifting system TLS makes repositioning possible even at high wind speeds



Adapts quickly to floorplan, room height and slab thickness

- easily relocatable swivel heads for adapting to different slab thicknesses
- system solution for integration of infill zones with insertion beams
- connects seamlessly to Dokaflex
- high stability and load capacity ensured by steel walings and connecting nodes



Fast, easy repositioning with DoKart plus

- ergonomic and safe repositioning of Doka tableforms by a single operator – repositioning instead of carrying
- compact unit, tremendously mobile for easy manoeuvring
- high load capacity of 1,950 kg
- big wheels and a solid baseplate make it very rugged and reliable

Dokadek 30

Hand-set formwork for extremely fast set-up and dismantling times and easy transport

Speed tests by an independent German institute yielded excellent results. In highrise projects these simple solutions for infill and custom zones also support fast and on-time construction workflows.



Extremely fast set-up and dismantling

- each beam-less panel has a surface area of 3 m² and the panels are easily engaged and swivelled up into position from floor level
- fast and safe handling with the ergonomically designed grip-holes in the edge profiles
- simple logistics with only two panel sizes: 2.44 m x 1.22 m and 2.44 m x 0.81 m



Adaptable to any specification

- closing infill zones quickly with suspension clamps and beams, without extra floor props
- time-saving forming in non-typical areas with seamless transition to Dokaflex
- drop heads for early stripping and faster reuse of panels



Safe working conditions

- set-up work from below, so no risk of workers stepping on to unsecured panels
- heads have built-in lift-out guards to prevent the wind from lifting them out (suction effect)



Durable components

- panels, have galvanised steel frames with a yellow paint finish
- high-quality Xlife sheet for many reuses without replacing the form ply
- there are only a few joints and the patterning is neat, so great results time after time

DokaTruss table

Efficient utilisation of crane capacity made possible by largest possible table units

Tables of any size can be pre-assembled as required, because the individual components combine as needed. Repositioning the entire table in a single crane lift speeds up the construction workflow and cuts down on assembly work.



Big surface area for fast forming

- tables up to 200 m² can be repositioned in a single crane lift
- pre-assembled, so ready for use all the faster
- few loose items, saving time during forming and stripping
- widely spaced table spindles reduce work during the repositioning process



Adaptable because of system-based 'construction kit'

- stepless length adaptation by individual combinations of two segment sizes and extensions
- corner areas and infill zones between columns are formed with fold-away panels repositioned along with the table
- drop beams can be formed in the system



System solution in detail

- A** fold-away panels
- B** free choice of secondary beams and spacing to suit the formwork sheeting
- C** safety at slab edge with built-in platform
- D** combination of steel and aluminium for high load capacity at low self-weight

Doka large-area formwork

Made-to-measure large-area formwork for all shapes and loads

Customised formwork with freely selectable form-tie spacing for optimum adaptation to the structural component

Freely selectable form ply and joint pattern for adaptation to use cycles and architectural requirements

Any pouring rate, because formwork is easily dimensioned for any fresh-concrete pressure



Large-area formwork Top 50

The standard wall formwork for a multitude of tasks. The comprehensive modular system permits adaptation to any load and any shape of structure.

Large-area formwork Top 100 tec

The super-strong wall formwork for special jobs. High-strength I tec 20 box beams combined with a WU14 waling system reduce the number of form-tie points, so the site is less labour-intensive.



Large-area formwork in detail

Formwork beams **1** and multi-purpose walings **2** are spaced closer together or further apart, depending on anticipated load. The form ply **3** is freely selectable to meet a wide range of requirements.



◀ SKE100 plus as a platform system used on construction of the Torre Isozaki in Milan. Large-area formwork Top 50 and Framed formwork Framax Xlife combined perfectly for building the shaft.



▲ Top 50 in combination with climbing system SKE50 plus. Large-area formwork and climbing scaffold adapt perfectly to the unusual shape of the structure.



▲ Top 50 in combination with Climbing formwork MF240

The large-area formwork is mounted on the travelling unit and can be rolled back 75 cm without a crane.

Doka working scaffold for reinforcement work



Doka's working scaffold is the ideal add-on for all Doka formwork systems on your construction site: it ensures safety and speed during reinforcement operations.

High-tensile connections permit rapid repositioning of complete units in a single crane lift. No additional assembly and disassembly operations are necessary.

Also suitable for use as a stair tower or a mobile scaffold tower.

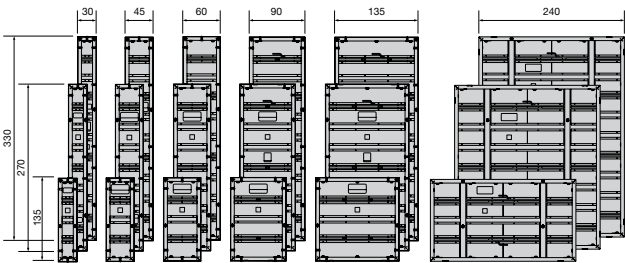
Doka framed formwork

Forming with standard panels in various sizes

Pre-fabricated framed formwork panels with consistent 15-cm increment-grid for adaptability to widely differing requirements

High re-use numbers thanks to galvanised, powder-coated framed formwork panels with the Xlife formwork sheet and plastic-enhanced surface for a long lifespan

Designed for 80 kN/m² fresh-concrete pressure for fast pouring



Framed formwork Framax Xlife

The high-performing steel-framed formwork for all-round use. It takes only a few panels to achieve a consistent 15-cm increment-grid, no matter whether the panels are stood upright or on their sides. All fixings and accessories fit seamlessly into this increment-grid, making them convenient to use on the job.



Framed formwork Framax Xlife in detail

Ingeniously co-ordinated panel formats up to 2.40 m wide and 3.30 m high help you make optimum use of formwork commissioning quantities.

Framed formwork Framax Xlife plus

The new framed formwork with tie rod system that can be operated from one side. The centrepiece of this wall formwork is the Framax Xlife plus form tie. It can be operated from one side and saves up to one third in forming and stripping time. Due to its conical shape, there is no need for jacket tubes and cones.





◀ Framax Xlife in combination with self-climbing system Xclimb 60.

The built-in stripping corner makes for easy forming and stripping, particularly for shafts.

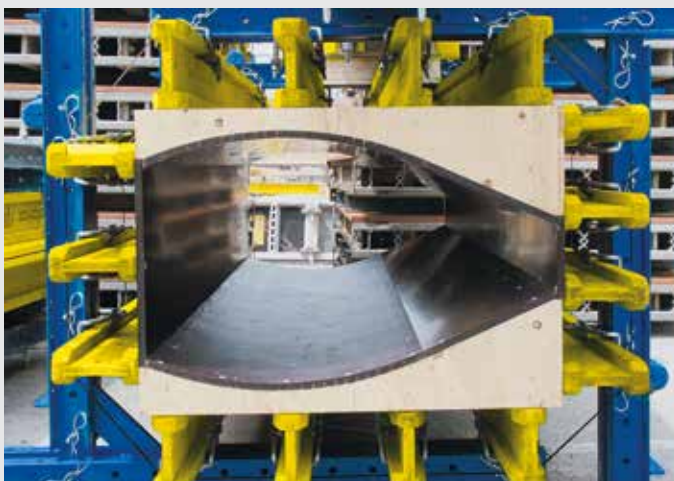


▲ Framax Xlife in combination with SKE100 plus

The wall formwork is precisely positioned vertically and horizontally using roller suspension and spindles.



Doka column formwork



- **Column formwork Top 50**
for CIP columns of any shape and height
- **Column formwork Framax Xlife**
for rectangular and square CIP columns
- **Column formwork KS Xlife**
for column formwork with folding mechanism
- **Column formwork RS**
the steel formwork for round column cross-sections
- **Custom solutions made of steel**
adapted individually to your project requirements

Protection screen Xclimb 60

Flexible enclosure for all highrise projects

Protection screen Xclimb 60 allows the crew to work at the top levels of highrise projects while remaining safe and protected from the weather. Protection screen Xclimb 60 is a hydraulically climbed system that can also be lifted quickly by crane when crane capacity is available. Because it is continuously structure-guided, it can be operated even at high wind speeds. The system comes in several versions, giving you the ideal solution for any requirement.

Working safely at any structure height

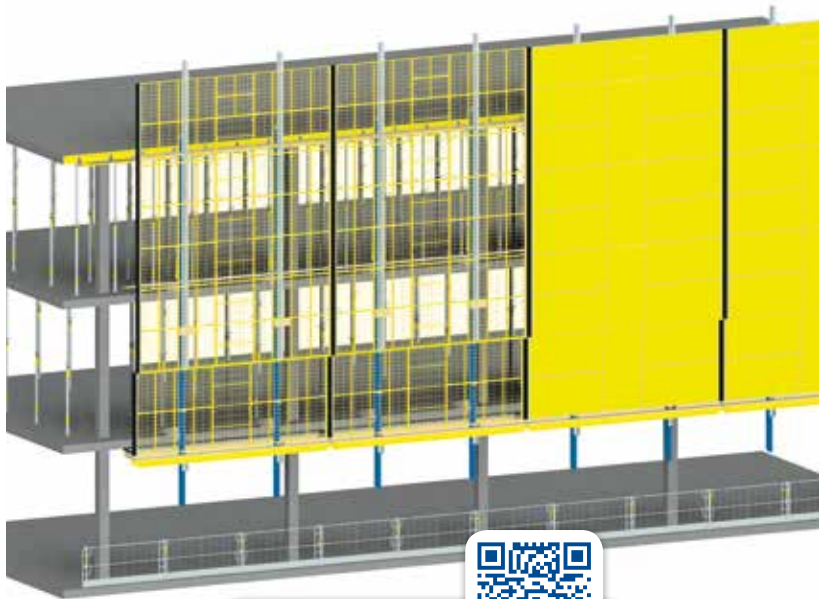
- gapless enclosure prevents falls and protects the crew against wind and weather
- secured to the structure at all times

Can be used anywhere

- several design variants with respect to type of enclosure and working platforms
- adjustable floor supports for facades with both changing and constant inclinations

Smooth construction workflow

- crane lifts or repositioning by mobile hydraulic system
- the system can climb at any time, even while the slab is formed in



More insights
in our video:

www.doka.com/screenxclimb60-video

Enclosure design variants

Framed enclosure Xbright

Frame-based enclosure panels and simple panel connections ensure rapid pre-assembly by hand. The entire protection screen system is available for rent.



Frame with polycarbonate inlay
translucent, wind-impermeable and
non-see-through



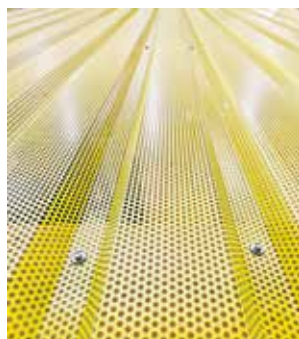
Frame with grid inlay
translucent

Trapezoidal sheet enclosure

An alternative design variant especially for projects with lengthy construction time. The free choice of enclosure and girder grille enables adaptation to customer-specific needs and preferences.



Trapezoidal sheet
wind-impermeable and non-see-through



Perforated trapezoidal sheet
translucent



▲ The mobile hydraulic unit is designed for simultaneous repositioning of up to 8 climbing units. Flat-face couplers and optional remote control ensure fast and easy operation.



▲ Ideal system solution for sealing: overlapping sealing profiles between protection screen units allow for horizontal movements up to ± 5 cm.



► In use even on structures with complex geometry – the innovative floor supports enable the protection screen to track the building contour, with the gap remaining at a constant minimum. This helps ensure the highest possible level of workplace safety.



TECHNICAL DETAILS

- lifting capacity: 6 metric tons/lifting unit; load capacity: 6 metric tons/lifting unit
- guided climbing – by crane or hydraulics
- double-acting mobile hydraulic system with optional radio remote control
- system solution for horizontal and vertical sealing
- floor supports can be anchored to structure without lost anchoring components
- for complex building geometries such as varying facade inclinations up to $\pm 10^\circ$
- Framed enclosure Xbright, also with telescoping function for flexible width adaptation, for transport and for dealing with changes in floor-plan

► Working-platform width is custom-matched to the project, depending on requirements. Made-to-measure covers permit work to proceed in safety underneath the protection screen, for example when facade elements have to be installed.



▲ Easy and precise positioning of re-usable suspension points as they are fixed directly on the floor formwork

Vertical repositioning of floor formwork, open-facade structures

Customised solutions for transporting loads

Fast, safe vertical repositioning of formwork and material is particularly important in highrise construction. Solutions ranging from simple loading platforms to crane-independent lifting systems are available and permit the construction process to progress smoothly.



◀ Multiple loading platforms on different storeys simplify materials logistics. Telescoping loading platforms can also be arranged vertically in a line. ▼



▲ With the Table Lifting System TLS, loads can be repositioned vertically without crane assistance. The TLS can be suspended from the structure or used as a self-climbing system, and it also integrates perfectly into Doka protection screens.

Special applications in facade work

Doka climbing technology for special requirements

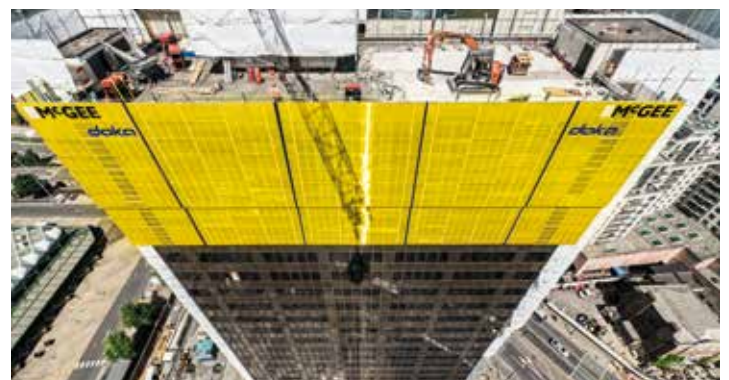
Facade construction

Fully enclosed, self-climbing working platforms facilitate the installation of facade elements with regard to workplace safety, accessibility and independence from wind and adverse weather conditions.



Renovation and demolition of structures

Protection screen Xclimb 60 climbs hydraulically downward in sync with the progress of demolition work. This dispenses with the costly and time-consuming erection of a full scaffold enclosure.



Safety net fan SNF

The dependable tray-net barrier to catch falling debris on any building

The Safety Net Fan SNF increases safety on construction sites and minimises the risk of parts falling while work is in progress. The three-layer net is available in a range of versions which, combined with add-on parts, permit adaptation to structures of any shape.



- 3-layer safety tray net
- units overlap by 0.85 m
- nets are resistant to ultraviolet light
- compliant with EN 1263 and ANSI 10.37
- range of adapters for flexible adaptation to any structure
- low weight of the individual parts for easy, effortless handling
- four types of net available in different widths and lengths

Edge protection system XP

Fall protection for use on both structure shell and formwork

The universal safety solution for all edge protection needs: perfect for fall protection on structure shell and compatible with Doka wall and floor formwork.

All-in-one system for fall protection

- only one upright for all types of edge protection from 1.20 m to 1.80 m high
- various widths and heights of protective grating
- adapters for any given application

Tested safety

- hot-dip galvanised and very strong
- compliant with EN 13374, GS mark



Concrete monitoring with Concremote

Measuring concrete temperature and strength in real time

With Concremote you can plan your construction project better and no matter where you are, you have round-the-clock access to your real-time data. So you can gauge concrete performance and initiate the necessary measures at exactly the right time.



**Save
time**



**Increase
safety**



**Enhance
concrete quality**



**Reduce
costs**



▲ How to use Concremote slab sensors

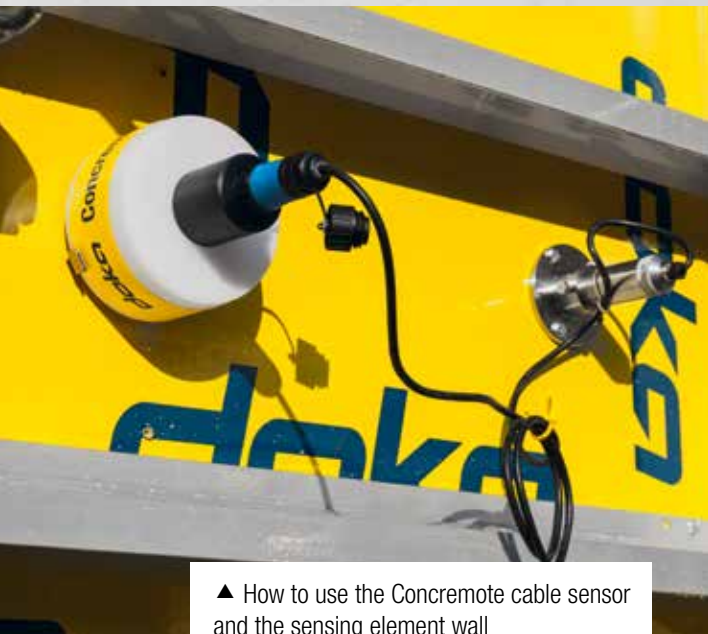
More insights
in our video:



www.doka.com/concremote

Generation 2.0

The tried-and-tested Concremote sensor technology is enhanced with new features, including additional networking options (2G, 3G, 4G, Bluetooth Low Energy (BLE), an LED status indicator, rechargeable batteries, and a smaller housing designed to withstand the harsh conditions of construction. The new version is available now as your reliable concrete wizard.



▲ How to use the Concremote cable sensor and the sensing element wall

Proof of thermal stresses in structure to prevent cracking:

- real-time monitoring of the difference between core temperature and surface temperature with Concremote sensors
- the early-warning system enables measures to be implemented quickly to avoid cracking, e.g. heating, cooling, covering
- suitable for solid components with high quality requirements, e.g. foundations, mega-columns, shear walls and core walls
- temperature development is documented and can be called up at any time in the Web portal

Proof of concrete strength for safe stripping and climbing operations:

- real-time monitoring of strength development with Concremote sensors
- active notification (by text message or email) when target strength is reached
- supports earliest possible stripping of the floor slab, so commissioning quantities are optimised
- supports earliest possible stripping and repositioning of the climbing formwork for shorter cycle times
- strength development is documented and can be called up at any time in the Web portal



_Understanding: Creating a project sequence that is safe

From planning stage through to project completion, Doka experts provide help with professional consultation in case questions arise. Safe use of formwork systems is achieved not only by the system, but even more so by using the system components correctly. Documents, practical tips, training right on site and verified systems support a safe project sequence.

Documentation

The following technical documentation ensures that your project solution can be calculated, configured, commissioned and dismantled safely and as intended:

- Planning documents
- Statics calculations
- User Information booklets
- Operating Instructions for CE-compliant systems
- Safety posters / checklists
- Video clips of system in use



Formwork instructor

The Doka Formwork instructor is a specially trained and experienced practitioner on the site. He provides the site crew with support in efficient and safe formwork use on the construction site. As a result you are ensured the best possible use of resources in terms of personnel and systems.



Safety with Doka

- Documentation
- Formwork instructor
- Training / Operation licence
- Standards-compliant and verified systems



Training / operation licence

Doka offers you detailed product and system training. The people who use automatic climbing formwork or the table lifting system TLS need special knowledge which can be imparted only by skilled Doka personnel in a separate training programme (operation licence).



Deutsches
Institut
für
Bautechnik

DIBt



European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung



Standard-compliant and verified systems

Certificates and awards issued for standard-compliant Doka formwork systems are your guarantee for high quality and safety. Additionally, all products are tested regularly at Doka's Test Center in Amstetten.

Understanding the importance of time: Logistics network for fast availability worldwide

To ensure a smooth construction workflow, the entire logistics network has to mesh like clockwork. Doka logistics experts plan and provide on-site support of deliveries and return shipments, site logistics and much more.



Delivery and return delivery just in time

Precisely scheduled deliveries are crucial on sites where access is restricted and storage space is at a premium. Punctual, precisely planned deliveries of standard and special shipments ensure on-time use of the formwork on site.



Logistics

- Delivery and return delivery just in time
- Site logistics
- Formwork return
- Cleaning and reconditioning
- myDoka

Site logistics

Highrise projects require huge quantities of materials. Accordingly, logistics control of formwork in construction operations is challenging. One way Doka can support you is with logistics concepts for intermediate storage and repositioning of formwork.

Formwork return

The rental formwork is inspected jointly right on the site or at the Doka branch. This way any damage and follow-up costs are defined together and transparently listed in a report.

Cleaning and reconditioning

At Doka Reconditioning, your formwork is cleaned and perfectly reconditioned in keeping with Doka quality standards. The necessary repairs are carried out and replacement parts properly installed. This extends the lifespan and ensures safety and reliability the next time the formwork is used.

myDoka

myDoka is the electronic customer portal for your project-specific data. myDoka provides you with 24/7 access to your latest inventory and transaction data, giving you an overview of all key information. From planning to evaluation, from contracts all the way through to controlling: you will find all your data displayed at a glance and always up-to-date.

A photograph of two construction workers on a site. The worker on the left is an older man with a mustache, wearing a yellow hard hat with the 'doka' logo, safety glasses, and a high-visibility yellow vest over a blue shirt. He is pointing his right index finger upwards. The worker on the right is a younger man wearing a blue hard hat with safety glasses, and a high-visibility yellow vest over a blue shirt. He is smiling. They are standing in front of a blurred background of construction scaffolding and a brick wall.

Understanding what happens on site: We are where you are.

We back up our promise on site. When it is time to put the made-to-measure formwork concept for your highrise project into practice, our formwork experts are by your side. This is how we ensure that construction workflows and schedules can be kept and the project successfully realised.

Pre-assembly Service

Special factors and structural requirements frequently call for an individualised approach. Doka's solutions include customised formwork, pre-assembled working platforms or protective screen units assembled at Doka Pre-assembly Service centres. This reduces assembly work and need for space on your construction site.



Pre-assembly on site

Out-of-the-ordinary formwork jobs require specially trained personnel for pre-assembly, operation and dismantling. Doka experts handle these tasks for you directly on site. All this ensures a smooth start of formwork operations.



Formwork instructor / technician

The Doka Formwork instructor is a specially trained and experienced practitioner on the site. He provides the site crew with support in efficient and safe formwork use on the construction site. As a result you are ensured the best possible use of resources in terms of personnel and systems.



Formwork inspection as assembled

The Doka Formwork instructor or technician checks the site in your company so you know that the formwork is correctly assembled. Faulty utilisation is identified immediately and can be corrected before pouring commences.



Customer service

Proper servicing and preventive maintenance of electrical and hydraulic formwork equipment by Doka specialists ensure troublefree operation on site.



Lotte World Tower

Lotte World Tower - Seoul, South Korea. The tallest building in Eastern Asia soars into the sky. Standing 555 metres tall, the tower boasts elegant architecture making it a resplendent feature of the city's skyline. It was made possible by the technology and know-how of the Doka formwork experts. Automatic climbing formwork SKE100 and SKE50 plus, combined with Protection screen Xclimb 60, ensured swift and safe progress on the build.

Challenge:

- from the 40th floor upward, the facade geometry tapers from 250 m to 100 m side length
- combination of steel frame construction for the floor slabs with cast-in-place core and mega-columns
- tight schedule for operations scheduling and construction



Location: Seoul, South Korea
Construction work by: Lotte Construction
Architect: Kohn Pederson Fox
Type of structure: office/administration/multi-purpose building
Height: 555 m
Storeys: 123
Cycle time: 7-day cycle

Customer benefits & solution:

- complete enclosure of 4.5 floors with protection screen units telescoping up to 2 m
- formwork operations and reinforcement work separated for fast cycle times by using climbing scaffolds and working platforms
- optimised construction process made possible by the Putzmeister MX concrete placing technology built into the formwork concept for the outside of the core
- on-time job scheduling with only 3 months lead time thanks to cross-border formwork planning involving up to 20 Doka technicians

Products used:

Core: Automatic climbing formwork SKE100 and Xclimb 60, Large-area formwork Top 50

Mega-columns: Automatic climbing formwork SKE50 plus, Large-area formwork Top 50

Facade: Protection screen Xclimb 60 with trapezoidal sheet enclosure

Construction time: 2011 – 2015





European Central Bank

The new headquarters building of the European Central Bank is situated on the right bank of the River Main, on the site of Frankfurt's former wholesale market hall.

Location: Frankfurt am Main, Germany
Construction work by: Ed. Züblin AG, Stuttgart
Architect: COOP HIMMELB(L)AU Architects, Vienna
Type of structure: Office building
Height: 185 m or 165 m
Cycle time: 6-day cycle

Customer benefits & solution:

- only minor modifications because the core formwork solution, consisting of a high-capacity Automatic climbing SKE100 work platform, adapts to wall inclination
- the automatic climbing table lifting system TLS on the inclined facade means that no time is lost waiting for the crane
- high-level safety at slab edge even with changing floorplans and inclinations because work proceeds inside a gapless enclosure with Protection screen Xclimb 60
- certainty of costs, scheduling and quality with the Pre-assembly on site service

Challenge:

- significant parts of core and facade inclined up to 8.9°
- twisting polygonal floorplans up the entire height of the building
- high degree of crane-independent and high-performing formwork solutions

Products used:

Core: Platform SCP, Automatic climbing formwork SKE50 plus, SKE100 and Xclimb 60, Large-area formwork Top 50

Facade: Protection screen Xclimb 60 with framed enclosure Xbright, table lifting system TLS

Floor: Dokamatic table

Construction time: 2010 – 2014



Minerva Tower

Rising out of a 12-storey car-parking podium, the 82 floors of the highrise reach up 300 m into the sky in two separate towers. The Minerva Tower was named after the Roman goddess of wisdom; its shape is reminiscent of an oversized letter 'M'.

Challenge:

- high reinforcement ratio of core walls and shear walls
- maintain steady utilisation of manpower over the construction schedule
- building core advances approximately 5 floors ahead of the floor operations
- system solution for door box-outs



Location: Mumbai, India
Construction work by: Larsen & Toubro Construction, India
Architect: Hafeez Contractor
Type of structure: Luxury residential building
Height: 307 m
Storeys: 82
Cycle time: 10-day cycle

Customer benefits & solution:

- formwork concept allows simultaneous reinforcement work for the next section and stripping work as soon as the concrete has hardened
- dividing the building core into 4 pouring zones for the individual teams' continuous job cycles
- stair tower with grid enclosure suspended from the scaffold ensures fast and safe ascent to and descent from the work stations
- optimised formwork operations thanks to the swing-out side formwork for door openings integrated into the wall formwork

Products used:

Core: Automatic climbing formwork SKE50 and SKE100, Large-area formwork Top 50

Shear walls: Automatic climbing formwork SKE50, Large-area formwork Top 50

Construction time: 2012 – 2016



Vienna's 'HoHo Wien'

An innovative wooden hybrid highrise structure 24 floors and 84 metres tall is under construction in Vienna's Seestadt Aspern district. Wood is used for some 75 % of the structure from the ground floor upward, but cast-in-place concrete is an essential on this build. The all-important smart formwork solution for the concrete core is from Doka.



Location: Vienna, Austria

Construction work by: HANDLER Gruppe

Architect: RLP Rüdiger Lainer + Partner

Type of structure: Highrise with innovative timber-construction technology

Height: 84 m

Cycle time: 10- to 14-day cycle

Customer benefits & solution:

- concept optimised for the construction process on this build; it combined automatic and crane-lifted climbing formwork
- fast closing and opening of the shaft formwork with Framax stripping corner I
- no unforeseen disruptions in the work sequence, because forming and casting of the concrete ledges was taken into consideration right from the start
- resources are conserved by industrial, high-quality pre-assembly of the working platforms by the Doka Pre-assembly Service

Products used:

Core: Framed formwork Framax Xlife, Automatic climbing formwork Xclimb 60, Shaft platforms, Climbing formwork MF240

Floor: Dokaflex

Construction time: 2017 – 2019

Challenge:

- formed/poured in advance cores with small shaft dimensions
- concrete ledges projecting from the core walls, designed to carry the timber floor structures
- limited on-site resources for pre-assembly





OMNITURM

In the heart of Frankfurt's financial district, the OMNITURM tower rose skyward. The almost rectilinear glass tower brings action to the city's skyline, because at about half-height the tower describes what could be called 'a shift of the hip'. For this spiralling shift of the building's axis, Doka developed a protection screen that can tilt forward, backward and sideways to 21 degrees.

Location: Frankfurt, Germany
Construction work by: Adolf Lupp GmbH & Co. KG
Architect: Bjarke Ingels Group (BIG)
Type of structure: Multi-purpose building
Height: 190 m
Cycle time: vertical sections 4-day cycle, sloping sections 7-day cycle

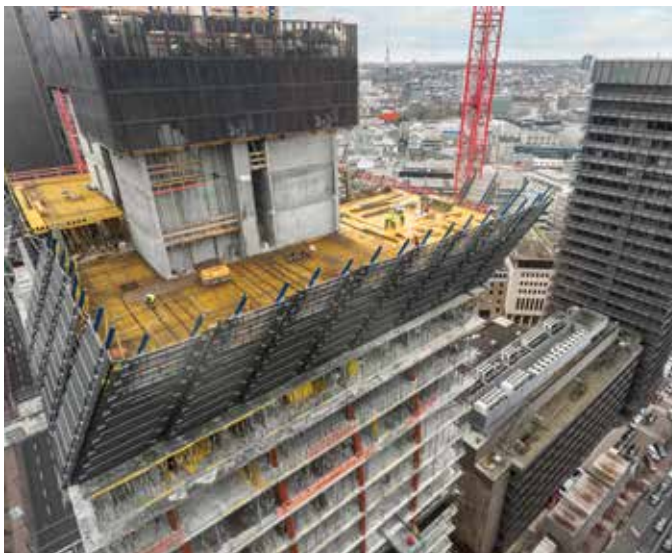
Customer benefits & solution:

- protection screen follows the continuously changing geometry of the structure between the 13th and 22nd storeys, no additional alterations necessary
- protection screen can be angled up to 21° forward or back and also up to 21° to either side, to ensure compliance with the high requirements for health and safety and tight fit against the structure at all times
- functional dependability of the protection screen solution right from the start, because it was modelled and analysed in 3D by Doka specialists with Autodesk Inventor
- compliance with the project owner's schedule by spot-on delivery of pre-assembled units to site and speedy final assembly by Doka

Products used:

Core: Platform SCP, Large-area formwork Top 50, Stair tower 250 (suspended)
Façade: Protection screen Xclimb 60
Floor: Dokaflex

Construction time: 2017 – 2019



Challenge:

- exceptional geometry of the structure with extremely challenging angles of façade inclination
- protection screen solution capable of adapting to the radical change in the structure's geometry between floors 13 and 22
- only 8 months lead time for planning, delivery and on-site assembly of the protection-screen custom solution and the platform solution
- extremely limited space, because the site is right in the centre of Frankfurt city





Location: Shams, Abu Dhabi, United Arab Emirates
Construction work by: Fibrex Contracting
Architect: Woods Bagot / AECOM
Type of structure: Residential tower
Height: 110 m
Cycle time: 5- to 7-day cycle

Customer benefits & solution:

- simultaneous climbing of up to 8 units by innovative double-acting hydraulic system
- high work productivity from day one, owing to short familiarisation period and easy operations with only a few work steps in the climbing procedure
- work proceeding in the typical cycle from the 3rd pouring section onward
- safe climbing even in high winds, because the system remains connected to the structure at all times

Products used:

Core: Automatic climbing formwork Xclimb 60
 Short track, Large-area formwork Top 50

Construction time: 2016 – 2017

Shams Meera

Shams Meera in Abu Dhabi is a residential development consisting of two 25-storey towers near the planned Shams Park. The two towers stand on a common podium with shared gardens, swimming pool and children's play area.



Challenge:

- limited crane capacity and crane time available for construction of the formed/poured in advance cores
- automatic climbing system is easy to set up and operate
- safe and fast repositioning of the climbing units

432 Park Avenue

A new residential building to best all others has been erected in Manhattan. The 432 Park Avenue tower is located in close proximity to New York's Central Park and stands 426 metres tall. The building's architecture is marked by lean proportions resulting from a square footprint of approx. 28 x 28 m and remaining rigorously unchanged over the entire height.

Challenge:

- 2-day/3-day cycle for advancing building core
- production of slab-edge drop beams and uprights in fair-faced concrete quality in the same work cycle
- limited craneage; only one crane with needle-type boom



Location: New York City, USA
Construction work by: Roger & Sons Concrete
Architect: Rafael Viñoly Architects, SLCE Architects
Type of structure: Luxury residential building
Height: 426 m
Storeys: 96
Cycle time: 2-day/3-day cycle

Customer benefits & solution:

- fast core operations with Framed formwork Framax Xlife with widely spaced ties and Framax stripping corner I
- fast repositioning of the entire platform in a single lift in less than 90 minutes
- fast forming of slab-edge drop beams and uprights in fair-faced concrete quality with self-climbing Xclimb 60 formwork-platform scaffold and made-to-measure custom steel formwork
- additional lifting capacity of the self-climbing table lifting system TLS on the facade

Products used:

Core: Super Climber SCP, Framed formwork Framax Xlife

Façade: Automatic climbing formwork Xclimb 60, custom steel formwork, table lifting system TLS (self-climbing)

Floor: Load-bearing tower Staxo 100

Construction time: 2011 – 2016





Challenge:

- customer's own material taken into account in planning and execution of the build
- available crane capacities had to be reserved primarily for work on the steel-girder skeleton and the slabs
- space severely limited inside the individual shafts

Azuri Peninsula

In the Eko Atlantic City marina in the heart of Nigeria's business capital Lagos, the Azuri Peninsula is one of the most ambitious and spectacular residential construction projects in all of Africa. Doka is supplying the automatic climbing formwork systems and the technical expertise for three residential towers on this project.



Location: Marina District, Eko Atlantic City, Lagos, Nigeria
Construction work by: ITB FZE – a subsidiary of ITB Nigeria Limited
Architect: MZ Architects & Design Group Nigeria Limited
Type of structure: Residential towers/mixed-use real estate
Height: 140 m
Storeys: 32
Cycle time: 6-day cycle

Customer benefits & solution:

- a one-time investment in a universal automatic climbing system with lifting capacity of 5 metric tons and durable, galvanised individual components, subsequently available for future projects
- automatic climbing formwork SKE50 plus enables craneless lifting of the core formwork from the 1st pouring section upward
- ample space for optimum placement of the reinforcement, because the formwork opens well clear and the inside and outside sets of formwork climb sequentially

Products used:

Core: Automatic climbing formwork SKE50 plus and SKE50, Large-area formwork Top 50

Construction time: 2016 – 2020



Location: Dubai, United Arab Emirates
Construction work by: TAV Construction
Type of structure: Office building, hotel
Height: 264 m
Storeys: 66
Cycle time: 5-day cycle

Customer benefits & solution:

- certainty of schedule and quantities with JIT time delivery of formwork materials from nearby Doka country headquarters
- certainty of planning and quality with ready-to-use formwork panels manufactured by Doka's Pre-assembly service
- faster construction workflow because the formwork solution allows separate production of the building components

Products used:

Core: Automatic climbing formwork SKE50 plus, Large-area formwork Top 50
Shear walls: Climbing formwork MF240, Framed formwork Framax Xlife
Floor: Panel floor formwork Dokadek 30, Dokaflex tables

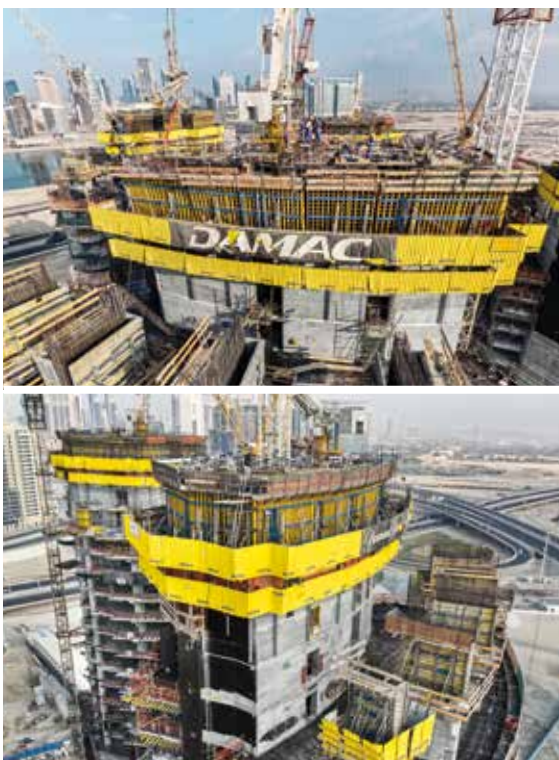
Construction time: 2013 – 2017

Challenge:

- short project lead time and high volumes of materials required for simultaneously erecting 4 towers
- limited storage space and reduced availability of crew members for assembly
- tight construction schedule

Damac Towers by Paramount Hotels & Resorts

The skyline of Dubai, the city in the Arabian desert, is enhanced by an architectural masterpiece. The Damac Towers project consists of a hotel highrise and three residential towers interconnected by a podium.



Crescent Development Project

With 450,000 m² of residential, office and shop space, Crescent City and Crescent Place will be the new centre of Baku. 205 metres tall and with 41 storeys, the Crescent City office tower overlooks the complex. The complex also includes Crescent Place, an 8-storey shopping centre that supports a 170-metre residential tower accommodating 168 apartments, and the La Luna hotel tower with its unusual shape.



Challenge:

- high wind speeds restrict crane usage
- changing core geometry with discontinuous walls and changes in wall thickness
- tight construction schedule

Location: Baku, Azerbaijan

Construction work by: Ilk Insaat MMC

Architect: Heerim Architects & Planners

Type of structure: Crescent City (office tower), Crescent Place (residential tower, shopping centre) La Luna (hotel)

Height: Crescent City: 205 m, Crescent Place: 174 m, La Luna: 170 m

Storeys: 41 / 35 / 28

Cycle time: 6-day cycle

Customer benefits & solution:

- largely independent formwork concept designed for maximum wind speed of 210 km/h
- fewer cranes, less crane time because of the self-climbing Table lifting system TLS
- only minor modifications needed because the core formwork solution is comprised of Automatic climbing formwork SKE plus and Large-area formwork Top 50
- formwork instructor and technician on-site support for set-up and coordination of materials

Products used:

Core: Automatic climbing formwork SKE50 plus and SKE100 plus, Large-area formwork Top 50

Floor: Load-bearing tower d2, Dokaflex

Façade: Protection screen Xclimb 60, table lifting system TLS (self-climbing)

Construction time: 2013 – 2016





Location: Lima, Peru
Construction work by: COSAPI S.A.
Architect: Bernardo Fort-Brescia
Type of structure: Office and administration building
Height: 134 m
Storeys: 30
Cycle time: 5-day cycle

Customer benefits & solution:

- two table lifting systems TLS integrated into the protection screen for craneless lifting of loads up the facade, which has a 2° angle of inclination
- efficient installation of reinforcement, because the formwork concept combines Platform SCP and Automatic climbing formwork SKE50 plus on the outside of the core
- fast and easy horizontal repositioning of floor formwork; large-area Dokaflex tables moved with DoKart plus

Products used:

Core: Platform SCP, Automatic climbing formwork SKE50 plus, Large-area formwork Top 50

Façade: Protection screen Xclimb 60 with trap-ezoidal sheet enclosure, table lifting system TLS (self-climbing)

Floor: Dokaflex tables, Staxo 40

Columns: Column formwork Frami Xlife

Construction time: 2014 – 2015

Challenge:

- severely limited lifting capacity; only one tower crane on site
- thick core outer walls with high reinforcement ratio and screw/sleeve adapters for reinforcing rods
- short pouring cycles for floors and walls

Banco de la Nación

The new headquarters building of the National Bank in Lima, Peru, offers 66,580 m² of floor space and is 134 m high. With its two building facades inclined by 2°, the design reflects the balance between tradition and modernity. Using Doka formwork solutions, the bank's headquarters were erected in the shortest possible time and in compliance with high-level safety requirements.





Location: Milan, Italy
Construction work by: Colombo Costruzioni
Architect: Arata Isozaki
Type of structure: Office/administration and multi-purpose building
Height: 220 m
Storeys: 52
Cycle time: 6-day cycle

Customer benefits & solution:

- elimination of the construction joint between floor and core, because the working platform is anchored to the inside of the core and the outside formwork is suspended
- no temporary openings in floors because the self-climbing concrete placing boom technology is integrated into the core formwork concept
- safe working conditions at the floor edge with integrated horizontally adjustable working platforms in the protection screen

Products used:

Core: Automatic climbing formwork SKE100 plus, Large-area formwork Top 50

Facade: Protection screen Xclimb 60 with trapezoidal sheet enclosure

Construction time: 2012 – 2015

Torre Isozaki

A new business and residential district was created as part of the CityLife Project in Milan. Its centre is made up of three new flagship structures: Torre Isozaki by Arata Isozaki, Torre Hadid by Zaha Hadid and Torre Libeskind by Daniel Libeskind. Given each one of their shapes, people also refer to them as 'the straight', 'the crooked' and 'the hunchback'. Standing 220 m high, Torre Isozaki is one of the tallest buildings in Italy.

Challenge:

- first highrise in Italy built by the 'monolithically cast floor and walls' construction method
- special facade shape with floor edges alternately projecting and recessed by 30 cm from storey to storey





Ağaoğlu Maslak

A major infrastructure project was launched in Istanbul in October 2012. The new district is named Ağaoğlu Maslak 1453; it is home to office buildings, apartments, a hotel and a modern urban entertainment centre with shopping mall on an area of 325,000 m². Doka was supplying the formwork solution for the heterogeneous architecture that included five high-rise buildings.

Location: Istanbul, Turkey
Construction work by: Akdeniz Construction Inc.
Type of structure: Office and residential buildings, hotel, shopping mall
Height: tallest tower stands 173 m high
Cycle time: 5-day cycle

Customer benefits & solution:

- JIT delivery of formwork and enclosure materials for 5 building cores and facades
- self-climbing system solutions to reduce the need for crane capacity
- platform SCP with few suspension points, so no subsequent concreting of floor slabs in the building cores



Challenge:

- large volume of materials needed for simultaneous construction of 5 highrise towers
- only one tower crane available for each building
- floor and walls cast in a single pour (monolithic construction method)



Products used:

Core: Platform SCP, Large-area formwork Top 50
Floor: Load-bearing tower d2, Dokaflex
Façade: Protection screen Xclimb 60 with trapezoidal sheet enclosure

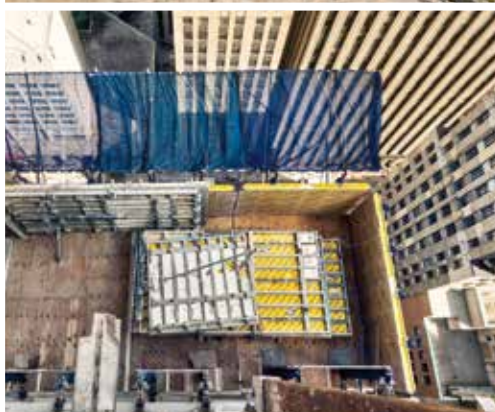
Construction time: 2012 – 2016

INDX Condominium

As part of the INDX Condominium Project in Toronto, Doka supplied Hardwall Construction with a one-of-a-kind protection screen system. In addition to gapless enclosure of two entire levels, the integrated loading platforms ensured availability of ample storage and set-down areas outside the building.

Challenge:

- protection for site crew at floor edge and for passers-by on ground level
- limited storage and set-down areas inside the building
- tight schedule



Location: Toronto, Canada
Construction work by: Hardwall Construction Ltd.
Type of structure: Residential building
Height: 173 m
Storeys: 54 with 798 suites
Cycle time: 4-day cycle

Customer benefits & solution:

- gapless enclosure at slab edge with protection screen with integrated loading platforms and all-round protective netting
- fast, guided repositioning up one entire side of the building by simultaneous hydraulic lifting of up to 7 protection screen units
- ample storage and set-down areas outside the building provided by loading platforms integrated into the protection screen
Load capacity per platform: 2,700 kg
Set-down area per platform: 3.7 m x 4.9 m
- reduction of cycle time from 6 to 4 days due to optimised construction process

Products used:

Protection screen Xclimb 60 with integrated loading platforms, Framed formwork Framax Xlife

Construction time: 2014 – 2015



Location: London, Great Britain
Contractors for concrete works: O'Halloran & O'Brian Ltd.
Architect: Leach Rhodes Walker Architects
Type of structure: Hotel
Height: 124 m
Storeys: 39
Cycle time: 5-day cycle

Customer benefits & solution:

- best-possible access to floor stop-ends inside gapless enclosure consisting of a protection screen with built-in upper working platform
- fast, crane-independent repositioning of core formwork and protection screen by hydraulic assistance
- high-profile advertising for both contractor and future hotel operator because the enclosure is ideal as eye-catchingly prominent advertising space

Products used:

Core: Automatic climbing formwork SKE50 plus
Façade: Protection screen Xclimb 60 with framed enclosure Xbright

Construction time: 2014 – 2016

Challenge:

- strict safety requirements at slab edges
- tight schedule and short cycle times specified for core and floor
- branding for targeted product communication

40 Marsh Wall London

The Novotel Hotel is a striking feature of London's skyline. Visible from afar, the prominent surfaces of the protection screen Xclimb 60 have already been put to good use advertising the hotel during construction.





Istanbul Marina

The Istanbul Marina project is comprised of five buildings in different geometric shapes (two resembling an 'S' and three resembling a 'C'). The Protection screen Xclimb 60 enables construction work to be carried out on the topmost levels of this spectacular project in great safety and protected from the weather.



Challenge:

- gapless enclosure for buildings of exceptional shape
- high level of safety at the slab edge in every phase of work
- recurrence of obstacles in the area of the enclosure where the crane-to-structure mounting points are sited
- short project lead time and installation time

Location: Kartal Istanbul, Turkey

Construction work by: DAP Construction & Eltes Construction, Emlak Konut GYO

Architect: Proje Limited Company

Type of structure: Office & residential towers

Height: Block A 120 metres, Block B 133 metres, Block C 147 metres, Block D 150 metres, Block E 147 metres

Storeys: Block A: 33, Block B: 37, Block C: 40, Block D: 42, Block E: 40

Cycle time: 7-day cycle

Customer benefits & solution:

- constant minimum distance from the structure, because Protection screen Xclimb 60 designed for +/- 15 degrees of inclination and +/- 6° lateral tilt
- gapless protection between tilted protection screen and slab, with the hinged cover panels remaining horizontal at all times
- safe climbing in the area of the crane mounts, because individual Xbright frames can be removed and re-installed with complete flexibility
- on-site materials logistics improved by loading platforms integrated into the protection screen
- scheduling and planning certainty for the contractors, with execution planning handled by more than 15 highrise experts and on-site support by Doka's Gebze branch

Products used:

Façade: Protection screen Xclimb 60 with trapezoidal sheet enclosure and with framed enclosure Xbright, loading platforms

Construction time: 2012 – 2018



JuBi

A new office building for the Dutch Ministry of Security, Justice and Internal Affairs was built with Doka formwork solutions in The Hague, in the Netherlands. The columned facades in brick and granite are signature features of the ministry towers in the centre of the city.

Location: The Hague, Netherlands
Construction work by: Bouwcombinatie JuBi V.O.F.
Type of structure: Office building
Height: 2 towers of 146 m
Storeys: 36
Cycle time: 4-day cycle

Customer benefits & solution:

- easy access for facade installation from the outside made possible by Automatic climbing formwork Xclimb 60 with 6 working platform levels
- integrated monorail system for fast, reliable horizontal movement of architectural facing elements to their installation locations
- efficient planning, scaffolding concept coordinated directly with facade builder

Challenge:

- architectural facing elements can be installed only from the outside of the building
- anchoring on the structure
- iteration between monorail system and climbing scaffold

Products used:

Core: Automatic climbing formwork SKE50 plus, Large-area formwork Top 50
Facade: Automatic climbing formwork Xclimb 60, Large-area formwork Top 50, Automatic climbing framework Xclimb 60 for facade construction

Construction time: 2010 – 2012



Hudson Yards

The massive Hudson Yards urban development project in New York City has so far gained two titles: the nation's largest private real-estate development and the most complex construction project in the city's history. The mega-project has created 11 hectares of new land in Manhattan by building on top of a large working rail yard. From this new land, several skyscrapers are rising to provide more than 93,000 m² of high-end retail and mixed-use space and 1.7 km² of amenity-packed commercial and residential space.



Location: New York, USA
Construction work by: 3 construction companies involved (Cross Country Construction, W&W Steel, Roger & Sons Concrete)
Architect: Kohn Pederson Fox
Type of structure: 5 office & residential towers
Height: 55 Hudson Yards 238 m, 15 Hudson Yards 275 m, 35 Hudson Yards 305 m, 30 Hudson Yards 395 m
Storeys: 55 Hudson Yards: 51, 15 Hudson Yards: 71, 35 Hudson Yards: 79, 30 Hudson Yards: 92

Customer benefits & solution:

- on-schedule deliveries to site with a fleet of 180 trucks and professional project support by a 50-strong team working out of Doka's nearby North-east Branch
- maximum safety in all phases of work on the structure shell and finishing by enclosure of 4 1/2 storeys inside 125 pre-assembled Protection screen Xclimb 60 units
- craneless, speedy lifting of formwork material by the Table Lifting System TLS integrated into the protection screen
- short routes for site personnel; the stair towers integrated into the protection screen have an aggregate length of 150 metres
- loading platforms integrated into the protection screen optimise on-site materials logistics

Products used:

Core: Super Climber SCP, Framed formwork Frami S Xlife
Façade: Protection screen Xclimb 60 with framed enclosure Xbright and loading platforms, table lifting system TLS
Floor: Dokaflex S

Construction time: 2012 – 2024

Challenge:

- high demand for formwork and safety solutions for simultaneous construction of 4 highrise towers
- prominence of the location in down-town Manhattan necessitates the very best protection at the slab edge for site crew and the environment
- restricted storage and set-down space at ground level and also inside the buildings
- limited availability of crane capacity for lifting formwork material



La Marseillaise

Long since the national anthem of France, from 2018 onward 'La Marseillaise' has also been the name of a new office tower in the city of Marseilles. On this project, Doka convincingly demonstrated its ability to satisfy ultra-high safety standards, meet a tight assembly schedule and keep cycle times short.

Location: Marseilles, France
Construction work by: VINCI Construction France
Architect: Jean Nouvel
Type of structure: Office building
Height: 135 m
Storeys: 31
Cycle time: 5-day cycle

Customer benefits & solution:

- excellent fair-faced concrete surfaces and with the innovative Xface formwork sheet, no labour-intensive changes of form-facing
- safe protection against extreme weather conditions, because the formwork solution was designed for wind speeds up to 213 km/h
- the SKE shaft and mast system was used, so forming times were fast and there was plenty of space for working, even in narrow shafts
- planned safety facilities and integrated traffic-routes concept between all work-deck levels and concreting zones increase productivity on site
- labour savings and faster project start with pre-assembled platforms delivered to site

Products used:

Core: Automatic climbing formwork SKE50 plus and SKE100 plus, Large-area formwork Top 50 with Doka Xface sheet

Construction time: 2015 – 2018

Challenge:

- construction of a 31-storey tower with high fair-faced concrete requirements for the core
- prominent coastal location in combination with stringent safety standards, so ultra-high requirements apply for deployment of the formwork and special protective measures are necessary
- core divided into 3 concreting zones, each consisting of multiple small-cell shafts
- tight construction schedule and very cramped site conditions





Tour Odéon

The Tour Odéon is a residential highrise at one of the world's most prestigious addresses. At 170 m, the two-part building complex is the tallest structure ever built in the Principality of Monaco.

Location: Monaco, Monaco
Construction work by: VINCI Construction France
Architect: Alexandre Giraldi
Type of structure: Residential highrise
Height: 170 m
Storeys: 49
Cycle time: 5-day cycle

Customer benefits & solution:

- enclosure is a combination of polycarbonate inlay and grid inlay so that external reference points for survey work are easily sighted from the topmost level
- high-level safety at floor edge by arranging protection screen units even in the area where the tower crane mast is anchored
- the self-climbing table lifting system TLS and the ample storage areas on six loading platforms integrated into the protection screen all contribute to speeding up the construction workflow

Challenge:

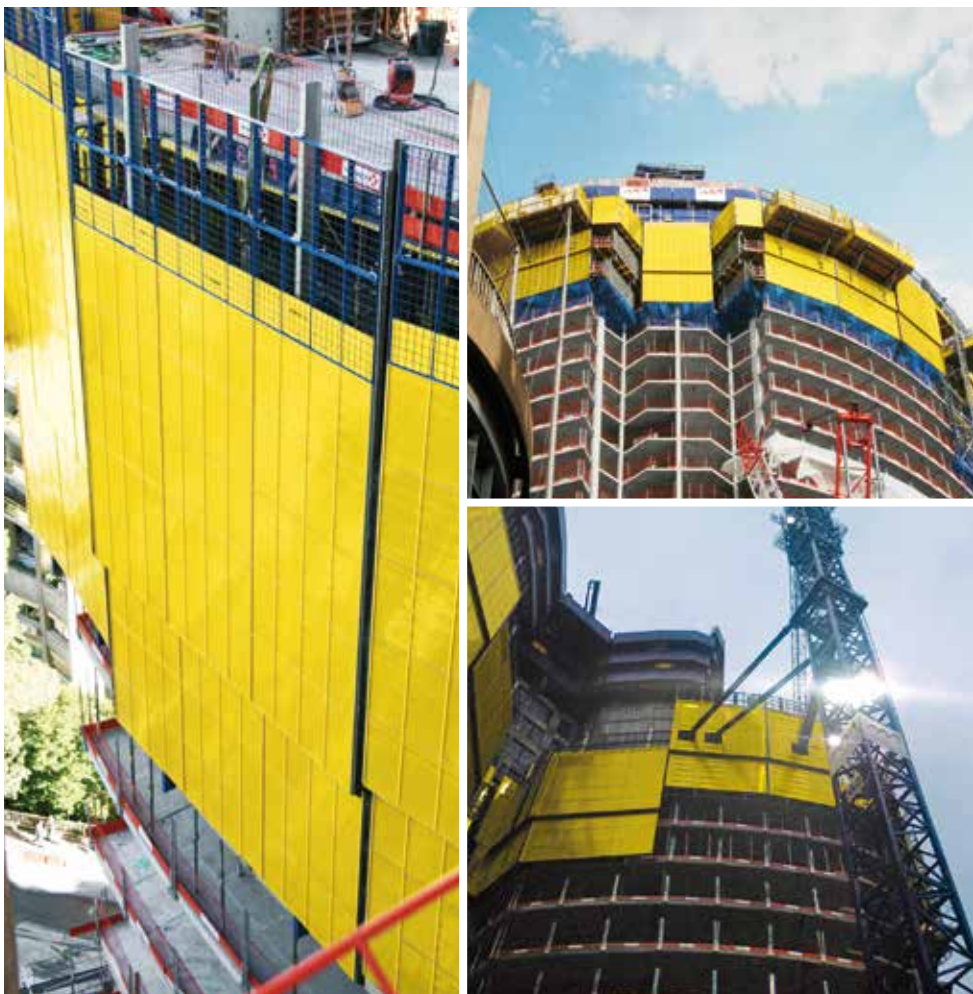
- high safety requirements especially at the edges of the floor slabs
- limited lifting capacity; only one tower crane on site

Products used:

Façade: Protection screen Xclimb 60 with framed enclosure Xbright, Automatic climbing formwork Xclimb 60, table lifting system TLS (self-climbing)

Floor: Panel floor formwork Dokadek 30

Construction time: 2009 – 2015





Challenge:

- forming and pouring core, edge columns and floor separately and in fast cycles
- safe working conditions at any height

Location: Mumbai, India
Construction work by: Larsen & Toubro (L&T)
Architect: Foster + Partners
Type of structure: Luxury residential and office building
Height: 300 m (tower A)
Storeys: 77
Cycle time: 6-day cycle for core, 4-day cycle for supporting columns

Customer benefits & solution:

- platform SCP lifts core formwork quickly in a single lift
- high-speed forming with Panel floor formwork Dokadek 30 with integrated floor stop-ends
- climbing formwork with several high-capacity working platforms for efficient installation of reinforcement for edge columns
- complete enclosure of upper floor levels and all climbing systems

Products used:

Core: Platform SCP, Large-area formwork Top 50

Shear walls: Automatic climbing formwork SKE50, Large-area formwork Top 50

Floor: Panel floor formwork Dokadek 30

Façade: Protection screen Xclimb 60

Construction time: 2013 – 2017

Omkar 1973 Worli

The new landmark in the heart of Mumbai is called Omkar 1973 because the site is on the 19th parallel north and the 73rd meridian east. The three towers measuring altogether 800 m offer luxury in a class of its own. Doka supplied the formwork solution for the automatic climbing systems for all three towers.



Aurora Melbourne Central

As well as being the second tallest highrise in the city, the new Aurora building on La Trobe Street in Melbourne City Centre is also the only residential tower with its own access to the City Loop rapid-transit underground railway. A formwork solution from Lubeca and Doka was the system of choice for construction of the luxury residential highrise.

Location: Melbourne, Australia
Construction work by: Probuild
Type of structure: Residential building
Height: 269 m
Stores: 92
Cycle time: 4-day cycle

Challenge:

- 4-day cycle with the site crew working steadily
- enclosure for work on the structure shell and installation of the façade panels
- installation of 40,000 m² of enclosure without using mobile shifting devices
- narrow time window for installation of the façade elements on the building

Customer benefits & solution:

- division of the building's core into two pouring zones, each with its own platform system
- safe working at the building's edge with a protection screen 24 m high (gapless enclosure of 7 1/2 storeys)
- safe and straightforward installation of the façade panels using a monorail system integrated into the protection screen
- scheduling certainty for installation because the protection screen units are pre-assembled

Products used:

Protection screen Xclimb 60 with monorail system, Lubeca Jump Form System

Construction time: 2016 - 2018



Exchange 106

Exchange 106 (former name 'Signature Tower') is a new architectural highlight that will grace the skyline of Kuala Lumpur. Working closely with the highrise specialists at headquarters in Amstetten, the Doka branch in Malaysia developed a practical formwork and safety concept adapted to the tight construction schedule and the customer's high safety requirements. The extremely large building core was built using a combination of Automatic climbing formwork SKE plus and Large-area formwork Top 50.



Location: Kuala Lumpur, Malaysia
Construction work by: China State Construction Engineering Corporation
Architect: Mulia Group Architects
Type of structure: Residential building
Height: 492 m
Storeys: 106
Cycle time: 3-day cycle

Customer benefits & solution:

- formwork concept tailored to customer's requirements and the requirements of the structure ideally supports the scheduling targets
- efficient installation of the reinforcement for the core from several highly loadable platform levels. Good accessibility to both sides of the walls, because the two retractable halves of the formwork leave plenty of working space
- Automatic climbing formwork SKE100 plus is designed for high live loads and the platforms are spacious, permitting interim storage of reinforcement and other materials
- safe working at the building edge inside 2,500 m² enclosure consisting of Protection screen Xclimb 60 with integrated material barrier net



Challenge:

- maintenance of a 3-day cycle for construction of building core, steel-girder skeleton and composite slabs, plus installation of the façade elements
- solid concrete core with high degree of reinforcement and rebars extending over 2 storeys, requiring spacious storage areas and ability to deal with high live loads
- high safety requirements – especially at the building edge and during construction of the slabs and the steel-girder skeleton

Products used:

Automatic climbing formwork SKE100 plus, Automatic climbing formwork SKE50 plus, Large-area formwork Top 50, Protection screen Xclimb 60 with integrated material barrier net

Services in use:

Formwork instructors from Malaysia and from headquarters in Amstetten

Construction time: 2016 – 2018



Location: London, United Kingdom
Construction work by: Laing O'Rourke / Expanded
Architect: PLP Architecture International Ltd
Type of structure: Luxury hotel and residential complex
Height: 136 m
Storeys: 43
Cycle time: 5-day cycle

Customer benefits & solution:

- fast cycle times; using SKE50 plus meant no obstructions for crane-lifting the prefabricated rebar cages into place
- fully hydraulic SKE50 plus solution facilitated progress on the build with safe craneless repositioning
- formwork concept allowed for resource-conserving modification of individual platforms directly on the structure
- safe, fast progress, just like working on ground level, inside full enclosure and facilitated by the ingenious traffic-routes concept

Products used:

Core: Automatic climbing formwork SKE50 plus, Framed formwork Framax Xlife

Construction time: 2016 – 2019

One Bishopsgate Plaza

Construction specialist Expanded (a subsidiary of Laing O'Rourke) built the 52,000 m² One Bishopsgate Plaza mixed-use development located in the heart of the city of London. Doka provided automatic climbing formwork SKE50 plus for construction of the building core. The ingenious formwork concept performed excellently, and enabled a reduction in the core construction cycle time of around 25% compared to the original planned schedule.

Challenge:

- tight schedule and limited crane capacities
- changing core geometry with discontinuous walls and changes in wall thickness
- high level of workplace safety specified and traffic routes had to be kept short





Location: Nanning, Guangxi, China
Construction work by: Huaxi & CSCES 8 (Guangxi)
Architect: GP Goettsch Partners
Type of structure: Office and hotel highrise
Height: 445 m
Storeys: 94
Cycle time: 5-day cycle

Customer benefits & solution:

- custom solution 18.5 metres high, with 5 platform levels designed for live loads up to 5 kN/m²
- free access from above for smooth positioning of the heavy wall internals by crane
- adherence to the 5-day cycle with two suspended working platforms to decouple the formworking and reinforcing operations
- high-performing climbing system designed for climbing additional site equipment at the same time (total 55 metric tons: 2 concrete pumps, 1 water tank, welding equipment, 1 generator)
- minimal alterations on account of the formwork concept, because changes in the structure were taken fully into account in the planning phase

Products used:

Core: Platform SCP,
Automatic climbing formwork SKE50

Construction time: 2015 – 2019

Challenge:

- formwork solution for large, heavily reinforced building core with 6 cells (140 metric tons of reinforcing bar and 800 m³ of concrete per section)
- individual work steps have to be synchronised as closely as possible
- changing core geometry with apertured walls and some leaning walls

Nanning China Resources Tower

The Nanning China Resources Tower is located in Nanning City and will be the first mega highrise in Southwest China. With a height of about 445 metres it will accommodate offices and a 5-star hotel. Doka's automatic climbing formwork system SKE50 in combination with a project-specific platform solution SCP ensures that work can proceed in safety and on several levels at the same time.





Challenge:

- complex steel and concrete structure with high storey heights in the lower part of the building
- from the 12th storey upward, change in construction technique from core formed/poured in advance to monolithic slab-and-core casting
- ultra-high requirements for construction time and workplace safety in all phases of the project

Central Park Tower

Tall, taller, tallest – in New York's district of Manhattan work on a super-highrise is well under way. At 472 metres, the Central Park Tower will rank as the world's tallest residential building. It will take over as number one from 432 Park Avenue, also in New York City. The Central Park Tower will also be the second tallest building in the metropolis. Only One World Trade Center stands taller, at a roof height of 541 metres. Doka supplied the formwork solution for the structural core and the façade on this prestige project

Location: New York, USA

Construction work by: Pinnacle Industries

Architect: Adrian Smith + Gordon Gill Architecture

Type of structure: Residential building

Height: 473 m

Customer benefits & solution:

- smooth construction workflow with the same climbing system despite the change in construction technique, handled by universal solution and end-to-end planning
- fast repositioning of the core formwork by high-performing platform system designed for additional live loads such as reinforcement, material containers or concrete placing booms
- safe working conditions at the slab edge and repositioning only after every second storey on account of gapless Protection screen Xclimb 60 enclosure with 2 1/2 storey cantilever
- short routes and efficient materials logistics by stair towers, loading platforms and Table Lifting System TLS, all integrated into the protection screen

Products used:

Core: Super Climber SCP

Façade: Automatic climbing formwork Xclimb 60, Folding platform K, Large-area formwork Top 50 S, Framed formwork Frami S Xlife, Protection screen Xclimb 60 with framed enclosure Xbright with integrated loading platforms, Table lifting system TLS, Stair tower 250

Construction time: 2014 – 2020



Understanding what the future holds

We invest every day in further developing our products and services so we can always continue to find the best solutions for our customers. Valuable information is gathered on each and every project and incorporated as soon as we work on the next one. So we are equipped for the future and always ready to take our customers to the next level.

