plettac®
distribution

PD70/100

70 cm, 110 cm, 150 cm, 200 cm, 250 cm, 300 cm

ASSEMBLY AND USE MANUAL OF PD 70/100 FRAME SCAFFOLDING

plettac Distribution Sp. z o.o.
Kościuszki 31
PL 63-500 Ostrzeszów

Ostrzeszów, July 2013

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NOTE
This manual is intended for designers, assembly personnel and „PD 70/100" scaffolding users.
The company performing the assembly, disassembly, and using the „PD 70/100" system scaffolding must ensure the availability of this manual at a location in which the scaffoldings are assembled, disassembled and used.

COMPONENT DESIGNATION

The scaffolding components have been designated by the following inscription:

PD/XX

where XX - mean the last digits of manufacturing year.

PD70 scaffolding designation

Scaffolding EN 12810-3N-SW06/300-H1-A-LS
Scaffolding EN 12810-3N-SW06/300-H1-B-LS

Pd100 scaffolding designation

Scaffolding EN 12810-3N-SW09/300-H1-A-LS
Scaffolding EN 12810-3N-SW09/300-H1-B-LS

CHAPTER I.
Application range of PD 70/100 system scaffoldings

1.1 Application range of PD 70/100 system scaffoldings has been distinguished based on:

1. Working load of typical scaffoldings:
   - PD 70 spacing 3,0 m = 2,0 kN/m2
   - PD 70 spacing 2,5 m = 3,0 kN/m2
   - PD 100 spacing 2,5 m = 3,0 kN/m2
   - PD 100 spacing 3,0 m = 2,0 kN/m2

2. Allowable working load of decks - provided on the list of PD 70/100 system scaffolding components p. 7-14.

3. Allowable height of typical PD70/100 scaffoldings:
   - PD 70 – 24 m, fields of max length 2,5 m,
   - PD 70 – 24 m, fields of max length 3,0 m,
   - PD 100 – 24 m, fields of max length 3,0 m.

4. Allowable wind load at which the use of scaffoldings is possible without special designs:
   - only within the 1st area of wind loads as per PN-77/B-02011.

5. Hoist installation - the scaffolding cannot be exposed to installation of construction hoists or lifting equipment of lifting capacity above 150 kg.

6. Scaffolding works - Allowable only on one level of each scaffolding vertical section.

7. The use of scaffoldings apart from the mentioned in pts. 1-6 application range, requires performing static calculations and the execution of technical construction design.

8. Static calculations are also required by scaffolding structures in which the following are assumed to be used:
   - compensation frames,
   - walk-through frames,
   - girders for suspension over gates,
   - canvas covers and protective nets,
   - wide triple-deck extension brackets,
   - different than specified in this manual bracing or anchoring layout.

PD 70/100 scaffolding structure calculations should be performed in accordance with the applicable standards and regulations based on an agreement with plettac Distribution Sp. z o.o. company representatives.

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CHAPTER II.
Component specification of PD 70/100 system scaffoldings

Note: the dot „•" designates components used in typical structures assembly.

2.1. Basic equipment.

	Name		Dimensions (cm)	Weight	Catalog number
	**Steel Vertical Frame PD 70** • hot-dip galvanized		200 x 70 150 x 70 100 x 70 50 x 70	18,85 kg 17,00 kg 13,50 kg 9,50 kg	PD 100 200 PD 100 150 PD 100 100 PD 100 050
	**Steel Vertical Frame PD 100** • hot-dip galvanized		200 x 110 150 x 110 100 x 110 50 x 110	23,00 kg 20,00 kg 16,00 kg 12,00 kg	PD 110 200 PD 110 150 PD 110 100 PD 110 050
	**Steel Vertical Frame PD 40** hot-dip galvanized		200 x 40	17,40 kg	PD 120 040
	**Side Bracket Frame**		200 x 70	20,80 kg	PD 140 070
	**Fall Arrest Frame**		200 x 70 / 110	21,50 kg	PD 160 070
	**Walk Through Frame** • to PD 70 / PD 70 (with 4 platforms) to PD 70 / PD 100 (with 5 platforms)		200 x 150 200 x 180	36,00 kg 38,00 kg	PD 150 150 PD 150 180
	**Timber Deck** • glued, waterproof up to class 6	Class 3 Class 4 Class 5 Class 6 Class 6 Class 6	300 x 32 x 4,8 250 x 32 x 4,8 200 x 32 x 4,8 150 x 32 x 4,8 110 x 32 x 4,8 70 x 32 x 4,8	23,00 kg 20,00 kg 14,70 kg 11,40 kg 8,50 kg 6,00 kg	PD 200 300 PD 200 250 PD 200 200 PD 200 150 PD 200 110 PD 200 070
	**Steel Deck** • hot-dip galvanized, perforated up to load class 6	Class 3 Class 4 Class 5 Class 6 Class 6 Class 6	300 x 32 x 7 250 x 32 x 7 200 x 32 x 7 150 x 32 x 7 110 x 32 x 7 70 x 32 x 7	25,00 kg 20,00 kg 15,00 kg 12,00 kg 9,60 kg 7,30 kg	PD 210 300 PD 210 250 PD 210 200 PD 210 150 PD 210 110 PD 210 070

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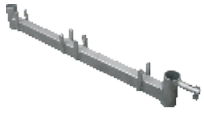
	Name	Dimensions (cm)	Weight	Catalog number
	**Steel Filler Deck** •	300 x 30 x 4 250 x 30 x 4 200 x 30 x 4 150 x 30 x 4	16,00 kg 13,50 kg 10,80 kg 8,00 kg	PD 260 300 PD 260 250 PD 260 200 PD 260 150
	**Vertical Brace** • 300 x 200 cm 250 x 200 cm 200 x 200 cm 150 x 200 cm 250 x 150 cm 250 x 100 cm 300 x 100 cm	 361 320 283 250 292 270 316	 10,00 kg 9,00 kg 7,00 kg 6,00 kg 8,00 kg 7,20 kg 9,90 kg	 PD 300 300 PD 300 250 PD 300 200 PD 300 150 PD 310 150 PD 320 100 PD 330 100
	**Diagonal Fixing Bracket** •	-	0,50 kg	PD 340 100
	**Staircase Transom** •	-	3,30 kg	PD 350 100
	**Guard Rail** • 300 cm 250 cm 200 cm 150 cm 110 cm 70 cm	 300 250 200 150 110 70	 4,12 kg 3,45 kg 2,76 kg 2,07 kg 0,76 kg 0,49 kg	 PD 400 300 PD 400 250 PD 400 200 PD 400 150 PD 400 110 PD 400 070
	**Single End Guard Rail** • PD 70 PD 100	 70 110	 2,00 kg 3,00 kg	 PD 410 070 PD 410 100
	**Double End Guard Rail** • PD 70 PD 100 PD 40	 70 110 40	 4,00 kg 5,00 kg 3,50 kg	 PD 420 070 PD 420 110 PD 420 040
	**Toeboard for Decks** • 300 cm 250 cm 200 cm 150 cm 110 cm 70 cm	 300 250 200 150 110 70	 6,00 kg 5,00 kg 4,30 kg 2,70 kg 2,20 kg 1,50 kg	 PD 500 300 PD 500 250 PD 500 200 PD 500 150 PD 500 110 PD 500 070
	**End Toeboard** • PD 70 PD 100	 70 100	 1,30 kg 2,00 kg	 PD 510 070 PD 510 100
	**Base plate** • with a tubular spindle with round thread base clamping nut	length: 40 length: 60 length: 80 length: 100	2,25 kg 3,00 kg 3,50 kg 4,30 kg	PD 070 040 PD 070 060 PD 070 080 PD 070 100
	**Swivel base plate**	length: 56,8	6,10 kg	PD 070 110

	Name	Dimensions (cm)	Weight	Catalog number
	**Steel guard rail post** • 	100 200	4,00 kg 8,00 kg	PD 600 100 PD 600 200
	**Steel guard rail post with toeboard pin** PD 70/100	100	3,95 kg	PD 650 100
	**Steel guard rail support** • PD 70 PD 100	70 100	6,00 kg 6,30 kg	PD 620 070 PD 620 100
	**Support for fall arrest nets** • PD 70	70 x 200	11,10 kg	PD 640 070
	**Upper deck retainer** • PD 70 PD 100	70 100	2,00 kg 2,70 kg	PD 610 070 PD 610 100
	**End guard rail frame** • PD 70 PD 100	70 100	13,90 kg 16,80 kg	PD 630 070 PD 630 100

2.2. Communication route.

	Name	Dimensions (cm)	Weight	Catalog number
	**Alu plywood platform with a surface and ladder** • supporting structure made of aluminium, platform made of a waterproof, non-slip plywood which is integrated with the access ladder	300 x 65 x 7 250 x 65 x 7	30,00 kg 26,00 kg	PD 220 300 PD 220 250
	**Light alu plywood platform with a travelling ladder** •	300 x 65 x 7 250 x 65 x 7	20,50 kg 17,50 kg	PD 240 300 PD 240 250
	**Alu access deck with surface and ladder**	300 x 65 x 7 250 x 65 x 7	29,20 kg 24,40 kg	PD 230 300 PD 230 250

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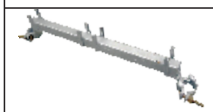
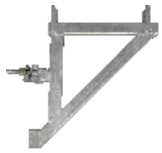
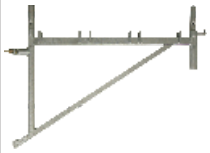
	Name	Dimensions (cm)	Weight	Catalog number
	**Internal ladder steel** for access platforms	-	11,70 kg	PD 240 100
	**Alu staircase** •	200 x 250 200 x 300	32,00 kg 37,00 kg	PD 250 250 PD 250 300
	**Outer guard rail double** •	250 300	12,00 kg 14,40 kg	PD 260 250 PD 260 300
	**Inner guard rail double** •	250 300	11,00 kg 13,90 kg	PD 265 250 PD 265 300
	**Special guard rail for staircase** •	-	12,80 kg	PD 265 350
	**Toeboard for the special guard rail**	-	12,80 kg	PD 265 360
	**Wide complementary platform for staircase** •	70 x 45	3,20 kg	PD 270 045
	**Narrow complementary platform for staircase** •	70 x 32	2,30 kg	PD 270 032
	**Adapter for intermediate heights**	width: 74	3,30 kg	PD 280 074
	**Intermediate transom**	width: 74 width:110	3,80 kg 4,90 kg	PD 290 074 PD 290 110

2.3. Scaffolding extension.

	Name	Dimensions (cm)	Weight	Catalog number
	**Side bracket 32** • without connection spigot	width: 32	3,50 kg	PD 800 032
	**Side bracket 32** • with connection spigot	width: 32	5,50 kg	PD 810 032
	**Side bracket 64/50** •	width: 74	8,00 kg	PD 800 064
	**Side bracket 74/50** •	width: 74	10,30 kg	PD 800 074
	**Side bracket 96/50** •	width: 110	9,70 kg	PD 800 096
	**Side bracket 110/50**	width: 110	11,90 kg	PD 800 110
	**Bracket protection** •	width: 32 width: 74 width: 110	1,30 kg 1,95 kg 2,10 kg	PD 800 111 PD 800 112 PD 800 113
	**Side Bracket support** •	width: 74 width: 110	8,20 kg 8,80 kg	PD 810 074 PD 810 110

2.4. Safety scaffoldings.

	Name	Dimensions (cm)	Weight	Catalog number
	**Extension side bracket**	width: 50	6,50 kg	PD 800 050

	Name	Dimensions (cm)	Weight	Catalog number
	**Deck retainer safety fun**	-	3,10 kg	PD 703 300
	**Roof side bracket**	-	3,50 kg	PD 703 400

2.5. Passageways, Underpasses.

	Name	Dimensions (cm)	Weight	Catalog number
	**Bridging beam**	length: 500 length: 600 length: 750	50,50 kg 60,60 kg 76,60 kg	PD 820 500 PD 820 600 PD 820 750
	**Steel lattice girder** height 45 cm, made of a fi 48,3 mm steel tube, hot-dip galvanized	length: 310 length: 410 length: 510 length: 610 length: 760	30,00 kg 39,00 kg 49,00 kg 58,00 kg 73,00 kg	PD 830 310 PD 830 410 PD 830 510 PD 850 610 PD 850 760
	**Alu lattice girder** height 45 cm, made of a fi 48,3 mm steel tube	length: 310 length: 410 length: 510 length: 610 length: 810	12,00 kg 15,50 kg 19,60 kg 23,00 kg 30,30 kg	PD 840 310 PD 850 410 PD 860 510 PD 860 610 PD 860 810
	**Heavy load lattice girder** height 75 cm, made of a fi 48,3 mm steel tube, hot-dip galvanized	length: 400 length: 500 length: 600 length: 700	45,20 kg 55,30 kg 65,40 kg 77,20 kg	PD 870 400 PD 870 500 PD 870 600 PD 870 700
	**Steel decking rail for lattice girder** 2-deck 3-deck 4-deck 5-deck 6-deck	 length: 70 length: 100 length: 130 length: 160 length: 195	 4,30 kg 6,20 kg 8,00 kg 10,00 kg 12,00 kg p.6,20 kg	 PD 880 070 PD 880 100 PD 880 130 PD 880 160 PD 880 195
	**Connecting spigot straight** with 4 connection bolts	-	4,40 kg	PD 880 200
	**Connecting spigot curved** upper lower with 4 connection bolts	 - -	 4,50 kg 4,00 kg	 PD 880 300 PD 880 400

2.6. Rolling scaffoldings.

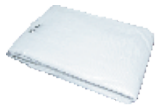
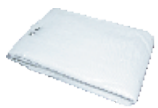
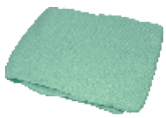
	Name	Dimensions (cm)	Weight	Catalog number
	**Castor 1200** made of reinforced plastic and 130 x 110 mm base plate, without spigot, fi 200 mm wheel with a brake, load capacity 1190 kg, for centric weight distribution	-	6,00 kg	PD 880 500

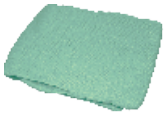
	Name	Dimensions (cm)	Weight	Catalog number
	**Rolling beam 170**	length: 170	15,00 kg	PD 880 600

2.7. Anchoring elements.

	Name	Dimensions (cm)	Weight	Catalog number
	**Scaffold tie** •	length: 40 length: 50 length: 80 length: 110 length: 130 length: 150	1,70 kg 2,00 kg 2,80 kg 4,00 kg 4,80 kg 5,50 kg	PD 700 040 PD 700 050 PD 700 080 PD 700 110 PD 700 130 PD 700 150
	Eyebolt • galvanized eyebolt, packed	12 x 95 mm 12 x 120 mm 12 x 160 mm 12 x 190 mm 12 x 230 mm 12 x 350 mm	0,1 kg 0,2 kg 0,3 kg 0,4 kg 0,5 kg 0,6 kg	PD 720 230 PD 720 240 PD 720 250 PD 720 260 PD 720 270 PD 720 280
	**Expansion anchor** • 70 mm, made od plastic, for eyebolts	70 mm	-	PD 730 070
	**Plastic cap**	-	-	PD 740 100

2.8. Bad weather protection.

	Name	Dimensions (cm)	Weight	Catalog number
	**Roof protecton post** PD 70 / PD 100	height: 215	13,00 kg	PD 620 200
	**Scaffold canvas 2,70** for 2,50 m fields with edge eyelets	10,00m x 2,70m 20,00m x 2,70m	9 kg per roll 18 kg per roll	PD 900 110 PD 900 120
	**Scaffold canvas 3,20** for 3,00 m. fields with edge eyelets; weight approx: 280 g/m tensile strength: approx. 500 N/5 cm	10,00m x 3,20m 20,00m x 3,20m	11 kg per roll 22 kg per roll	PD 900 130 PD 900 140
	**Protective scaffold canvas** belt fabric with edge eyelets transparent-white weight: approx. 180 g/m tensile strength: approx. 650 N/5 cm	10,00m x 2,60m 20,00m x 2,60m 10,00m x 3,10m 20,00m x 3,10m	6 kg per roll 12 kg per roll 7 kg per roll 14 kg per roll	PD 900 150 PD 900 160 PD 900 170 PD 900 180
	**Scaffold net 2,57** for 2,50 m fields with edge eyelets	10,00m x 2,50m 20,00m x 2,50m	2 kg per roll 4 kg per roll	PD 900 200 PD 900 210

	Name	Dimensions (cm)	Weight	Catalog number
	**Scaffold net 3,07** for 3,00 m fields with edge eyelets weight: approx. 92 g/m wind permeability approx. 50-70%	10,00m x 3,10m 20,00m x 3,10m	2,5 kg per roll 5 kg per roll	PD 900 220 PD 900 230
	One way plastic tie (100 pieces) tensile strength: approx. 22,00 kg	-	0,50 per pack	PD 900 190

2.9. Couplings.

	Name	Dimensions (cm)	Weight	Catalog number
	**Double coupler** • with flanged nuts for tubes with an external diameter of fi 48,3 mm	-	1,10 kg	PD 710 100
	**Swivel coupler** • with flanged nuts for tubes with an external diameter of fi 48,3 mm	-	1,20 kg	PD 710 110
	**Tension coupler** • with flanged nuts for tubes with an external diameter of fi 48,3 mm	-	1,50 kg	PD 710 120
	**Tube connecting spigot** • tubes with an external diameter of fi 48,3 mm	-	1,00 kg	PD 710 130
	**Gravity pin coupler** •	-	0,90 kg	PD 710 140
	**Gravity pin**	-	0,10 kg	PD 710 150
	**Box spanner** SW 22, chrome-vanadium SW 19	length: 25 length: 25	0,35 kg 0,35 kg	PD 710 160 PD 710 170
	**Ratchet spanner** with aluminium handle 19/22 mm	length: 30	0,95 kg	PD 710 180

2.10. Storage and transport.

	Name	Dimensions (cm)	Weight	Catalog number
	**Extension arm** without block	extension arm 65	4,50 kg	PD 710 190

	Name	Dimensions (cm)	Weight	Catalog number
	**Rope hoists GEDA Mini 60 S** complete with an extension arm and a hook for scaffold components; with a power cable 10m; Maximum hoisting capacity - 60 kg	-	43,00 kg	PD 703 300
	**Rope hoists GEDA Maxi 120 S** complete with an extension arm and a hook for scaffold components; with a power cable 10m; Maximum hoisting capacity - 60 kg	-	65,00 kg	PD 703 400
	**Rope hoists GEDA 250 Comfort** complete with an extension arm and a hook for scaffold components; with a power cable 10m; Maximum hoisting capacity - 250 kg	-	65,00 kg	PD 703 500
	Power cable complete 30 m. for all types of electric winches	-	6,00 kg	PD 703 600
	**Stack pallete**	116 x 66 x 93	42,20 kg	PD 880 700
	**Grid box pallete** for small items	120 x 80 x100	60,00 kg	PD 880 710

CHAPTER III.
Assembly and disassembly rules of PD 70/100 system scaffoldings

3.1. Assembly and disassembly rules of PD 70/100 system scaffoldings.

3.1.1 General remarks.

1.) The scaffolding user is strictly obliged to follow the use and assembly rules provided:
- in this manual,
- in standards PN-M-47900:1996, PN-EN 12811; PN-EN 12810
- in the Ordinance of Minister of Infrastructure dated 6th February 2003 on health and safety during the execution of construction works (Journal of Laws No. 47 dated 2003, item 401),
- in the Ordinance of the Minister of Labor and Social Policy dated 26th September 1997 on general health and safety provisions (Journal of Laws No. 129 item 844 as amended),
- in the Ordinance of the Minister of Economy, the Minister of Labor and Social Policy date 30th September 2003 amending the ordinance on minimum requirements of health and safety within the use of work equipment by workers at work (Journal of Laws No. 178, item 1745)

The abovementioned regulations are intended for assembly supervisors and scaffolding technical acceptance staff.

2.) The assembly and disassembly of PD 70/100l scaffoldings may be performed under the supervision of a competent person with appropriate certificates and familiarized with this manual.

3.1.2 Specific requirements arising from the provisions of PN standards and applicable laws in Poland.

3.1.2.1 Bearing capacity of the ground

Provisions of the PN-M-47900-2:1996 pt. 4.3 standard are applicable.

3.1.2.2 Scaffolding placement.

Provisions of the PN-M-47900-2:1996 pt. 4.4 standard are applicable.

3.1.2.3 Location of scaffoldings in the vicinity of overhead electricity lines.

Provisions of the PN-M-47900-2:1996 pt. 4.9.1 standard are applicable.

3.1.2.4 Electrical equipment (electrical cables).

Provisions of the PN-M-47900-2:1996 pts. 4.9.2; 4.9.3. standards are applicable.

3.1.2.5 Lightning protection equipment.

Provisions of the PN-M-47900-2:1996 pt. 4.8 standard are applicable.

3.1.2.6 Protective roofs.

Protective roofs should be installed in accordance with the provisions of the PN-M-47900-2:1996 pt. 4.10.3.

3.1.2.7 Fencing, bumping posts, signs and warning lights.

The installation of the abovementioned protective measure should be executed in accordance with the provisions of the PN-M-47900-2:1996 pts. 4.10.4; 4.10.5; 4.10.6; 4.10.7.

3.1.2.8 Transport equipment.

During the use and installation of transport equipment, the provisions of PN-M-47900-2:1996 pts. 4.7.2; 4.7.3 are applicable.

3.1.2.9 Scaffoldings with canvas covers and safety nets.

The method of securing scaffoldings with canvas covers and protective nets is regulated by the provisions of PN standards, therefore the use of this type of protective measures should be agreed with the manufacturer's representatives and confirmed by static calculations.

3.1.2.10 Examination of the assembled scaffolding structures.

The examination of the assembled scaffolding structure should be conducted in accordance with the procedure described in PN-M-47900-2:1996 pt. 7.3

3.1.2.11 Technical acceptance of the assembled scaffolding.

Scaffolding use is possible after a technical acceptance. The acceptance should be conducted by a person who is competent in accordance with the applicable regulations. The acceptance conditions have been defined in the Ordinance of Minister of Infrastructure (Journal of Laws No. 47 dated 2003, item 401).

3.1.2.12 Scaffolding periodic inspection.

PD70/100 scaffoldings under operation are subjected to the following inspections:

1.) Daily inspections:

Daily inspections should be conducted by users of the scaffolding i.e. employees working on the scaffolding.
Daily inspection consists in checking whether:

a) the scaffolding has not been damaged or deformed,
b) the scaffolding has been properly anchored,
c) the electrical cables have been properly insulated and are not in contact with the scaffolding structure,
d) the condition of working and communication decks is appropriate (cleanliness of deck, during winter time - the anti-slip deck protection),
e) phenomenons influencing the scaffolding safety have occurred.

2.) Decade inspections:

Decade inspections should be conducted every 10 days. The inspection should be performed by the scaffolding maintenance employee or an engineering and technical worker, e.g. foreman or the site manager. The aim of the decade inspection is to check whether the entire scaffolding construction has not been changed in a way that could result in a construction disaster or cause a dangerous scaffolding use environment.

3.) Immediate inspections:

Immediate inspections should be carried out after a downtime of more than 2 weeks and after every storm of wind force above 6 points on the Beaufort scale (i.e. 12 m/s). Immediate inspection should be carried out by a commission consisting of the foreman, master workman and the Construction Supervision Inspector. It may be ordered at any time by a construction supervision inspection body.
The spotted defects should be removed after each inspection before attempting work. The inspection responsibility lays on the site manager or the indicated by him authorized person. The results of decade and immediate inspections should be entered into the construction log book by the staff performing the inspection.

3.1.2.12 Packing, storage and transport of scaffolding components.

This field is governed by the requirements of PN-M-47900-2:1996 pt. 6.

3.1.3 Assembly and disassembly instructions.

3.1.3.1 General remarks.

1.) The assembly and disassembly of PD 70/100 scaffoldings may be performed by staff with proper qualifications and under the supervision of a competent person.

2.) This manual provides general scaffolding assembly and disassembly instructions

3.) All scaffolding components should be visually checked before the assembly. Damaged components as well as non-system components must not be installed within the scaffolding.

4.) The scaffolding assembly is performed in stages, one following another.

5.) A dangerous zone should be determined and marked properly during the assembly, reconstruction or disassembly of the scaffolding. Only the scaffolding assembly, reconstruction or disassembly staff should be present within the borders of the dangerous zone. A scaffolding technical acceptance should be held after works completion in accordance with pt. 3.1.2.11 and the protocol should be placed in a visible place, next to the communication paths. The use of a scaffolding without a valid protocol is FORBIDDEN.

3.1.3.2 Foundation.

The scaffolding can only be placed on a foundation of proper load bearing capacity. Setting up a scaffolding on soil requires sole boards, which shall ensure the equal distribution of loads.
(fig. no. 1).

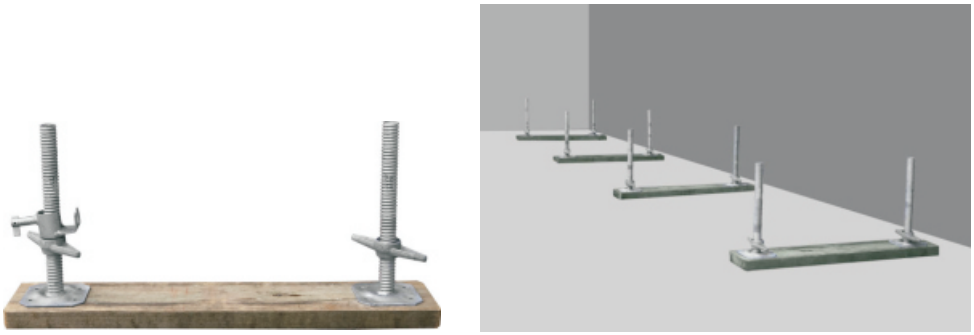


Fig. no. 1. Distribution of load using sole boards.

Setting up a scaffolding on a slope of terrain with irregularities requires compensation frames or supports (regulated base plates) of proper height (fig. no. 2).

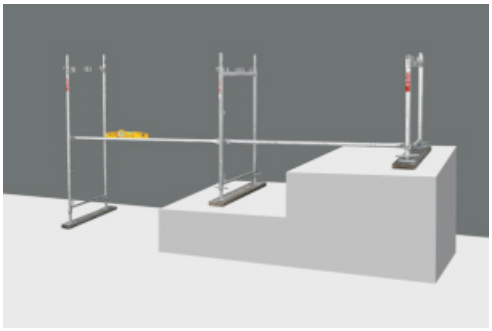


Fig. no. 2 Intermediate frames (compensation), frame base plates with a threaded pin.

3.1.3.3 Assembly of the first scaffolding field and further levels.

1.) Scaffolding assembly begins with setting up jack base plates. The plate distance is determined by the length of rails and the width of the frame. The wall side plates should be located so the horizontal spacing between the edge of the scaffolding deck and the wall, after frame and deck assembly, does not exceed 20 cm. The next step is mounting the lower bracing fixation to the external jack base plates in the field in which the bracing assembly has been assumed.

2.) Scaffolding frame assembly should begin with the highest point of the area. Vertical frames should be inserted into the jack base plates and joined with rails the lower rail should be installed within inserts meant for vertically installed boards in frame locks, and secured by a cross connection, the upper rails should be mounted in rail holders with pawls located on the frame (as shown in fig. no. 3).

Fig. no. 3. Frame assembly.

3.) Furthermore, the bracing and decks should be installed from the outer side fig. no. 4.
Note: diagonal bracing has two mounting openings at one side. During the assembly of the first level of scaffolding, the bracing should be mounted to the clip in the first opening counting from the middle. The bracings of upper levels should always be mounted using the second bracing opening.

Fig. no. 4. Assembly of the first bracing.

The assembled first field of the scaffolding should be levelled and positioned upright, the wall distance should be checked. Levelling should be performed by turning the jack base plate spindle.

4.) Assembly of further scaffolding fields.
The procedure of constructing further scaffolding fields is identical as in pt. 2. Every 5 scaffolding fields require a minimum of one bracing (fig. no. 5) and not less than every 10 m.

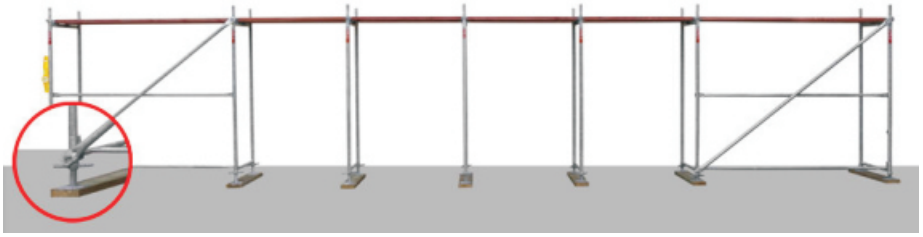


Fig. no. 5. Assembly of further elements of the first scaffolding level.

Decks with a manhole and a ladder should be mounted in the field above which the communication route is to be built. It is recommended to set up boards on lower frame locks, which shall constitute a support for the entrance ladder. After assembly, the first level of scaffolding should be levelled using plate nuts.

6.) Construction of upper scaffolding levels.
The assembly of further scaffolding fields is executed based on the description in pt. 2. During the assembly of upper levels the following rules should be obeyed:

a) The railing should be mounted from the outer scaffolding side, horizontally to the frames, putting on frame spigots secured with special pawls; in case the scaffolding distance from the wall face is > 20 cm then rails and boards should also be mounted from the inner side. The assembly of protections from the wall side should be performed with railing couplings and a pinned coupling for the board installation or frame with inner connectors for railings and boards.
b) The scaffolding platforms should be executed using decks. The decks are to be installed horizontally onto vertical frame spigots. The decks have a function of horizontal bracings and must be mounted in every scaffolding field. The fields must be entirely filled with decks.
c) The scaffolding platforms on which people are assumed to stand must be secured with two rails, which require mounting at the height of 1.0 m and 0.5m measuring from the surface of the platform.
d) Top side platforms require securing using double rails (upper rail at height of 1.0m) and transverse boards.

e) Bracing should be mounted on the outer scaffolding side.
f) The scaffolding assembly should be performed so that the fall risk is minimized. Personal protective equipment providing protection from falling should be used during the assembly, disassembly and reconstruction.
g) The component vertical transport may be performed manually or using hoists. Main and intermediate rails must be installed during manual vertical transport.
h) Staircase - communication route should be built during scaffolding assembly - within the scaffolding net. The distance between adjacent communication routes should not exceed 40 m and 20 m from the furthest work station. Examples of communication routes layout for PD 70 and PD 100 fig. no. 6.

Fig. 6. Communication route.

i) Further scaffolding assembly may be performed based on the following: vertical frame assembly starts with the field where the vertical transport occurs and should be executed in the direction of the external - last scaffolding field (fig. no. 7).

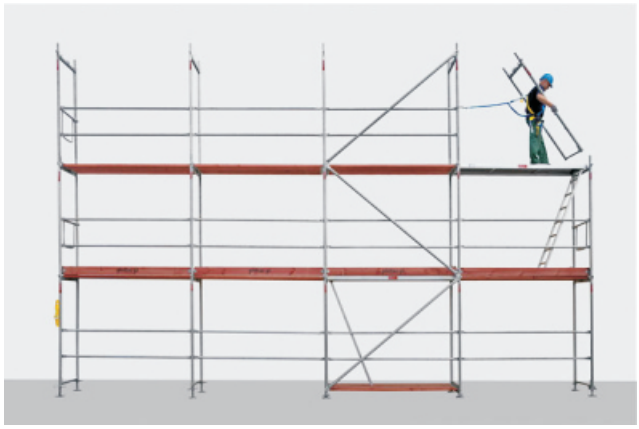


Fig. no. 7 - assembly sequence.

j) The adjacent frames in the corner of the building, at the height of anchored scaffolding stories, should be joined using 48.3x3.2 tubes and couplings. An alternative solution is to mount the vertical corner frame standard using two rotary couplings from the lowest adjacent perpendicular vertical frame to the building wall. The jack base plate is therefore not required. The load is transferred through rotary couplings to the adjacent frame standard. The frames at the height of anchored scaffolding stories should be connected using two additional rotary couplings. The platform gap between scaffolding fields should be enclosed. The frames from both sides of the corner should be anchored using anchoring triangle couplings. An example of corner scaffolding solution has been provided on fig. no. 8.

Fig. no. 8. Example - wall corner scaffolding.

k) Scaffolding bracing.
Bracing should be executed in accordance with the bracing layout presented in diagrams of each assembly variants, while maintaining the distance between braced fields not less than 10 m. (for fields 3 m in length the bracing should be installed every 4 fields, for fields of 1.5 m; 2.0 m and 2.5 m long the bracing should be installed every 5 fields). Every scaffolding story should have at least two bracings. Bracing should be executed maintaining a vertical section pattern (bracing layout along one vertical path) or as an alternative in a large-area layout.

l) Scaffolding anchoring.
Scaffoldings must be anchored to the wall of the building or structure ensuring scaffolding stability and stiffness as well as allowing the distribution of exterior loads applied to a scaffolding. Anchoring must be done using anchor couplings and anchoring elements (eye bolts and dowels), which are the basic scaffolding equipment. The anchoring must be performed gradually during scaffolding assembly.

3.1.3.4 Anchor types:

a) long anchor - anchoring connector fitted against two frame standards (distributes force perpendicular and parallel to the facade)

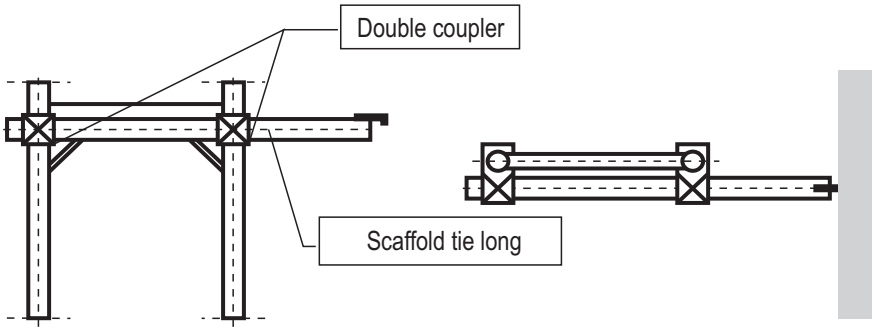


Fig. no. 9. Long anchor

b) short anchor - short anchoring connector fitted against the internal frame standards (distributes forces perpendicular to the facade)

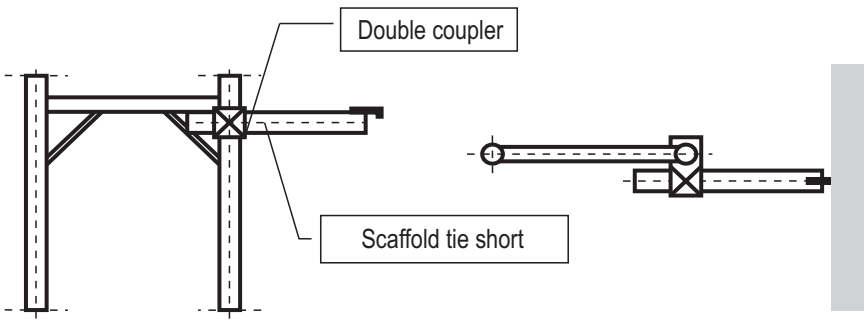


Fig. no. 10. Short anchor

c) triangular anchor - two short anchoring connectors fitted against the internal frame standards 45° against the wall (distributes forces perpendicular and parallel to the facade)

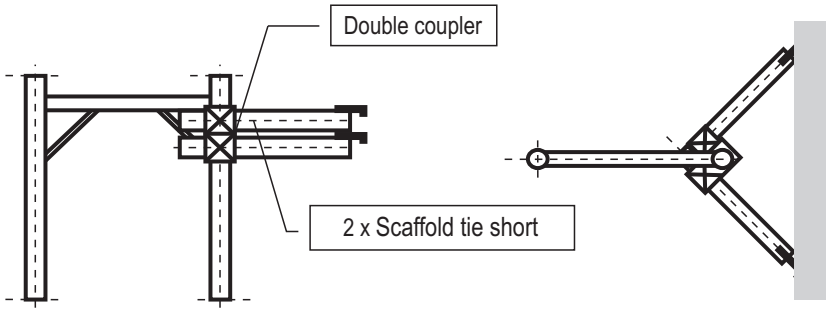


Fig. no. 11. Triangular type "V" anchor

Cross connectors should be tightened with a 50 Nm torque (Allowable deviation of 10%).

3.1.3.5 Anchoring layout.
The layout and anchoring type has been shown in diagrams of each assembly variants.

3.1.3.6 Anchoring execution rules:
- the anchoring begins with the second scaffolding story;
- the anchors should be performed symmetrically through the entire scaffolding area;
- the anchors should be placed very second field horizontally and every second story, while bearing in mind that the anchoring rows should be displaced against each other by one field,
- the communication route should be anchored from every side, each 4 m:
- the top scaffolding story should be anchored every second field;
- the external vertical frames should be anchored every 4 m;
- all frames to which wide external extension brackets are mounted must be anchored, and in case of using platforms 3m in length the frames located one story below should also be anchored.

3.1.3.7 Anchoring forces.
The values of anchoring forces applied to one anchor for facades (without open openings) have been provided on scaffolding assembly diagrams (chapter 4). For open facades, it is necessary to perform scaffolding static calculations.

3.1.3.8 Inspection of anchoring under load.
The resistance of the building wall-dowel connection should be documented by conducting tests. Anchoring points subjected to test loads must be defined by a person responsible for the scaffolding assembly

1) Number of tests.
- 10% against a concrete wall,
- 30% against other walls.

Minimum number of tested anchors - 5.

2) The test load should be 1.2 times the anchor force (+20% of the nominal force).
Anchor checking should be performed gradually during scaffolding assembly.
Test results should be described in the presence of a commission and must be kept through the entire scaffolding operation period.

3.1.3.9 Scaffolding disassembly.
Should be performed in a reverse order than presented in the manual figures, and in the assembly description. Maintaining safety is crucial for the disassembly personnel (collective protection measures should be maintained as long as possible - rails).

CHAPTER IV.
PD 70/100 scaffolding assembly diagrams

4.1 GENERAL REMARKS

- Typical structures described in this manual may be used provided that the below mentioned rules are followed:
  Only one platform in each scaffolding vertical section may be subjected to operation and full load. Other scaffolding load states require confirmation through scaffolding structure static calculations,
- Scaffoldings may only be used in the 1st and 2nd wind load area as per PN-77/B-02011. Scaffoldings under operation in the 3rd wind load category should be subjected to additional static calculations, which consider higher wind load in the area.
- Impermissible is overloading the scaffolding platforms above the assumed scaffolding load capacity.
  Typical scaffolding variants have been verified using the static method as per PN-EN 12811-1; i PN-EN 12811-2 standards, while assuming a load factor of $\gamma f = 1,5$.

4.2 DECKS

Typical scaffolding platforms may be assembled with system decks adapted for mounting on horizontal crossbars with self-lock hooks. Scaffolding decks have also the function of horizontal braces in the scaffolding field plane, therefore must be necessarily mounted in each scaffolding field.

The following can be used for the assembly of platforms in PD 70 scaffoldings:

- 2 decks 0.32m wide (wooden or steel)
- 1 deck 0.64 wide (as a communication platform) with sheathing of plywood, equipped in a “floating” fastening ladder.

The following can be used for the assembly of platforms in PD 100 scaffoldings:

- 3 decks 0.32m wide (wooden or steel)
- 1 deck 0.64 wide (as a communication platform) with sheathing of plywood, equipped in a “floating” fastening ladder, and 1 deck 0.32m wide (wooden or steel)

In PD70/100 scaffoldings with working platform extensions all gaps between decks, greater than 8cm, require compensation using steel decks.

4.3 ANCHORING

Basic anchoring layout.
The scaffolding should be anchored beginning with the second story, every second field vertically, and every second field horizontally, while the adjacent anchoring rows should be displaced against each other by one field.
Additional anchoring
- anchored should be the external frames at the edge of the scaffolding in each horizontal anchor row,
- the communication route fields should also be anchored at both sides of each anchoring row,
- additional anchors should be executed in accordance with specific variant diagrams.

The anchoring elements should be fixed with frame standards using cross connections. Cross connection nuts should be tightened with a 50 Nm torque.
Anchoring should not distribute vertical forces.
Anchor couplings should be fixed with two standards directly under horizontal crossbars planes (platform planes) in accordance with the anchoring layout presented in the figures. Allowable deviation from theoretical anchoring points along standards is equal to: 40cm for 24m high scaffoldings.

4.4 ANCHOR STRESS (ANCHORING FORCES)

Scaffolding covers/ maximum platform lengths	Anchor stress [kN]			
	Partially open wall		Enclosed wall	
	$F_{\perp}$	$F_{\parallel}$	$F_{\perp}$	$F_{\parallel}$
No covers/3.0m	4,5	1,7	2,5	1,7
Net cover/3.0m	5,2	1,9	4,2	1,9
Canvas cover/3.0m	6,6	2,1	6,6	2,1

The required anchoring forces values provided on drawings have been defined for scaffoldings located by:
- partially open walls, meaning those, which have evenly spread opening surfaces not exceeding 60% of the entire wall surface,
- enclosed walls, meaning those, which have evenly spread opening surfaces not exceeding 20% of the entire wall surface.

In case of wall "permeability" of 20% to 60% the linear interpolation of anchoring forces is not allowable.

4.5 GENERAL REMARKS

It should be adopted that for typical scaffoldings not exceeding 24m of height the nominal (characteristic) load of one standard is equal to:
- for PD70 scaffoldings (w/wo brackets) - 20kN
- for PD100 scaffoldings (w/wo brackets) - 25kN

4.6 BRACING

The bracing should be fixed every 5th field maintaining a vertical section or a large-size pattern, while the bracing number should not be less than two on each scaffolding story. Additional bracing in accordance with the layout have been presented in diagrams of specific variants.

4.7 SCAFFOLDING WORKING LOADS (NOMINAL VALUE)

Typical PD70 variants are scaffoldings of 2kN/m2 of working load. Nominal value 3 as per PN-M-47900:1996.
Typical PD100 variants are scaffoldings of 3kN/m2 of working load. Nominal value 4 as per PN-M-47900:1996.

4.8 COMMUNICATION ROUTES

Communication route platforms should be mounted in each scaffolding vertical section so that the manholes are placed on both sides of the field. Frame standards adjacent to the communication route must be anchored with a distance not exceeding 4m.

4.9 SAFETY RAILING AND TOE-BOARDS

All platforms should be secured in accordance with pt. 3.1.3.
In case of setting up the scaffolding more than 20cm from the wall, the safety railing and toe-boards must also be assembled from the wall side.

4.10 NARROW EXTENSION PLATFORM (BRACKET)

Narrow extension platforms (one-deck) can be assembled only at the inner scaffolding side, and only at the main platform level.

4.10 WIDEEXTENSION PLATFORM (BRACKET)

Wide extension platforms (two-deck) can be assembled only at the outer scaffolding side, and only at the top main platform level.

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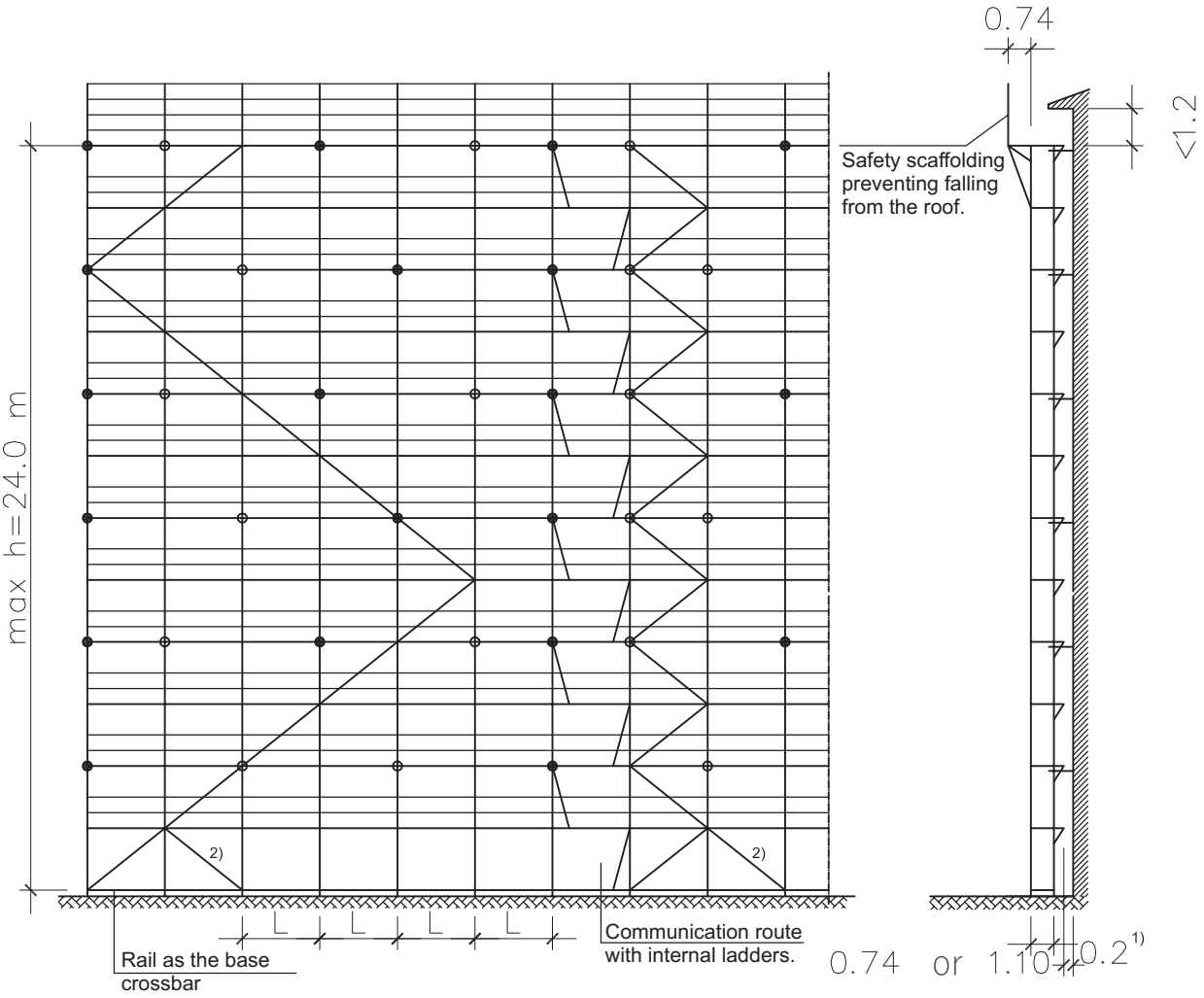
Complementary diagram of a scaffolding up to 24m.



1) The dimensions are applicable for the inner deck edge.
2) Necessary additional bracing only at 3.0m fields and inner brackets.

Field distance of: 3.0 m / 2.5 m / 2.0 m / 1.5 m..
Decks: wooden, steel, deck alu-plate
Anchoring:
- Anchoring using long anchors - anchor mounted to the inner and outer frame standard
- Anchoring using short anchors - anchor mounted to the outer frame standard

Bracing:
Bracing should be fixed with the following pattern:
- for fields of lengths: 2.5 / 2.0 / 1.5 m.
  - passing through max of 5 fields,
  - through only 1 field from the bottom to the top every 5 fields
- for fields of 3.0m long
  - passing through max of 4 fields,
  - through only 1 field from the bottom to the top every 4 fields

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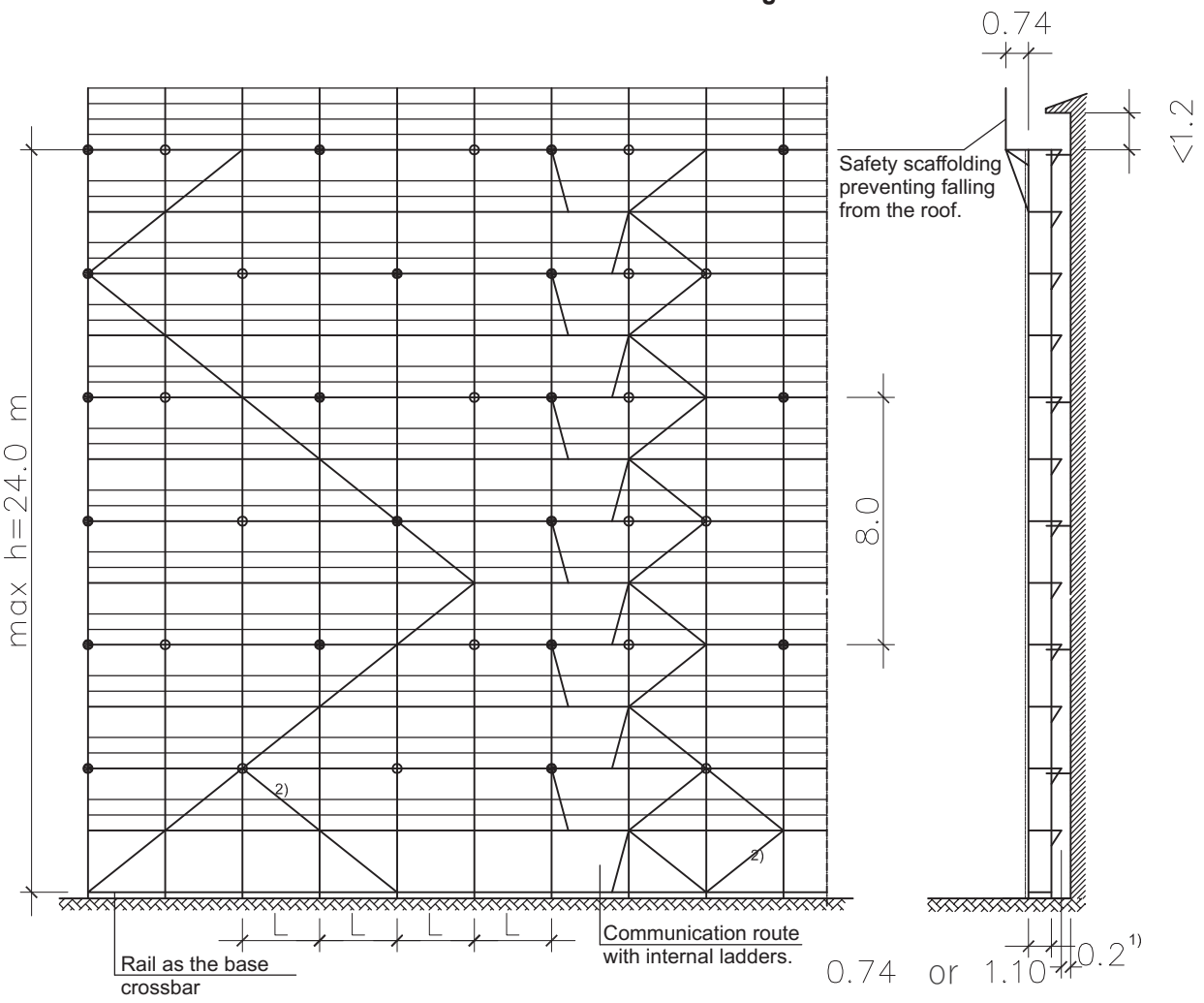
Complementary diagram of a scaffolding up to 24m.
Net covered scaffolding



1) The dimensions are applicable for the inner deck edge.
2) Necessary additional bracing only at 3.0m fields and inner brackets.

Field distance of: 3.0 m / 2.5 m / 2.0 m / 1.5 m..
Decks: wooden, steel, deck alu-plate
Anchoring:
- ◆ Anchoring using long anchors - anchor mounted to the inner and outer frame standard
- ⊕ Anchoring using short anchors - anchor mounted to the outer frame standard

Bracing:
Bracing should be fixed with the following pattern:
- for fields of lengths: 2.5 / 2.0 / 1.5 m.
  - passing through max of 5 fields,
  - through only 1 field from the bottom to the top every 5 fields
- for fields of 3.0m long
  - passing through max of 4 fields,
  - through only 1 field from the bottom to the top every 4 fields

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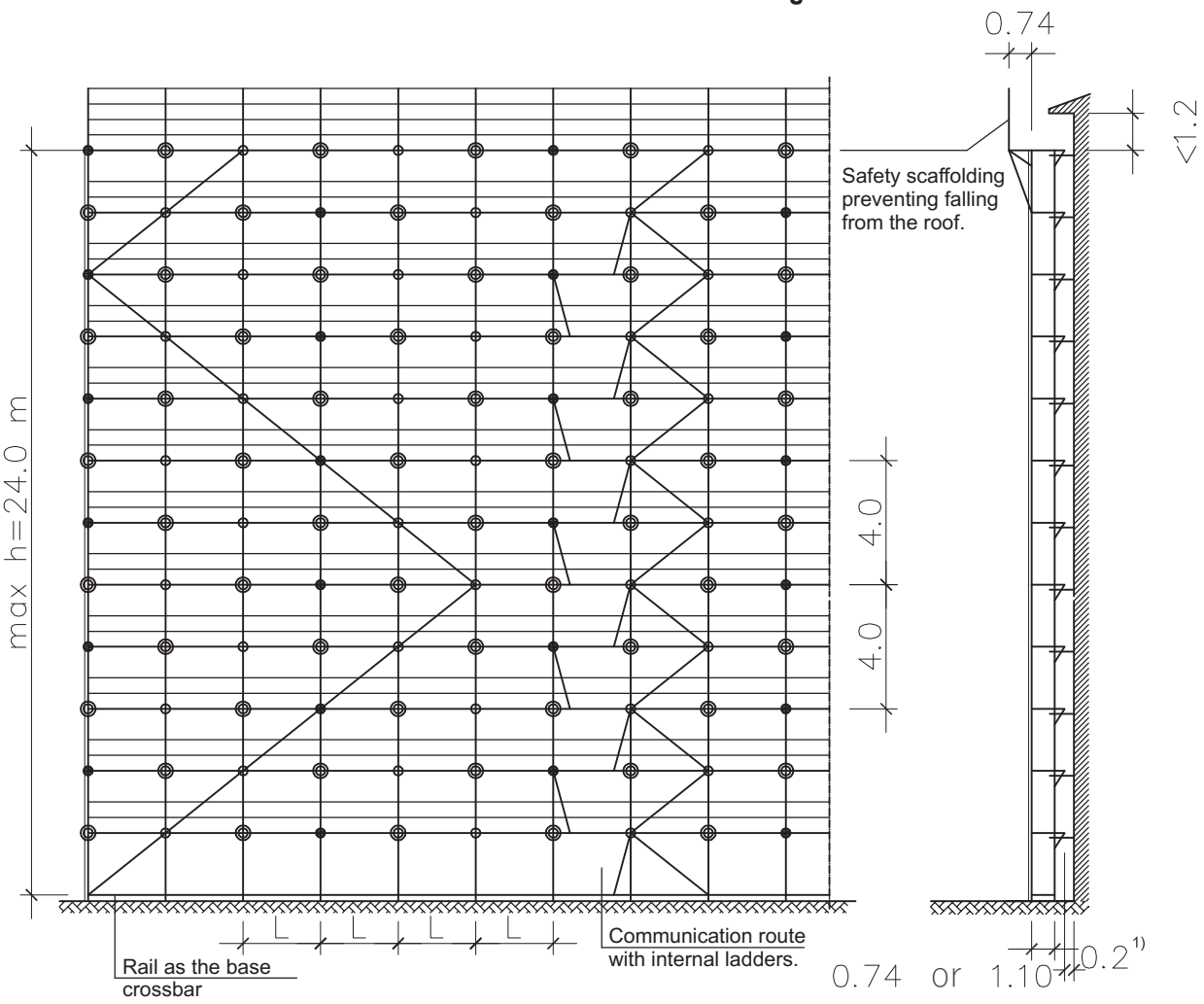
Complementary diagram of a scaffolding up to 24m.
Canvas covered scaffolding



1) The dimensions are applicable for the inner deck edge.
2) Canvas covers should also be thoroughly assembled at the side of the scaffolding with disconnect couplings.

Field distance of: 3.0m / 2.5m / 2.0m / 1.5m.
Decks: wooden, steel, deck alu-plate
Anchoring:
- Anchoring using long anchors - anchor mounted to the inner and outer frame standard
- Anchoring using short anchors - anchor mounted to the outer frame standard
- Load wind resistance - short fitting to inner standards

Bracing:
Bracing should be fixed with the following pattern:
- for fields of lengths: 2.5 / 2.0 / 1.5m
  - passing through max of 5 fields,
  - through only 1 field from the bottom to the top every 5 fields
- for fields of 3.0m long
  - passing through max of 4 fields,
  - through only 1 field from the bottom to the top every 4 fields

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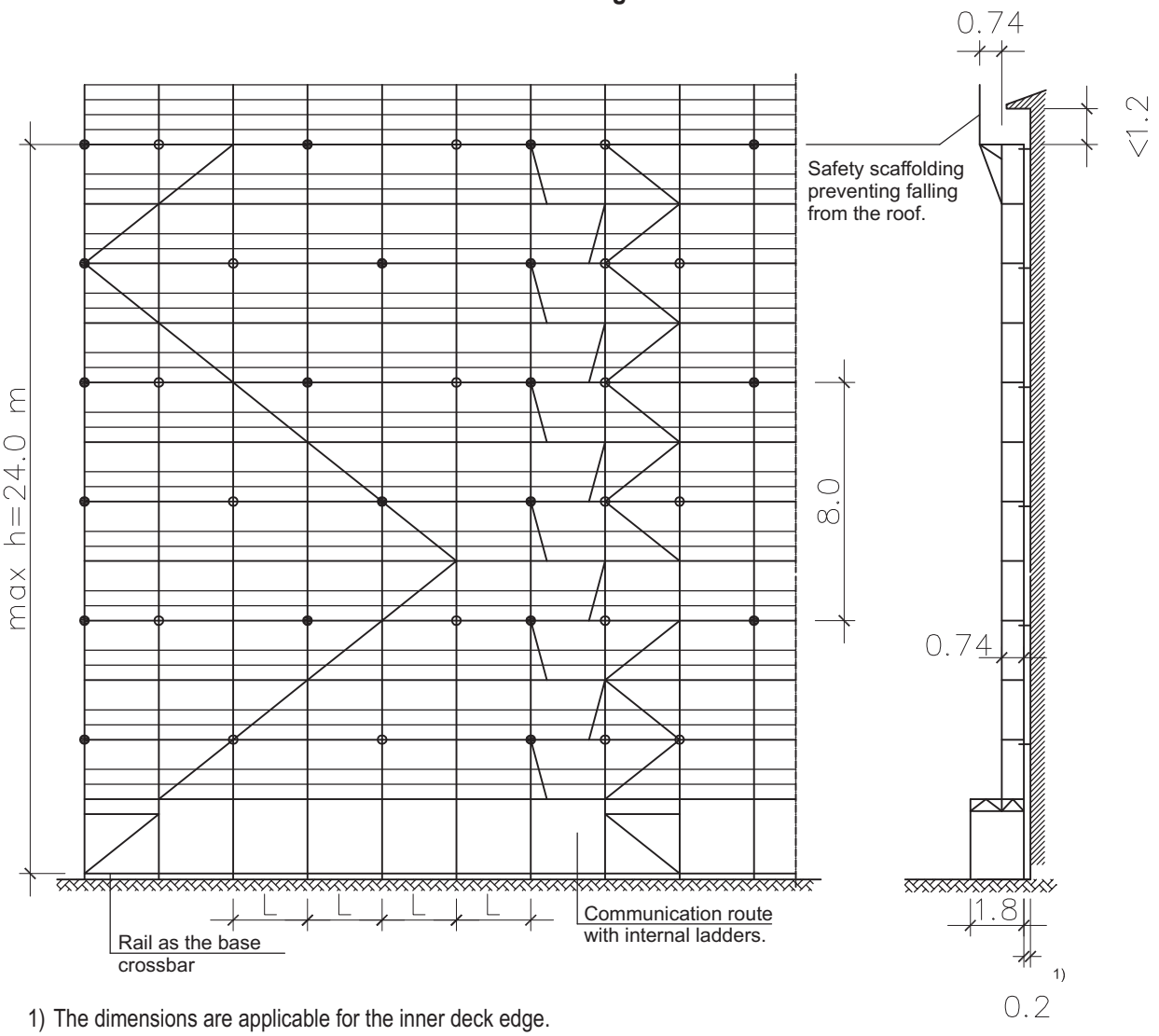
Complementary diagram of a scaffolding up to 24m
Walk-through frames

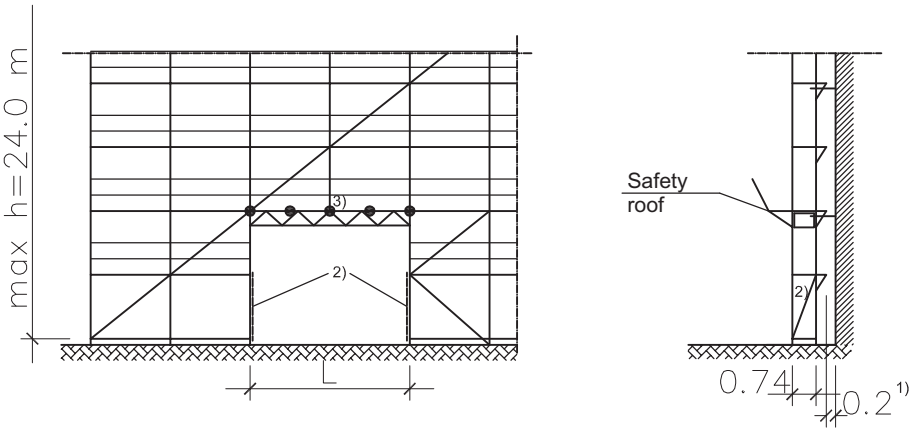


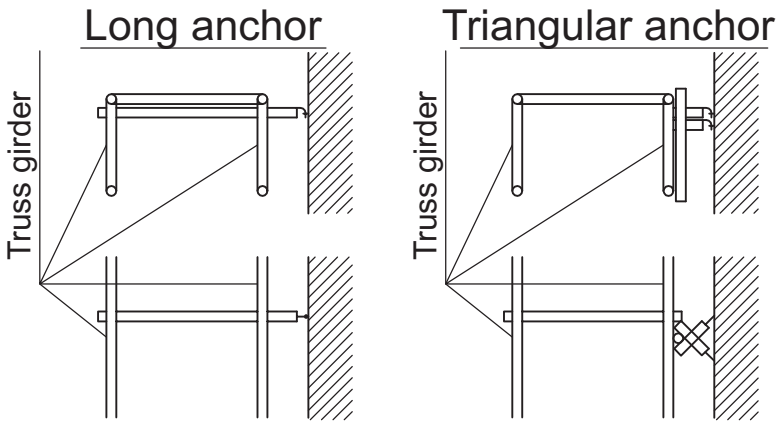
1) The dimensions are applicable for the inner deck edge.
2) The anchors should be at max distance of 4.0m when using deck alu-plates and aluminum decks..

Field distance of: 3.0m / 2.5m / 2.0m / 1.5m.
Decks: wooden, steel, deck alu-plate
Anchoring:
- ◆ Anchoring using long anchors - anchor mounted to the inner and outer frame standard
- ⊕ Anchoring using short anchors - anchor mounted to the outer frame standard

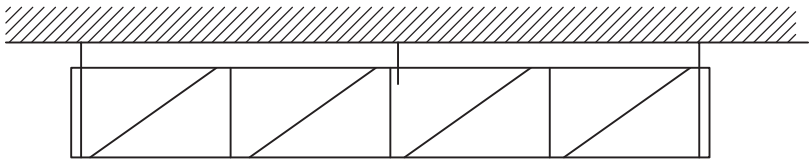
Bracing:
Bracing should be fixed with the following pattern:
- for fields of lengths: 2.5 / 2.0 / 1.5m
  - passing through max of 5 fields,
  - through only 1 field from the bottom to the top every 5 fields
- for fields of 3.0m long
  - passing through max of 4 fields,
  - through only 1 field from the bottom to the top every 4 fields

Girders for passing over obstacles





Alternative: for anchoring - horizontal connection of upper truss girders



Connectors - tube cross-connectors and rotary connectors with an inspection mark.

1) The dimensions are applicable for the inner deck edge.
2) Cross bracing - alternative - tube with rotary couplings.
3) Crossbars up to medium heights

Length L: 6,0 m / 5,0 m / 4,0 m
Anchoring:

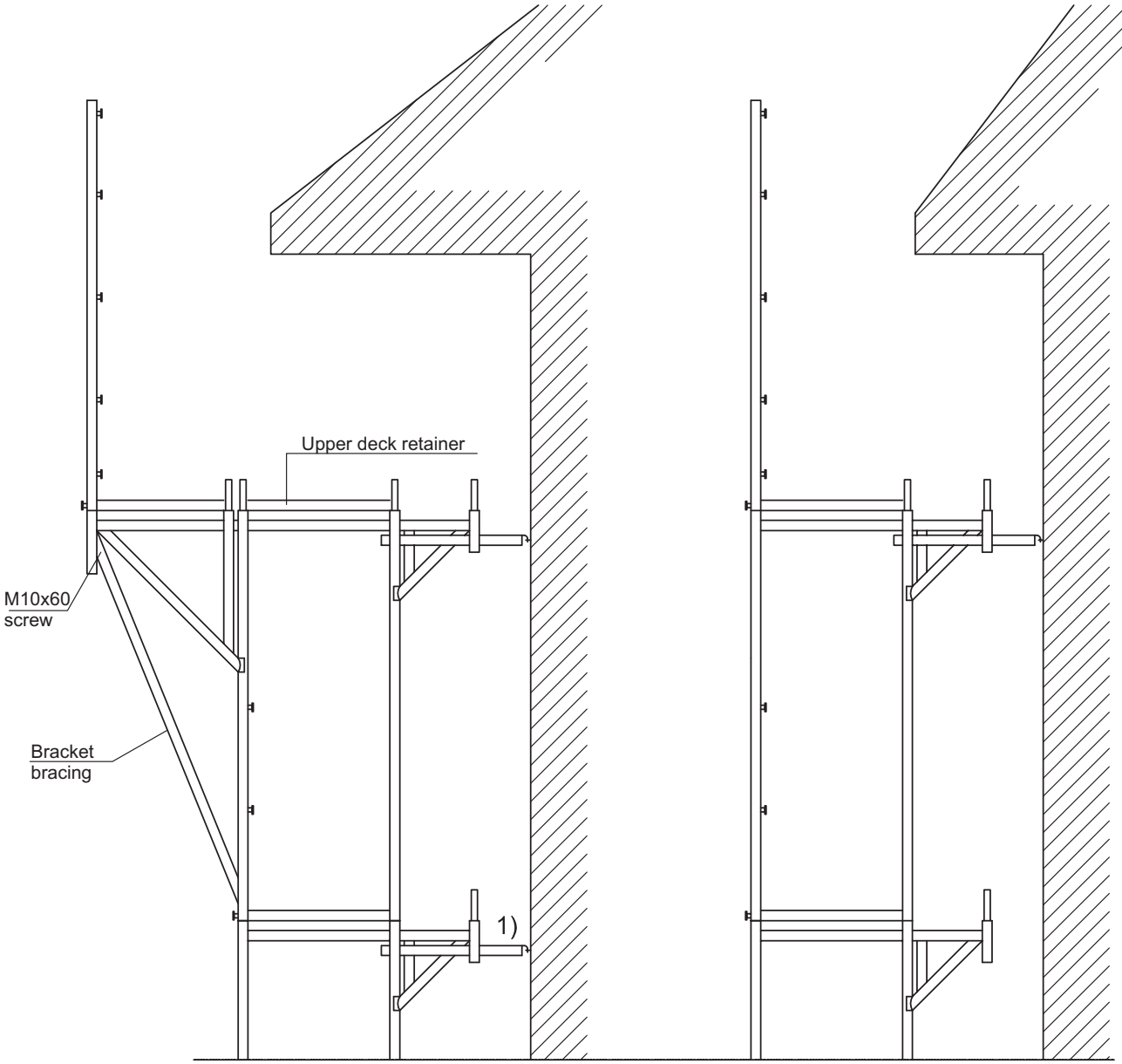
- Anchoring using long anchors - anchor mounted to the inner and outer frame stand
  alternative - triangular anchor
  Scaffolding anchoring - see other solutions

Bracing:
Bracing should be fixed with the following pattern:

- passing through max of 5 fields,
- through only 1 field from the bottom to the top every 5 fields.
- additional bracing up to 4.0m is required next to passages over obstacles

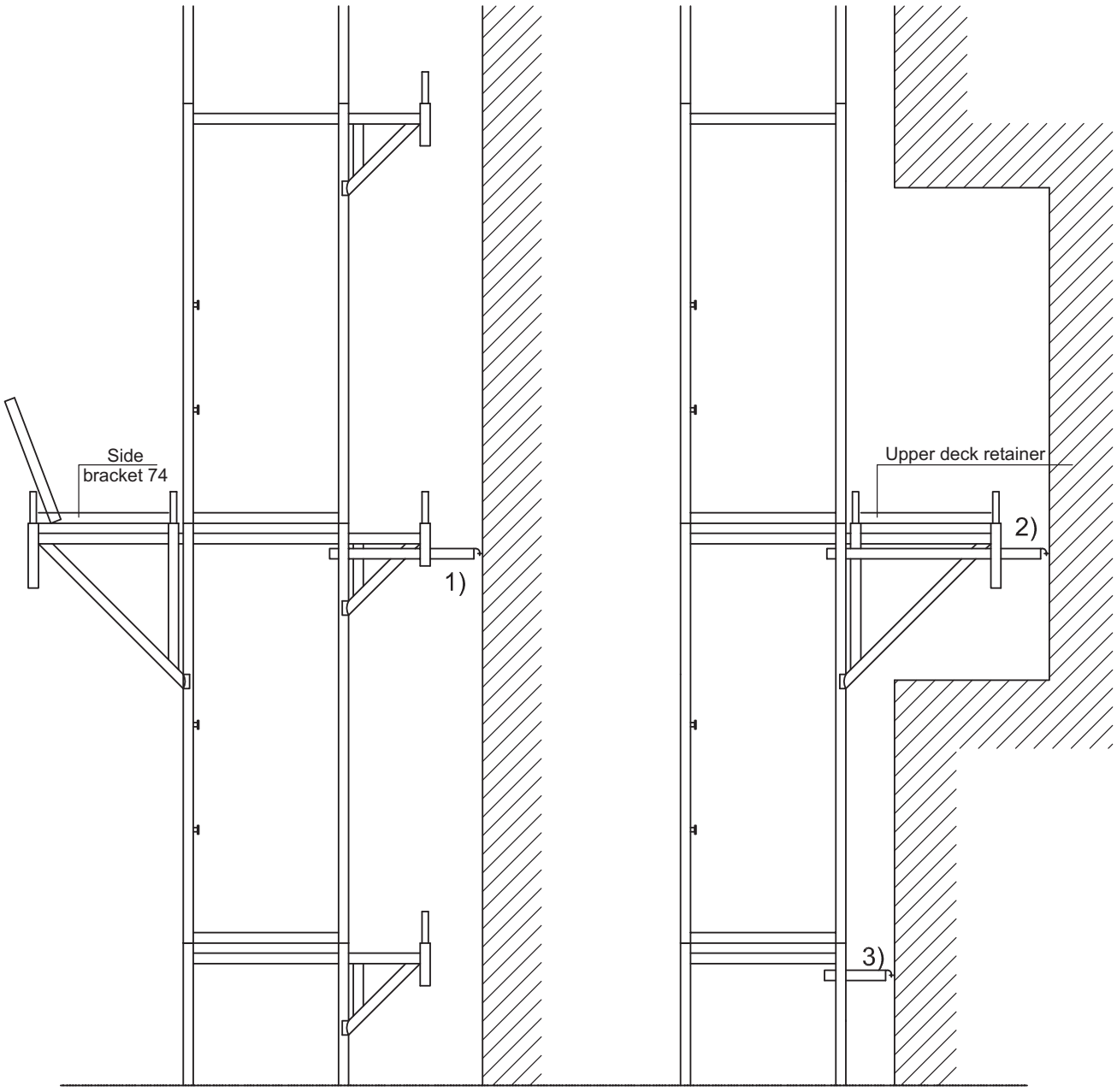
Safety scaffolding preventing falling from the roof.
At the length of L=6.0m the safety wall posts can be set up directly next to the scaffolding.

Safety scaffolding preventing falling from the roof.



Every frame vertical section must be anchored. Every second frame vertical section should be anchored using long anchors, also when using inner bracket of triangular anchor (alternative for the long anchor of every frame vertical section).

1) Bottom anchor is only necessary at the 3.0m field.



Safety roof

Side bracket 74

Every frame vertical section must be anchored.

1) Every second frame vertical section must be secured with long anchors; the triangular anchor can also be used at inner brackets (alternative - long anchors on every frame vertical section)
2) Every second frame vertical section must be secured with a triangular anchor.
3) Every standard requires only short anchors.

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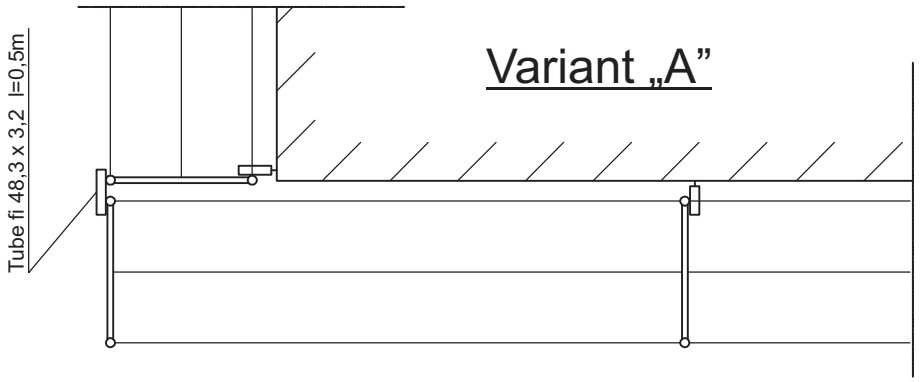
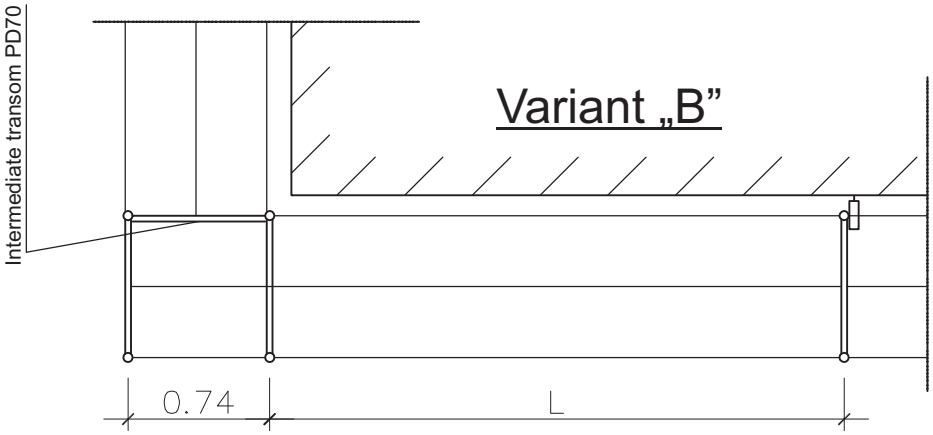
Joining corners

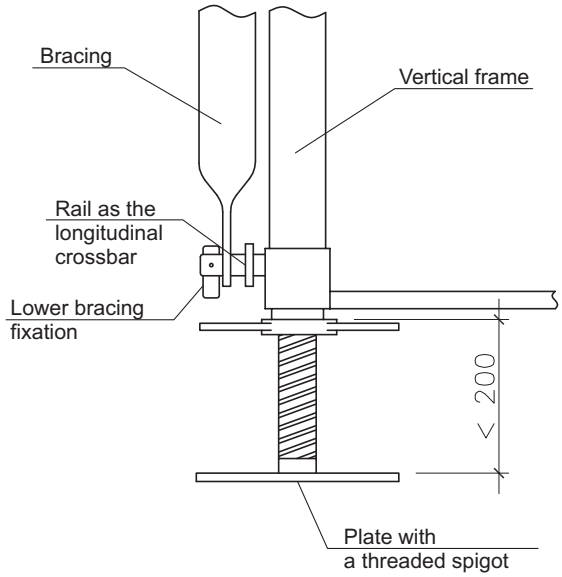


Tube coupling - normal 48 with an inspection mark

Alternative:
Rotary tube coupling without the tube when the distance between vertical sections is 80 mm.
Tube couplings should be tightened with a 50 Nm torque (Allowable deviation ± 10%).



Support point



PIGR	**TECHNICAL ACCEPTANCE PROTOCOL OF A SCAFFOLDING INTENDED FOR USE**	WWW.PIGR.PL

Logo of the assembly company

Technical acceptance protocol of the scaffolding intended for use

1. Protocol registry number .....
2. Scaffolding acceptance date .....
3. Scaffolding assembly contractor .....
4. Scaffolding user (assembly ordering party) .....
   .....
5. Place of scaffolding assembly and its area (volume) .....
   .....
6. Scaffolding type: .....
7. Allowable working deck load capacity: 1,5 kN/m2; 2 kN/m2; 3 kN/m2; .....
8. The contractor has handed over to the user the following acceptance documents:
   a) scaffolding technical documentations (statistics) .....
   b) scaffolding operation manual .....
   c) other protocols .....
   d) .....
   .....
9. Statement: the contractor ascertains that the scaffolding described herein is complete, has been assembled in accordance with the sound engineering practice, the operation and maintenance manual (former DTR), and the user manual issued by the manufacturer in accordance with the health and safety requirements. The assembly has been executed by a certified staff. The acceptance commission ascertains with no remarks that the scaffolding is ready for use.
10. Acceptance commission members:

    ..... - User .....

    ..... - User .....

    ..... - User .....

    (Names and surnames) (Signatures)

11. Date of notifying the scaffolding for deassembly .....

Remarks
1. Changes in the scaffolding structure may only be performed by the scaffolding assembly Contractor!
2. The grounding electrode resistance has been provided in the "Grounding measurement protocol".
3. Dates of further scaffolding inspections have been provided in the Scaffolding operation manual.

	Anchoring force inspection protocol FORM	

Organizational department:……....., Inspection date……..

Site/address ……..

Commission consisting of (name and surname) / companies

1.) ……..... / ……

2.) ……..... / ……

3.) ……..... / ……

Item	Inspection results			
	Enclosed facade		Partially open facade**	
	Anchors mounted up to the height of 10m			
	Concrete wall	Other walls	Concrete wall	Other walls
	Test load .....kN		Test load .....kN	
1.	…….....		…….....	
2.	…….....		…….....	
3.	…….....		…….....	
4.	…….....		…….....	
5.	…….....		…….....	
6.	…….....		…….....	
7.	…….....		…….....	
8.	…….....		…….....	
	Anchors mounted within 10-20m			
	Test load .....kN		Test load .....kN	
1.	…….....		…….....	
2.	…….....		…….....	
3.	…….....		…….....	
4.	…….....		…….....	
5.	…….....		…….....	
6.	…….....		…….....	
7.	…….....		…….....	
8.	…….....		…….....	
	Anchors mounted above 20m			
	Test load .....kN		Test load .....kN	
1.	…….....		…….....	
2.	…….....		…….....	
3.	…….....		…….....	
4.	…….....		…….....	
5.	…….....		…….....	
6.	…….....		…….....	
7.	…….....		…….....	
8.	…….....		…….....	

REMARKS:
1. *) If the facade opening area does not exceed 20% of the facade area.
   **) If the facade opening area does not exceed 20% of the facade area.
2. Anchors should be determined based on the as-built drawing - anchors examined on the drawing should be marked.
3. The required anchoring force value should be determined based on the “Assembly and use manual” or a technical design of the examined scaffolding.
4. The horizontal force of one scaffolding anchoring should not be lower than 2.5 kN.

Commission members (signatures)

1.) ……..
2.) ……..
……..

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