



MK SYSTEM

Numerous configurations with standard components



// Pieces that can be easily assembled with minimal tools



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Versatile and composed entirely of standard components, the MK System has been designed for a variety of high load applications. The MK System is used for the construction of buildings, tunnels, and other heavy civil projects.

The primary item for all these applications is the **MK Waler**. Combined with various accessories, the MK waler can form a variety of different geometries and load bearing structures.



- ▶ **Easy:** Pieces that can be easily assembled with minimal tools.
- ▶ **Multifaceted:** Can create simple or complex structures based on the project scope.
- ▶ **Versatile:** Can be combined with multiple forming and shoring items from ULMA's product portfolio.
- ▶ **Safe:** Easily adaptable safety items with multiple configurations.
- ▶ **Certified components:**

- Timber beam VM-20

PEFC : Chain of custody.



- Phenolic Plywood

FSC® : The material used for this component has been responsibly sourced.



MK SYSTEM APPLICATIONS



MK in bridges and slabs

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MK in bridges and slabs

MK Shoring systems

The MK Shoring systems are built from standard MK components, and are ideal for creating high load bearing structures used to support large construction projects.

SHORING CONFIGURATIONS

MK-360 Shoring tower

Main use: Shoring for gantry structures.

MK-150 Shoring tower

Main use: Shoring under beams, slabs or prefabricated structures.

MK Prop shoring

Main use: Support for beams and slabs in abutment zones. The module sizes in plan view are of 0.75, 1, 1.5, 2.5 and 3 m, in all their combinations.

Benefits

- ▶ **Modular and versatile system** capable of providing numerous configurations for shoring applications.
- ▶ Configured as **independent or interconnected towers**.
- ▶ The use of independent jacks to achieve required high elevations.
- ▶ Quick and easily secured joints between components.
- ▶ Optimal **cable-stayed system** joins the towers and optimizes the assembly.
- ▶ **Safe**: walkway platforms and guardrails can be installed anywhere on the towers, with access ladders between towers.
- ▶ The system can be stripped at either the base or head.
- ▶ Tower base can be anchored to the ground for increased load-bearing capacity.

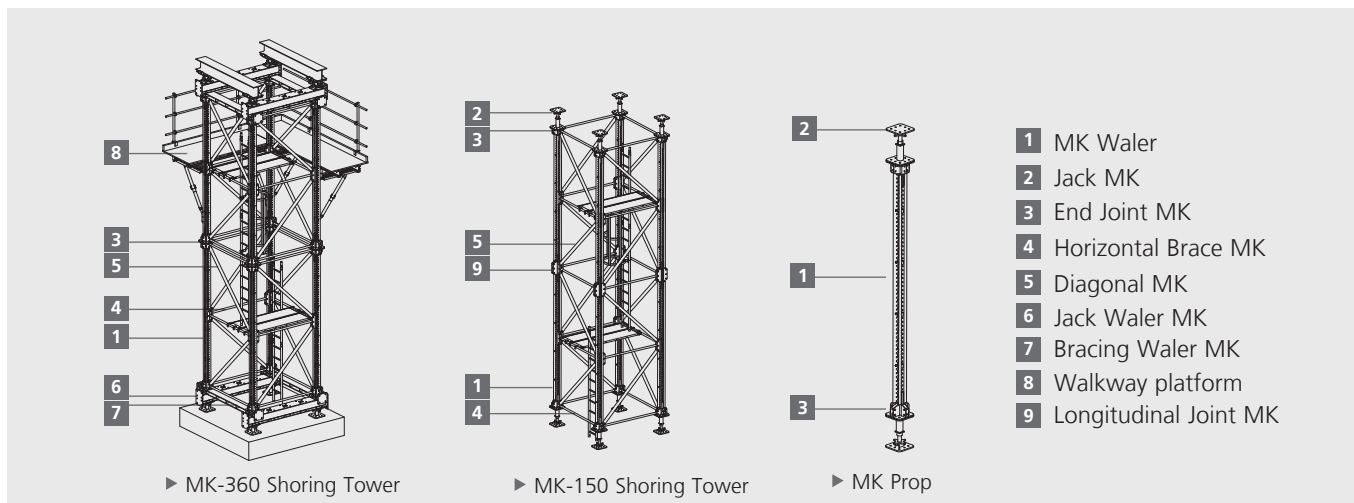


▶ Walkway platforms on top of the tower



▶ MK shoring used at height

System components



MK Truss

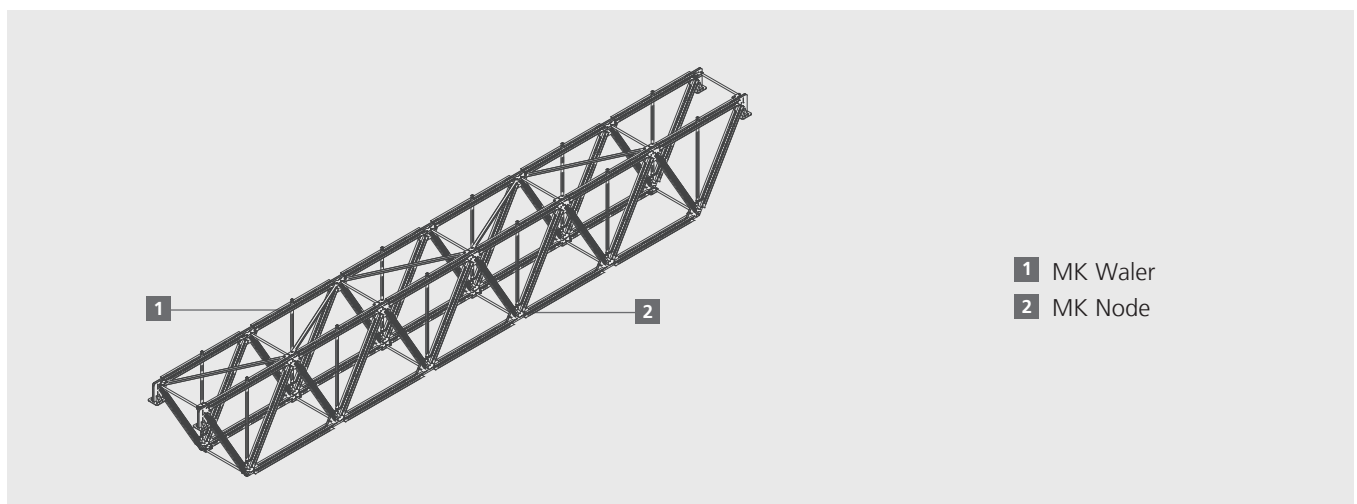
Truss structure designed to bear heavy loads with large spans between supports.

Benefits

- **Modular structure** of interconnected walers capable of adapting to most project requirements.
- Easy transport, handling and assembly.
- **Conforms to bridge** shapes, high elevations, and gradients.
- Can be combined with ULMA's **high-load bearing** shoring products (**MK-360** and **MK-150**).
- **Flexible and multifunctional**: can be used as a beam with dual supports, a continuous beam with multiple supports, or a cantilever beam.
- Includes **safety** and access **elements**: platforms, and safety handrails, depending on the requirements of each project.



System components



ENKOFORM HMK

Composed of standard beams and walers, ENKOFORM HMK can adapt to the varied shapes of concrete structures in civil projects.

This system can form the varied sections of bridge decks, overpasses and underpasses, and other applications that requires high load bearing capacities.

PROJECT TYPES IDEAL WITH ENKOFORM HMK

- ▶ Bridge sections, viaducts or overpasses/underpasses with constant or variable section in width and depth.
- ▶ Thick slabs.
- ▶ Pier caps.
- ▶ Pier segments.

Benefits

- ▶ The connector design enables superb adjustment and adaptation to the different sections of:
 - Bridges of constant or variable sections, both solid and hollow.
 - Bridges of variable deck depth.
 - Bridges with high elevations.
- ▶ **Rigid structure** for easy handling and transport.
- ▶ **Fast stripping** of formwork units.
- ▶ Easy connection of walers and timber beams.

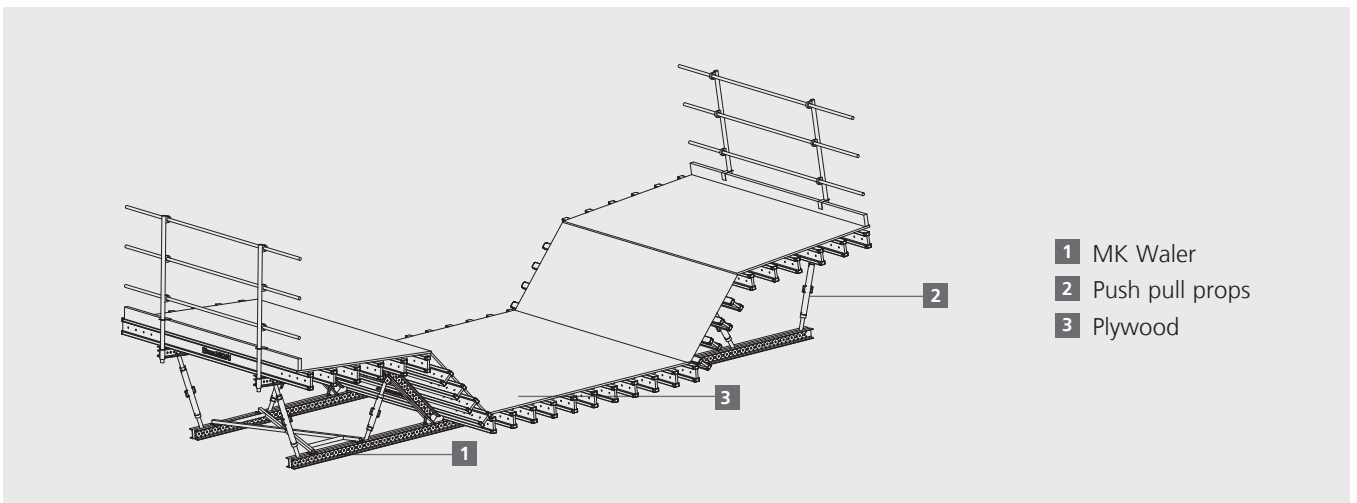


▶ Configurable ENKOFORM HMK



▶ Combination of ENKOFORM HMK and T-60 Shoring

System components



MK Carriages for use on bridges

CVS

Cantilever Formwork Carriage (CVS) is a mobile steel structure for the construction of pier segments using the balanced cantilever method.

Suitable for the construction of bridge decks and bridge arches with large spans, or where ground shoring is complex or not practical.

CARRIAGES WITH DIFFERENT LOAD-BEARING CAPACITIES

Max. segment possible (t)	Segment Length				
Carriage Type	5 m	4.5 m	4 m	3.5 m	3 m
CVS 165/4.5		165 t	182 t	202 t	227 t
CVS 200/4.5		200 t	220 t	247 t	279 t
CVS 165/5	165 t	180 t	200 t	220 t	248 t
CVS 200/5 (Rentable)	200 t	218 t	240 t	267 t	300 t

Benefits

- **Comprehensive solutions** for the carriage and formwork, both employing a limited number of standard elements.
- Technology for spans between piers of up to 200 m: riverbeds, road junctions, railroad crossings, etc.
- Carriage and formwork are customised to fit specific applications.
- Adaptable to a variety of section types.
- **Spans multiple distances.**
- **Adaptable to multiple deck depths.**
- **Repetitive hydraulic movement** for advancement ease.
- **Comprehensive safety.** Work on bridge decks in tight spaces.
- Pre-assembly on ground level.
- Walkway platforms at different levels with safe access.

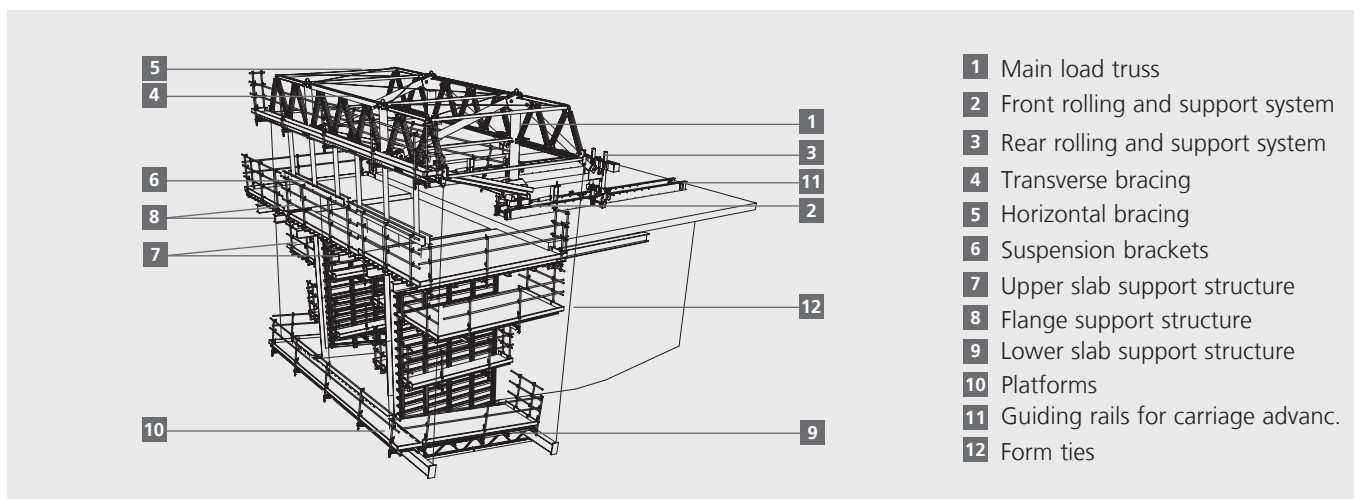


► Segments pouring



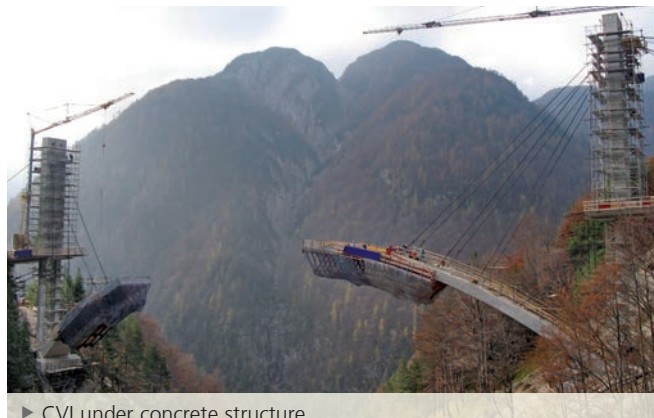
► Bridge construction

System components



CVI

Form carriage for the cantilevered construction of bridge deck segments. The carriage moves below the concrete structure being built, supporting concrete and formwork.

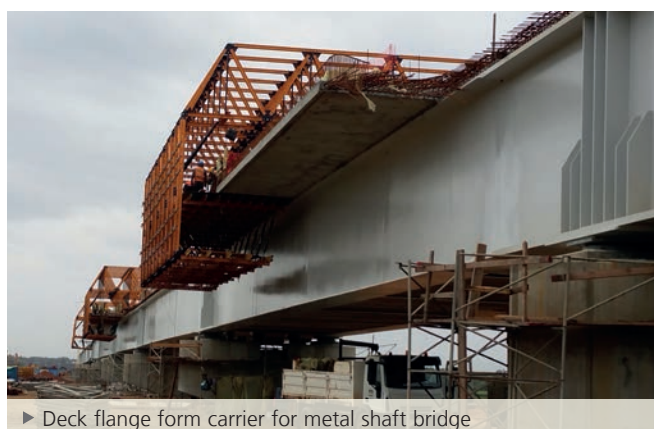


► CVI under concrete structure

Deck flange form carrier

Efficient system for casting deck flanges of metal bridges and partially prefabricated structures.

The forward movement of the form carrier is accomplished with the pull or push auxiliary devices recommended by ULMA.



► Deck flange form carrier for metal shaft bridge

Parapet form carriage

Light form carriage which can be moved manually. It is designed for the construction of protection parapets for bridges or structures with load-bearing requirements. It only requires a solid base where to rest the guide rail.



► Parapet form carrier in between two bridge decks

Vertical formwork carriage

Formwork attached to the carriage eases and simplifies formwork erection and dismantling along with increases pouring performance and speed. The carriage can be used on both single sided and double sided walls.



► Vertical formwork carrier for double-sided walls



MK in tunnels

MK Carriage for mine tunnels

Mobile carriage combines shoring and formwork in one structure, facilitating successive pouring in mine tunnels.

Concrete is poured around the MK carriage and vibrated externally. This system supports large concrete pressures and can be moved manually as well as hydraulically.



► Mine tunnels

Benefits

- **Efficient and productive.** Composed primarily of standard, reusable components.
- **Fully configurable.** Sections adaptable to different shapes, pressures, and loads.
- **Fast pace of construction** due to ease of use and repeated movements.
- Attachable walkway platforms and guardrails.



► Subway or train tunnels

MK Carriage for cut-and-cover tunnels

Mobile structure for tunnel construction that combines shoring and forming to shape tunnel vaults.

Concrete can be poured externally with the carriage moving either manually or hydraulically.



► Most geometries can be formed with the available standard items

Benefits

- **Efficient and productive.** Composed mainly of fully reusable standard components.
- **Lightweight.** Large formwork units assembled without the need for a crane.
- **Quick work cycles.** Easy use and repetitive movements.
- Attachable walkway platforms and guardrails.



► Cut-and-cover tunnel



MK in walls

ENKOFORM VMK

Formwork for vertical structures in building construction and civil engineering projects. Excellent finishes and high performance for walls, piers, columns, abutments, and more.

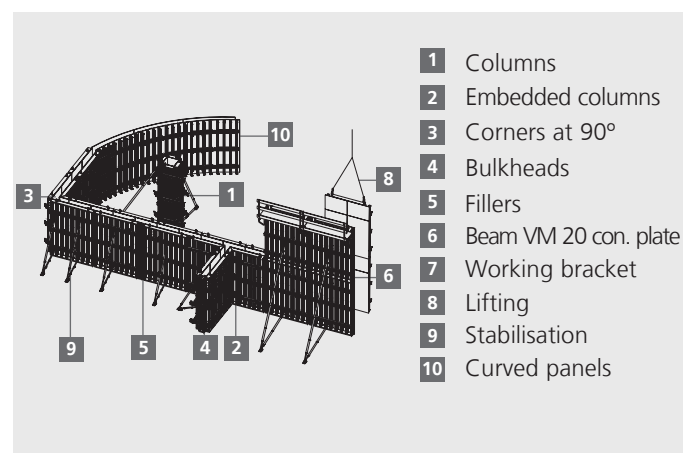
Benefits

- ▶ **Versatile and adaptable** to complex project requirements and building geometries.
- ▶ Easily replaceable plywood for repair or damage.



▶ Construction of columns with ENKOFORM VMK and MK trusses

- ▶ **The formwork can be modified to match the projects required pour pressure.**
- ▶ Simple assembly and handling of panels.
- ▶ **Safe:** Easy-to-assemble safety elements.
- ▶ Common standard accessories shared with other ULMA formwork systems: push-pull props, climbing brackets, anchors, etc.



SMK Frames

Single-sided formwork solution with truss structure, built with MK walers up to 10.5 m in height.

DIFFERENT CONFIGURATIONS

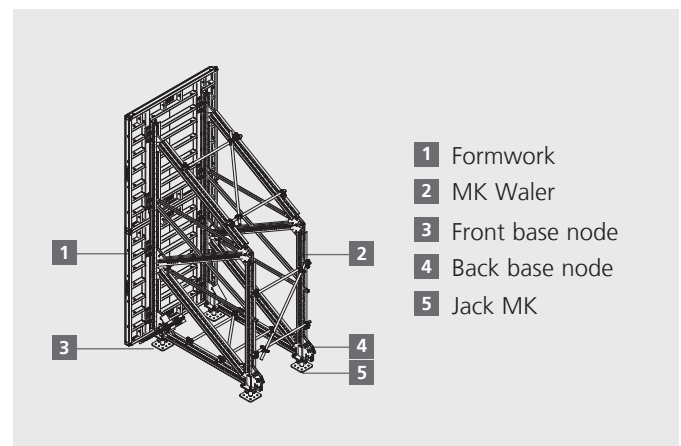
- ▶ SMK Frame up to 3.4 m
- ▶ SMK Frame > 3.4 m < 5.4 m
- ▶ SMK Frame > 5.4 m < 6.6 m
- ▶ SMK Frame > 6.6 m < 8.7 m
- ▶ SMK Frame > 8.7 m < 10.5 m



▶ SMK Frame with ORMA wall formwork

Benefits

- ▶ **Configurable.** The same elements can be used in different truss configurations.
- ▶ Compatible with all ULMA wall formwork systems.
- ▶ Minimal transport volume.
- ▶ Mobile truss and formwork assembly.
- ▶ Quick and simple connection to the formwork, base, or foundation slab.
- ▶ **Safety.** Platforms and guardrails for work at height.





MK in climbing

BMK

The BMK Consoles, made up of standard length MK walers and specific accessories, can even be adapted to address the execution of inclined and circular walls.

DIFFERENT CONFIGURATIONS

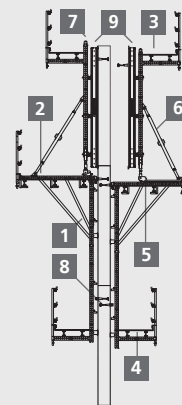
- ▶ Climbing bracket BMK-240. Platform width: 240 cm
- ▶ Climbing bracket BMK-170. Platform width: 170 cm
- ▶ Climbing bracket SBMK-180. Platform width: 180 cm



▶ Wall construction with BMK

Benefits

- ▶ **Highly flexible** with few components.
- ▶ **Configures** to straight, inclined, or circular walls.
- ▶ **Easy to use:** few components simplify the assembly and disassembly procedure, and also **reduce the number of trucks required for transport.**



- 1 Climbing Bracket BMK-240
- 2 Main platform
- 3 Pouring platform
- 4 Cone recovery platform
- 5 Stripping system
- 6 Push-pull prop
- 7 Vertical waler
- 8 Anchorage
- 9 Formwork

KSP

KSP interior platforms are placed in elevator, stair case shafts and other types of openings where formwork support is necessary.

TWO SOLUTIONS DEPENDING ON ANCHOR TYPE:

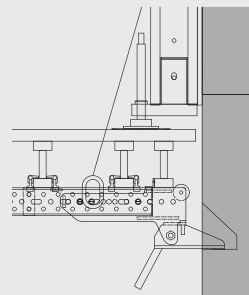
- ▶ Gravity pawl brackets with concrete box outs.
- ▶ Adjustable folding bracket and anchor.



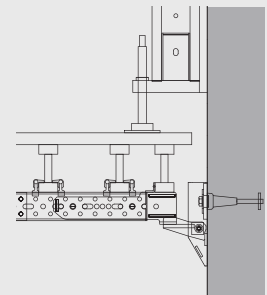
▶ Gravity pawl bracket with concrete box-out

Benefits

- ▶ **Covers any distance to be covered with totally standard and modular material**, mainly walers and wooden beams.
- ▶ **Versatile gravity pawl bracket.** Adaptable to all MK waler types and different lengths.
- ▶ **Easy adjustment** with multiple types of formwork.



1 Gravity pawl bracket with concrete box-out



2 Adjustable folding bracket and anchor

RKS

The RKS is a double mast guided climbing system. The system climbs the building through the entire project without ever detaching from the structure. The RKS assembly is lifted using a hydraulic system or crane.

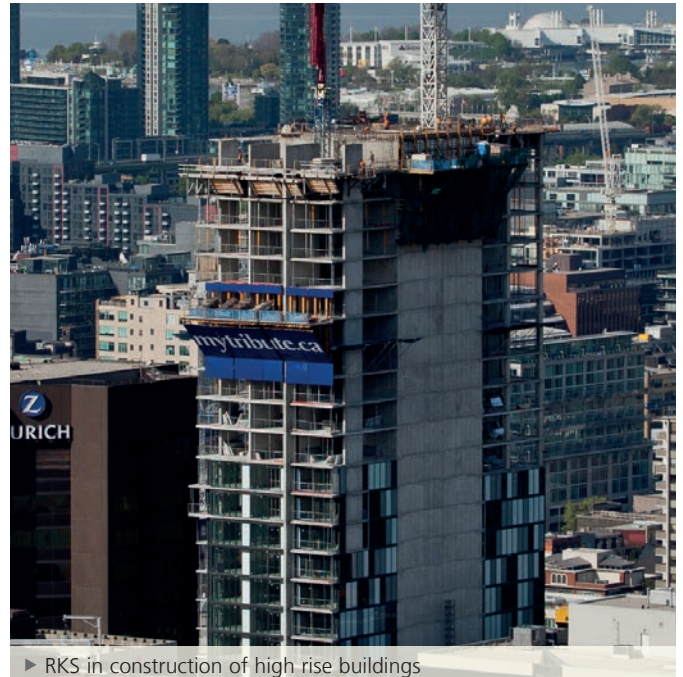
- Can be adapted to different pouring heights. Established standard range from 2.7 m to 5 m in height.
- Hydraulic cylinder lifting capacity: 50 kN.
- Formwork roll-back distance: 80 cm.



► Safety at working levels

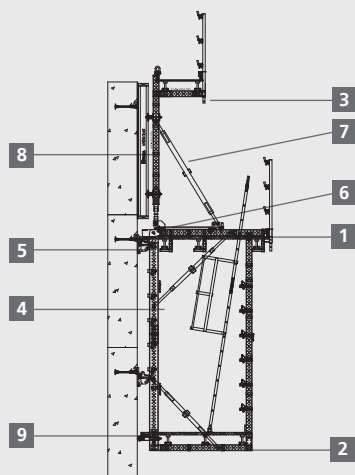
Benefits

- **Optimized configuration** to obtain high levels of efficiency on-site.
- **Efficient climbing structure** that requires only a single point of guidance/anchorage per pour.
- **Safe climbing at height** ensured by rails attached to wall.
- **Versatile and adaptable** to form complex building geometries.
- **Large and secure platforms**, with customizable configurations.
- Climbing assemblies lifted with a single hydraulic unit and two portable cylinders.



► RKS in construction of high rise buildings

System components



- 1 Main platform
- 2 Cone recovery platform
- 3 Pouring platform
- 4 Mast
- 5 Anchorages
- 6 Roll-back carriage
- 7 Push-pull prop
- 8 Formwork
- 9 Mast shoe RKS with wheel

ATR

Formwork support structure for the construction of walls and other vertical structures without crane assistance (hydraulic and mechanical mechanisms).

The climbing process consists of successive lifts of both the mast and the bracket-formwork assembly along the wall surface using hydraulic components.

ATR CONFIGURATIONS

- ▶ ATR-B self-climbing bracket.
- ▶ ATR-N narrow self-climbing bracket.
- ▶ ATR-P self-climbing platform.

Benefits

- ▶ **Versatile** system able to be adapted to most job requirements when building large and tall concrete structures.
- ▶ **The system is independent from the crane.** It is designed to simultaneously lift the formwork, walkway platforms, and placing booms.
- ▶ **Operational even in bad weather conditions.**
- ▶ **Safe to lift and handle at height.**
- ▶ **Adaptable to complex geometries.**
- ▶ Wide and protected walkway platforms with **safe access**.
- ▶ Hydraulic system fully configurable to construction requirements.
- ▶ **High load-bearing capacity.** Supports large concrete structures and forms.
- ▶ Roll-back system allows work to be performed between formwork panels.
- ▶ Main accessories are shared throughout the entire product range.

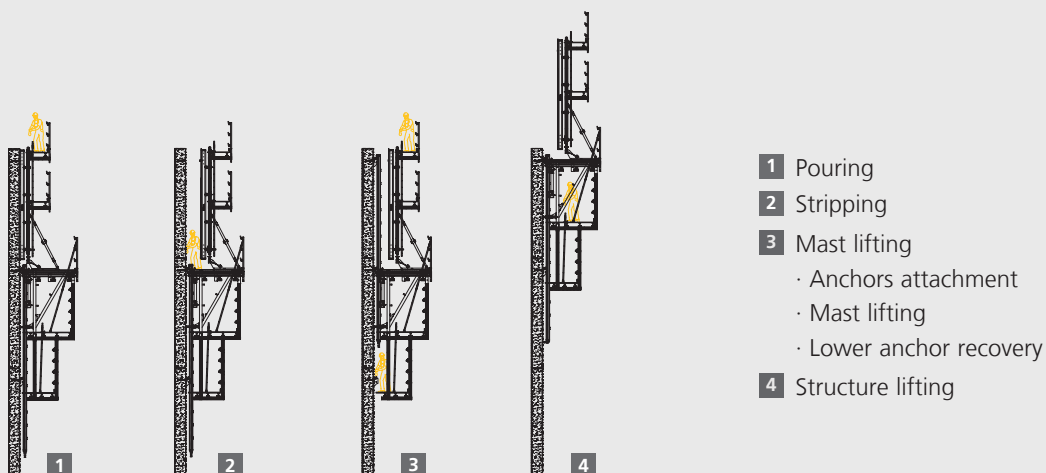


▶ Construction of building core with ATR Self-Climbing system



▶ Can be adapted to complex structures

Working sequence



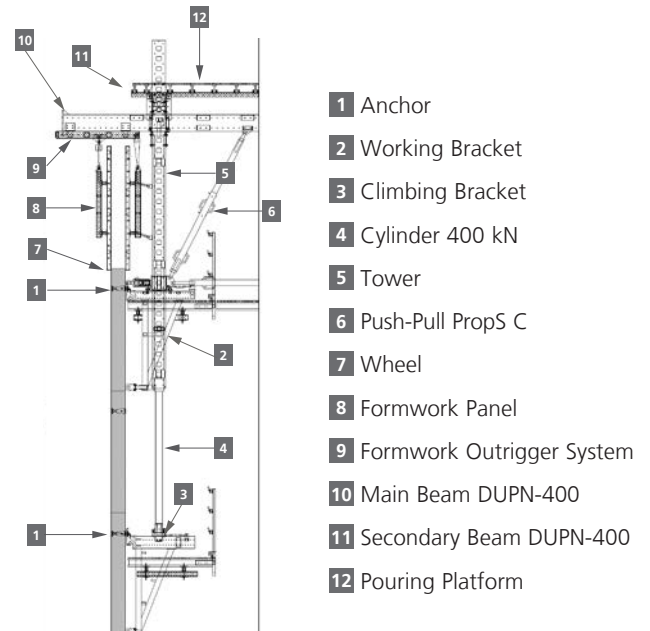
ATR-SC

Heavy duty self-climbing system (400 kN per Cylinder) for use in the construction of **large sky-scraper cores**, designed to **minimise the handling** of the formwork system on site.

Based on the MK system, **the system adapts to the geometry of the core and to the pouring height required** thanks to the flexible upper structure.

The system is lifted continuously by a single stroke cylinder, without any need for any rail, simply being **supported and guided by the previously executed walls**.

System components



MK in scaffolding

BRIO- MK

Solutions that can be developed by combining two of ULMA's most versatile products: BRIO multidirectional scaffolding and the MK System.

- **Flexible and adaptable** by using MK structures to support heavy loads and BRIO to support light loads.
- **Versatility** for adapting to each site's particularities and preferences.





HWS

Perimeter safety screen designed for high rise building construction. Covers the floor under construction and the floors immediately below. It can be adapted to different geometries and configurations according to building requirements.

The HWS screens can be elevated either with a crane or automatically with a hydraulic system. The HWS system can also provide platforms for access and storage.

ANCHORAGE OF HWS TO SLAB OR WALL

- Slab anchor system.
- Wall anchor system.
- Range of **panels**:
 - **Telescopic** perforated steel panels.
 - **HWS Panels** opaque or semi-transparent, stiff or elastic, etc.
 - **Corner Panels**.

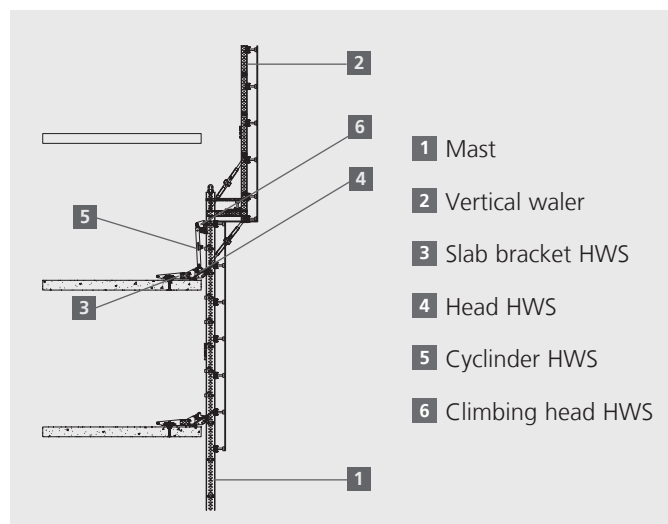
Benefits

- **Prevents falls from the slab edge.**
- Excellent **protection against inclement weather.**
- Reduces the visual height effect.
- **Adaptable protective sheathing** opaque, semi-transparent, stiff, elastic, etc.
- Allows for the use of **exterior material lifting platforms.**
- Provides access between the final storeys of the building.
- **Platform for work** on the slab edge.
- **Can be anchored to slab or wall.**
- **Adapts well to the geometry of irregular slabs.**
- Provides large surfaces at height for promotional messages.

System components



► Multiple configurations of perimeter protection





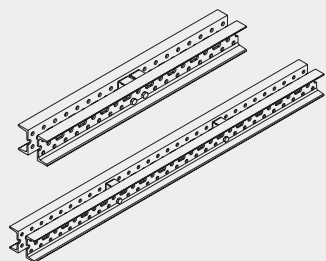
► Safe working space



► Telescopic HWS panels installed on site

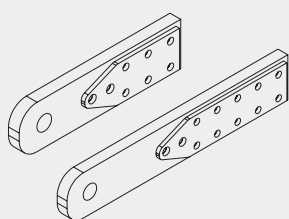
Basic components

		 kg
MK WALERS AND MK PROFILES		
MK-120/1.125 Waler	1990209	29.4
MK-120/1.375 Waler	1990211	35.5
MK-120/1.625 Waler	1990213	41.9
MK-120/1.875 Waler	1990215	49.7
MK-120/2.125 Waler	1990217	54
MK-120/2.375 Waler	1990219	60
MK-120/2.625 Waler	1990221	68
MK-120/3.125 Waler	1990225	81
MK-120/3.625 Waler	1990229	93
MK-120/4.125 Waler	1990233	107
MK-120/4.625 Waler	1990237	120
MK-120/4.875 Waler	1990239	126
MK-120/5.625 Waler	1990245	146

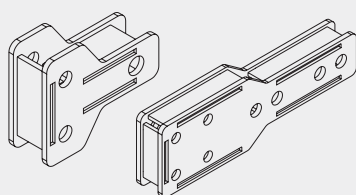


MK CONNECTORS

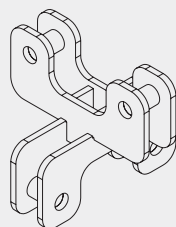
Axial node M D40 MK	1990300	15
Axial node 90° M D40 MK	1990301	23



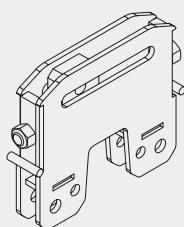
Axial node M D20 MK	1990590	1.5
Axial node M 2-D20 MK	1991458	5.1



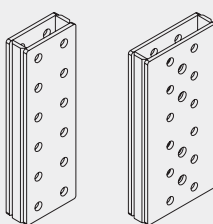
Waler-waler 90° joint MK	1990402	3.7
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Bottom connector MK	1990705	9.1
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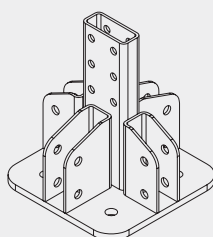


Orthogonal joint MK	1990395	6.5
Orthogonal joint MK-180	1991200	9.1



SPECIAL MK SYSTEM COMPONENTS

End joint MK	1990504	24.4
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Node 180 MK	1990485	30.6
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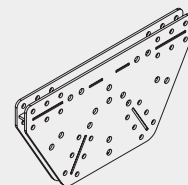
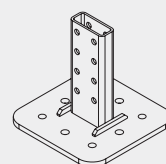
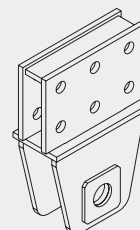


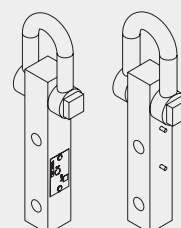
Plate waler head MK	1990405	15.7
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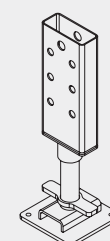
Swivel head	1991503	6
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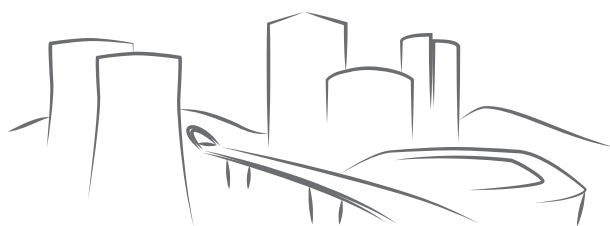


Lifting hook MK	1991360	7.1
Lifting waler hook	0331010	6.0



Jack MK 60	1990506	7.4
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From the beginning of your projects



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