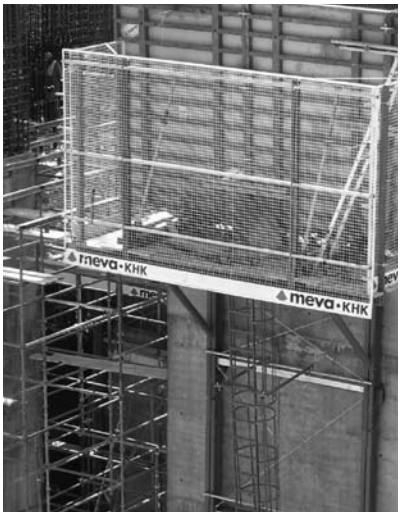

MEVA Guided Climbing MGC

Technical Instruction Manual

Product Features

MGC is the abbreviation for MEVA Guided Climbing and the name of MEVA's guided climbing system. Guided climbing means that after each pouring cycle the system climbs up the building structure by one level. Climbing is done with the help of guiding profiles and climbing shoes while the system is lifted by a crane.

The MGC system offers a significant advantage: the entire system including guiding profiles, ladder extensions, secondary platforms etc. is mounted from ground level below – under simple, safe and time-saving conditions.

Another advantage ist that the vertical formwork and the safety platform are a single unit which, thanks to the guiding profiles, remains securely attached to the building structure during building and lifting. Thus, wind velocities do not affect the building process or endange worker safety. This is why the MGC system is ideally suited for high-rise building in areas with much wind and generally for high buildings since the wind velocity increases with the height. The MGC system supports wall heights from 3,00 m to 4,25 m and safe working is possible with wind velocities up to 70 km per hour.

Abbreviations, measurements, decimal numbers, figures and tables
MGC is used for the MEVA Guided Climbing system.

DIN means Deutsche Industrie-Norm (German Industrial Standard). E DIN (E = Entwurf / draft) means that the DIN is in draft status and not yet approved of.

TÜV means Technischer Überwachungsverein. This is the independent German organisation that tests the safety of technical installations, machinery and motor vehicles. If a product passes the test, it is permitted to carry the GS seal. GS stands for Geprüfte Sicherheit (approved safety).

The DIBt (Deutsches Institut für Bautechnik) is the German institute that, among other construction-related tasks, drafts technical rules, prepares technical decisions and grants national and European technical approvals.

Any further abbreviations are explained where they are used the first time.

Measurements: This manual uses the metric system and thus m (for metre), cm (for centimetre) and mm (for millimetre). Dimensions without a measure are in cm. Decimal numbers: Note that the comma is used in a decimal numbers, e.g. 1,5 means 1 and a half.

The page numbers in this manual start with MGC. The figures and tables are numbered per page. Depending on its product abbreviation, a cross reference in the text refers to a page, table or figure in this or in another manual.

Updated 10 July 2009

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Please note

This Technical Instruction Manual contains information, instructions and hints describing how to use the MEVA equipment on the construction site in a proper, quick and economic way. Most examples shown are standard applications that will occur in practice most often. For more complicated or special applications not covered in this manual, please contact the MEVA experts for advice.

When using our products the federal, state and local codes and regulations must be observed. Many of the details shown do not illustrate the wall formwork system in the ready-to-pour condition as to the aforementioned safety regulations. Please adhere to this manual when applying the equipment described here. Deviations require engineering calculations and analysis to guarantee safety.

Please observe the assembly instructions that your local contractor or employer has created for the site on which the MEVA equipment is used. Such instructions are intended to minimise site-specific risks and must contain the following details:

- The order in which all working steps including assembly and disassembly must be carried out
- The weight of the panels and other system parts
- The type and number of ties and braces as well as the distance between them
- The location, number and dimensions of working scaffolds including working area and protection against falling down
- Pick points for panel transport by crane

Important: Generally, only well maintained material may be used. Damaged parts must be replaced. Apply only original MEVA spare parts for replacement. Attention: Never wax or oil assembly locks.

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3	Guard-railing post 10/300 - Timber fixture
4	Side-railing post 10/300
5	Timber fixture U 100
6	Climbing bracket MGC consisting of: Horizont. waler MGC with slide carriage Guiding profile MGC Brace MGC
7	Access hatch KLK
8	Planks (5 cm thick) placed on: Stringers U 160 and Square timbers 16/8
9	Cover MGC
10	Ledger MGC
11	Tension rods consisting of: Threaded rods LH Threaded rods RH Turnbuckle nut M16 Tension rod extension
12	Scaffold tube 48 with Bolt-on couplers 48/M14
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14	Ladder system consisting of: Ladder 243 Extension ladder Ladder fixture Safety cage Ladder connector Ladder link (set) Ladder base KLK Coupling pin 48 LAB Scaffold tube 48 Ladder fixture (railing)
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17	Side-railing post
18	Guard-railing post 48/1300
19	Safety mesh 115/260 and 115/130

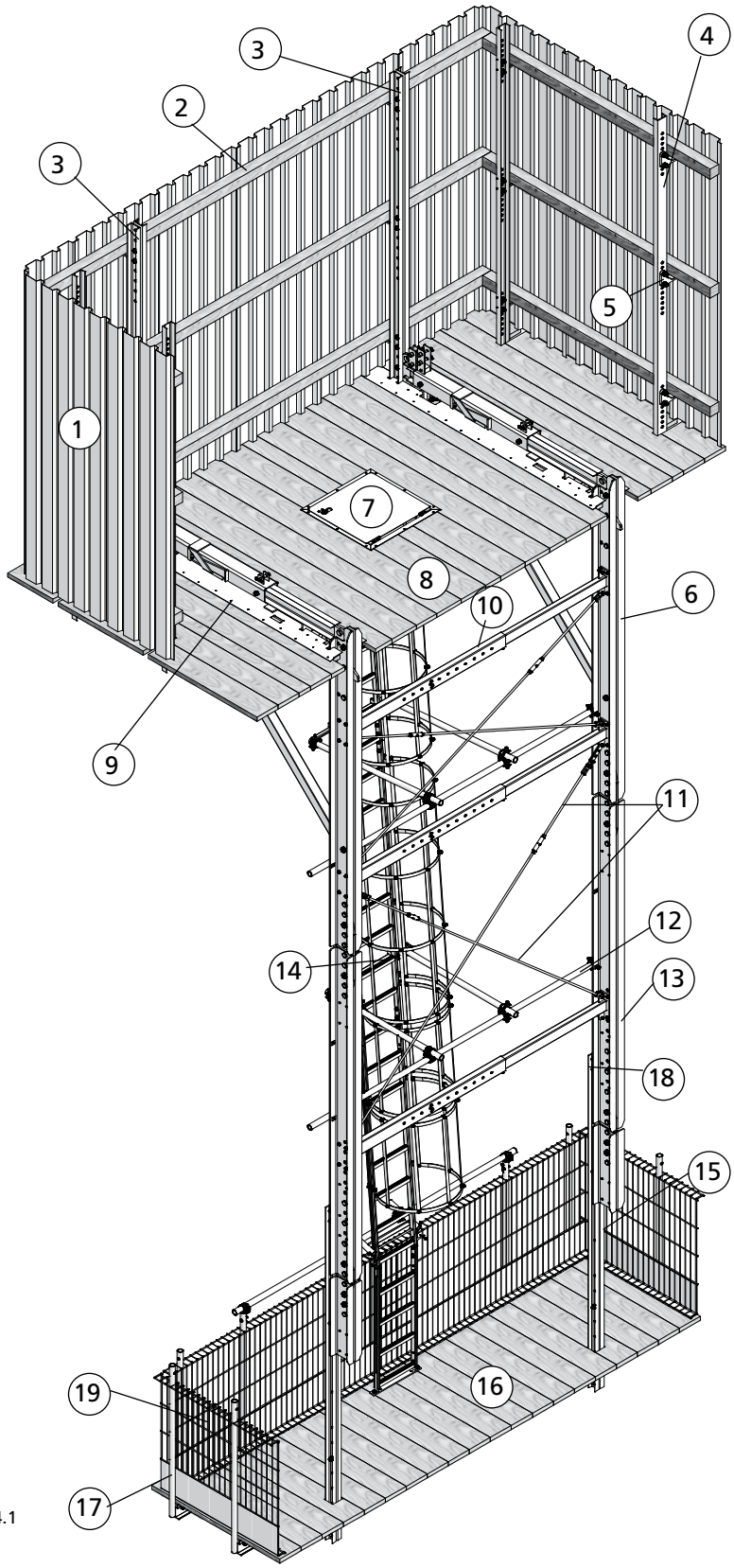

Fig. 4.1

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System overview

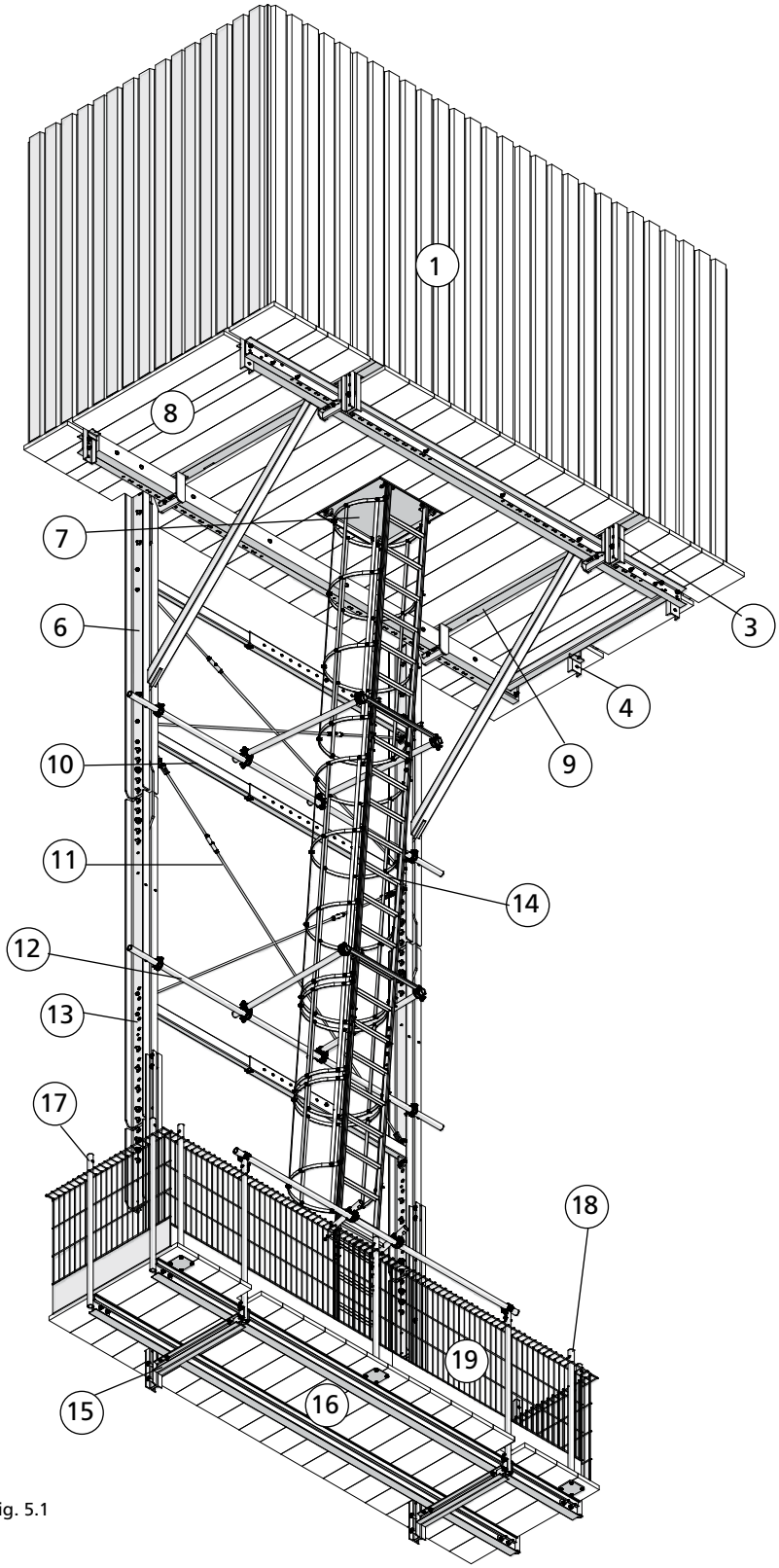

Fig. 5.1

Setup-of an MGC climbing unit

1	Perforated trapezoidal sheet
3	Guard-railing post 10/300 - Timber fixture
4	Side-railing post 10/300
6	Climbing bracket MGC consisting of: Horizont. waler MGC with slide carriage Guiding profile MGC Brace MGC
7	Access hatch KLK (not visible)
8	Planks (5 cm thick) placed on: Stringers U 160 and Square timbers 16/8
9	Cover MGC
10	Ledger MGC
11	Tension rods consisting of: Threaded rods LH Threaded rods RH Turnbuckle nut M16 Tension rod extension
12	Scaffold tube 48 with Bolt-on couplers 48/M14
13	Guiding profile extension MGC
14	Ladder system consisting of: Ladder 243 Extension ladder Ladder fixture Safety cage Ladder connector Ladder link (set) Ladder base KLK Coupling pin 48 LAB Scaffold tube 48 Ladder fixture (railing)
15	Secondary platform (folding bracket)
16	Planks (5 cm thick) placed on: Stringers U 100 and Square timbers 10/8
17	Side-railing post
18	Guard-railing post 48/1300
19	Safety mesh 115/260 and 115/130

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System overview – Top view

Platform with access hatch

(1) Perforated trapezoidal sheet
(2) Square timber 16/8
(3) Guard-railing post 10/300 – timber fixture U 100
(4) Horizontal waler MGC with slide carriage
(5) Cover MGC
(6) Guiding profile MGC
(7) Ledger MGC
(8) Planks (5 cm thick) placed on stringers U 160 and square timbers 16/8
(9) Access hatch KLK
(10) Support planks around opening for access hatch
(11) Climbing shoe

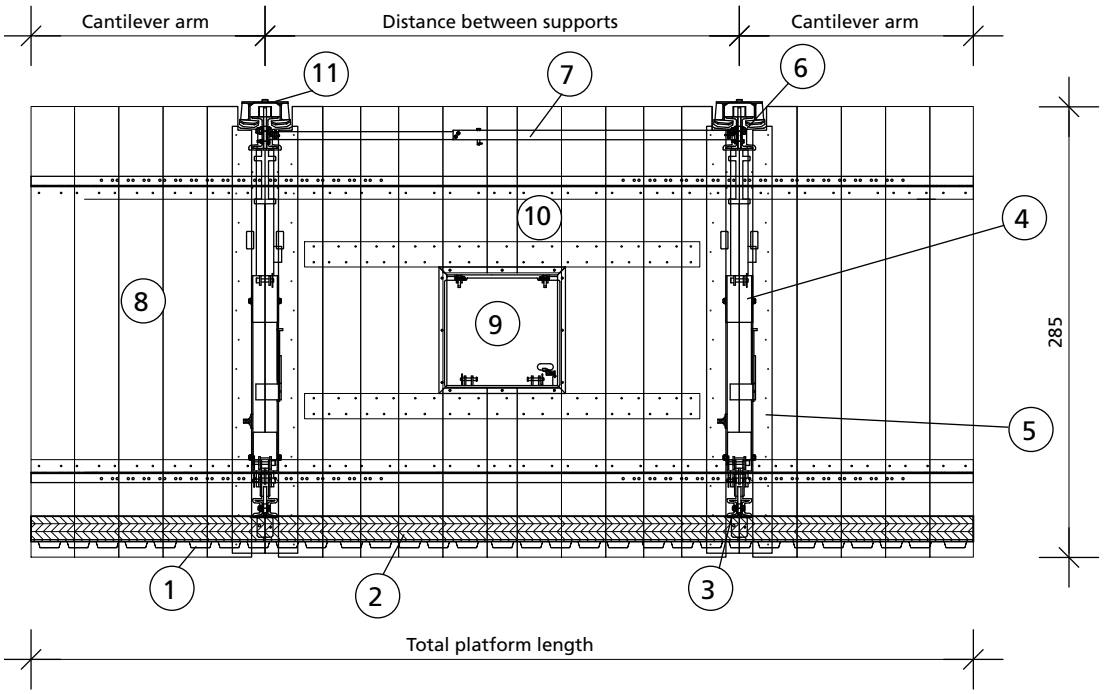

Fig. 6.1

Secondary platform

(1) Safety mesh 115/260 and 115/130
(2) Guard-railing post 48/1300
(3) Folding bracket MGC
(4) Planks (5 cm thick) placed on:
- Stringers U 100 and
- Square timbers 8/10
(5) Scaffold tube 48/400
(6) Swivel-joint coupler 48/48
(7) Ladder fixture (railing)
(8) Extension ladder

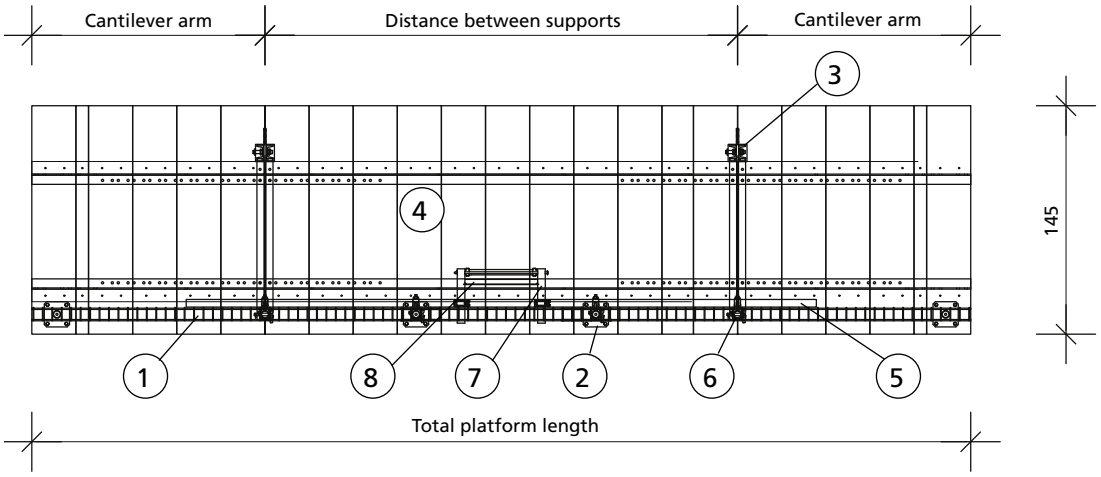

Fig. 6.2

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Load details for the platforms

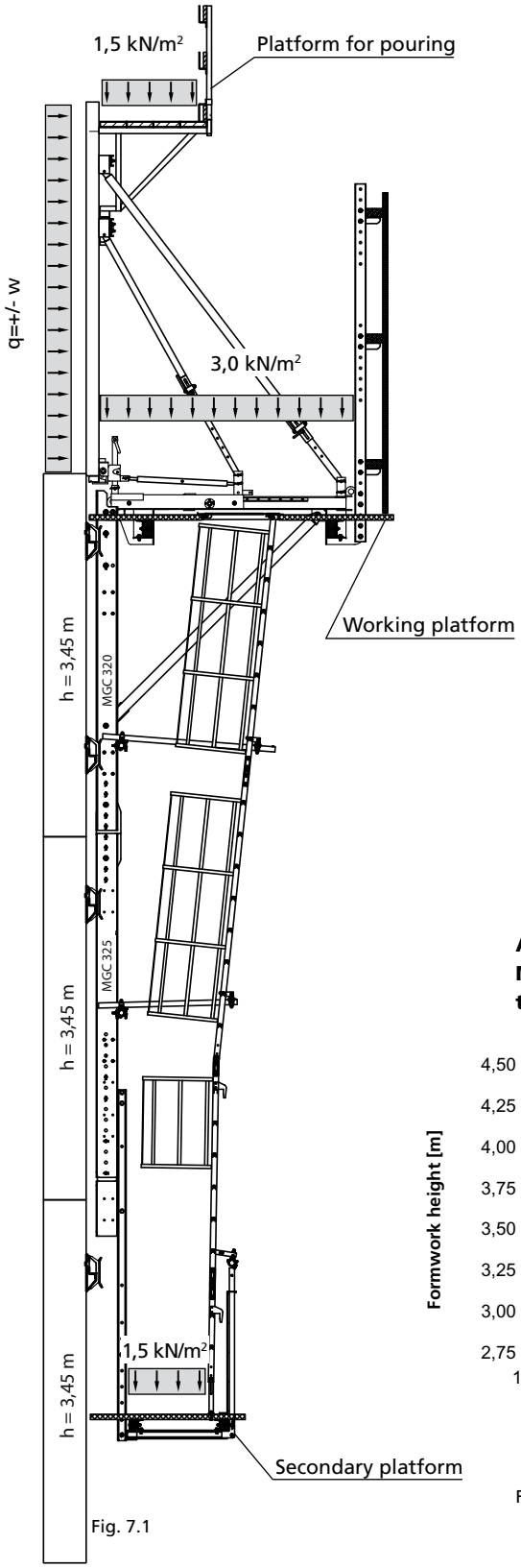

Fig. 7.1

Wind velocity and load

Wind velocity (v)		Load (q)
[m/s]	[km/h]	[kN/m²]
28,3	101,9	0,50
35,8	128,9	0,80
42,0	151,2	1,10
45,6	164,2	1,30
46,7	168,2	1,36
55,3	199,0	1,91

v = Wind velocity [m/s] and [km/h]
q = Load [kN/m²] = v² [m/s]/1600

Table 7.2

Admissible formwork height depending on the MGC climbing bracket's influence width and on the wind velocity

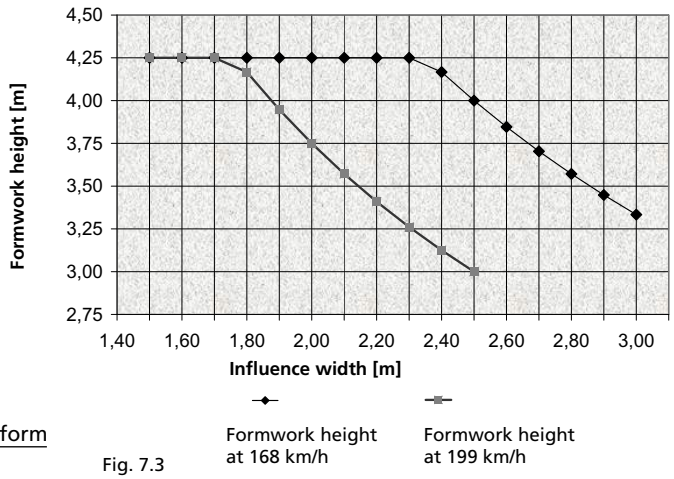

Fig. 7.3

An MGC climbing unit consists of a working platform, formwork with platforms for pouring on up to 2 levels, and a secondary platform. The unit is designed to support the following loads:

- Working platform, scaffold group 4: 3,00 kN/m²
- Platform for pouring, scaffold group 2: 1,5 kN/m² per level
- Secondary platform, scaffold group 2: 1,5 kN/m²

Important

- Lifting must be stopped when the wind velocity exceeds 20 m/s (72 km/h). In this case the formwork must be moved to the building's wall, blocked and, if necessary, anchored.
- The climbing unit must be kept free (or prior to working on it be cleared) from excessive snow and ice.
- With regard to the wind loads that the system can support, the maximum formwork area per climbing bracket is limited to 10 m².

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Load details for the climbing cones

The diagrams show the admissible load for climbing cone 15/M24 when used with anchor plate 15/120 and suspension screw M24 at an installation depth of 160 mm, or when used with anchor plate 15/170 and suspension screw M24 at an installation depth of 210 mm. The concrete composition corresponds to that of a C 20/25 concrete. The nominal strength β_{WN} is indicated in
N/ mm². This minimum strength β_{WN} is necessary because of the local strength required for the climbing cone. The nominal strength β_{WN} must be documented on site on the basis of test cubes.

Important
Make sure to observe the general technical approval no.. 21.6-1751 granted by the DIBt, above all section 4.4. When using the MGC system outside the territorial application of said approval, the diagrams on this page can be used in lieu of the approval.

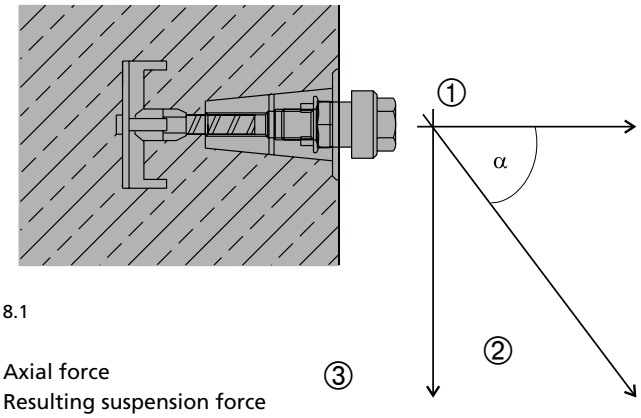
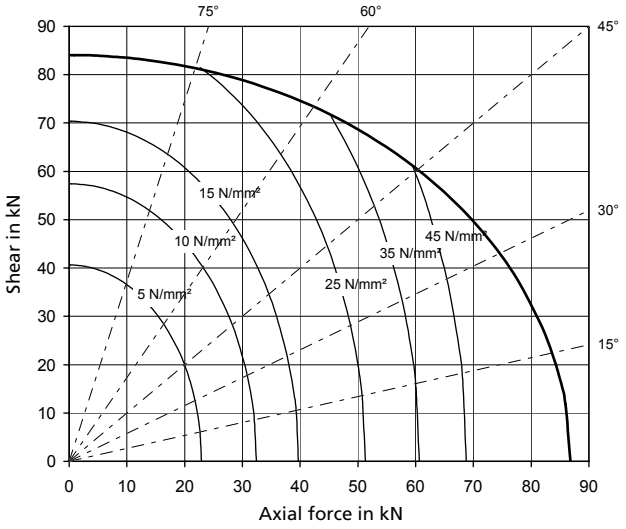


Fig. 8.1

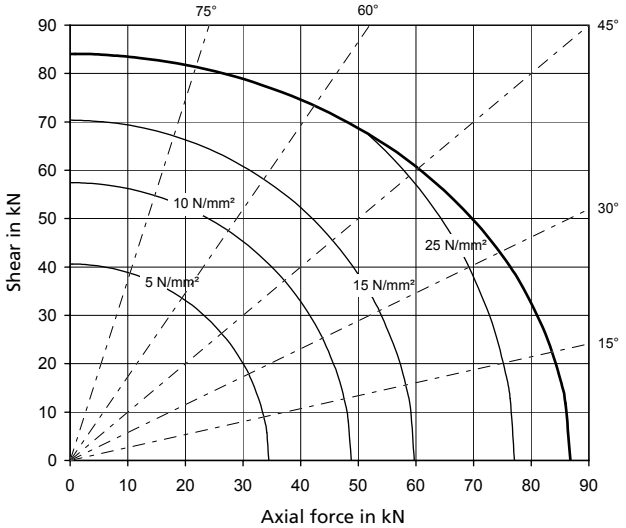
① Axial force
② Resulting suspension force
③ Shear

The load angles from 15° to 75° are vertical with regard to the concrete surface, i.e. for axial force the angle is 0° and for shear it is 90°.

Admissible load for climbing cone 15/M24
With anchor plate 15/120 and 160 mm installation depth



Admissible load for climbing cone 15/M24
With anchor plate 15/170 and 210 mm installation depth



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Minimum and edge distances for the climbing cones

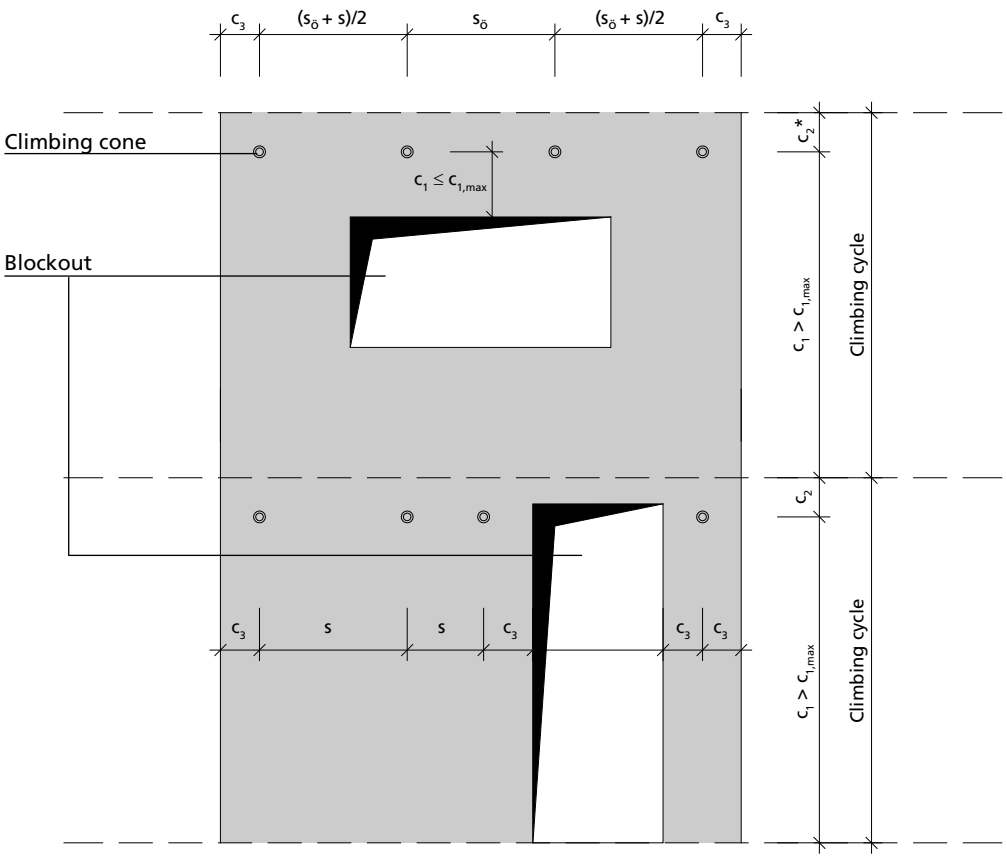

Fig. 9.1
For dimensions like c_3 etc. see the table on the next page.

(Source: General technical approval no. Z-21.6-1751 for the MEVA climbing cone KK15/M24 granted by the DIBt)

Minimum dimensions and distances must be observed when installing the climbing cones – above all over blockouts and near edges. In this case the dimensions and distances shown in Fig. 9.1 and in tables 10.1 und 10.2 on the next page must be observed.

The minimum distances shown apply when using the MGC climbing brackets with a maximum load according to approval Z-21.6-1751. The minimum distances can be reduced if the load is lower. In this case a separate statistical proof is required.

* Note for c_2:
For engineering reasons an edge distance of
c_2 = 55 cm
is selected when using the MGC system.

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Minimum and edge distances for the climbing cones

Specific values for the load-bearing capacity in the case of transverse load
(Breakage oft the concrete edge breakage / failure between concrete and steel of the suspension rebars)

Characteristical transverse load-bearing capacity $V_{Rk,c}$ • for cracked and non-cracked concrete • at least C20/25 • 24 hours old or older • βw = 10 N/mm²			Required distance from edge in the direction of force c_1 (mm)	Required structure thickness h ≥ (mm)
MEVA climbing cone, installation depth hnom = 160 mm				
• for maximum value	$V_{Rk,c}$ (kN)	105	$c_{1,max}$ = 650	200
• for minimum distance from edge in the direction of force		64	$c_{1,min}$ = 350	400
		52		250
		50		200
MEVA climbing cone, installation depth hnom = 210 mm				
• for maximum value	$V_{Rk,c}$ (kN)	127	$c_{1,max}$ = 700	250
• for minimum distance from edge in the direction of force		64	$c_{1,min}$ = 350	400
		52		250
Related safety factor	γ_{Mc}	1,5		

Table 10.1

Minimum values for structure thickness, axis distances and distances from edges

MEVA climbing cone		Installation depth	
		h_{nom} = 160 mm	h_{nom} = 210 mm
Minimum structure thickness	hmin (mm)	200	250
Axis distances			
• Minimum axis distance for a wall without blockings $c_1 > c_{1,max}$	s_{min} (mm)	580	730
• Axis distance over blockouts $c_1 \leq c_{1,max}$	$s_{\ddot{u}} \geq$ (mm)	1,5 x c_1	
Distances from edges			
• in the direction of load to the strained edge	$c_{1,min}$ (mm)	350	
• in the direction of load to the non-strained edge	$c_{2,min}$ (mm)*	290	365
• vertical to the direction of load	$c_{3,min}$ (mm)	290	365

Table 10.2
(Source: General technical approval no. Z-21.6-1751 for the MEVA climbing cone KK15/M24 granted by the DIBt)

* Note for c_2:
For engineering reasons an edge distance of c_2 = 55 cm is selected when using the MGC system.

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Installation of the climbing cones

Possible installation methods of the climbing cones at the formwork

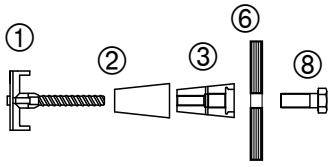

Fig. 11.1

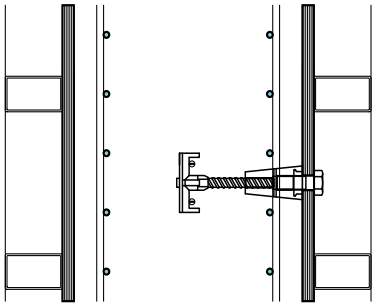

Fig. 11.2

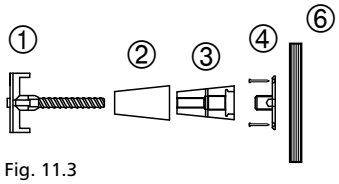

Fig. 11.3

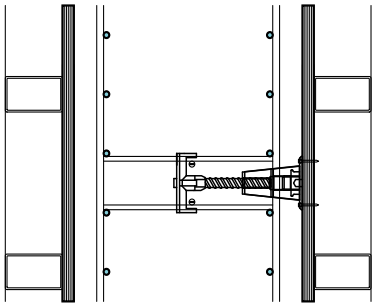

Fig. 11.4

Befestigung des Kletterschuhs an der Wand

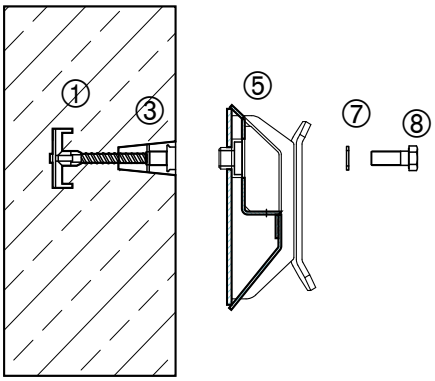

Fig. 11.5

① Anchor plate
② Conical sleeve
③ Climbing cone 15/M24
④ Positioning disc M24
⑤ Climbing shoe
⑥ Facing
⑦ Washer D40xD26x4
⑧ Hexagonal screw M24x60, 10.9 black, ISO 4017

Important
The accurate installation of the anchoring material is mandatory.

Installation with hexagonal screw M24/60
(Fig. 11.1 and 11.2)
Use this method when the climbing cones always have the same location since it ensures a dimensionally accurate installation.
1. Screw the hexagonal screw M24/60 through the pre-drilled hole (Ø 25 mm) in the facing into the climbing cone.
2. Plug the conical sleeve onto the climbing cone. This will ease unscrewing climbing cone after stripping the formwork.
3. Screw the anchor plate into the climbing cone.
4. Before stripping the formwork, remove the hexagonal screw M24/60 and detach the formwork from the concrete.

Installation with positioning disc M24
(Fig. 11.3 and 11.4)
1.Attach the positioning disc with 4 nails to the facing, e.g. with nails Ø 3,1/65.
2. Put a foam plug into the Allen key of the positioning disc.
3. Screw the climbing cone onto the positioning disc.
4. Plug the conical sleeve onto the climbing cone. This will ease unscrewing after stripping the formwork.
5. Screw the anchor plate into the climbing cone (Fig. 11.3).
6. Secure the positioning anchor with additional rebars or wire it to the rebars (Fig. 11.4).
7. After stripping the formwork, unscrew the positioning disc from the climbing cone using an appropriate Allen key.

Description	Ref. No.
Anchor plate	
15/120	**29-412-30**
15/170	**29-412-35**
20/170	**29-412-37**
Climbing cone	
15/M24	**29-412-70**
20/M24	**29-412-75**
Conical sleeve	**29-412-95**
Positioning disc M24	**29-412-85**
Climbing shoe MGC	**29-011-50**
Climbing shoe MGC with swivel-guide	**29-011-60**
Washer D40xD26x4, galv. DIN 1440-26	**29-412-78**
Hexagonal screw M24x60,10.9 black, ISO 4017	**63-119-48**

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Determining the heights for the climbing cycles

First of all, the heights for the climbing cycles need to be defined. The first pouring cycle (beginner) must have a minimum height of 3,25 m (this includes the necessary installation allowance of 10 cm). The height of 3,25 m is due to the construction of the MGC climbing bracket and the distance of the climbing cone frome the edge of the structure.

Table 12.3 shows the minimum heights for the first pouring cycle depending on the used climbing brackets MGC.

The heights of the subsequent cycles determine the lengths of the guiding profile extensions. Please note that there is also a minimum for the total height of the first plus the second pouring cycle (including an installation allowance of 10 cm), see table 12.4.

For the detailed illustrations A and B see p. MGC-13.

Minimum height for the first pouring cycle depending on the used climbing bracket MGC

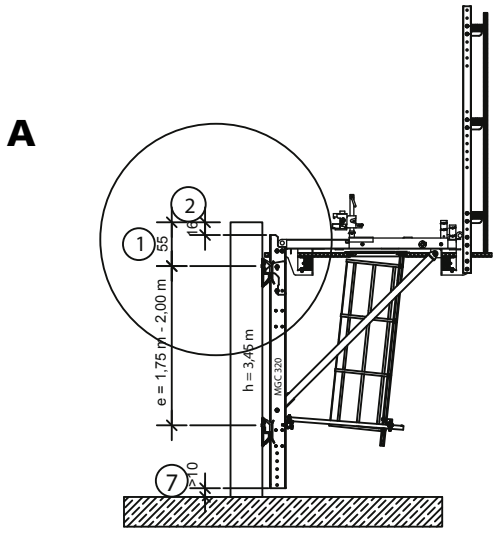

Fig. 12.1

Climbing bracket	1st pouring cycle	1st + 2nd pouring cycle	
		with extension 325	with extension 400
MGC 300	min. 325 cm	min. 650 cm	min. 725 cm
MGC 320	min. 345 cm	min. 670 cm	min. 745 cm
MGC 370	min. 395 cm	min. 720 cm	min. 795 cm

Table 12.3

Minimum height for the first and second pouring cycle depending on the used climbing bracket MGC and a guiding profile extension

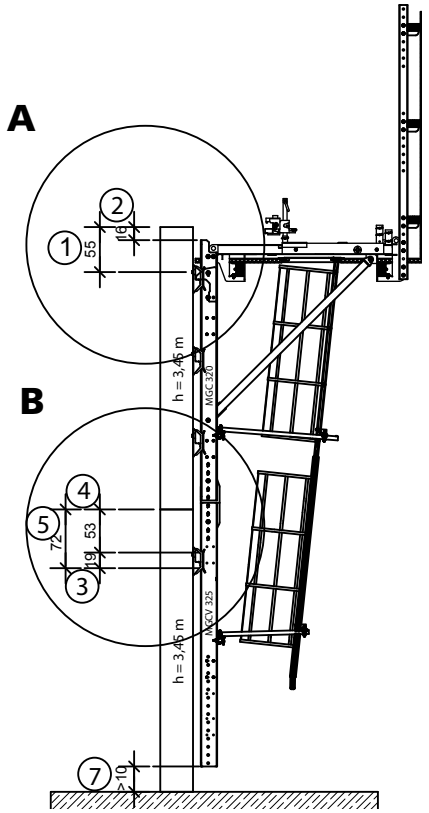

Fig. 12.2

The required guiding profile length is also determined by the below criteria 1 through 7

See the illustrations on pages MGC-12 and MGC-13.

No.	Required guiding profile lengths	
①	Climbing cone position below the wall's top end	55 cm
②	Distance from the top of the last pouring cycle to the top end of the climbing bracket's guiding profile	16 cm
③	Overlapping when climbing (length of guidance in the climbing shoe)	19 cm
④	Distance from the top of the next to last pouring cycle to the top of the guidance of the used shoe	53 cm
⑤	Distance from the top of the last or next to last pouring cycle until the bottom of the guidance in the climbing shoe (53 cm + 19 cm)	72 cm
⑥	Clearing required to remove the climbing shoes	8 cm
⑦	Distance from the guiding profile end to the ground (installation allowance)	10 cm

Table 12.4

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Determining the heights for the climbing cycles

Minimum and maximum guiding profile lengths

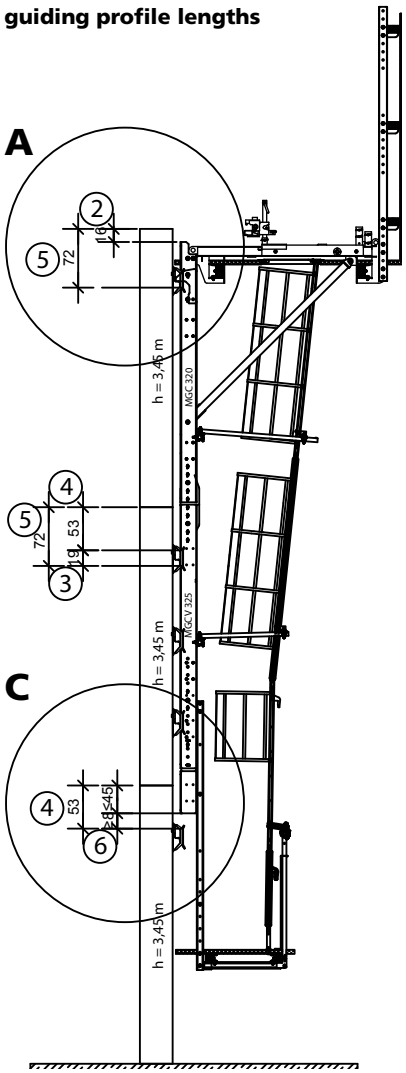

Fig. 13.1

Detail A
(See p. MGC-12 and MGC-13)

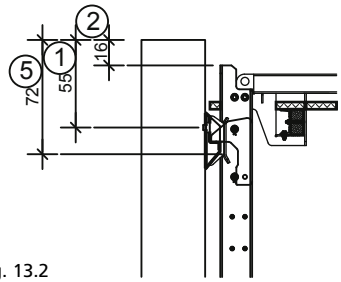

Fig. 13.2

Detail B
(See p. MGC-12)

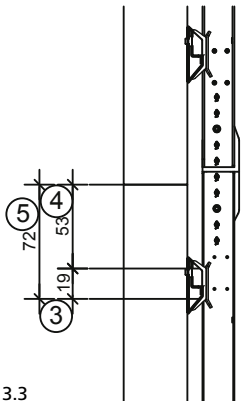

Fig. 13.3

Detail C
(See p. MGC-13)

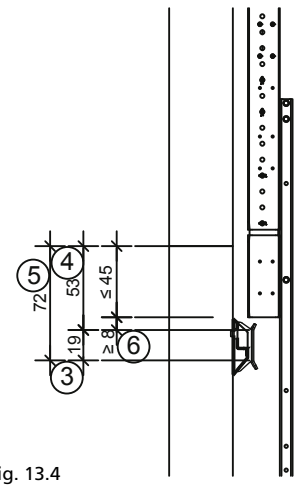

Fig. 13.4

Formulae to calculate and determine the guidung profile lengths

Minimum guiding profile length
Last pouring cycle (= pc)
+ next to last pc
– 72 cm ⑤
+ 53 cm ④
+ 19 cm ③
= last pc + next to last pc

Maximum guiding profile length
Last pouring cycle (= pc)
+ next to last pc
+ 53 cm ④
– 8 cm ⑥
– 16 cm ②
= last pc + next to last pc + 29 cm

Maximum guiding profile length for the first two pouring cycles
First pouring cycle (= pc)
+ second pc
– 16 cm ②
– 10 cm ⑦
= first pc + second pc – 26 cm

The tables on page MGC-14 show what climbing brackets and guiding profile extensions can be used depending on the heigths opf the first and subsequent pouring cycles.

The required guiding profile length is also determined by the below criteria 1 through 7
See the illustrations on pages MGC-12 and MGC-13.

No.	Required guiding profile lengths	
①	Climbing cone position below the wall's top end	55 cm
②	Distance from the top of the last pouring cycle to the top end of the climbing bracket's guiding profile	16 cm
③	Overlapping when climbing (length of guidance in the climbing shoe)	19 cm
④	Distance from the top of the next to last pouring cycle to the top of the guidance of the used shoe	53 cm
⑤	Distance from the top of the last or next to last pouring cycle until the bottom of the guidance in the climbing shoe (53 cm + 19 cm)	72 cm
⑥	Clearing required to remove the climbing shoes	8 cm
⑦	Distance from the guiding profile end to the ground (installation allowance)	10 cm

Table 13.5

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When to use the various climbing brackets MGC

Use climbing bracket MGC 300
if the first pouring cycle is ≥ 325 cm high
and subsequent cycles are ≥ 300 cm to 390 cm high

Height of the subsequent cycles [cm]	Climbing bracket			Guiding profile extension					Minimum height of the pouring cycles (= pc)	
	MGC 300	MGC 320	MGC 370	MGC 400	MGC 325	MGC 80	MGC 55	MGC 30	Height of 1st pc	Height of 1st + 2nd pc
Art.-Nr.	29-005-30	29-005-40	29-005-50	29-007-60	29-007-50	29-007-30	29-007-25	29-007-20		
300 – 312	X	-	-	-	X	-	-	-	325 cm	650 cm
313 – 327	X	-	-	-	X	-	-	X	325 cm	650 cm
326 – 340	X	-	-	-	X	-	X	-	325 cm	650 cm
339 – 352	X	-	-	-	X	X	-	-	325 cm	650 cm
336 – 350	X	-	-	X	-	-	-	-	325 cm	725 cm
351 – 365	X	-	-	X	-	-	-	X	325 cm	725 cm
364 – 377	X	-	-	X	-	-	X	-	325 cm	725 cm
376 – 390	X	-	-	X	-	X	-	-	325 cm	725 cm

Use climbing bracket MGC 320
if the first pouring cycle is ≥ 345 cm high
and subsequent cycles are ≥ 308 cm to 400 cm high

Height of the subsequent cycles [cm]	Climbing bracket			Guiding profile extension					Minimum height of the pouring cycles (= pc)	
	MGC 300	MGC 320	MGC 370	MGC 400	MGC 325	MGC 80	MGC 55	MGC 30	Height of 1st pc	Height of 1st + 2nd pc
Art.-Nr.	29-005-30	29-005-40	29-005-50	29-007-60	29-007-50	29-007-30	29-007-25	29-007-20		
308 – 322	-	X	-	-	X	-	-	-	345 cm	670 cm
323 – 337	-	X	-	-	X	-	-	X	345 cm	670 cm
336 – 350	-	X	-	-	X	-	X	-	345 cm	670 cm
348 – 362	-	X	-	-	X	X	-	-	345 cm	670 cm
345 – 360	-	X	-	X	-	-	-	-	345 cm	745 cm
361 – 375	-	X	-	X	-	-	-	X	345 cm	745 cm
373 – 387	-	X	-	X	-	-	X	-	345 cm	745 cm
385 – 400	-	X	-	X	-	X	-	-	345 cm	745 cm

Use climbing bracket MGC 370
if the first pouring cycle is ≥ 395 cm high
and subsequent cycles ≥ 333 cm to 425 cm high

Height of the subsequent cycles [cm]	Climbing bracket			Guiding profile extension					Minimum height of the pouring cycles (= pc)	
	MGC 300	MGC 320	MGC 370	MGC 400	MGC 325	MGC 80	MGC 55	MGC 30	Height of 1st pc	Height of 1st + 2nd pc
Art.-Nr.	29-005-30	29-005-40	29-005-50	29-007-60	29-007-50	29-007-30	29-007-25	29-007-20		
333 – 347	-	-	X	-	X	-	-	-	395 cm	725 cm
348 – 361	-	-	X	-	X	-	-	X	395 cm	725 cm
360 – 375	-	-	X	-	X	-	X	-	395 cm	725 cm
373 – 387	-	-	X	-	X	X	-	-	395 cm	725 cm
370 – 385	-	-	X	X	-	-	-	-	395 cm	795 cm
385 – 400	-	-	X	X	-	-	-	X	395 cm	795 cm
398 – 412	-	-	X	X	-	-	X	-	395 cm	795 cm
410 – 425	-	-	X	X	-	X	-	-	395 cm	795 cm

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Location and installation of the climbing cones

Recommended distance e_1

Climbing bracket	e_1
MGC 300	1,50 – 1,75 m
MGC 320	1,75 – 2,00 m
MGC 370	2,00 – 2,50 m

Table 15.1

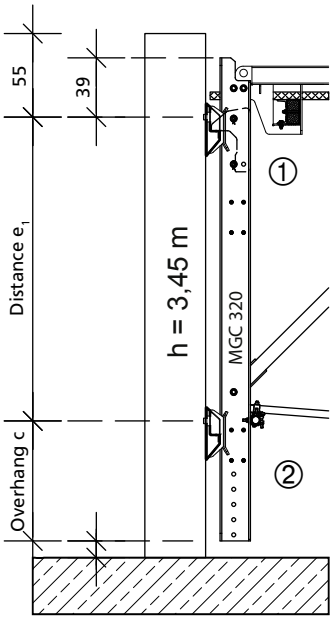
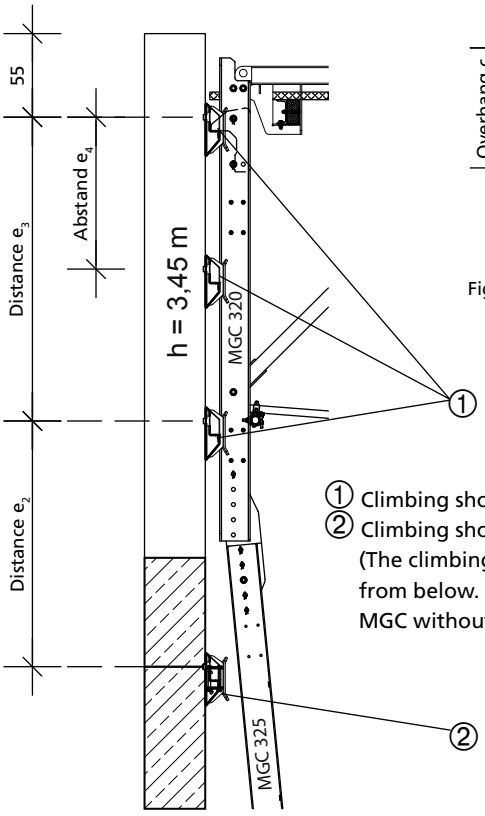


Fig. 15.2



① Climbing shoe MGC
② Climbing shoe MGC with swivel-guide (The climbing shoe can also be removed from below. In this case the climbing shoe MGC without swivel-guide will do.)

Fig. 15.3

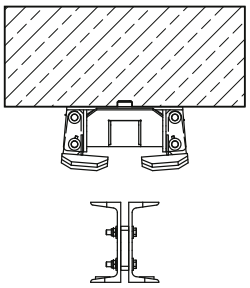


Fig. 15.4

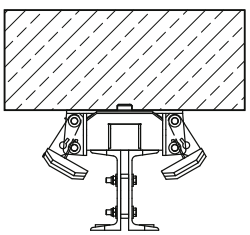


Fig. 15.5

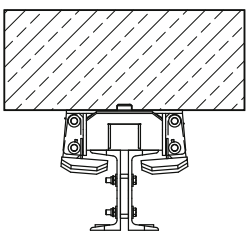


Fig. 15.6

1st pouring cycle

The upper level is always located 55 cm below the top of the pouring height. Depending on the pouring height and the used climbing bracket MGC, the lower level is located at distance e_1 (between 1,50 m and 2,50 m) from the axis of the upper climbing cone (Table 15.1).

2nd pouring cycle

Climbing cones are required on two levels in order to make sure the climbing brackets are guided in the climbing shoes (Fig. 15.3). As with the 1st pouring cycle, the upper level is located 55 cm below the top of the pouring height. The location of the lower level (distance e_2 from the suspension of the 1st pouring cycle) is calculated as follows:

$e_2 = l_{MGC} - e_1$

Distance e_3 results from the above and distance e_4 for the middle level is approximately $e_3/2$.

Climbing shoe MGC with swivel-guide

This type of climbing shoe is used on the upper level of the first pouring cycle, see fig. 15.2 through 15.4. The platform unit is suspended there. The swivel-guide allows the guiding profile extension to be swivelled in.

Please note

A climbing unit must always be guided with a minimum of two climbing shoes.

Climbing shoe MGC

The lower climbing shoe MGC is a rigid type of shoe without swivel-guide, see fig. 15.2. This type of shoe is used here so that, if necessary, it can be removed from below before mounting the guiding profile extension. All further climbing shoes are also shoes without swivel-guide.

Reference	Ref. No.
Climbing shoe MGC	**29-011-50**
Climbing shoe MGC with swivel-guide	**29-011-60**
Guiding profile extension	
MGC 400	**29-007-60**
MGC 325	**29-007-50**
MGC 80	**29-007-30**
MGC 55	**29-007-25**
MGC 30	**29-007-20**
Washer D40xD26x4, galv., DIN 1440-26	**29-412-78**
Hexagonal screw M24x60,10.9 black, ISO 4017	**63-119-48**

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Determining the platform geometry

Platform planning
The statical system of the climbing system consists of a girder placed on two props and of two cantilever arms. The admissible load and selected scaffold groups determine the brace spacing and the span of stringers and cantilever arms. The admissible bowing under load is limited to l/300 for the field and to l/150 for the cantilever arm. The load must be distributed acording to DIN EN 12811-1:2004.

For the calculation of the spans and cantilever arms refer to the tables on the following pages. The bracket spacing determines which ledgers are to be used. They can be mounted in increments of 5 cm. U 160 stringers with a length of 3, 4, 5 or 6 m are used for the main platform and U 100 stringers with a length of 3, 4, 5 or 6 m for the secondary platforms.

The stringers have drill holes which are used to attach them to the climbing brackets. The stringer web contains drill holes to attach square timbers 16/8 or 10/8 as well as side-railing posts.

The square timbers can project up to 40 cm over the stringers. This ensures an optimum adjustment to the building geometry using standard girdes. For the secondary platform, H20 girders can be used instead of stringers.

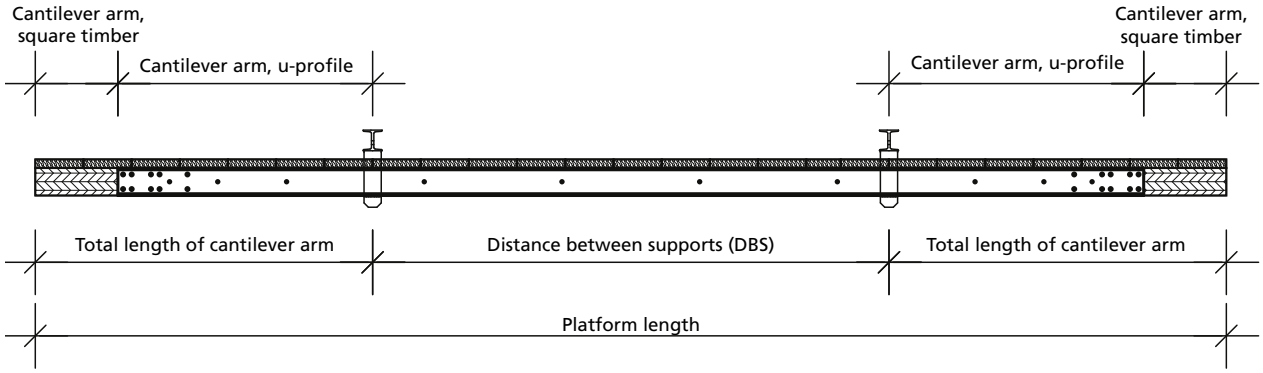

Fig. 16.1

Reference	Ref. No.
Stringers for main platform	
U 160/3,00 m	**29-014-30**
U 160/4,00 m	**29-014-40**
U 160/5,00 m	**29-014-50**
U 160/6,00 m	**29-014-60**
Stringers for secondary platform	
U 100/3,00 m	**29-015-30**
U 100/4,00 m	**29-015-40**
U 100/5,00 m	**29-015-50**
U 100/6,00 m	**29-015-60**
Ledgers	
MGC 1,40 m – 2,00 m	**29-008-20**
MGC 2,00 m – 3,00 m	**29-008-30**
MGC 3,00 m – 3,60 m	**29-008-40**
Side-railing post 10/300	**29-012-80**
Side-railing post secondary platform	**29-013-50**

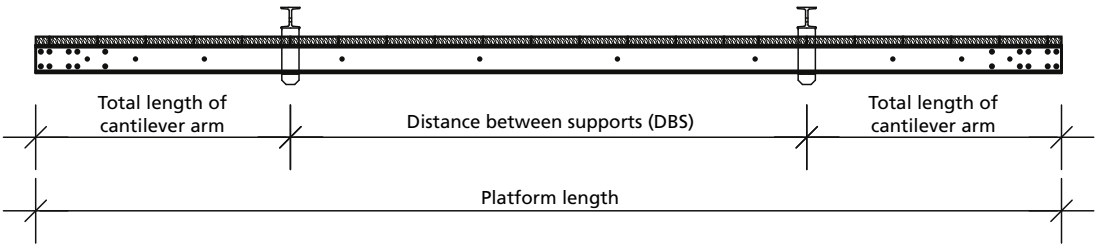

Fig. 16.2

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Ascertaining the spans / cantilever arms

Main platform – with U 160 stringer and square timber 16/8

Stringer	Ref. No.	Platform length [cm]	Distance between supports		Total length of cantilever arm on either platform side [cm]		
			Max [cm]	Min [cm]	with max. DBS	with min. DBS	length of timber square
U 160 – 3,00 m	29-014-30	300	240	140	30	80	-
		340	240	150	50	95	20
		380	240	160	70	110	40
U 160 – 4,00 m	29-014-40	400	300	170	50	115	-
		440	300	200	70	120	20
		480	300	210	90	135	40
U 160 – 5,00 m	29-014-50	500	360	220	70	140	-
		540	360	240	90	150	20
		580	360	260	110	160	40
U 160 – 6,00 m	29-014-60	600	360	260	120	170	-
		640	360	300	140	170	20
		680	360	360	160	160	40

Secondary platform – with U 100 stringer and square timber 10/8

Stringer	Ref. No.	Platform length [cm]	Distance between supports		Total length of cantilever arm on either platform side [cm]		
			Max [cm]	Min [cm]	with max. DBS	with min. DBS	length of timber square
U 100 – 3,00 m	29-015-30	300	240	140	30	80	-
		340	240	150	50	95	20
		380	240	160	70	110	40
U 100 – 4,00 m	29-015-40	400	300	170	50	115	-
		440	300	200	70	120	20
		480	300	220	90	130	40
U 100 – 5,00 m	29-015-50	500	360	220	70	140	-
		540	360	240	90	150	20
		580	360	300	110	140	40
U 100 – 6,00 m	29-015-60	600	360	290	120	155	-
		640	360	360	140	140	20

Secondary platform – with H20 girders

Stringer	Ref. No.		Distance between suppports		Total length of cantilever arm on either platform side [cm]	
			Max [cm]	Min [cm]	with max. DBS	with min. DBS
H20/290	29-206-05	290	240	140	25	75
H20/330	29-206-10	330	240	140	45	95
H20/390	29-206-20	390	300	170	45	110
H20/450	29-206-30	450	300	200	75	125
H20/490	29-206-40	490	320	220	85	135
H20/590	29-206-48	590	350	320	120	135

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Position of the secondary platform

The position of the ledgers depends on the position of the secondary platform while the position of this platform depends on the location of the climbing shoes.

It is ideal if the climbing shoe is located between 1,30 m und 1,60 m over the surface of the secondary platform's planking. In this case the ledger is normally attached at the 2nd position of the guiding profile extension (= position 4 for climbing bracket plus extension, see fig. 20.1 through 20.6). The working level of the secondary platform can be changed in increments of 15 cm at the folding bracket, see fig. 18.2.

For pouring cycles lower than 3,20 m, we recommend attaching the ledger at position 6, see fig. 20.1 through 20.6. In any case, always check that the position of the secondary platform is accurate.

The lengths of the tension rods for the guiding profile extensions are determined by the rules above.

Pouring height	Climbing bracket	Guiding profile extension MGC	Distance between climbing shoe and planking of the secondary platform
4,25 m	MGC 370	MGC 400 + 80	Approx. 1,20 m
4,00 m	MGC 370	MGC 400	Approx. 1,70 m
3,75 m	MGC 320	MGC 400	Approx. 1,70 m
3,50 m	MGC 320	MGC 325	Approx. 1,45 m
3,25 m	MGC 300	MGC 325	Approx. 1,45 m

Table 18.2

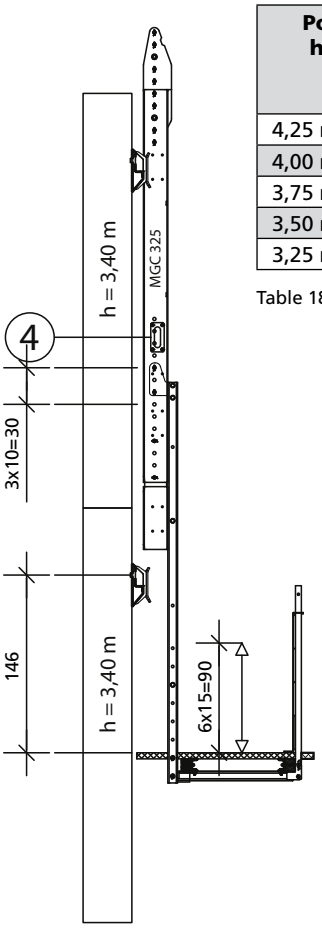

Fig. 18.1

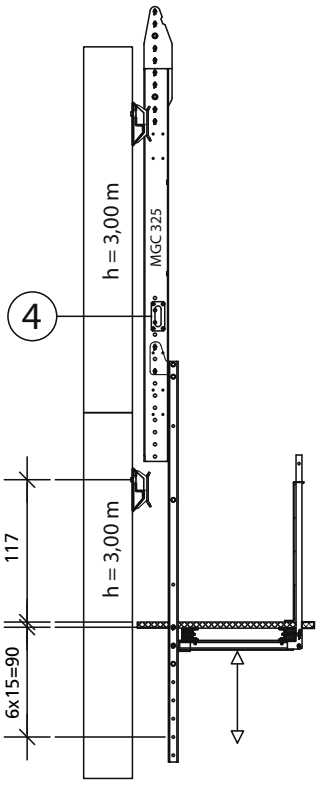

Fig. 18.3

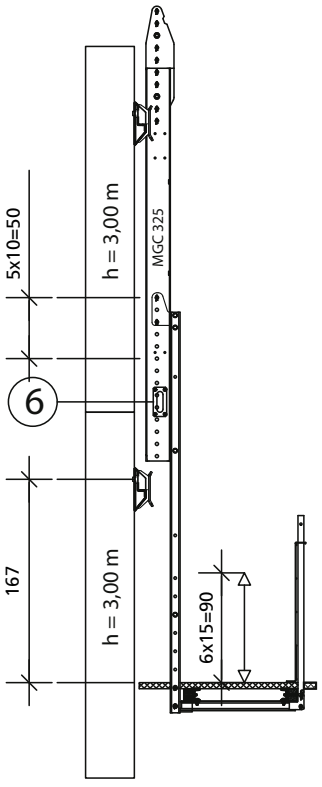

Fig. 18.3

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Ledgers and tension rods

Lenght calculation of the tension rods
The below formula is used to calculate the length c for the tension rods.

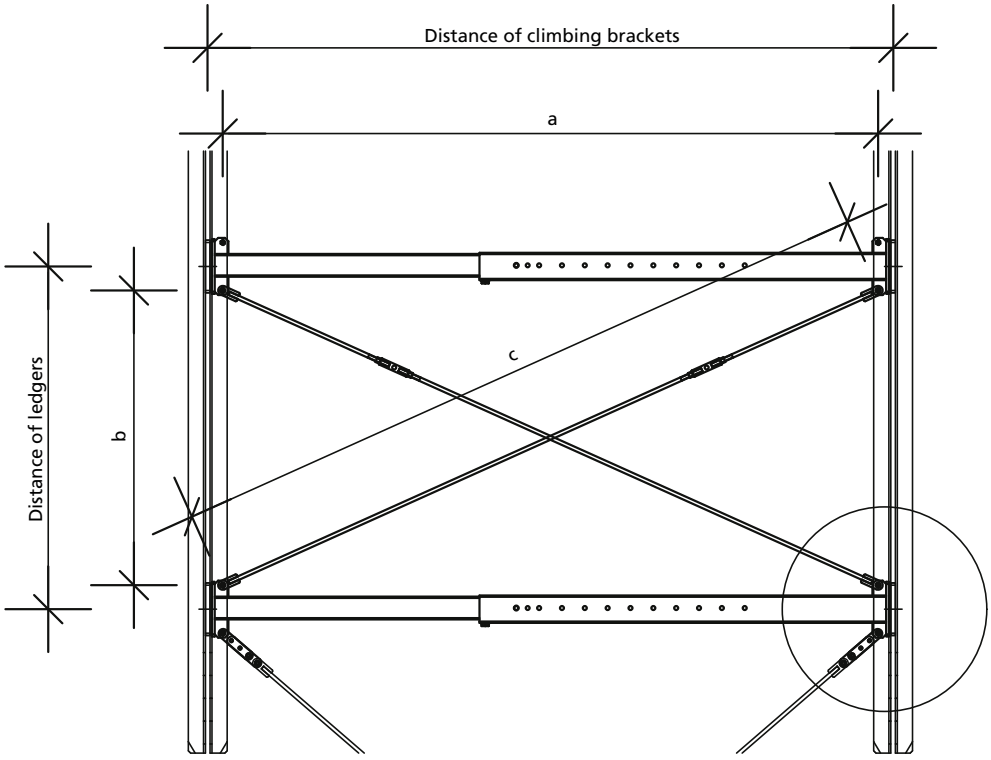

Fig. 19.1

Formula to calculate the tension rod length (c)

a = Distance of brackets – 2 x 6,6 cm
b = Distance of ledgers – 2 x 10,5 cm
$c = \sqrt{a^2 + b^2}$

Detail: Tension rod attached to ledger

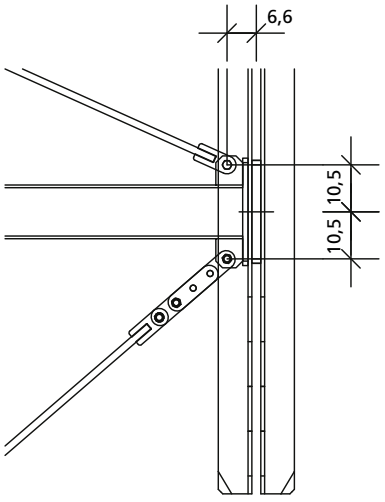

Fig. 19.2

After determining the climbing bracket distances, the position of the ledgers in the guiding profiles is determined (for the climbing brackets and extensions see positions ① through ⑥ in fig. 20.1 through 20.6). In most cases 3 ledgers are sufficient.

Climbing brackets MGC
The ledgers are attached at positions ① and ② of the climbing brackets.

Guiding profile extensions
Ledgers can be attached at 3 positions. In most cases only 1 ledger is required and attached at position ④. The attachment at this position depends on the position of the secondary platform. Position ⑤ or ⑥ is recommended for pouring heights lower than 3,20 m.

Always check for an accurate position of the ledgers at the guiding profile extensions.

Guiding profile extensions 80 and 55 usually do not require a ledger.

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Ledgers and tension rods

Climbing bracket MGC 300
+ extension MGC 325

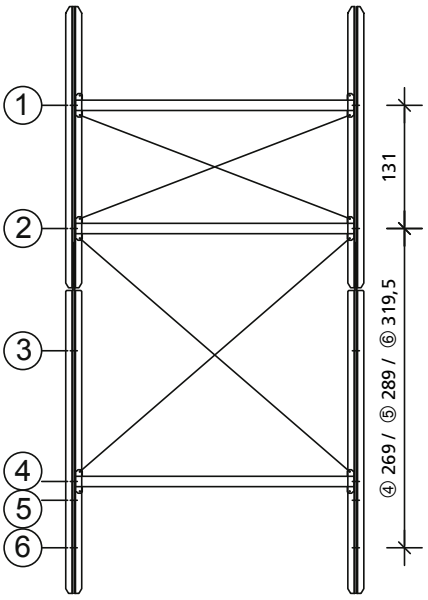

Fig. 20.1

Climbing bracket MGC 320
+ extension MGC 325

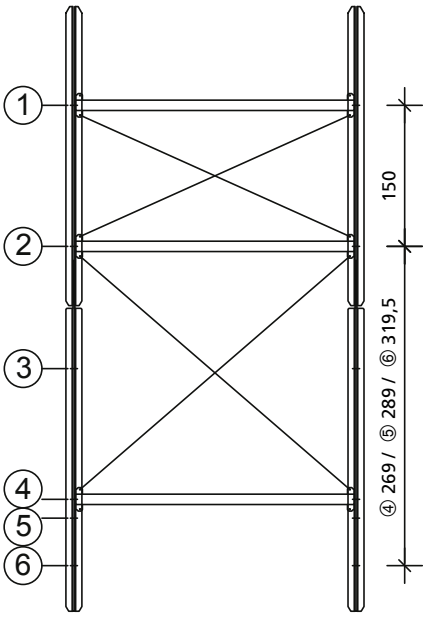

Fig. 20.2

Climbing bracket MGC 370
+ extension MGC 325

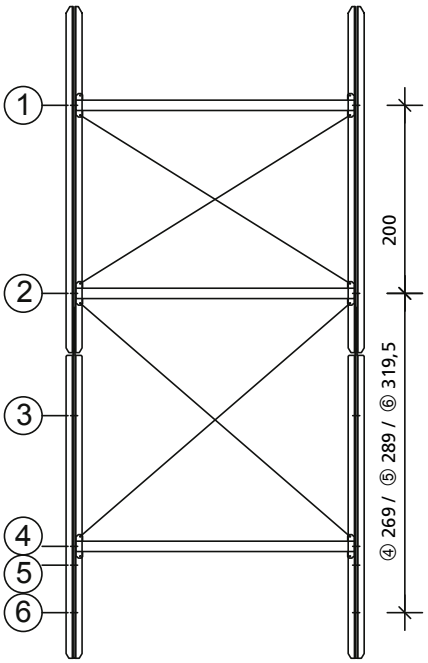

Fig. 20.3

Climbing bracket MGC 300
+ extension MGC 400

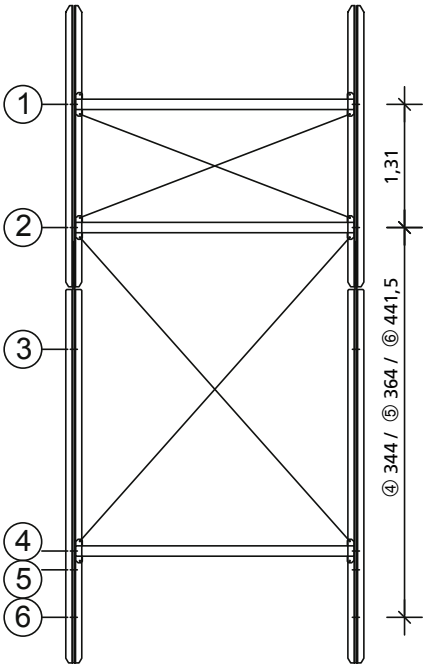

Fig. 20.4

Climbing bracket MGC 320
+ extension MGC 400

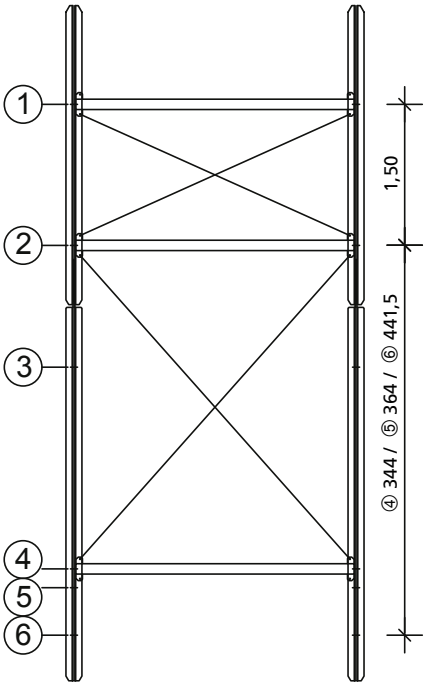

Fig. 20.5

Climbing bracket MGC 370
+ extension MGC 400

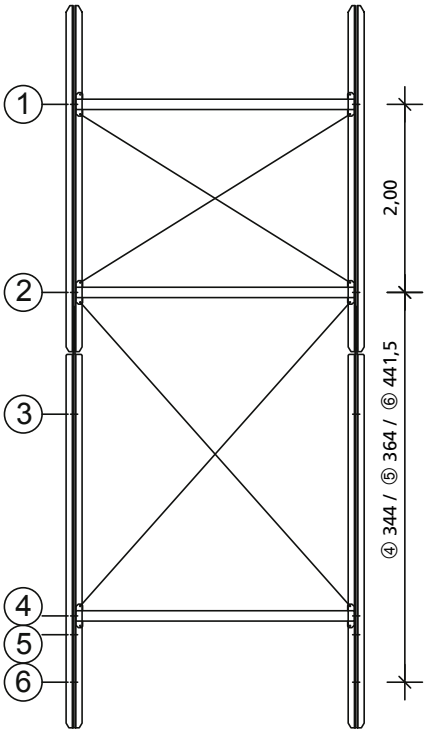

Fig. 20.6

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Ascertaining the lengths of the tension rods

Length of the tension rods when using ledgers MGC 1,40 m – 2,00 m, Ref. No. 29-008-20

		Distance between the axes of the climbing brackets MGC [cm]						
Combination	**Pos.**	**200**	**190**	**180**	**170**	**160**	**150**	**140**
MGC 300	① - ②	217	208	20	192	183	176	168
MGC 300 + Ext. MGC 325	② - ④	310	305	299	293	288	283	279
	② - ⑤	327	321	316	310	306	301	296
	② - ⑥	369	364	360	355	351	347	343
MGC 300 + Ext. MGC 400	② - ④	373	368	364	359	355	351	347
	② - ⑤	391	386	381	377	373	369	366
	② - ⑥	436	431	427	424	420	417	413
MGC 320	① - ②	227	219	211	203	195	188	181
MGC 320 + Ext. MGC 325	② - ④	310	305	299	293	288	283	279
	② - ⑤	327	321	316	310	306	301	296
	② - ⑥	369	364	360	355	351	347	343
MGC 320 + Ext. MGC 400	② - ④	373	368	363	359	355	351	347
	② - ⑤	390	386	381	377	373	369	365
	② - ⑥	435	431	427	423	419	416	413
MGC 370	① - ②	259	252	245	238	231	225	219
MGC 370 + Ext. MGC 325	② - ④	310	305	299	293	288	283	279
	② - ⑤	327	321	316	310	306	301	296
	② - ⑥	369	364	360	355	351	347	343
MGC 370 + Ext. MGC 400	② - ④	373	368	363	359	355	351	347
	② - ⑤	390	386	381	377	373	369	365
	② - ⑥	435	431	427	423	419	416	413

Length of tension rods when using ledgers MGC 2 ,00 m – 3,00 m, Ref. No. 29-008-30

		Distance between the axes of the climbing brackets MGC [cm]										
Combination	**Pos.**	**300**	**290**	**280**	**270**	**260**	**250**	**240**	**230**	**220**	**210**	**200**
MGC 300	① - ②	307	298	289	279	27	261	252	243	234	225	217
MGC 300 + Ext. MGC 325	② - ④	379	372	364	357	350	343	336	329	323	317	310
	② - ⑤	393	385	378	371	364	358	351	345	339	332	327
	② - ⑥	429	422	415	409	403	397	391	385	380	374	369
MGC 300 + Ext. MGC 400	② - ④	432	425	419	413	406	401	395	389	384	378	373
	② - ⑤	447	441	435	428	423	417	411	406	401	395	391
	② - ⑥	487	481	475	470	464	459	454	449	445	440	436
MGC 320	① - ②	314	305	296	287	278	270	261	252	244	235	227
MGC 320 + Ext. MGC 325	② - ④	379	372	364	357	350	343	336	329	323	317	310
	② - ⑤	393	385	378	371	364	358	351	345	339	332	327
	② - ⑥	429	422	415	409	403	397	391	385	380	374	369
MGC 320 + Ext. MGC 400	② - ④	432	425	419	412	406	400	395	389	383	378	373
	② - ⑤	447	440	434	428	422	416	411	405	400	395	390
	② - ⑥	486	481	475	469	464	459	454	449	444	439	435
MGC 370	① - ②	338	330	321	313	305	297	289	281	274	266	259
MGC 370 + Ext. MGC 325	② - ④	379	372	364	357	350	343	336	329	323	317	310
	② - ⑤	393	385	378	371	364	358	351	345	339	332	327
	② - ⑥	429	422	415	409	403	397	391	385	380	374	369
MGC 370 + Ext. MGC 400	② - ④	432	425	419	412	406	400	395	389	383	378	373
	② - ⑤	447	440	434	428	422	416	411	405	400	395	390
	② - ⑥	486	481	475	469	464	459	454	449	444	439	435

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Ascertaining the lengths of the tension rods

Length of tension rods when using ledgers MGC 3,00 m – 3,60 m, Ref. No. 29-008-40

		Distance between the axes of the climbing brackets MGC [cm]						
Kombination	**Pos.**	**360**	**350**	**340**	**330**	**320**	**310**	**300**
MGC 300	① - ②	364	354	345	335	326	317	307
MGC 300 + Ext. MGC 325	② - ④	426	418	410	402	394	387	379
	② - ⑤	438	430	423	415	407	400	393
	② - ⑥	471	464	456	449	442	435	429
MGC 300 + Ext. MGC 400	② - ④	474	467	459	452	445	439	432
	② - ⑤	488	481	474	467	460	454	447
	② - ⑥	525	518	512	505	499	493	487
MGC 320	① - ②	370	361	351	342	333	324	314
MGC 320 + Ext. MGC 325	② - ④	426	418	410	402	394	387	379
	② - ⑤	438	430	423	415	407	400	393
	② - ⑥	471	464	456	449	442	435	429
MGC 320 + Ext. MGC 400	② - ④	474	467	459	452	445	439	432
	② - ⑤	487	480	473	467	460	453	447
	② - ⑥	524	517	511	505	498	492	486
MGC 370	① - ②	390	381	373	364	355	347	338
MGC 370 + Ext. MGC 325	② - ④	426	418	410	402	394	387	379
	② - ⑤	438	430	423	415	407	400	393
	② - ⑥	471	464	456	449	442	435	429
MGC 370 + Ext. MGC 400	② - ④	474	467	459	452	445	439	432
	② - ⑤	487	480	473	467	460	453	447
	② - ⑥	524	517	511	505	498	492	486

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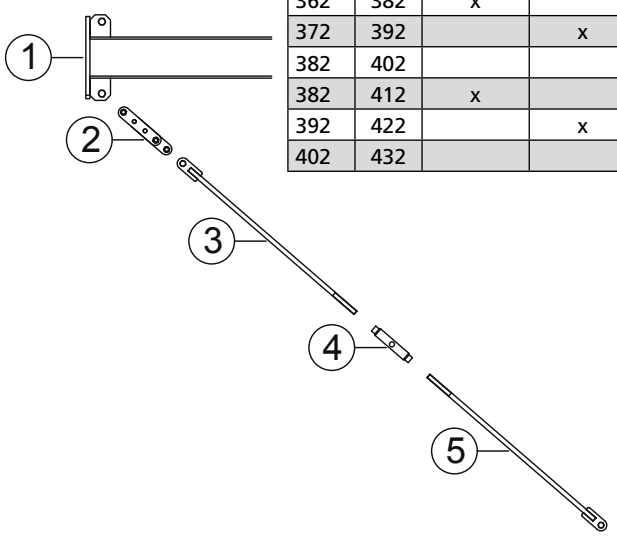
Tension rod configuration

If a length of 432 cm is not sufficient, further tension rod extensions can be added. Each extension adds an additional 20 to 30 cm.

Adjustment range (min - max)		Threaded rod							Tension rod extension	Turnbuckle nut
		60 LH	70 LH	80 LH	130 RH	180 RH	230 RH	280 RH		
		29-009-10	29-009-15	29-009-20	29-009-40	29-009-50	29-009-60	29-009-70	29-009-90	29-009-95
192	202	x								x
202	212		x		x					x
212	222			x	x					x
212	232	x			x				1	x
222	242		x		x				1	x
232	252			x	x				1	x
232	262	x			x				2	x
242	252	x				x				x
242	272		x		x				2	x
252	262		x			x				x
252	282			x	x				2	x
262	272			x		x				x
262	282	x				x			1	x
272	292		x			x			1	x
282	302			x		x			2	x
282	312	x				x			2	x
292	302	x					x			x
292	322		x			x			2	x
302	312		x				x			x
302	332			x		x			2	x
312	322			x			x			x
312	332	x					x		1	x
322	342		x				x		1	x
332	352			x			x		1	x
332	362	x					x		2	x
342	352	x						x		x
342	372		x				x		2	x
352	362		x					x		x
352	382			x			x		2	x
362	372			x				x		x
362	382	x						x	1	x
372	392		x					x	1	x
382	402			x				x	1	x
382	412	x						x	2	x
392	422		x					x	2	x
402	432			x				x	2	x

Reference	Ref. No.
Threaded rod	
60 LH	**29-009-10**
70 LH	**29-009-15**
80 LH	**29-009-20**
130 RH	**29-009-40**
180 RH	**29-009-50**
230 RH	**29-009-60**
280 RH	**29-009-70**
Ledgers	
MGC 1,40 m – 2,00 m	**29-008-20**
MGC 2,00 m – 3,00 m	**29-008-30**
MGC 3,00 m – 3,60 m	**29-008-40**
Turnbuckle nut M16	**29-009-95**
Tension rod extension	**29-009-90**



① Ledger
② Tension rod extension
③ Threaded rod LH
④ Turnbuckle nut M16
⑤ Threaded rod RH

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Side protection (options and assembly)

Different options are available to build an efficient side protection. The side protection for the main platform is 3,00 m high while the protection for secondary platforms is 1,15 m high.

Protection with the perforated trapezoidal sheet
The perforated trapezoidal sheet is the highest safety standard. By enclosing the platform completely, it protects workers against falling down, against falling material and against the effects of weather. The guard-railings posts 10/300 with timber fixture are used for this kind of side protection. They have a double u-profile 100 and allow for a protection height of 3,00 m over the planking.

The three integrated timber fixtures carry the horizontally placed square timbers 16/8. Carriage bolts M12x120, washers for wooden assemblies and stop nuts are used for assembly.

If necessary, further timber fixtures can be attached. The perforated trapezoidal sheets (3,00 m high and 91,5 cm wide) are screwed to the square timbers from the outside.

Protection with safety mesh (project-related)
The safety mesh with integrated toeboards is used as a fall-down protection and protection against falling parts.

This option uses guard-railing posts 10/300 and tube brackets U 100. The tube brackets must be ordered separately and are used to attach the scaffold tubes to the posts. The number of required tube brackets depends on the number of scaffold tubes that are connected (4 levels are sufficient). The mesh is clamped between the guard-railing posts and scaffold tubes.

Reference	Ref. No.
Guard-railing post	
10/300	**29-012-30**
10/300 - with timber fixture	**29-012-35**
Scaffold tube	
48/200	**29-412-23**
48/300	**29-412-26**
48/400	**29-412-27**
48/500	**29-412-25**
48/600	**29-412-28**
Tube bracket U 100	**29-013-96**
Safety mesh	
115/130	**29-920-20**
115/260	**29-920-10**
- extension 57,5/130	**29-920-40**
- extension 57,5/260	**29-920-30**
- corner hinge	**29-920-65**
Perforated trapezoidal sheet	
91,5/160	**29-006-40**
91,5/300	**29-006-30**

Side protection with perforated trapezoidal sheet

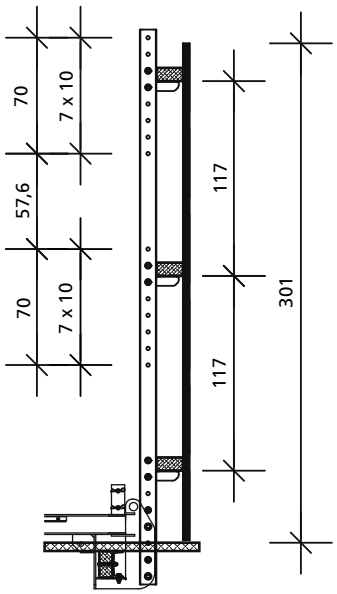

Fig. 24.1 Sectionlal drawing

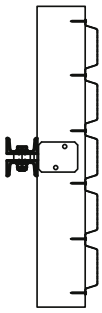
Fig. 24.2 Top view

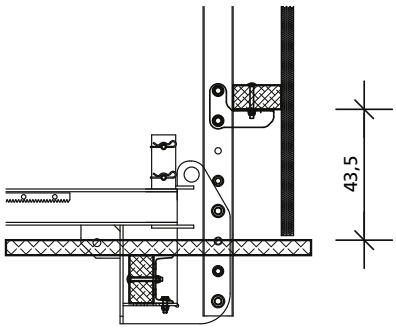

Fig. 24.3 Detailed sectional drawing

Side protection with safety mesh

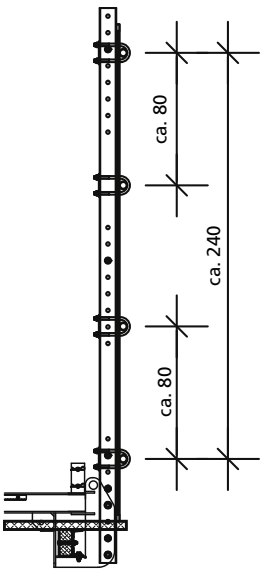

Fig. 24.4

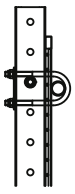
Fig. 24.5

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Side protection (options and assembly)

Protection with scaffold tubes

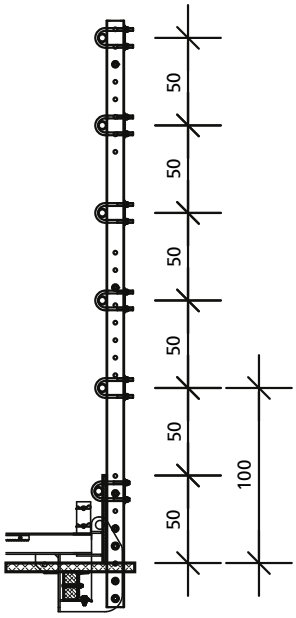

Fig. 25.1

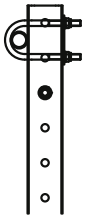

Fig. 25.2

Protection with a close-mesh guard net

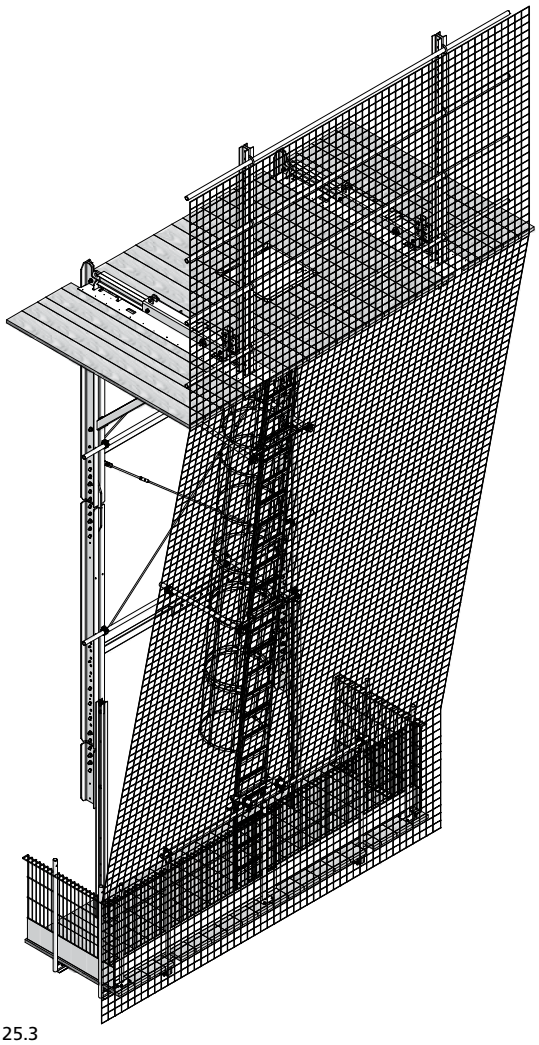

Fig. 25.3

Protection with scaffold tubes
This is a low-cost option. In addition to the scaffold tubes, a toeboard with a minimum height of 15 cm must be attached and close-mesh guard nets must be used for protection against falling parts (Fig. 25.1).

Close-mesh guard nets
Close-mesh guard nets are recommended if no perforated trapezoidal sheets are used for protection. The guard nets make make workers feel safe and ensure that no small parts can fall down through the net. We recommend using such guards nets especially around safety cages of laddes or as blinds for platforms that have an access hatch and ladder to a secondary platform (Fig. 25.3).

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Side protection (options and assembly)

Protection for the secondary platform
We recommend using safety meshes with integrated toeboards. The height of the safety meshes is approx. 1,15 m, they are available in widths of 2,60 m and 1,30 m. The safety meshes are plugged over the guard-railing posts and adapted to the platform length by overlapping them. Depending on the platform length, an additional guard-railing post 48/1300 may be required at the planking. The screws must be positioned at least 6 cm from the plank edge.

The guard-railing post extension 48/600 is used to attach the 57,5 cm high safety mesh extension. The extension is firmly attached to the guard-railing post with pin 14/90.

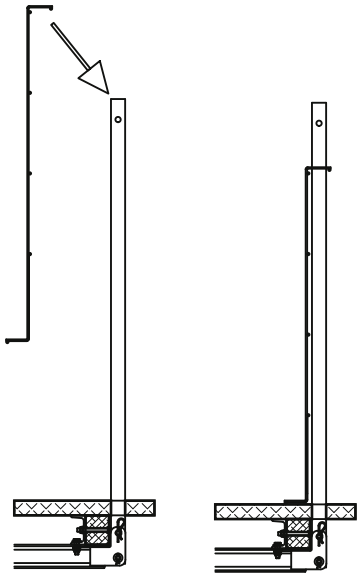

Fig. 26.1

Fig. 26.2

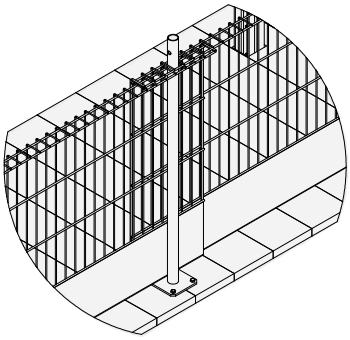

Fig. 26.4

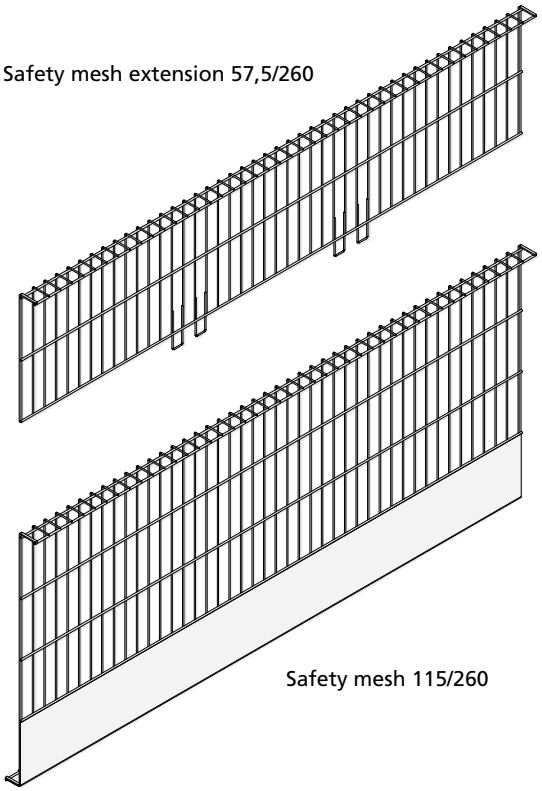

Fig. 26.3

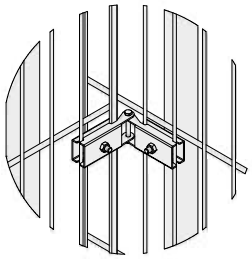

Fig. 26.5 The safety mesh corner hinge connects the safety meshes in the corner.

Guard-railing post 48/1300

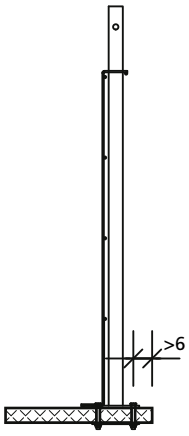

Fig. 26.6

Reference	Ref. No.
Folding bracket MGC for secondary platform	**29-013-20**
Side-railing post for secondary platform	**29-013-50**
Guard-railing post 48/1300	**29-012-40**
extension 48/600	**29-012-45**
Safety mesh 115/260	**29-920-10**
115/130	**29-920-20**
- extension 57,5/260	**29-920-30**
- extension 57,5/130	**29-920-40**
- corner hinge	**29-920-65**

Distance of the guard-railing post 48/1300 from the edge

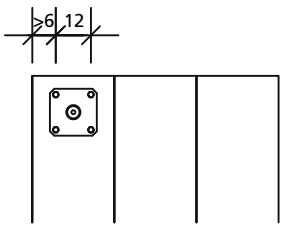

Fig. 26.7

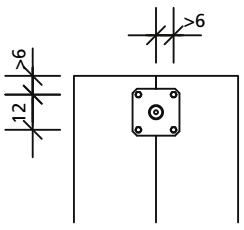

Fig. 26.8

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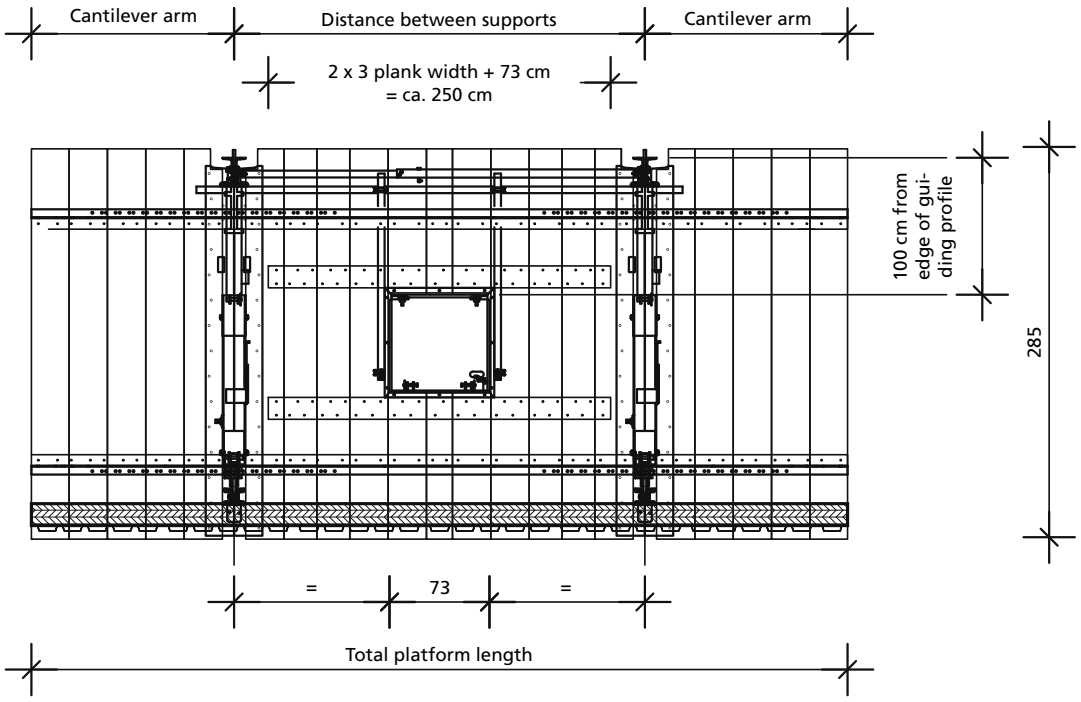
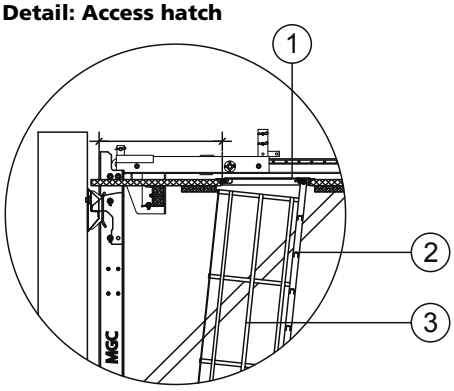
Access hatch and ladder system

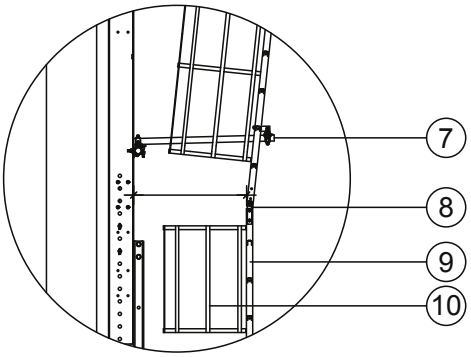
Top view onto the main platform with access hatch



Detail: Access hatch



Detail: Ladder link



Access to the secondary platform

① Access hatch KLK
② Ladder 243
③ Safety cage 210

⑦ Ladder fixture 130
⑧ Ladder link set
⑨ Extension ladder 210
⑩ Safety cage 85

The planning and assembly of the access hatch and ladder system is done from the bottom to the top. The layout of the ladder system depends primarily on the position of the secondary platform, the position of which is determined by the height of the pouring cycles and the position of the climbing shoes, see p. MGC-18.

The access hatch is set into the platform planking. This requires an opening of 73 cm x 73 cm in the planking. The access hatch is positioned between the platform's stringers and the slide carriages. It must be located 100 cm (minimum) behind the edge of the guiding profile to make sure that the hatch can also be opened when the formwork is removed from the wall. Make sure the hatch cover can be opened towards the formwork.

Longitudinal planks must be placed on either side of the opening for the access hatch. These planks must be approx. 250 cm. On either side of the access hatch, such a plank must project beyond the access hatch by a length three times its width which is approx. 90 cm. So this makes 90 cm x 2 (for two sides) + 73 cm for the access hatch = approx. 250 cm.

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Ladder to the secondary platform

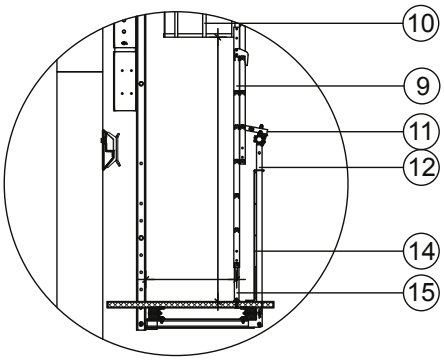
Example of a ladder acces to the secondary platform (from top to bottom)

1	Access hatch KLK	29-416-05
2	Ladder 243	29-416-50
3	Safety cage 210	29-414-85
4	Ladder fixture 150	29-416-67
5	Ladder connector	29-414-70
6	Extension ladder 270	29-416-52
7	Ladder fixture 130	29-416-68
8	Ladder link set	29-414-72
9	Extension ladder 210	29-416-60
10	Safety cage 85	29-414-90
11	Ladder fixture (railing)	29-416-69
12	Coupling pin 48 LAB	29-421-95
13	Extension ladder 90	29-416-60
14	Safety mesh 115/260	29-920-10
15	Ladder base KLK	29-416-70

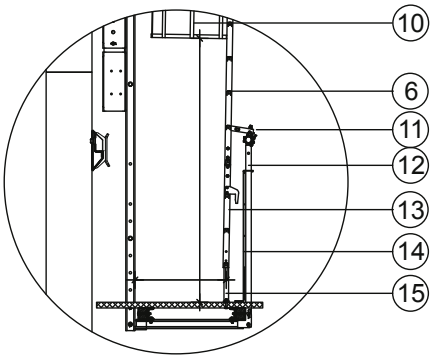
Connecting material for access hatch:
12 wooden screws 6x45

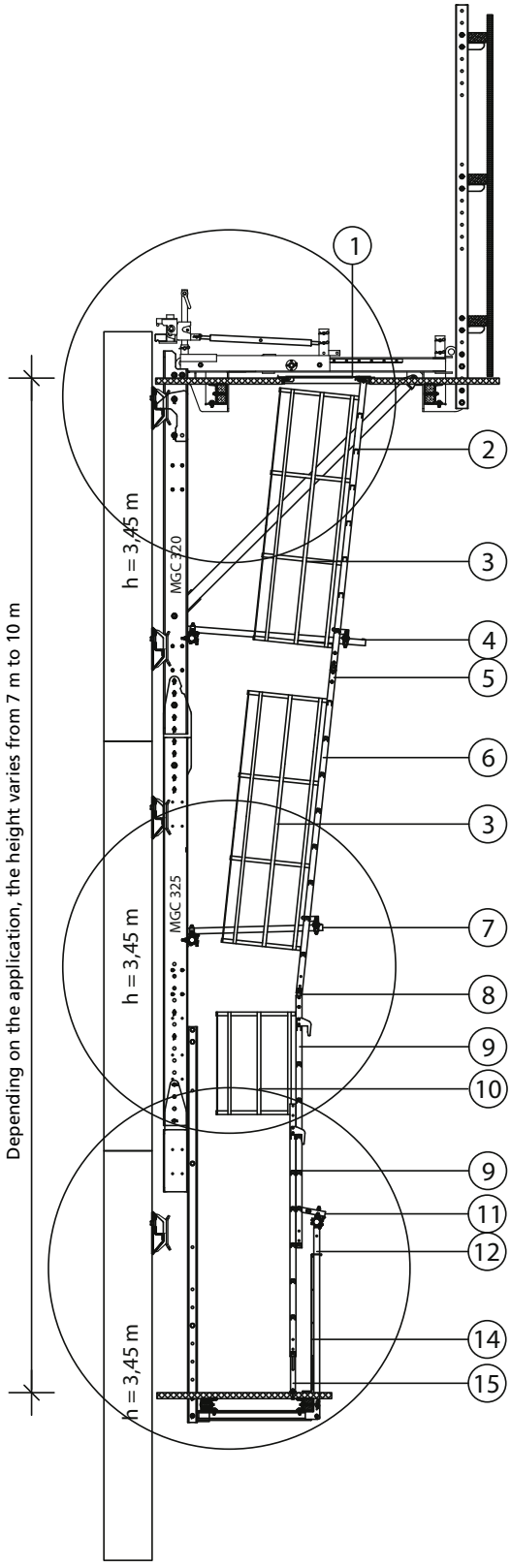
Connection material for the bottom fixture:
- 4 carriage bolts M12x130 per plank
- 4 washers for wooden assembly
- 4 self-locking nuts M12

Detail: Ladder base with ladder



Detail: Ladder base with extension ladder





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Ladder configuration

Ladder configuration		Height min.- max. [m]											
Reference (article)	min.	6,64	6,94	7,24	7,54	7,84	8,14	8,44	8,74	9,04	9,34	9,64	9,94
	max.	7,01	7,31	7,61	7,91	8,21	8,51	8,81	9,11	9,41	9,71	10,01	10,31
Acccess hatch KLK	29-416-05	1	1	1	1	1	1	1	1	1	1	1	1
Ladder 243	29-416-50	1	1	1	1	1	1	1	1	1	1	1	1
Extension ladder 270	29-416-52			1	1	2	1	1	2	2	1	1	2
Extension ladder 210	29-414-60	2	1	1			1	1			2	1	1
Extension ladder 120	29-416-55		2		2			1		1		2	
Extension ladder 90	29-416-60						1		1				
Ladder base KLK	29-416-70	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Ladder connector	29-414-70	1	2	1	2	1	2	2	2	2	2	3	2
Ladder link set	29-416-72	1	1	1	1	1	1	1	1	1	1	1	1
Ladder fixture 150	29-416-67	1	1	1	1	1	1	1	1	1	1	1	1
Ladder fixture 130	29-416-68	1	1	1	1	1	1	1	1	2	2	2	2
Ladder fixture (railing)	29-416-69	1	1	1	1	1	1	1	1	1	1	1	1
Safety cage 210	29-414-85	1	1	2	2	2	2	2	2	2	2	3	3
Safety cage 85	29-414-90	2	2			1	1	1	2	2	2		
Safety cage 40	29-416-90			1	1								

Table 29.1

The parts required for a ladder system from the secondary to the main platform depend on the distance between the planking of the secondary platform and that of the main platform. Using this table, you can determine what parts are required for your ladder system. The ladders are connected with ladder connectors.

Quantities in parentheses () indicate that the article may not be necessary for the configuration.

Special case: Extension ladder 210 also used as hang-in ladder

Ladder configuration		Height min.- max. [m]										
Reference (article)	min.	6,64	6,94	7,24	7,54	7,84	8,14	8,74	9,04	9,34	9,64	9,94
	max.	7,01	8,51	7,61	9,11	8,21	9,71	9,11	10,61	9,71	11,21	10,31
Access hatch KLK	29-416-05	1	1	1	1	1	1	1	1	1	1	1
Ladder 243	29-416-50	1	1	1	1	1	1	1	1	1	1	1
Extension ladder 270	29-416-52			1	1	2	2			1	1	2
Extension ladder 210	29-414-60	2	2	1	1			3	3	2	2	1
„Hang-in" ladder	29-414-60		1		1		1		1		1	
Ladder base KLK	29-416-70	1	1	1	1	1	1	1	1	1	1	1
Ladder connector	29-414-70	1	1	1	1	1	1	2	2	2	2	2
Ladder link set	29-416-72	1	1	1	1	1	1	1	1	1	1	1
Ladder fixture 150	29-416-67	1	1	1	1	1	1	1	1	1	1	1
Ladder fixture 130	29-416-68	1	1	1	1	1	1	1	2	2	2	2
Ladder fixture (railing)	29-416-69	1	1	1	1	1	1	1	1	1	1	1
Safety cage 210	29-414-85	1	1	2	2	2	(2-3)	2	2	3	3	3
Safety cage 85	29-414-90	2	(2-4)		(1-2)	1	(1-2)	2	(2-4)		(1-2)	
Safety cage 40	29-416-90											1

Table 29.2

The parts required for a ladder system from the secondary to the main platform depend on the distance between the planking of the secondary platform and that of the main platform. Using this table, you can determine what parts are required for your ladder system. The ladders are connected with ladder connectors. In some cases, the extension ladder 210 is used as a normal hang-in ladder.

Quantities in parentheses () indicate that the number of safety cages may vary depending on the height of the ladder system. In these cases, the number of required safety cages should be ascertained with drawings during the planning phase.

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Corners – main platform

When planning and building 90° corners the admissible lateral distances from the edges must be observed by all means. They are defined in the general technical approval by the DIBt, approval no. Z-21.6-1751, see pages MGC-9 und MGC-10.

The cantilever arms of the platforms must be positioned in a way that, with the formwork slided back, the passage behind the formwork is still approx. 60 cm wide.

When using the side-railing posts 10/300 and/or adapters for side-railing posts at the platform end, the square timber 16/8 must end before the end of the stringer so that the side protection can be attached. This is why the last plank cannot be screwed to the square timber 16/8. For this reason, 2 to 3 planks 28/5 with a length of approx. 1,00 m – see position ⑤ in fig. 30.2 – must be attached cross-wise below the planking.

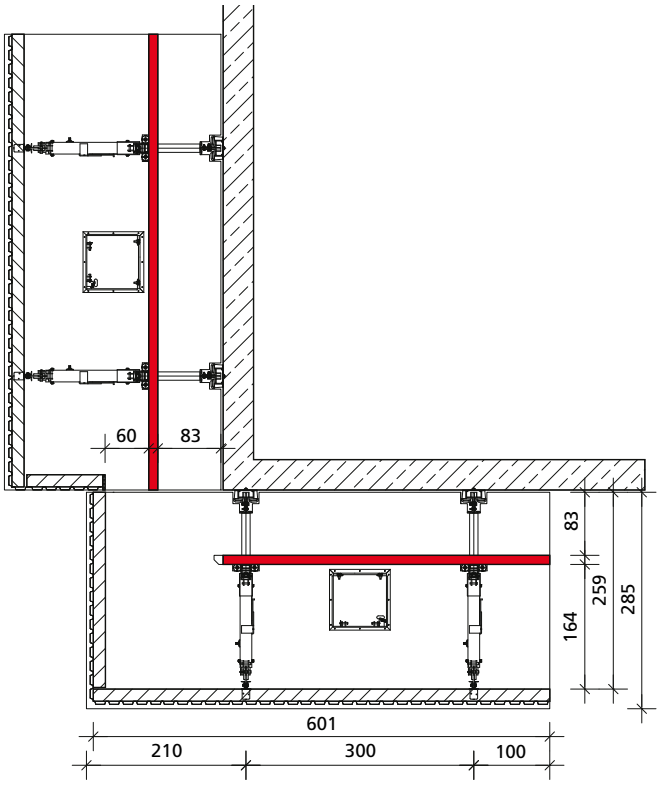

Fig. 30.1

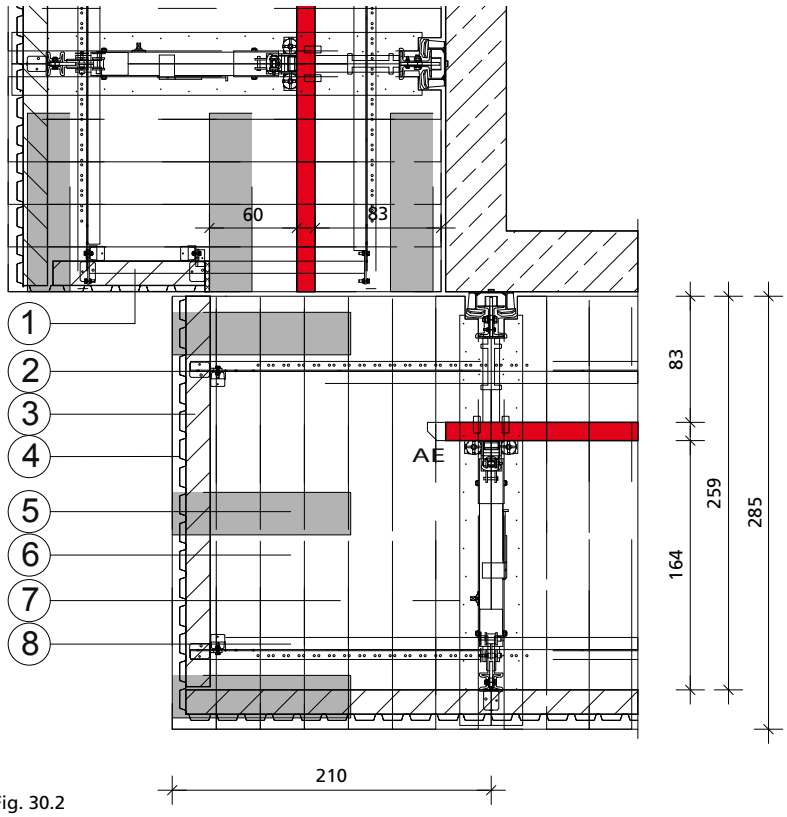

Fig. 30.2

① Adapter for side-railing post
② Side-railing post 10/300 with timber fixture U 100
③ Square timber 16/8
④ Perforated trapezoidal sheet
⑤ Planks 28/5 (crosswise)
⑥ Normal plank
⑦ Cover MGC
⑧ Square timber 16/8 at stringer U 160

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Corners – secondary platform

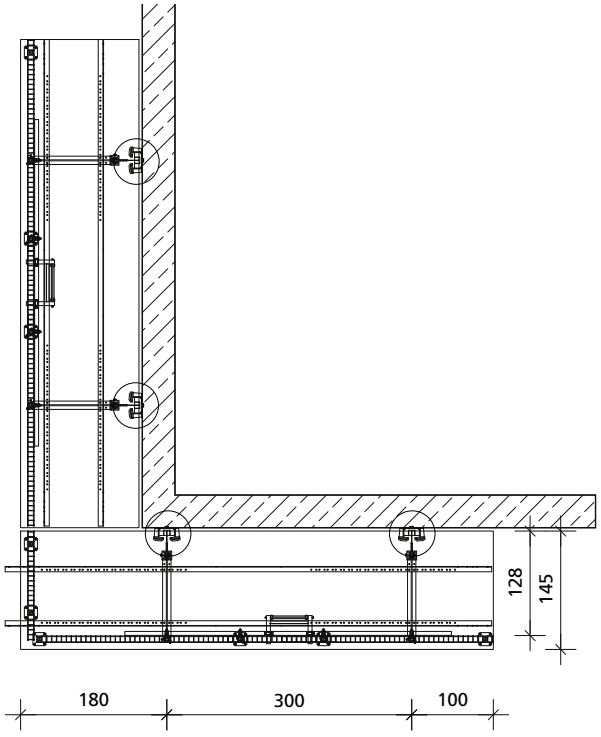

Fig. 31.1

When planning the corner areas for the secondary platforms, keep in mind that they are not as wide as the main platforms. For this reason, the cantilever arms in the corners are shorter (approx. 30 cm) and the stringers U 100 must be planned and positioned in a way that they cantilever to the outside, see fig. 31.1. Alternatively, custom-tailored stringers can be planned, produced and used.

Prior to the next climbing cycle, the marked climbing shoes are removed by staff on the secondary platform.

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Climbing and lifting the platforms

The following pages describe step by step how to climb with an MGC system consisting of a shaft platform and 6 working platforms. In the illustrations, the shaft platform is number 1, the working platforms are numbered 2 through 7. Two or more persons are required to lift the platforms. In the example, person A is located on the upper level and person B on the lower level. The climbing process is done in 7 steps.

Important
A platform must not be lifted while a person or material is on that platform. However, when lifting the first and the last platform, a person is allowed to stand on the platform if that person wears personel protective equipment (PPE), if the safety regulations for passenger transportation are observed and if a crane with approval for passenger transport is used.

The person that attaches the crane slings to the working platform must be secured and attached with a safety belt to the building. The fall-down protection that is required according the local legislation must be identified and listed in the assembly instructions. All loose parts and tools must be removed from the platform prior to lifting it.

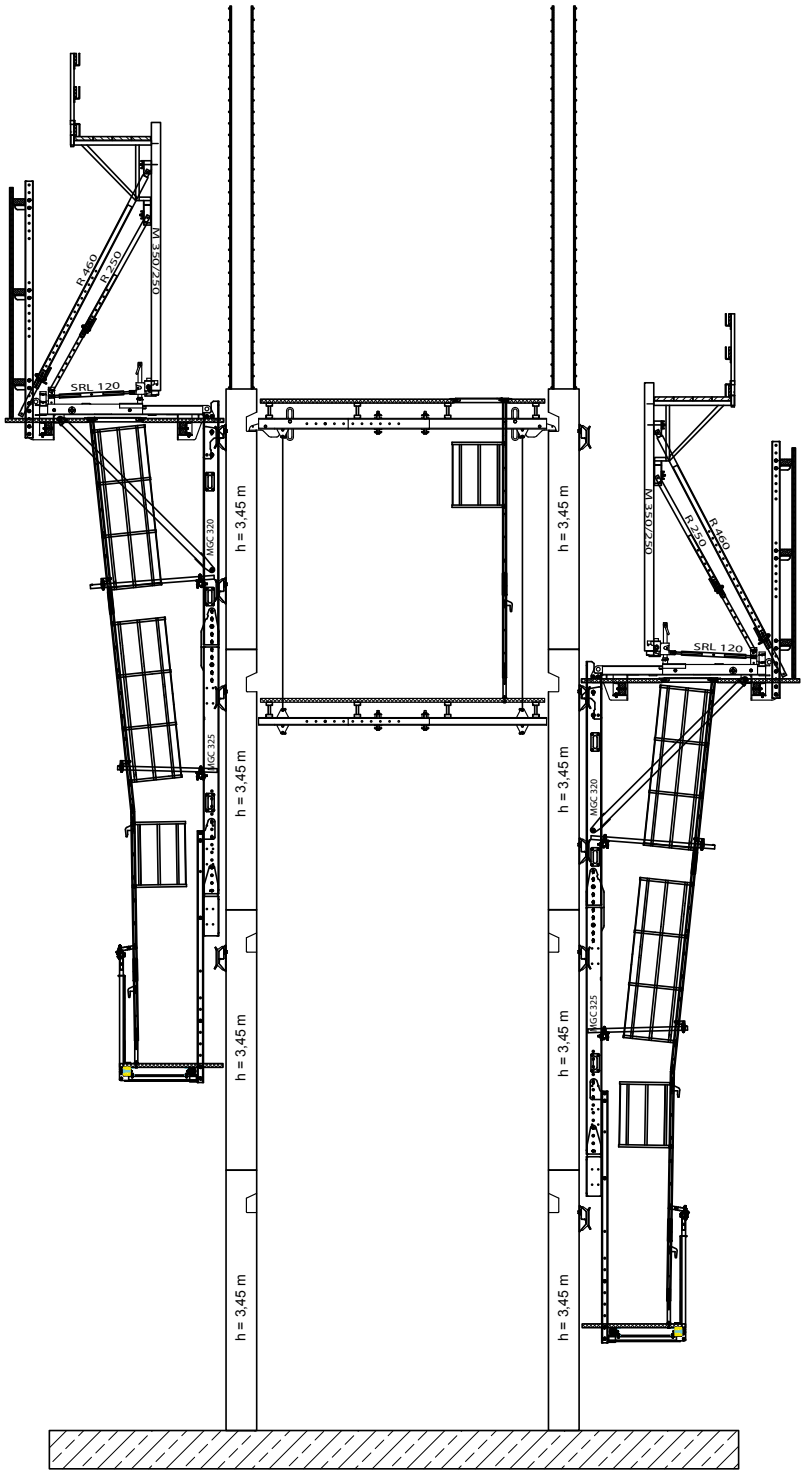

Fig. 32.1

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Climbing and lifting the platforms

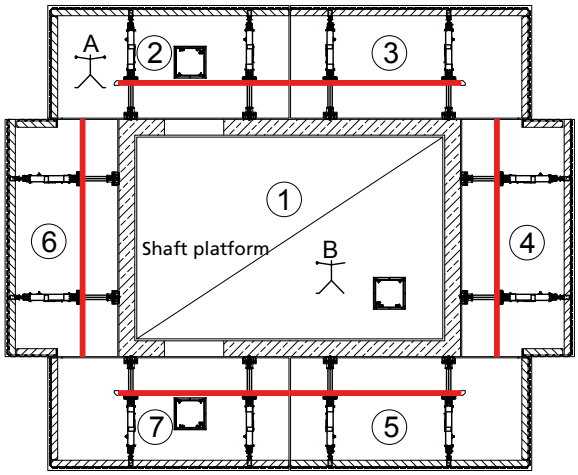

Fig. 33.1 The entire unit before the shaft platform is lifted

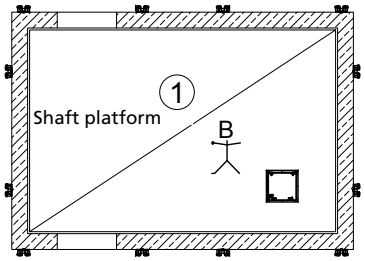

Fig. 33.2 The shaft platform has been lifted to the upper level

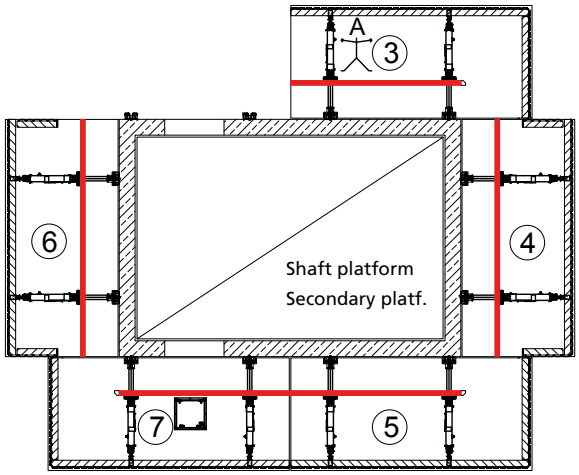

Fig. 33.3 Lower level

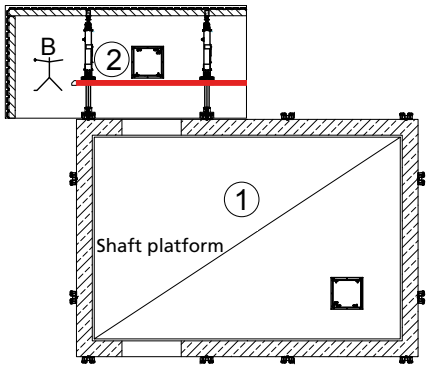

Fig. 33.4 Upper level

Start und step 1: Shaft platform 1
(Fig. 33.1 and 33.2)
First of all, the shaft platform is lifted. If it is equipped with a secondary platform, person B can remain on one of the working platforms 2 through 7 while the shaft platform is lifted. After the lift, person B goes to the secondary platform and climbs up the ladder to the main platform. If there is no secondary platform, person B, protected with a PPE, remains on the shaft platform when it is lifted. Prior to lifting the shaft platform, person A moves from the shaft platform to the working platform that is lifted after the shaft platform (working platform 2).

Step 2: Working platform 2
(Fig. 33.3 and 33.4)
Now the platform is lifted that can be accessed from the shaft platform (working platform 2 in our example). On the lower level, person A attaches the crane slings to platform 2, moves to platform 3 and puts a fall-down protection to its front which will be open after lifting platform 2. Now platform is lifted to the upper level (Fig. 33.3). There, person B, protected with a PPE, moves from the shaft platform to platform 2 and detaches the crane slings.

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Climbing and lifting the platforms

Step 3:
Working platform 3
(Fig. 34.1 and 34.2)
Person A on the lower level attaches the crane slings to working platform 3, moves to platform 4 and protects it with a fall-down protection. Platform 3 is lifted to the upper level (Fig. 34.1). There, person B, protected with a PPE, moves from platform 2 to platform 3 and detaches the crane slings (Fig. 34.2).

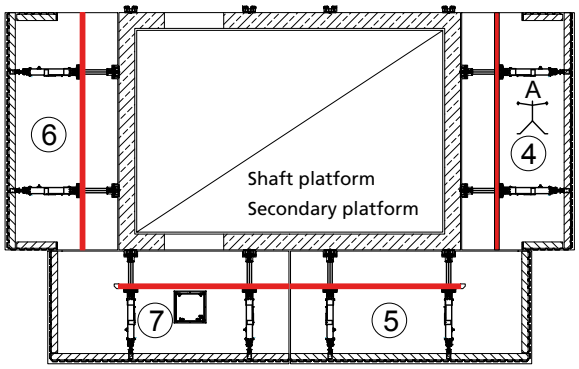

Fig. 34.1 Lower level

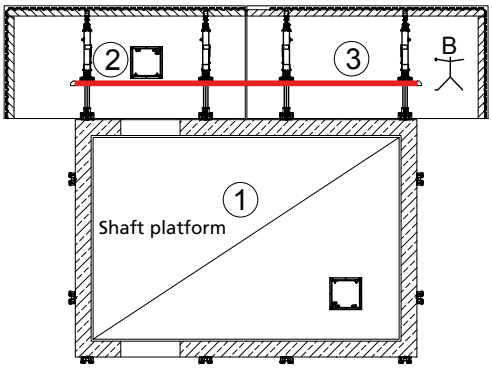

Fig. 34.2 Upper level

Step 4:
Working platform 4
(Fig. 34.3 and 34.4)
Like in the previous steps, person A attaches the crane slings to the platform to be lifted, moves to platform 5 and protects it with a fall-down protection. Platform 4 is lifted to the upper level (Fig. 34.3). There, person B, protected with a PPE, moves from platform 3 to 4 and detaches the crane slings (Fig. 34.4).

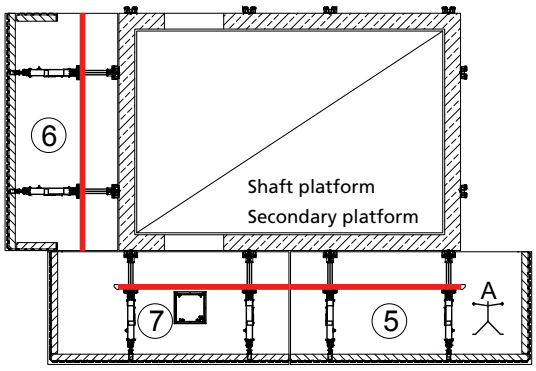

Fig. 34.3 Lower level

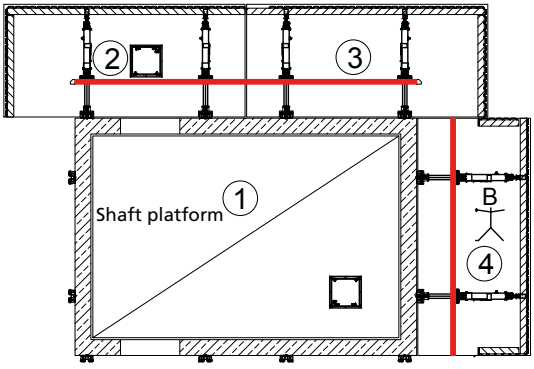

Fig. 34.4 Upper level

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Climbing and lifting the platforms

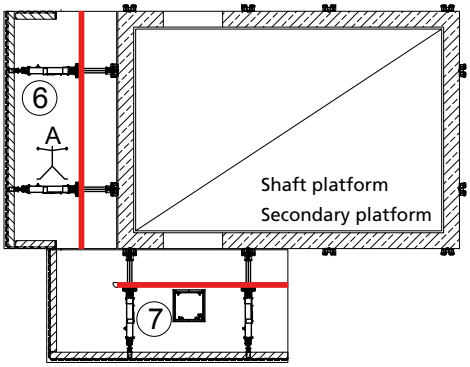

Fig. 35.1 Lower level

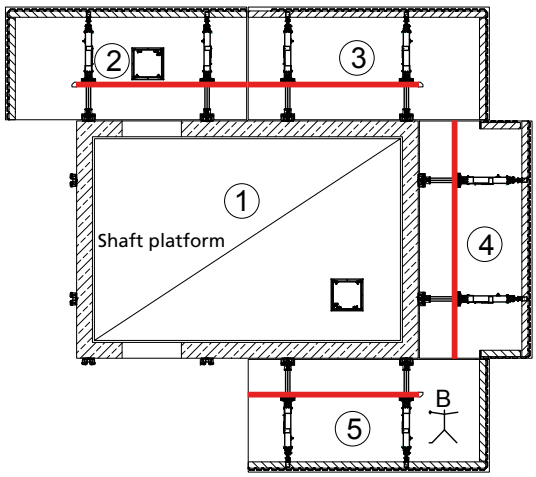

Fig. 35.2 Upper level

Step 5: Working platform 5
(Fig. 35.1 and 35.2)
Person A attaches the crane slings to platform 5 and moves to (the overnext) platform 6. Platform 5 is lifted to the upper level (Fig. 35.1) and person B, protected with a PPE, moves from platform 4 to platform 5 and detaches the crane slings (Fig. 35.2).

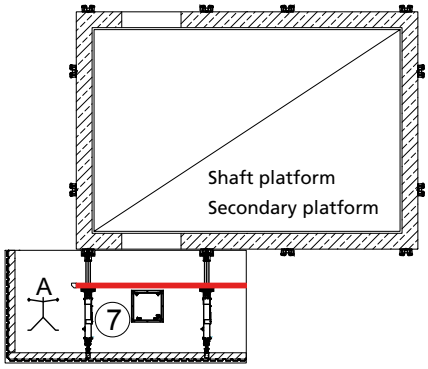

Fig. 35.3 Lower level

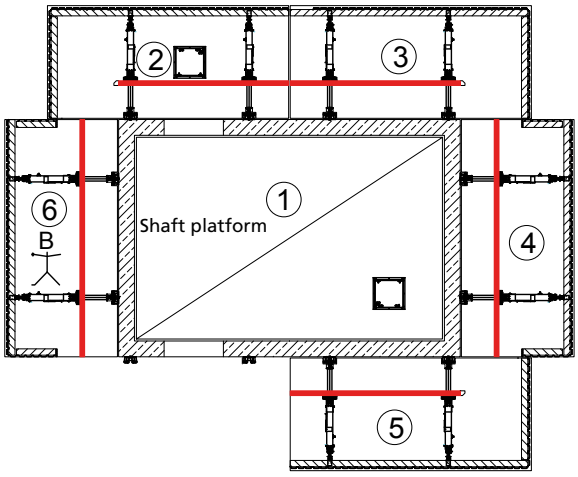

Fig. 35.4 Upper level

Step 6:
Working platform 6
(Fig. 35.3 and 35.4)
Person A attaches the crane slings to platform 6, moves to the neighbouring platform 7 and protects it with a fall-down protection (Fig. 35.3). On the upper level, person B, protected with a PPE, moves from platform 5 to the shaft platform and on to platform 5 to detach the crane slings (Fig. 35.4).

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Climbing and lifting the platforms

Step 7: The last working platform
(Fig. 36.1 and 36.2)
The last platform that is lifted should be the one with an access to the shaft platform. In this case and after attaching the crane slings to the last platform, person A can move from there to the secondary platform and climb up ladder to the upper level. The last platform that is lifted is platform 7 because the shaft has an opening to this platform. Otherwise person A must remain on the last platform while it is lifted. In this case, person A must protected with a PPE. Once the platform is on the upper level, person B goes to that platform and detaches the crane slings.

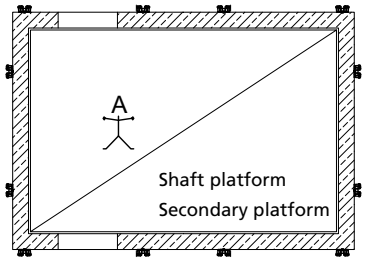

Fig. 36.1 Lower level

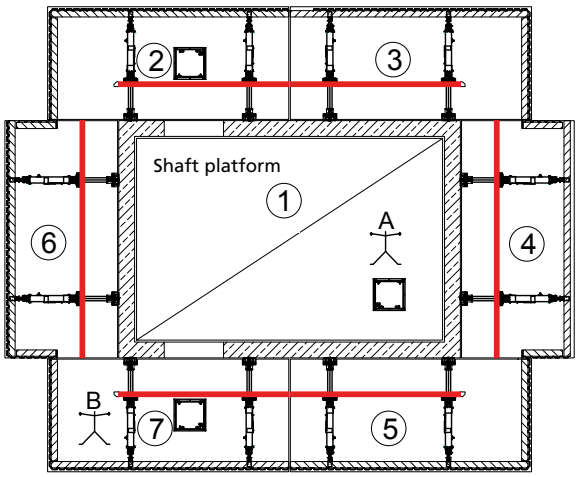

Fig. 36.1 Upper level

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