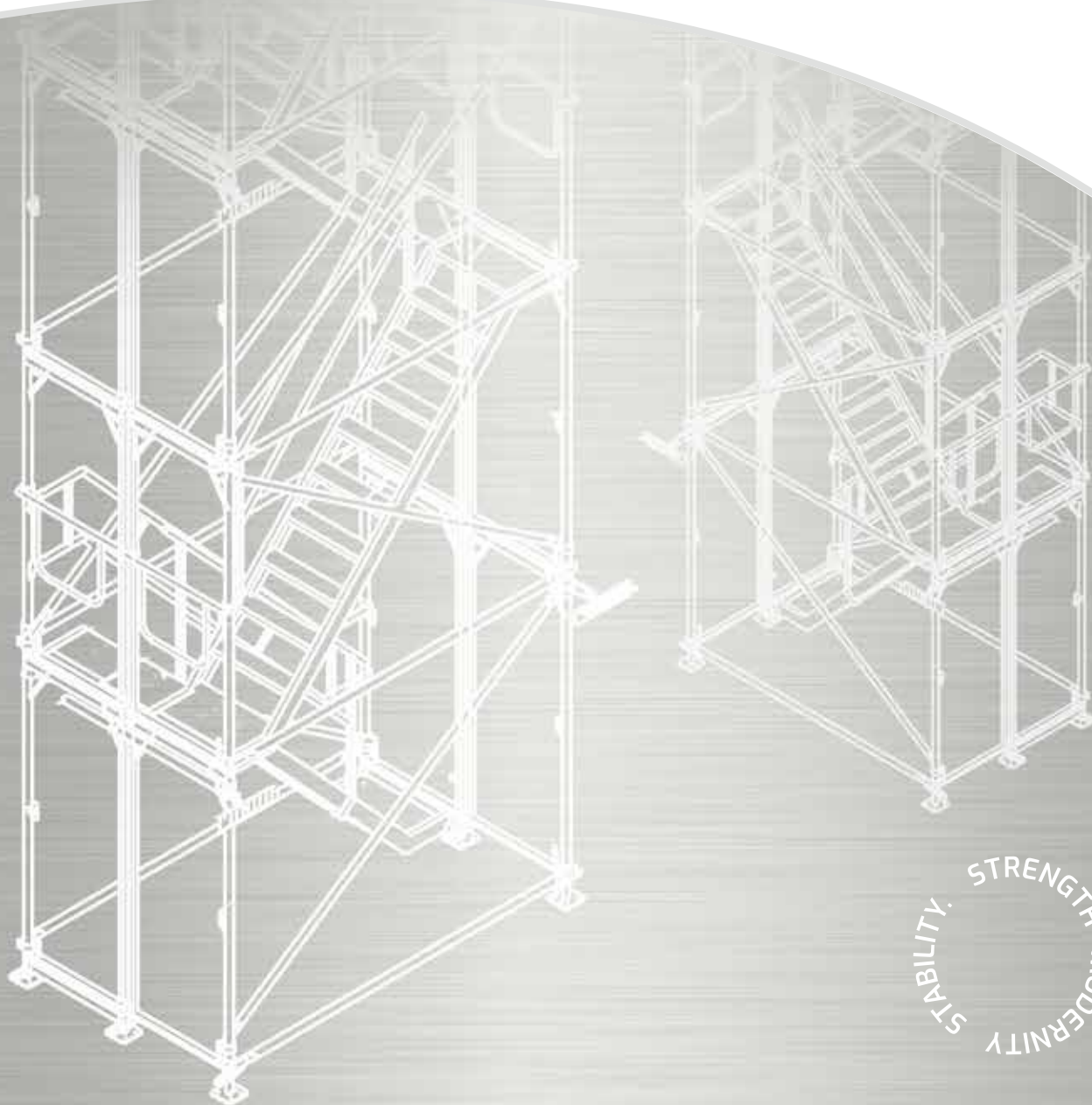




MOSTOSTAL  
SCAFFOLDING  
FORMWORK

# MOSTOSTAL PLUS FRAME SCAFFOLDINGS

ASSEMBLY MANUAL



STABILITY. STRENGTH  
MODERNITY







MOSTOSTAL  
SCAFFOLDING  
FORMWORK

# MOSTOSTAL PLUS FRAME SCAFFOLDINGS

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ASSEMBLY MANUAL



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STABILITY. STRENGTH  
MODERNITY



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# 1. TECHNICAL OVERVIEW

## GENERAL RULES OF SCAFFOLDING ASSEMBLY AND USE

### 1.1. Scaffolding characteristics

ALTRAD-MOSTOSTAL manufactures steel and aluminium MOSTOSTAL Plus frame scaffoldings. The system includes such basic components as base jacks, frames, railings, braces, platforms and toe boards. The system includes also multiple auxiliary filling components that facilitate subsequent scaffolding use.

Distance between the individual scaffolding levels is indicated by the frames 2,00 m high and 0,73 or 1,09 m wide. Bay system length equals to 0,73 m, 1,09 m, 1,57 m, 2,07 m and 3,07 m respectively.

The scaffolding load capacity depends on its dimensions and the length of the platforms used to install the given scaffolding and it can vary from 2 up to 6 kN/m<sup>2</sup> (load classes according to PN-EN 12811-1:2004), see: Load capacity table on p. 53.

The scaffolding load bearing components are base jacks, frames and platforms. To make the scaffolding rigid you should use braces. The scaffolding safety components are: railings, double railings, front railings and toe boards. By using the above-mentioned components and other components present in the system (see p. 45-52 – Component list) you can develop the scaffolding while maintaining the safety rules and guidelines contained in this manual.

The MOSTOSTAL Plus frame scaffolding assembly manual shows the system capabilities on the basis of several dozen sample set-ups which are certified with the IMBiGS Safety Certificate. Users may use other guidelines and set-up models than those presented in this manual (see p. 22-39) but they must use individual designs and structural analyses.



### 1.2. List of standards and rules concerning the scaffoldings

When designing, installing, disassembling and using the scaffoldings you should observe the rules and requirements included in:

- This manual.
- Regulation of the Minister of Labour and Social Policy of 28 August 2003 on general occupational health and safety rules – unified text (Journal of Laws No. 169/03 item 1650) as further amended.
- Regulation of the Minister of Economy of 30 October 2002 on minimum requirements for occupational health and safety regarding usage by the employees of the machinery during work (Journal of Laws No. 191/02, item 1596) as further amended.
- Regulation of the Minister of Infrastructure of 6 February 2003 on occupational health and safety during construction works (Journal of Laws No. 47/03 item 401).
- PM-M-47900-1:1996 “Steel, standing scaffoldings. Definitions, division and main parameters”.
- PM-M-47900-2:1996 “Steel, standing scaffoldings. Pole scaffoldings made of pipes”.
- PM-M-47900-3:1996 “Steel, standing scaffoldings. Frame scaffoldings”.
- PN-EN 12811-1:2004 “Provisional structures used at a construction site. Scaffoldings. Conditions for the production and general design rules”.
- PN-EN 12810-1:2004 “Facade scaffolding made of prefabricated elements. Products’ technical specifications”.
- PN-EN 12810-2:2004 “Facade scaffolding made of prefabricated elements. Particular design and construction methods”.
- PN-EN 74:2002 “Couplings, centring plungers and foot sets used in working and load-bearing scaffoldings made of steel pipes. Requirements and examination procedures”.
- PN-EN 39:2003 “Steel pipes for scaffolding construction – Technical regulations for the delivery process”.
- PN-EN 1004 “Movable working platforms made of prefabricated elements, materials, scaffolding components, dimensions, force take-over and occupational health and safety requirements”.



## 2. GENERAL RULES



**Read the assembly manual before assembly.**

### 2.1. Component evaluation criteria

During the scaffolding assembly you should only use components in perfect condition being the parts of the system. Components with visible signs of damage cannot be used. You cannot use the following:

- components with signs of corrosion localised at the connection areas (welds),
- load-bearing frames with visible signs of damage in the form of stand twists, section deformation,
- platforms with damaged sheathing or damaged and bent catches,
- screw base jacks with damaged threads, twisted plunger or resistive nuts,
- other damaged components.

Damaged components should be replaced with those which are free of defects.

### 2.2. General assembly rules

The scaffoldings may be installed only by an appropriately qualified person who knows the assembly and operation manual of the given scaffolding type. Persons working on the assembled scaffolding which is put into use do not have to have such qualifications. A user is responsible for using the scaffolding handed-over.

Basic MOSTOSTAL Plus scaffolding technical and usage data regarding the standard set-up:

- work load – within 2 - 6 kN/m<sup>2</sup>, see p. 56 Load table (nominal scaffolding size according to PN-EN 12811-1:2004);
- number of platforms loaded simultaneously – one scaffolding platform on the given scaffolding section;
- bay width – 0,73 m or 1,09 m;
- bay length – max. 3,07 m;
- scaffolding height (height of the top working platform) – 34 m + 0,2 m.

The scaffolding set-ups which are used most often are presented in chapter 3. They include the assembly of protective canopies, scaffolding passages, assembly of the transport outrigger, nets and protective canvases.

Structural analyses are not required for typical scaffolding structure set-ups. However, they must be performed for the following scaffoldings:

- used in III wind zone according to PN-77/B-02011 (see NOTE on p. 6);
- with operational load greater than 2 kN/m<sup>2</sup> or whose individual vertical sections will have more than one platform loaded;
- assembled in the manner different than that which is used in the case of the wall set-ups described in this manual;
- with compensating frames (scaffoldings placed on the terrain with a considerable slope).

**2.2.1.** Before commencing the assembly the scaffolding ground base needs to be checked. In the case of the structural bases and base reinforcement the scaffolding placement has to meet the requirements of PN-M-47900-2 section 4.4

**2.2.2.** During the assembly you should use only original components which are not damaged and which are included in the MOSTOSTAL Plus scaffolding system.

**2.2.3.** A scaffolding should be placed on the stable and graded base which allows rainwater to flow. To protect the base jack from driving into the base and puncturing it you should use wooden beams. At least 2 base jacks should be located on one beam.

**2.2.4.** The base jack plunger should be at least 150 mm in the frame pipe.

**2.2.5.** During the assembly it is recommended to secure the frames with securing pins.

**2.2.6.** The scaffolding should be placed 0,2 m from the inner platform edge to the building. When the distance from the internal platform edge to the building exceeds 0,2 m or when the scaffolding is a free-standing structure you should install on its internal side additional railings by using the railing couplings and the toe boards. See fig. 3.25, p. 14 (section 3.4.2.).

- 2.2.7.** When loading the scaffolding platforms you should observe the following rules:
- scaffolding load should be evenly distributed on its entire surface;
  - assume 80 kg (0.8 kN) for each person working on the scaffolding;
  - to analyse the structure increase the weight of the components delivered with the hoist by 20%;
  - dynamic platform loading, e.g. jumping, throwing heavy objects etc. is prohibited;
  - platforms fixed on the consoles must be of the same load class as the basic scaffolding platforms.
- 2.2.8.** A wall scaffolding is braced on the scaffolding external plane parallel to the wall by performing multiplane or tower bracing. See fig. 3.9, p. 11.
- 2.2.9.** The extreme platform endings should be protected with front railings and toe boards.
- 2.2.10.** A scaffolding should be provided with circulation paths. The paths should be provided when erecting the scaffolding structure. The distance between the circulation paths cannot exceed 40 m. The greatest distance of the work station from the circulation path cannot exceed 20 m.
- 2.2.11.** All connections of the scaffolding pipes should be made with normal or rotary couplings compliant with PN-EN 74:2002. The coupling screws should be torque-tightened to 50 Nm.
- 2.2.12.** Steel platforms should be laid so that the gap between two platform parts on one level does not exceed 25 mm. When the working platform expansion consoles are installed the resulting gap should be filled with wood.
- 2.2.13.** It is acceptable to expand the scaffolding platforms with the consoles and frames supported with the vertical braces. The platforms can be expanded on the external scaffolding side or on its last level or on any level providing that they are anchored to the expanded level wall and to the wall located one level above and below the expanded level. When the platforms are expanded with the console 0,36 m from the internal scaffolding side the distance of the internal frame stand to the wall is increased to 0,56 m.
- 2.2.14.** The rules concerning installation of the facade scaffoldings presented in this manual are specified for the scaffoldings up to 34 m high and more than 10 m long after erection.
- 2.2.15.** To protect people against objects falling from the scaffolding you should use the protective nets or canvases.
- 2.2.16.** The scaffolding may be used in all wind zones acc. to PN-77/8-02011.



**For the scaffoldings intended for use in III wind zone and in places located more than 1500 m a.s.l. you should perform the additional structural analyses concerning wind.**

- 2.2.17.** If the scaffolding is anchored it should be anchored as the assembly progresses. The natural anchoring point is the gusset plate window. It is acceptable to fix the anchor couplings within 30 cm above and below the gusset plate window.
- 2.2.18.** The scaffolding may be disassembled when all works performed from this scaffolding are complete and all tools and materials are removed. It is acceptable to gradually disassemble the scaffolding from the top as the works progress. Throwing the components down when disassembling the scaffolding is prohibited. When disassembled all scaffolding components should be cleaned, checked and grouped into those which can be used again and those which must be repaired or replaced.
- 2.2.19.** If the scaffolding is anchored the anchorage should be disassembled when disassembling the scaffolding structure. Disassembly of more than one anchor set below the disassembled scaffolding level is prohibited.
- 2.2.20.** The scaffolding components should be stored and transported according to the provisions of PN-M-47900-2:1996 "Steel, standing scaffoldings. Pole scaffoldings made of pipes".



## 2.3. General safety rules for the scaffolding assembly and use

- 2.3.1.** The employees hired for the scaffolding assembly and disassembly should be trained and authorised by a training centre approved by the Institute of Mechanised Construction and Rock Mining in Warsaw.
- 2.3.2.** When assembling and disassembling the scaffolding you should use the personal protective equipment.
- 2.3.3.** When assembling and disassembling the scaffolding you should establish a danger zone and secure it with the proper markings and railings min. 1,5 m high. The danger zone cannot be smaller than 1/10 of the scaffolding height and not smaller than 6 m according to PN-M-47900-2:1996 section 4.10.4. In a city compact settlement the danger zone may be smaller providing that other protections are used.
- The scaffolding cannot be assembled, disassembled or used during:**
- a) sunset of no proper lighting has been provided;
  - b) heavy fog, rain, snow and glazed frost;
  - c) storm and wind that exceeds 10 m/s.
- 2.3.4.** The scaffolding assembly and disassembly area should be marked with the warning plates provided in the visible locations at the height of 2.5 m from the ground level. The text on the plates should be readable at least from 10 m.
- 2.3.5.** The scaffoldings located directly at the circulation roads should be provided with the protective canopies which comply with § 22 of the Regulation of Minister of Infrastructure of 6 February 2003, Journal of Laws No. 47 item 401.
- 2.3.6.** The frames located at the gates, clearances and passages used for the vehicle traffic should be protected with the barriers (bumping posts) which are not connected with the scaffolding structure.
- 2.3.7.** When the passage is blocked during the scaffolding assembly (against the local authority consent) you should place a barrier in the passage along with a red shield with a text that warns of the closed or blocked passage and install a red light on the barrier that will be used at night.
- 2.3.8.** The scaffolding cannot be assembled, disassembled or used nearby the overhead power lines if the distance between the scaffolding and the extreme power lines is smaller than:
- a) 3 m for the lines with the maximum rated voltage of 1 kV;
  - b) 5 m for the lines with the rated voltage between 1 kV and 15 kV;
  - c) 10 m for the lines with the rated voltage between 15 kV and 30 kV;
  - d) 15 m for the lines with the rated voltage between 30 kV and 110 kV;
  - e) 30 m for the lines with the rated voltage exceeding 110 kV.
- When the scaffolding is assembled or disassembled under the overhead power lines or at a distance smaller than those specified above during the works the voltage should be cut-off.
- 2.3.9.** The scaffolding structure should be equipped with the lightning protection equipment according to PN-M-47900-2:1996.
- 2.3.10.** The scaffolding may be used when it is accepted by the technical supervisor or other authorised person. During the acceptance you should test the scaffolding according to section 7.3. of PN-M-47900-2:1996. The scaffolding acceptance is confirmed with a log according to annex no. 1 to this manual or a record in the construction logbook.
- 2.3.11.** The scaffolding should be provided with a plate which informs of the permissible platform load. It is prohibited to load the scaffolding platforms with materials which are heavier than its load capacity and to gather people on the platforms.
- 2.3.12.** The scaffolding may be equipped with a device used for transporting materials with the jibs secured to the scaffolding structure. The jibs may be made of the pipes secured to the scaffolding with the couplings. You can use the typical jib and block offered by the manufacturer.
- Maximum weight of the lifted materials cannot exceed 150 kg. When using jibs with a higher lift capacity which are secured to the scaffolding you should carry out the structural analyses for this scaffolding. The transport jib must be additionally anchored at least in two points. Distance between the jibs cannot exceed 30 m. Distance of the cumulative axis from the furthest scaffolding point on the lifting plane cannot exceed 0,5 m. Height from the block attachment point to the platform level cannot be smaller than 1,6 m.
- For vertical transport it is recommended to use the hoisting winches with attachment that can be installed on the scaffolding. This equipment must have the approval certificate issued by the Office of Technical Inspection. The hoisting winches should be installed in strict accordance with the manual prepared by the hoisting winch manufacturer.
- 2.3.13.** Before each use the scaffolding should be checked for the proper and complete structure and you should also

check if there are no environmental changes that affect the safe use. In particular you should check if the foundation is intact. These checks should be performed by the foreman who uses the scaffolding.

**2.3.14.** The scaffolding should be inspected after strong wind, heavy rain, hailstorm, lightning stroke or when it was affected by other dangerous factors and when no works have been carried out on the scaffolding for 10 days, and the inspection should be performed at least once a month.

**During the inspections check:**

- condition of the base where the scaffolding is placed,
- protection condition (railings, toe boards),
- platform condition (gaps between platforms, damage, platform loading method), circulation paths (ladder fastening, proper opening and closing of hatches),
- method used for protecting the upper platforms and platforms supported on the consoles against falling out,
- rotary coupling condition,
- anchorage force,
- condition of the hoisting winches and the supporting structure,
- lightning protection system condition.

The inspection is carried out by the construction manager or other authorised person. Each inspection should be documented with a memo or recorded in the construction logbook.

**2.3.15.** Before work in winter you should remove snow from the scaffolding.





## 3. ASSEMBLY OF SCAFFOLDINGS UP TO 34 m HIGH

### 3.1. Preliminary actions

- 3.1.1. Before the assembly check the technical condition of all scaffolding components.
- 3.1.2. During the assembly use only such components which are in perfect technical condition. These components cannot have cracks, bent couplings, bent platform catches, indentations and deformations of straight surfaces, coupling screws with damaged threads etc.

### 3.2. Assembly guidelines for safer use

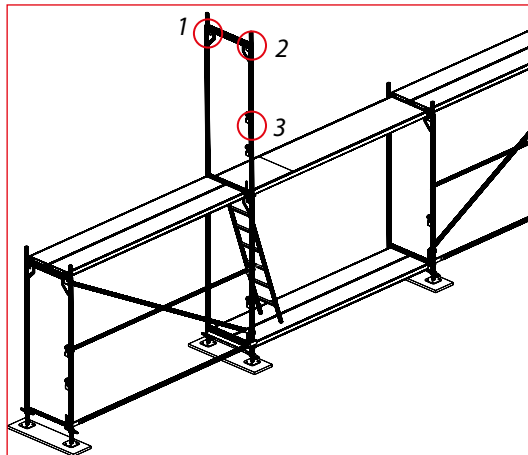


fig. 3.1. – Recommended safety harness attachment point

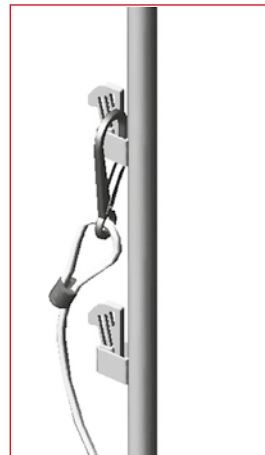


fig. 3.2 – Attachment to the wedge cassette

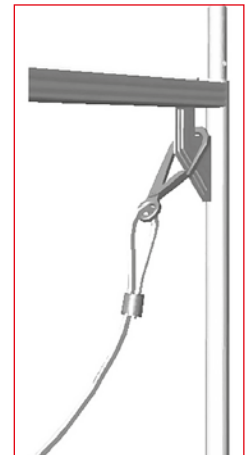


fig. 3.3. – Attachment to the gusset plate



For clarity the safety cords are not shown in the rest of the manual however they are absolutely required.

#### Personal protection

Personal protective equipment (helmet, safety braces, protective shoes, safety cord) must be used during the scaffolding assembly, disassembly and use. For greater safety of the service the above figures present the examples of the above-mentioned protective equipment attachment points.

When erecting the scaffolding the personal safety cord must be attached to the scaffolding components. Cord and gusset plate binding should be performed with the frames that are higher than the level you are standing on. The same applies to the securing cassettes. When the frames of the assembled level are not connected with the railings the safety cords should be attached to the wedge cassette at the height of 1 m. It is acceptable to attach the cord to the components of the level you are standing on only when there is no other possibility. There are also ways to attach the personal protective equipment directly to the structure surrounded by the scaffolding. The protection is provided separately for each facility.

#### Safety Kit

A Safety Kit is a temporary safety precaution for the fitter used when entering the net level before the frames and railings are installed.

The Kit consists of 2 assembly posts and a telescopic railing. When the Safety Kit is assembled the railing is one meter above the platform over the level which the post is assembled on. The post can be assembled and disassembled from

both levels. The telescopic railing allows for moving the post to the next levels without disassembling the railing and adjust the set length within 1,5 m to 2,07 , or 2,07 m to 3,7 m.

Small weight of the structure allows for convenient moving of the set by the fitters to the next scaffolding level (after completing the works on the given level).

### **Safety Kit assembly stages:**

An assembly post consists of two pipes which can be rotated and moved along a joint axis. This allows opening and closing the catch. When the post is properly installed the bolt in the bottom catch enters the opening in the closing sheet (fig. 3.4).

By lifting and rotating the pipe external pipe attach the post to the frame so that the bottom catch leans on the upper railing of the scaffolding and the upper catch is placed between the pipe and the gusset plate (fig. 3.5).

Attach the telescopic railing to the eye of the installed post (fig. 3.6).

Attach the other telescopic railing end to the post eye before the post installation.

When the frames and railing are installed on the higher scaffolding level the Safety Kit can be moved to the next level. This procedure does not require the telescopic railing to be disassembled.

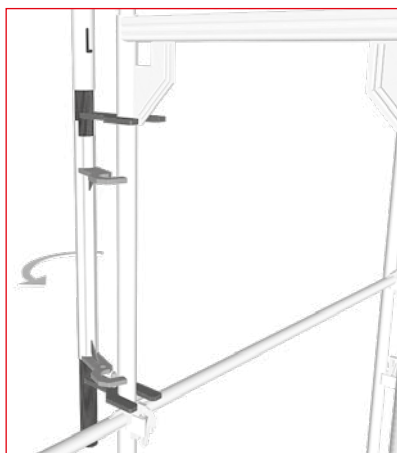


fig. 3.4.

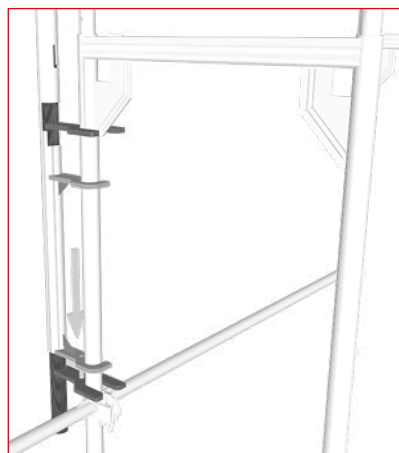


fig. 3.5.

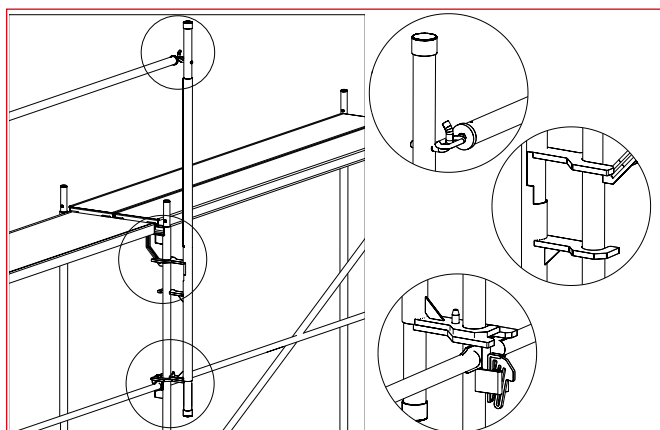


fig. 3.6.

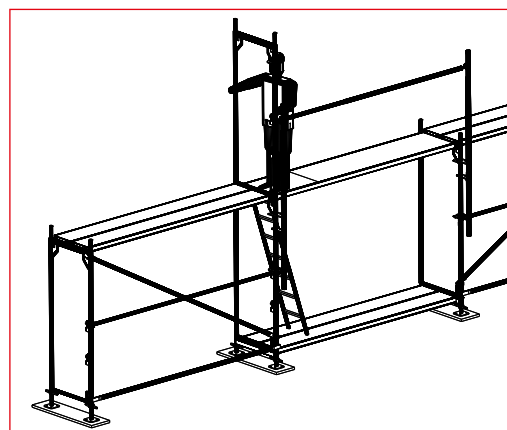


fig. 3.7.

The Safety Kit is required for the frame scaffolding system whenever safety of the construction workers and following the OHS rules are important.



**The Assembly Safety Kit does not substitute the personal protective equipment.**

### 3.3. Scaffolding assembly steps

#### Stage 1

The scaffolding assembly starts at the highest point of the ground where the scaffolding will be assembled. Place the base jacks with nut at the proper distance with the nuts unscrewed. Proper spacing between the individual pairs of base jacks results from the individual railings placed on the ground. Place first two frames on the base jacks and connect them with the railings (fig. 3.8).

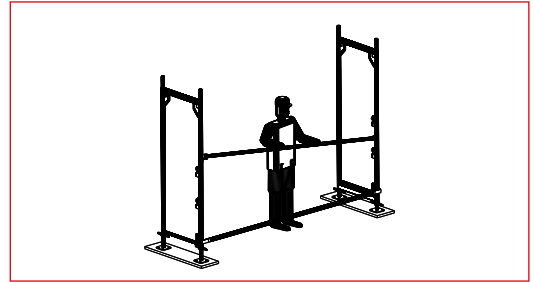


fig. 3.8

#### Stage 2

Place the platforms on the frame U-sections. Insert the diagonal into the frame gusset plate hole from the external side (frame stand with the railing couplings) and screw the other end of the diagonal to the lower part of the opposite vertical frame. Using the level set the frames vertically and level the assembled bay. Starting from this initial bay assemble the next bays by attaching the frames on the base jacks, connecting them with the assembled bays by using railings and placing the platforms (fig. 3.9).

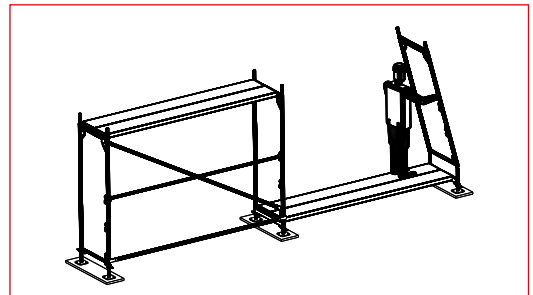


fig. 3.9



Each braced bay has to contain a horizontal brace attached by screwing it to the frame stands just above the base jack but (fig. 3.9).

#### Stage 3

Choose the bay for the circulation path – internal entrance. For this bay you should install the initial U-transom for the stairs, then the starting platforms which support the ladder of the circulation path and then install the frames and the railings. The assembled frames should be fitted with the passage platform with a hatch (fig. 3.10). When the first level is assembled level it carefully starting from the highest point of the ground.

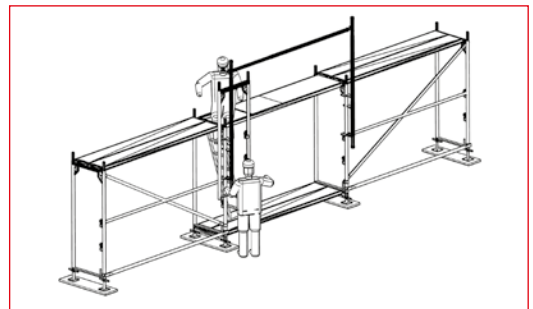


fig. 3.10.

#### Stage 4

The frames for the next level are placed starting from the circulation path. Place the first frame for the next level while standing on the ladder of the previous scaffolding level (fig. 3.11).

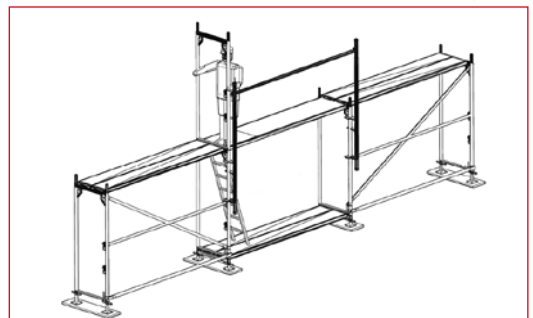


fig. 3.11

### Stage 5

Starting from this bay proceed with the assembly in both directions (fig. 3.12).



The disassembly has to be performed in the reverse order. Always in the direction of the circulation path.

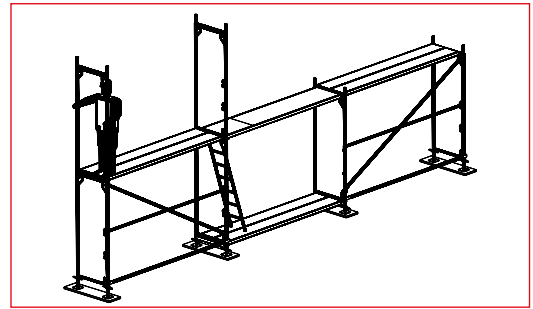


fig. 3.12

### Stage 6

The frames have to be immediately inter-connected with the railings to secure the employee (fig. 3.13).



No platforms should be ever placed on the frames which are not inter-connected with the railings (fig. 3.14). This may lead to an accident and damaging the scaffolding components.

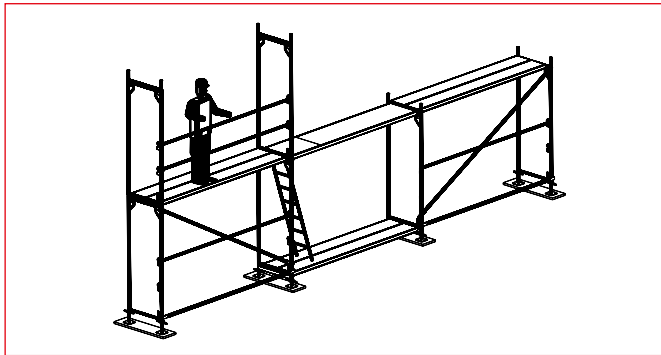


fig. 3.13

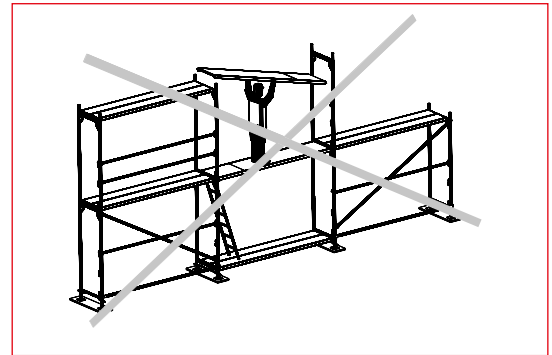


fig. 3.14

### Stage 7

Each level should be secured from the front side with the front railing (fig. 3.15). All scaffolding levels placed higher than 2 m should be secured with the toe boards. The toe boards should be attached to the frame rods. The platforms should be secured with the longitudinal toe boards along the scaffolding and with the transverse toe boards from the front side (fig. 3.15 and 3.16).

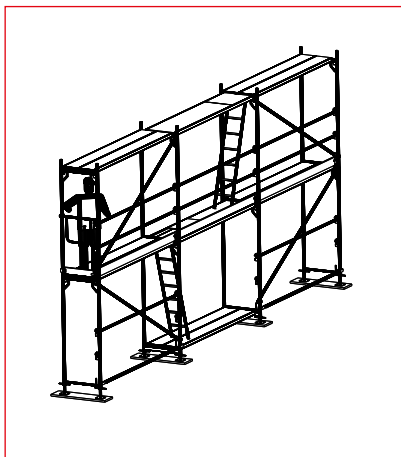


fig. 3.15

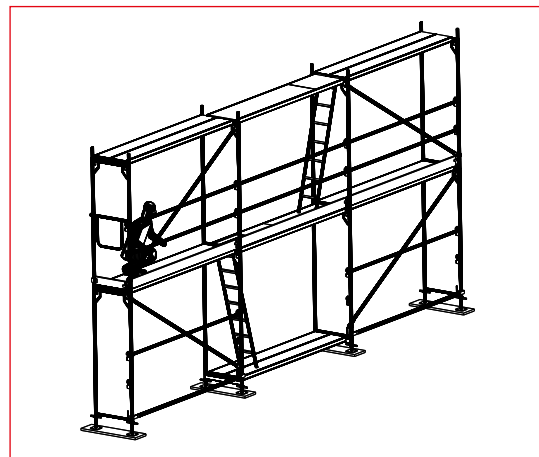


fig. 3.16

### Stage 8

Place the platforms on the U-sections of the adjacent frames (fig. 3.17). Install the anchors acc. to the rules specified in section 3.4.6. Follow the rules specified for stages 4 – 8 when installing each next level.

### Stage 9

To secure proper vertical communication you should install the passage platforms with a ladder and a hatch. These platforms are installed alternately in the circulation path. The hatch is protected against opening. The hatches may be opened only when passing from one scaffolding level to another. When you enter or leave the platform you must always close the hatch.

The next scaffolding level should be assembled starting always from placing the frame over the passage hole. To secure the highest scaffolding level instead of the frames install the railing posts and secure the railings. Place the first post in the circulation path (fig. 3.18).

Secure the scaffolding from the front side by installing the front frame.

Install the longitudinal and transverse toe boards (fig. 3.19).

Observe the following rules during the assembly:

- the anchors should be installed successively to the assembly of the entire scaffolding according to the anchoring grid prepared for the given scaffolding variant,
- each separate level must always be set vertically by using a level. This procedure should be performed in the bays where the vertical braces are installed. The vertical position of the scaffolding is adjusted by adjusting the brace bottom coupling position relative to the frame vertical pipe. The scaffolding is disassembled in the reverse order.

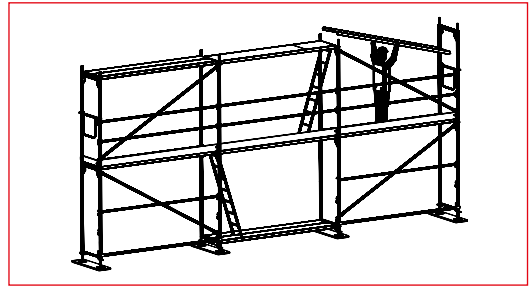


fig. 3.17

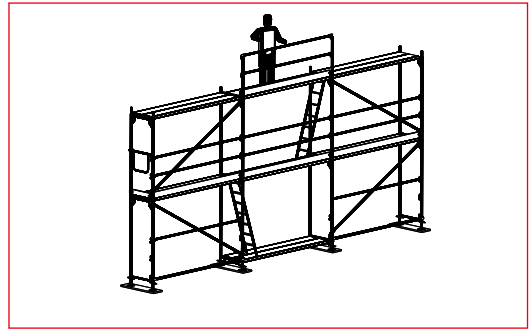


fig. 3.18

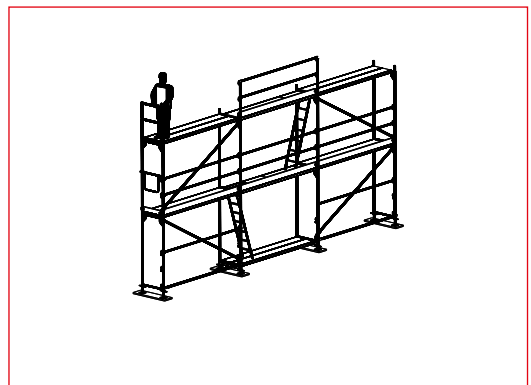


fig. 3.19

## 3.4. Assembly rules important for safety

### 3.4.1. Scaffolding levelling

To set the scaffolding position you should start from the highest level with the base jack nuts in the lowest position. The nut is used to level the scaffolding frames (fig 3.20). If the scaffolding is placed on the ground base the base jacks must be supported by the wooden beams to distribute the load over the larger surface. The beams are also recommended when the scaffolding is placed on the structural base. At least two screw base jacks must be placed on one wooden beam. If the ground is considerably inclined use the compensating frames 0,6 m, 1 m or 1,5 m high. If the ground slope exceeds 10° and the scaffolding has to be assembled there its structure must be reinforced by installing the pipes secured with the couplings. The pipes should be installed 20 cm over the ground parallel to the ground slope direction (fig. 3.21).

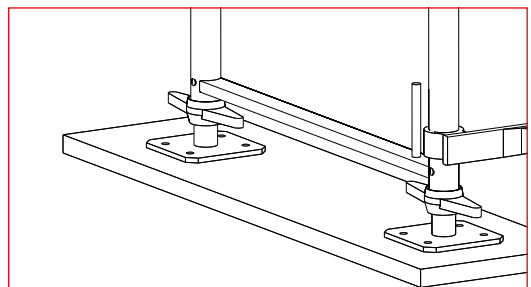


fig. 3.20

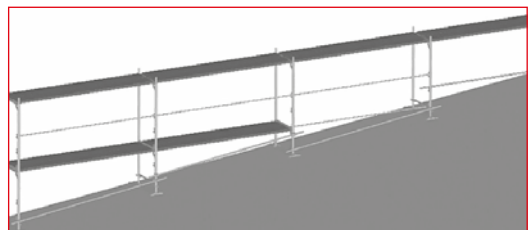


fig. 3.21

### 3.4.2. Side protection

Each platform has to be secured with the single upper and intermediate (bottom) railing and the longitudinal toe board. The railings are installed on the frame cassettes and locked with a wedge (fig. 3.22 and 3.23).

The toe boards are installed on the frame pegs (fig. 3.24). If the distance between the platform edge and the wall exceeds 0,2 m install the complete side protection – railings and toe boards from the internal side (fig. 3.250). The toe boards at the wall should be made of planks 3 x 15 cm. The planks should be attached to the stands with the toe board catches. The plank should be 20 – 40 cm longer than the bay where it will be installed. It is acceptable to use other platform protections, e.g. net screen.

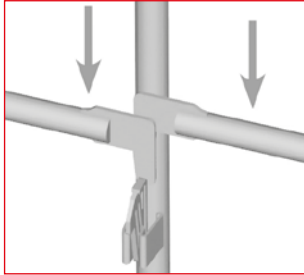


fig. 3.22

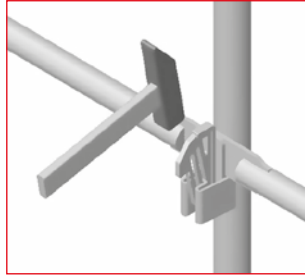


fig. 3.23

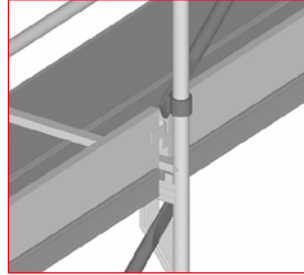


fig. 3.24

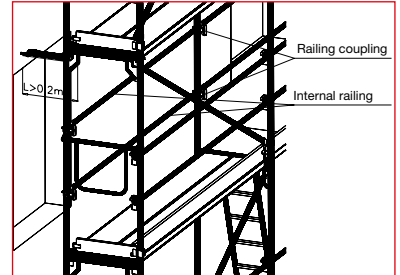


fig. 3.25

### 3.4.3. Side protection

This protection is made by installing the front railing (fig. 3.26). The platforms placed on the wide console should be secured from the front side with the front frame. The front railing is installed the other way round as compared to the installation where the vertical frames are used (fig. 3.27). Make sure that in this position the upper railing part is 1 – 1,1 m over the platform. Figure 3.28 presents the protection of the platform installed on the console at the working platform expansion.

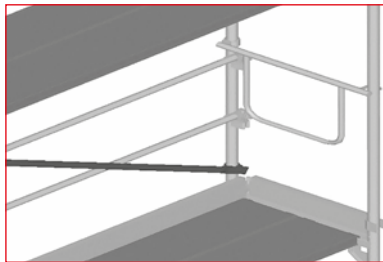


fig. 3.26

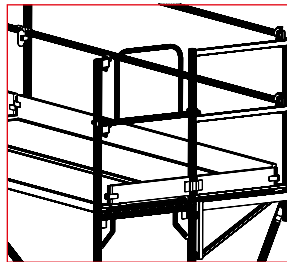


fig. 3.27

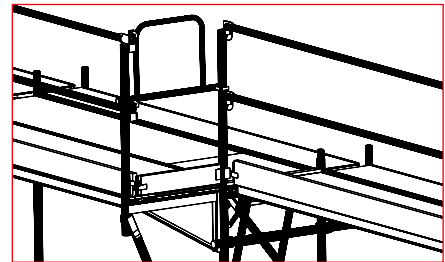


fig. 3.28

### 3.4.4. Scaffolding bracing

The upper end of the vertical brace is inserted into the hole cut in the gusset plate and the bottom end is fastened to the frame with the rotary coupling (fig. 3.29). The frames should be successively set vertically with a level in the braced bays on each level.

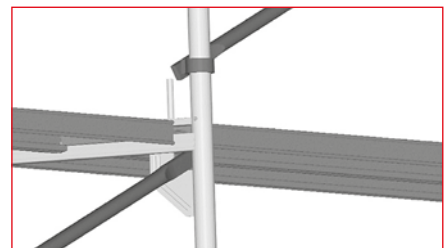


fig. 3.29

### 3.4.5. Scaffolding highest level protection

The protection is made by installing the front frame (fig. 3.30) from the scaffolding front side and the railing posts along the scaffolding with the railings. The posts and the platform protection protect the platforms from falling out.

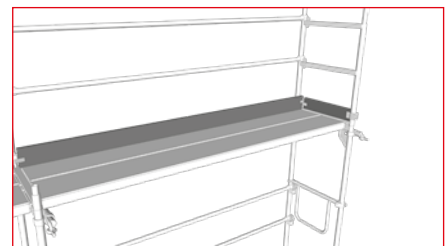


fig. 3.30

### 3.4.6. Scaffolding anchoring – types of anchors

The scaffolding is anchored with the anchor couplings fastened to the frame stands with the standard couplings below the working platform and to the wall structure (fig. 3.31). The couplings are fitted with the hooks to attach the scaffolding to the anchor screws with the eye which are attached to the wall or they are used to catch the wall structural parts. The coupling is inserted in the screw eye from the middle part of the coupling hook (about 50 mm relative to the upper coupling pipe edge). When the screw eye is set horizontally the horizontal forces are transferred from the scaffolding on the building.

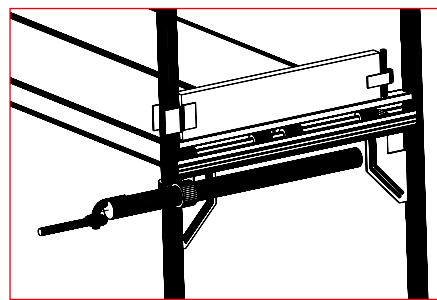


fig. 3.31

### 3.4.7. Scaffolding passages

To secure proper vertical communication on the scaffolding you should install the platforms with a ladder and a hatch. The hatch should always be closed (fig. 3.32). To provide convenient and ergonomic work you could install the optional staircases (p. 18, section 3.4.14.).



fig. 3.32

### 3.4.8. Protection during roof works

To secure the facility roof works install the net screen posts with the net screens on the highest scaffolding level (fig. 3.33). When the net screens are installed the longitudinal toe boards are not required.



fig. 3.33

### 3.4.9. Scaffolding inter-connecting

Where the scaffolding bay meet the frame external stands are connected with the pipe and two standard couplings (fig. 3.34). The pipes that connect two bays act also as a side protection. The space between the bays is covered with the steel platforms, filling steel platforms or planks securing from the wind.

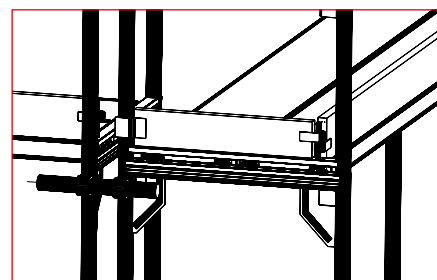


fig. 3.34

### 3.4.10. Passages under scaffoldings

The passage frames are installed to provide a passage for people under the scaffolding (fig. 3.35). The frames should be inter-connected with the railings and horizontal braces. The connection should be made directly over the screw base jack nut parallel to the facade. The maximum height of the scaffolding built with the passage frames is 34 m providing that all nodes of the first and second level are anchored. The passage frames are braced on both frame sides (external and internal). For the higher levels the frames are braced on the external side.

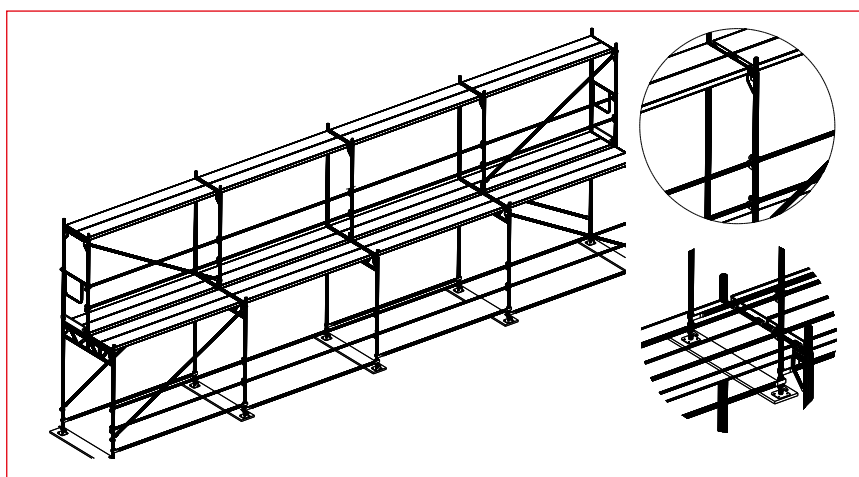


fig. 3.35



### 3.4.11. Gate entrances (scaffolding passages)

The scaffolding passages are made of the grate girders installed on the external sides of the adjacent frames with the standard couplings. Each girder is fastened to the frame stands with 4 couplings. When the passage is more than 3,07 m wide the girder transom or the compensating frame 0.6 m must be installed which can be fitted with the frames of the next levels (fig. 3.36). When the scaffolding passage is built with the grate girder it cannot replace more than two bays. The scaffoldings which are more than 20 m high and 1,09 m wide should be additionally reinforced over the girder and equipped with the universal pipes 6 m long to reinforce the frame stands in the passage area (see p. 30 and 40 section 3.5.8).



The girders 6 m may be provided with up to 5 levels (10 m).

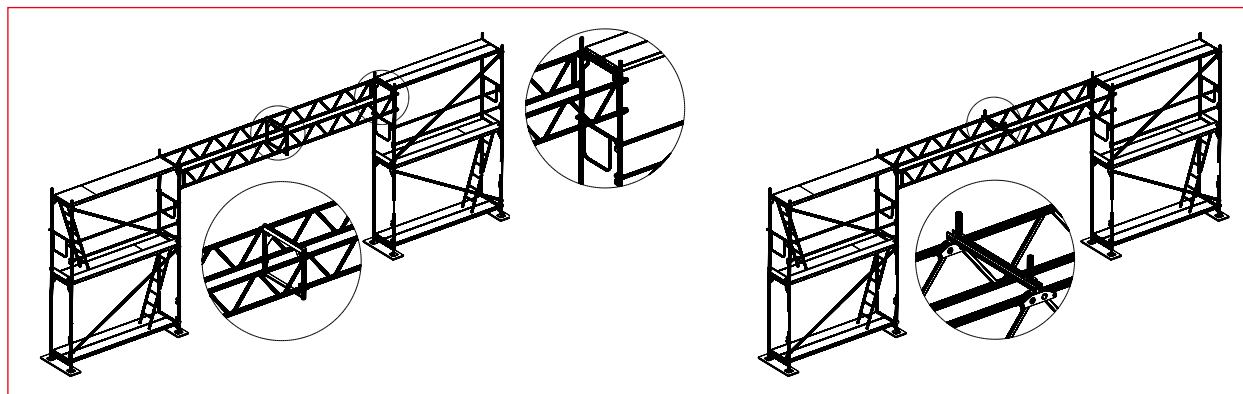


fig. 3.36

### 3.4.12. Scaffolding expanding

To expand the steel scaffolding working area install the consoles outside (fig. 3.37 and 3.38) or inside the scaffolding. It is acceptable to expand the scaffolding platform with the steel consoles 0,36 m and 0,73 m. The consoles 0,36 m can be installed from the scaffolding internal side (facade) on each level of the scaffolding.

The consoles should be installed at the gusset plate level. The load of the platform installed on the console cannot be greater than the main platform permissible loads.

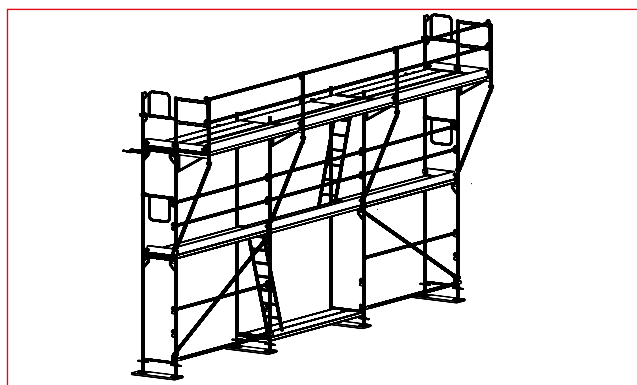


fig. 3.37

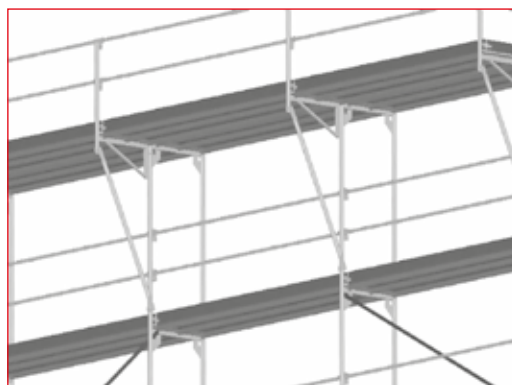


fig. 3.38

The consoles 0,73 m can be installed on the scaffolding external side on its last level or on any level providing that an additional anchorage is provided for the wall of the level with the installed console and one level above and below this level.



When installing the wide consoles (0,73 m) from the scaffolding external side on the level other than the last one the braces of the braced bays should be made of the pipe and two couplings.



Platform arrangement on the expanded scaffoldings,

fig. 3.39, fig. 3.40, fig. 3.41, fig. 3.42

• solid aluminium platforms 0.61 m and steel platforms 0.32 m and 0.19 m

The platforms should be laid so that the gap between the platforms on one level is not larger than 15 mm and the gap between the platform installed on the console 0,367 m and the platform installed on the vertical frame is not larger than 25 mm.

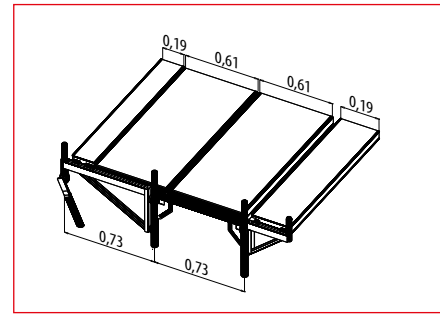


fig. 3.39

• steel platforms 0.32 m and 0.19 m wide

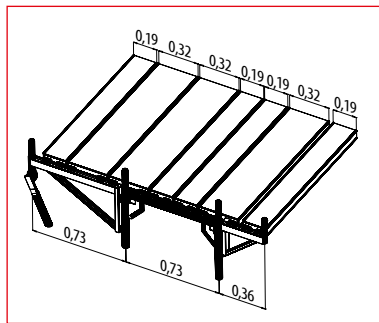


fig. 3.40

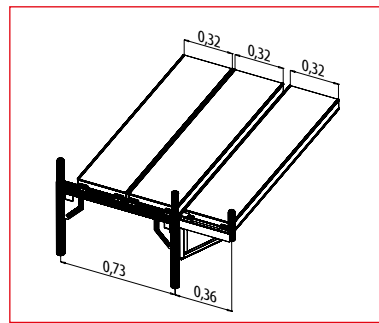


fig. 3.41

• aluminium-plywood platforms 0.6 m wide and steel platforms 0.19 m wide

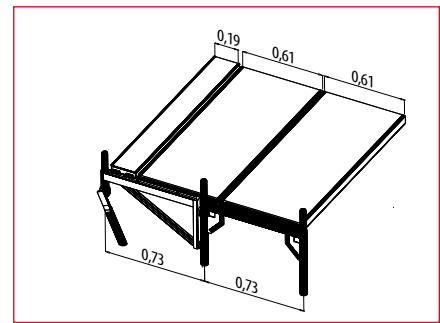


fig. 3.42

### 3.4.13. Protective roof

To protect people walking by or under the scaffolding you should install a protective roof. It is made of the steel console 0,73 m connected with the frame and the roof console. The roof console is covered with the platforms. Each frame supporting the protective roof must be anchored to the building (fig. 3.43).

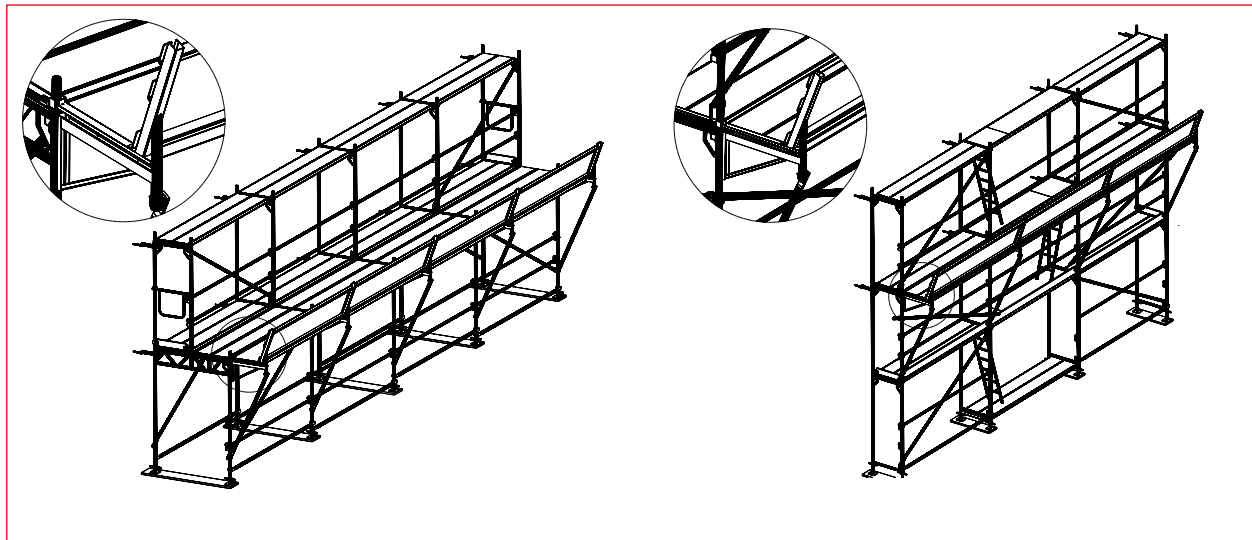


fig. 3.43



The protective roof presented in fig. 3.43 is not a sufficient protection in terms of the requirements specified in PN-M-47900-2:1996 section 4.10.3

### 3.4.14. External staircases

To provide convenient vertical communication external staircases are installed on the scaffolding. Typically, an external staircase is installed in the bay measuring 3,07 m or 2,57 m according to one of the two presented diagrams. Additionally, installed frames are vertically connected with the wall scaffolding every 4 m with the wall scaffolding node anchored in the connection points. The connections are made of pipes of the diameter of 48.3x3,2 and normal couplings. The staircase should be equipped with railings including the front railing and stairs internal and external railings.

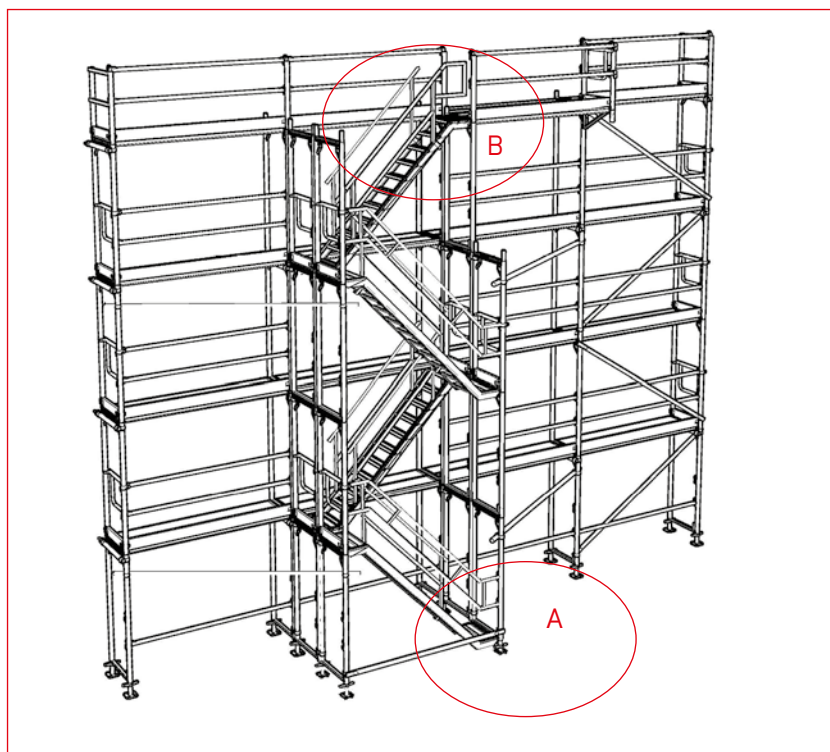


fig. 3.44

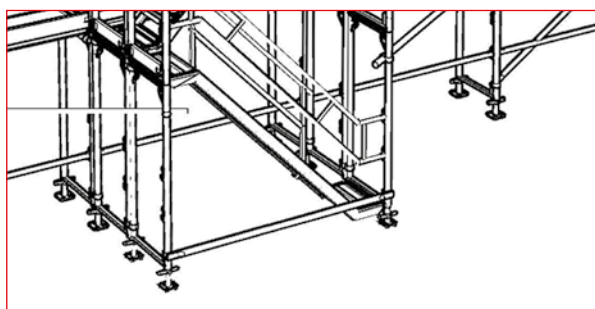


fig. 3.45 – detail A



fig. 3.46 – detail B

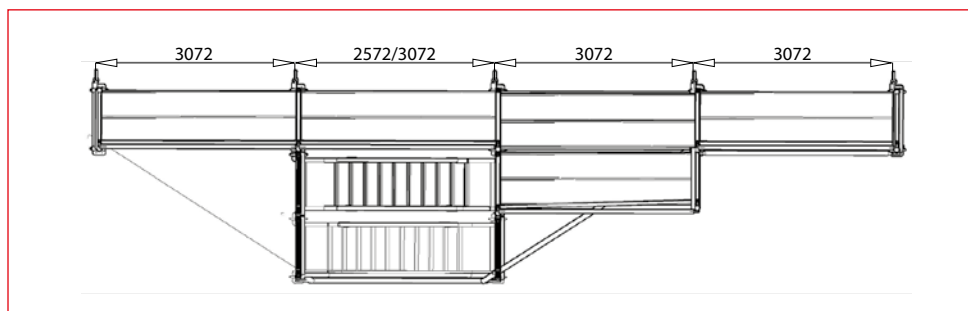


fig. 3.47 – top view

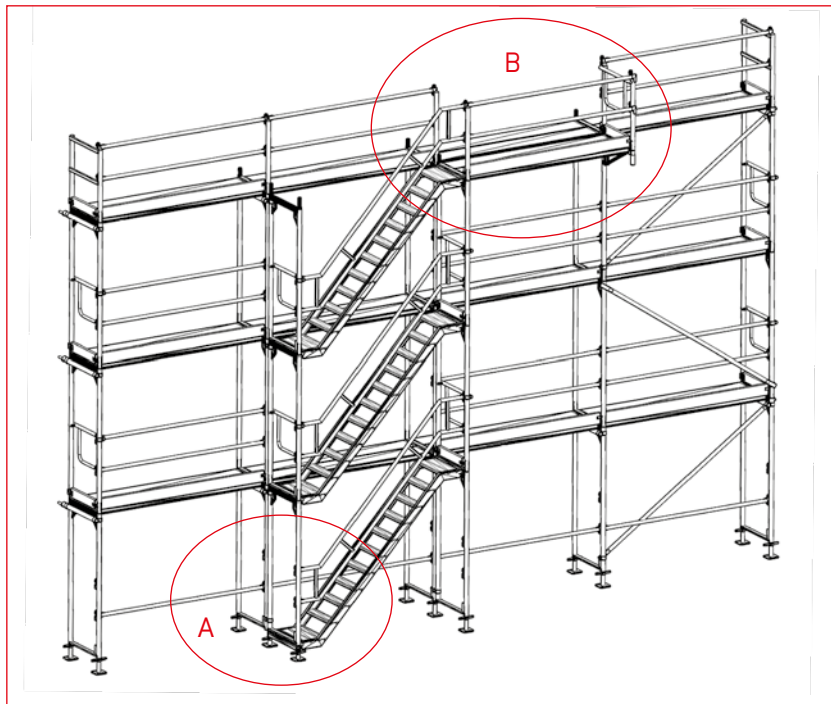


fig. 3.48 – complete view

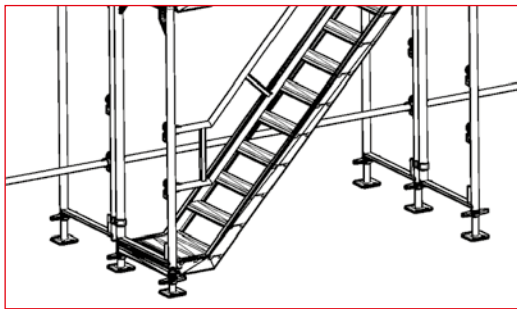


fig. 3.49 – detail A

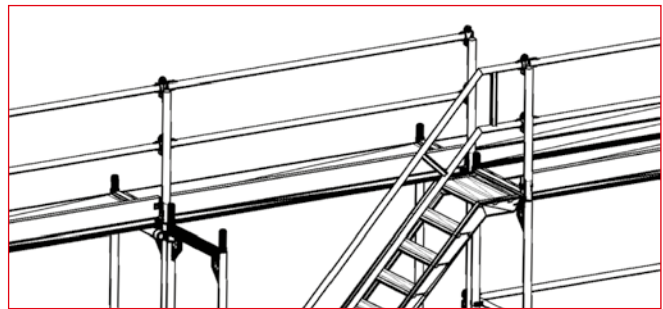


fig. 3.50 – detail B

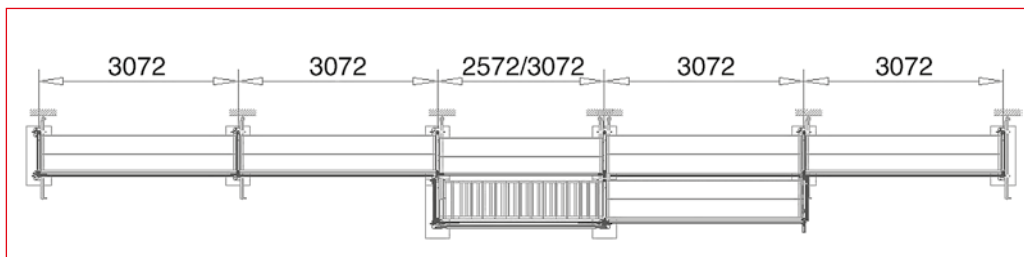


fig. 3.51 – top view

### 3.4.15. Material transport

The scaffolding may be equipped with a device used for transporting materials with the jibs secured to the scaffolding structure. You can use the typical block offered by the manufacturer.

Maximum weight of the lifted materials cannot exceed 150 kg. When using hoisting winches with a higher lift capacity which are secured to the scaffolding you should carry out the structural analyses for this scaffolding because of the non-standard solution.



The transport jib must be additionally anchored at least in two points (see: figure 3.52) while considering the anchorage of two adjacent frames on the level located below and over the jib.

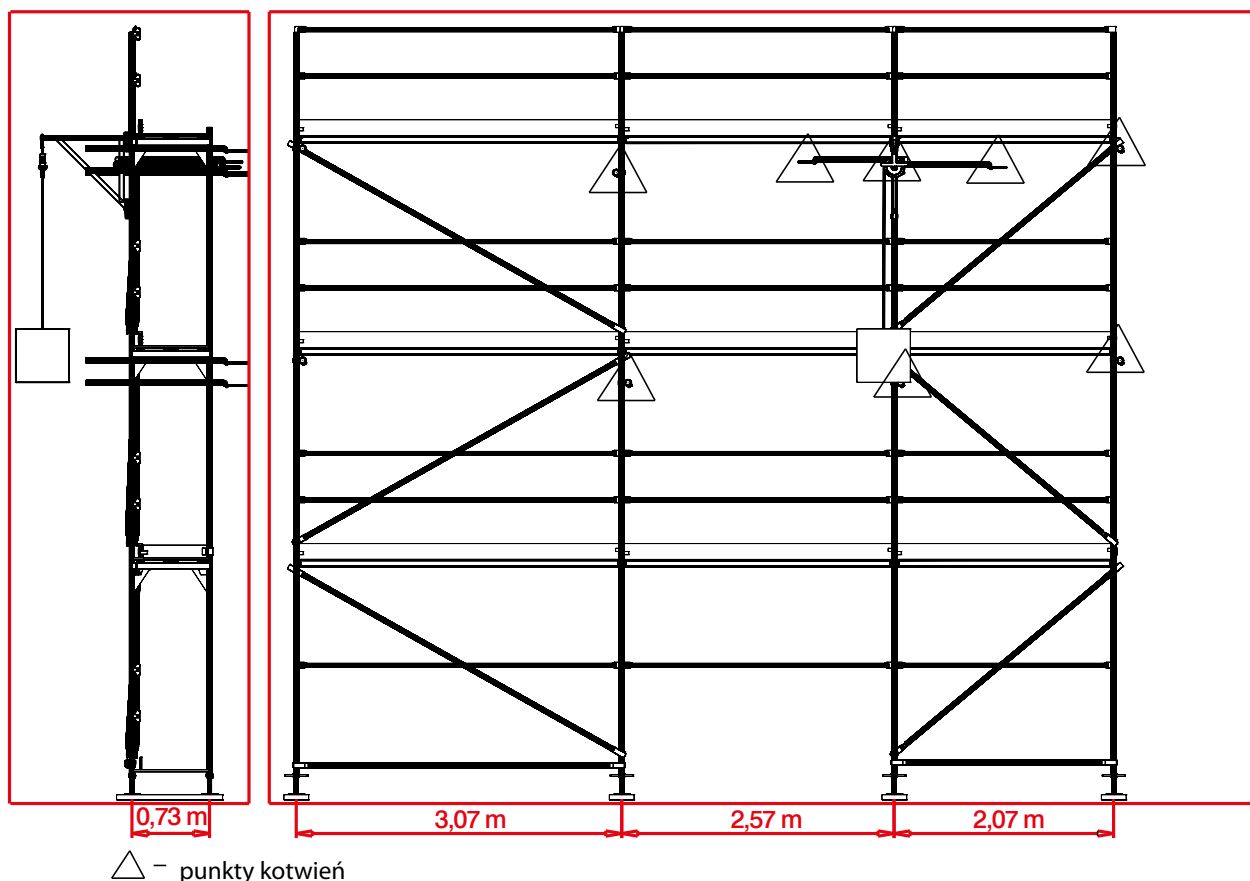


fig. 3.52 – additional anchors installed during the console installation

Distance between the jibs cannot exceed 30 m. Distance of the jib from the scaffolding closer end cannot be less than 15 m. Height from the block attachment point to the platform level cannot be smaller than 1,6 m. For vertical transport it is recommended to use the hoisting winches with attachment that can be installed on the scaffolding. This equipment must have the approval certificate issued by the Office of Technical Inspection. The hoisting winches should be installed in strict accordance with the manual prepared by the hoisting winch manufacturer.

### 3.5. Rules for anchoring and assembly of braces

#### 3.5.1. Basic anchoring rules:

- anchors should be installed from the second level, anchors should consists of the anchor couplings and the stand-ard couplings,
- anchors should be placed symmetrically over the entire surface,
- horizontal distance between the anchors should not exceed 6 m (anchor every other bay 2,57 m and 3,07 m,
- distance between the vertical anchor rows should not exceed 4 m (anchor every other level) with the rows of an-chors moved horizontally relative to each other,
- each anchor row should end on the scaffolding edge,
- the bays with the circulation paths should be additionally anchored on both sides in the given row of anchors,
- it is acceptable to install the anchors 30 cm above or below the gusset plate hole.

For the scaffoldings covered with the canvases or nets, scaffoldings with the gate girders, passage frames and pro-protective roofs additional anchors are required. The distribution and number of the anchors of these scaffoldings are presented in the figures in the rest of this manual.

For the scaffoldings with the console 0,36 m installed from the scaffolding internal side when the scaffolding is anchored to the internal stand with a single coupling 20% of all anchors must be double anchors. These anchors should be evenly distributed over the entire surface and the rule of at least two V anchors installed on each anchored level should be followed. See fig. 3.53.

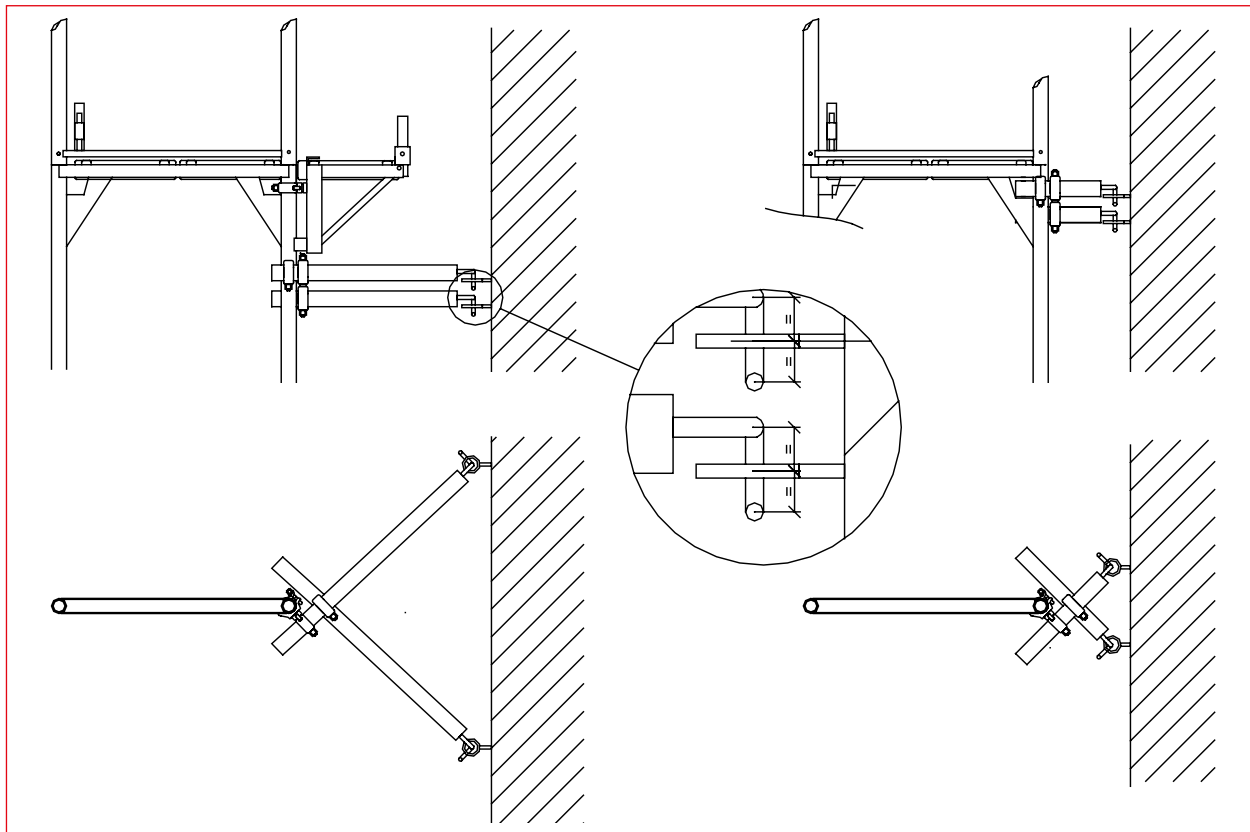


fig. 3.53 – additional anchors installed during the console installation

### 3.5.2. Assembly rules for diagonals:

- tower-shaped diagonal should be zigzagged. Brace at least every fifth bay of the module 2,57 m or every fourth bay of the module 3,07 m. Remember to continuously install the braces from the base jack upwards. The maximum distance between the individual braces cannot exceed 10 m,
- diagonal should be placed symmetrically over the scaffolding length,
- at least 2 braces must be installed on each level,
- large-format braces should be installed in the following manner: one brace for 5 bays of a single level,
- slarge-format braces should be installed diagonally across 5 bays and then you should turn and install the next braces diagonally across another 5 bays (braces mirrored acc. to the horizontal axis).

### 3.5.3. Combination of forces in anchors and base jacks of typical sets:

The forces acting in the anchors and base jacks are specified in the tables provided with the scaffolding set-up diagrams. See p. 24-37.

### 3.5.4. Brace and anchor arrangement for the scaffolding up to 24 m high.



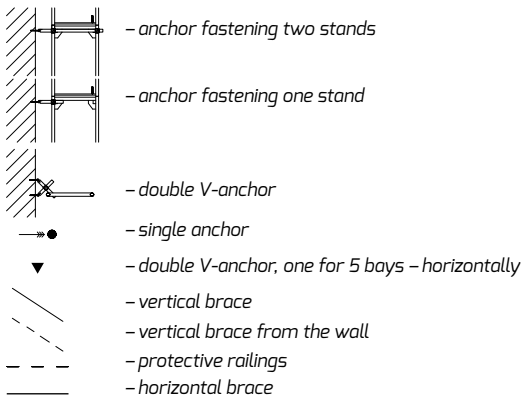
The scaffoldings installed at the facilities acc. to the diagrams included in this document do not require any separate structural analyses to be performed. Information included in the descriptions of individual sets have been reviewed during the structural analyses. It is completely safe to use them when the requirements specified in the diagrams are met. All set-ups which deviate from the set-ups and provisions specified in this document require the structural analyses to be performed to confirm that the structure is stable.

The term **closed facade** describes the building facade with the entire surface covered with the scaffolding filled with the air-proof material (concrete, glass, composite, wood etc.).

The term **partially open facade** describes the building facade with the part of the surface covered with the scaffolding up to 60% not filled with the air-proof material (the passage holes are present). This facade allows the wind to pass through the building.

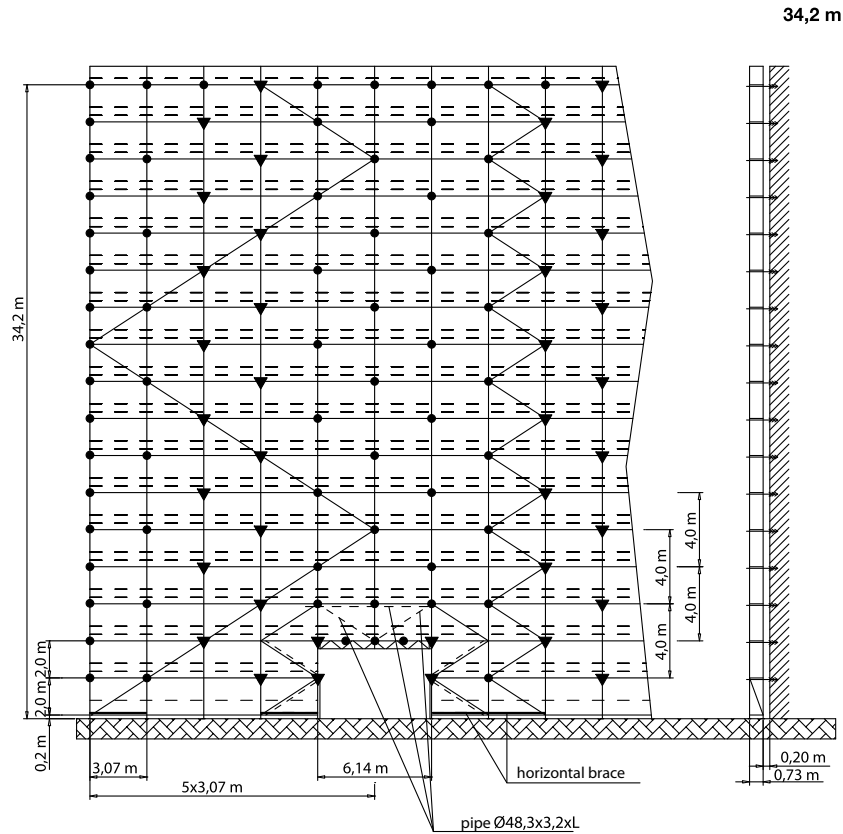
3.5.5. Scaffolding assembly up to 34 m high

Scaffolding without covering, closed facade\*  
Gate crossing option  
Working platform load of 2 kN/m²  
Safety platform 1 kN/m²

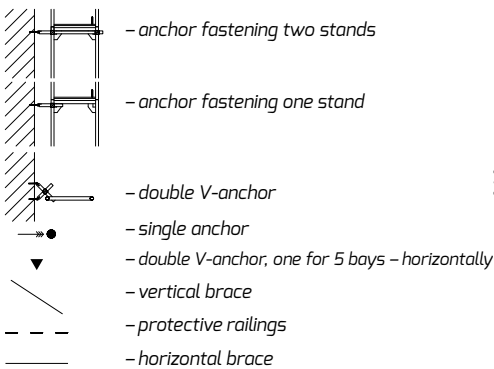


Type of facade filling	closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)		1,9	01
	⊥	4,8	
Maximum force in the foot (kN)	internal stand	23,4	01
	external stand	52,2	

\* closed facade, when number of openings is less than 20% of facade surface

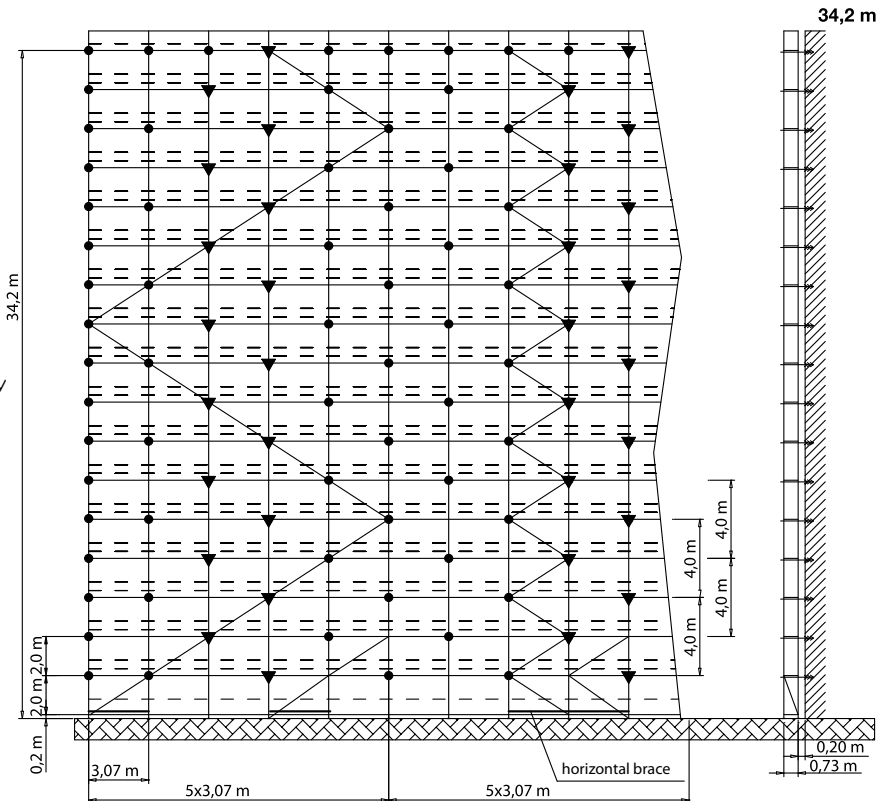


Scaffolding without covering, closed facade\*  
Basic option  
Working platform load of 2 kN/m²  
Safety platform 1 kN/m²

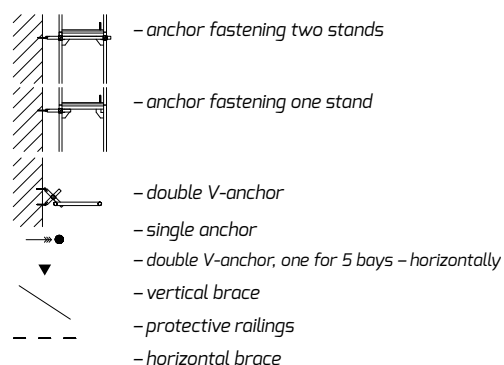


Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)		2,8	03
	⊥	4,8	
Maximum force in the foot (kN)	Internal stand	16,3	03
	External stand	55,1	

\* closed facade, when number of openings is less than 20% of facade surface

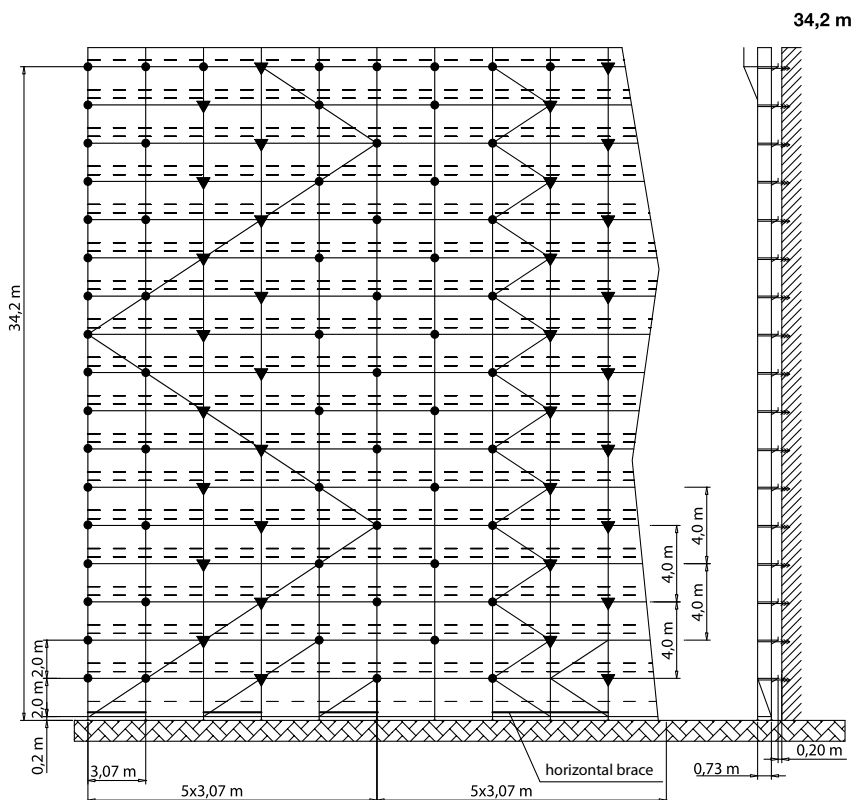


Scaffolding without covering, closed facade\*  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Option: bracket 0,36 m – inside, all levels

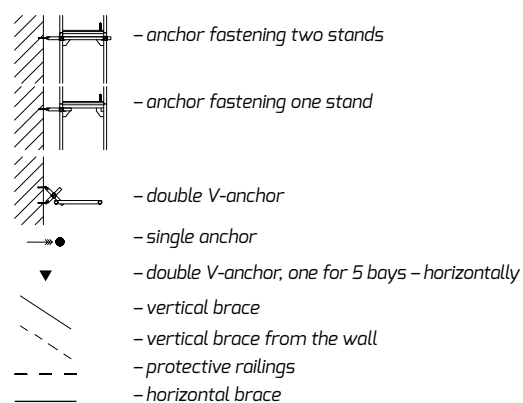


Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,1	
	I	4,7	
Maximum force in the foot (kN)	Internal stand	29,4	05
	External stand	62,4	

\* closed facade, when number of openings is less than 20% of facade surface

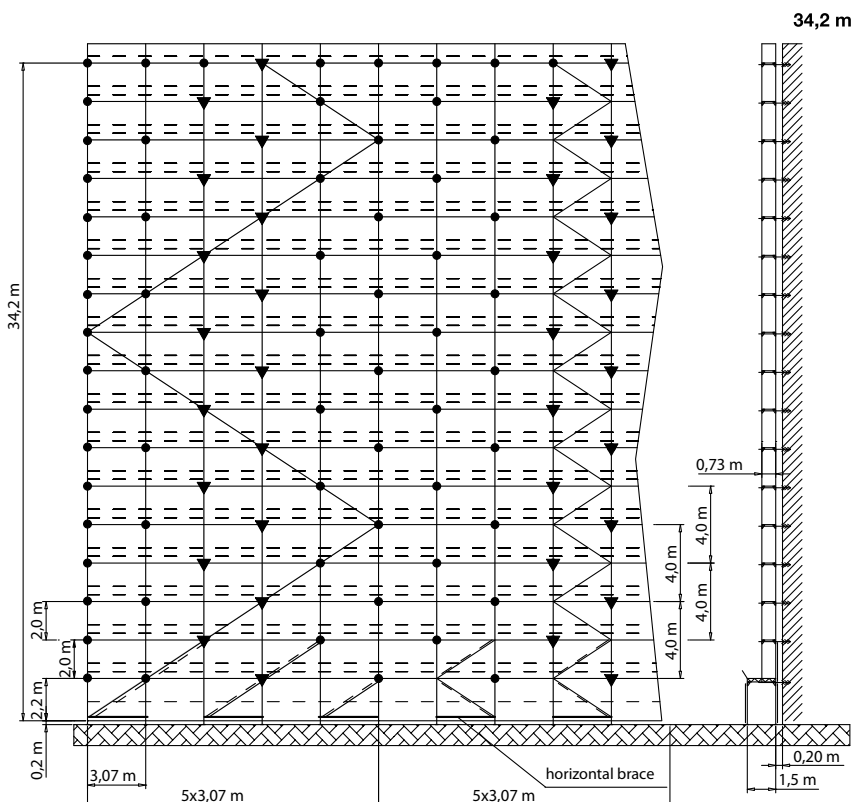


Scaffolding without covering, closed facade\*  
 Passage frame option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Vertical brace on two levels, 2 for every 5 bays



Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,3	
	I	4,8	
Maximum force in the foot (kN)	Internal stand	25,1	07
	External stand	49,7	

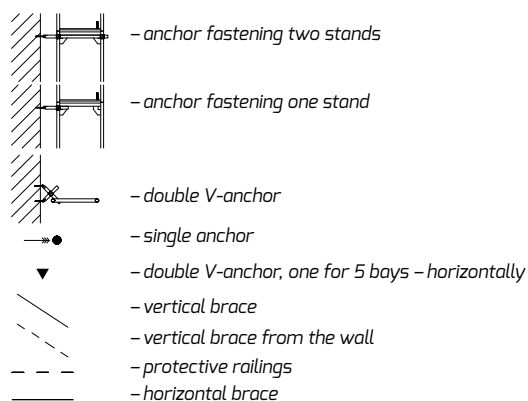
\* closed facade, when number of openings is less than 20% of facade surface





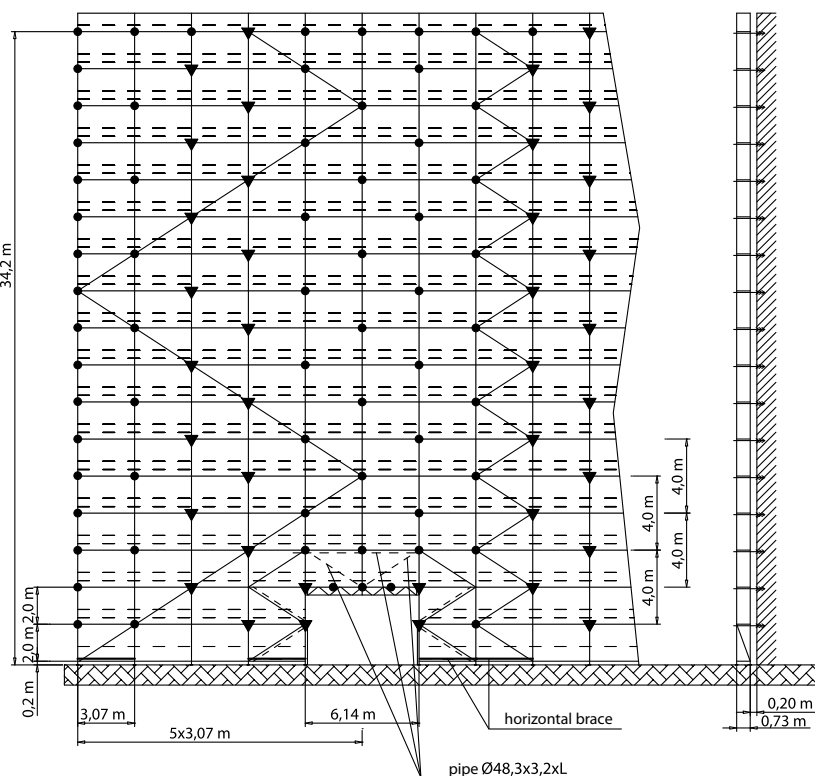
Scaffolding without covering, semi-open facade\*  
Gate crossing option  
Working platform load of 2 kN/m<sup>2</sup>  
Safety platform 1 kN/m<sup>2</sup>

34,2 m



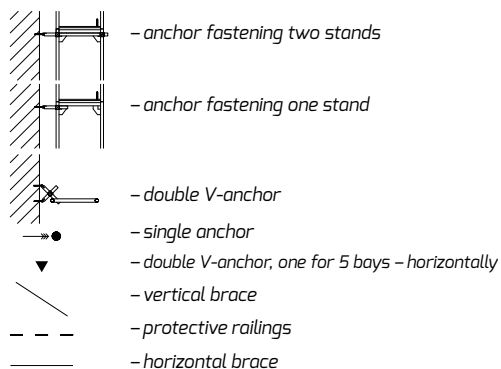
Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)		1,9	09
	⊥	4,8	
Maximum force in the foot (kN)	Internal stand	23,4	09
	External stand	52,1	

\* semi-open facade, when the number of openings in the facade is within the range of 0% to 60%



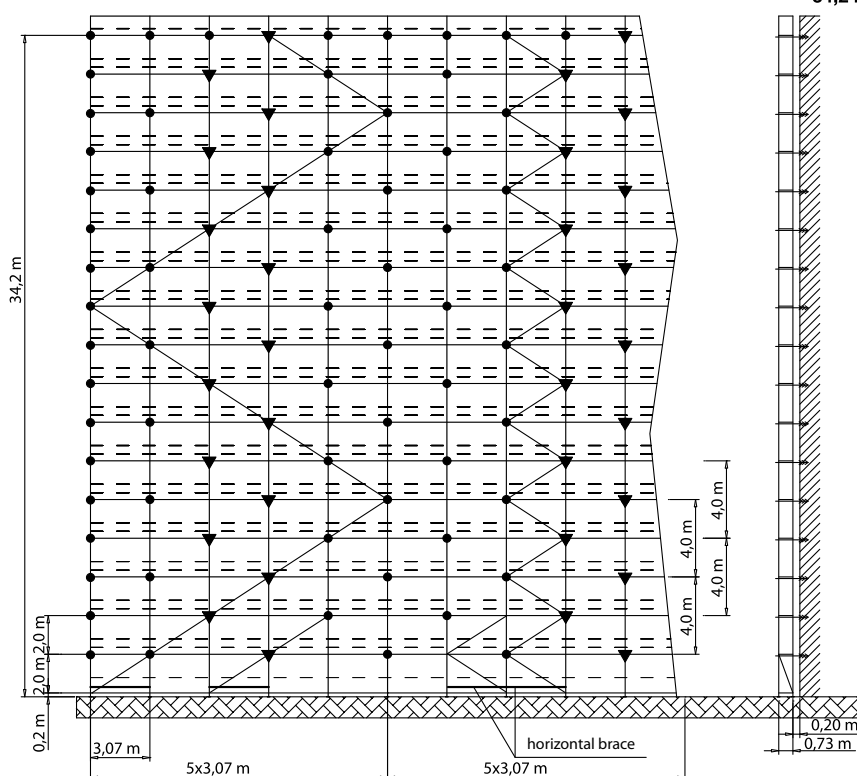
Scaffolding without covering, semi-open facade\*  
Basic option  
Working platform load of 2 kN/m<sup>2</sup>  
Safety platform 1 kN/m<sup>2</sup>

34,2 m



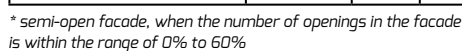
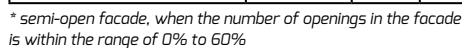
Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)		2,8	10
	⊥	4,8	
Maximum force in the foot (kN)	Internal stand	17,1	10
	External stand	55,1	

\* semi-open facade, when the number of openings in the facade is within the range of 0% to 60%





Option: bracket 0,36 m – inside, all levels

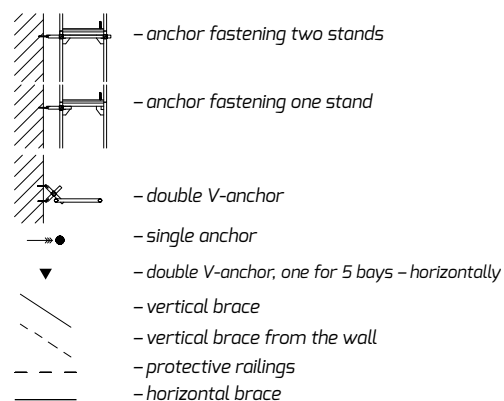


### Scaffolding without covering, closed facade\*

Gate crossing option

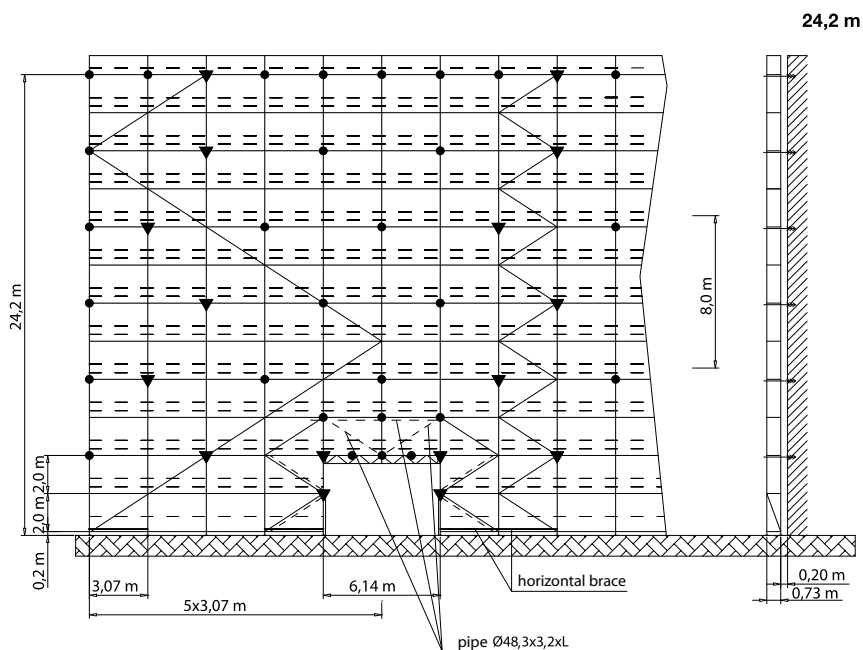
Working platform load of 2 kN/m<sup>2</sup>

Safety platform 1 kN/m<sup>2</sup>



Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	
	I	4,2	
Maximum force in the foot (kN)	Internal stand	20,5	13
	External stand	34,1	

\* closed facade, when number of openings is less than 20% of facade surface

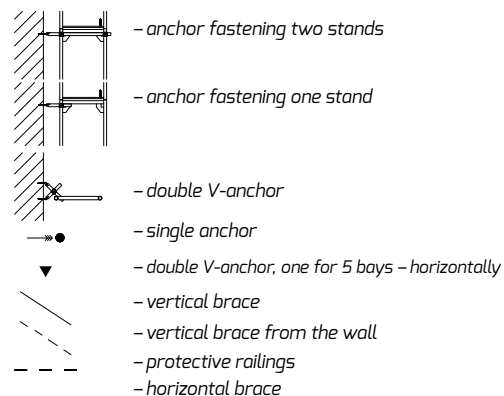


### Scaffolding without covering, closed facade\*

Basic option

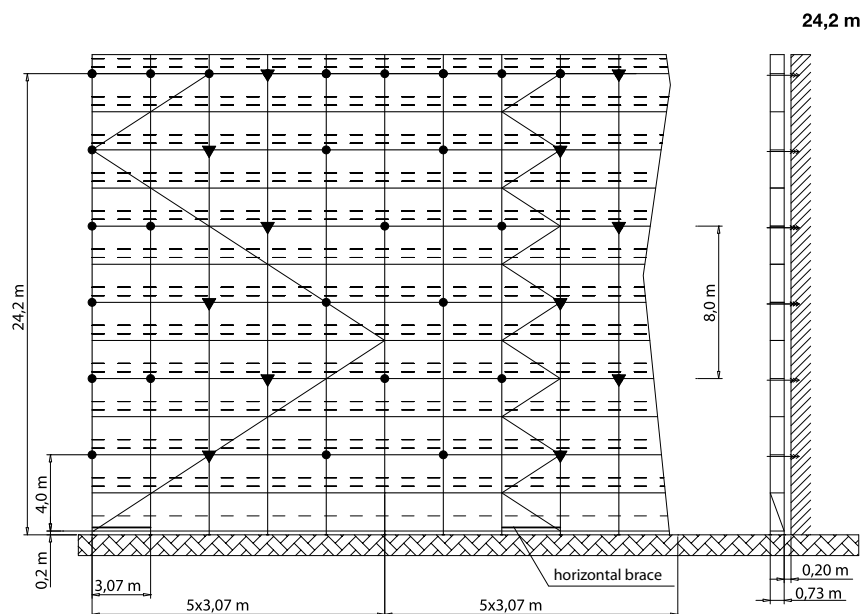
Working platform load of 2 kN/m<sup>2</sup>

Safety platform 1 kN/m<sup>2</sup>

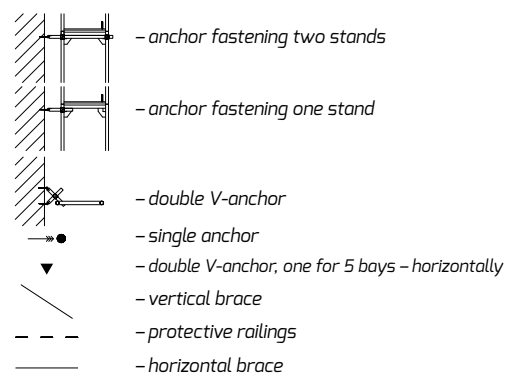


Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	
	I	4,2	
Maximum force in the foot (kN)	Internal stand	14,0	15
	External stand	37,0	

\* closed facade, when number of openings is less than 20% of facade surface

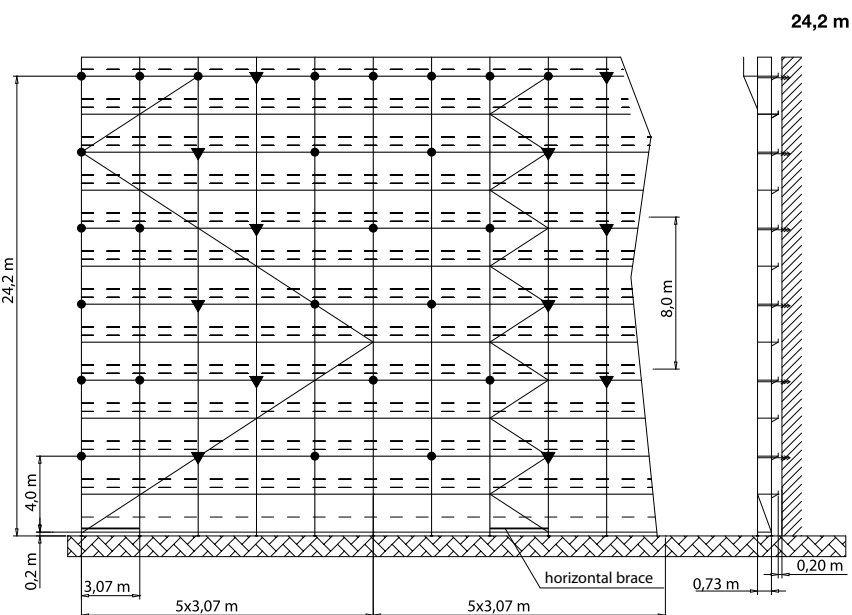


Scaffolding without covering, closed facade\*  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Option: bracket 0,36 m – inside, all levels

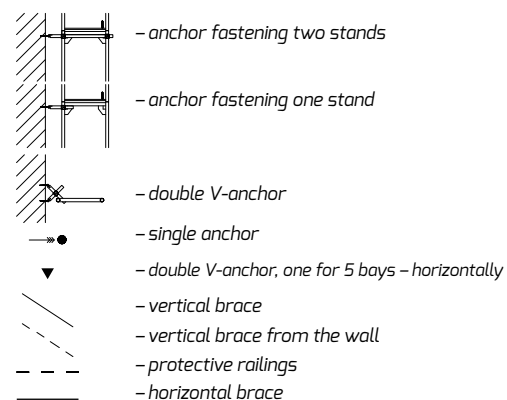


Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	
	I	4,1	
Maximum force in the foot (kN)	Internal stand	24,3	17
	External stand	44,4	

\* closed facade, when number of openings is less than 20% of facade surface

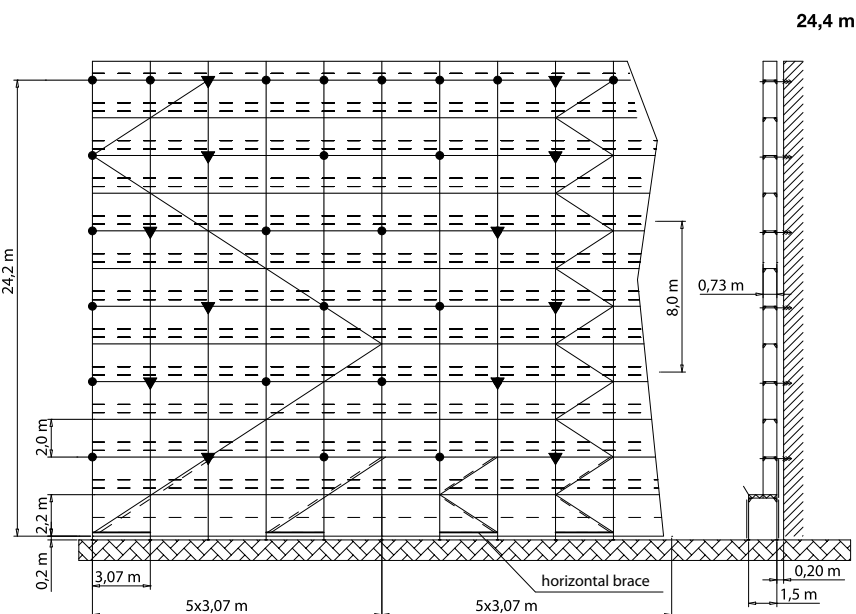


Scaffolding without covering, closed facade\*  
 Passage frame option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Vertical brace on two levels, 2 for every 5 bays



Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,6	
	I	4,2	
Maximum force in the foot (kN)	Internal stand	21,3	19
	External stand	32,0	

\* closed facade, when number of openings is less than 20% of facade surface

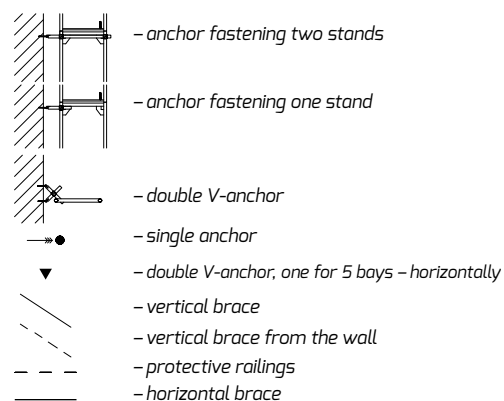


### Scaffolding without covering, closed facade\*

Gate crossing option

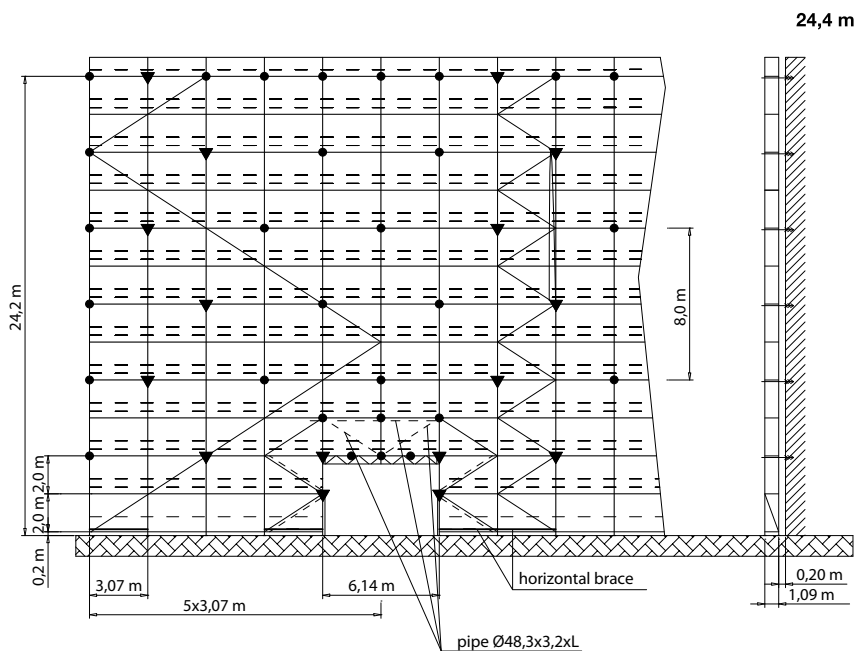
Working platform load of 2 kN/m<sup>2</sup>

Safety platform 1 kN/m<sup>2</sup>



Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	3,2	
	I	4,3	
Maximum force in the foot (kN)	Internal stand	25,9	28
	External stand	39,0	

\* closed facade, when number of openings is less than 20% of facade surface

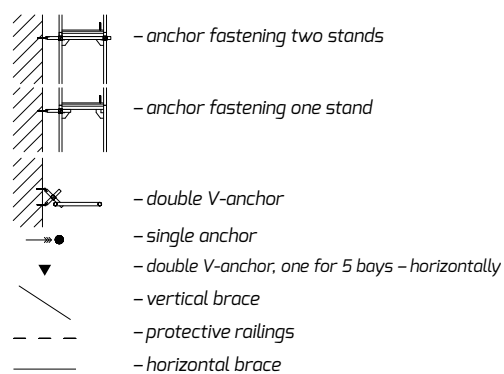


### Scaffolding without covering, closed facade\*

Basic option

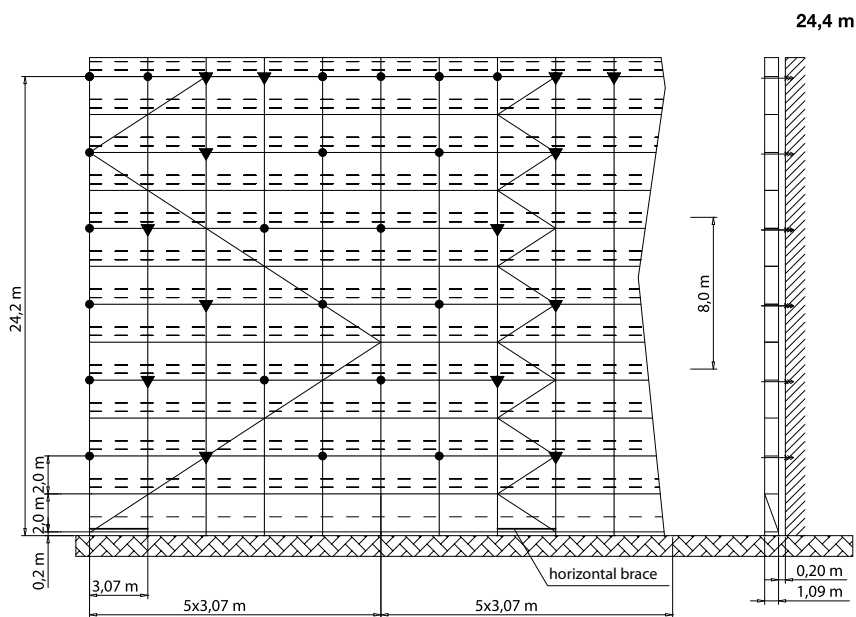
Working platform load of 2 kN/m<sup>2</sup>

Safety platform 1 kN/m<sup>2</sup>

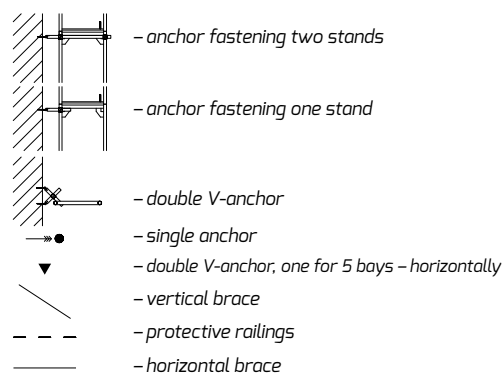


Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	
	I	4,3	
Maximum force in the foot (kN)	Internal stand	18,0	29
	External stand	42,7	

\* closed facade, when number of openings is less than 20% of facade surface

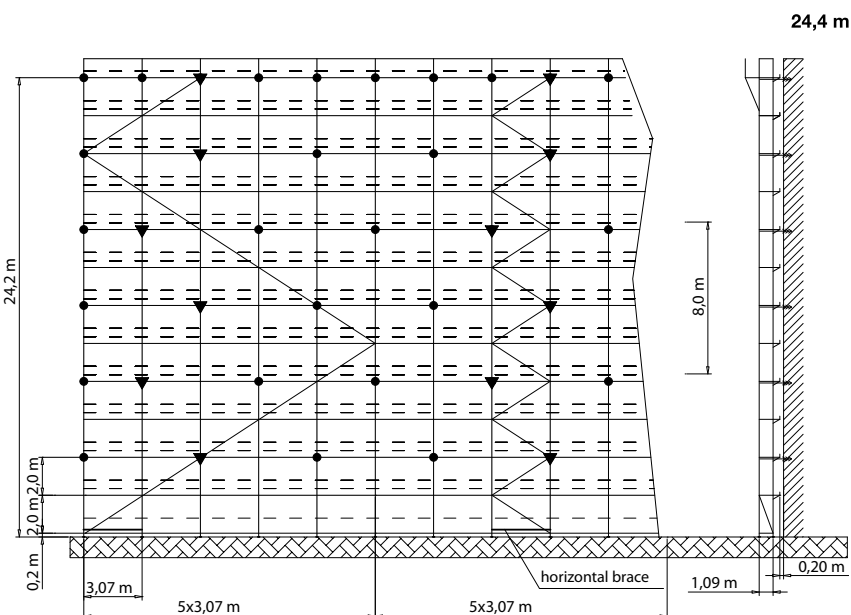


Scaffolding without covering, closed facade\*  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Option: bracket 0,36 m – inside, all levels

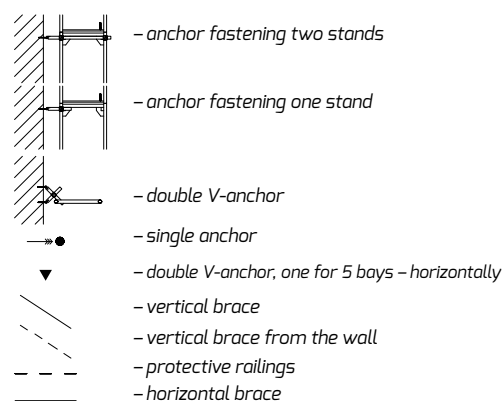


Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	30
	I	4,2	
Maximum force in the foot (kN)	Internal stand	29,4	30
	External stand	50,1	

\* closed facade, when number of openings is less than 20% of facade surface

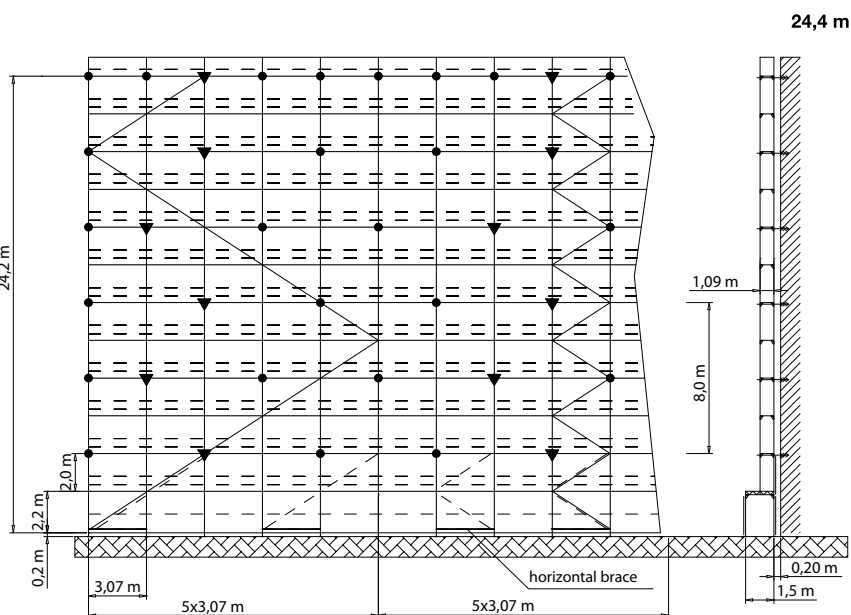


Scaffolding without covering, closed facade\*  
 Passage frame option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Vertical brace on two levels, 2 for every 5 bays

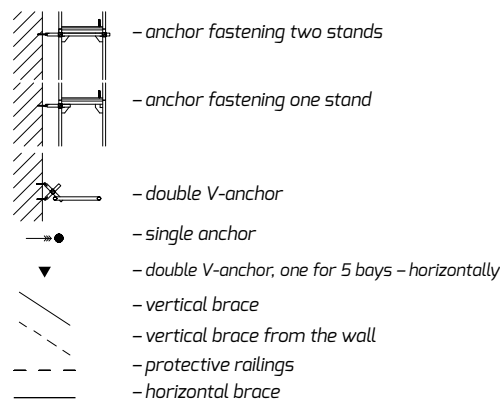


Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	3,0	31
	I	4,2	
Maximum force in the foot (kN)	Internal stand	24,3	31
	External stand	34,6	

\* closed facade, when number of openings is less than 20% of facade surface

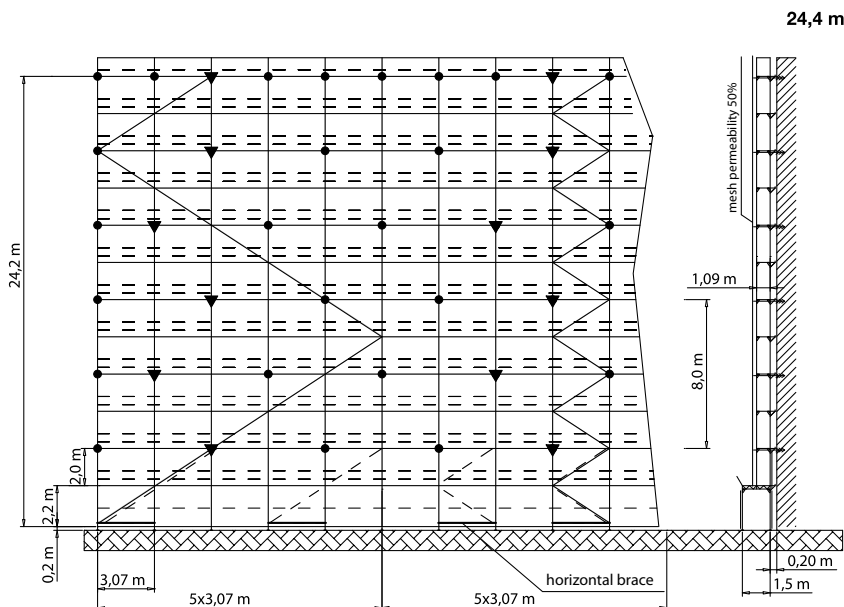


Scaffolding with covering, closed facade\*  
 Passage frame option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Vertical brace on two levels, 2 for every 5 bays



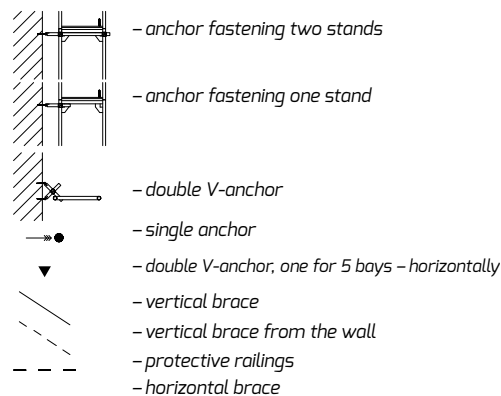
Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	
	I	2,6	
Maximum force in the foot (kN)	Internal stand	31,2	32
	External stand	32,0	

\* closed facade, when number of openings is less than 20% of facade surface



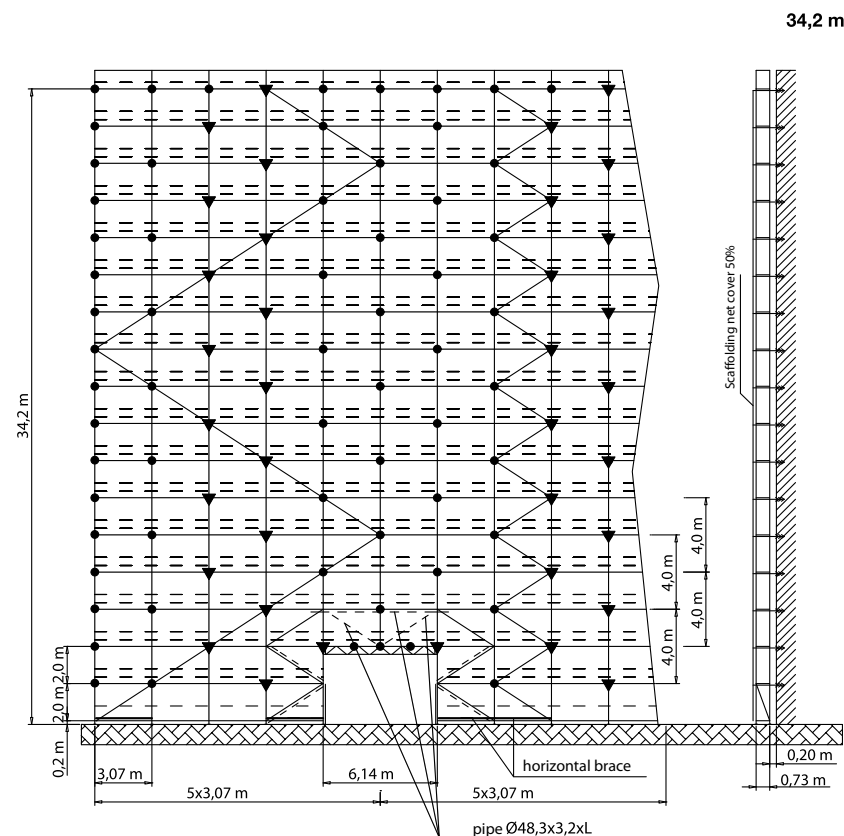
### 3.5.6. Braces and anchors arrangement for scaffolding shield with net screen or canvas, up to 34 high

Scaffolding with net screen, closed facade\*  
 Gate crossing option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>



Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,2	
	I	3,0	
Maximum force in the foot (kN)	Internal stand	22,0	02
	External stand	53,2	

\* closed facade, when number of openings is less than 20% of facade surface



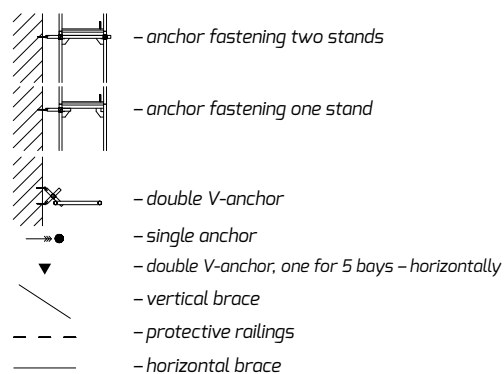
### Scaffolding with net screen, closed facade\*

Basic option

Working platform load of 2 kN/m<sup>2</sup>

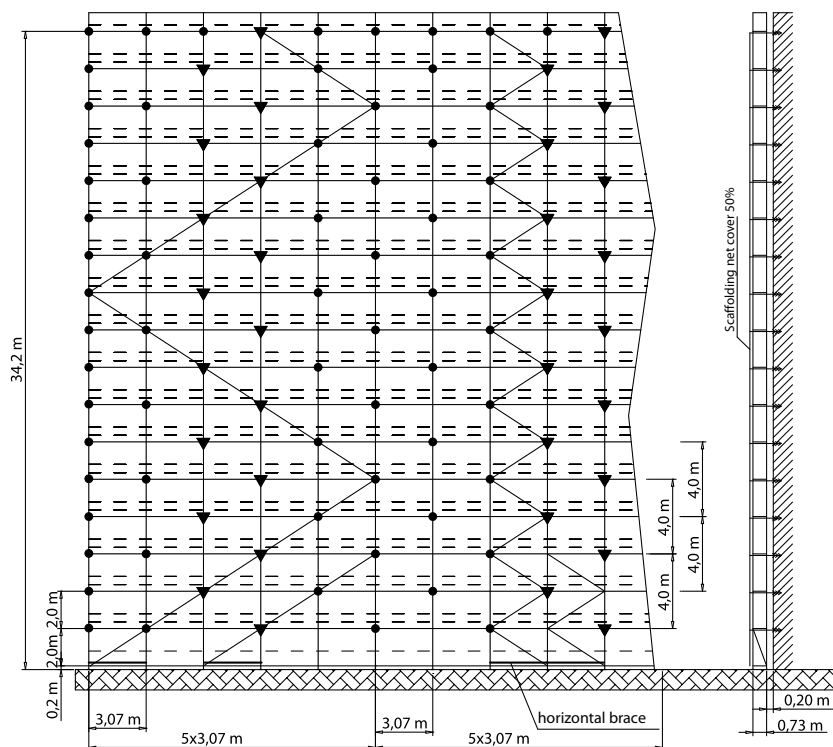
Safety platform 1 kN/m<sup>2</sup>

34,2 m



Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	3,9	04
	I	3,0	
Maximum force in the foot (kN)	Internal stand	16,3	04
	External stand	53,7	

\* closed facade, when number of openings is less than 20% of facade surface



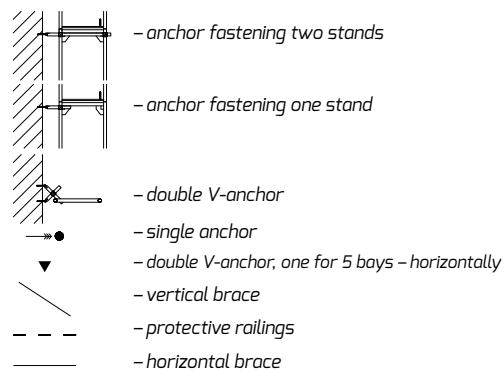
### Scaffolding with net screen, closed facade\*

Working platform load of 2 kN/m<sup>2</sup>

Safety platform 1 kN/m<sup>2</sup>

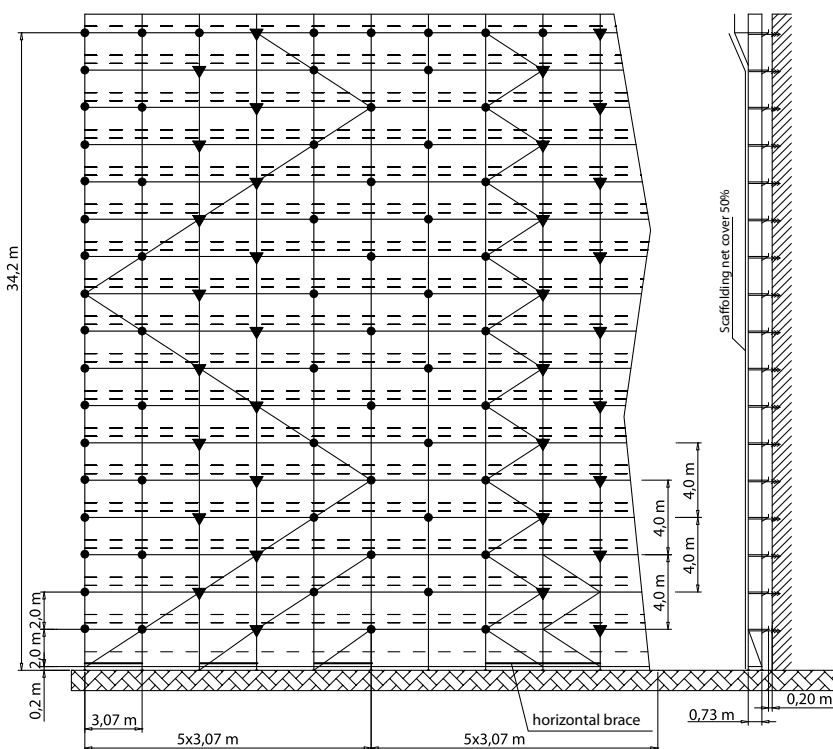
Wariant: wspornik 0,73 m – zewnętrzny ostatni poziom  
+ Bracket 0,36 m – inside, all levels

34,2 m



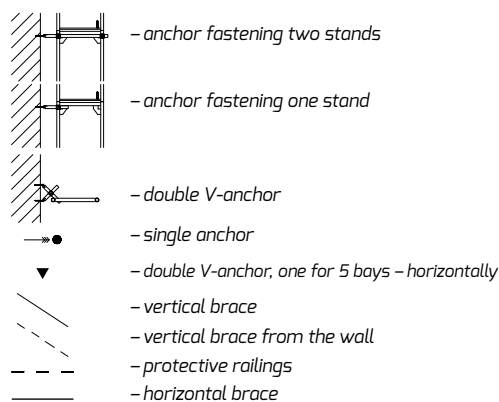
Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	3,1	06
	I	3,0	
Maximum force in the foot (kN)	Internal stand	29,3	06
	External stand	61,2	

\* closed facade, when number of openings is less than 20% of facade surface



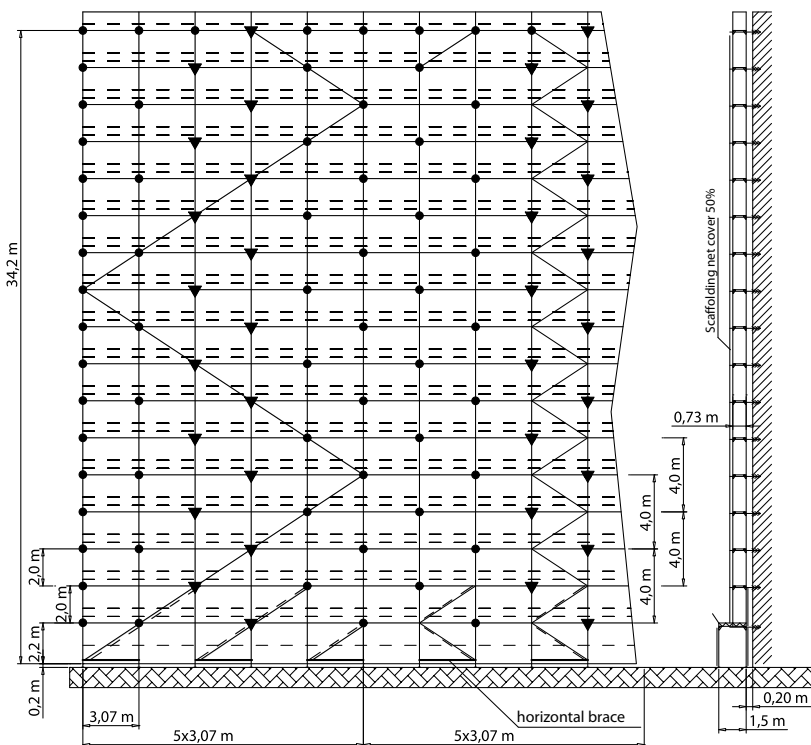
Scaffolding with net screen, closed facade\*  
 Passage frame option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Vertical brace on two levels, 2 for every 5 bays

34,2 m



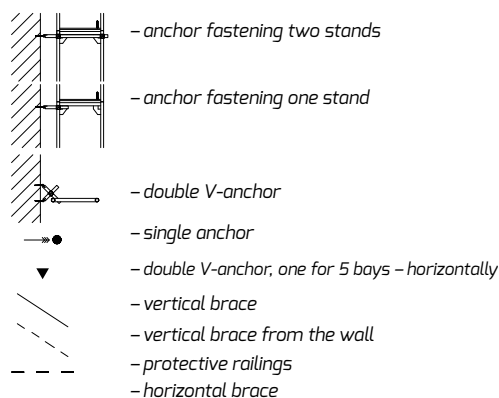
Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	5,1	
	I	3,7	
Maximum force in the foot (kN)	Internal stand	25,5	08
	External stand	32,7	

\* closed facade, when number of openings is less than 20% of facade surface



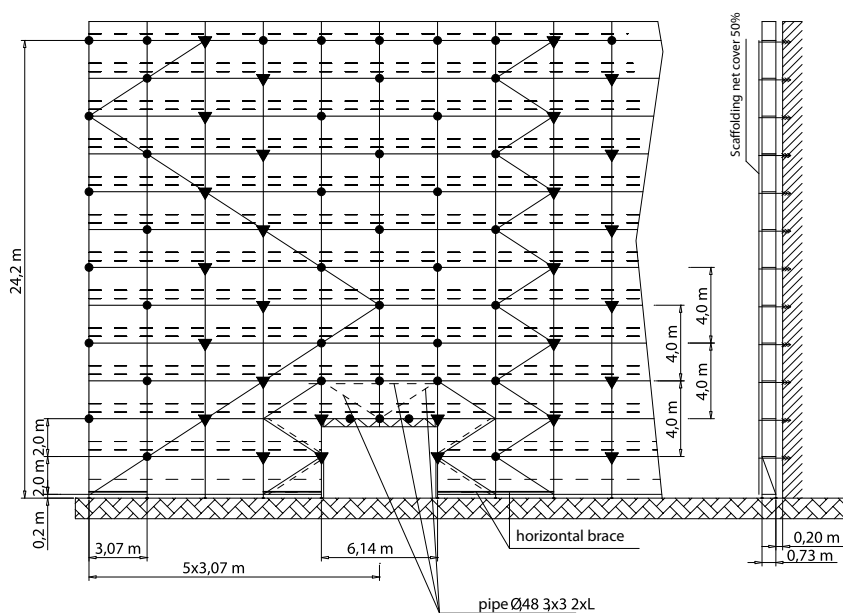
Scaffolding with net screen, closed facade\*  
 Gate crossing option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>

24,4 m



Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,7	
	I	2,6	
Maximum force in the foot (kN)	Internal stand	17,6	14
	External stand	34,4	

\* closed facade, when number of openings is less than 20% of facade surface





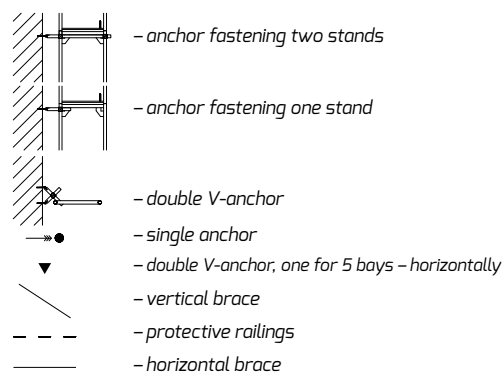
### Scaffolding with net screen, closed facade\*

Basic option

Working platform load of 2 kN/m<sup>2</sup>

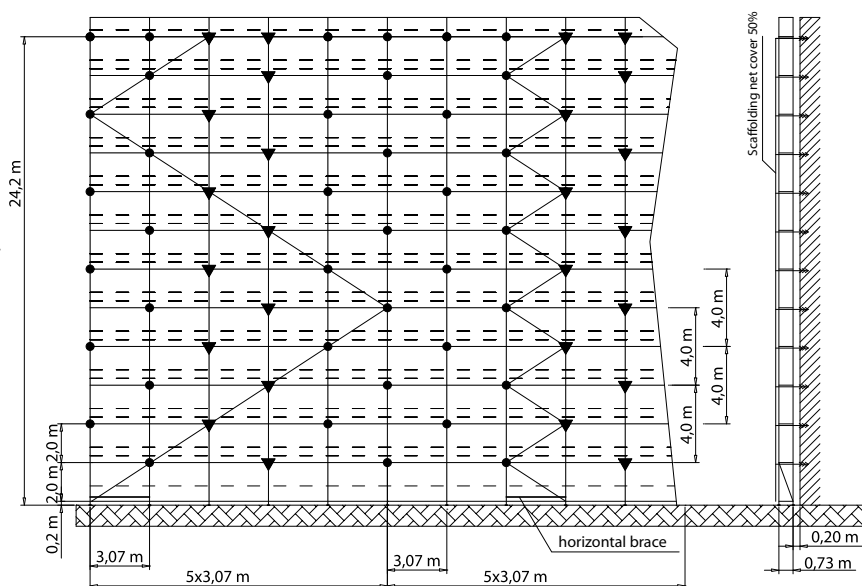
Safety platform 1 kN/m<sup>2</sup>

24,4 m



Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,7	
	I	2,6	
Maximum force in the foot (kN)	Internal stand	12,7	16
	External stand	37,3	

\* closed facade, when number of openings is less than 20% of facade surface



### Scaffolding with net screen, closed facade\*

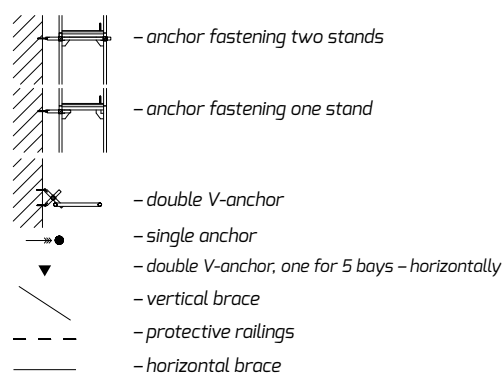
Working platform load of 2 kN/m<sup>2</sup>

Safety platform 1 kN/m<sup>2</sup>

Wariant: wspornik 0,73 m – zewnętrzny ostatni poziom

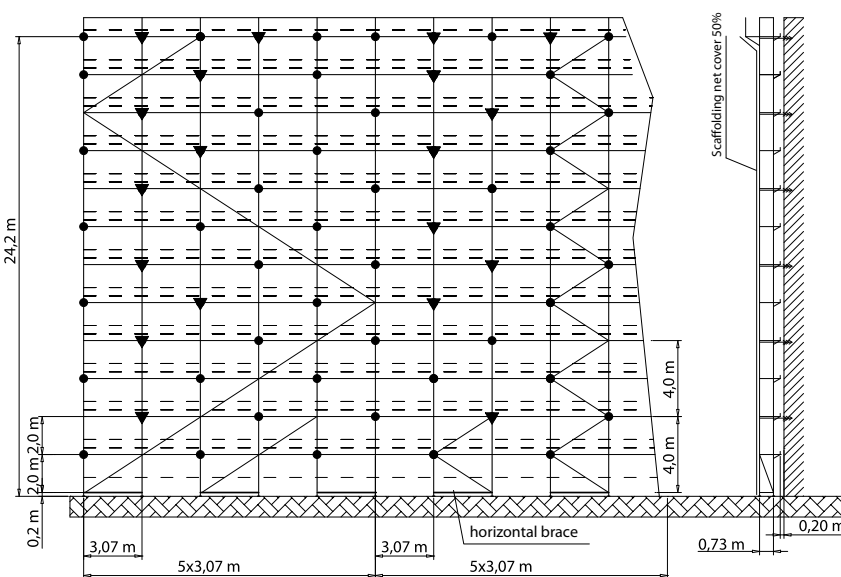
+ Bracket 0,36 m – inside, all levels

24,4 m



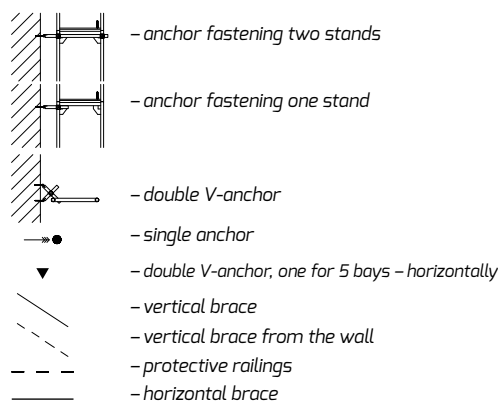
Type of facade filling	Closed facade		
Vertical anchoring spacing	8 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	
	I	2,6	
Maximum force in the foot (kN)	Internal stand	23,3	18
	External stand	43,5	

\* closed facade, when number of openings is less than 20% of facade surface



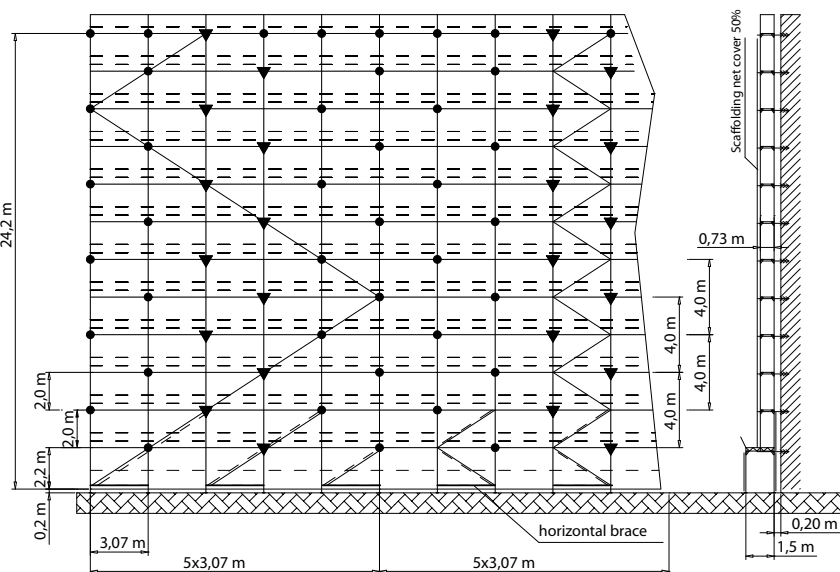
Scaffolding with net screen, closed facade\*  
 Passage frame option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Vertical brace on two levels, 2 for every 5 bays

24,4 m



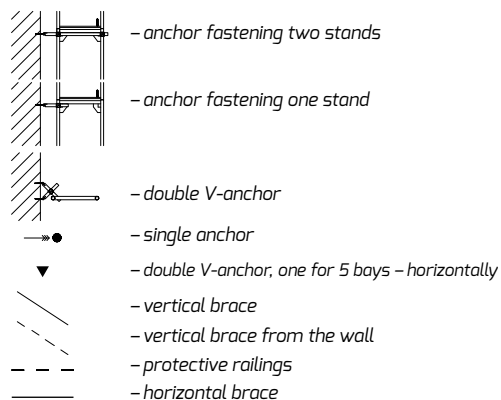
Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	20
	I	2,6	
Maximum force in the foot (kN)	Internal stand	20,4	20
	External stand	32,0	

\* closed facade, when number of openings is less than 20% of facade surface



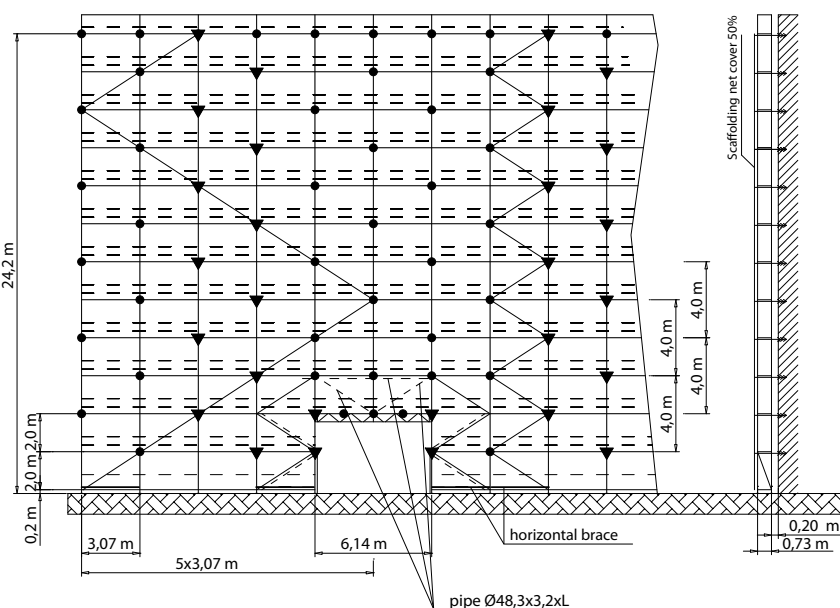
Scaffolding with net screen, semi-open facade\*  
 Gate crossing option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>

24,4 m



Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,7	21
	I	2,8	
Maximum force in the foot (kN)	Internal stand	17,6	21
	External stand	35,1	

\* semi-open facade, when the number of openings in the facade is within the range of 0% to 60%



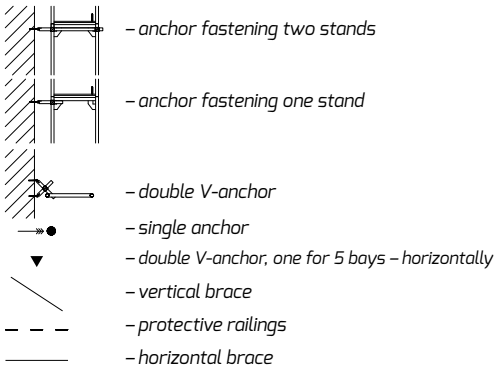
Scaffolding with net screen, semi-open facade\*

Basic option

Working platform load of 2 kN/m<sup>2</sup>

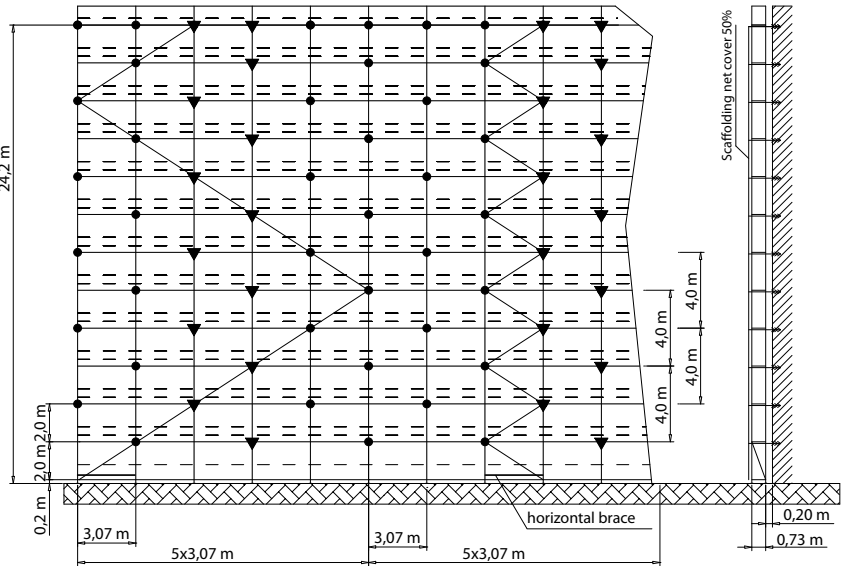
Safety platform 1 kN/m<sup>2</sup>

24,4 m



Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	
	I	2,9	
Maximum force in the foot (kN)	Internal stand	12,5	22
	External stand	37,1	

\* semi-open facade, when the number of openings in the facade is within the range of 0% to 60%



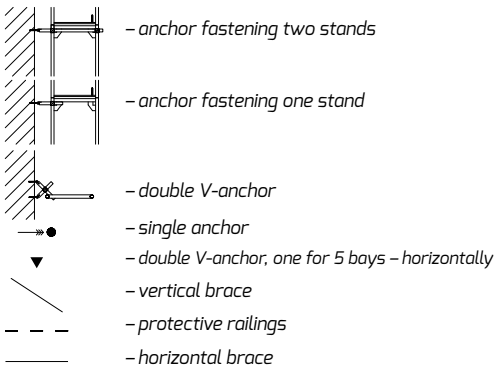
Scaffolding with net screen, semi-open facade\*

Working platform load of 2 kN/m<sup>2</sup>

Safety platform 1 kN/m<sup>2</sup>

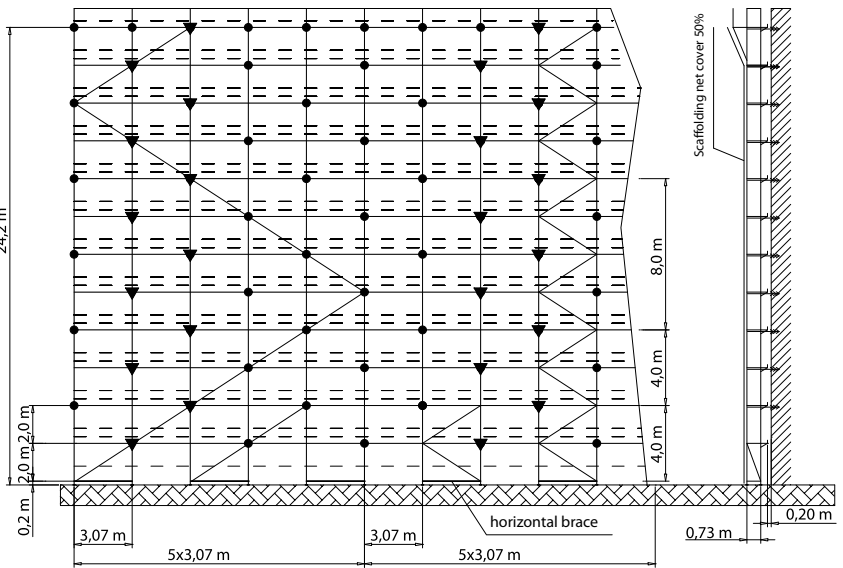
Option: bracket 0,36 m – inside, all levels

24,4 m



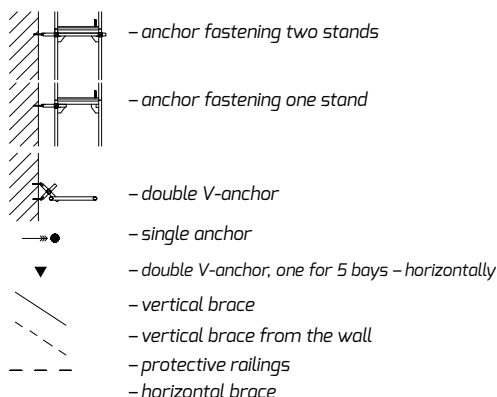
Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	
	I	2,9	
Maximum force in the foot (kN)	Internal stand	23,3	23
	External stand	43,5	

\* semi-open facade, when the number of openings in the facade is within the range of 0% to 60%



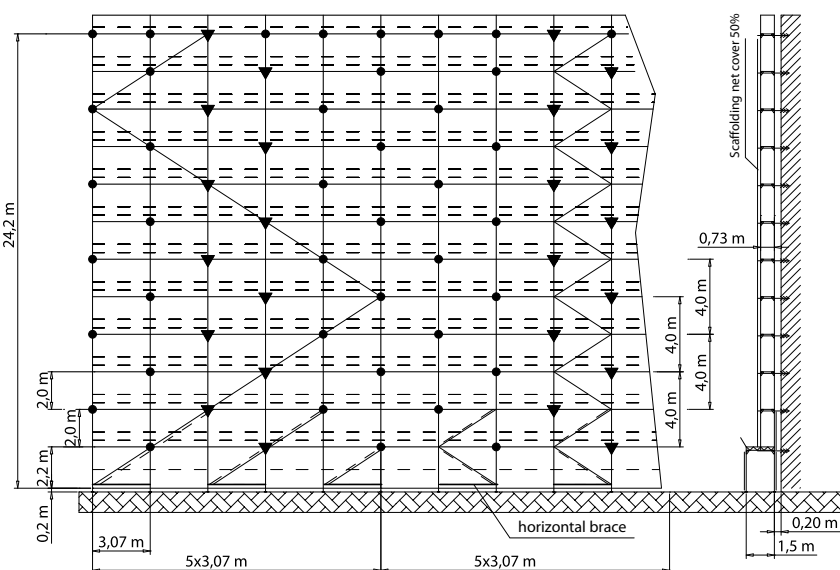
Scaffolding with net screen, semi-open facade\*  
 Passage frame option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Vertical brace on two levels, 2 for every 5 bays

24,4 m



Type of facade filling	Closed facade		
Vertical anchoring spacing	4 m		
Horizontal anchoring spacing	every second bay		
Maximum force in the anchor (kN)	II	2,8	24
	I	2,9	
Maximum force in the foot (kN)	Internal stand	20,4	24
	External stand	32,0	

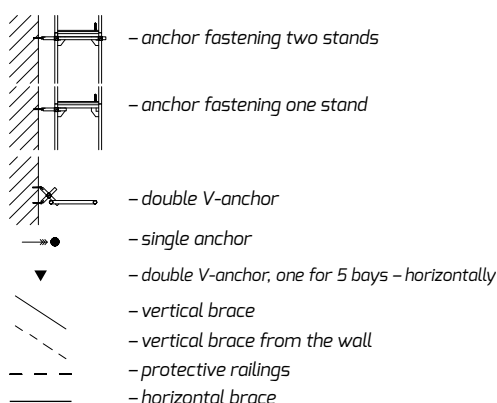
\* semi-open facade, when the number of openings in the facade is within the range of 0% to 60%



### 3.5.7. Braces and anchors arrangement for scaffolding shield with canvas, up to 34 high

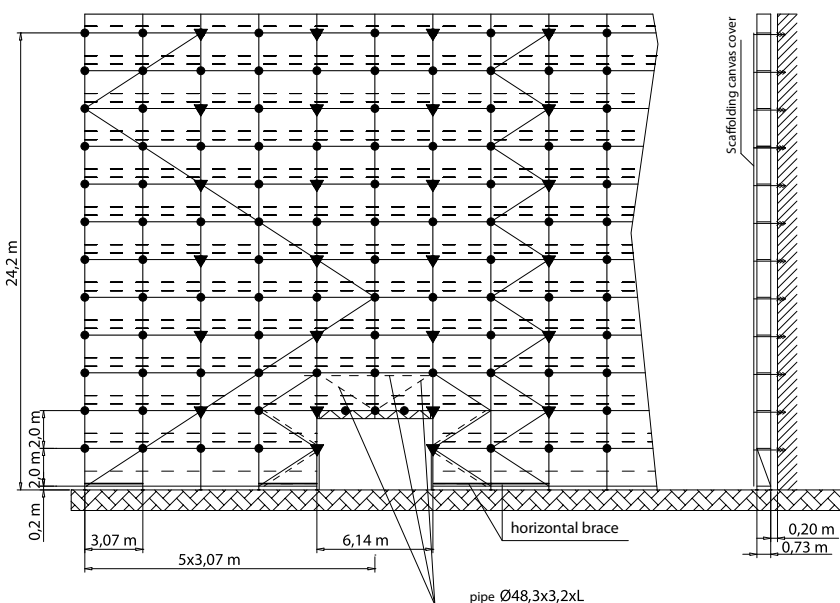
Scaffolding with canvas, closed facade\*  
 Gate crossing option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>

24,4 m



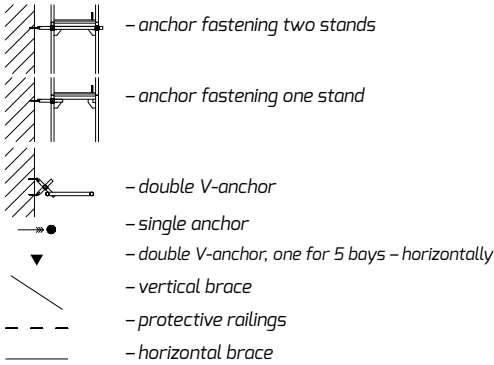
Type of facade filling	Closed facade		
Vertical anchoring spacing	each node		
Horizontal anchoring spacing	each node		
Maximum force in the anchor (kN)	II	1,65	25
	I	2,9	
Maximum force in the foot (kN)	Internal stand	18,0	25
	External stand	35,4	

\* closed facade, when number of openings is less than 20% of facade surface



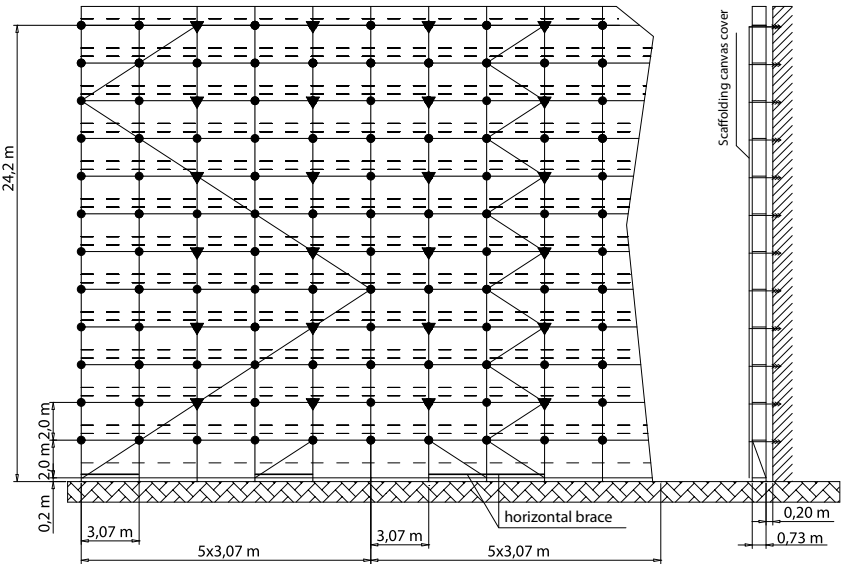
Scaffolding with canvas, closed facade\*  
 Basic option  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>

24,4 m



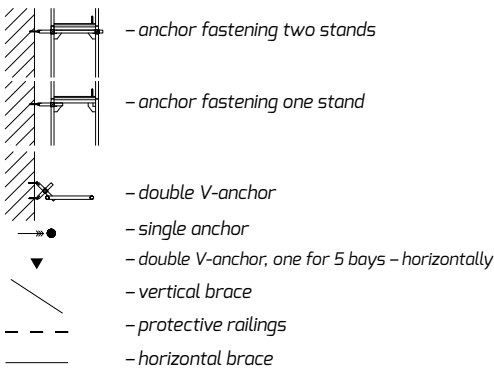
Type of facade filling	Closed facade		
Vertical anchoring spacing	each node		
Horizontal anchoring spacing	each node		
Maximum force in the anchor (kN)	II	1,6	
	I	2,9	
Maximum force in the foot (kN)	Internal stand	13,2	26
	External stand	36,9	

\* closed facade, when number of openings is less than 20% of facade surface



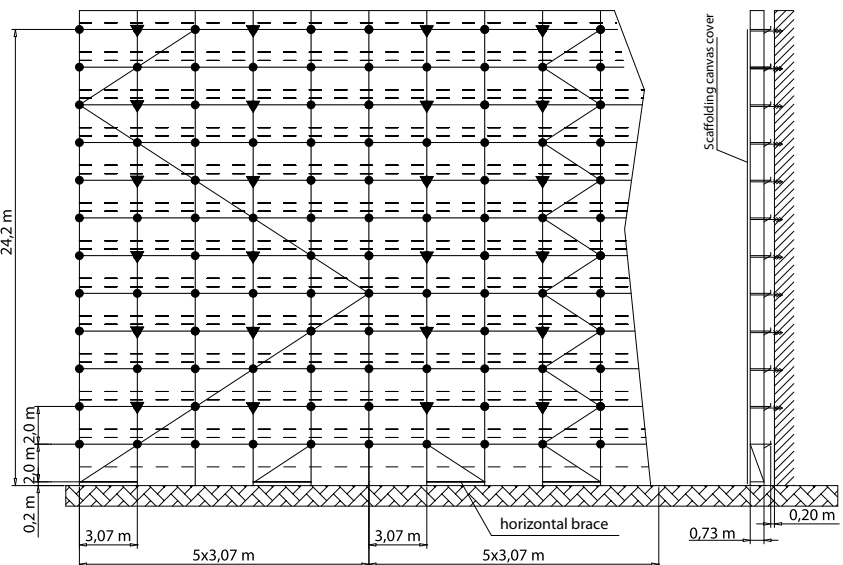
Scaffolding with canvas, closed facade\*  
 Working platform load of 2 kN/m<sup>2</sup>  
 Safety platform 1 kN/m<sup>2</sup>  
 Bracket 0,36 m – inside, all levels

24,4 m



Type of facade filling	Closed facade		
Vertical anchoring spacing	each node		
Horizontal anchoring spacing	each node		
Maximum force in the anchor (kN)	II	1,6	
	I	3,0	
Maximum force in the foot (kN)	Internal stand	23,5	27
	External stand	36,9	

\* closed facade, when number of openings is less than 20% of facade surface





### 3.5.8. Additional anchors during girder assembly

Permissible workload of 2 kN/m<sup>2</sup>.  
 Brecket 0,36 m (E285539) at the wall side.  
 Permissible level of footing unscrewing – 0,2 m.

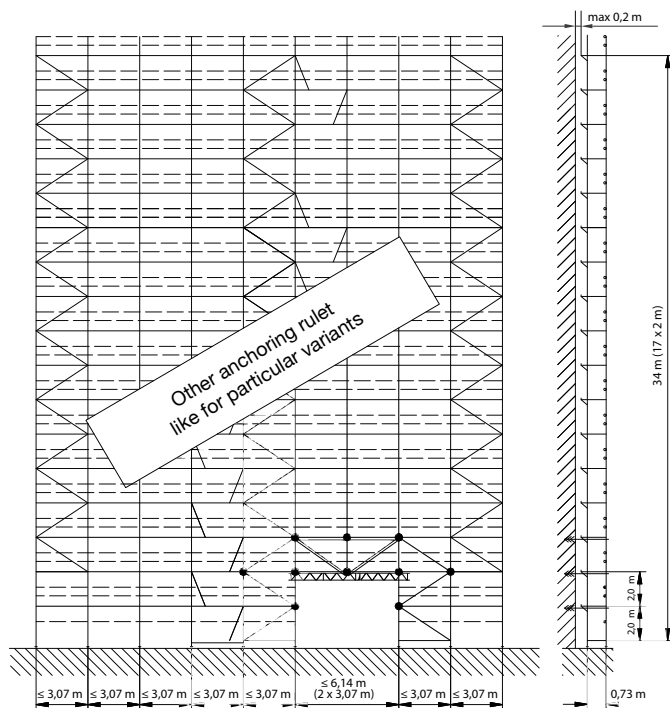


fig. 3.54 – Forces present in anchor in individual options

Permissible workload of 2 kN/m<sup>2</sup>.  
 Brecket 0,36 m (E285539) at the wall side.  
 Permissible level of footing unscrewing – 0,2 m.

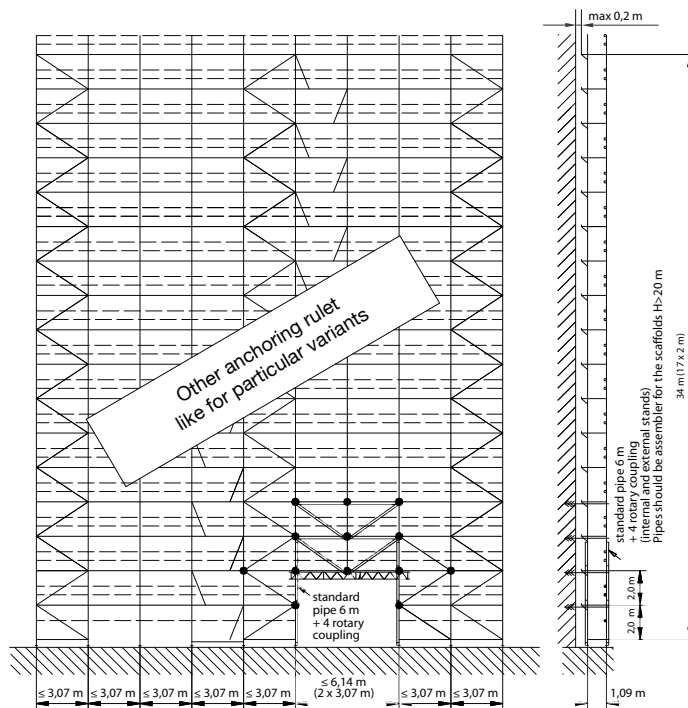


fig. 3.55 – Forces present in anchor in individual options

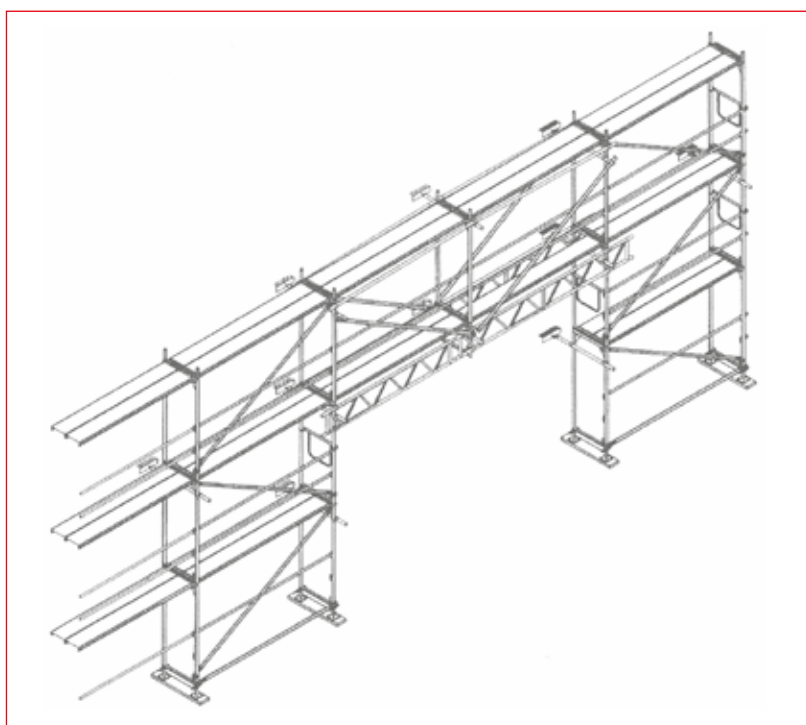


fig. 3.56 – Axonometric view of exemplary gate crossing

### 3.5.9. Additional anchors during protective canopy and passage frames installation

Permissible workload of 2 kN/m<sup>2</sup>.  
 Brecket 0,36 m (E285539) at the wall side.  
 Permissible level of footing unscrewing – 0,2 m.

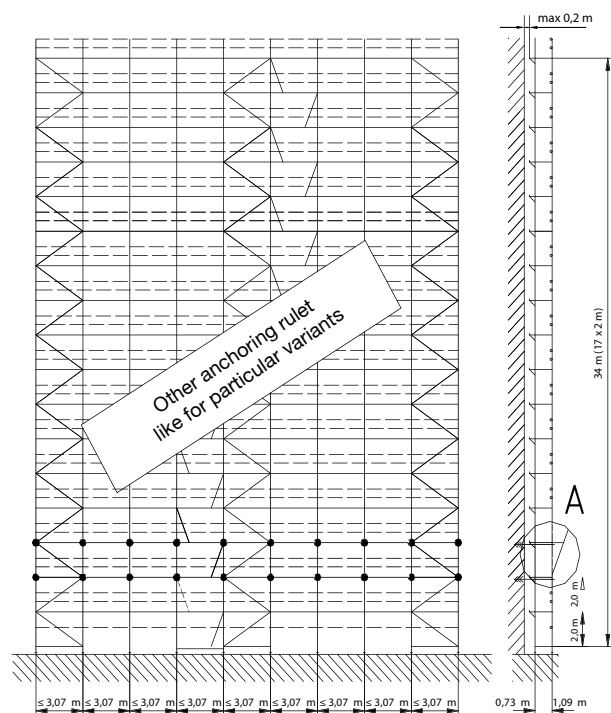


fig. 3.57 – Forces present in anchor and in footings are in individual options

Permissible workload of 2 kN/m<sup>2</sup>.  
 Brecket 0,36 m (E285539) at the wall side.  
 Permissible level of footing unscrewing – 0,2 m.

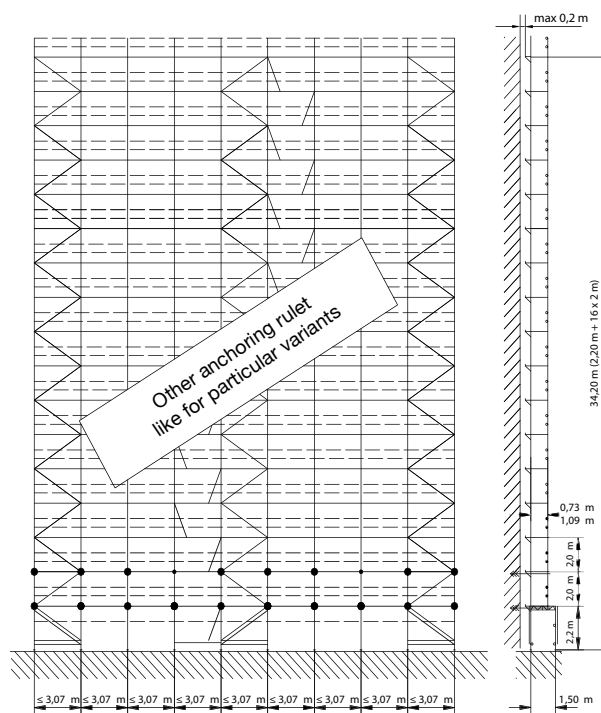


fig. 3.58 – Forces present in anchor and in footings are in individual options

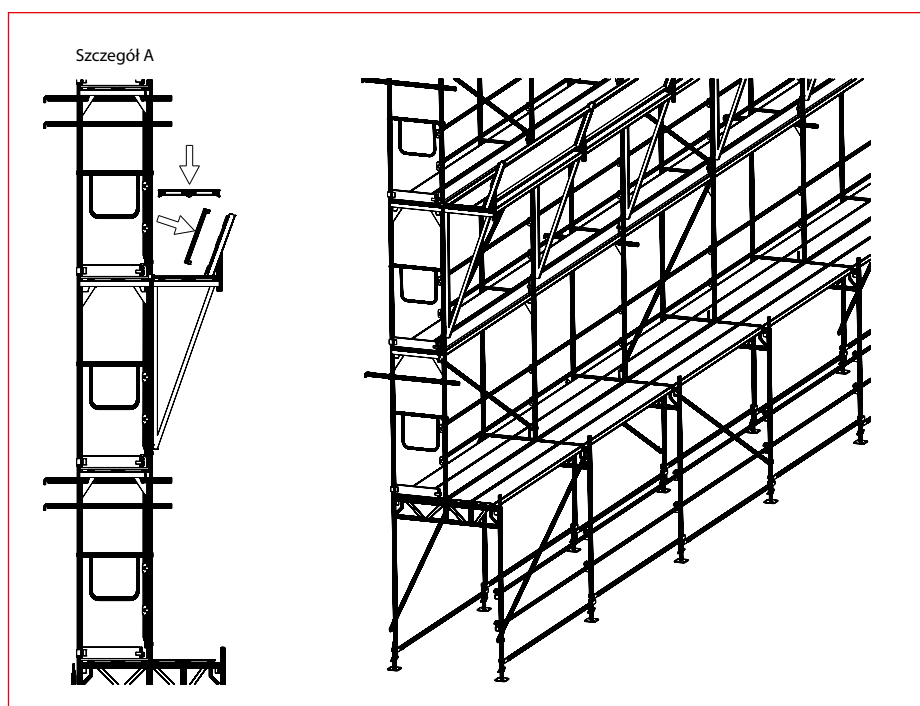


fig. 3.59 – Protective canopy example

## 4. MOBILE SCAFFOLDINGS

The featured system allows the creation of mobile scaffoldings based on elements used with facade set-up. Examples of this set-up are presented in the illustrations below.

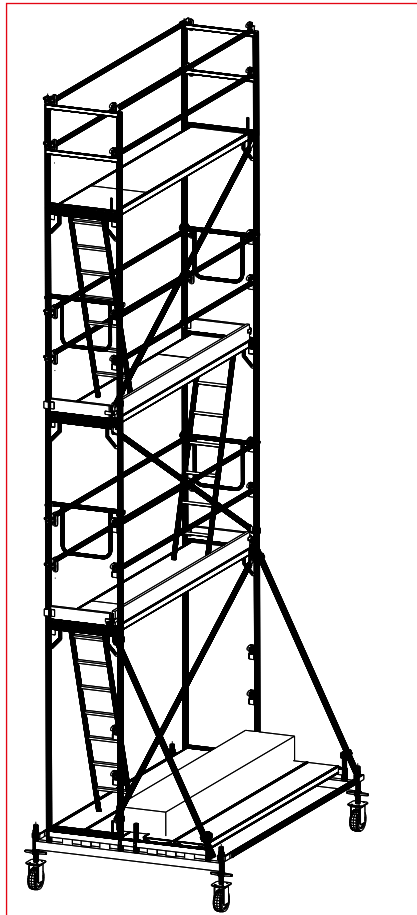


fig. 4.1 – Set with a width of one frame

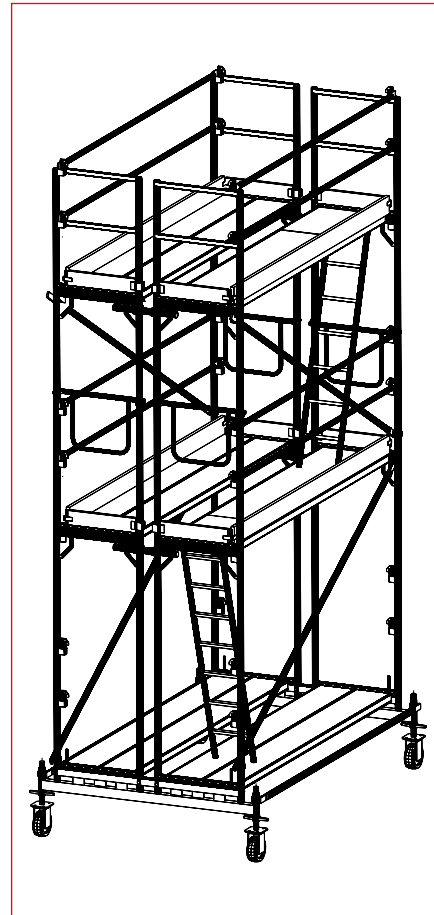


fig. 4.2 – Set with a width of two frames

The following rule must be obeyed when building mobile scaffoldings: scaffoldings height cannot exceed tripled length of the smaller side of scaffolding base, in case of a scaffolding placed outside the building, and quadrupled length of smaller side of the scaffoldings base in case of scaffolding placed inside the building. This rule does not apply to mobile scaffoldings anchored to the building.

Following rules must be obeyed during work on this type of scaffolding:

- work only on one work level,
- do not mount winches,
- move the scaffolding only across flat, even and strong enough surface,
- move only along the longer axis of the scaffolding,
- workers and tools are not allowed to be/remain on the scaffolding during moving,
- after the scaffoldings reached its destination point, lock the castor breakes,
- after the scaffolding is moved, check its stability (all castors supporting the scaffolding).

## 5. EXEMPLARY NON-STANDARD SCAFFOLDING ANCHORING

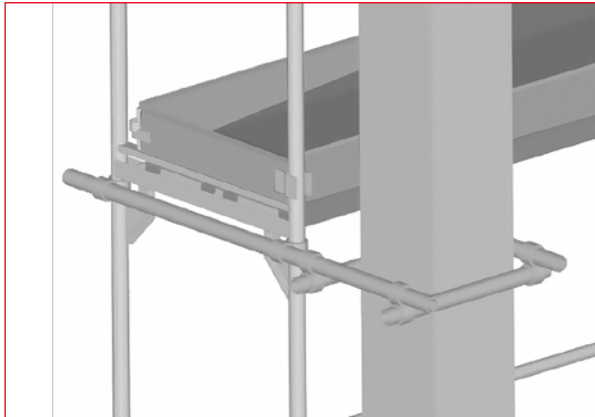


fig. 5.1 – Pole anchoring

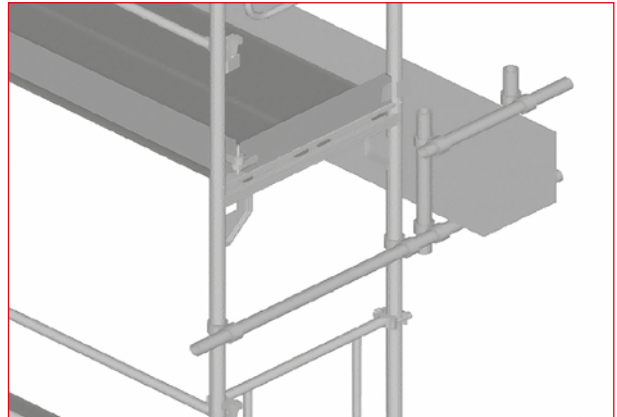


fig. 5.2 – Beam anchoring

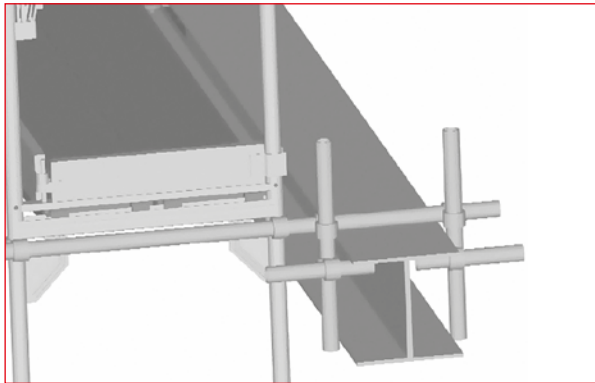


fig. 5.3 – I-beam anchoring

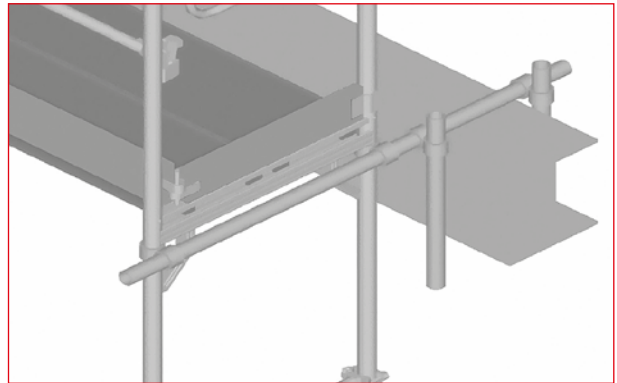
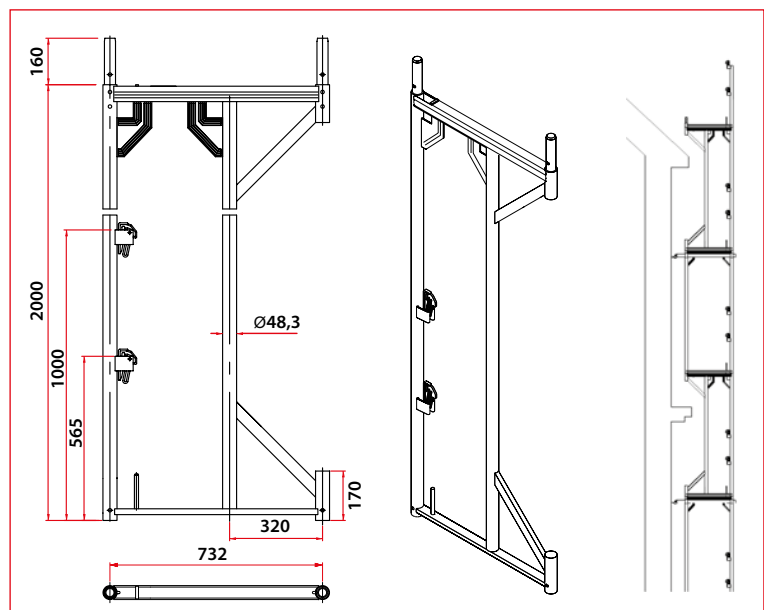


fig. 5.4 – I-beam anchoring

## 6. BYPASS FRAMES

Used where the cornices, roof protrusions overlap the scaffolding. Bypass frames may be fitted with the standard system vertical frames 2,0x0,73 m. The bypass frame may be built up to 8 m.



## 7. SCAFFOLDINGS BUILD ON ANCHORED CONSOLES

Anchored consoles allow building the scaffoldings at any height. It is often required when it is not necessary or possible to build the scaffolding on the ground level. A scaffolding cannot be often installed on roofs, balconies or ceilings due to their structure or load capacity and a wall anchored console is often used then to build a scaffolding by using the grate girders.

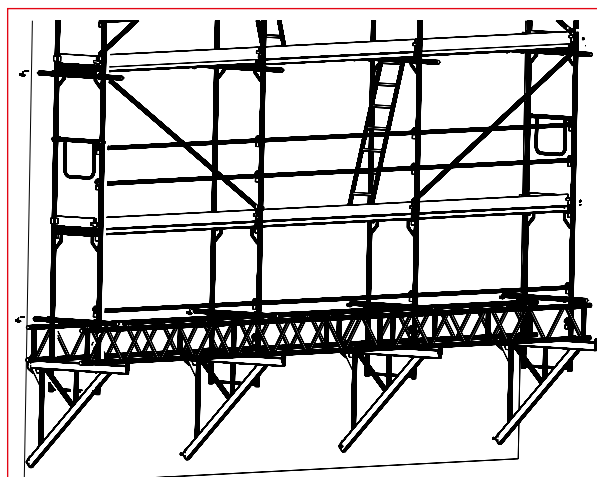


fig. 7.1 - The scaffolding bottom attachment in close-upfig.

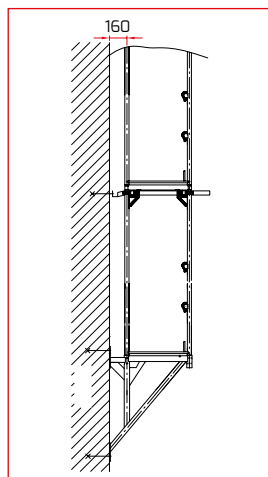


fig. 7.2 - Anchored console 0,73 m

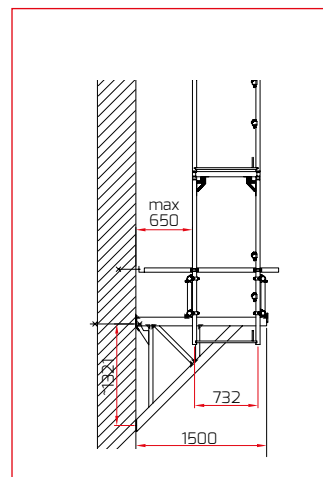


fig. 7.3 - Anchored console 1.50 m

The console must be anchored with two or three anchors while considering the base (wall) characteristics. In general, it is recommended to make holes through the entire wall thickness and mount the consoles with the threaded stays. When it is not possible to make such holes it is recommended to use chemical anchors stuck according to the supplier guidelines.

When calculating the forces acting on the console you should consider the structure weight and the operational load.



The maximum height of the facility erected on the anchored console 1,5 m is as follows:

- frame scaffolding 0,73 m x 2,75 m – 34 m;
- frame scaffolding 0,73 m x 3,07 m – 32 m;

The maximum height of the facility erected on the anchored console 0,73 m is as follows:

- frame scaffolding 0,73 m x 2,75 m – 20 m;
- frame scaffolding 0,73 m x 3,07 m – 20 m;

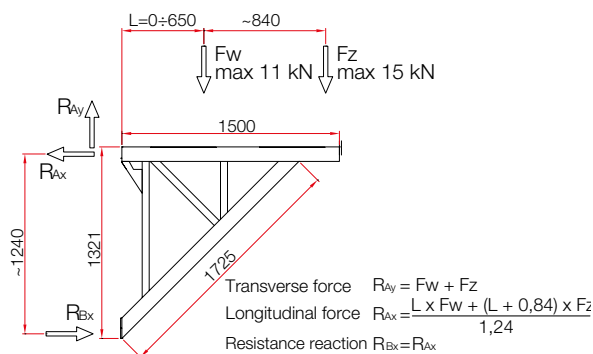
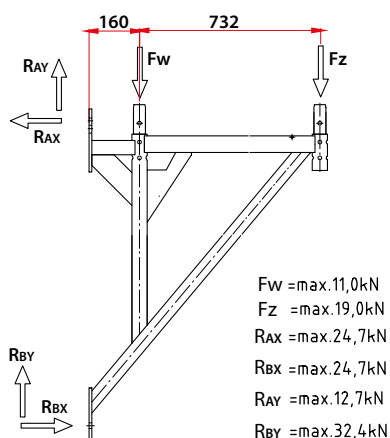


fig. 7.4 - Method for calculation the reaction for the anchorage sites.



Rusztowania montowane na wspornikach kotwionych wymagają indywidualnego projektu technicznego.

## 8. EXEMPLARY FRAME SCAFFOLDING SET-UPS

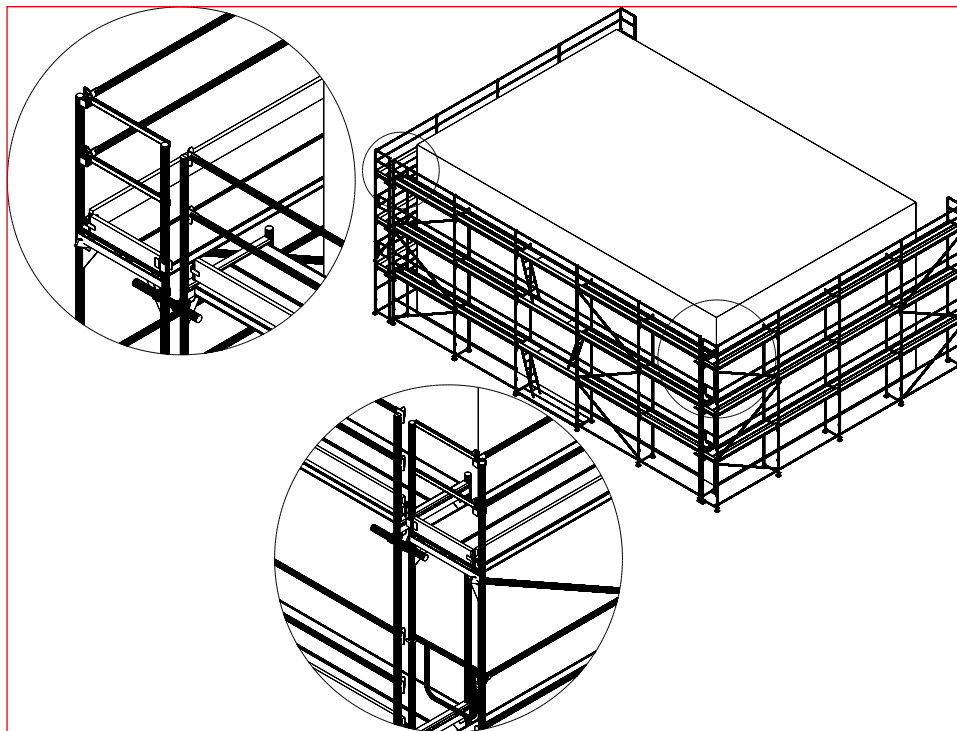


fig. 8.1 – Scaffolding arranged on the building walls

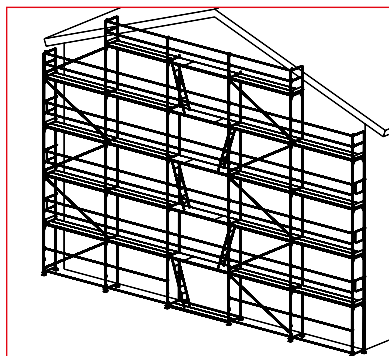


fig. 8.2 – Scaffolding arranged on the building gable wall

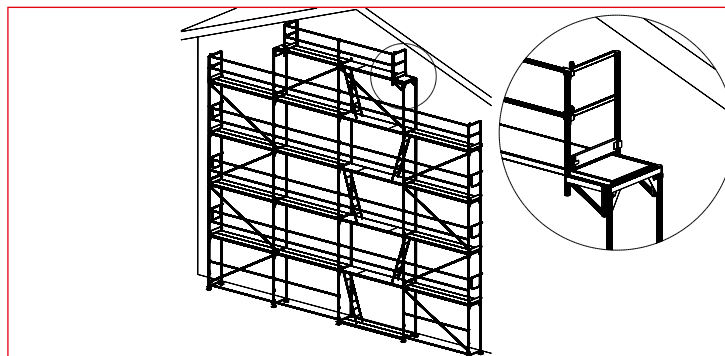


fig. 8.3 – Scaffolding arranged on the building gable wall with the bay 3,07 m reduced to the bay 2,57 with the E285550 console

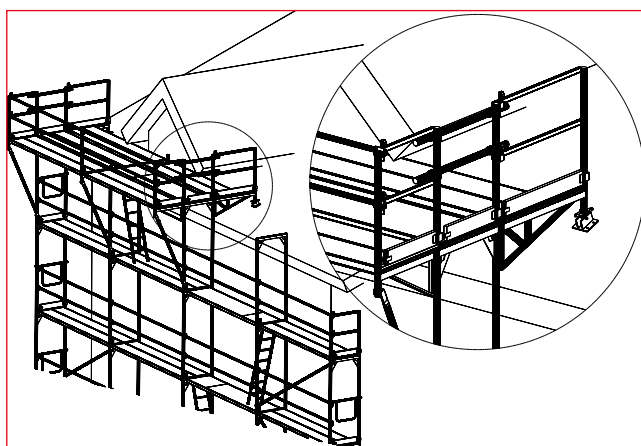


fig. 8.4 – Attic set-up 1

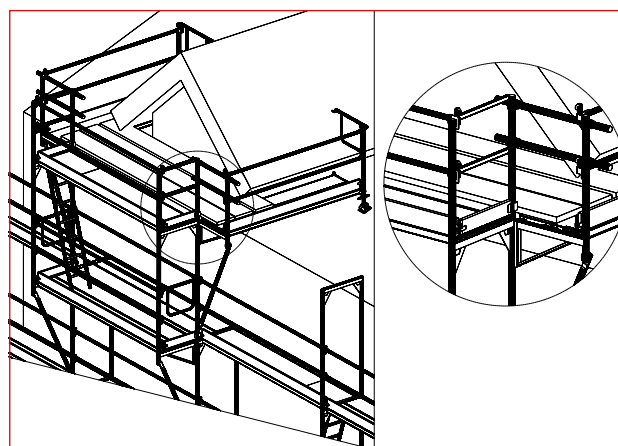


fig. 8.5 – Attic set-up 2



## 9. NON-STANDARD SCAFFOLDING SET-UPS

You have to perform the structural analyses for the non-standard scaffolding set-ups. The assumptions and data used for the analyses are presented in the separate document and available upon the request of the parties interested in this information.

## 10. RAW MATERIALS USED FOR COMPONENT MANUFACTURE

All information concerning the shape and parameters of the raw materials used to manufacture the scaffolding configuration components are specified in the figures of the scaffolding components and can be obtained from the scaffolding manufacturer. The basic material for the primary scaffolding components is S235JRG2 steel with the higher yield stress of  $Re \geq 320$  MPa (for the frame structure components) or  $Re \geq 280$  MPa (for the platforms), and for the secondary components – steel of  $Re \geq 235$  MPa.

## 10. PRODUCT MARKING SYSTEM

All products manufactured by ALTRAD-MOSTOSTAL according to the existing ISO 9001 quality system are marked with the permanent marks (stamp ~ 0,7 mm deep) located as specified in the technical documentation. Additionally, the manufacturer and/or customer labels are used acc. to the individual agreements.

### A 75 RRM – general mark view

A 75 – permanent mark of the manufacturer – ALTRAD-MOSTOSTAL in Siedlce

M – letter of the month of manufacture (variable mark)

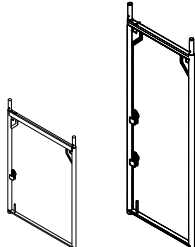
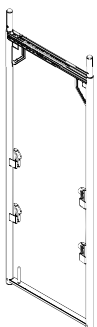
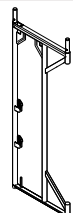
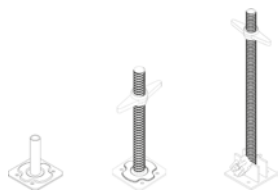
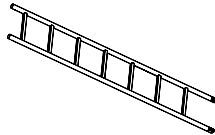
RR – digit of the year of manufacture (variable mark)

Year symbol RR	
01 = 1995	20 = 2014
.....	21 = 2015
16 = 2010	22 = 2016
17 = 2011	23 = 2017
18 = 2012	.....
19 = 2013	95 = 2089

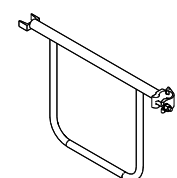
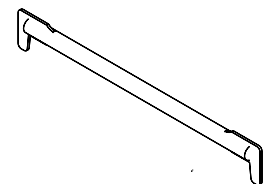
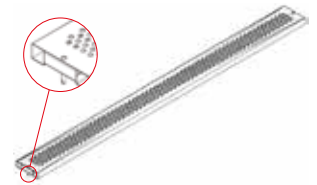
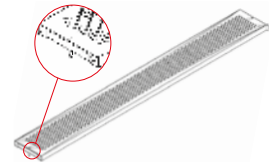
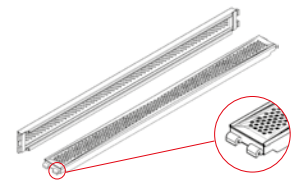
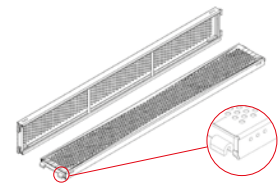
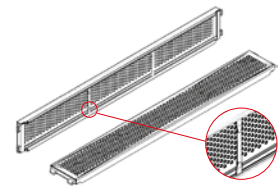
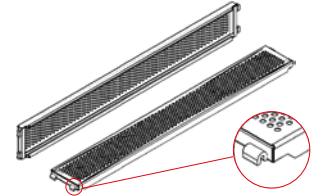
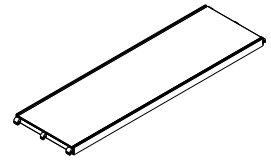
Month symbol M	
A – January	G – July
B – February	H – August
C – March	I – September
D – April	J – October
E – May	K – November
F – June	L – December

Additionally, it is possible to mark the products with the approval number appropriate for the individual domestic markets, e.g. Ü 190, Ü 846, Ü 887. Additional marking is placed at the end of the basic mark. The mark location is specified in the product design drawings.

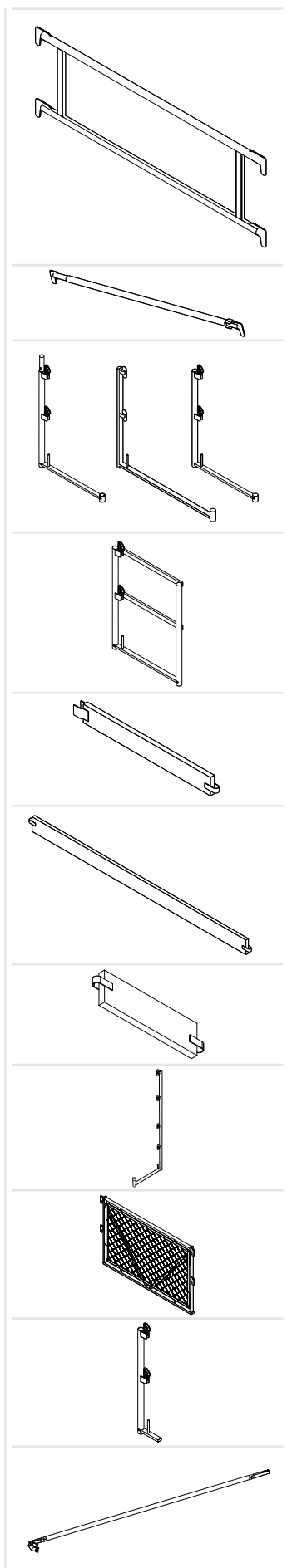
## 12. COMPONENT LIST

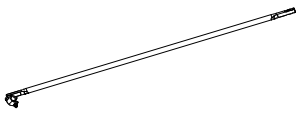
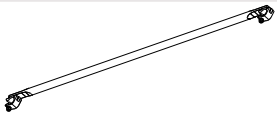
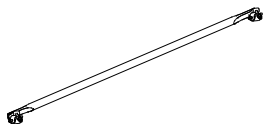
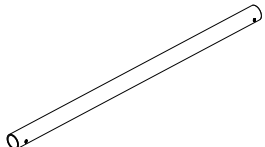







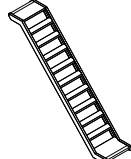





Component name	Contr. no.	Weight [kg]	Picture
Steel frame 0.66 x 0.73 m	E281606	10.28	
Steel frame 1.00 x 0.73 m	E281610	12.76	
Steel frame 1.50 x 0.73 m	E281615	16.20	
Steel frame 2.00 x 0.73 m	E281620	19.27	
Steel frame 0.66 x 1.09 m	E281206	14.44	
Steel frame 1.00 x 1.09 m	E281210	16.79	
Steel frame 2.00 x 1.09 m	E281220	22.67	
Alu. frame 0.66 x 0.73 m	E282206	5.11	
Alu. frame 1.00 x 0.73 m	E282210	6.43	
Alu. frame 1.50 x 0.73 m	E282215	8.23	
Alu. frame 2.00 x 0.73 m	E282220	9.73	
PLUS Steel frame 0.66 x 0.73 m	E202029	10.36	
PLUS Steel frame 1.00 x 0.73 m	E202028	13.17	
PLUS Steel frame 1.50 x 0.73 m	E202027	16.20	
PLUS Steel frame 2.00 x 0.73 m	E202026	19.80	
PLUS Steel frame 2.00 x 0.36 m	E202018	17.94	
Alu. frame 0.66 x 0.73 m	E203010	4.64	
Alu. frame 1.00 x 0.73 m	E203011	6.05	
Alu. frame 2.00 x 0.73 m	E203012	9.40	
Steel frame PLUS – double railing 0.73 x 2.00 m	E202036	21.02	
Passage frame 2.00 x 0.73 m	E202019	25.24	
Passage frame 2.00 x 0.73 m	E280520	22.84	
Normal steel base jack	E511200	1.38	
Base jack with nut 0.40 m	E511204	3.39	
Base jack with nut 0.60 m	E511206	4.28	
Base jack with nut 0.80 m	E511208	5.20	
Base jack with nut 1.50 m	E511313	9.45	
Tilt base jack 0.80 m	E511408	7.81	
Platform ladder, spare part 2.45 x 0.40 m	E492601	4.60	
Inter-level ladder 2.14 x 0.34 m	E511600	11.68	
Inter-level ladder 2.78 x 0.34 m	E511601	14.06	
Aluminium-plywood access platform with a ladder 2.57 x 0.61 m	E492125	23.81	
Aluminium-plywood access platform with a ladder 3.07 x 0.61 m	E492130	29.10	
Passing Platform Plus without ladder 0.61 x 2.07 m	E492020	15.96	
Passing Platform Plus without ladder 0.61 x 3.07 m	E492030	24.30	

Complete aluminium and plywood Platform PLUS 0.61 x 0.73 m	E491907	6.07
Complete aluminium and plywood Platform PLUS 0.61 x 1.09 m	E491910	8.75
Complete aluminium and plywood Platform PLUS 0.61 x 1.57 m	E491915	11.92
Complete aluminium and plywood Platform PLUS 0.61 x 2.07 m	E491920	15.53
Complete aluminium and plywood Platform PLUS 0.61 x 2.57 m	E491925	18.80
Complete aluminium and plywood Platform PLUS 0.61 x 3.07 m	E491930	24.06
Steel platform 0.32 x 0.73 m – U	E491307	6.09
Steel platform 0.32 x 1.09 m – U	E491310	8.54
Steel platform 0.32 x 1.40 m – U	E491314	10.31
Steel platform 0.32 x 1.57 m – U	E491315	11.84
Steel platform 0.32 x 2.07 m – U	E491320	15.34
Steel platform 0.32 x 2.57 m – U	E491325	18.70
Steel platform 0.32 x 3.07 m – U	E491330	22.13
Steel platform 0.32 x 1.57 m – U with crosspiece	E491415	12.04
Steel platform 0.32 x 2.07 m – U with crosspiece	E491420	15.74
Steel platform 0.32 x 2.57 m – U with crosspiece	E491425	19.10
Steel platform 0.32 x 3.07 m – U with crosspiece	E491430	22.56
Steel platform 0.32 x 2.57 m – U ECO	E491625	16.15
Steel platform 0.32 x 3.07 m – U ECO	E491630	18.85
Steel platform 0.19 x 0.73 m – U	E491807	4.63
Steel platform 0.19 x 1.09 m – U	E491810	6.57
Steel platform 0.19 x 1.57 m – U	E491815	9.29
Steel platform 0.19 x 2.07 m – U	E491820	11.92
Steel platform 0.19 x 2.57 m – U	E491825	14.64
Steel platform 0.19 x 3.07 m – U	E 491830	17.37
Filling steel platform 0.3 x 1.0 m with protection	E494310	5.14
Filling steel platform 0.3 x 1.5 m with protection	E494315	7.39
Filling steel platform 0.3 x 2.0 m with protection	E494320	9.65
Filling steel platform 0.3 x 2.5 m with protection	E494325	11.90
Additional Platform 0.19 x 0.7 m	E494407	2.84
Additional Platform 0.19 x 1.0 m	E494410	3.92
Additional Platform 0.19 x 1.5 m	E494415	5.70
Additional Platform 0.19 x 2.0 m	E494420	7.49
Additional Platform 0.19 x 2.5 m	E494425	9.27
Additional Platform 0.19 x 3.0 m	E494430	11.06
Steel single railing 0.73 m	E283607	1.55
Steel single railing 1.09 m	E283610	2.17
Steel single railing 1.57 m	E283615	3.00
Steel single railing 2.07 m	E283620	3.86
Steel single railing 2.57 m	E 283625	4.70
Steel single railing 3.07 m	E 283630	5.58
Front railing 0.73 m	E283907	3.72
Front railing 1.09 m	E283910	4.66
Front railing 0.73 m (with wedge)	E283007	3.80
Front railing 1.09 m (with wedge)	E283010	4.76

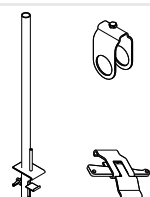
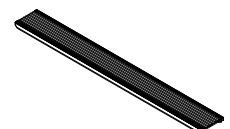
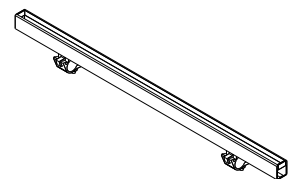
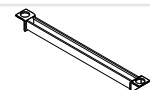
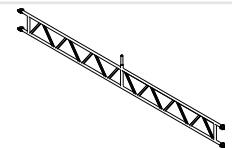
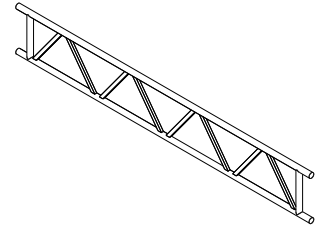


Steel double railing 0.50 x 1.57 m	E284215	7.40
Steel double railing 0.50 x 2.07 m	E284220	9.13
Steel double railing 0.50 x 2.57 m	E284225	11.51
Steel double railing 0.50 x 3.07 m	E284230	13.24
Alu. double railing 0.50 x 1.57 m	E284315	3.48
Alu. double railing 0.50 x 2.07 m	E284320	4.28
Alu. double railing 0.50 x 2.57 m	E284325	5.08
Alu. double railing 0.50 x 3.07 m	E284330	5.89
Steel telescopic railing 1.60-2.62 m	E283700	7.16
Steel railing post with platform protection 0.73 x 1.00 m	E202089	6.64
Steel railing post with platform protection 0.73 x 1.00 m	E202091	5.86
Steel railing post with platform protection 1.09 x 1.00 m	E202092	6.50
Steel railing post with platform protection 0.73 x 1.00 m	E282007	5.89
Steel railing post with platform protection 1.09 x 1.00 m	E282010	6.53
Aluminium railing post with platform protection 0.73 x 1.00 m	E203083	2.97
Front frame 0.73 x 1.00 m	E202023	11.34
Front frame 1.09 x 1.00 m	E202024	13.20
Front frame 0.73 x 1.00 m	E283307	12.53
Front frame 1.09 x 1.00 m	E283310	14.43
Alu. Plus front frame 0.73 x 1.00 m	E203080	5.69
Transverse toe board 0.15 x 0.73 m	E286807	1.70
Transverse toe board 0.15 x 1.09 m	E286810	2.72
Longitudinal toe board 0.15 x 1.09 m	E286813	2.94
Longitudinal toe board 0.15 x 1.57 m	E286815	4.15
Longitudinal toe board 0.15 x 2.07 m	E286820	5.40
Longitudinal toe board 0.15 x 2.57 m	E286825	6.70
Longitudinal toe board 0.15 x 3.07 m	E286830	7.90
Transverse toe board 0.15 x 0.54 m	E286805	1.54
Net screen post 0.73 x 2.00 m	E285911	15.20
Net screen post 1.09 x 2.00 m	E285912	16.90
Net screen 1.00 x 1.57 m	E285015	16.92
Net screen 1.00 x 2.07 m	E285020	21.52
Net screen 1.00 x 2.57 m	E285025	25.10
Net screen 1.00 x 3.07 m	E285030	28.64
PLUS normal railing post 1.00 m	E202085	5.25
PLUS normal railing post 1.00 m	E282700	4.15
Aluminium railing post 1.00 m	E282800	2.28
Aluminium railing post 1.00 m	E203084	2.44
Diagonal 1.57 x 2.00 m	E284715	6.27
Diagonal 2.07 x 2.00 m	E284720	6.45
Diagonal 2.57 x 2.00 m	E284725	7.25
Diagonal 3.07 x 2.00 m	E284730	8.14

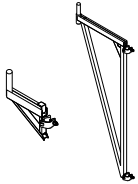
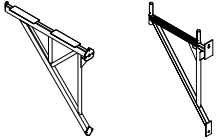
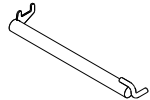
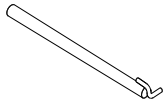
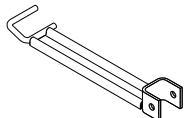
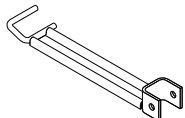

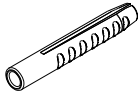




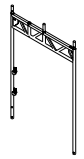
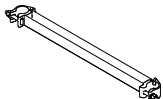


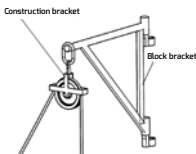
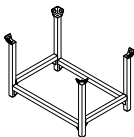
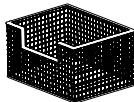
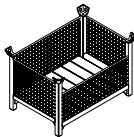
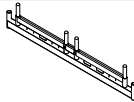
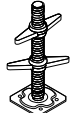
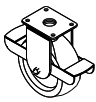


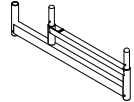


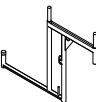
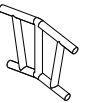

Diagonal 1.57 x 2.00 m (with wedge)	E284815	6.65	
Diagonal 2.07 x 2.00 m (with wedge)	E284820	6.63	
Diagonal 2.57 x 2.00 m (with wedge)	E284825	7.43	
Diagonal 3.07 x 2.00 m (with wedge)	E284830	8.33	
Horizontal brace 2.07 m	E283820	8.13	
Horizontal brace 2.57 m	E283825	9.77	
Horizontal brace 3.07 m	E283830	11.40	
Transverse brace 1.75 m	E285179	4.99	
Transverse brace 1.95 m	E285119	5.52	
Universal steel pipe 0.048 x 1.00 m	E440510	3.58	
Universal steel pipe 0.048 x 2.00 m	E440520	7.16	
Universal steel pipe 0.048 x 3.00 m	E440530	10.70	
Universal steel pipe 0.048 x 4.00 m	E440540	14.30	
Universal steel pipe 0.048 x 5.00 m	E440550	17.90	
Universal steel pipe 0.048 x 6.00 m	E440560	21.50	
Normal coupling	E581119	1.25	
Rotary coupling 0.40 x 2.45 m	E581319	1.20	
Longitudinal coupling	E581419	1.50	
Railing coupling with wedge	E284600	0.90	
Anchor coupling	E284610	0.99	
Handle of a curb	E284615	0.85	
Anchor coupler	E284620	1.06	
Alu. stairs 0.64 x 2.57 m	E286225	25.23	
Alu. stairs 0.64 x 3.07 m	E286230	30.00	
Stairs external railing 2.57 m	E286325	16.00	
Stairs external railing 3.07 m	E286330	17.80	
Stairs internal railing	E286300	11.85	
Poręcz dolna schodów	E286305	4.38	
Initial U-transom 0.73 m	E286207	3.07	

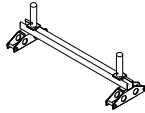
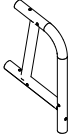

Steel girder 0.40 x 3.00 m	E503330	29.22
Steel girder 0.40 x 3.24 m	E503332	31.14
Steel girder 0.40 x 4.00 m	E503340	39.28
Steel girder 0.40 x 4.24 m	E503342	39.67
Steel girder 0.40 x 5.24 m	E503352	48.55
Steel girder 0.40 x 6.00 m	E503360	57.42
Steel girder 0.40 x 6.24 m	E503362	58.03
Steel girder 0.50 x 3.24 m	E503230	36.40
Steel girder 0.50 x 4.24 m	E503240	45.60
Steel girder 0.50 x 5.24 m	E503250	52.33
Steel girder 0.50 x 6.24 m	E503260	61.12
Alu. girder 0.40 x 3.00 m	E501230	12.70
Alu. girder 0.40 x 4.00 m	E501240	17.00
Alu. girder 0.40 x 5.24 m	E501252	20.96
Alu. girder 0.40 x 6.00 m	E501260	24.70
Alu. girder 0.40 x 6.24 m	E501262	25.12
Alu. girder 0.40 x 8.00 m	E501280	32.40
Alu. girder 0.50 x 3.24 m	E501330	14.97
Alu. girder 0.50 x 4.24 m	E501340	18.79
Alu. girder 0.50 x 5.24 m	E501350	22.60
Alu. girder 0.50 x 6.24 m	E501360	26.43
DAlu. girder 0.50 x 8.24 m	E501380	34.03
Steel girder 0.40 x 5.14 m – passage	E503152	56.00
Steel girder 0.40 x 6.14 m – passage	E503162	62.13
Girder transom 0.73 m	E503407	2.80
Girder coupling 0.44 m	E502000	2.20
Alu. crossbeam 0.60 m	E501006	2.70
Alu. crossbeam 0.90 m	E501009	3.30
Alu. crossbeam 1.20 m	E501012	3.80
Alu. crossbeam 1.60 m	E501016	5.20
Alu. crossbeam 1.90 m	E501019	5.80
Alu. crossbeam 3.00 m	E501030	8.50
Alu. crossbeam 4.00 m	E501040	10.20
Alu. crossbeam 5.00 m	E501050	12.70
Alu. crossbeam 6.00 m	E501060	15.20
Alu. platform 0.59 x 4.20 m	E491042	32.70
Alu. platform 0.59 x 5.20 m	E491052	39.68
Alu. platform 0.59 x 6.10 m	E491061	46.90
Alu. platform 0.59 x 7.10 m	E491071	53.51
Alu. post for platform railing	E491001	2.50
Platform railing clamp	E491002	0.30
Platform railing clamp	E491003	0.30





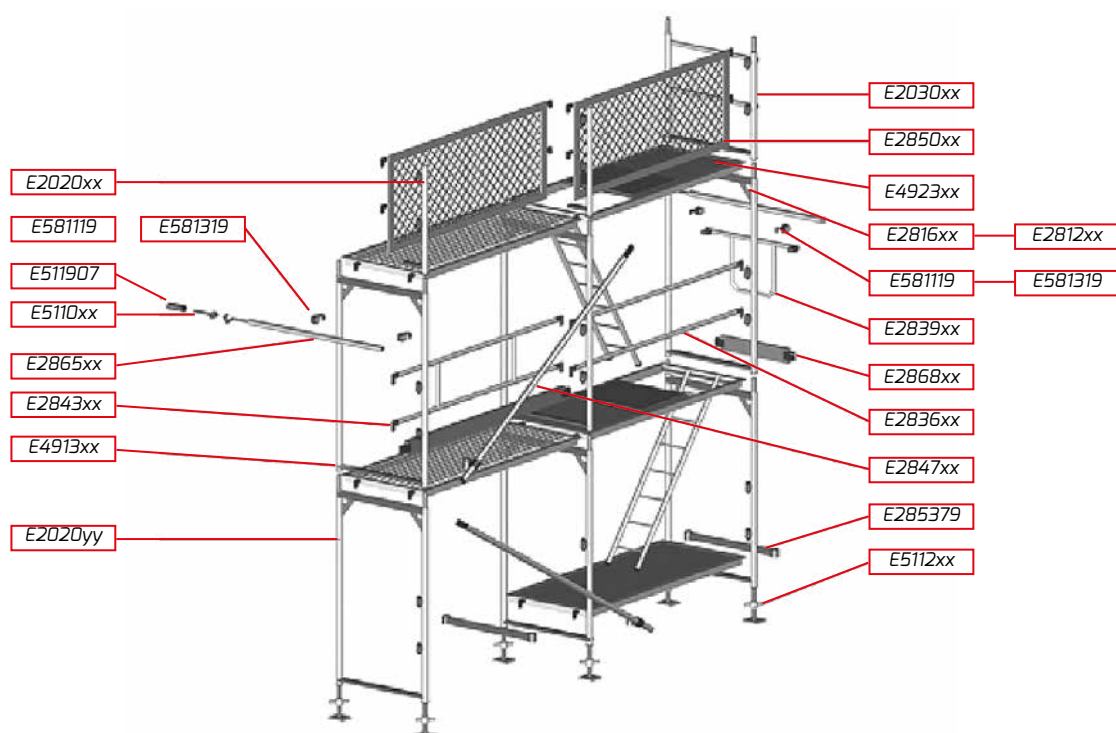
Console 0.36 x 0.28 m	E285539	3.40	
Console 0.73 x 1.76 m	E285589	19.40	
Console 0.73 x 0.38 m	E285579	6.54	
Console 1.09 x 0.38 m	E285519	10.64	
Console 0.50 x 0.30 m	E285550	5.15	
Steel console – anchored 0.73 m	E285590	16.10	
Steel console – anchored 1.50 m	E285515	41.10	
Anchor coupling with hook 0.60 m	E286606	2.74	
Anchor coupling 0.40 m	E286504	1.66	
Anchor coupling 0.80 m	E286508	2.96	
Anchor coupling 1.30 m	E286513	4.58	
Anchor coupling 1.50 m	E286515	4.94	
Platform protection for console platforms 0.36 m	E285403	0.99	
Platform protection for console platforms 0.73 m	E285407	1.75	
Platform protection for console platforms 1.09 m	E285410	2.48	
Securing pin	E511100	0.10	
Plastic rawplug 14 / 70 mm	E511907	0.03	
Plastic rawplug 14 / 100 mm	E511910	0.03	
Anchor eye bolt 0.12 m	E511012	0.20	
Anchor eye bolt 0.16 m	E511016	0.25	
Anchor eye bolt 0.19 m	E511019	0.30	
Anchor eye bolt 0.23 m	E511023	0.40	
Anchor eye bolt 0.28 m	E511028	0.50	
Anchor eye bolt 0.30 m	E511030	0.55	
Anchor eye bolt 0.35 m	E511035	0.60	
Hole plug	E511800	0.01	
Tee head bolt	E581301	0.10	
Flange nut	E581302	0.04	
Roof protective console 0.73 m	E288501	5.65	
Passage frame 1.50 x 2.20 m	E202195	34.54	
Passage frame 1.50 x 2.20 m	E281515	35.96	
Transverse transom 0.73 m	E285379	3.40	
Transverse transom 1.09 m	E285319	6.14	

Jib for block	E552100	7.86	
Jib for block. Block for jib	E552000	3.00	
Module pallet	E822800	40.20	
Module pallet	E823800	29.00	
Module basket 0.68 x 1.08 m	E822900	30.40	
Net pallet	E822808	69.70	
Net pallet	E823808	69.70	
Mobile scaffolding guide beam 1.09 x 2.60 m	E571110	37.76	
Mobile scaffolding guide beam 0.73 x 1.90 m	E571173	26.34	
Base jack with two nuts 0.40 m	E571175	4.10	
Mobile scaffolding wheel	MP-116	4.00	
Scaffolding net 2.57 x 10 m	E732025	0.05	
Scaffolding net 2.57 x 10 m	E732030	0.06	
Scaffolding canvas cover 2.60 x 10 m	E733725	0.18	
Scaffolding canvas cover 3.10 x 10 m	E733730	0.18	
Reducing transom (steel adjusting beam) 0.73 x 1.09 m	E281402	12.85	
Assembly post 2.00 m	E206600	6.82	
Telescopic railing 2.07-3.70 m	E206700	4.23	
Telescopic railing 1.50-2.07 m	E206800	3.45	
Steel eaves frame 1.00 m	E281525	15.22	
Aluminium eaves frame 1.00 m	E281530	7.96	
Roof steel girder 0.4 x 0.80 m	E502140	8.20	
Girder bracket 0.73 m	E503507	5.99	

Girder transom 0.28 x 0.91 m	E503573	7.47	
Roof ending beam 0.4 x 0.62 m	E501940	5.59	
Mini 60S electric hoisting winch	E552606	56.00	
Maxi 120S electric hoisting winch	E552612	65.00	
Maxi 150S electric hoisting winch	E552615	65.00	

### 13. EXEMPLARY SET – FRAME SCAFFOLDING

Below is the basic frame scaffolding set-up with the examples of the indices of individual components (component list, see p. 47 – 54).



## 14. TABLES

### – PLATFORM AND BASE JACK LOAD

Table 1. Platform load

Platform load class acc. to EN-12 811							
No.	Platform type	3.07	2.57	2.07	1.57	1.09	0.73
1.	Steel platforms 0,32 E4913xx; 4914xx; 4916xx; 4955xx; 4956xx;	4 kl. (3,0 kN/m <sup>2</sup> )	5 kl. (4,5 kN/m <sup>2</sup> )	6 kl. (6 kN/m <sup>2</sup> )	6 kl. (6 kN/m <sup>2</sup> )	6 kl. (6 kN/m <sup>2</sup> )	6 kl. (6 kN/m <sup>2</sup> )
2.	Filling steel platforms 0,19 E491810xx	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )
3.	Alu-plywood platforms 0,61 E4920xx; 4919xx; 4921xx	3 kl. (2,0 kN/m <sup>2</sup> )	3 kl. (2,0 kN/m <sup>2</sup> )	3 kl. (2,0 kN/m <sup>2</sup> )	3 kl. (2,0 kN/m <sup>2</sup> )	3 kl. (2,0 kN/m <sup>2</sup> )	3 kl. (2,0 kN/m <sup>2</sup> )

Length – L [m]							
No.	Platform type	3.0	2.50	2.0	1.50	1.0	0.70
4.	Filling platform 0,30 E4943xx	3 kl. (2,0 kN/m <sup>2</sup> )	4 kl. (3,0 kN/m <sup>2</sup> )	5 kl. (4,5 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )
5.	Filling platform 0,19 E4944xx	4 kl. (3,0 kN/m <sup>2</sup> )	5 kl. (4,5 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )	6 kl. (6,0 kN/m <sup>2</sup> )

Table 2. Base jack vertical load capacity.

Base jack type	Base jack sort	Permissible nut removal [cm]				
No.		20	30	40	50	60
E511204	Base jack with nut 0.4 m	40 kN	–	–	–	–
E511206	Base jack with nut 0.6 m	40 kN	29 kN	22 kN	–	–
E511208	Base jack with nut 0.8 m	40 kN	29 kN	22 kN	17 kN	15 kN
E511313	Base jack with nut 1.5 m	40 kN	29 kN	22 kN	17 kN	15 kN
E511408	Tilt base jack 0.8 m	40 kN	29 kN	22 kN	17 kN	15 kN

# 15. ANNEX NO. 1 SCAFFOLDING COMMISSION PROTOCOL



## SCAFFOLDING COMMISSION PROTOCOL

No. \_\_\_\_\_ of \_\_\_\_\_

To agreement no. \_\_\_\_\_ of \_\_\_\_\_

Contractor .....	User .....
.....	.....
.....	.....
.....	.....
Authorised person .....	Authorised person .....
Phone no. ....	Phone no. ....
Scaffolding type:  <input type="checkbox"/> Frame <input type="checkbox"/> Wall <input type="checkbox"/> Rotax modular <input type="checkbox"/> Free-standing <input type="checkbox"/> Mobile <input type="checkbox"/> Hanging <input type="checkbox"/> Facade <input type="checkbox"/> .....	Assembly site ..... ..... ..... ..... ..... .....
Scaffolding parameters: Structure dimensions ..... Net dimensions ..... Structure load capacity ..... Working platform permissible load capacity ..... kNm <sup>2</sup> .....	Scaffolding purpose ..... ..... ..... ..... .....
Earthing resistance ..... Ω  Subsequent inspection dates ..... ..... ..... .....	Additional equipment ..... ..... ..... ..... .....

### Declaration and confirmation

- Assembly Contractor certifies that the scaffolding described in this protocol is complete. The scaffolding was assembled according to the best construction practices and the assembly manual issued by the manufacturer as well as according to the OHS requirements. The assembly was performed by certified fitters.
- The scaffolding structure may be modified only by the Assembly Contractor.
- The Assembly Contractor provides the following along with this protocol:
  - scaffolding scheme
  - scaffolding assembly manual
  - .....
  - .....
- Scaffolding user accepts this scaffolding for use without any reservations and declares that he/she is aware of the rules of use resulting from the assembly manual.
- Before each use of the scaffolding the User should check its technical condition and completeness.
- Commission in the following panel confirms the scaffolding hand-over after assembly and acceptance for use.
 

a) .....	.....	.....	- User
b) .....	.....	.....	- User
c) .....	.....	.....	- Contractor

full name

position

signature

Application date for scaffolding disassembly: .....







**MOSTOSTAL**  
SCAFFOLDING  
FORMWORK

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[www.altrad-mostostal.pl](http://www.altrad-mostostal.pl)

04.2022

