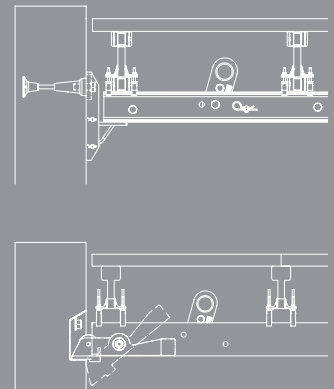
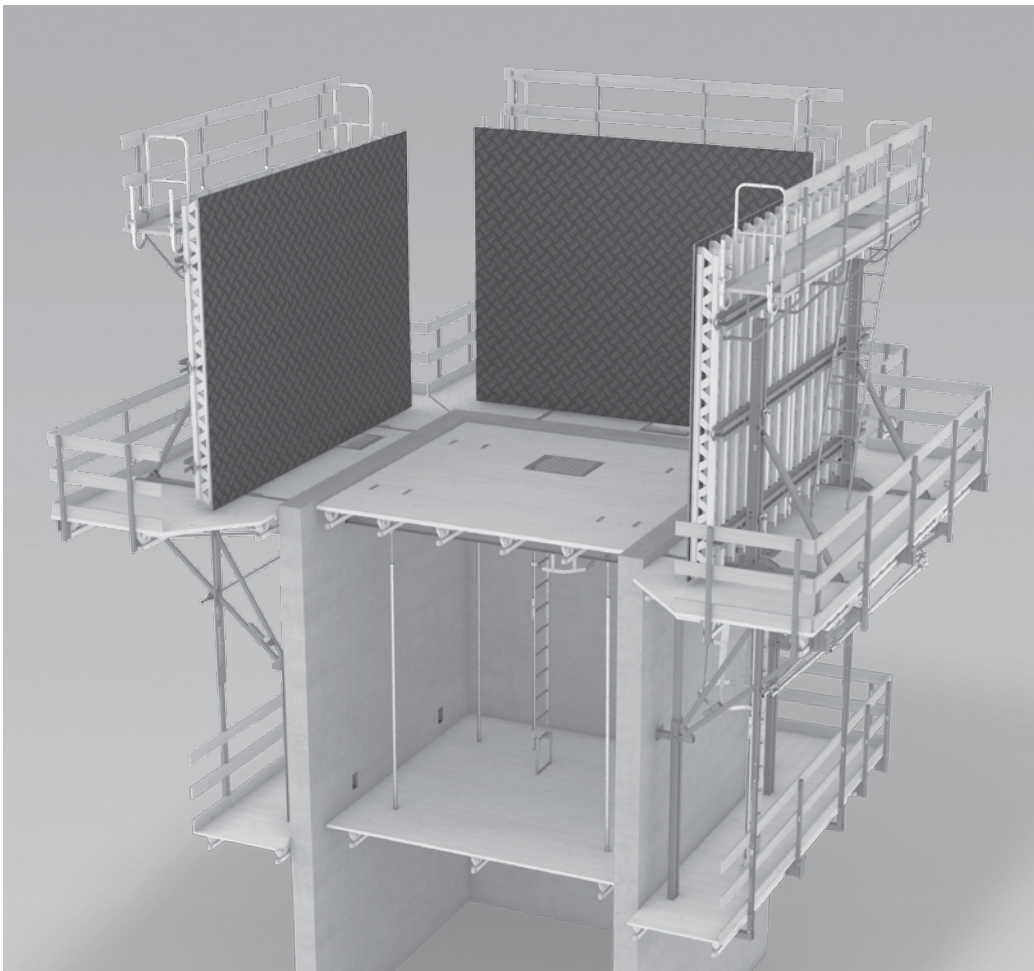


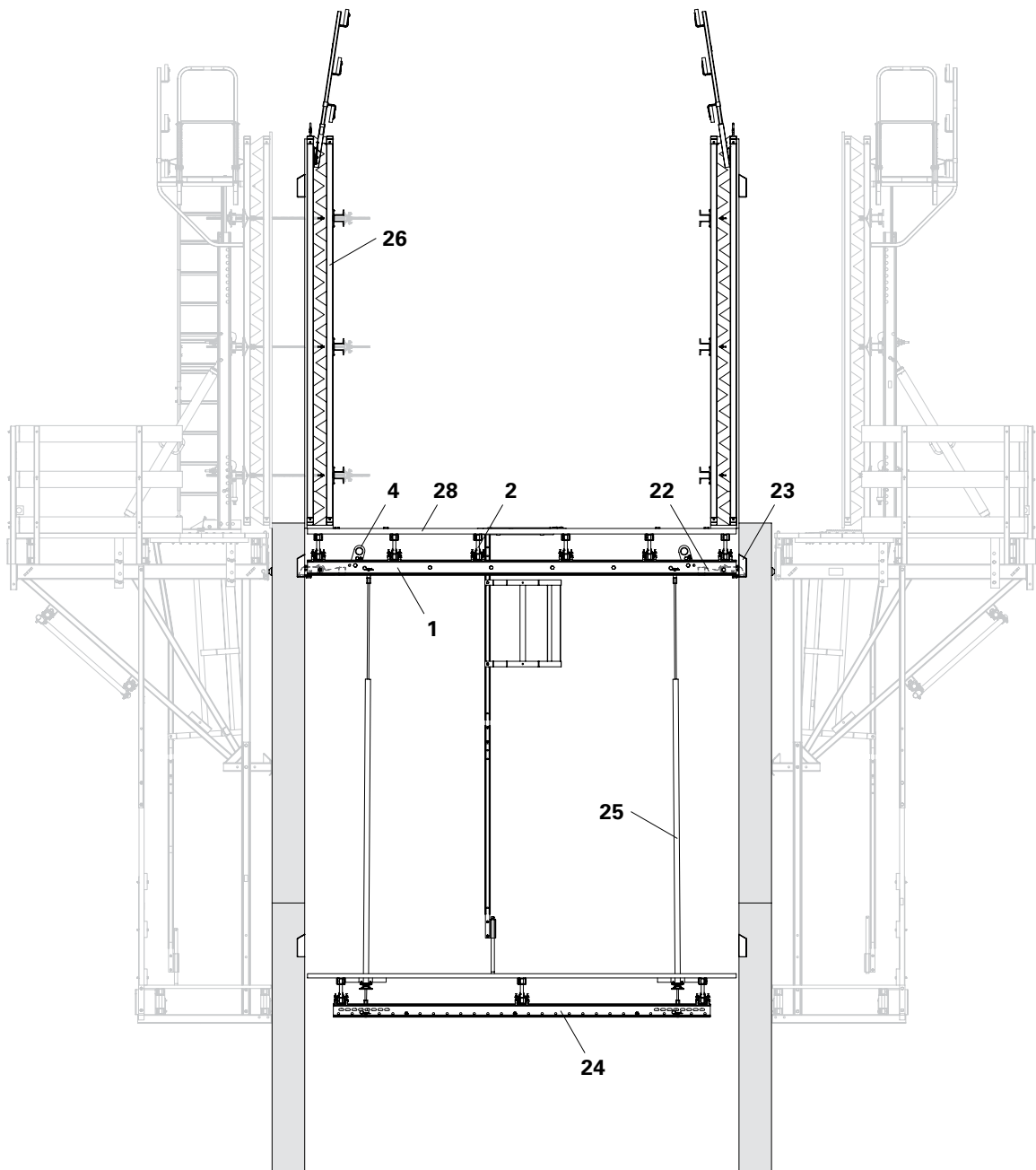
Climbing System BR Shaft Platform

Instructions for Assembly and Use – Standard Configuration – Issue 09 | 2019

UK Issue 10 | 2020



Main Components



- 1 Platform Beam BR
- 2 Girder (here: Lattice Girder GT 24)
- 4 Crane Eye BR-2 2.5 t
- 22 Support (here: Gravity Pivot Plate)
- 23 Anchoring (here: Bearing Box BR)
- 24 Steel Waler Universal SRU U120
- 25 Suspension of the finishing platform
- 26 Internal formwork
- 28 Planking with recesses

Overview

Main Components	3
Key	4

Introduction

Target Groups	5
Additional Technical Documentation	5
Intended Use	6
Instructions on Use	6
Cleaning and Maintenance Instructions	7
Storage and Transportation	7

Safety Instructions

Cross-System	8
System-Specific	10
Building Tolerances	10
Assembly Work	11
Access	11
Accessing the Shaft Platform	12
Climbing Procedure	12
Protection Against Falling Components	12
Maintenance and Repairs	13

Component Overview and Tool List

Component List	14
Tool List	15
Tightening Torque	15

System Overview

A1 Support	16
Support with the Gravity Pivot Plate BR	16
Support with the Folding Bracket 25	17
A2 Anchoring	18
General	18
Overview	19
Anchoring Depth	21
Climbing Cone-2 M24/DW 15	22
Screw-On Cone-2 M24/DW 20	23
Anchor Sleeve M24	24
Bearing Box BR	25
Assembly of the Leading Anchor with Anchor Positioning Stud M24	26
Assembly of the Leading Anchor with Anchor Positioning Plate M24	27
Assembly of the Bearing Box with Anchor Positioning Plate M24	29
Dismantling the Anchor Positioning Stud M24	30
Dismantling the Anchor Positioning Plate M24	30
Assembly of the Folding Bracket 25	31
A3 Live Loads and Operating Status	32
Live Loads	32
Other Operating Status	33
A4 Standard Operating Procedure	34
Preparation	34
Initial Use	34
Striking	34
Moving	34

Suspending the Finishing Platform	35
Standard Cycle	35
Dismantling	35

Assembly

B1 Assembly - General	36
Preparation of the Assembly	36
Sub-Construction for the Planking	37
B2 Assembling the Working Platform	38
Assembly with the Gravity Pivot Plate BR	38
Assembly with the Folding Bracket 25	40
Mounting the Platform Decking	41
B3 Assembling the Hatches	43
Assembly of the Control Hatches	43
Assembly of the Descent Hatch	45
B4 Assembling the Ladder Access	46
B5 Assembling the Finishing Platform	48
Mounting the Girders	48
Mounting the Suspension	49
Mounting the Platform Decking	51
B6 Finishing Tasks	53
Shaft Platform Markings	53

Application

C1 General Information	54
Safety Instructions	54
Installing the Distance Device	56
Using the Distance Device	57
C2 First Concreting Section	58
Prerequisites	58
Concreting the Starter	58
Preparation for Initial Use	58
C3 Second Concreting Section	59
Suspending the Working Platform	59
Checking the Support	60
Finishing Tasks	61
C4 Supplementing the Shaft Platform	62
Flying out the Shaft Platform	62
Mounting the Vertical Struts	63
Suspending the Finishing Platform	63
Attaching the Shaft Platform	64
C5 Standard Cycle	65
New Concreting Section	65
C6 Special Case	68
Shaft with Three External Walls	68
C7 Misapplication	69

Removal and Dismantling

D1 Dismantling	70
Striking	70
Lifting out the Shaft Platform	70
Dismantling the Support	71
Dismantling	71

Components

BR Shaft Platform	72
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Key

Pictogram | Definition

Danger / Warning / Caution

Note

To be complied with

Load-bearing point

Visual check

Tip

Misapplication

Safety helmet

Safety shoes

Safety gloves

Safety glasses

Personal protective equipment to prevent falling from a height (PPE)

Arrows

Arrow representing an action

Arrow representing a reaction of an action*

Forces

* If not identical to the action arrow.

Safety instruction categories

The safety instructions alert site personnel to the risks involved and provide information on how to avoid these risks. Safety instructions are featured at the beginning of the section or ahead of the instructions, and are highlighted as follows:

Danger

This sign indicates an extremely hazardous situation which, if not avoided, will result in death or serious injury.

Warning

This sign indicates a hazardous situation which, if not avoided, could result in death or serious injury.

Caution

This sign indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Information

This sign indicates situations in which failure to observe the information can result in material damage.

Set-up of the safety instructions

Signal word

Type and source of the danger!
Consequences of non-compliance.
⇒ Avoidance measures.

Dimension specifications

Dimensions are usually given in cm. Other measurement units, e.g. m, are shown in the illustrations.

Conventions

- Instructions are numbered with: 1., 2., 3.
- The result of an instruction is shown by: →
- Position numbers are clearly provided for the individual components and are given in the drawing, e.g. 1, in the text in brackets, for example (1).
- Multiple position numbers, i.e. alternative components, are represented with a slash, e.g. 1 / 2.

Presentational reference

The illustration on the front cover of these instructions is understood to be a system representation only. The assembly steps presented in these Instructions for Assembly and Use are shown in the form of examples with only one component size. They are valid accordingly for all component sizes contained in the standard configuration.

For a better understanding, detailed illustrations are partly incomplete. Some safety installations which have possibly not been shown in these detailed descriptions must nevertheless still be available.

Target Groups

Contractors

These Instructions for Assembly and Use are designed for contractors who either

- assemble, modify and dismantle the formwork system, or
- use them, e.g. for concreting, or
- allow it to be used for other operations, e.g. carpentry or electrical work.

Competent person

(Construction Site Coordinator)

The Safety and Health Protection Coordinator*

- is appointed by the client,
- must identify potential hazards during the planning phase,
- determines measures that provide protection against risks,
- creates a health and safety plan,
- coordinates the protective measures for the contractor and site personnel so that they do not endanger each other,
- monitors compliance with the protective measures.

Competent person qualified to carry out inspections

Due to the specialist knowledge gained from professional training, work experience and recent professional activity, the competent person qualified to carry out inspections has a reliable understanding of safety-related issues and can carry out inspections correctly. Depending on the complexity of the inspection to be undertaken, e.g. scope of testing, type of testing or the use of certain measuring devices, a range of specialist knowledge is necessary.

Qualified personnel

Formwork systems may only be assembled, modified or dismantled by personnel who are suitably qualified to do so. For the work to be carried out, the qualified personnel must have received instructions** covering at least the following points:

- Explanation of the plan for the assembly, modification or dismantling of the formwork in an understandable form and language.
- Description of the measures for assembling, modifying or dismantling the formwork.

- Naming of the preventive measures to be taken to avoid the risk of persons and objects falling.
- Naming of the safety precautions in the event of changing weather conditions which could adversely affect the safety of the formwork system as well as the persons concerned.
- Details regarding permissible loads.
- Description of all other risks and dangers associated with assembly, modification or dismantling operations.



- **In other countries, ensure that the relevant national guidelines and regulations in the respective current version are complied with!**
- **If no country-specific regulations are available, it is recommended to proceed according to German guidelines and regulations.**
- **A competent person must be present on site during formwork operations.**

* Valid in Germany: Regulations for Occupational Health and Safety on Construction Sites 30 (RAB 30).

** Instructions are given by the contractor himself or a competent person selected by him.

Additional Technical Documentation

- Approvals:
 - PERI Screw-On Cone Z-21.6-1766
 - PERI Climbing Cone Z-21.6-1767
 - PERI Anchor Sleeve M24 Z-21.6-1768
- Instructions for Use:
 - Crane Eye BR-2 2.5 t

Intended Use

Product description

PERI products have been designed for exclusive use in the industrial and commercial sectors by qualified personnel only.

The BR Shaft Platform is used as support scaffolding of the inner shaft formwork according to DIN EN 12811 or DIN EN 12812 and as a working platform.

The Shaft Platform consists of:

- Platform Beam BR with Lifting Eye BR 2.5 t
- Platform Beam GT 24 or VT 20
- Planking
- Gravity Pivot Plate BR or Folding Bracket 25
- Finishing Platform (optional)

When storing the Shaft Platform, a distinction is made regarding:

- storage with the Gravity Pivot Plate. Here, fold the Gravity Pivot Plate into the wall recess.
- Storage with the Folding Bracket 25. Here, fold the Folding Bracket under the Platform Beam BR, thus serving as new support.

External formwork, internal formwork and Shaft Platform are moved separately to the next concreting section by means of a crane.

The external formwork is positioned on the building slab or a climbing scaffold, e.g. PERI CB 240.

The internal formwork serves either as primary formwork, which is reinforced from the outside, or as closing formwork.

The Shaft Platform can be supplemented with:

- Adjustable Braces for supporting the formwork system.
- a height-adjustable finishing platform complete with access ladder.
- end-to-end guardrails on the working and finishing platforms in accordance with EN 12811.

In the standard configuration, VARIO GT 24 Girder Wall Formwork is used. This is temporarily connected with the platform unit.

Climbing Anchors or Bearing Boxes are dismantled with site personnel positioned on the finishing platform as well as carrying out subsequent reworking on the building.

Access via ladders with hatches are possible with PERI standard components.

Technical data

Depending on the load and span, different U-profiles are used for the Platform Beam BR:

- U 100
Beam length L: 1.45 – 3.65 m
- U 120
Beam length L: 1.45 – 5.05 m
- U 140
Beam length L: 2.96 – 6.00 m
- U 160
Beam length L: 4.36 – 6.00 m

Foreseeable misapplications

- Transport of persons and loads.
- Use as a bridge between two shafts.

Instructions on Use

Use in a way not intended according to the Instructions for Assembly and Use, or any use deviating from the standard configuration or the intended use, represents a misapplication with a potential safety risk, e.g. risk of falling.

Only PERI original components may be used. The use of other products and spare parts is not allowed and represents a misapplication with associated safety risks.

Changes to PERI components are not permitted and represent a misapplication with associated safety risks.

Only use approved and calculated components.

Operations with damaged or incomplete lifting equipment are not permissible.

The system described in these Instructions for Assembly and Use may contain patent-protected components.



- The description of the assembly and operation of the assemblies and components in these Assembly Instructions is intended as an example.
- For use on the construction site, a project-specific assembly plan is required.
- The project-related assembly plan from PERI is binding for assembly operations.

Cleaning and Maintenance Instructions

In order to maintain the value and operational readiness of the formwork materials over the long term, clean the panels after each use.

Some repair work may also be inevitable due to the tough working conditions.

The following points should help to keep cleaning and maintenance costs as low as possible.

Spray the formwork on both sides with concrete release agent before each use; this facilitates easier and faster cleaning of the formwork. Spray the concrete release agent very thinly and evenly!

Spray the rear side of the formwork with water immediately after concreting; this avoids any time-consuming and costly cleaning operations.

When used continuously, spray the panel formlining with concrete release agent immediately after striking; then clean by means of a scraper, brush or rubber lip scraper. Important: do not clean formlining made of plywood with high-pressure equipment. This could result in the formlining being damaged.

Fix box-outs and mounting parts with double-headed nails; as a result, the nails can easily be removed later, and damage to the formlining is largely avoided.

Close all unused anchor holes with plugs; this eliminates any subsequent cleaning or repair work. Anchor holes accidentally blocked with concrete are cleared by means of a steel pin from the formlining side.

When placing bundles of reinforcement bars or other heavy objects on horizontally stored formwork elements, suitable support, e.g. square timbers, is to be used: this largely avoids impressions and damage to the formlining.

Internal concrete vibrators should be fitted with rubber caps if possible; as a result, any damage to the formlining is reduced if the vibrator is accidentally inserted between the reinforcement and formlining.

Never clean powder-coated components, e.g. elements and accessories, with a steel brush or hard metal scraper: this ensures that the powder coating remains intact.

Use spacers for reinforcement with large-sized supports or extensive areas of support; this largely avoids impressions being formed in the formlining when under load.

Mechanical components, e.g. spindles or gear mechanisms, must be cleaned of dirt or concrete residue before and after use, and then greased with a suitable lubricant.

Provide suitable support for the components during cleaning so that no unintentional change in their position is possible.

Do not clean components suspended on crane lifting gear.

Storage and Transportation

Store and transport components ensuring that no unintentional change in their position is possible.

Detach lifting accessories and slings from the lowered components only if they are in a stable position and no unintentional change is possible.

Do not drop the components.

Use PERI lifting accessories and slings and only those load-bearing points provided on the component.

During the moving procedure

- ensure that components are picked up and set down so that unintentional falling over, falling apart, sliding, falling down or rolling is avoided.
- no persons are allowed to remain under the suspended load.

The access areas on the construction site must be free of obstacles and tripping hazards, as well as being slip-resistant.

For transportation, the surface used must have sufficient load-bearing capacity.

Use original PERI storage and transport systems, e.g. Crate Pallets, Pallets or Stacking Devices.

Cross-System



The safety instructions apply to all phases of the system.

General

The contractor must ensure that the Instructions for Assembly and Use supplied by PERI are available at all times and understood by the site personnel.

These Instructions for Assembly and Use can be used as the basis for creating a risk assessment. The risk assessment is compiled by the contractor. However, these Instructions for Assembly and Use do not replace the risk assessment!

Always take into consideration and comply with the safety instructions and permissible loads.

For the application and inspection of PERI products, the current safety regulations and guidelines valid in the respective countries must be observed.

Materials and working areas are to be inspected on a regular basis, especially before each use and assembly, for:

- signs of damage,
- stability and
- function.

Damaged components must be exchanged immediately on site and may no longer be used.

Safety components are to be removed only when they are no longer required.

Components provided by the contractor must conform to the characteristics required in these Instructions for Assembly and Use, as well as all valid construction guidelines and standards. Unless otherwise indicated, this applies in particular to:

- timber components: Strength Class C24 for Solid Wood according to EN 338.
- scaffold tubes: galvanised steel tubes with minimum dimensions of $\varnothing 48.3 \times 3.2$ mm according to EN 12811-1:2003 4.2.1.2.
- scaffold tube couplers according to EN 74.

Deviations from the standard configuration are only permitted after a further risk assessment has been carried out by the contractor.

Appropriate measures for working and operational safety, as well as stability, are defined on the basis of this risk assessment.

Corresponding proof of stability can be provided by PERI on request if the risk assessment and resulting measures to be implemented are made available.

Before and after exceptional occurrences that may have an adverse effect on the safety of the formwork system, the contractor must immediately

- create another risk assessment, with appropriate measures being carried out based on the results, to ensure the stability of the formwork system,
- arrange for an extraordinary inspection to be carried out by a competent person qualified to do so. The aim of this inspection is to identify and rectify any damage in good time in order to guarantee safe use of the formwork system.

Exceptional occurrences can include:

- accidents,
- longer periods of non-use,
- natural events, e.g. heavy rainfall, icing, heavy snowfall, storms or earthquakes.

Assembly, modification and dismantling work

Assembly, modification or dismantling of formwork systems may only be carried out by qualified persons under the supervision of a competent person. The qualified personnel must have received appropriate training for the work to be carried out with regard to specific risks and dangers.

On the basis of the risk assessment and Instructions for Assembly and Use, the contractor must create installation instructions in order to ensure safe assembly, modification and dismantling of the climbing unit.



The contractor must ensure that the required personal protective equipment (PPE)

- safety helmet,
 - safety shoes,
 - safety gloves,
 - safety glasses,
- required for assembly, modification or dismantling operations is available and used as intended.



If personal protective equipment against falling from a height (PPE) is required or specified in local regulations, the contractor must determine appropriate attachment points on the basis of the risk assessment. The contractor stipulates the PPE to be used to prevent falling.

The contractor must

- provide safe working areas for site personnel, which are to be reached through the provision of safe access ways. Areas of risk must be cordoned off and clearly marked.
- ensure stability during all stages of construction, in particular during assembly, modification and dismantling operations.
- ensure and prove that all loads can be safely transferred.

Utilisation

Every contractor who uses or allows formwork systems or sections of the formwork to be used, is responsible for ensuring that the equipment is in good condition.

If the formwork system is used successively or at the same time by several contractors, the health and safety coordinator must point out any possible mutual hazards and all work must be then coordinated.

- Working areas must remain free of any tripping hazards.
- Do not walk on components and assembly units, always ensure that they are in a secure position.
- Always keep components and assembly units free of dirt, ice and snow. In particular, there is an increased risk of slipping in wet weather conditions.
- Working platforms are to be kept clean and tidy.
- Do not remain in the area of risk created by the moving parts.
- Avoid installing working areas and access points in areas of risk.
- Cordon off the areas of risk.

System-Specific



The safety instructions apply to all phases of the system.

The contractor must ensure that assembly, modifications and dismantling, moving, as well as the use and handling of the product, are managed and supervised by professionally qualified and authorised personnel.

All persons working with the product must be familiar with the operating instructions and safety information.

The contractor must ensure that the Instructions for Assembly and Use, other instructions required for operations or assembly, relevant planning documents, parts lists and other data are available to users.

Retract components only when the concrete has sufficiently hardened and the person in charge has given the go-ahead for striking to take place.

Anchoring is to take place only if the anchorage has sufficient concrete strength.

Close hatch cover immediately after climbing through the hatch.

Use non-slip covering for the platforms.

Ensure that the coverings remain slip-resistant.

Do not stand under suspended loads.

The distance between ladder rungs and side protection must not be less than 15 cm.

Building Tolerances

For deviations from DIN 18202, the following tolerances have been defined for the safe use of the Shaft Platform BR:

- Limit deviations for dimensions in the ground plan: +20 mm / -10 mm.
- Limit values for angle deviations must not exceed the limit deviations for the dimensions.
- The tolerances apply to all nominal dimensions.

Assembly Work

The contractor must ensure that the user has the appropriate and sufficient number of tools, lifting equipment and slings, suitable and sufficient space for assembly and storage, as well as adequate crane capacity at his disposal.

There is always the possibility of unforeseen risks arising during assembly work. Assess the degree of risk in each individual case and, if necessary, take measures to prevent or at least minimise the risk.

If anti-fall protection cannot be used or has to be removed due to operational reasons, safety equipment must be installed in its place in order to prevent or arrest falls from any height. If the use of fall arrest equipment is deemed to be inappropriate, personal protection equipment (PPE) can be used if suitable fixing points are available.

Use a guide rope to ensure that assembly units suspended from the crane are fully under control when being moved.

Avoid entering the area between suspended loads and the building.

Site personnel are forbidden to remain in areas below where assembly work is being carried out, unless the area of risk has been provided with sufficient protection against falling, overturned, sliding or rolling objects and masses.

Cordon off areas of risk.



- Secure all bolts with cotter pins.
- Secure all bolts with nuts.
- Check connecting parts for signs of damage and ensure that they have been correctly installed.

Access

Safe access to all working areas must be guaranteed at all times.

Preferred options are walkways, stairs, stair towers or site lifts. Ladders are only suitable for use as access means in exceptional cases.

Ladders must not be connected to each other for more than two levels and should be offset against one another. They must be secured on the outer side by means of appropriate anti-fall equipment such as rear safety protection or safety nets.

Suitable equipment must be available on hatches and openings in accessible areas to prevent accidents. After the ladder access is used each time, ensure that the hatch cover is closed.

In the case of danger, it must be ensured that working areas can be vacated via emergency escape routes or rescue equipment. It must also be ensured that at least one emergency escape route or piece of rescue equipment can still be used if the power supply fails.

Accessing the Shaft Platform

Before accessing, check the Shaft Platform to ensure the platform covering is complete and replace any damaged planking.

When accessing the platform, ensure that the guardrails in front of building openings and projections are complete.

When accessing the Shaft Platform be aware of gaps, hatches, and open hatch covers.

Climbing Procedure

Retract components only when the concrete has sufficiently hardened and the person in charge has given the go-ahead for striking to take place. Suspend climbing units on the next concreting section only after the required concrete strength has been reached.

As a result of the moving procedure, leading edges are formed between the platforms. These areas are to be cordoned off!

Do not transport persons, building materials or tools when moving with the crane. Exceptions to this can be determined through the operational working and assembly instructions on the basis of a corresponding risk assessment.

In case of a malfunction, lower the platform to the next possible position, leave the climbing unit in a safe and secure manner and notify an authorised person immediately!

Ensure climbing is carried out uniformly.

Protection Against Falling Components

Work activities may not be carried out simultaneously on areas positioned on top of each other unless the lower working areas and access routes are provided with protection against falling objects such as tools or materials.

Avoid positioning working areas and access points in areas of risk. If this is not possible due to work procedures, suitable protection equipment must be available. This also applies to work requiring only a short period of time.

Operational working areas at great heights are to be secured against falling objects by means of appropriate constructional measures. Safety nets (mesh size ≤ 2 cm) and planking are considered to be suitable here, and are to be installed very close (distance ≤ 5 cm) to the building.

Working areas positioned below must be protected using suitable protective roofs along the entire area at risk.

Maintenance and Repairs

The components of the climbing formwork are to be inspected before each use to ensure that they are in perfect condition and function correctly. Only materials in perfect condition are to be used.

The platforms are to be inspected for signs of damage at regular intervals by authorised personnel. Remove loose concrete residue. Dirt which affects functionality is to be removed immediately. Damaged components are to be inspected, removed and replaced.

In case of overload or damage, stop work on and under the platforms, determine the cause, set down and replace damaged components.

If the maximum permissible wind speed has been exceeded, temperatures are outside the scope of application, or after any extraordinary event has taken place such as a fire or earthquake, the functionality and load-bearing capacity of all safety components, as well as the supporting structure, are to be checked.

Safety components:

- Regular visual inspections are to be carried out by qualified personnel.
- Before any climbing or assembly, a functionality check is carried out by qualified personnel.
- Only PERI original components are used when replacing parts.
- Repairs are carried out by PERI qualified personnel only.

Supporting structure:

- A visual inspection is to be carried out by authorised personnel before initial use.
- Only PERI original components are to be used for repairs or replacement.

Other components:

- Inform authorised persons.
- Repairs are carried out by authorised personnel.

Component Overview and Tool List



Pos. no.	Component name	Item no.
1	Platform Beam BR	
1.1	Platform Beam BR U100	020320
1.2	Platform Beam BR U120	020510
1.3	Platform Beam BR U140	020310
1.4	Platform Beam BR U160	020520
2	Girders	
3	Hook Strap	
4	Crane Eye BR-2 2.5 t	127834
5	Screw-On Cone-2 M24/DW 20	114158
6	Threaded Anchor Plate DW 20	030860
7	Climbing Cone-2 M24/DW 15	031220
8	Threaded Anchor Plate DW 15	030840
9	Tie Rod DW 15	030030
10	Tie Rod B 15 Special Length	030740
11	Bolt ISO 4014 M24 x 70-10.9	026430
12	Spacer Tube rough DR 22, L = 2.00 m	065027
13	Anchor Sleeve M24	026230
14	Spacer PP Ø 31/26, c = 25	026240
15	Anchor Positioning Stud M24	026420
16	Wire Nail 3 x 80	710312
17	Anchor Positioning Plate M24	029280
18	Hex. Wood Screw DIN 571 6 x 20	029440
19	Advancing Bolt M24	029270
20	Spacer for Platform Beam BR	020620
21	Folding Bracket 25	020330
22	Gravity Pivot Plate BR	020600
23	Bearing Box BR	108162
24	Steel Waler Universal SRU U120	
25	Finishing Platform Suspension	
25.1	Fitting Pin Ø 21 x 120	104031
25.2	Eye Nut RCS DW 15	115378
25.3	Hex. Nut DW 15 SW 30/50	030070
25.4	Steel Scaffold Tube Ø 48.3 x 3.2	026415
25.5	Cotter Pin 4/1	018060
25.6	Wingnut Pivot Plate DW 15	030370
26	Internal formwork	

Pos.no.	Component name	Item no.
27	External Formwork	
28	Planking 40 mm	
29	Planking 50 mm	
30	Wooden Plank 15/3 cm	
31	Wooden Plank 24/4 cm	
32	Limit Stop Plank	
33	Timber 10 / 10 cm	
34	Distance Device	
35	Guardrail Holder GT 24 / VT 20	101290
36	Guardrail Post HSGP-2	116292
40	Hatch 55 x 60-2, foldable	126431
41	Bolt ISO 4017 M12 x 40-8.8	710224
42	Nut ISO 7040 M12-8	710381
43	Ladder 180/6	051410
44	Ladder 220/6	051420
45	End Ladder 180/2	103724
46	Ladder Base 30, adjustable	109105
47	Ladder Base	051460
48	Ladder Hook	103718
49	Ladder Safety Cage 75	104132
50	Ladder Safety Cage 150	051450
51	L-Angle RCS 120 x 120 x 200	110289
52	Anchor Bolt PERI 14 x 150	117020
53	Washer ISO 7089 200 HV, A 14	725574
54	Bolt ISO 4014 M12 x 80-8.8	710220
55	Washer ISO 7094 100 HV, A 12	113348
56	TSS-Torx 6 x 80	024690
57	TSS-Torx 6 x 40	024540
58	Hex. Bolt ISO 4032-M12-8	104526
60	Control Hatch	
60.1	Cut-To-Size Plank 25 x 80	
60.2	Hinge DIN 7957-200-ST	111436
61	Descent Hatch	
100	Steel Wire Pin	
101	Spax Screw TX25, 5 x 40	110642
102	Binding Wire	

Component Overview and Tool List

Tool name	Item no.
Hex. Allen Key SW 14, long	027212
Socket SW 19-1/2"	029620
Socket Spanner SW 36, chrome-plated	031480
Ratchet Wrench 3/4"	051764
Socket SW 30-3/4"	057276
Torx Blade TX 30	072140
Power Wrench M14, ASB 636	072150
Socket SW 13-1/2", L = 80 mm	072170
Ratchet Wrench 1/2"	072180
Power Screwdriver SCU 7-9	072210
Bit Holder for SCU 7-9	072220
Magnet Holder for SCU 7-9	072230
Depth Chuck for SCU 7-9	072240
Socket SW 24-1/2"	102784
Forstner drill Ø 42 mm	
Allen key SW 14	

Tightening torque

For non-defined lubricated screw connections, PERI recommends the following guide values as "hand-tightened" tightening torque M_A . These guide values are based on EN 15048 with Safety Factor 3 against breakage of a bolt with Strength Class 4.6.

Bolt M8	8 Nm
Bolt M10	16 Nm
Bolt M12	30 Nm
Bolt M16	65 Nm
Bolt M20	100 Nm
Bolt M24	150 Nm
Bolt M30	260 Nm
Bolt M36	350 Nm

Tightening torque has been determined for the following components:

Bolt of Spacer M20	100 Nm
Bolt of Spacer M24	150 Nm
Scaffold tube coupling	50 Nm
Clamping Plate for the Slab Anchor Template	120 Nm

When supporting the Shaft Platform, a distinction is made regarding:

- supporting with the Gravity Pivot Plate BR.
- supporting with the Folding Bracket 25.

Supporting with the Gravity Pivot Plate BR

The Gravity Pivot Plate BR (**22**) is mounted on the Platform Beam BR (**1**) and is positioned in the Bearing Box BR (**23**).

Components

- 1** Platform Beam BR
- 22** Gravity Pivot Plate BR
- 23** Bearing Box BR

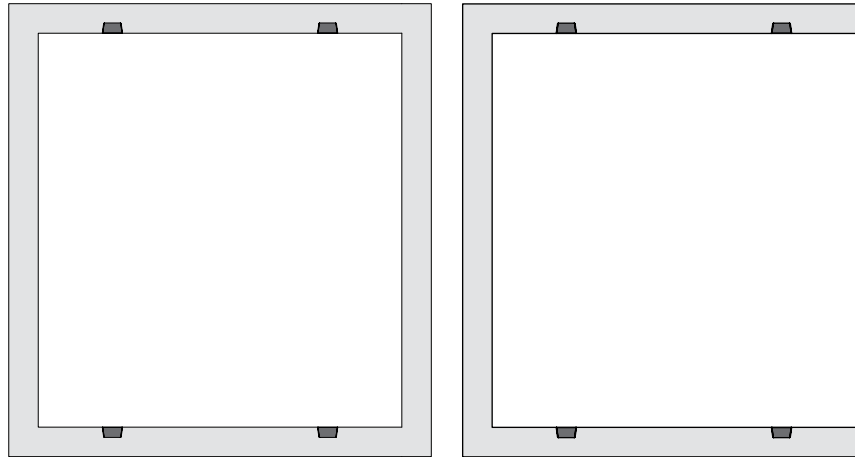


Fig. A1.01



- Use of the Gravity Pivot Plate BR with closed and open shafts. (Fig. A1.01)
- The distance $c_{1,2}$ from the bottom edge of the Bearing Box to the concreting joint depends on the type of girder. (Fig. A1.02)



Bearing Box BR

- With the standard application, the Bearing Box BR must remain in the wall as long as the Shaft Platform is positioned on it.
- For suspension without the Bearing Box BR, specific project verification must be carried out.



Safety Item

All Internal Platform Beams supplied by PERI UK Ltd include a 17mm hole and 16 x 65/86 Locking Pin & Cotter Pin for prevention of tipping during use

Technical data	
Flange dimension a_{soll}	60 mm
Flange dimension a_{min}	27 mm

Table A1.01

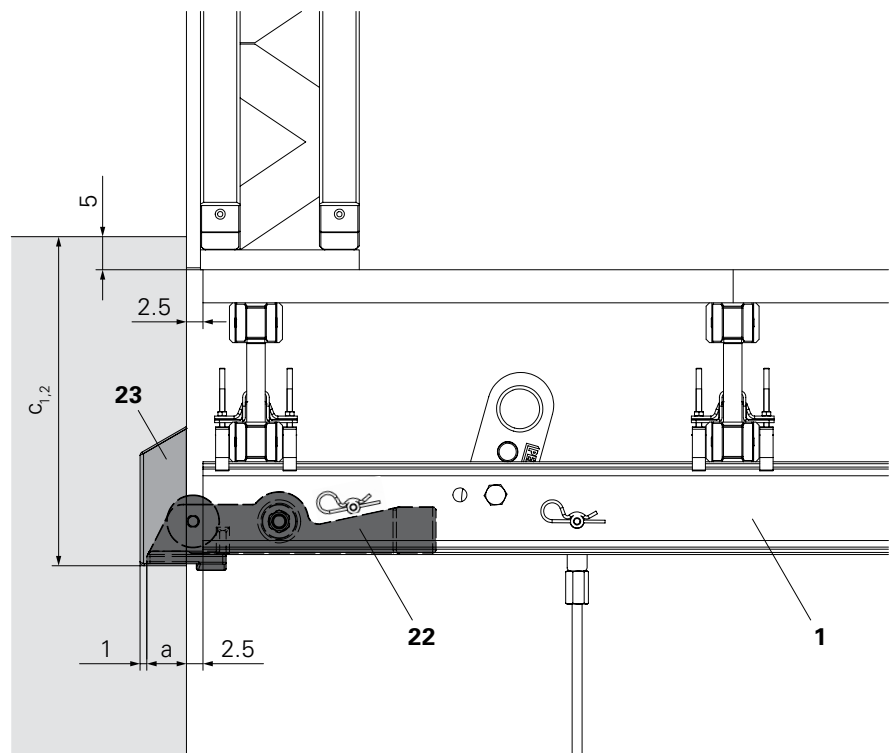


Fig. A1.02

Supporting with the Folding Bracket 25

The Shaft Platform rests directly with the Platform Beam BR (1) on the Folding Bracket 25 (21).

The Folding Bracket 25 is mounted on the inner side of the shaft wall. The Folding Bracket can be anchored with:

- Climbing Cone 2 M24/DW 15 (7)
- Screw-On Cone M24/DW 20
- Anchor Sleeve M24

Components

- 1 Platform Beam BR
- 7 Climbing Cone-2 M24/DW 15
- 21 Folding Bracket 25

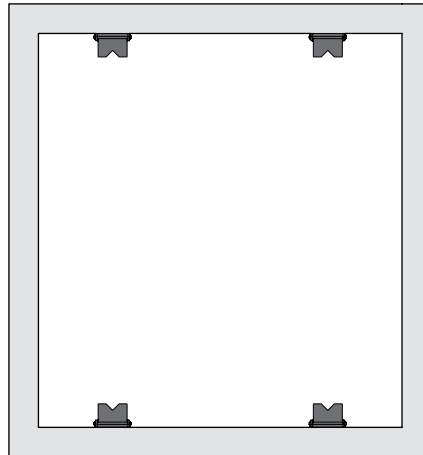


Fig. A1.03



- Use of the Folding Bracket 25 only with closed shafts. (Fig. A1.03)
- Distance $c_{1,2}$ from the anchor to the concreting joint depends on the type of girder.
- Pay attention to the minimum distances $c_{1,2}$ of the anchor used, see Section "A2 Anchoring". (Fig. A1.04)

Technical data

Flange dimension a_{soll}	92 mm
Flange dimension a_{min}	50 mm

Table A1.02



Important Note:

Due to possible misapplication of use with Internal Platforms, the use of Folding Bearing Plates must only be considered following a comprehensive assessment of the risks and the provision and management of a safe system of use. Additional measures are required to ensure the platforms cannot be dislodged during use.

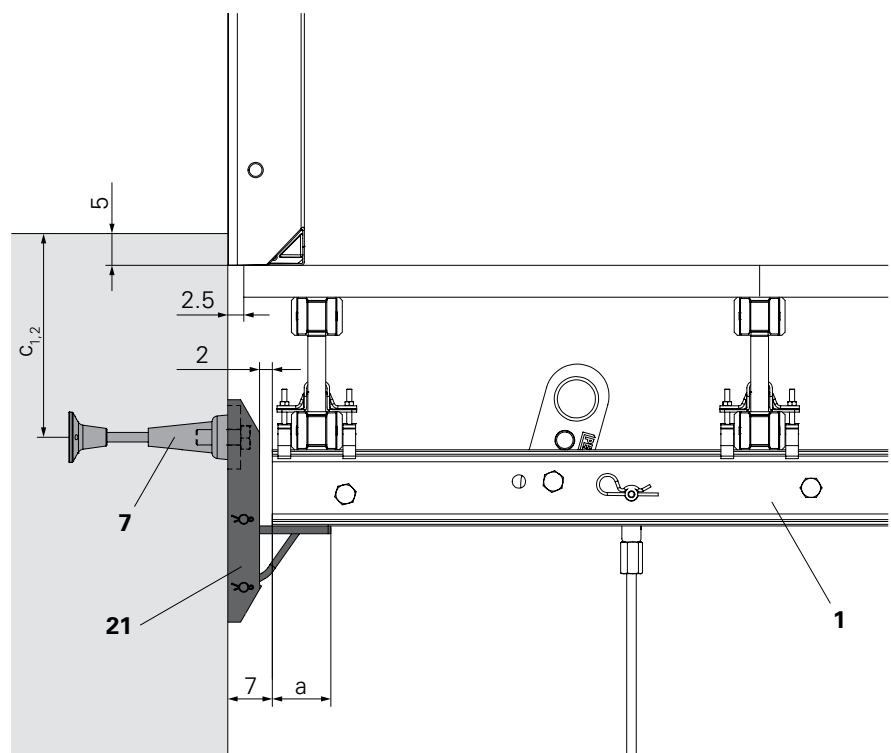


Fig. A1.04

General



Danger

Incorrect assembly or anchoring operations may lead to the platform falling to the ground!

This could result in serious injuries or even death.

- ⇒ Every Shaft Platform must have its own anchoring.
- ⇒ Loosening or removal of the anchoring is only possible on the side of the load transfer.
- ⇒ The installation of two cones against each other is not allowed. (Fig. A2.01)
- ⇒ Minimum edge distances c , minimum component thicknesses D and other design requirements are provided in the separate PERI product information and the project-specific planning, and must be observed. (Fig. A2.03a + A2.03b)



- If $h_1 + h_2 > D$: ensure that the anchoring has an offset arrangement. (Fig. A2.02 + A2.03)
- Depending on the static or design requirements, use the most suitable anchoring variant.
- Take component approvals into consideration:
 - Z-21.6-1766
 - Z-21.6-1767
 - Z-21.6-1768

Removing the anchoring



Carefully grease those surfaces in contact with the concrete as well as the internal thread for the tie rods. This enables the anchoring to be recovered later.

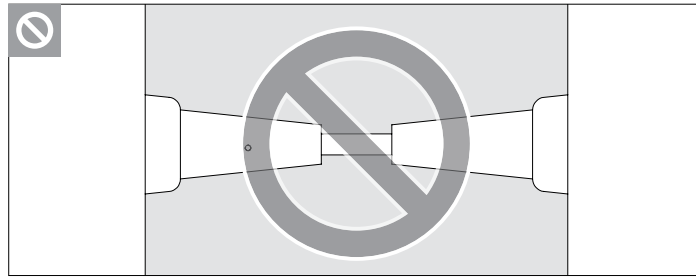


Fig. A2.01

Top view

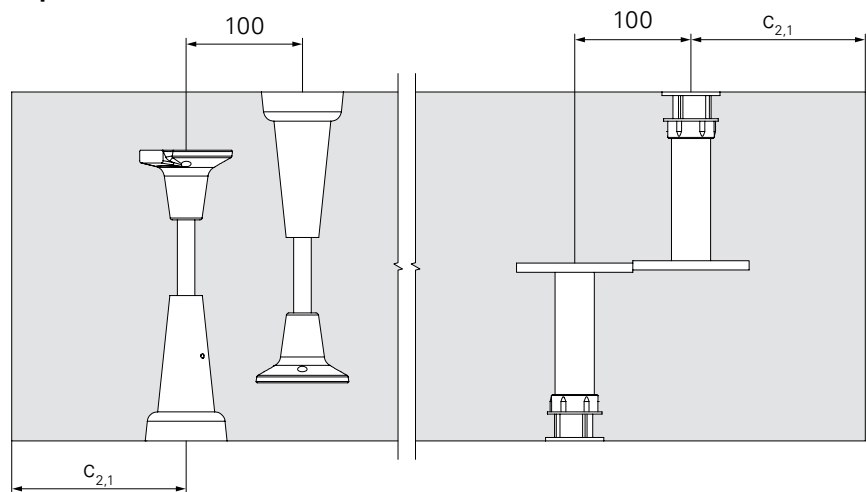


Fig. A2.02

Side view

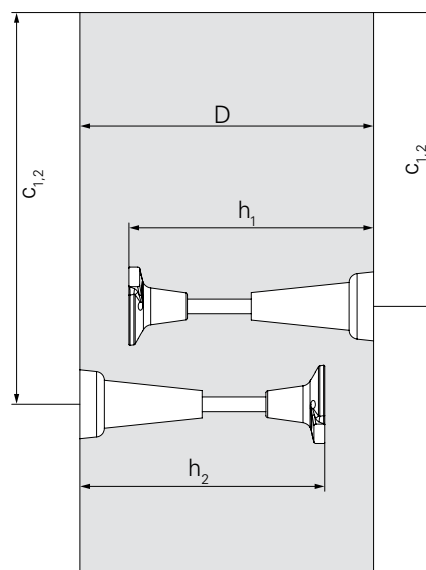


Fig. A2.03

Overview

Anchoring system variants

The following anchoring systems are available:

- Climbing Cone-2 M24/DW 15 (Fig. A2.04a)
- Screw-On Cone-2 M24/DW 20 (Fig. A2.04b)
- Anchor Sleeve M24 (Fig. A2.04c)

The Folding Bracket 25 serves as a support and is attached to one of these anchor systems.

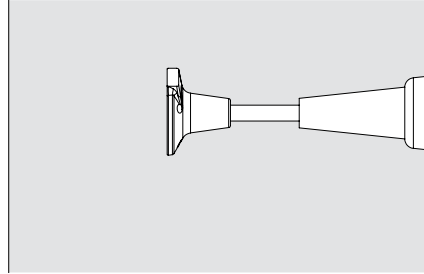


Fig. A2.04a

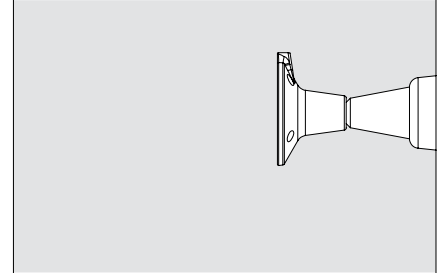


Fig. A2.04b

Exception

The Bearing Box BR is both the anchoring and support. (Fig. A2.04d)



The choice of the correct anchoring is done project-specifically. Anchoring systems must not be combined.

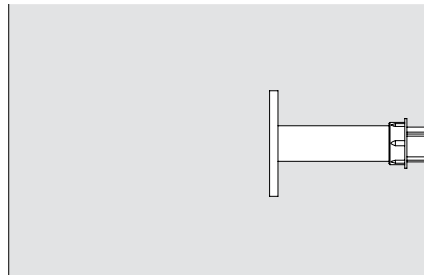


Fig. A2.04c

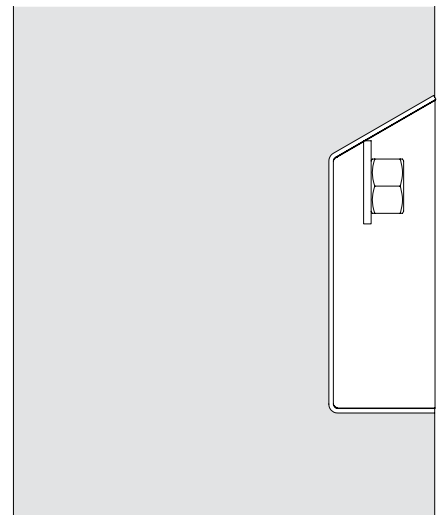


Fig. A2.04d

Overview of the influencing factors	
Wall thickness	D
Anchoring depth	h
Distance to the top concrete joint	c _{1,2}
Edge distance to underlying openings	c _{1,1}
Lateral distance to edge	c _{2,1}
Axis spacing between the anchoring	s
Flange dimension	a

Table A2.01

Assembling the anchoring

The anchor system is mounted on the inner side of the formlining.

Required components:

- Anchor Positioning Stud M24 (Fig. A2.05)
- or
- Anchor Positioning Plate M24 with Advancing Bolt M24 (Fig. A2.06)

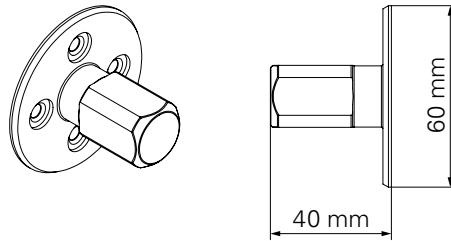


Fig. A2.05

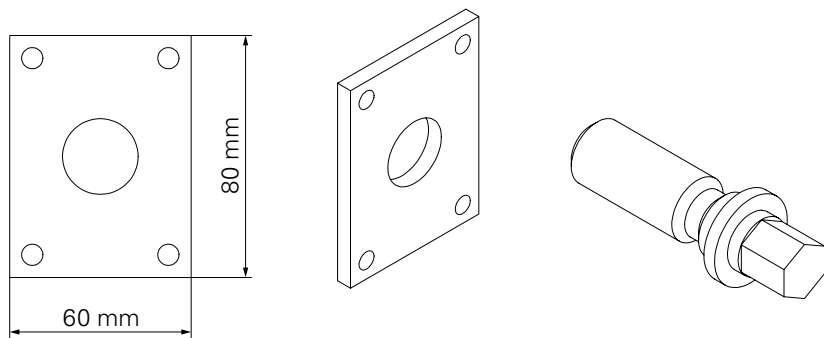


Fig. A2.06

Permissible combinations of the anchoring system				
	Anchor Sleeve M24	Screw-On Cone-2 M24/DW 20	Climbing Cone-2 M24/DW 15	Bearing Box BR
Anchor Positioning Stud M24	x	x		
Anchor Positioning Plate M24	x	x	x	x

Table A2.02

Anchoring Depth

The anchoring depth and component thickness require project-specific planning.

Variant V1:

with Climbing Cone-2 M24/DW 15
Anchoring depth h : according to static requirements.

Variant V2:

with Screw-On Cone-2 M24/DW 20

Variant V3:

with Anchor Sleeve M24

Variant V4:

with Bearing Box BR
(Fig. A2.07)



Take component approvals into consideration:

- Z-21.6-1766
- Z-21.6-1767
- Z-21.6-1768

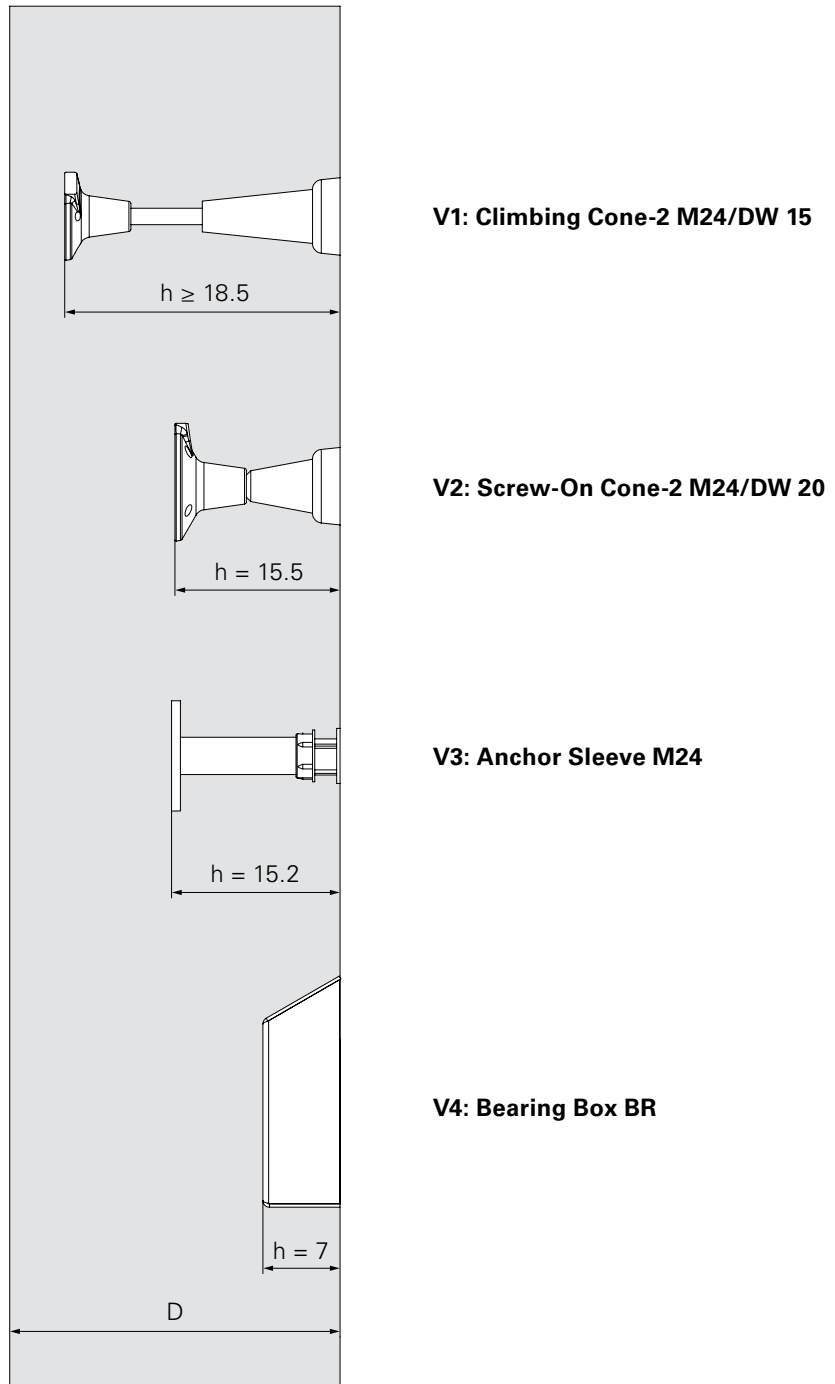


Fig. A2.07

Climbing Cone-2 M24/DW 15

Components

- 7** Climbing Cone-2 M24/DW 15
- 8** Threaded Anchor Plate DW 15
- 9** Tie Rod DW 15
- or
- 10** Tie Rod B 15
- 12** Spacer Tube rough DR 22

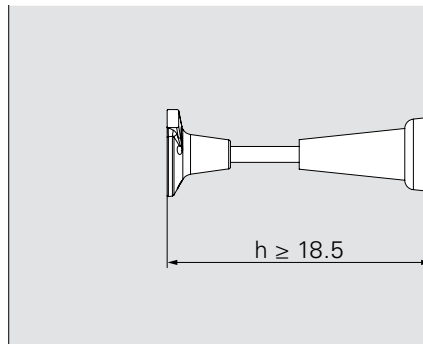


Fig. A2.08



- If the Spacer Tube rough DR 22 (**22**) is used, the Tie Rod is reusable.
- Anchoring depth h is variable but minimum 18.5 cm. (Fig. A2.08)
- $L_1 = h - 8 \text{ cm}$
- $L_2 = h - 18.5 \text{ cm}$
(Tolerance 0 to +5 mm)
(Fig. A2.09)

Assembly

1. Screw the Tie Rod DW 15 or B 15 (**9/10**) onto the Climbing Cone-2 M24/DW 15 (**7**) as far as possible.
2. Place the Spacer Tube rough DR 22 (**12**) on the Tie Rod (**9/10**).
3. Screw the Threaded Anchor Plate DW 15 (**8**) onto the Tie Rod (**9/10**) as far as possible.

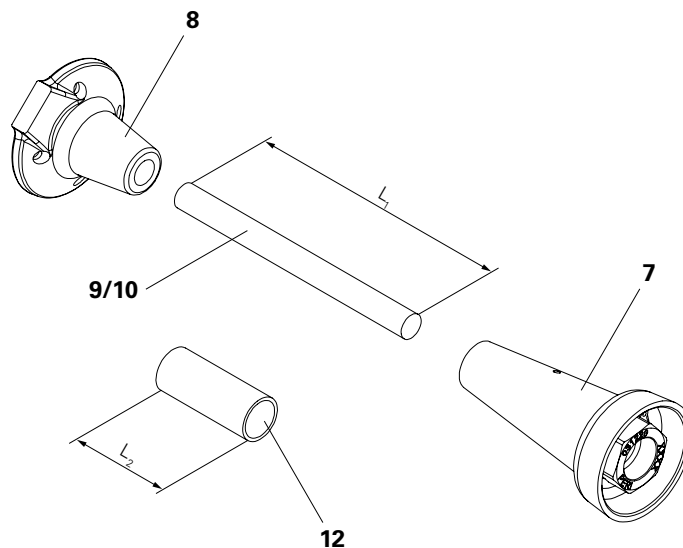


Fig. A2.09

Screw-On Cone-2 M24/DW 20

Components

- 5** Screw-On Cone M24/DW 20
- 6** Threaded Anchor Plate DW 20



Anchoring depth $h = 15.5$ cm
(Fig. A2.10)

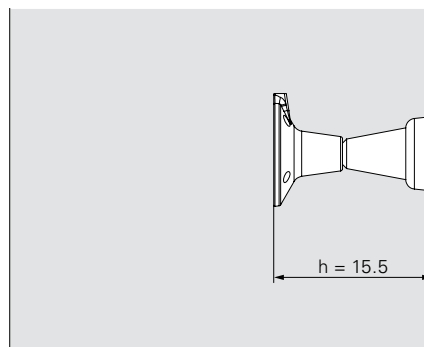


Fig. A2.10

Assembly

1. Screw the Screw-On Cone 2 M24/DW 20 (**5**) onto the Threaded Anchor Plate DW 20 (**6**) as far as possible.
(Fig. A2.11)

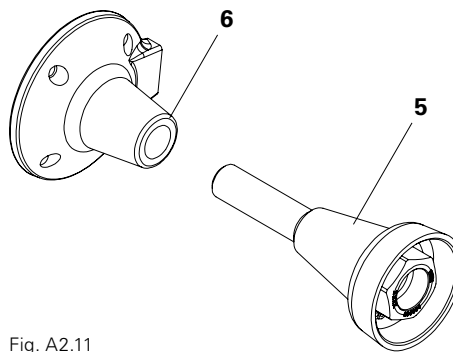


Fig. A2.11

Anchor Sleeve M24

Components

- 13** Anchor Sleeve M24
- 14** Spacer PP $\varnothing 31/26$, $c = 25$



Anchoring depth $h = 15.2$ cm
(Fig. A2.12)

Assembly

1. Put the Spacer PP (**14**) on the Anchor Sleeve M24 (**13**) as far as possible.
(Fig. A2.13)

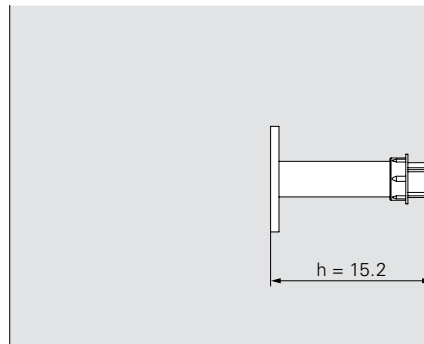


Fig. A2.12

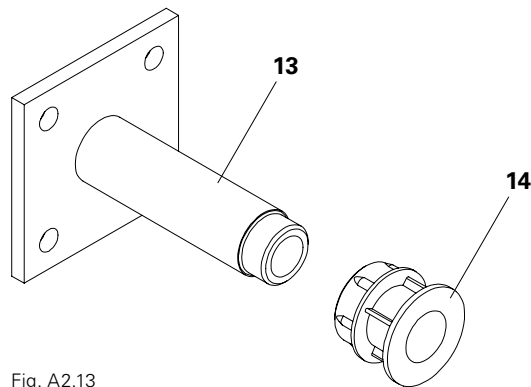


Fig. A2.13

Bearing Box BR

Components

23 Bearing Box BR



Anchoring depth $h = 7$ cm
(Fig. A2.15)

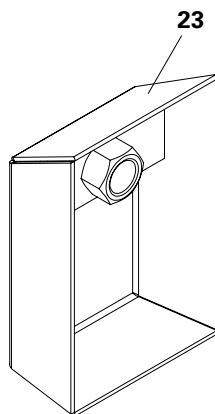


Fig. A2.14

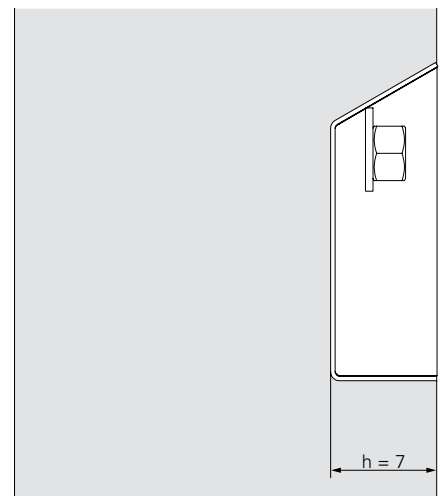


Fig. A2.15

Assembly of the Leading Anchor with Anchor Positioning Stud M24

Climbing Cone, Screw-On Cone or Anchor Sleeve are all possible as the Leading Anchor. The example shows assembly with the Screw-On Cone.

Components

- 15** Anchor Positioning Stud M24
- 16** Wire Nail 3 x 80
- 37** Leading Anchor

Initial use and standard use

1. Fix the Anchor Positioning Stud M24 (**15**) to the marked position using 4x wire nails 3 x 80 (**16**). (Fig. A2.16)
2. If necessary, fold down the wire nails on the back of the formlining.
3. Screw on and tighten the pre-assembled Leading Anchor on the Anchor Positioning Stud M24 (**15**). (Fig. A2.17 + A2.18)



Check assembly

- Height
- Anchor spacings
- Anchoring depth h
- Alignment according to specifications



The Leading Anchor and reinforcement measures can be checked at the same time.

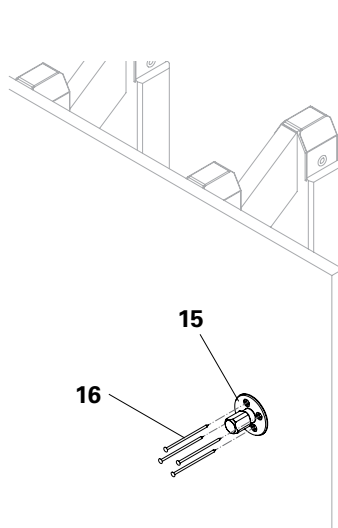


Fig. A2.16

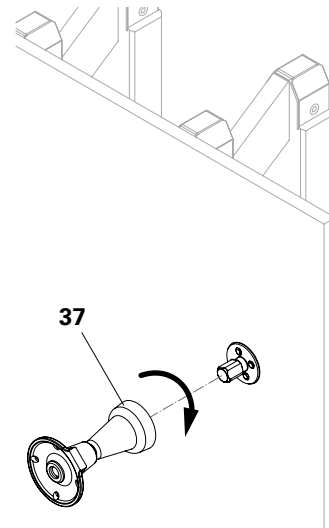


Fig. A2.17



- A more stable mounting is achieved through the installation of the Anchor Positioning Plate, see "Assembly of the Leading Anchor with Anchor Positioning Plate M24" on Page 27.
- In this case, the distances from the holes to be drilled to the steel struts of the formwork must be large enough.
- Firmly connect the Threaded Anchor Plate (**6/8**) to the reinforcement to ensure a secure position.

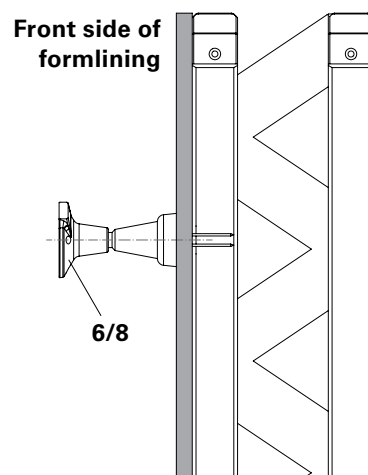


Fig. A2.18

Assembly of the Leading Anchor with Anchor Positioning Plate M24

Climbing Cone, Screw-On Cone or Anchor Sleeve are all possible as the Leading Anchor. The example shows assembly with the Screw-On Cone.

Components

- 17** Anchor Positioning Plate M24
- 18** Hex. Wood Screw DIN 571 6 x 20
- 19** Advancing Bolt M24
- 37** Leading Anchor

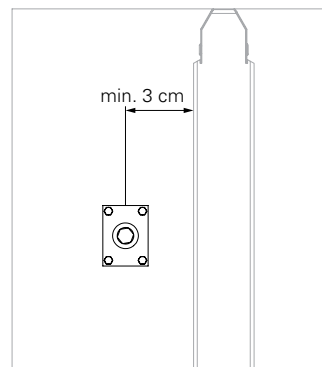


Fig. A2.19

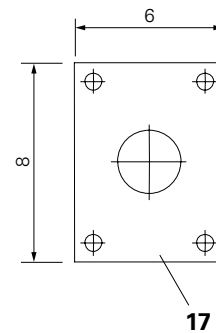


Fig. A2.20

Initial use

1. Check the required space for the Anchor Positioning Plate M24 (**17**). A lateral clearance of 3 cm or 4 cm is required. (Fig. A2.19 + A2.20)
2. Measure the assembly position and drill a hole of \varnothing 25 mm from the front of the formwork.
3. Mount Anchor Positioning Plate M24 (**17**) on the rear of the form-lining using 4x wood screws DIN 571 6 x 20, SW 10 (**18**). (Fig. A2.21)

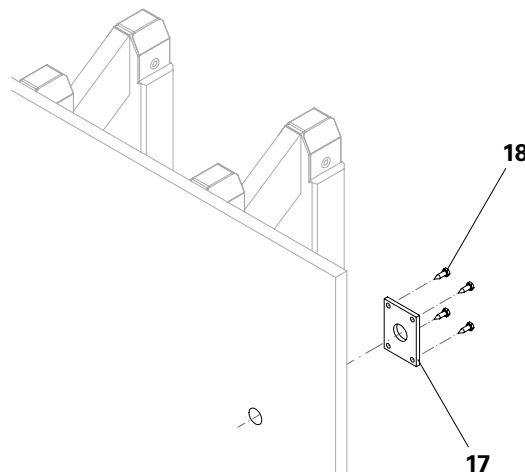


Fig. A2.21

Standard use

1. Insert the Advancing Bolt M24 (**19**) from the rear side of the formlining through the drilled hole.
2. On the front side of the formlining, tightly screw on the Leading Anchor (**37**).

(Fig. A2.22 + A2.23)



- If there is a formwork girder positioned at the rear of the anchoring, assembly with the Anchor Positioning Stud M24 can be carried out.
- Firmly connect the Threaded Anchor Plate (**6/8**) to the reinforcement to ensure a secure position.



Checking the assembly

- Height
- Anchor spacings
- Anchoring depth h
- Alignment according to specifications



The assembly position of the Leading Anchor and the reinforcement measures can be checked together.

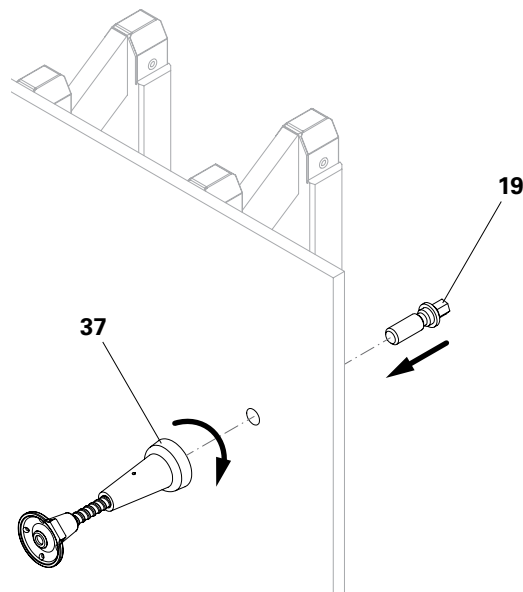


Fig. A2.22

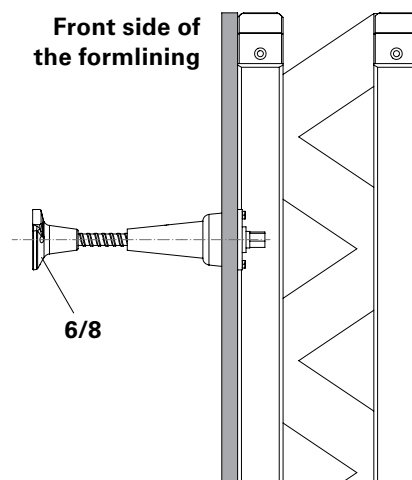


Fig. A2.23

Assembly of the Bearing Box with the Anchor Positioning Plate M24

Components

- 17 Anchor Positioning Plate M24
- 18 Hex. Wood Screw DIN 571 6 x 20
- 19 Advancing Bolt M24
- 23 Bearing Box BR

Mounting the Bearing Box

1. Assembling the Bearing Box is carried out in the same way as for the Leading Anchor.
2. Align the Bearing Box so that a horizontal supporting surface is created for the Gravity Pivot Plate.



Checking the assembly

- Height
- Anchor spacings
- Alignment according to specifications



- If necessary, the edge of the Bearing Box can be sealed with silicone.
- The assembly position of the Bearing Box and the reinforcement measures can be checked together.

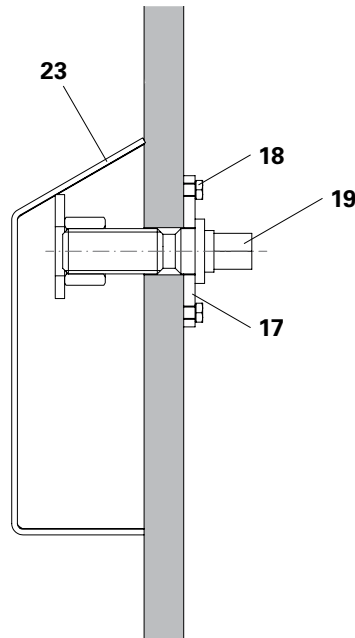


Fig. A2.24

Dismantling the Anchor Positioning Stud M24

Dismantling

1. Straighten the bent wire nails $\varnothing 3 \times 80$ (16).
2. Release the formwork from the wall using the Heavy Duty Spindle.
→ Pull wire nails $\varnothing 3 \times 80$ (16) out of the formlining.
3. Retract formwork.
(Fig. A2.25)
4. Bend wire nails $\varnothing 3 \times 80$ (16) in order to protect hands.
5. Remove the Anchor Positioning Stud M24 (15) using an Allen Key SW 14.
(Fig. A2.26)

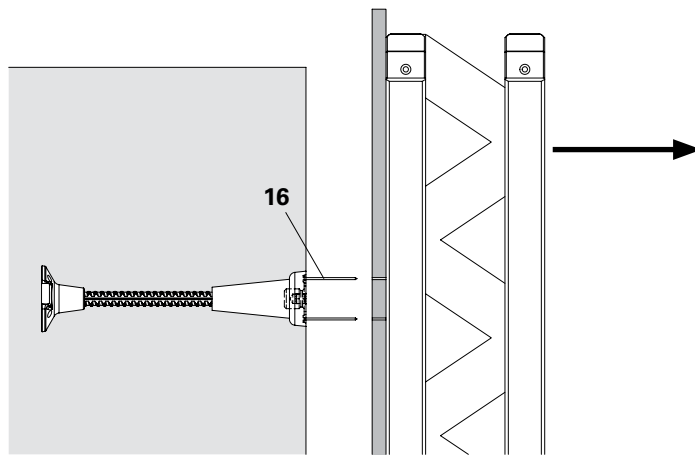


Fig. A2.25

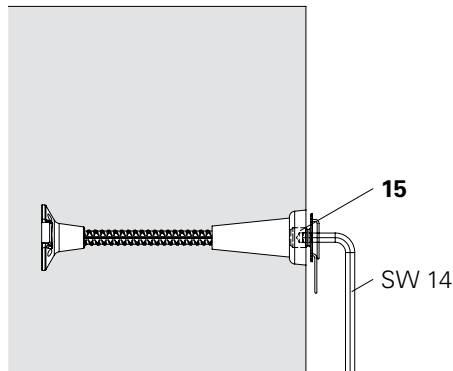


Fig. A2.26

Dismantling the Anchor Positioning Plate M24

Dismantling

1. Release the Advancing Bolts M24 (19) and remove.
2. Release the formwork from the wall using the Heavy Duty Spindle.
3. Retract the formwork.
(Fig. A2.27)

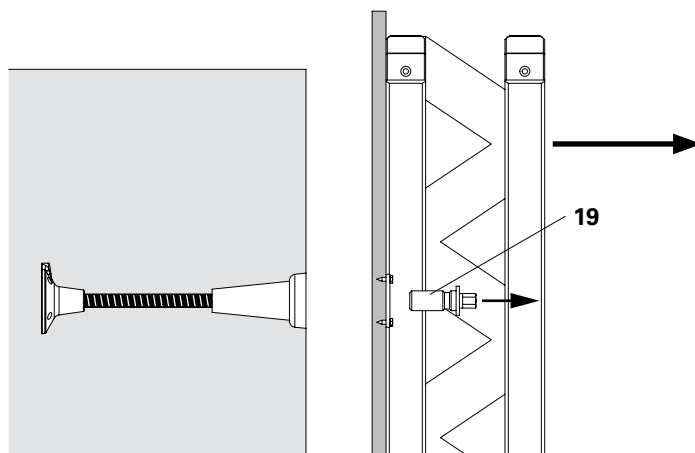


Fig. A2.27

Assembly of the Folding Bracket 25



- Use Bolt ISO 4014 M24 x 70-10.9 (11) for mounting.
- Other bolt types are not permitted.

Assembly

1. Place the Folding Bracket 25 (21) on the anchor position and vertically align.
2. Firmly attach the Folding Bracket 25 (21) to the Anchor (6/8/13) using bolt ISO 4014 M24 x 70-10.9 (11). (Fig. A2.28a + A2.28b)

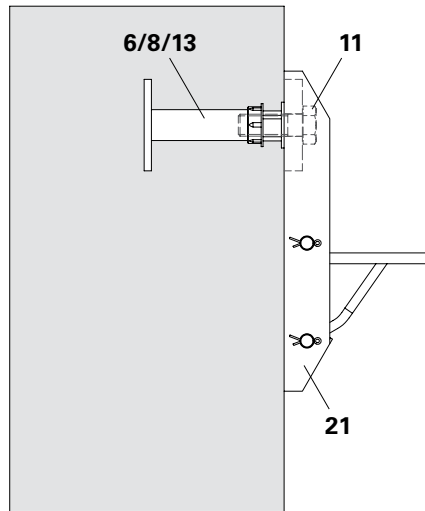


Fig. A2.28a

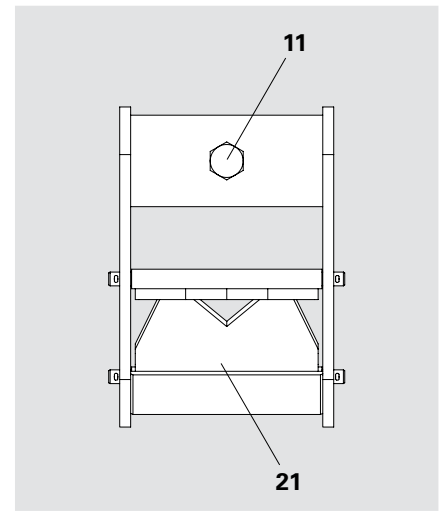


Fig. A2.28b

Required edge distances for mounting the Folding Bracket 25:

- Distance to the top concrete joint $c_{1,2} \geq 280$ mm
 - Lateral distance to edge $c_{2,1} \geq 280$ mm
 - Edge distance to underlying openings $c_{1,1} \geq 900$ mm
 - Axis spacing between the anchoring $s \geq 560$ mm
 - Wall thickness $D \geq 180$ mm
- (Fig. A2.29a + A2.29b)



- Permissible anchoring:
 - Anchor Sleeve M24
 - Climbing Cone-2 M24/DW 15
 - Screw-On Cone-2 M24/DW 20

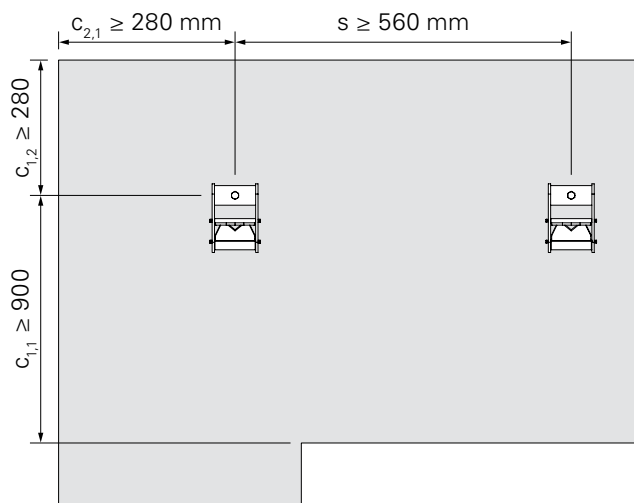


Fig. A2.29a

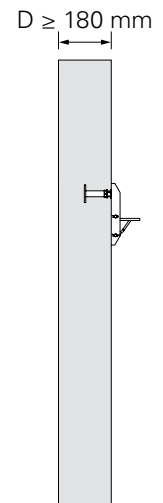


Fig. A2.29b

Live Loads

When placing the Shaft Platform under load, the following factors are to be taken into consideration:

- with the concreting platform
- with the finishing platform

External primary formwork

In the standard assembly, the external formwork is the primary formwork while the internal formwork is the closing formwork. As a result, the Shaft Platform is not subjected to any wind load. (Fig. A3.01)

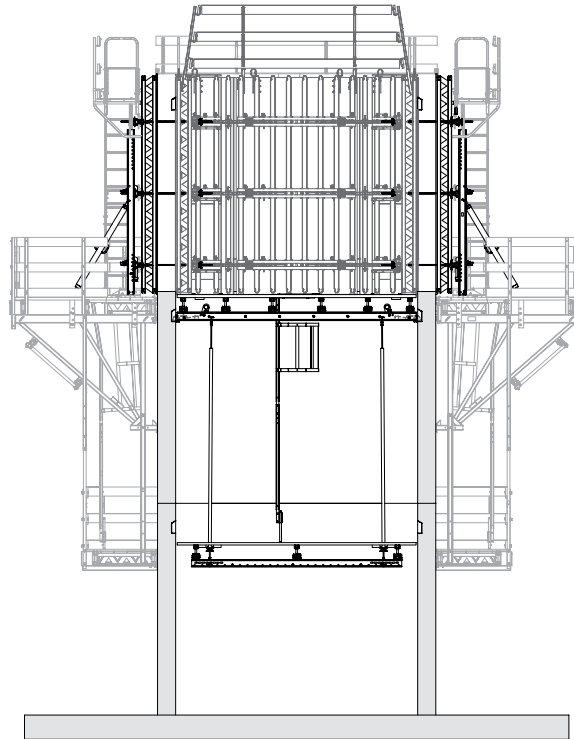


Fig. A3.01



- If more platforms are loaded, only one level can be fully loaded; other platform levels directly above and below only 50 %, see Table.
- Loads are to be evenly distributed. One-sided loading of cantilevered platform areas is not permitted.
- Storm conditions: if wind speeds are greater than 64 km/h, appropriate storm protection measures must be taken. For example, anchoring the formwork to the structure or dismantling the formwork.
- The area-related live loads correspond to EN 12811.

Platform	Max. live load [kg/m ²] ¹⁾	Permissible live load with several platforms [kg/m ²] ¹⁾ 100 % load on the working platform
Concreting platform	150	75
Working platform	300	300
Finishing platform	75	37.5

¹⁾ Max. wind speed 64 km/h.

Other Operating Status

Operating status: working

Work required to be carried out on the climbing formwork and working platforms:

- Cleaning of formwork, reinforcing of walls, closing the formwork, concreting and striking, inspection and maintenance.
→ Platforms are freely accessible for the required work to be carried out.
- Max. wind speed 102 km/h (dynamic wind pressure $q = 0.50 \text{ kN/m}^2$).
- Loads are to be evenly distributed. Single-sided loads on cantilevered platform areas are only allowed if an appropriate fixation against lift-off is fitted to the bracket positioned opposite.

Operating status: concreting

- Concreting the casting segment.
- Concreting platform is freely accessible for the work to be carried out.
- Working platform:
only access – no additional loads.
- Finishing platform:
only access – no additional loads.

Operating status: climbing

- Move the Shaft Platform with the crane.
- Internal formwork is removed.
- Non-planned loads on the platforms are to be removed.
- Climbing with the crane: personnel are not allowed on the platforms during the climbing procedure.
- Max. wind speed 72 km/h (dynamic wind pressure $q = 0.25 \text{ kN/m}^2$).
- The climbing position must be statically verified as it can prove to be decisive.

Non-operational status

During longer work breaks, overnight or in the case of storm warnings with wind speeds of over 64 km/h.

- Position the formwork in its concreting position.
- In the event of sudden storms or lightning, precautionary measures are to be taken only if they do not endanger site personnel in any way. Otherwise leave the Shaft Platform immediately.
- Accessing the Shaft Platform during storm conditions is prohibited.
- Materials or equipment can be left on the working platform if appropriately secured.
- The assumed wind speed (dynamic wind pressure) during storm conditions is calculated based on the respective application height, wind zone and terrain category according to DIN EN 1991-1-4 or EC 1.
- For storm warnings with higher wind speeds than assumed, an authorised person is to be informed. The Shaft Platform can be climbed back to the previous concreting section if instructed to do so. Remove materials and equipment from the platforms.

Preparation

Assembly work

1. Assemble the wall formwork.
2. Mount the required platforms.

Concreting the Starter

1. Position wall formwork for the first concreting section.
2. Fix the Leading Anchor or Bearing Box BR.
3. Place the formwork anchor.
4. Carry out reinforcement work.
5. Concrete the first section. (Fig. A4.01)

Preparation for the initial use

1. Release the Leading Anchor or Bearing Box BR.
2. Remove the starter formwork.
3. Mount the support. (not shown)

Initial Use

1. Suspend the external platform with external formwork.
2. If necessary: install wind bracing.
3. Suspend Shaft Platform BR in the shaft.
4. Check it is the correct support for the Shaft Platform.
5. Align the external formwork.
6. Carry out the reinforcement work.
7. Fix the Leading Anchor or Bearing Box BR to the internal formwork.
8. Fly in the internal formwork and align.
9. Concrete the second section. (Fig. A4.02)

Striking

1. Release the Leading Anchor or Bearing Box BR.
2. Remove the internal formwork.
3. Retract the external formwork. (Fig. A4.03)

Moving



- People are not to be transported!
- No loose components or other loads are to be transported!
- Persons are to keep away from the area of risk!

1. Attach the crane lifting gear.
2. Climb the external platform to the next concreting section. (Fig. A4.03)

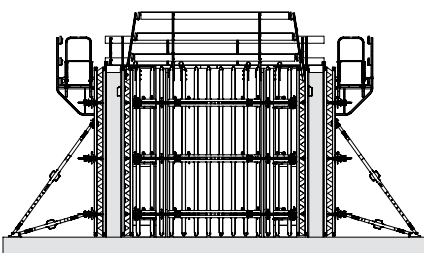


Fig. A4.01

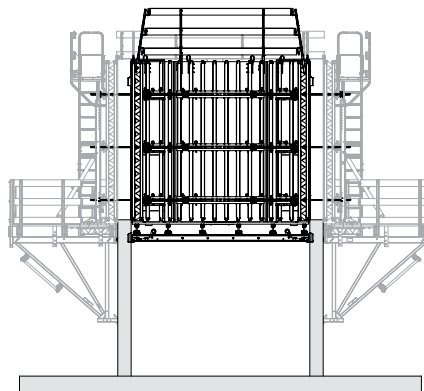


Fig. A4.02

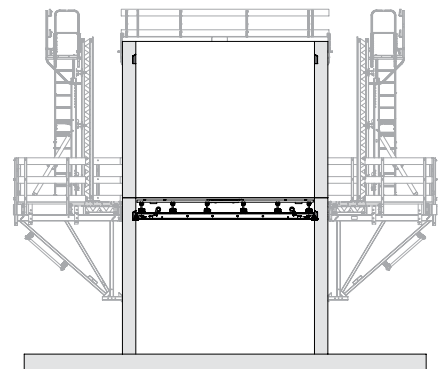


Fig. A4.03

Suspending the Finishing Platform

1. Attach crane lifting gear.
2. Fly out the Shaft Platform BR.
3. Ensure pre-assembled finishing platform is available.
4. Suspend the finishing platform on the Shaft Platform BR.
5. Mount the Shaft Platform BR with finishing platform in the shaft.
6. Check it is the correct support for the Shaft Platform.
7. Mount access ladder to the finishing platform.
(Fig. A4.04)

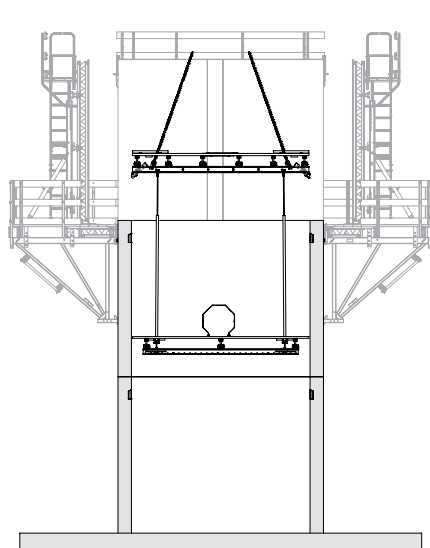


Fig. A4.04

Standard Cycle

1. Dismantling the support from the previous concreting section.
2. Position the external formwork and align.
3. Mount the Leading Anchor or Bearing Box BR on the internal formwork.
4. Carry out reinforcement work.
5. Position the internal formwork and align.
(Fig. A4.05)
6. Concrete the standard section.
7. Release the Leading Anchor or Bearing Box BR.

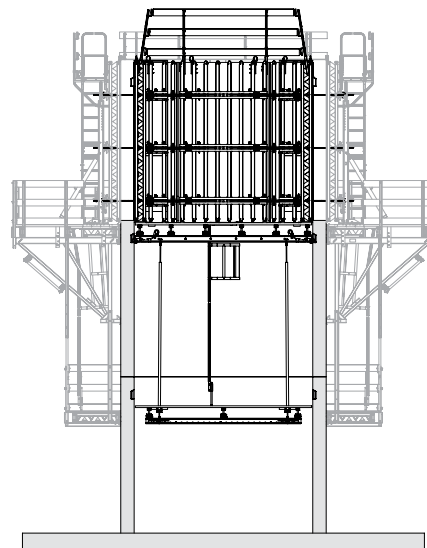


Fig. A4.05

8. Remove the internal formwork.
9. Retract the external formwork.
10. If necessary: close the anchor hole.
11. Climb the external platform to the next concreting section.
12. Climb the Shaft Platform to the next concreting section.
13. Check it is the correct support for the Shaft Platform.
(Fig. A4.06)

Dismantling

Dismantling the Shaft Platform.

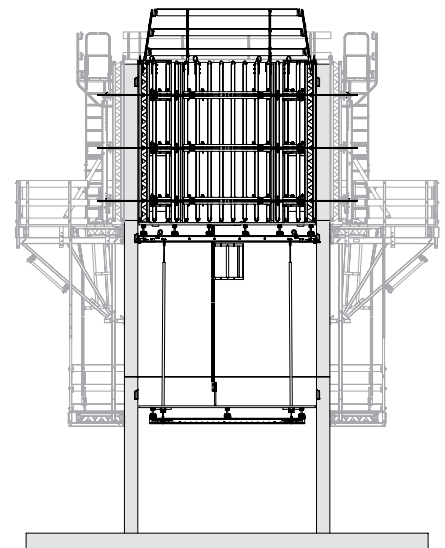


Fig. A4.06

Preparation of the Assembly

The following auxiliary construction facilitates the assembly of the working and finishing platforms. Dimension c is project-specific and corresponds to the distance of the Platform Beam BR or Steel Waler SRU.

Required resources

Hammer
Plumb line
Circular saw
Ratchet wrench 1/2"
Ratchet wrench 3/4"
Socket SW 30 - 3/4"
Wrench SW 30
Socket SW 24 - 1/2"
Wrench SW 24
Socket SW 19 - 1/2"
Wrench SW 19
Socket SW 13 - 1/2"
Electric power wrench (recommended)
Universal power screwdriver
Socket wrench SW 36
Allen Key SW 14
32 Limit stop plank
33 Timber 10/10 cm
100 Steel wire pin

3x

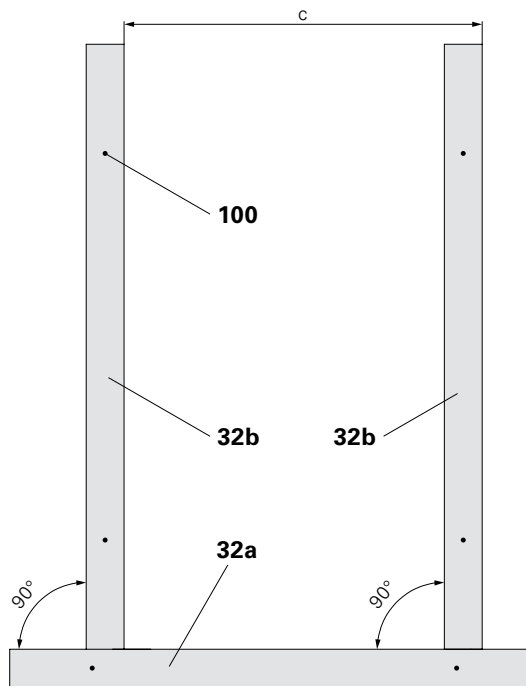


Fig. B1.01

Preparing the auxiliary construction

1. When assembling the Shaft Platform, ensure there is a sufficiently large and load-bearing assembly surface.
2. Fix a limit stop plank (**32a**) on the ground using steel wire pins (**100**).
3. At right angles, fix two equally long limit stop planks (**32b**) at a distance c on the ground using steel wire pins (**100**).
4. Determine the diagonal dimension of the limit stop planks (**32b**) and check whether the limit stop planks are parallel.

(Fig. B1.01)



- Are the limit stop planks at the specified distance c ?
- Are the limit stop planks in a parallel position?

Sub-Construction for the Planking

The planking overhang of the girder must not exceed 25 mm.
In order to adapt the sub-construction to suit the shaft width, the following variants are available.

Version 1

The planking (28) protrudes max. 25 mm over the girder (2).
(Fig. B1.02)

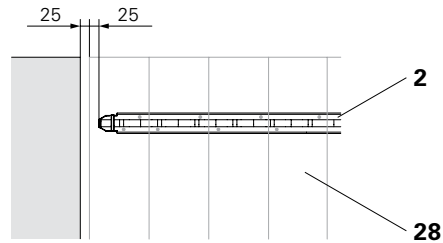


Fig. B1.02

Version 2

Offset two girders (2).
Dimensions are determined on a project-specific basis.
(Fig. B1.03)

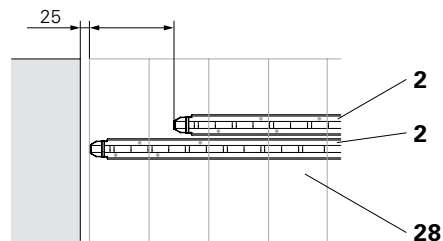


Fig. B1.03

Assembly with the Gravity Pivot Plate BR

Components

1 Platform Beam BR	2x
2 Girder	
3 Hook Strap	
32 Limit Stop Plank	

Mounting the girders

1. Align the Platform Beam BR (**1**) along the limit stop plank (**32**). The external holes lie below. (Fig. B2.01 + B2.02)
2. Place the two outer girders (**2a**) on the Platform Beam BR (**1**). The distance of the girder to the edge is max. 7 cm. (Fig. B2.02) The overhang d is the same on both sides. (Fig. B2.01)
3. Fix the girder (**2a**) to the Platform Beam BR (**1**) by means of hook straps (**3**).
4. Position and align all other girders (**2b**) according to project-specific specifications on the Platform Beams BR (**1**) and secure them using hook straps (**3**). (Fig. B2.02 + B2.03)



For accurately positioning the girder, use a plumb line.

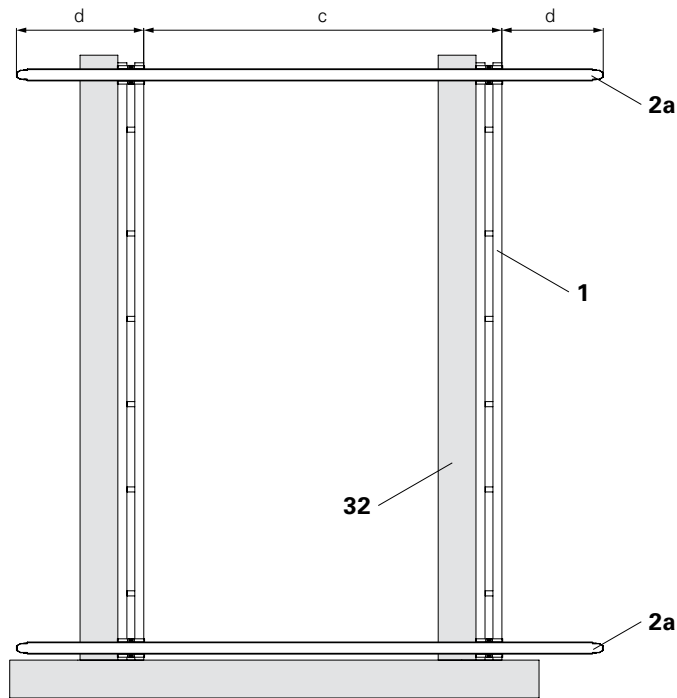


Fig. B2.01

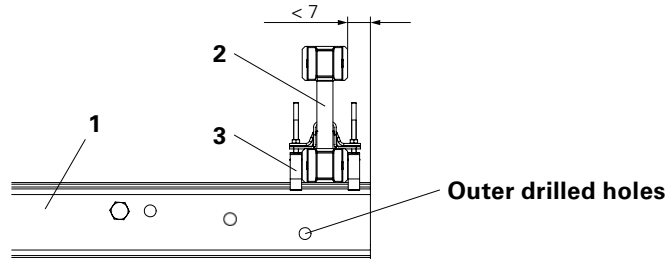


Fig. B2.02

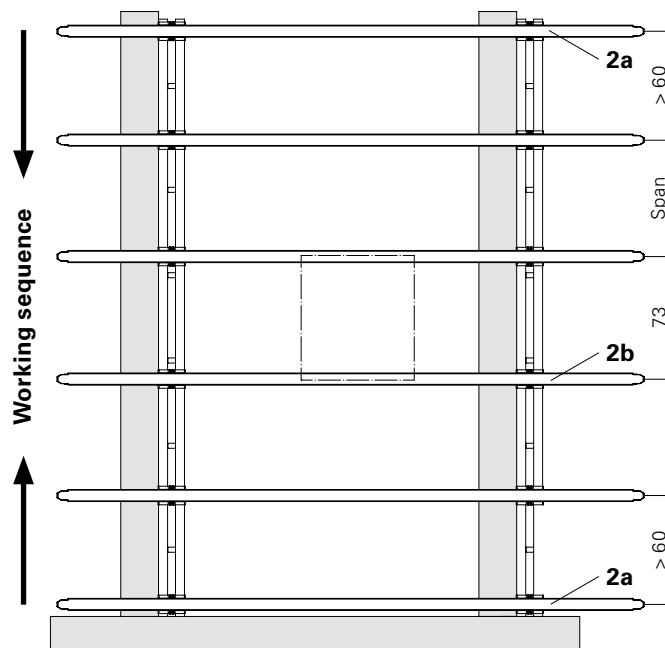


Fig. B2.03



- Distance of the two outer platform beams > 60 cm (collision with chain slings).
 - Clear width of the girders for the descent hatch 73 cm or 58 cm (depending on the hatch orientation).
 - Planking span ≤ 1.0 m
- Compare DIN EN 12811-1.
(Fig. B2.03)



For additional assembly, mount the platform beams with 10/10 cm timbers.

Mounting the Crane Eye BR-2 2.5 t

For installing and moving the Shaft Platform, the 4-sling lifting gear is attached to the Crane Eye BR-2 2.5 t.

Components

4	Crane Eye BR-2 2.5 t	4x
---	----------------------	----

- At the assembly position, dismantle the Spacer (1.5) for the Platform Beam BR (1).
- Position the Crane Eye BR-2 2.5 t (4) on the Spacer (1.5) for the Platform Beam BR (1) and install the complete assembly in its original position. The Crane Eye protrudes upwards out of the Platform Beam BR (1).
(Fig. B2.05 + B2.06)

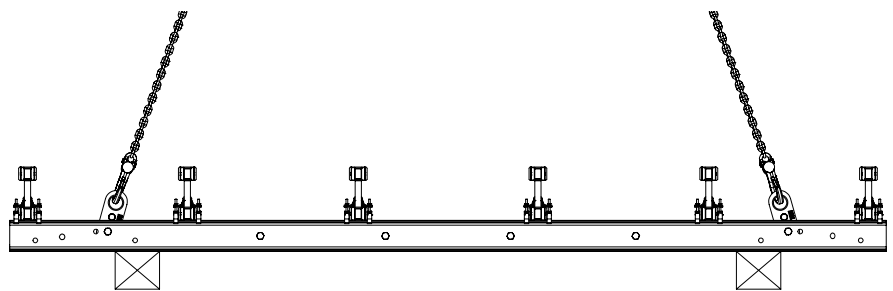


Fig. B2.04

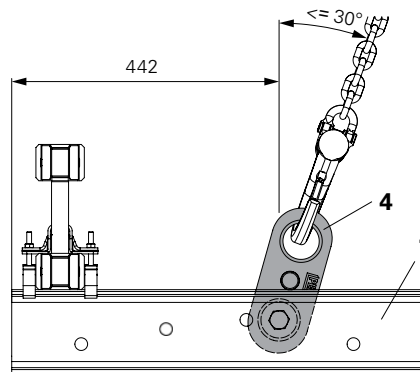


Fig. B2.05

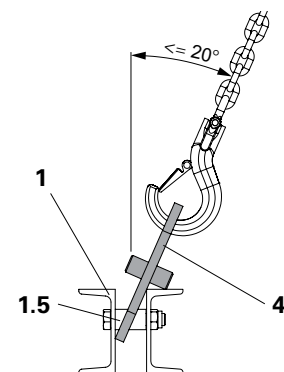


Fig. B2.06

Mounting the Gravity Pivot Plate BR

Components

22 Gravity Pivot Plate BR	4x
----------------------------------	----

1. Remove bolt M20 x 90 (**22.1**) and nut M20 (**22.2**).
2. Position the Gravity Pivot Plate BR (**22**) on the assembly position between the two U-profiles of the Platform Beam (**1**).
3. Securely fix the Gravity Pivot Plate (**22**) using bolt M20 x 90 (**22.1**) and nut M20 (**22.2**).
4. Check the free movement of the Gravity Pivot Plate.
(Fig. B2.08 + B2.09)

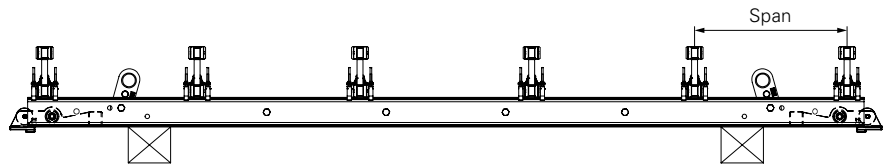


Fig. B2.07

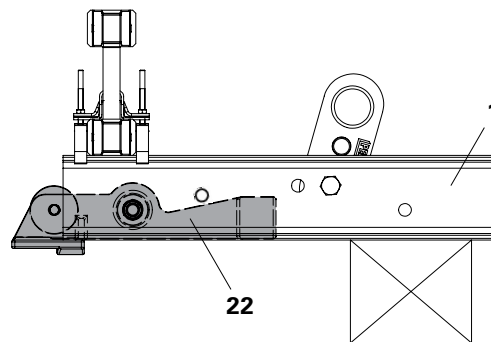


Fig. B2.08

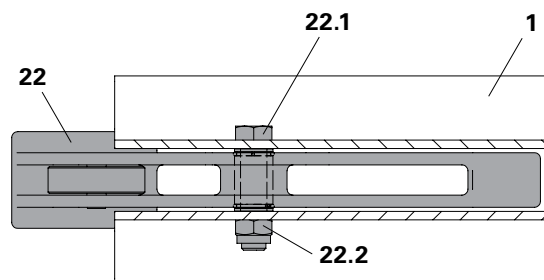


Fig. B2.09

Assembly with the Folding Bracket 25

Assembly of the Shaft Platform with the Folding Bracket takes place in the same way, except the Gravity Pivot Plates are not mounted.

Mounting the Platform Decking

Minimum requirements

- Soft Wood Strength Class C24 according to DIN 338.
- Alternatively, multi-layered panels with building inspection approval can also be used on the working and finishing platforms provided their use as a supporting and bracing component, as well as a substitute for solid wood according to DIN ENV 1995, is allowed. Minimum thickness 35 mm. The boundary conditions of the respective approval must be observed.
- Planking width at least 200 mm with a minimum plank thickness of 40 mm.
- The decking of all platforms is not designed for use as safety scaffold. The suitability as safety scaffold must be designed and proven on a project-specific basis. See also DIN EN 12811-1 as well as DIN 4420-1.

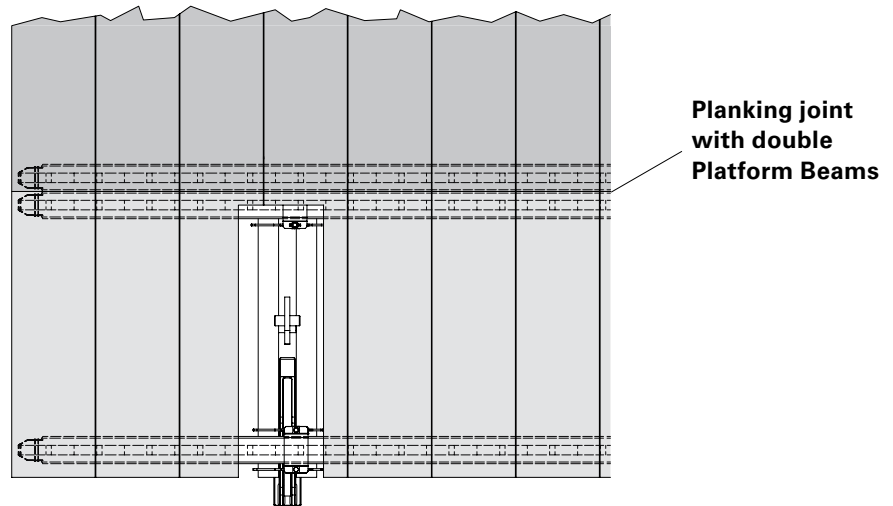


Fig. B2.10



- Always realise the joints of the planking with double Platform Beams. (Fig. B2.10)
- Always ensure that the respective national regulations for planking and guardrail boards are complied with.
- Take into account all project-specific planning.

B2 Assembling the Working Platform

The distance of the decking to the wall is 2.5 cm on all sides.

(Fig. B2.11 + B2.12)

The length of the planking is:
shaft length $L - 5$ cm

Components

- 29** Planking 50 mm
- 56** TSS-Torx 6 x 80

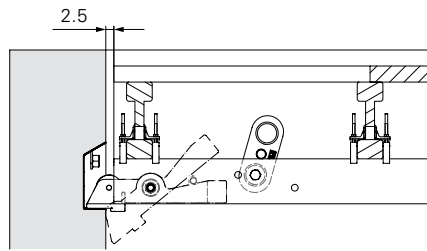


Fig. B2.11

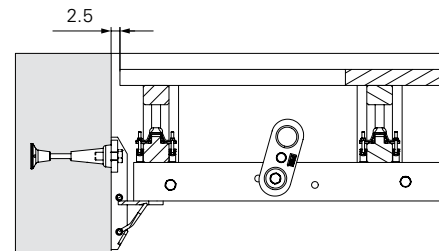


Fig. B2.12

Assembly

1. Cut planking 50 mm (**29**) at right angles to achieve the required length.
2. Align each planking 50 mm (**29**) flush with the ends of the girders (**2**). Ensure that the overhang is the same on both sides. (Fig. B2.13)
3. Secure the planking with two Torx TSS 6 x 80 screws (**56**) per girder. Ensure that the screws are offset and not fixed in a line. Alternatively: wire nails 38 x 100.
4. Fix the remaining planking in the same way.

(Fig. B2.14)



- When cutting the planking take into consideration the cut-outs for the hatches. (Fig. B2.14)
- For accurate positioning, use a plumb line.

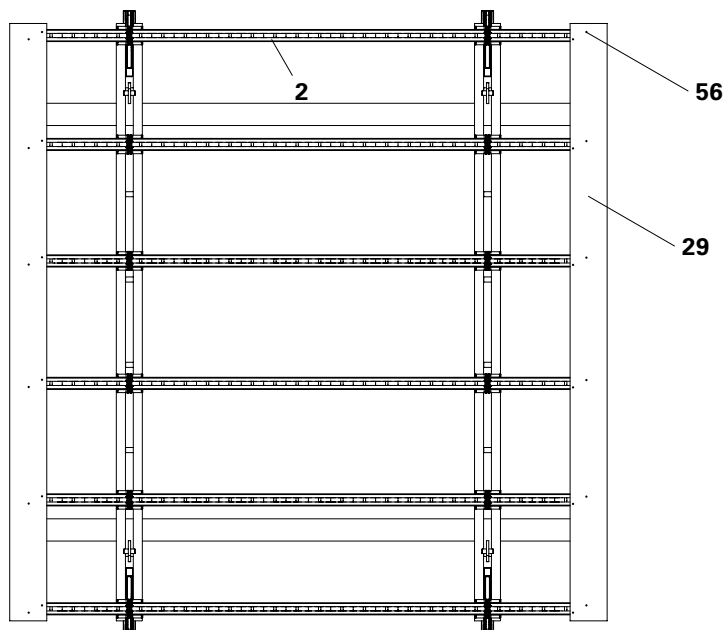


Fig. B2.13

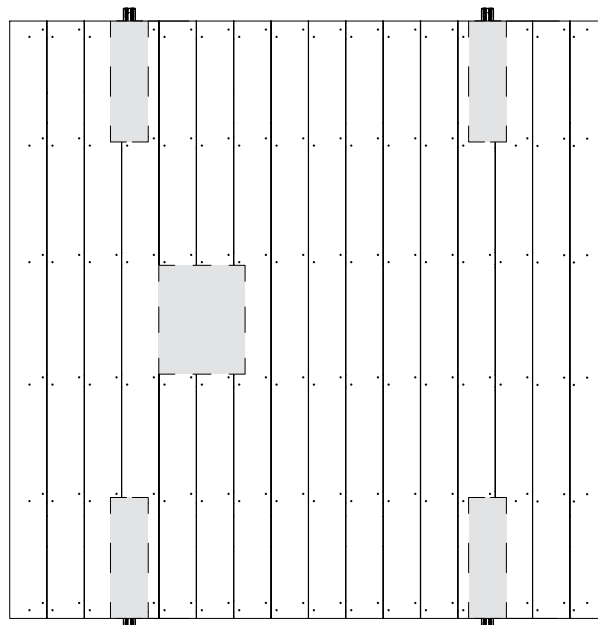


Fig. B2.14

B3 Assembling the Hatches

Five hatches are integrated in the Shaft Platform along with four control hatches (60) for moving the Shaft Platform and the descent hatch (61) to the finishing platform.

Assembly of the Control Hatches

After opening, the control hatches (60) allow the crane hooks to be attached to the Crane Eyes BR-2 2.5 t, as well as the visual check for the correct positioning of the Shaft Platform on the supports.

Components for one control hatch

60.1	Cut-To-Size Plank 25 x 80	1x
60.2	Hinge DIN 7957-200-ST	1x
101	Spax Screw TX25, 5 x 40	16x

Assembly

1. At the assembly position, cut out one opening. Opening: 25 x 80 cm. (Fig. B3.01 + B3.02)



The dimensions for the opening are given as an example and may vary depending on the project. The dimension 80 cm in this case corresponds to the distance from the edge of the platform covering to the middle of the second girder.

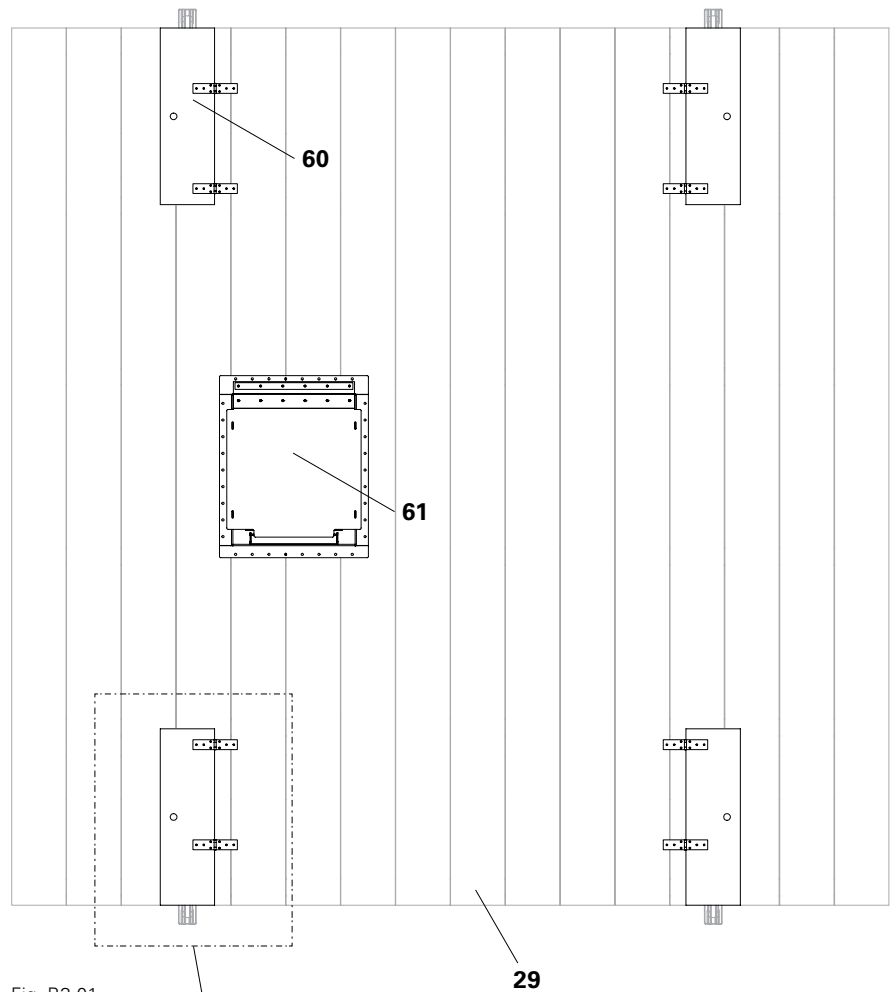


Fig. B3.01

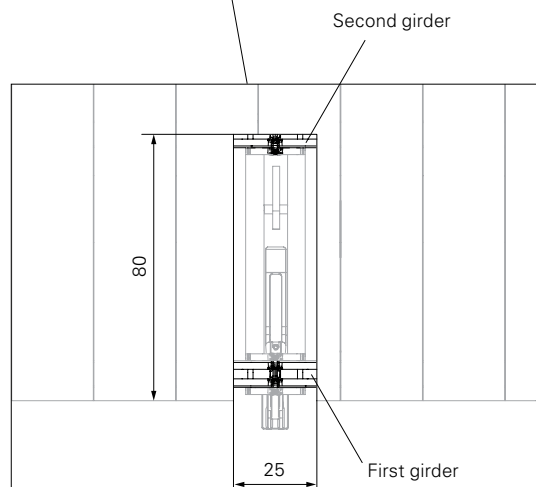


Fig. B3.02

B3 Assembling the Hatches

2. Cut out planking to required size **(60.1)** as a hatch.
Hatch dimensions: 25 x 80 cm.
The cut-to-size planking has an inclined edge along one longitudinal side. (Fig. B3.03a)
3. Using a Forstner bit \varnothing 42 mm, drill a hole **(60.2)** in the cut-to-size planking for opening the control hatch. (Fig. B3.03b)
4. Fix the inner hinge **(60.3)** at a distance of 5 cm from the outer edge with screws **(101)**. (Fig. B3.03c)
5. Fix the outer hinge **(60.4)** at a distance of 25 cm from the outer edge with screws **(101)**. (Fig. B3.03c)
6. Fix the pre-assembled control hatch to the platform decking with screws **(101)**.

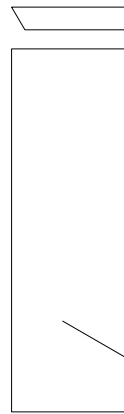


Fig. B3.03a

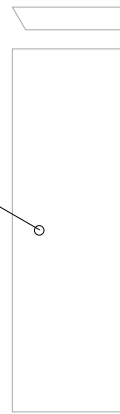


Fig. B3.03b

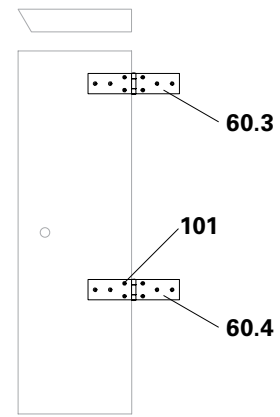


Fig. B3.03c



- Ensure that the control hatch
- does not protrude over the edge of the platform decking.
 - is centrally positioned on the second girder.

Fig. B3.04 shows a side view of the opened control hatch.

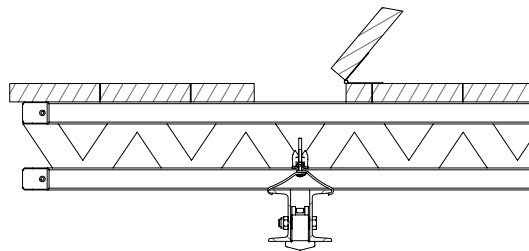


Fig. B3.04

Assembly of the Descent Hatch

Components

40 Hatch 55 x 60-2, foldable	1x
57 TSS-Torx 6 x 40	20x

Assembly

1. At the assembly position, cut out one opening. Opening: 72 x 57 cm. (Fig. B3.05)
2. Place hatch (40) in the opening.
3. Screw the hatch frame to the platform decking using screws TSS-Torx 6 x 40 (57). (Fig. B3.06)



Minimum planking width: $b_{\min} > 10$ cm.
If the minimum plank width is not realised, offset the descent hatch sideways.

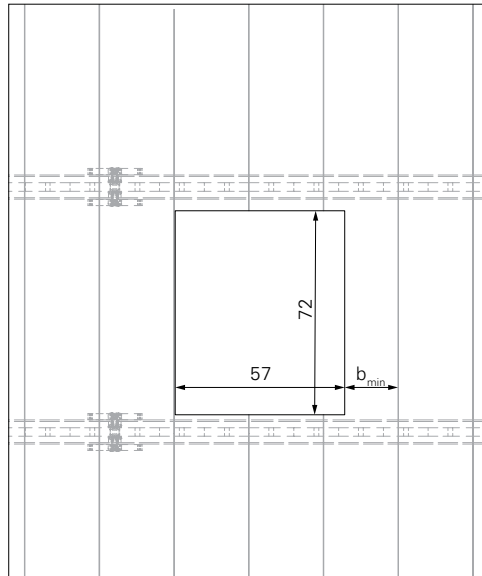


Fig. B3.05

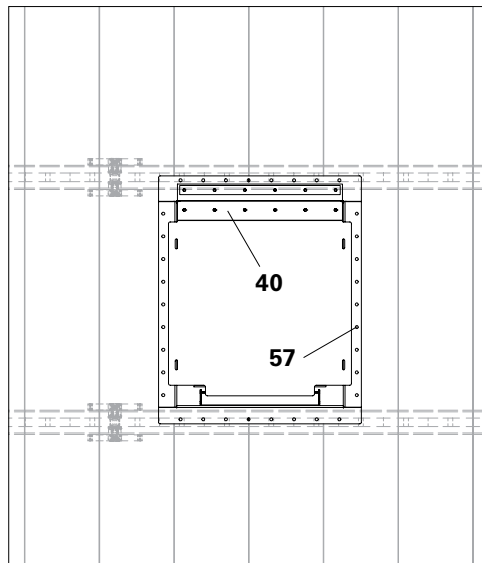


Fig. B3.06

B4 Assembling the Ladder Access



Do not use the ladder until it is securely attached at the top and bottom, and the Ladder Safety Cage has been mounted. The required ladder elements are project specific.

Components

- 41** Bolt ISO 4017 M12 x 40-8.8
- 42** Nut ISO 7042 M12-8
- 43** Ladder 180/6
- 44** Ladder 220/6
- 45** End Ladder 180/2
- 46** Ladder Base 30, adjustable
- 49** Ladder Safety Cage 75
- 50** Ladder Safety Cage 150
- 57** TSS-Torx 6 x 40

Ladder pre-assembly

- Permanently mounted ladders:
 1. Push top Ladder 220/6 (**44**) with the connector (**44.1**) as far as possible into the bottom Ladder 180/6 (**43**).
 2. Secure the bottom Ladder to the connector using the 4x bolts M12 x 40 and nuts (**44.2**) which have been provided.
 3. Fix Ladder Base (**46**) to the connector (**43.1**) on the bottom Ladder in the same way using 4x bolts M12 x 40 and nuts. (Fig. B4.01)

- Bottom Ladder as Hook-in Ladder:
 1. Secure ladder hook (**71**) to the 2 bottom holes on the ladder rail using the 4x provided bolts M12 x 25 and nuts (**71.1**).
 2. Securely mount the Ladder Base (**46**). See above.
 3. Attach Hook-in Ladder to the top Ladder.

(Fig. B4.02 + B4.03)

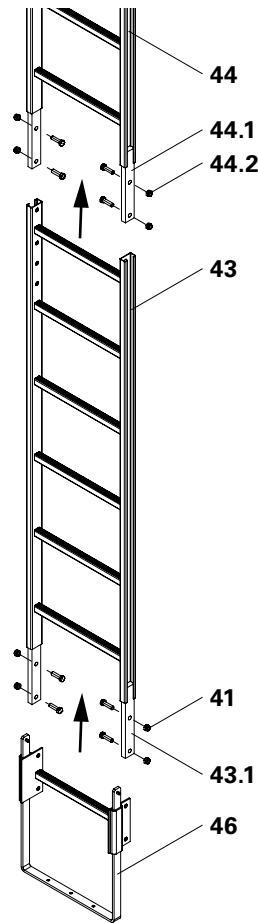


Fig. B4.01

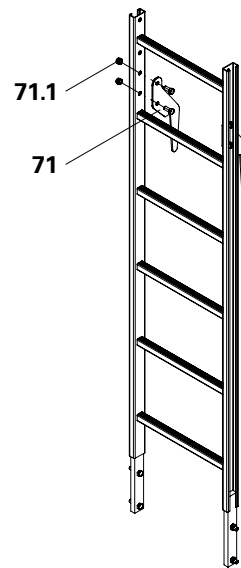


Fig. B4.02



The rungs of the Hook-in Ladder and top Ladder must be positioned at the same height. If not, secure the ladder hooks using the correct drilled holes.

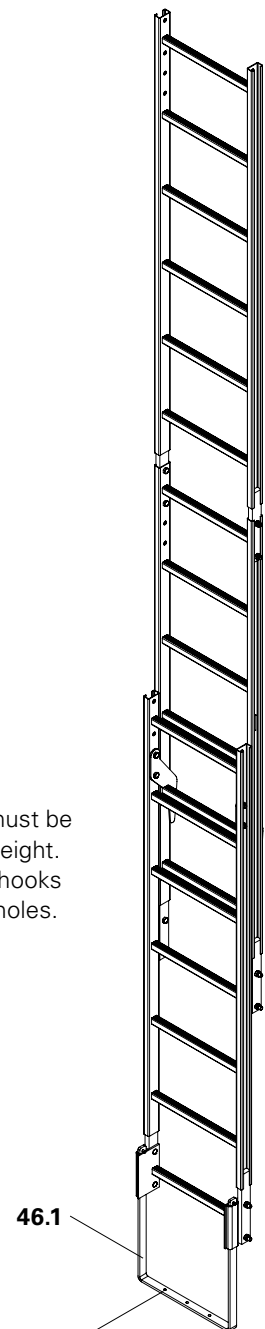


Fig. B4.03

Attaching the Ladder to the hatch

1. Open the hatch cover (40.1) and lift Ladder using the crane. Lower Ladder through the hatch opening (40).
 2. Fix Ladder to the hatch from above using 2x bolts M12 x 40 and nuts (41 + 42).
- (Fig. B4.04)

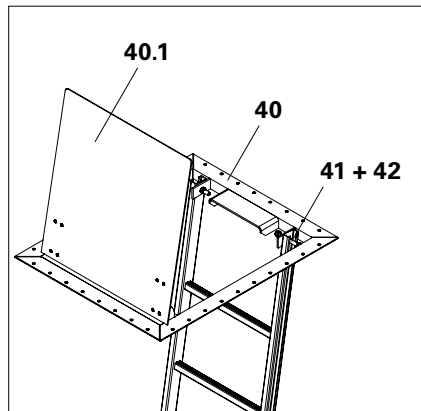


Fig. B4.04

Alternatively:

Attaching the End Ladder 180/2

1. Open the hatch cover (40.1).
2. Lift pre-assembled Ladders (43) with the crane into the hatch and lower so that the top rung of the Ladder lies in the U-profile of the hatch.

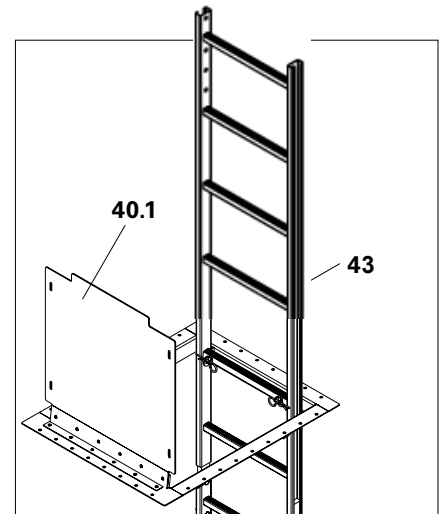


Fig. B4.05

(Fig. B4.05)

Fixing the Ladder Base

1. Pull out the bracket (46.1) of the Ladder Base (46) as far as the platform decking. Secure bracket to the platform decking using 3x TSS Torx 6 x 40 (57).

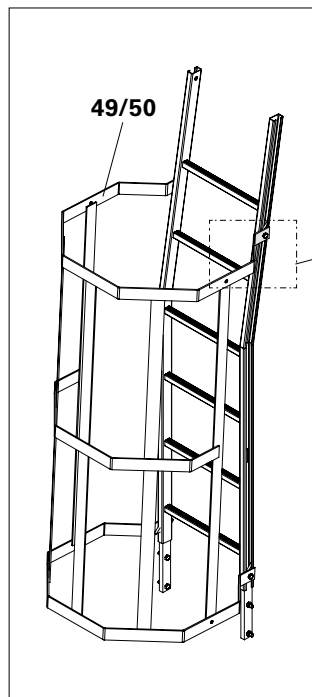
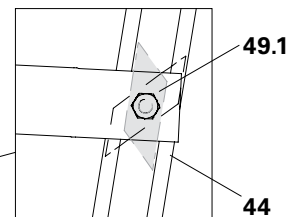
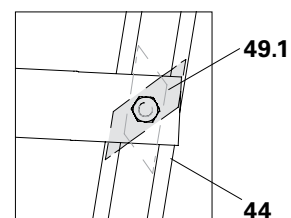


Fig. B4.06



Insertion position



Clamping position

Mounting the Ladder Safety Cage



- The distance from the platform decking to the Ladder Safety Cage ranges from 2.2 m to 3.0 m.
- The opening between two Ladder Safety Cages must not exceed 50 cm.
- Fly in the Ladder Safety Cage together with the finishing platform as it does not fit through the hatch and must be mounted from below.

1. Bring and hold the Ladder Safety Cage (49) in position using a rope.
 2. Slightly loosen the 4x bolts M12 x 25 on the clamping plate (49.1), position clamping plate on the ladder rail (44), turn and tighten bolts.
- (Fig. B4.06)



- The Ladder can, according to the criteria of DIN EN 131-2, be used with platform spacings of up to 7.0 m.
- Maximum inclination $\alpha < 15^\circ$.

For assembling the finishing platform, the same auxiliary construction is used as for the assembly of the Shaft Platform. The distance c of the Steel Waler SRU corresponds to the distance between the Platform Beam BR and the Shaft Platform.

Mounting the Girders

Components

- 2** Girder
- 3** Hook Strap
- 24** Steel Waler SRU
- 32** Limit Stop Plank

Assembly

1. Align the Steel Waler SRU (**24**) along the limit stop plank (**32**). The slotted holes in the Steel Waler SRU are at the top. (Fig. B5.01)
2. Place the two outer girders (**2a**) on the Steel Waler SRU (**24**). The distance of the girder to the edge is 3 cm. (Fig. B5.02) The overhang d is the same on both sides. (Fig. B5.03)
3. Fix the girder (**2a**) to the Steel Waler SRU (**24**) by means of hook straps (**3**).
4. Position and align all other girders (**2b**) according to project-specific specifications on the Steel Waler SRU (**24**) and secure them using hook straps (**3**).

(Fig. B5.03)



- In the area of the ladder descent, mount two girders (**2c**) at a distance of max. 1 m.
- Planking span ≤ 1.75 m. Compare DIN EN 12811-1. (Fig. B5.03)

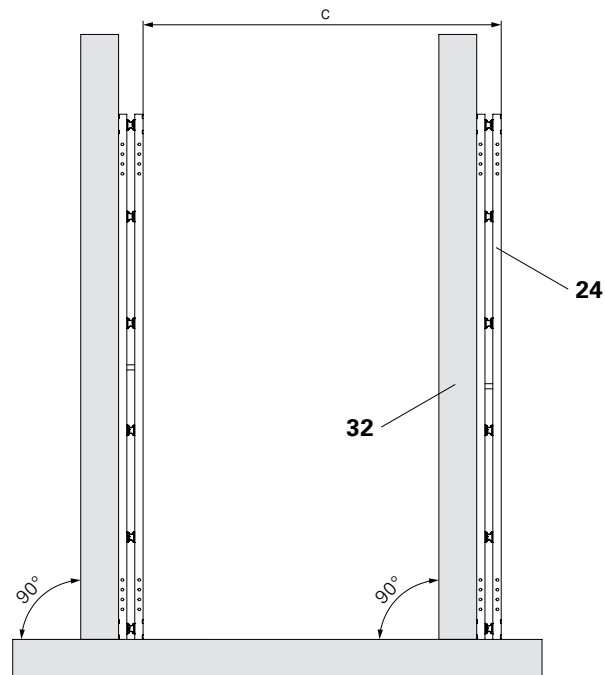


Fig. B5.01

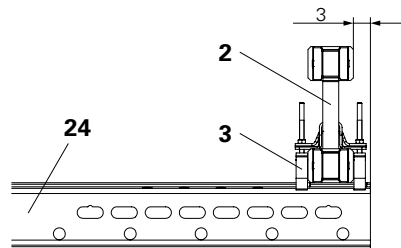


Fig. B5.02

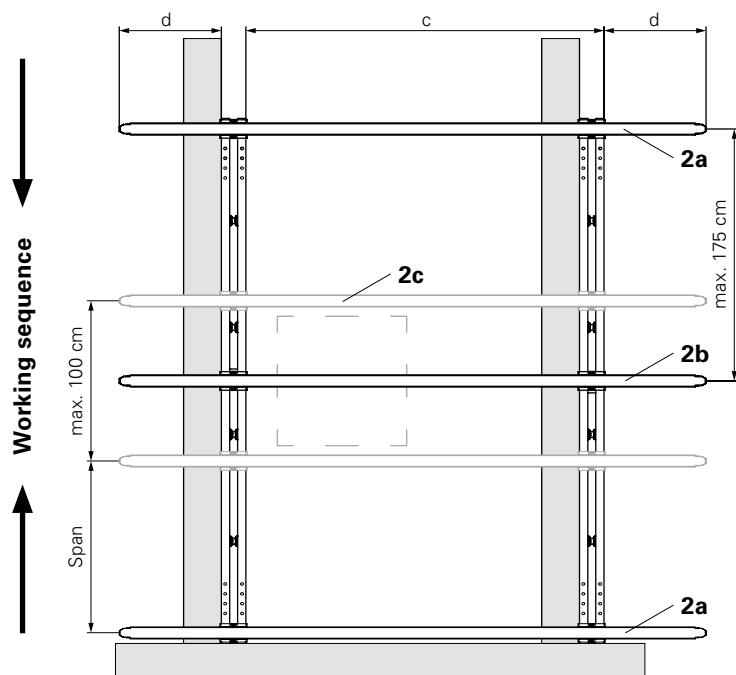


Fig. B5.03

Mounting the Suspension

Mount the finishing platform on the Platform Beam BR (1) of the Shaft Platform using four Tie Rods DW 15 (9). The suspended scaffolding tube (25.4) prevents unintentional loosening of the Tie Rods from the eye nuts. (Fig. B5.04)

For attaching the finishing platform to the Shaft Platform, see "Suspending the trailing platform" on Page 63.

Components

- 9** Tie Rod DW 15
- 25.1** Fitting Pin \varnothing 21 x 120
- 25.2** Eye Nut RCS DW 15
- 25.3** Hex. Nut DW 15 SW 30/50
- 25.4** Steel Scaffold Tube \varnothing 48.3 x 3.2
- 25.5** Cotter Pin 4/1
- 25.6** Wingnut Pivot Plate DW 15

Assembly on the Platform Beam BR

1. Screw Hex. Nut DW 15 (counternut) (25.3) onto the Tie Rod DW 15 (9).
2. Screw the Eye Nut RCS DW 15 (25.2) as far as possible on the Tie Rod DW 15 (9).
3. Tighten the counternut (25.3), thus securing the eye nut (25.2) against being loosened.
4. Fix the assembly unit on the Platform Beam BR (1) using fitting pins (25.1) and secure with cotter pins (25.5).

(Fig. B5.04a)

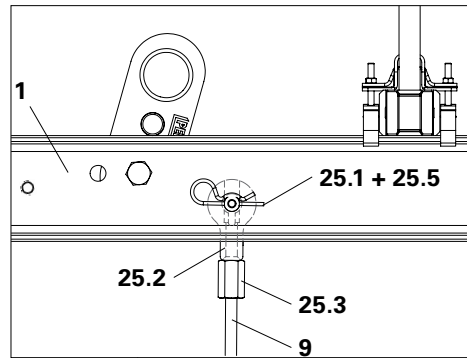


Fig. B5.04a

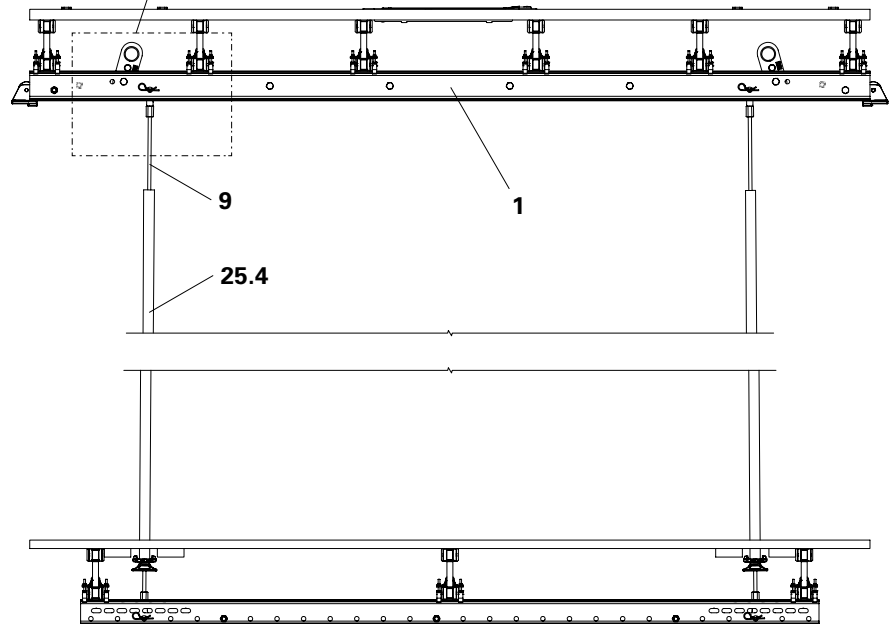


Fig. B5.04

Assembly on the Steel Waler SRU

1. Push the scaffold tube (25.4) onto the Tie Rod DW 15 (9).
2. Secure the scaffold tube (25.4) using the Wingnut Pivot Plate DW 15 (25.6). For this, screw the Wingnut Pivot Plate DW approx. 20 cm on the Tie Rod (9).
3. Screw Hex. Nut DW 15 (counternut) (25.3) onto the Tie Rod DW 15 (9).
4. Screw the Eye Nut RCS DW 15 (25.2) as far as possible on the Tie Rod DW 15 (9).
5. Screw back the eye nut (25.2) until the bottom eye nut is aligned with the top eye nut.
6. Tighten the counternut (25.3), thus securing the eye nut (25.2) against being loosened.

(Fig. B5.05a)

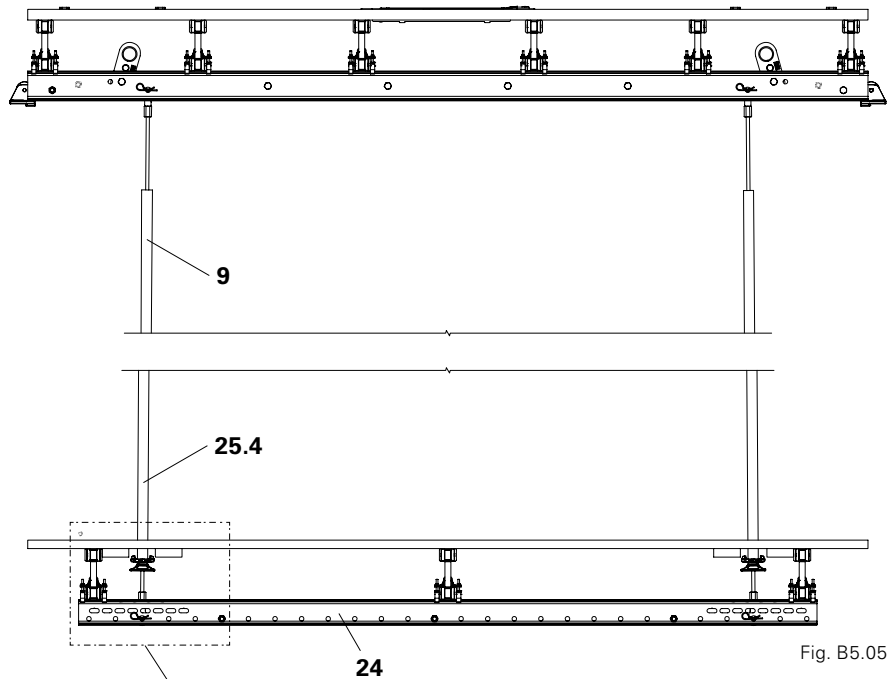


Fig. B5.05

Coupling the finishing platform to the Shaft Platform

1. Position the Shaft Platform over the finishing platform using the crane.
2. Fix all suspensions to the Steel Waler SRU (24) using fitting pins (25.1) and secure with cotter pins (25.5).

(Fig. B5.05b)



- If the live load or influencing area are changed, the suspension can be realised with Diagonal Struts DS. For more information, see PI 208.
- Any work that results in the formation of sparks is prohibited on the finishing platform, e.g. welding, flexing.

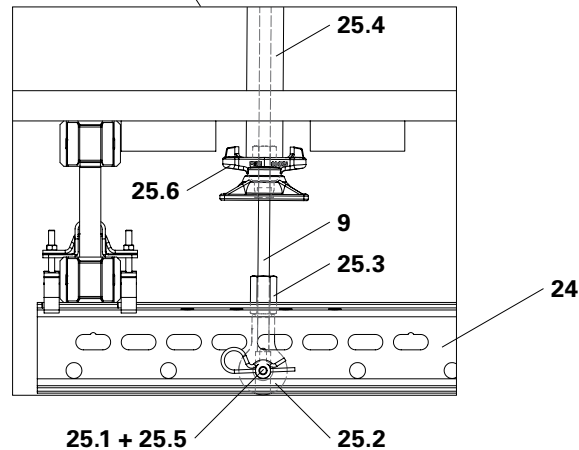


Fig. B5.05a

Mounting the Platform Decking

The distance of the decking to the wall is 2.5 cm on all sides.
The length of the planking is: shaft length L - 50 mm

Components

28	Planking 40 mm
56	TSS-Torx 6 x 80

Assembly with the Gravity Pivot Plate BR

1. Cut planking 40 mm (**28**) at right angles to achieve the required length.
 2. Align each planking 40 mm (**28**) flush with the ends of the girders (**2**). Ensure that the overhang is the same on both sides. (Fig. B5.06)
 3. Secure the planking with two Torx TSS 6 x 80 screws (**56**) per girder. Ensure that the screws are offset and not fixed in a line. Alternatively: wire nails 38 x 100.
 4. Fix the remaining planking in the same way.
 5. For suspending the finishing platform, cut out an opening of approx. 12.5 x 12.5 cm.
 6. Reinforce the openings on the underside with wooden planks 15/3 cm (**30**).
- (Fig. B5.07 + B5.08)



For accurate positioning, use a plumb line.

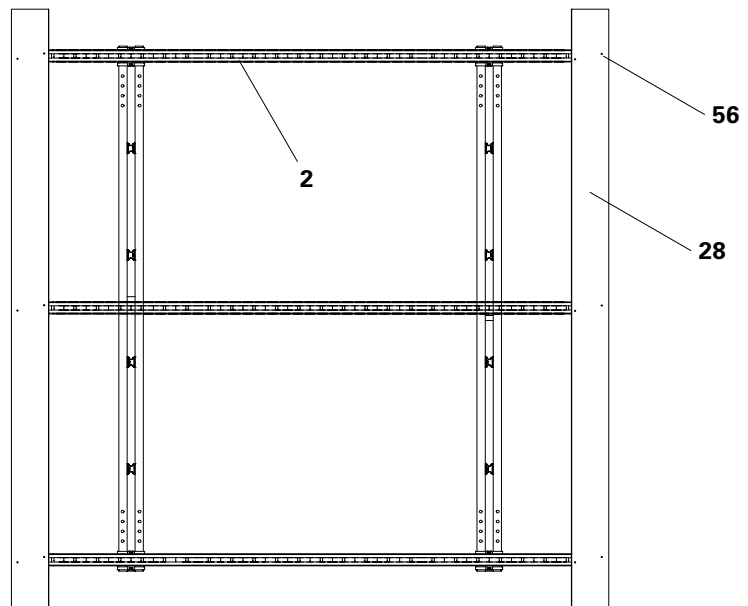


Fig. B5.06

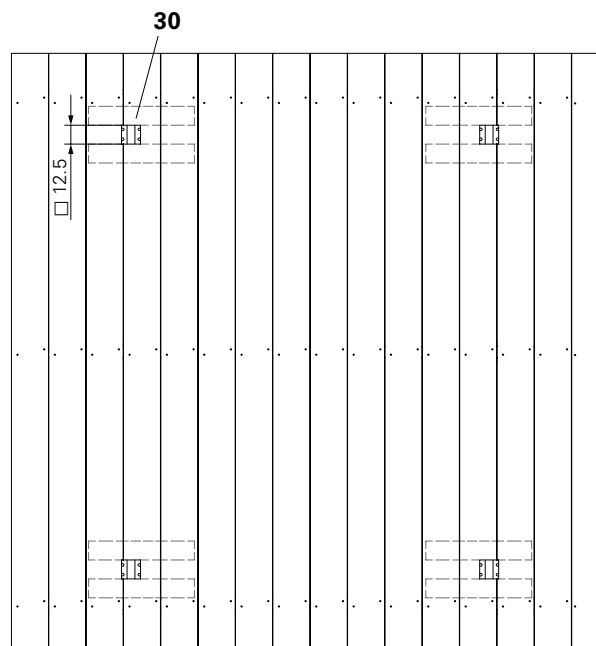


Fig. B5.07

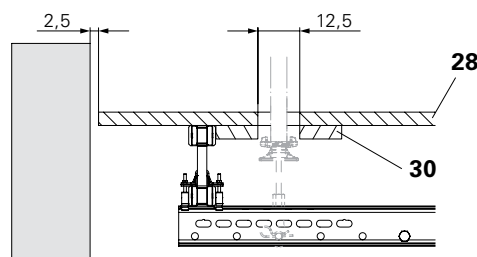


Fig. B5.08

Assembly with the Folding Bracket 25

Assembly is carried out as for the Gravity Pivot Plate BR.

In addition, openings of 17.5 x 35 cm in the planking (28) are required in the area of the Folding Brackets (21). (Fig. B5.09 + B5.10)

Fig. B5.10 shows the finishing platform when flown in; the finishing platform is not yet in the working position.



After flying in the Shaft Platform, close the openings for the Folding Brackets with planking!

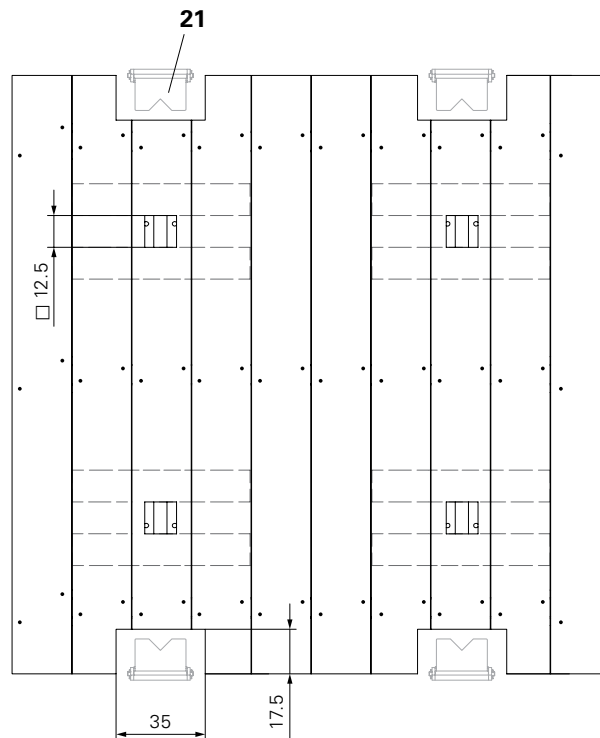


Fig. B5.09

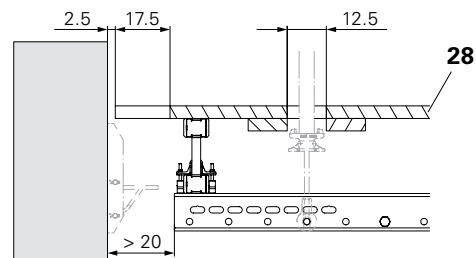


Fig. B5.10

Shaft Platform Markings

Attach a legible load capacity plate to the Shaft Platform and finishing platform. This ensures the clear identification of the platform position and the permissible load.
(Fig. B6.01)


Position of Shaft Platform:	Platform dimensions:
Position of finishing platform:	Platform dimensions:
Project: 	
Permissible load:	
Maximum surface area load:	kg/m ²
Maximum concentrated load:	kg
For wind speeds over 64 km/h, connect the internal formwork to the structure in a suitable way. The Shaft Platform may only be operated by trained and qualified personnel.	

Fig. B6.01

Safety Instructions

When working with the Shaft Platform BR, the following safety instructions must be observed.



Danger

There is a risk that the Shaft Platform BR could fall to the ground when being moved!

- ⇒ Do not transport persons or materials on the Shaft Platform BR.
- ⇒ Access the Shaft Platform BR only after it has been secured.



Support

As support for the Shaft Platform BR, only the Bearing Box BR or Folding Bracket 25 is allowed!

When supporting with the Bearing Box BR (23), the Bearing Box BR remains in the concrete wall. This results in better load distribution in the concrete and avoids tearing of the concrete edge.

The Gravity Pivot Plate BR (22) is positioned in the Bearing Box BR. Remove the Bearing Box BR (23) only after the Shaft Platform has been moved to the next concreting section. For this, a finishing platform is required. (Fig. C1.01)

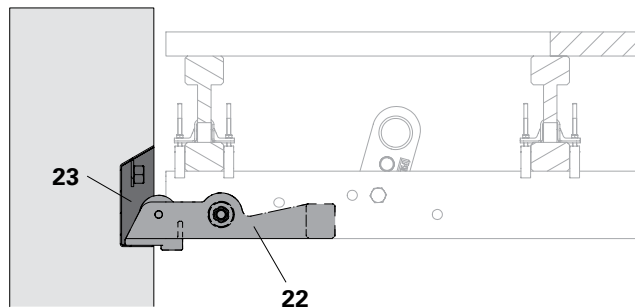


Fig. C1.01



Striking

If the internal formwork consists of individual elements, pay attention to the sequence when removing the internal formwork! As last, remove the formwork on the walls of the support. In this way, tipping of the Shaft Platform is prevented. (Fig. C1.02)

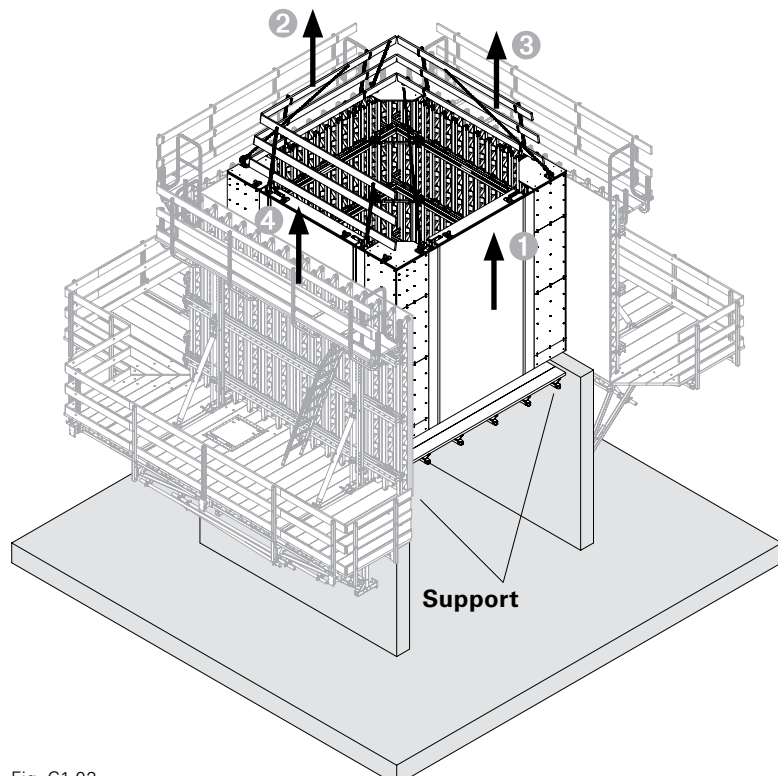


Fig. C1.02



Attaching

- Always connect the Shaft Platform BR to all four Crane Eyes BR-2 2.5 t using 4-sling lifting gear!
 - Attach the internal formwork to the attachment points using 4-sling lifting gear.
 - Angle of inclination $\beta \leq 30^\circ$
⇒ Use sufficiently long lifting gear.
- (Fig. C1.03)



Moving

- Before moving, remove materials and loose components from the Shaft Platform and formwork!
- Move the formwork and Shaft Platform separately. For jointly moving the formwork and Shaft Platform, detailed project-specific planning is required and, if necessary, special measures.
- Use a guide rope.
- Persons are to keep away from the area of risk!



Climbing procedure

Anchoring of the climbing units in the next concreting section is only to be carried out after the required concrete strength has been reached.

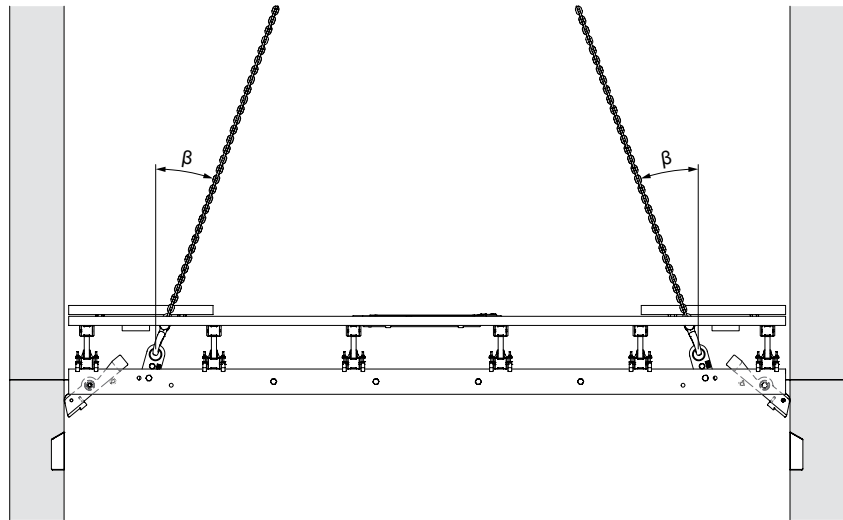


Fig. C1.03

Installing the Distance Device

With the help of the Distance Device, deviations in the shaft length are reduced. When using the Gravity Pivot Plate, the Distance Device is an important aid especially for the VARIO formwork system, see Section "Using the Distance Device". Building tolerances are limited to ± 10 mm.



The Distance Device does not replace the support of the formwork.

Shaft length	L	
Girder length of the Distance Device	L_T	$L_T = L - c$ or $L_T = L_1 + c$
Distance of the Head Piece	L_1	$L_1 = L - 2c$
Height of Steel Waler	a	
Height of GT 24	h	
Formlining thickness	d	
Recess	b	$b = a + 5$ mm
Projection	c	$c = h + d$

See Fig. C1.04 and C1.06

Components

- 34.1** Lattice Girder GT 24
- 34.2** Head Piece
- 56** TSS-Torx 6 x 80

Assembling the Distance Device

1. Cut out two Head Pieces from one piece of formlining (**34.2**) with the dimensions according to Fig. C1.04.
2. Cut Lattice Girder GT 24 (**34.1**) to girder length L_T .
3. Fix one Head Piece flush onto one end of the Lattice Girder GT 24 (**34.1**) by means of screws (**56**). (Fig. C1.05a)
4. Place the second Head Piece at the other end of the Lattice Girder GT 24.
5. Measure dimension L_1 and screw on the Head Piece. (Fig. C1.05b)

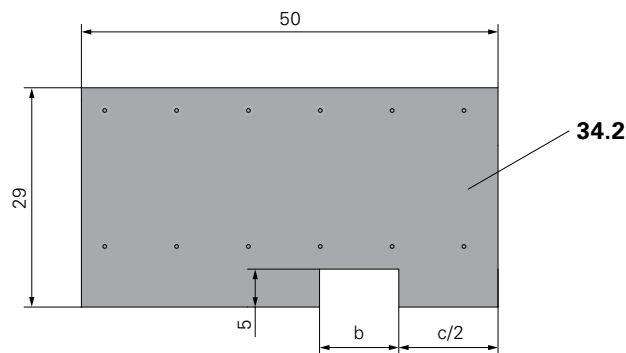


Fig. C1.04

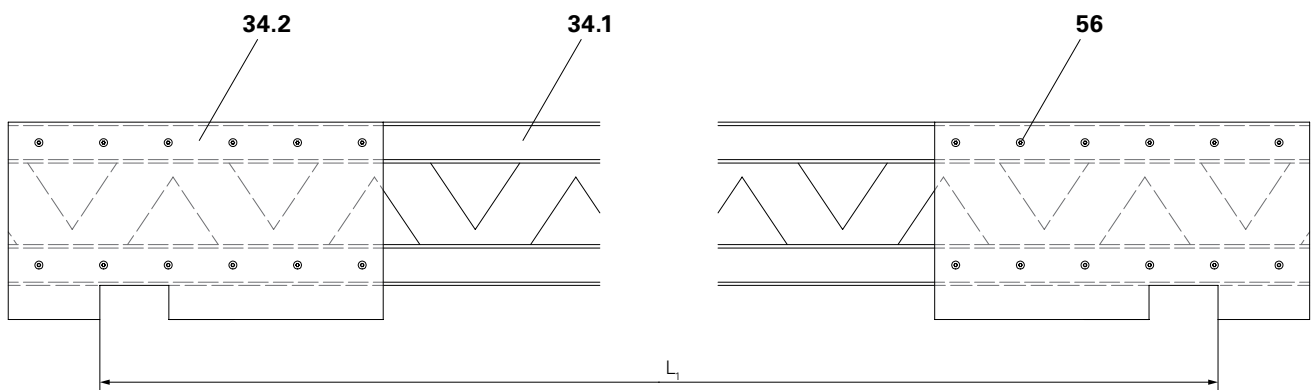


Fig. C1.05a

Fig. C1.05b

Using the Distance Device

Installing the Distance Device

1. Position the internal formwork and roughly align.
2. Attach the Distance Device (34) on both sides in the top SRU Walers of the internal formwork.
3. Connect the anchorage and internal formwork to the external formwork. (Fig. C1.07)



- The Distance Device must be positioned in the same direction as the Platform Beam.
- Place Distance Devices in a vertical position above the Platform Beams.

Dismantling the Distance Device

1. Lift the Distance Device (34) out of the SRU Waler and remove. (Fig. C1.08)

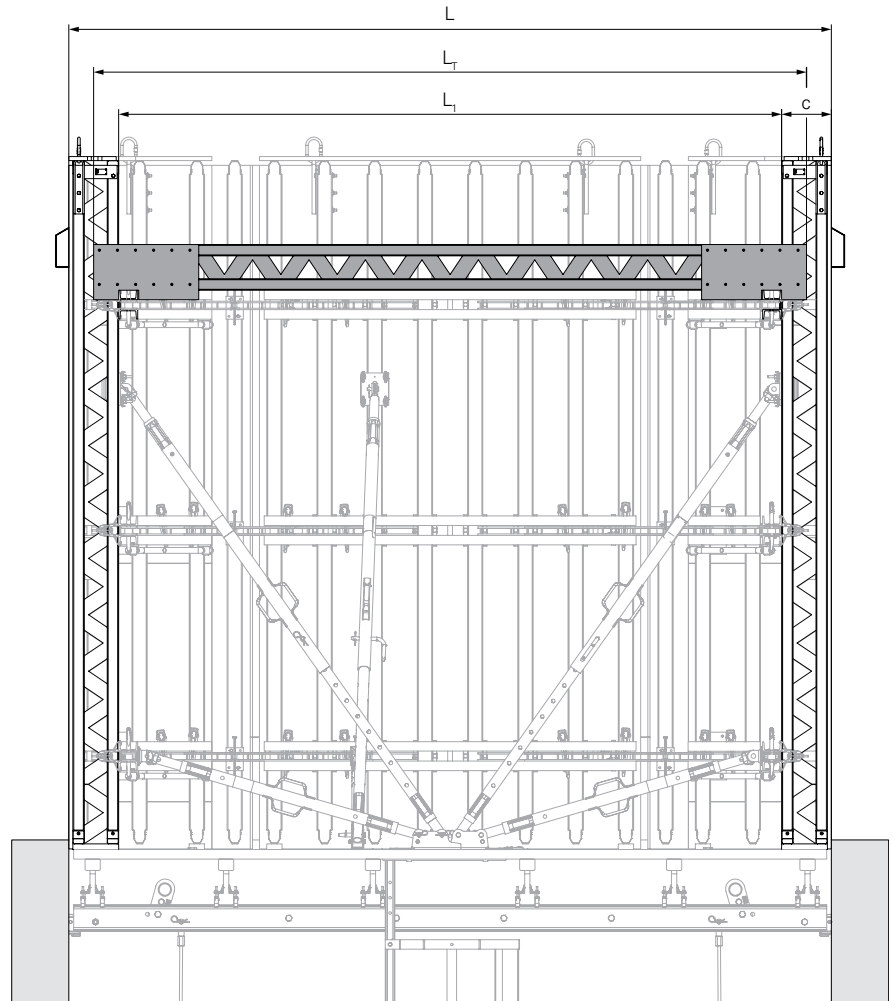


Fig. C1.06

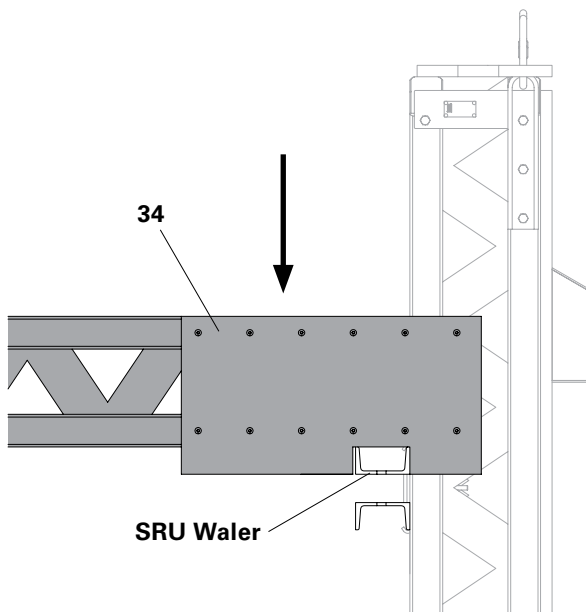


Fig. C1.07

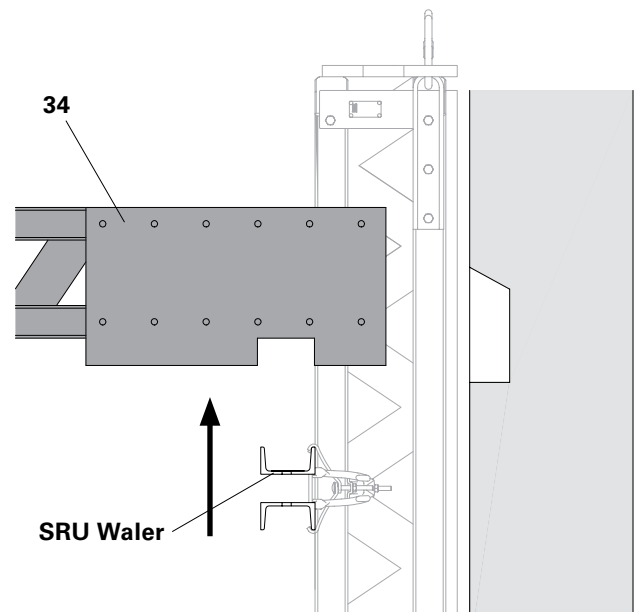


Fig. C1.08

Prerequisites

- The working and finishing platforms have been assembled.
- Ladder access has been prepared for the final assembly.

Concreting the Starter

1. Position the external formwork for the first concreting section and mount the external platform.
 2. If necessary: install wind bracing.
 3. Fix the Leading Anchor or Bearing Box BR to the internal and external formwork.
 4. Carry out reinforcement work.
 5. Place the formwork anchor and close the internal formwork.
 6. Check that the shaft dimensions are correct with the Distance Device.
 7. Concrete the Starter.
- (Fig. C2.01)

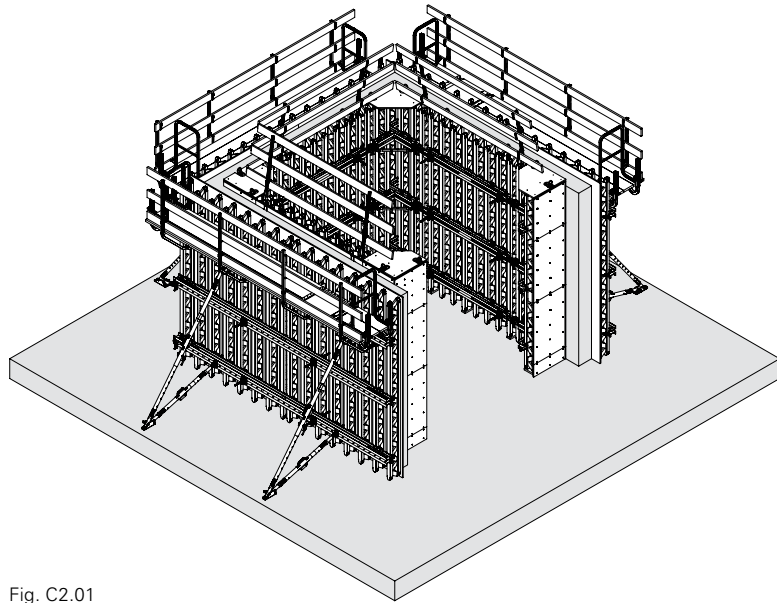


Fig. C2.01

Preparation for Initial Use

1. Release the Leading Anchor or Bearing Box BR.
2. Remove the internal formwork.
3. Mount the support.
(not shown)

Suspending the Working Platform

1. Move the external formwork with the external platform.
 2. Open the control hatches (60) and attach the Shaft Platform to the Crane Eye BR-2 2.5 t (4) using 4-sling lifting gear.
 3. Bind the Gravity Pivot Plate (22) upwards with binding wire (102) and fix it to the outer girder (2).
 4. Fly in the Shaft Platform and position above the first concreting section.
! Guide the Shaft Platform with ropes. Do not reach between the Shaft Platform and Starter.
 5. Slowly lower the Shaft Platform until the Gravity Pivot Plate enters the Starter.
 6. Remove the binding wire, thereby ensuring that the Gravity Pivot Plate can be moved smoothly.
 7. Lower the Shaft Platform until the Gravity Pivot Plate is positioned on the Bearing Box.
- (Fig. C3.01 + C3.03)

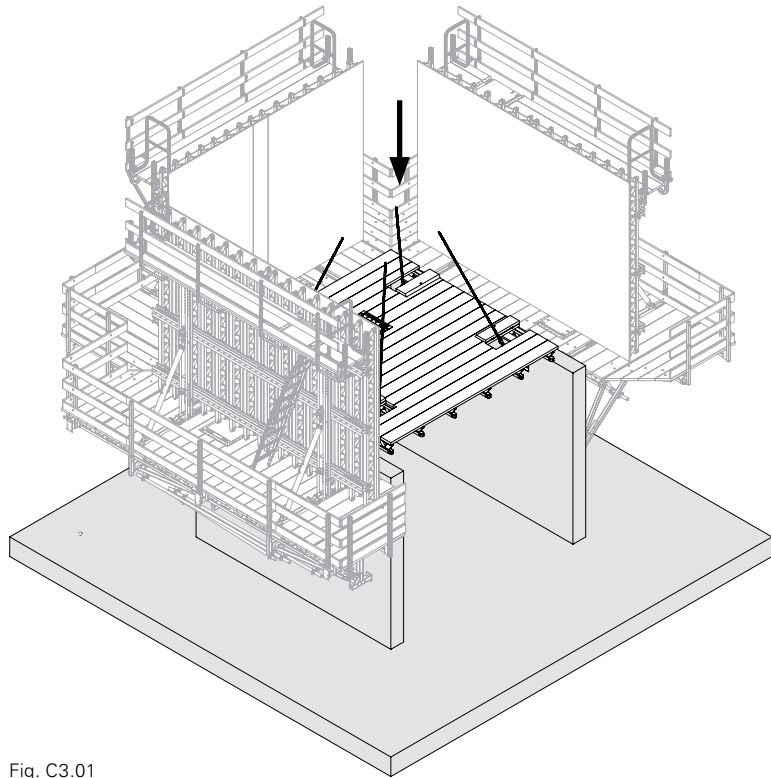


Fig. C3.01

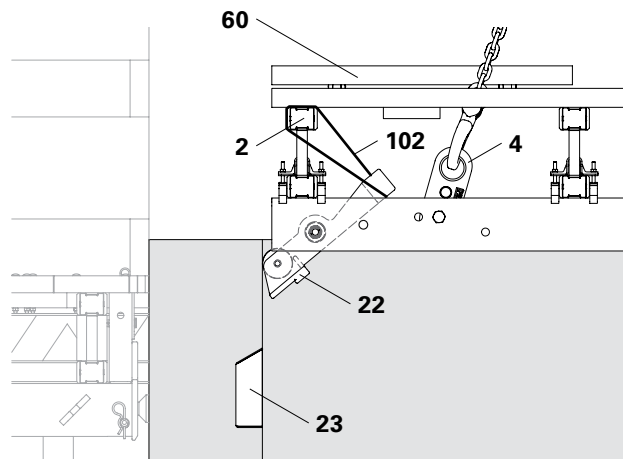


Fig. C3.02

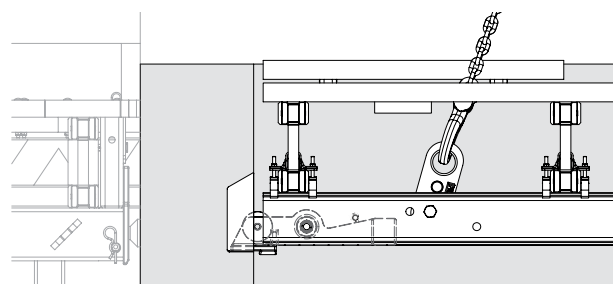


Fig. C3.03

Checking the Support



Site personnel must wear PPE when checking the support. Attach the PPE to a SRU Steel Waler of the external formwork.

- Checking the support takes place by means of a visual inspection.
- The Shaft Platform remains attached to the crane lifting gear until the inspection has been completed.



- The minimum support depth is 27 mm.
- Permissible area for safe support: a gap must not be visible between the shaft wall and roller of the Gravity Pivot Plate!

Visual check

1. Look through the control hatch from above.
2. Check whether a gap is visible between the shaft wall and the roller of the Gravity Pivot Plate. (Fig. C3.04 - C3.06)
3. If a gap is visible, move the Shaft Platform.
4. Repeat steps 2 and 3 on all supports until all supports are in the permissible area.
5. Clamp wooden wedges between the platform decking and shaft wall, thus securing the Shaft Platform against slipping. Ensure that the Shaft Platform does not change its position.
6. Remove crane lifting gear.

Optimum support

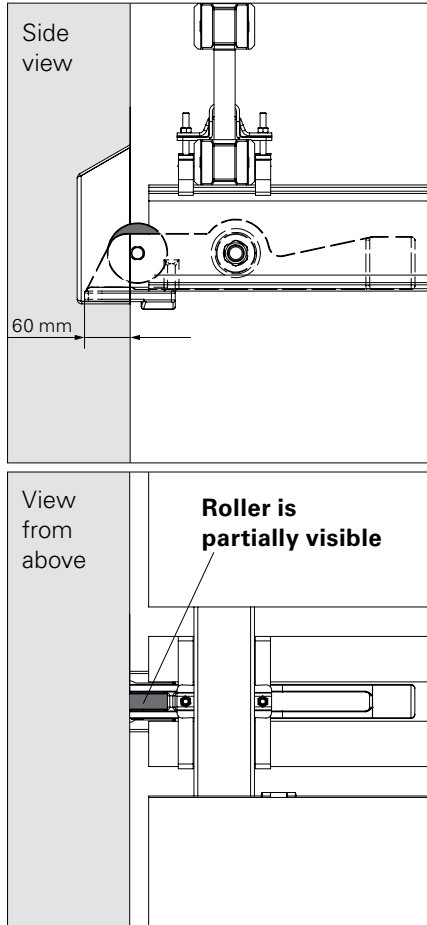


Fig. C3.04

Permissible support

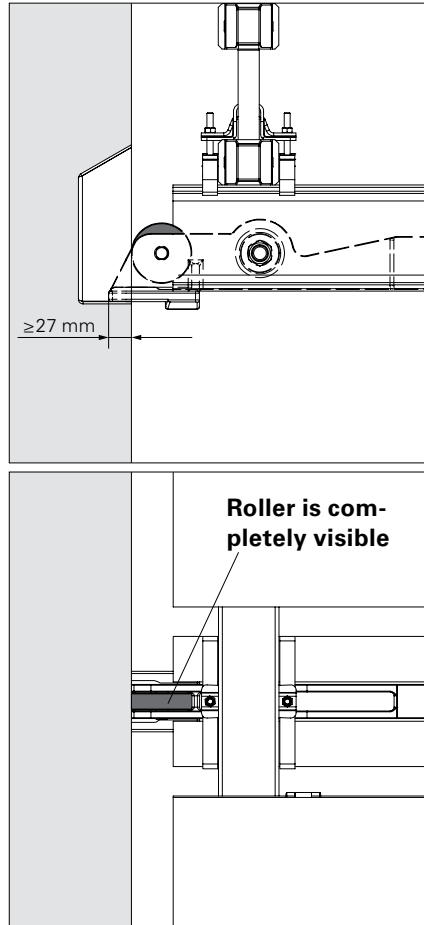


Fig. C3.05

Support not permissible

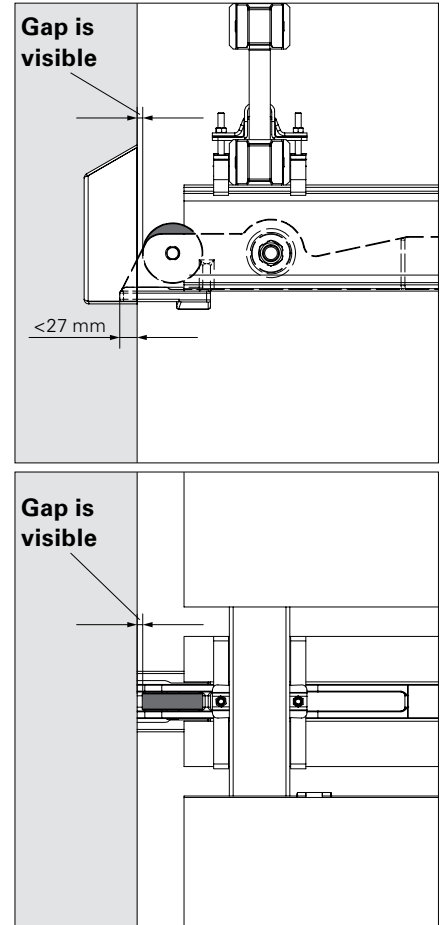


Fig. C3.06

Final Steps

1. Close the external formwork and align.
2. Carry out reinforcement work.
3. Fix the Leading Anchor or Bearing Box BR to the internal and external formwork.
4. Fly in the internal formwork. (Fig. C3.07)
5. Place the formwork anchor, close the internal formwork and align.
6. Check that the shaft dimensions are correct with the Distance Device. See "Using the Distance Device" on page 57.
7. Concrete the second section.

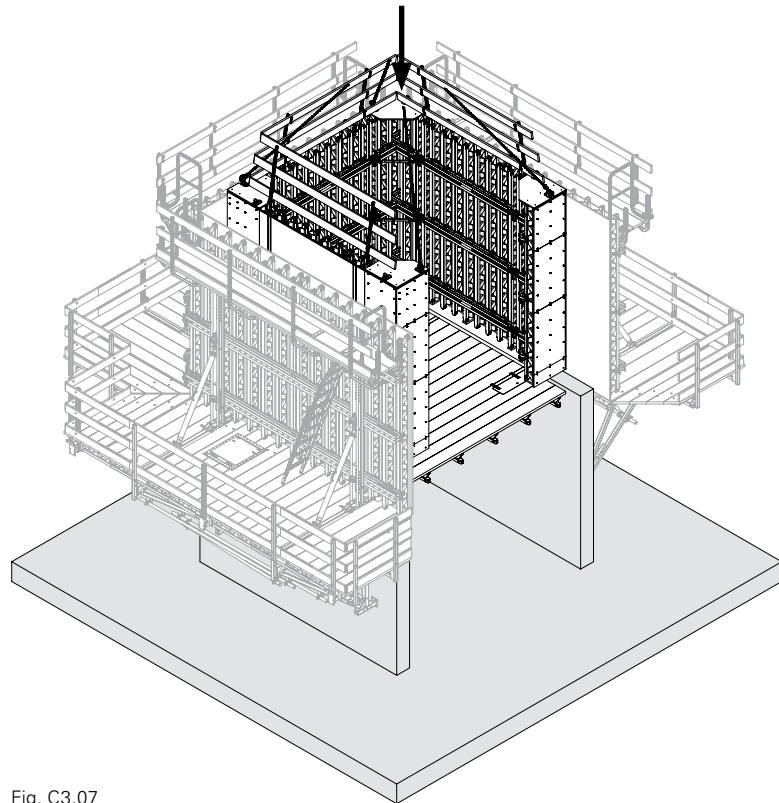


Fig. C3.07

Flying out the Shaft Platform

1. Release the Leading Anchor or Bearing Box BR.
2. Remove the internal formwork. (Fig. C4.01)
3. Retract the external formwork.
4. Move the external formwork with the external platform to the next concreting section.
5. Open the control hatches and attach the Shaft Platform to the Crane Eye BR-2 2.5 t using 4-sling lifting gear.
6. Fly out the Shaft Platform BR and place on a suitable support device. (Fig. C4.02 + C4.03)



Do not remove the crane lifting gear on the Shaft Platform when installing the finishing platform.

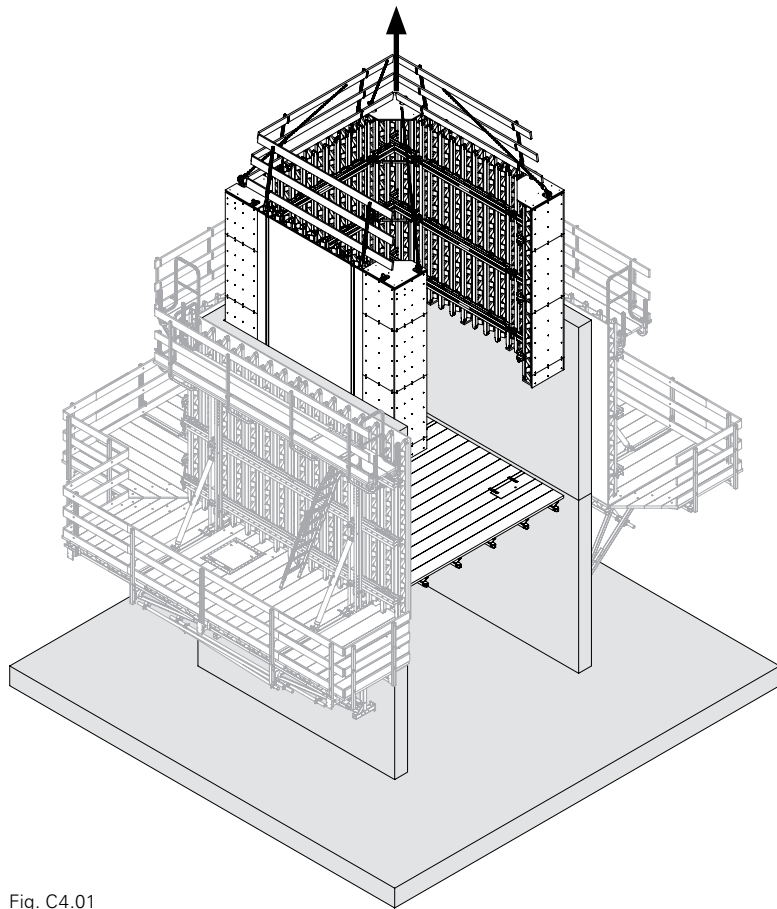


Fig. C4.01

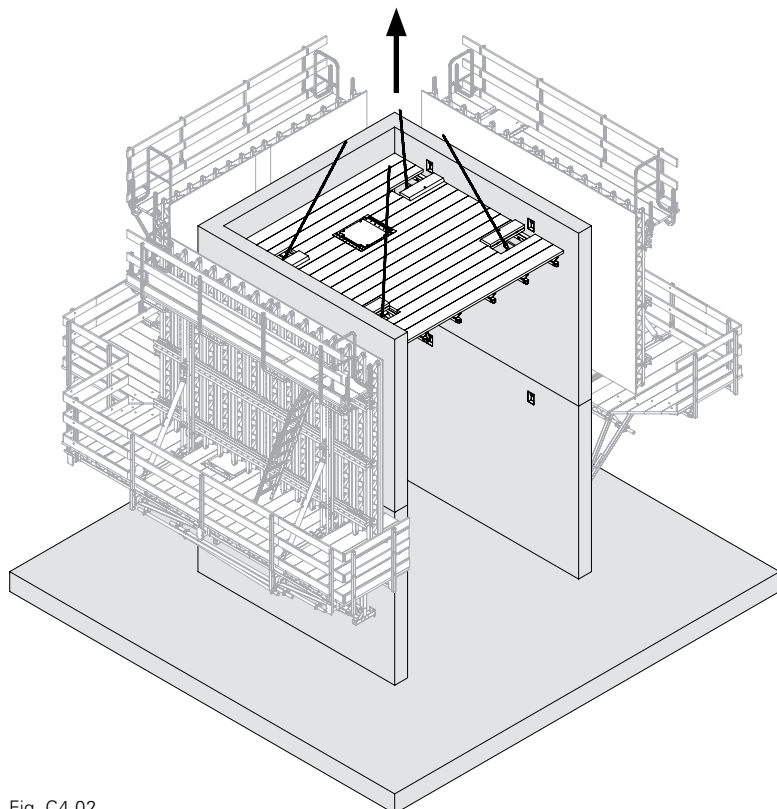


Fig. C4.02

Mounting the Vertical Struts

1. Bolt the vertical struts (25) to the Platform Beams of the Shaft Platform. See "Mounting the suspension" on page 49. (Fig. C4.03)

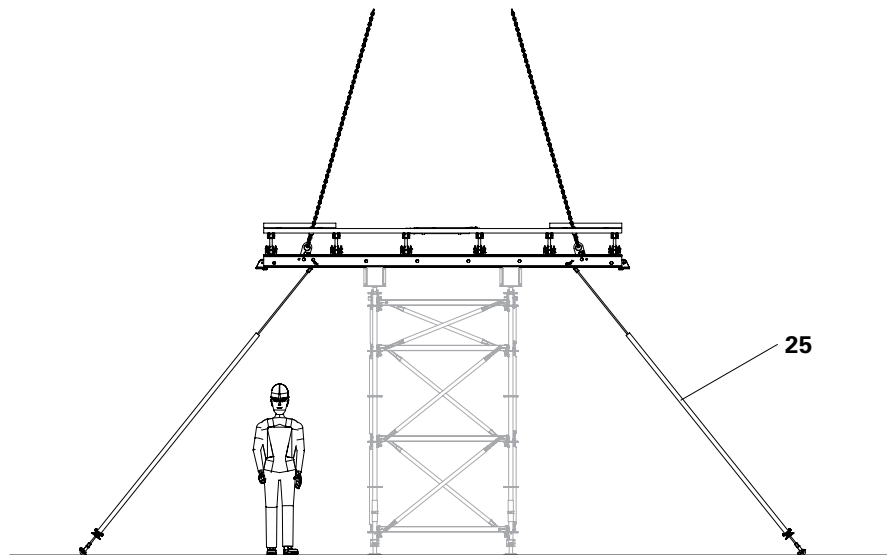


Fig. C4.03

Suspending the Finishing Platform

1. Ensure pre-assembled finishing platform is available.
2. Position the Shaft Platform over the finishing platform and then slowly lower.
3. Insert vertical struts through the openings in the planking of the finishing platform.
4. Bolt the vertical struts to the Steel Walers SRU of the finishing platform. See "Mounting the suspension" on page 49.
5. Bind the Gravity Pivot Plate upwards with binding wire and fix it to the outer girder. (Fig. C4.04)

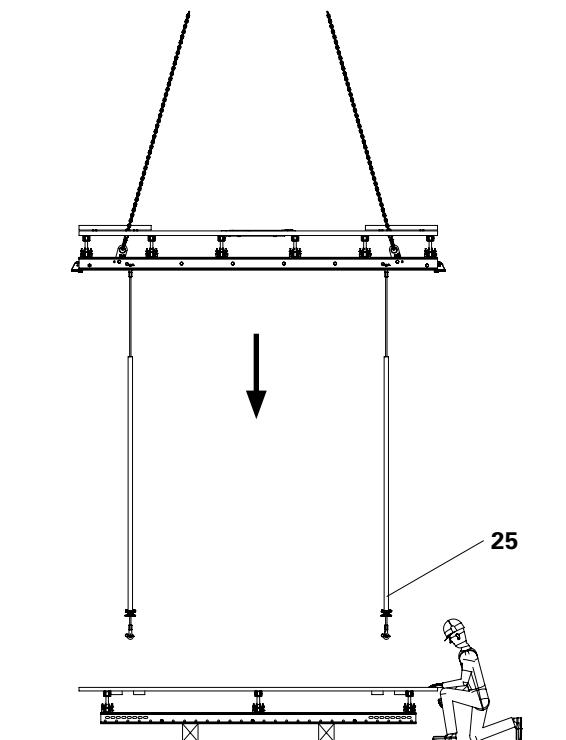


Fig. C4.04

Attaching the Shaft Platform

1. Bind the Gravity Pivot Plate upwards with binding wire and fix it to the outer girder.
2. Fly in the Shaft Platform and position above the second concreting section.
 - ⚠ Guide the Shaft Platform with ropes. Do not reach between the Shaft Platform and concrete wall.
3. Slowly lower the Shaft Platform until the Gravity Pivot Plate enters the second concreting section.
4. Remove the binding wire, thereby ensuring that the Gravity Pivot Plate can be moved smoothly.
5. Lower the Shaft Platform until the Gravity Pivot Plate is positioned in the Bearing Box.
6. Check it is the correct support for the Shaft Platform and secure against slipping. See "Checking the support" on page 60. (Fig. C4.05)
7. Mount access ladder to the finishing platform. (Fig. C4.06)

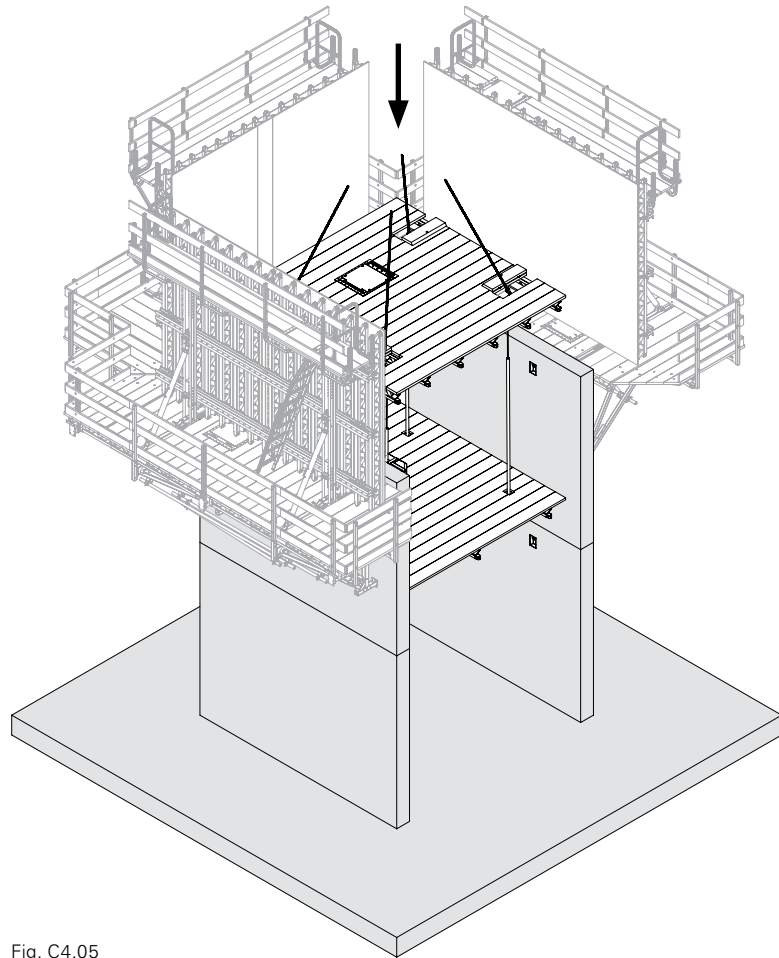


Fig. C4.05



Place the Ladder Safety Cage for the ladder access on the finishing platform before attaching the Shaft Platform and secure against falling off. This facilitates subsequent assembly of the ladder access.



When supporting with the Folding Bracket, close the openings in the finishing platform with planking.

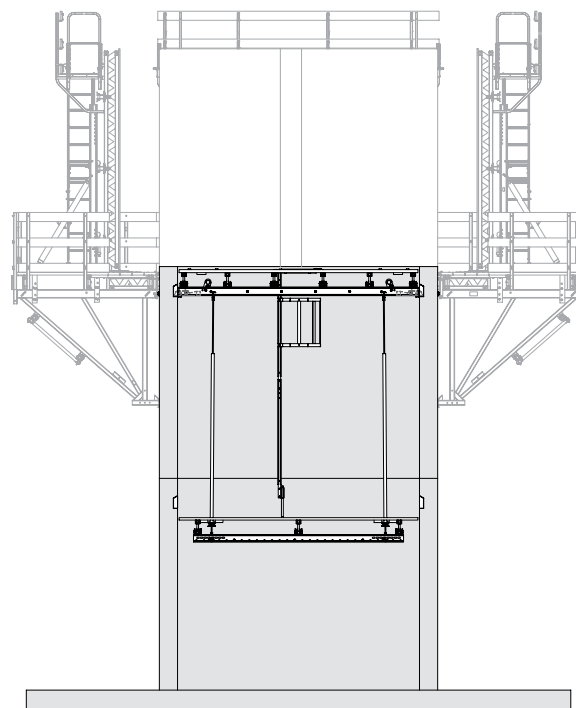


Fig. C4.06

New Concreting Section

1. Remove the support, Bearing Box or Folding Bracket, from the previous concreting section. (Fig. C5.01)
2. Position the external formwork and align.
3. Fix the Leading Anchor or Bearing Box BR to the internal formwork.
4. Carry out the reinforcement work.
5. Position the internal formwork on the Shaft Platform. Place the formwork anchor and close the internal formwork. (Fig. C5.02)

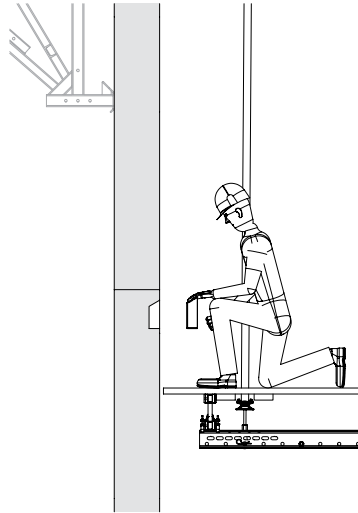


Fig. C5.01

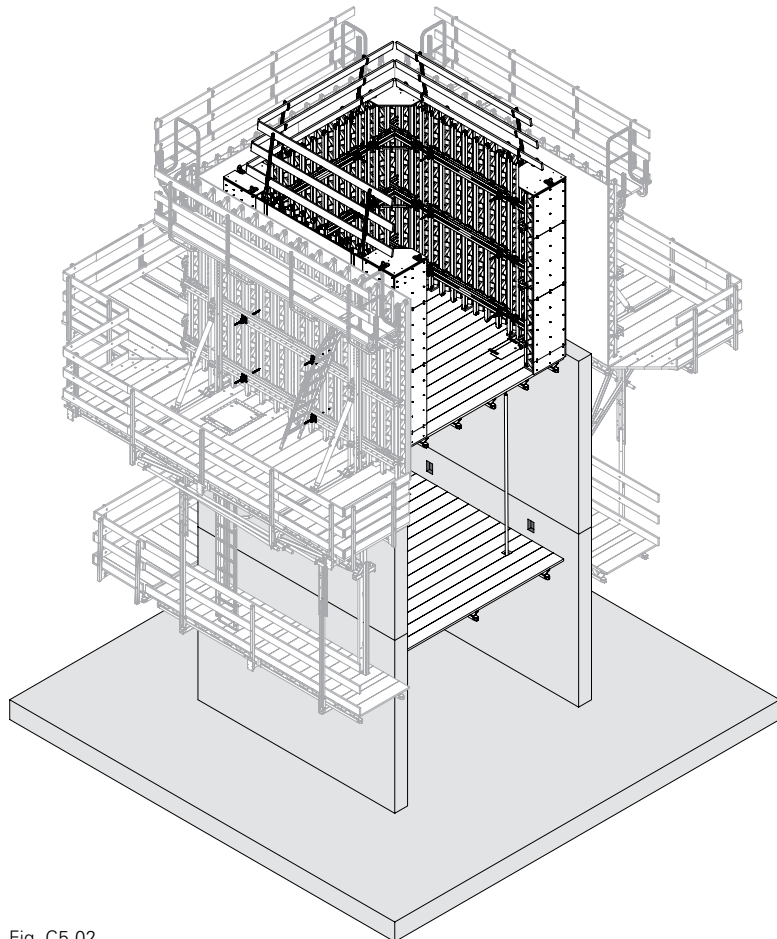


Fig. C5.02

6. Concrete the standard section.
(Fig. C5.03)
7. Release the Leading Anchor or Bearing Box BR.
8. Remove the internal formwork.
9. Retract the external formwork.
10. If necessary: close the anchor hole.

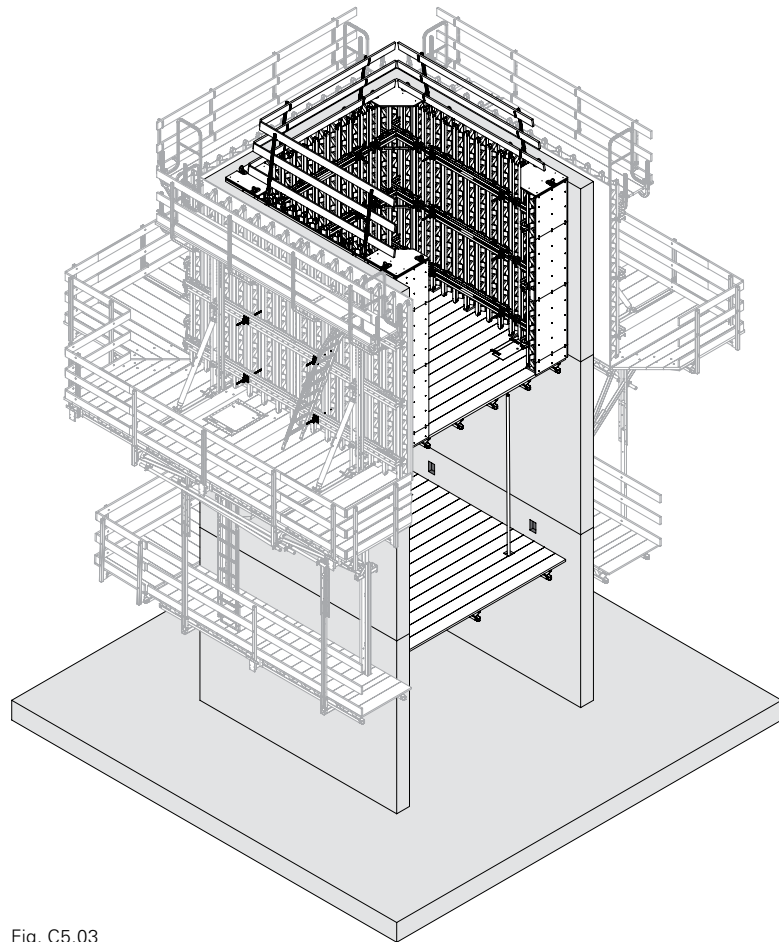


Fig. C5.03

11. Climb the external platform to the next concreting section.
 12. Climb the Shaft Platform to the next concreting section.
 13. Check it is the correct support for the Shaft Platform and secure against slipping. See "Checking the support" on Page 60.
- (Fig. C5.04)

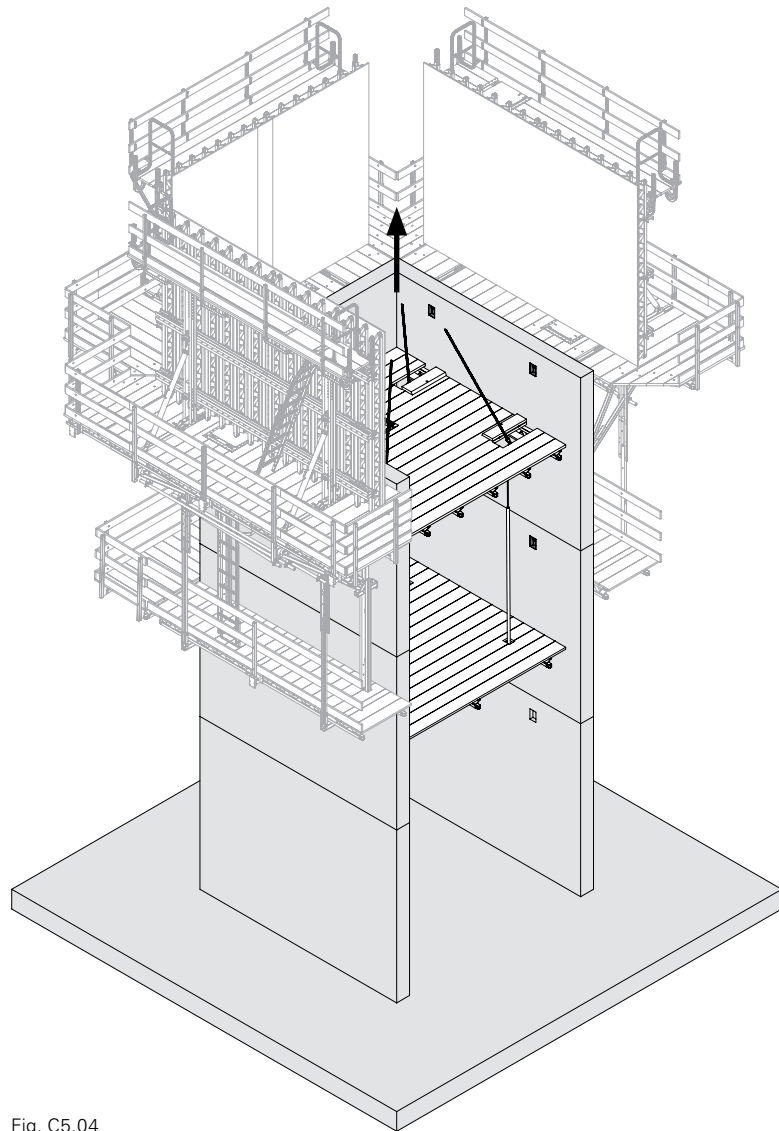


Fig. C5.04

Shaft with Three External Walls



Danger

- Danger of falling due to the Shaft Platform slipping when using the Folding Bracket 25!
 - ⇒ For shafts with three external walls, only use the Gravity Pivot Plate BR.
- Risk of falling due to leading edges!
 - ⇒ Mount guardrails on leading edges.

Components

30	Wooden Plank 15/3 cm
35	Guardrail Holder GT 24 / VT 20
36	Guardrail Post HSGP-2

Mounting the guardrail equipment

1. Attach the Guardrail Holder GT 24 / VT 20 (**35**) to the girder (**2**) using 1x bolt \varnothing 20 x 140 (**35.1**) and secure with cotter pin 4/1.
2. Insert Guardrail Post (**36**) in the Guardrail Holder.
3. Mount planking (**30**) on Guardrail Posts (**36**) and fix with suitable screws or nails.

(Fig. C6.01)



Also mount the guardrail equipment on the finishing platform.

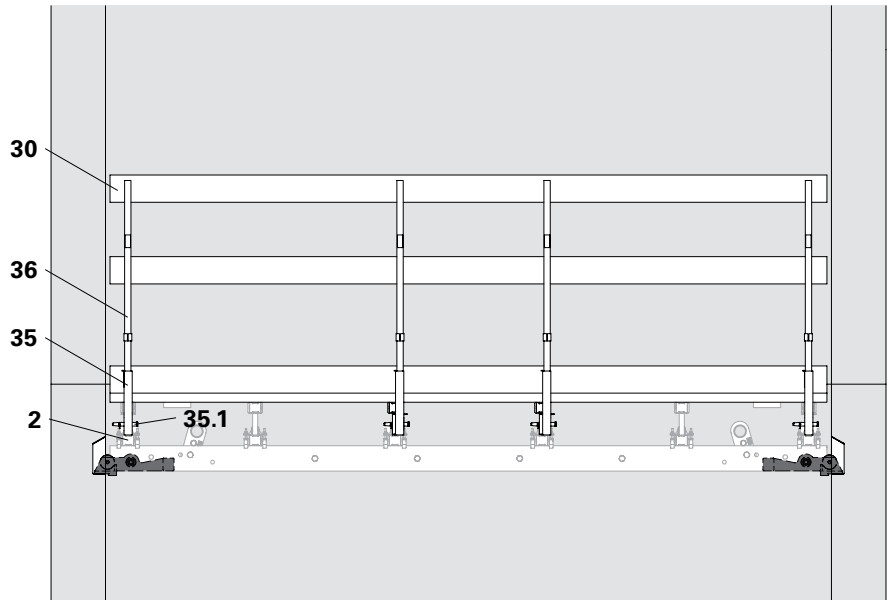


Fig. C6.01



Danger

Risk of falling for the Shaft Platform!
Serious injuries or death.

- ⇒ Do not use the Shaft Platform as a bridge.
- ⇒ Do not use the Shaft Platform between two independent shafts.

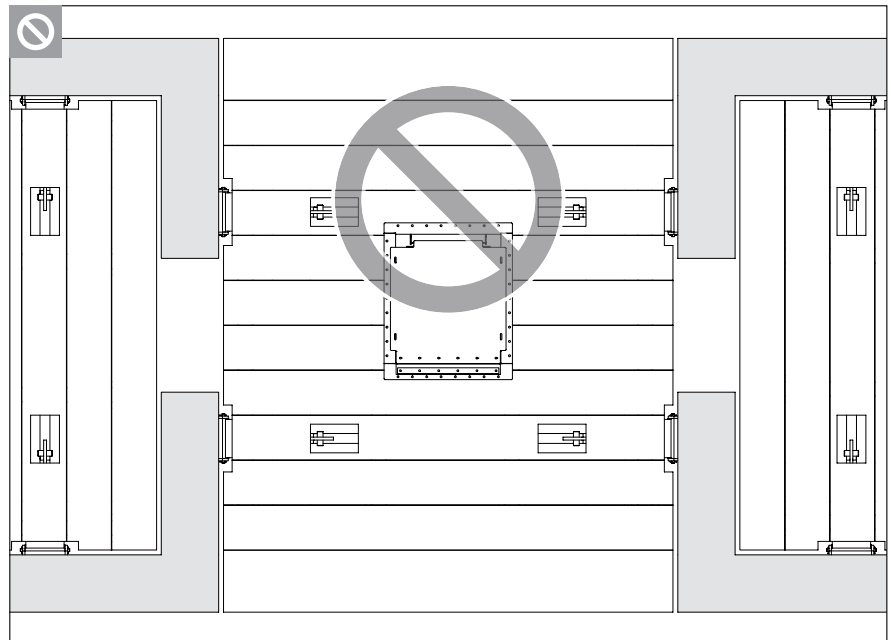


Fig. C7.01

Striking



Warning

If the formwork is comprised of individual elements, the formwork could tip during striking!

If the formwork tips, this could cause serious injuries.

- ⇒ Pay attention to the sequence when removing the formwork.
- ⇒ The final step is to remove the formwork on the walls with the support of the Shaft Platform.
- ⇒ Create a project-specific dismantling plan.

See "Safety Instructions" on page 54.

Striking procedure

1. Attach the formwork to the crane lifting gear.
2. Remove the formwork. (Fig. D1.01)

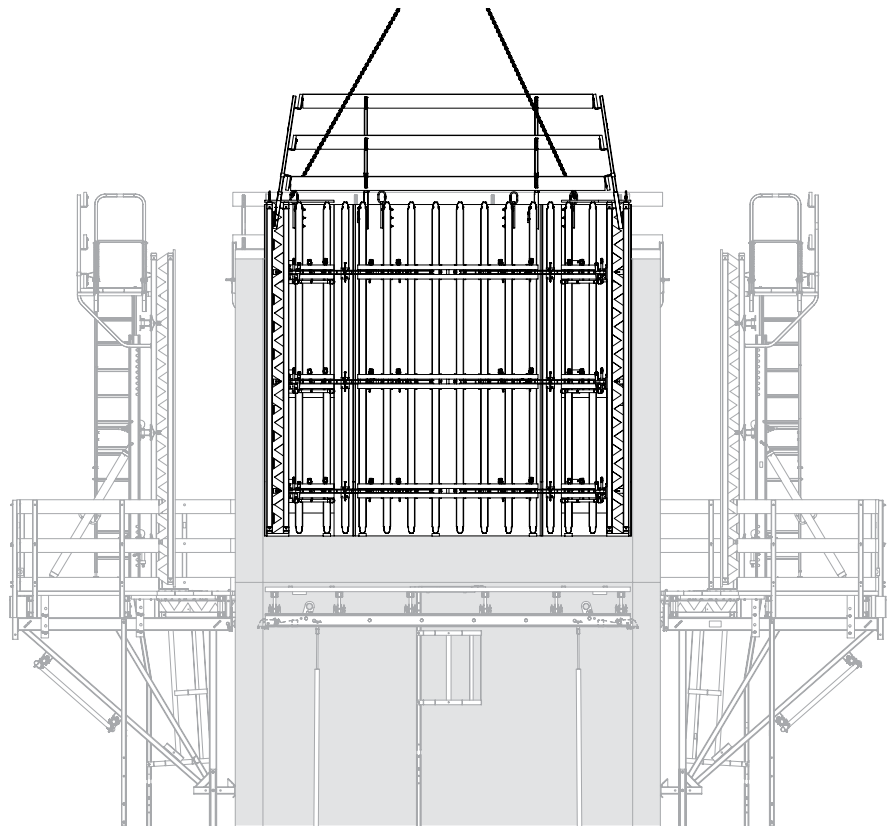


Fig. D1.01

Lifting out the Shaft Platform



- Before lifting out, remove all loose components from the platform and formwork, or secure these against falling off.
- Do not transport persons when lifting out.

Lifting out procedure

1. Remove the covering over the openings of the finishing platform.
2. Attach the Shaft Platform to all four Crane Eyes BR-2 2.5 t using 4-sling lifting gear.
3. Lift out the Shaft Platform. (Fig. D1.02)

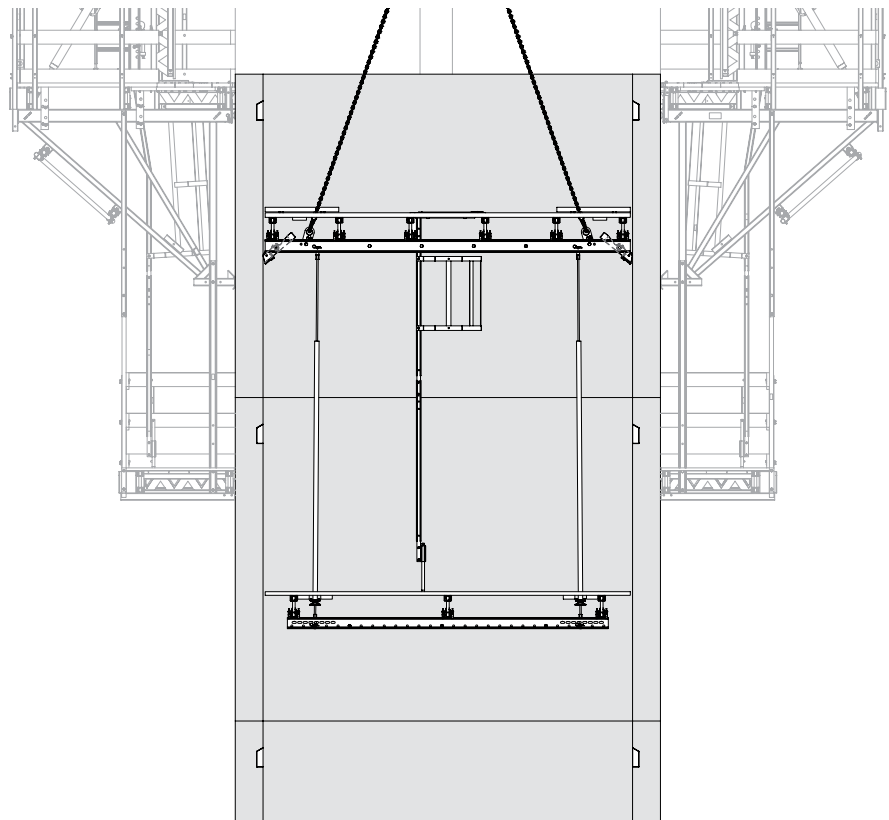


Fig. D1.02

Dismantling the Support

Remove the Folding Brackets or Bearing Box for the last support with the help of a working cage, or attach PPE above.

Dismantling



- Ensure that site personnel keep well away from beneath suspended loads during dismantling operations.
- The work area selected for dismantling must be flat and sufficiently load-bearing.

Dismantling

1. Remove the vertical struts from the finishing platform.
2. Dismantle the finishing platform. (Fig. D1.03)
3. Remove the vertical struts from the shaft platform using a safe working area. (Fig. D1.04)
4. Place the Shaft Platform on the ground and dismantle.

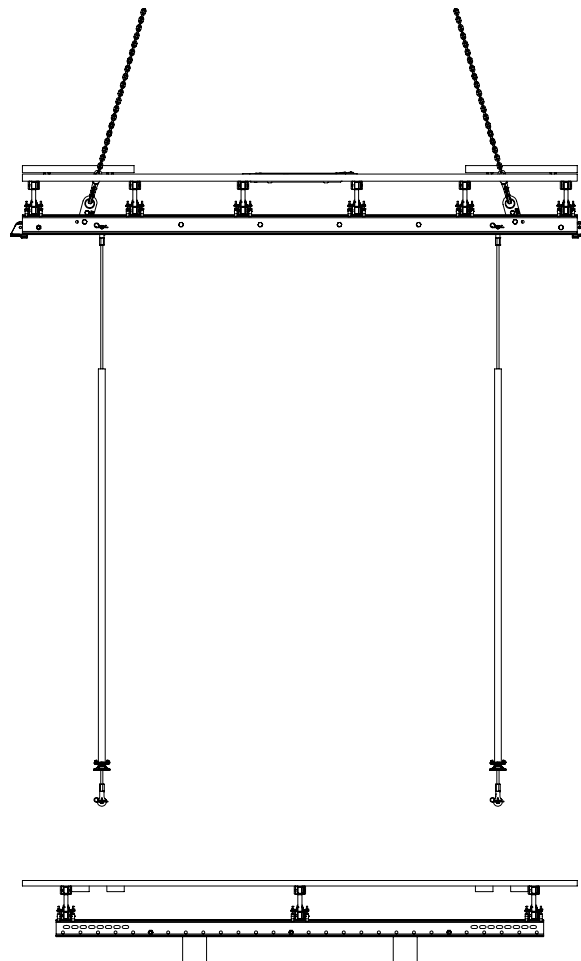


Fig. D1.03

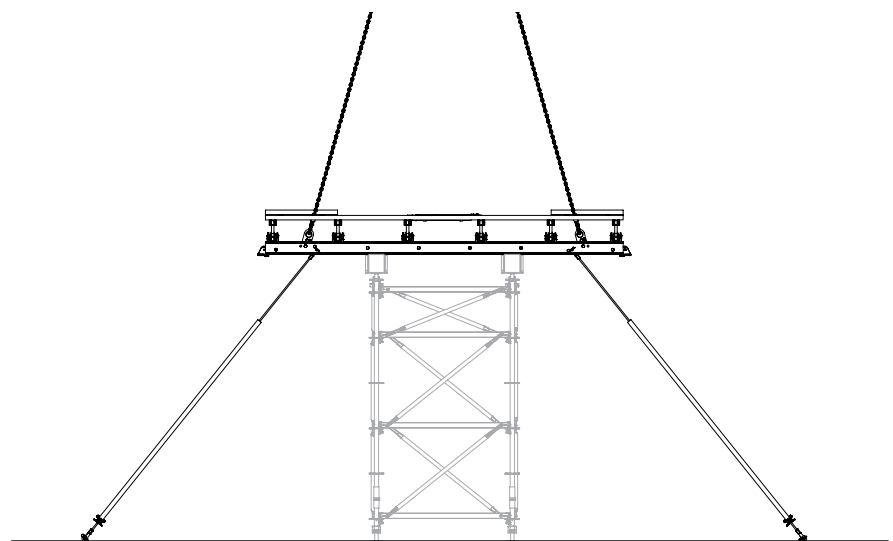


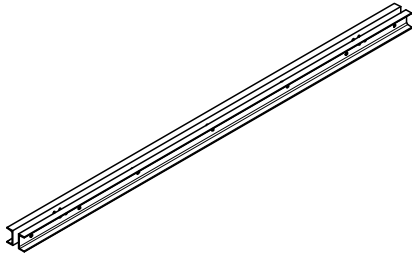
Fig. D1.04

Item no. Weight kg

020320	21.800
020510	27.400
020310	32.800
020520	38.600

Platform Beam BR
Platform Beam BR U100
Platform Beam BR U120
Platform Beam BR U140
Platform Beam BR U160

As cross beam for shaft platforms. The specified item no. is for the platform beams only (2 pieces). Required accessories are to be ordered separately.

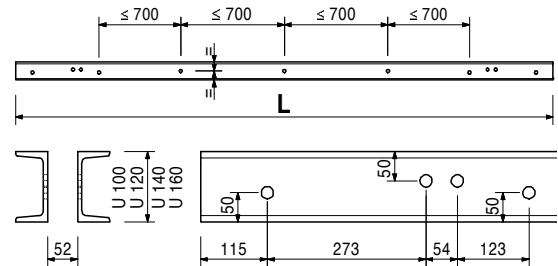


Note

Structural calculations are required. Information on longitudinal separation corresponding to item numbers and a separate design information on request.

Technical Data

Double U-profile corresponding to DIN 1026-1, S235



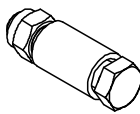
Accessories

020620	0.561
127834	2.210
020330	12.100
020600	6.870

Spacer for Platform Beam BR
Crane Eye BR-2 2.5 t, galv.
Folding Bearing Plate 25
Gravity Pivot Plate BR

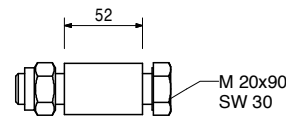
020620	0.561
--------	-------

Spacer for Platform Beam BR
 For Platform Beam BR or Steel Walers SRU.



Complete with

1 pc. 710226 Bolt ISO 4014 M20 x 90-8.8, galv.
 1 pc. 781053 Nut ISO 7040 M20-8, galv.



127834	2.210
--------	-------

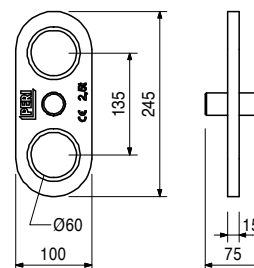
Crane Eye BR-2 2.5 t, galv.
 As attachment point for moving climbing systems or Platform Beam BR.

Note

Follow Instructions for Use!

Technical Data

Permissible load-bearing capacity 2.5 t.



Accessories

020620	0.561
--------	-------

Spacer for Platform Beam BR

BR Shaft Platform



Item no.	Weight kg
020600	6.870

Gravity Pivot Plate BR

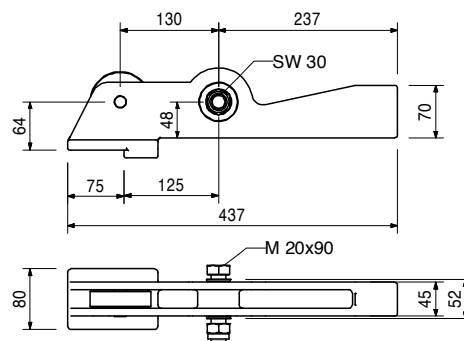
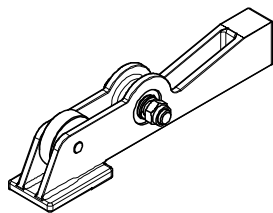
For supporting Platform Beam BR in wall box-outs. 2 pieces per platform beam.

Complete with

2 pc. 781053 Nut ISO 7042 M20-8, galv.
2 pc. 710226 Bolt ISO 4014 M20 x 90-8.8, galv.

Note

Separate design information on request.



Accessories

108162	1.800
--------	-------

Bearing Box BR

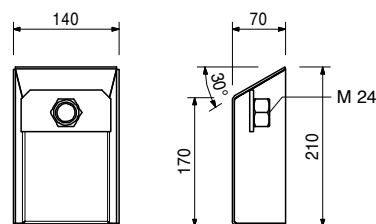
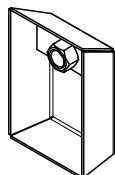
108162	1.800
--------	-------

Bearing Box BR

For creating wall box-outs for mounting with the gravity pivot plate.

Note

Reusable only with finishing platform.



Accessories

029270	0.331
--------	-------

Advancing Bolt M24, galv.

020330	12.100
--------	--------

Folding Bearing Plate 25

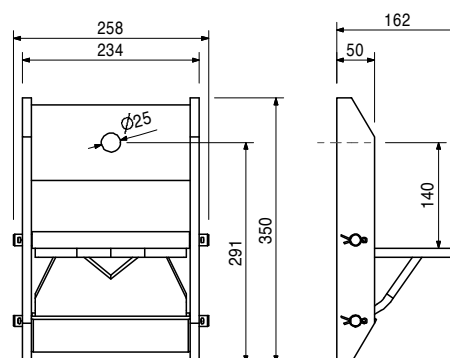
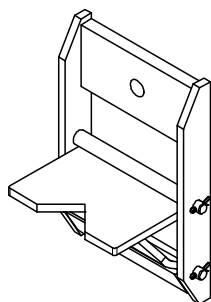
For supporting Platform Beam BR with Anchor System M24. 2 pieces per platform beam.

Note

Separate design information on request.

Technical Data

Permissible load 25.0 kN.



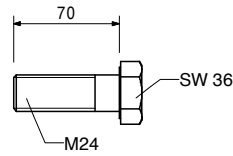
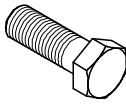
Accessories

026430	0.334
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Bolt ISO 4014 M24 x 70-10.9, galv.

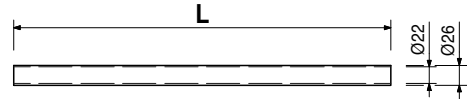
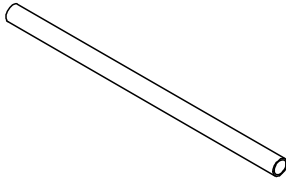
Item no.	Weight kg
026430	0.334

Bolt ISO 4014 M24 x 70-10.9, galv.
High-strength bolt for anchoring climbing systems.



065027	0.359
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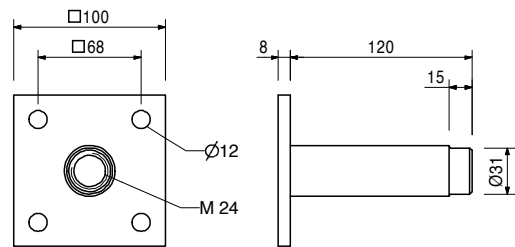
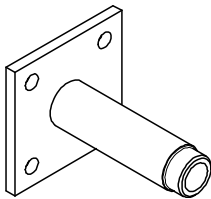
Spacer Tube rough DR 22, l = 2.00 m
Plastic spacer tube for DW 15, B 15.



026230	1.010
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Anchor Sleeve M24
To anchor platform systems.

Note
Separate design information on request.

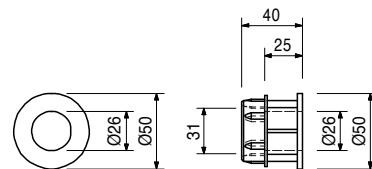


Accessories

026240	0.026	Cone PP Ø 31/26, c = 25
026250	0.005	Plug Ø 26 mm
116233	0.116	Cone FRC Ø 32/52, c = 40
026420	0.123	Anchor Positioning Stud M24, galv.
116234	0.033	Plug FRC Ø = 32
115150	0.200	Anchor Positioning Stud M24 x 65, galv.
123800	0.045	Threaded Cone M24/40

026240	0.026
--------	-------

Cone PP Ø 31/26, c = 25
Resulting in a concrete cover of 25 mm in combination with Anchor Sleeve M24. Made of polypropylene.

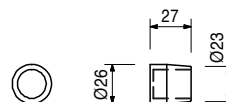


BR Shaft Platform

Item no.	Weight kg
026250	0.005

Plug Ø 26 mm

For closing Cone PP Ø 31 for Anchor Sleeve M24.
Made of polypropylene.



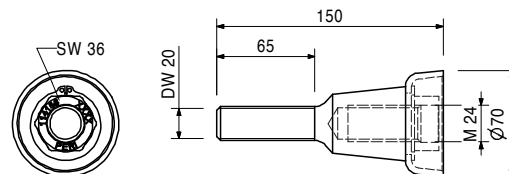
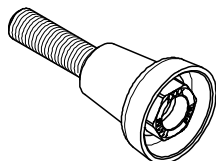
114158	1.030
--------	-------

Screw-On Cone-2 M24/DW 20, galv.

Anchor System M24.
For anchoring climbing systems.

Note

Separate design information on request.



Accessories

030860	0.792
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Threaded Anchor Plate DW 20

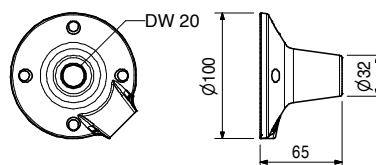
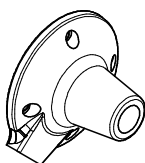
030860	0.792
--------	-------

Threaded Anchor Plate DW 20

For use with Tie Rod DW 20, B 20 or Screw-On Cone-2 M24/DW 20. For anchoring in concrete.

Note

Lost anchor part.



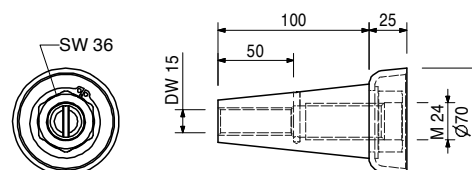
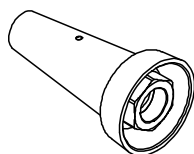
031220	1.010
--------	-------

Climbing Cone-2 M24/DW 15, galv.

Anchor System M24.
For anchoring climbing systems.

Note

Separate design information on request.



Accessories

030840	0.515
030030	1.440
030740	1.550

Threaded Anchor Plate DW 15

Tie Rod DW 15, spec. length

Tie Rod B 15, spec. length

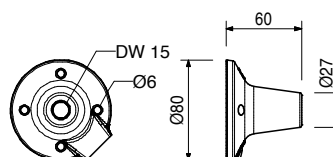
030840	0.515
--------	-------

Threaded Anchor Plate DW 15

For use with Tie Rod DW 15 or B 15. For anchoring in concrete.

Note

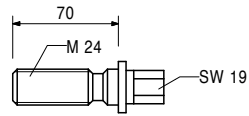
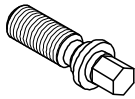
Lost anchor part.



Item no.	Weight kg
029270	0.331

Advancing Bolt M24, galv.

For fixing the M24 Anchor System if the plywood formlining is drilled through.



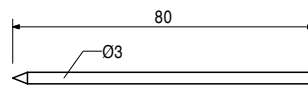
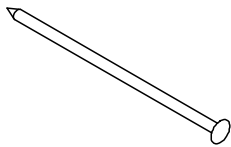
Item no.	Weight kg
029280	0.196

Accessories

Anchor Positioning Plate M24, galv.

710312	0.005
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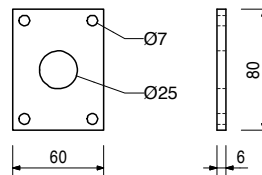
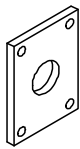
Nail 3 x 80



029280	0.196
--------	-------

Anchor Positioning Plate M24, galv.

For fixing the M24 anchor system if the plywood formlining is drilled through.



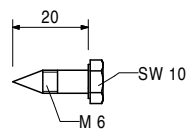
029440	0.005
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Accessories

Lag Screw DIN 571 6 x 20, galv.

029440	0.005
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Lag Screw DIN 571 6 x 20, galv.



BR Shaft Platform

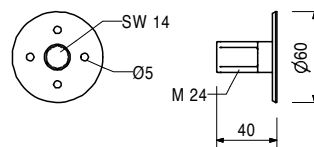
Item no.	Weight kg
026420	0.123

Anchor Positioning Stud M24, galv.

For fixing the M24 anchor system if the plywood formlining is not drilled through.

Note

Allen Key SW 14.



Accessories

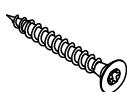
027212	0.445
710312	0.005

Allen Key SW 14, long

Nail 3 x 80

110642	0.006
--------	-------

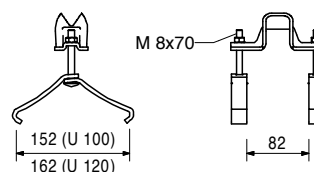
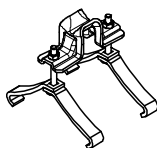
Spax Screw TX25, 5 x 40, yellow galv.



024070	0.691
--------	-------

Hook Strap HB 24-100/120, galv.

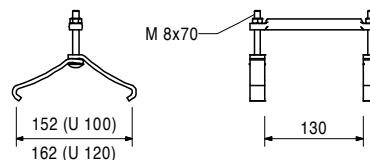
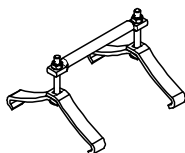
For fixing GT 24 Girders to Steel Walers SRZ, SRU and BR: U100 – U120.



024860	0.616
--------	-------

Hook Strap HB 24 QB 150, galv.

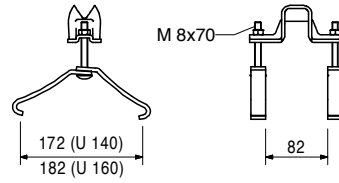
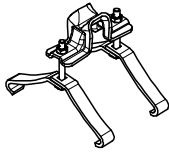
For fixing GT 24 Girders independent from girder node and timber beams to Steel Walers SRZ, SRU and BR: U100 – U120.



Item no.	Weight kg
024080	0.735

Hook Strap HB 24-140/160, galv.

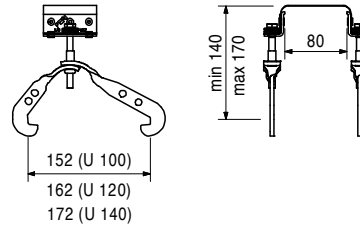
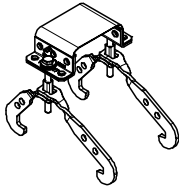
For fixing GT 24 Girders to Steel Walers SRZ, SRU and BR: U140 – U160.



115544	0.837
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Hook Strap Uni HBU 14-17

For fixing timbers 80 x 160 mm to Steel Walers SRZ, SRU and BR: U100 – U140.



024540	0.005
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Accessories

TSS-Torx 6 x 40, galv.

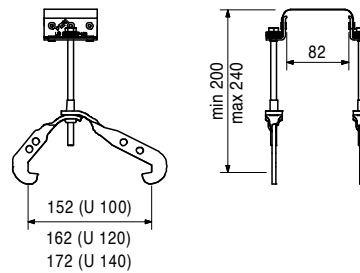
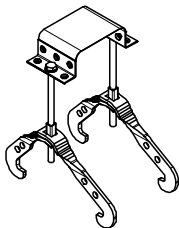
104931	0.865
--------	-------

Hook Strap Uni HBU 20-24

For fixing GT 24 Girders or VT 20 Girders to Steel Walers SRZ and SRU Profiles U100 – U140.

Note

The girders can be mounted at right-angles or diagonally to the steel walers and also outside of the nodes.



024540	0.005
--------	-------

Accessories

TSS-Torx 6 x 40, galv.

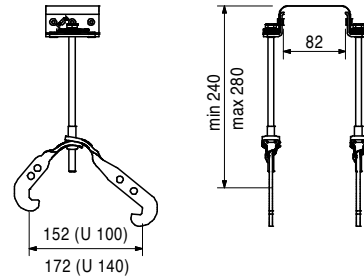
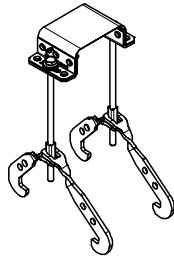
Item no.	Weight kg
103845	0.893

Hook Strap Uni HBU 24-28

For fixing GT 24 Girders to Steel Walers SRZ, SRU and BR: U100 – U140.

Note

The girders can be mounted at right-angles or diagonally to the steel walers and also outside of the nodes.



Accessories

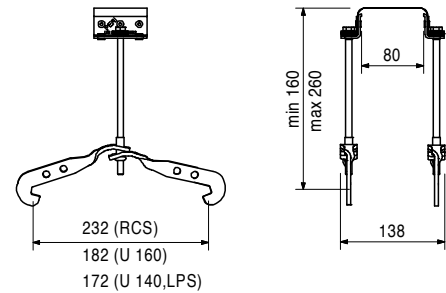
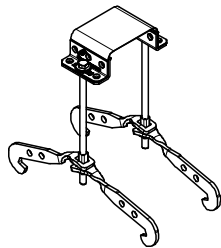
024540	0.005
--------	-------

TSS-Torx 6 x 40, galv.

111806	0.921
--------	-------

Hook Strap Uni HBU 24-26 U200

For assembling the GT 24 Girder on the Climbing Rails RCS and LPS or on Steel Walers BR: U140 – U160.



Accessories

024540	0.005
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TSS-Torx 6 x 40, galv.

030370	1.660
--------	-------

Wingnut Pivot Plate DW 15, galv.

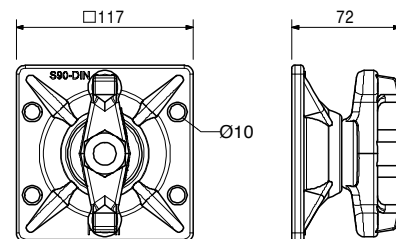
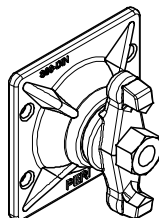
For anchoring with Tie Rod DW 15 and B 15. With pivoting captive nut. Maximum angle of tilting 8°.

Note

Wrench size SW 27.

Technical Data

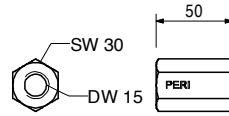
Permissible load 90 kN.



Item no.	Weight kg
030070	0.222

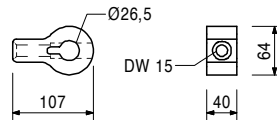
Hex. Nut DW 15 SW 30/50, galv.
For anchoring with Tie Rod DW 15 and B 15.

Technical Data
Permissible load 90 kN.



115378	1.080
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Eye Nut RCS DW 15
As an articulated connection to the Climbing Rail RCS, Steel Water SRU for bracing with DW 15.



Accessories

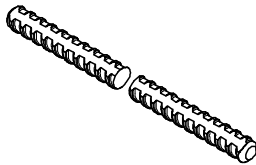
104031	0.462
018060	0.014
111567	0.729
022230	0.033

Fitting Pin Ø 21 x 120
Cotter Pin 4/1, galv.
Fitting Pin Ø 26 x 120
Cotter Pin 5/1, galv.

030030	1.440
030050	0.000

Tie Rod DW 15
Tie Rod DW 15, spec. length
Cutting Cost Tie Rod DW 15, B 15

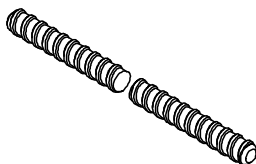
Note
Non-weldable! Take official Approval into consideration!
Technical Data
Permissible tension force 90 kN.



030740	1.550
030050	0.000

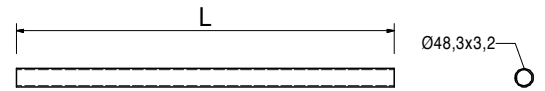
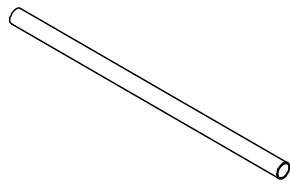
Tie Rod B 15
Tie Rod B 15, spec. length
Cutting Cost Tie Rod DW 15, B 15

Note
Weldable! Take official Approval into consideration!
Technical Data
Permissible tension force 82 kN.

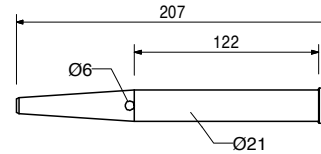
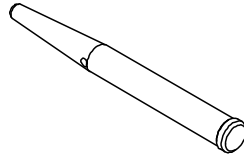


BR Shaft Platform

Item no.	Weight kg	
026412	7.100	Scaff. Tube Steel \varnothing 48.3 x 3.2, l = 2.0 m



104031	0.462	Fitting Pin \varnothing 21 x 120 For different connections.
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Accessories

018060	0.014	Cotter Pin 4/1, galv.
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018060	0.014	Cotter Pin 4/1, galv.
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Item no.	Weight kg		L
103868	18.100	Steel Waler Universal SRU	
103871	24.200	Steel Waler Universal SRU U120, l = 0.72 m	722
103874	30.900	Steel Waler Universal SRU U120, l = 0.97 m	972
103877	38.100	Steel Waler Universal SRU U120, l = 1.22 m	1222
103886	44.700	Steel Waler Universal SRU U120, l = 1.47 m	1472
103889	52.000	Steel Waler Universal SRU U120, l = 1.72 m	1722
103898	58.600	Steel Waler Universal SRU U120, l = 1.97 m	1972
103892	65.600	Steel Waler Universal SRU U120, l = 2.22 m	2222
103929	72.000	Steel Waler Universal SRU U120, l = 2.47 m	2472
103903	81.000	Steel Waler Universal SRU U120, l = 2.72 m	2722
103906	92.600	Steel Waler Universal SRU U120, l = 2.97 m	2972
103915	106.000	Steel Waler Universal SRU U120, l = 3.47 m	3472
103918	119.000	Steel Waler Universal SRU U120, l = 3.97 m	3972
103922	135.000	Steel Waler Universal SRU U120, l = 4.47 m	4472
103925	146.000	Steel Waler Universal SRU U120, l = 4.97 m	4972
103928	159.000	Steel Waler Universal SRU U120, l = 5.47 m	5472
		Steel Waler Universal SRU U120, l = 5.97 m	5972

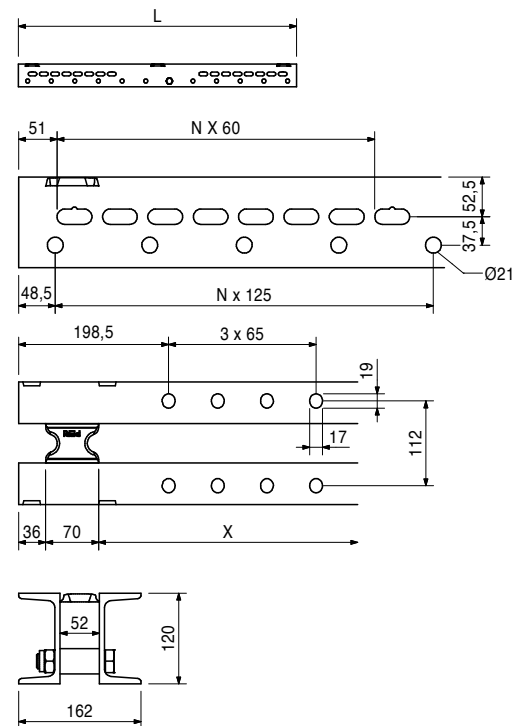
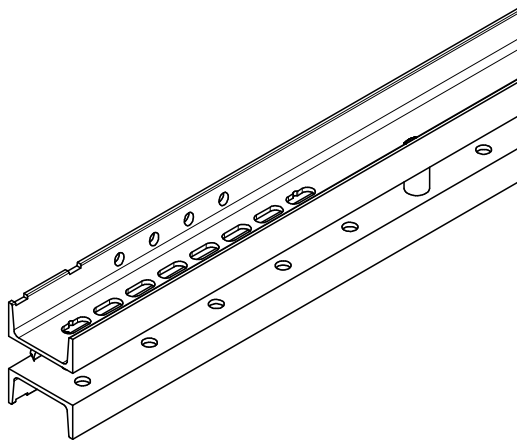
Universal Steel Waler Profile U120 used as waling for girder wall formwork and for diverse special applications. With adjustable spacers.

Note

Permissible load: see PERI Design Tables.

Technical Data

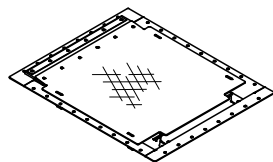
U120: $W_y = 121.4 \text{ cm}^3$, $I_y = 728 \text{ cm}^4$.



Item no.	Weight kg
126431	12.300

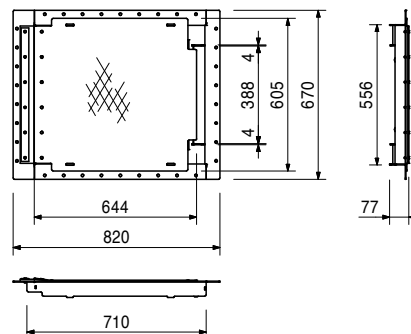
Hatch 55 x 60-2, foldable

Self-closing hatch for ladder access. Clear opening approx. 55 x 60 cm. Ladder fixation with bolts or by hanging up.



Complete with

1 pc. 126785 Hatch Hinge RCS
 12 pc. 108647 Rivet DIN 7337- A5 x 20
 2 pc. 022230 Cotter Pin 5/1, galv.



710224	0.047
710381	0.017

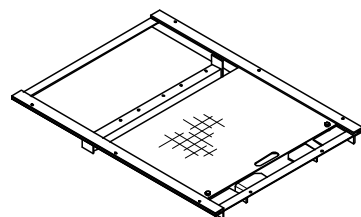
Accessories

Bolt ISO 4017 M12 x 40-8.8, galv.
Nut ISO 7042 M12-8, galv.

051430	37.900
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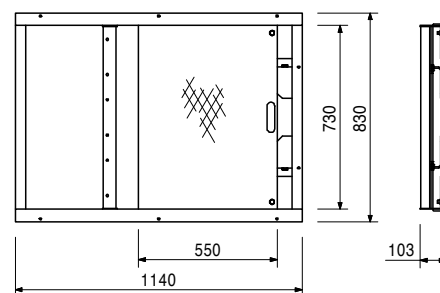
Sliding Hatch Cover

Non self-closing hatch for ladder access. Clear opening approx. 73 x 55 cm. Ladder fixation with bolts.



Complete with

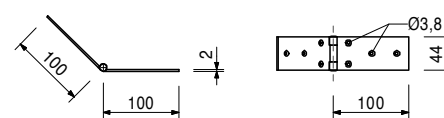
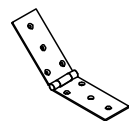
4 pc. 710266 Bolt ISO 4017 M12 x 25-8.8, galv.
 4 pc. 710381 Nut ISO 7042 M12-8, galv.



111436	0.150
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Hinge DIN 7957-200-ST, yellow galv.

For mounting the cover flap at the climbing protection panel.



111437	0.004
110642	0.006

Accessories

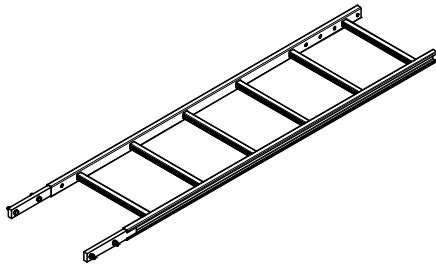
Spax Screw TX25, 5 x 20, yellow galv.
Spax Screw TX25, 5 x 40, yellow galv.

BR Shaft Platform

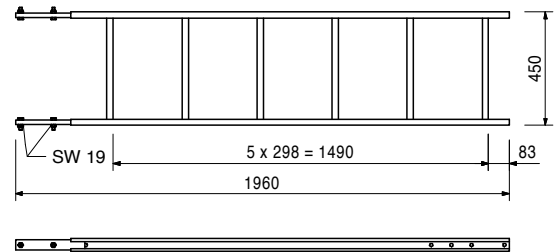


Item no.	Weight kg
051410	11.700

Ladder 180/6, galv.
As access for PERI Formwork Systems.

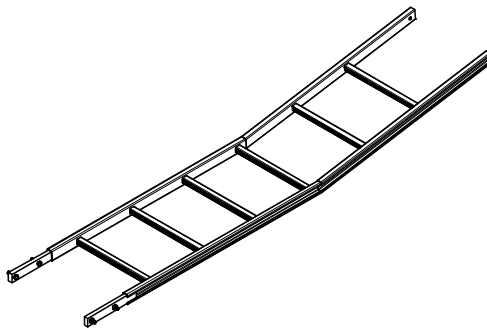


Complete with
4 pc. 710224 Bolt ISO 4017 M12 x 40-8.8, galv.
4 pc. 710381 Nut ISO 7042 M12-8, galv.

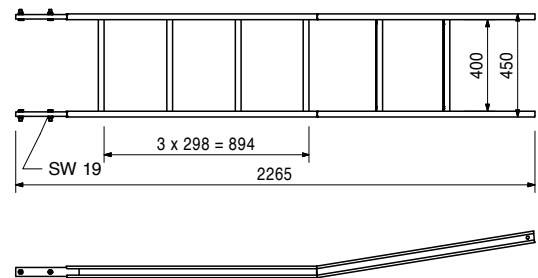


051420	12.800
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Ladder 220/6, galv.
As access for PERI Formwork Systems.

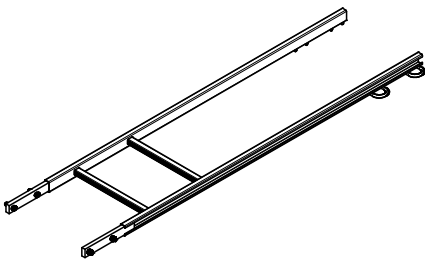


Complete with
4 pc. 710224 Bolt ISO 4017 M12 x 40-8.8, galv.
4 pc. 710381 Nut ISO 7042 M12-8, galv.

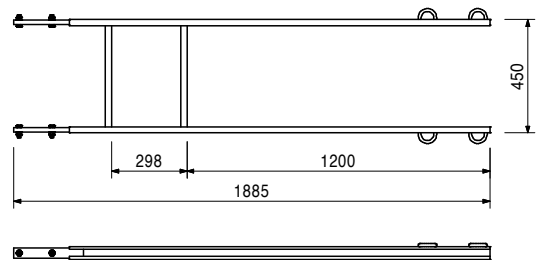


103724	10.400
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End Ladder 180/2, galv.
As access for PERI Formwork Systems.

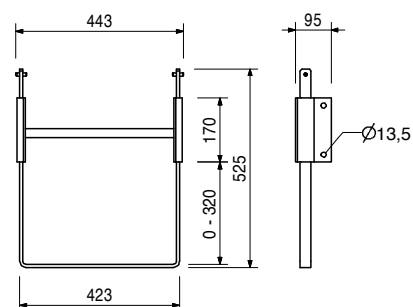
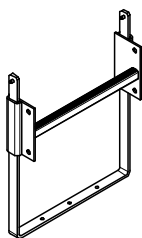


Complete with
4 pc. 710224 Bolt ISO 4017 M12 x 40-8.8, galv.
4 pc. 710381 Nut ISO 7042 M12-8, galv.



109105	5.070
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Ladder Base 30 adjustable, galv.
For horizontal fixing of ladders on the platform decking.

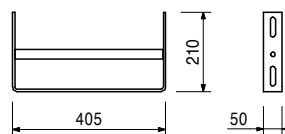
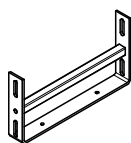


BR Shaft Platform

Item no.	Weight kg
051460	2.180

Ladder Base, galv.

As bottom ladder connection and for securing ladders against sliding on the scaffold decks.



103718	0.684
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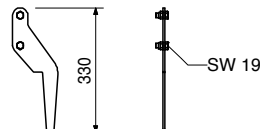
Ladder Hook, galv.

For adjusting the bottom ladder.
Always use in pairs.



Complete with

2 pc. 710266 Bolt ISO 4017 M12 x 25-8.8, galv.
2 pc. 710381 Nut ISO 7042 M12-8, galv.



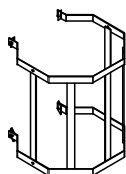
104132	15.600
051450	25.200

Ladder Safety Cages, galv.

Ladder Safety Cage 75, galv.

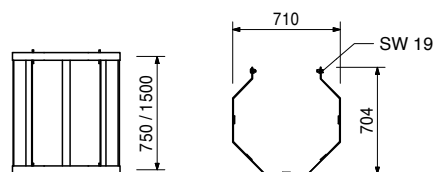
Ladder Safety Cage 150, galv.

Ladder safety cage for PERI Access Ladders.



Complete with

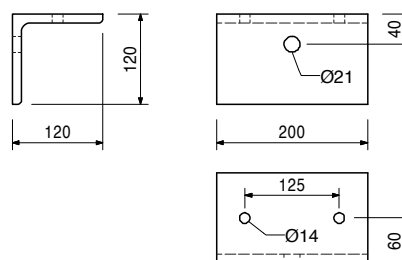
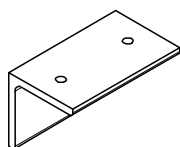
4 pc. 710266 Bolt ISO 4017 M12 x 25-8.8, galv.
4 pc. 701763 Clamping Plate FI 25 x 10 x 90



110289	4.260
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L-Angle RCS 120 x 120 x 200

For fixing end handrail posts on the decking.



Accessories

017040	0.850
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Screw-On Coupler AK 48, galv.

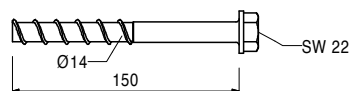
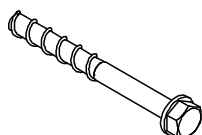
117020	0.213
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Anchor Bolt PERI 14 x 150

Re-usable.
Approval available.

Note

Separate Design Information on request.



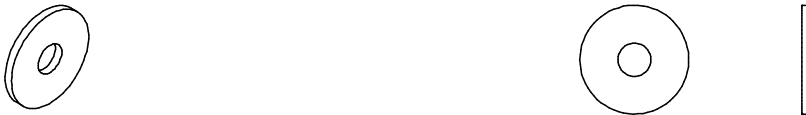
Item no.	Weight kg	
725574	0.009	Washer ISO 7089 200 HV, A 14, galv.



710220	0.087	Bolt ISO 4014 M12 x 80-8.8, galv.
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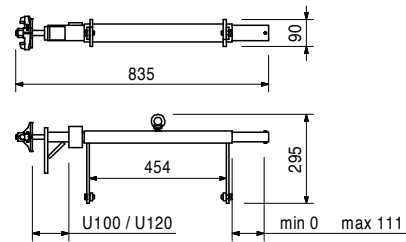
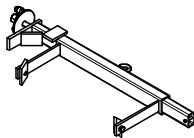
113348	0.043	Washer ISO 7094 100 HV, A 12, galv.
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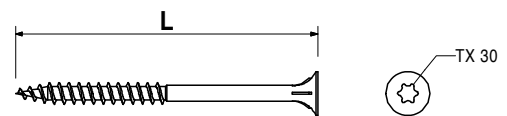
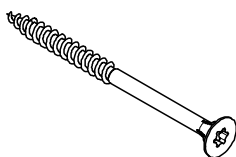
111165	6.080	Ladder Connector VARIO, adjustable	Complete with
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For connecting ladders to Steel Walers SRZ and SRU, Profile U100 – U120.

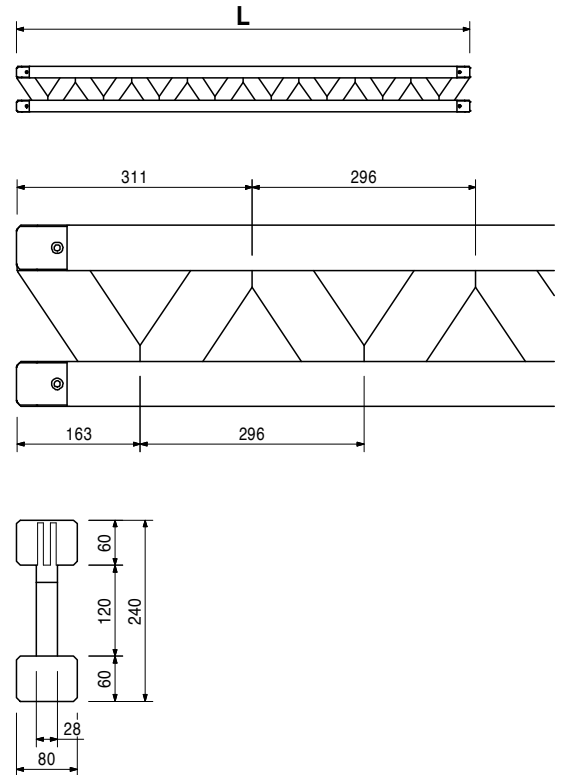
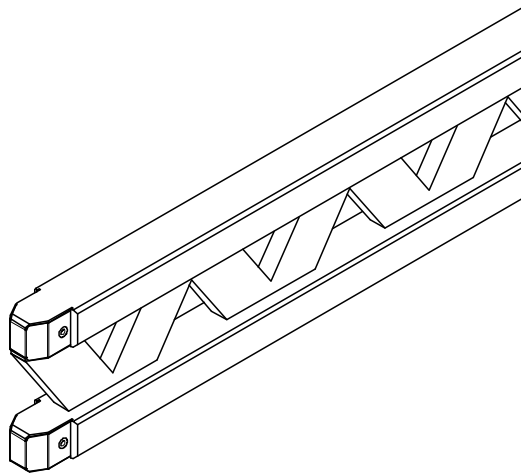
2 pc. 710266 Bolt ISO 4017 M12 x 25-8.8, galv.
2 pc. 701763 Clamping Plate FI 25 x 10 x 90



024540	0.005	TSS-Torx, galv.	L
024690	0.008	TSS-Torx 6 x 40, galv.	40
		TSS-Torx 6 x 80, galv.	80
For Torx Bits TX 30. Self-drilling.			



Item no.	Weight kg		L
075100	5.300	Girder GT 24	918
075120	7.100	Girder GT 24, l = 0.90 m	1214
075150	8.900	Girder GT 24, l = 1.20 m	1510
075180	10.600	Girder GT 24, l = 1.80 m	1806
075210	12.400	Girder GT 24, l = 2.10 m	2102
075240	14.200	Girder GT 24, l = 2.40 m	2398
075270	15.900	Girder GT 24, l = 2.70 m	2694
075300	17.700	Girder GT 24, l = 3.00 m	2990
075330	19.500	Girder GT 24, l = 3.30 m	3286
075360	21.200	Girder GT 24, l = 3.60 m	3582
075390	23.000	Girder GT 24, l = 3.90 m	3878
075420	24.800	Girder GT 24, l = 4.20 m	4174
075450	26.600	Girder GT 24, l = 4.50 m	4470
075480	28.300	Girder GT 24, l = 4.80 m	4766
075510	30.100	Girder GT 24, l = 5.10 m	5062
075540	31.900	Girder GT 24, l = 5.40 m	5358
075570	33.600	Girder GT 24, l = 5.70 m	5654
075600	35.400	Girder GT 24, l = 6.00 m	5950



Item no.	Weight kg	
		Girder GT 24, spec. lenght
078010	36.875	Girder GT 24, l = 6.25 m
078020	38.645	Girder GT 24, l = 6.55 m
078030	40.415	Girder GT 24, l = 6.85 m
078040	42.185	Girder GT 24, l = 7.15 m
078050	43.955	Girder GT 24, l = 7.45 m
078060	45.725	Girder GT 24, l = 7.75 m
078070	47.200	Girder GT 24, l = 8.00 m
078080	48.970	Girder GT 24, l = 8.30 m
078090	50.740	Girder GT 24, l = 8.60 m
078100	52.510	Girder GT 24, l = 8.90 m
078110	54.280	Girder GT 24, l = 9.20 m
078120	56.050	Girder GT 24, l = 9.50 m
078130	57.820	Girder GT 24, l = 9.80 m
078140	59.590	Girder GT 24, l = 10.10 m
078150	61.360	Girder GT 24, l = 10.40 m
078160	63.130	Girder GT 24, l = 10.70 m
078170	64.900	Girder GT 24, l = 11.00 m
078180	66.670	Girder GT 24, l = 11.30 m
078190	68.145	Girder GT 24, l = 11.55 m
078200	69.915	Girder GT 24, l = 11.85 m

Item no.	Weight kg
074990	8.230
074905	12.010
074910	13.630
074890	14.710
074920	16.060
074930	18.220
074940	19.840
074950	21.460
074960	24.700
074970	26.860
074980	32.260

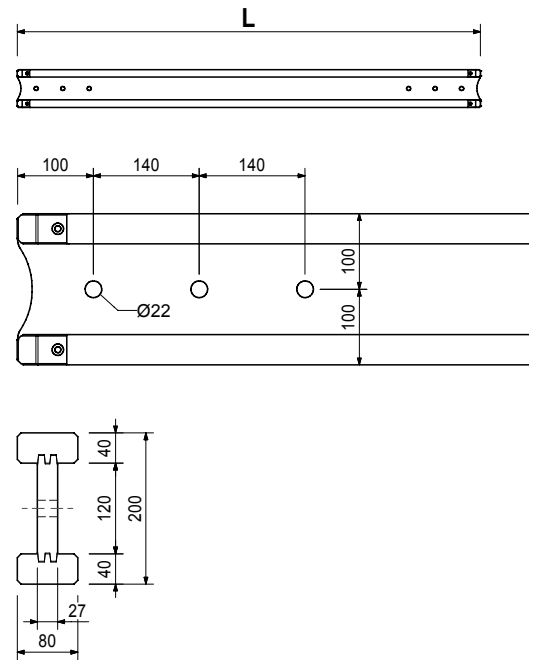
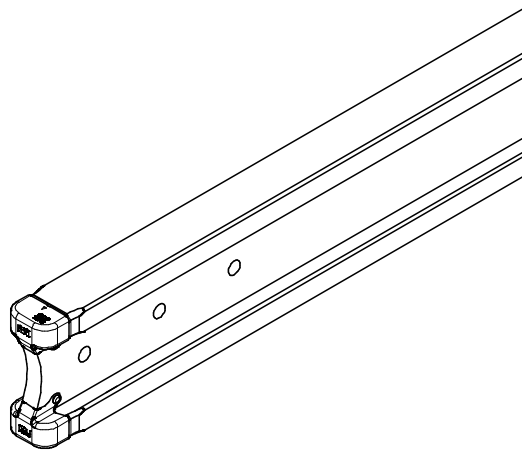
Girder VT20K
Girder VT 20K, l = 1.45 m
Girder VT 20K, l = 2.15 m
Girder VT 20K, l = 2.45 m
Girder VT 20K, l = 2.65 m
Girder VT 20K, l = 2.90 m
Girder VT 20K, l = 3.30 m
Girder VT 20K, l = 3.60 m
Girder VT 20K, l = 3.90 m
Girder VT 20K, l = 4.50 m
Girder VT 20K, l = 4.90 m
Girder VT 20K, l = 5.90 m

Universal formwork girder made of wood.

L
1447
2152
2452
2652
2902
3292
3592
3892
4492
4902
5902

Note

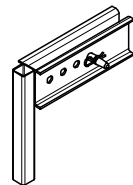
The girder fulfils all requirements of DIN EN 13377 class P20 (Declaration of Conformity).



101290	5.670
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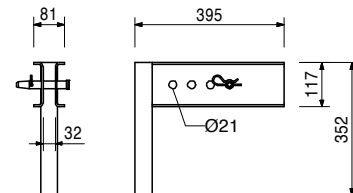
Guardrail Holder GT 24 / VT 20

For assembling a guardrail to GT 24 and VT 20 Girders.



Complete with

1 pc. 105400 Pin Ø 20 x 140, galv.
 1 pc. 018060 Cotter Pin 4/1, galv.



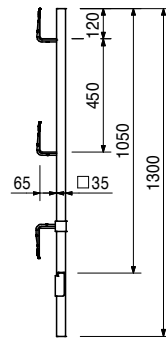
116292	4.720
061260	6.150

Accessories

Guardrail Post HSGP-2
Guardrail Post SGP

Item no.	Weight kg
116292	4.720

Guardrail Post HSGP-2
As guardrail for different systems.



**The optimal System
for every Project and
every Requirement**



Wall Formwork



Column Formwork



Slab Formwork



Climbing Systems



Bridge Formwork



Tunnel Formwork



Shoring Systems



Construction Scaffold



Facade Scaffold



Industrial Scaffold



Access



Protection Scaffold



Safety Systems



**System-Independent
Accessories**



Services



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 www.peri.com

