

LAYHER KEDER ROOF AND KEDER HALL INSTRUCTIONS FOR ASSEMBLY AND USE



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NOTE

The products or assembly variants shown in these instructions for assembly and use may be subject to country-specific regulations. The user of the products bears the responsibility for compliance with such regulations. Subject to local regulations, we reserve the right not to supply all the products illustrated here.

Your Layher local partner will be happy to provide advice and answers to all questions relating to the approvals for the products, their use or specific assembly regulations.

1. INTRODUCTION

General

These instructions for assembly and use relate to assembly, modification and dismantling of the main assembly variants of the keder roof from Wilhelm Layher GmbH & Co. KG, of Gueglingen-Eibensbach, Germany. The instructions cannot cover all possible applications. The supporting scaffold must be built in accordance with the appropriate instructions for assembly and use for the scaffold type used. If you have any questions about specific applications, please contact your Layher partner.

Important: The stability of the overall structure (support scaffolding and keder roof) must be verified and assured at all times, including in the assembled state. The support scaffolding and Layher keder roof may only be assembled, modified and dismantled under the supervision of a suitably qualified person and by technically trained employees.

Only original Layher components may be used for assembly.

Visually check all components prior to installation and before they are used to ensure that they are in flawless condition. Do not use damaged components.

Important: Assembly, alteration and dismantling of the overall structure involve risk of falls. Perform construction work in such a way that the risk of falls is avoided as far as possible and the residual risk is minimized. Assembly situations where there is a risk of a fall have been identified in these instructions with the following symbol inside the assembly pictures.



Figure 1

The scaffolding erector must stipulate, on the basis of how he assesses the risk, suitable measures to prevent or minimize risks for the specific case and / or for the respective activities involved.

The measures must be selected with due consideration of the actual risk, their usefulness and their practical applications, and also depending on

- the qualification of the employees
- the type and duration of the activity in the high-risk area
- the possible fall height
- the state of the surface onto which the employee might fall and
- the state of the workplace and its access.

Suitable measures to prevent risks can be:

- The employment of personnel instructed about the specific risk situation
- The use of personal safety apparatus (PSA)
- The use of an advance guardrail
 - in the access bay of the scaffolding
 - additionally over the entire width of the scaffolding when the roof beams are placed on the support scaffolding

If personal safety apparatus (PSA) is required for assembly work or is specified by local regulations, the attachment points shown in section 3 must be used. The suitability of PSA for fall prevention must be checked, with particular attention being given here to the assembly of the second and third scaffolding levels.

Before the start of construction work, the contractor must ascertain whether the planned working area contains equipment that might endanger the employees.

Assembly, modification and dismantling may only be performed with appropriate protective equipment. Components must not be thrown; instead they must be handed over in such a way that they cannot slip or be dropped.

Every use of the support scaffolding and of the keder roof must be preceded by a check that they are in flawless condition.

With regard to the following instructions for assembly and use of the keder roof system, it must be pointed out that as a general principle scaffolding and roofs may only be assembled, modified or dismantled under the supervision of a qualified person and by technically trained employees adequately and specifically instructed in this work. To that extent, and with regard to use, we refer to the required conditions set out in German Ordinance on Industrial Safety and Health (BetrSichV). In the following instructions for assembly and use, we provide the erector and the user, on the basis of our risk analysis, with advice on how to comply with the requirements of the Ordinance in the relevant assembly situation.

The technical details set forth in the instructions for assembly and use are intended to help the erector and / or user to comply with the requirements of the Ordinance and are not mandatory specifications for them. The erector / user must take the measures needed on the basis of the risk assessment, prepared according to the preconditions of the Ordinance, at his own discretion and exercising all due care and diligence. The specific features of the individual case must be taken into account.

It is essential that the following instructions for assembly and use are complied with in every case. It is pointed out that all information, particularly that regarding stability of the assembly variants, applies only when original Layher components are used. The installation of non-Layher parts can lead to safety defects and insufficient stability.

The current instructions for assembly and use must be available to the supervisor and to the employees involved.

During assembly, modification and dismantling, as well as during use, local regulations or the legal regulations of the German Ordinance on Industrial Safety and Health (BetrSichV) concerning the erection and use of scaffolding and roof structures must be complied with.

Inspection and documentation

The overall structure (support scaffolding and keder roof) must, whenever it has been assembled and before it is put into service, be inspected by persons qualified to do so. The inspection must be documented. If certain areas are not ready for use, particularly during assembly, modification and dismantling, they must be identified with a prohibitory sign indicating "no entry". In addition, it must be made clear by barriers that the structure has not been completed and hence must not be entered.



Figure 2

After completion of the overall structure, it is useful to indicate that inspection has been passed by a clearly discernible identification for the duration of its use.

Use

The user must check that the selected roof structure is suitable and safe to use for the work to be performed (Section 4 of BetrSichV). They must ensure that the overall structure is checked for obvious defects before use. If defects are found during this check, the overall structure must not be used in those areas where there are defects until these have been eliminated by the erector. Subsequent alterations are deemed as assembly, modification or dismantling and may only be performed by technically trained employees. They must be inspected and approved by the erector.

The legal regulations of the German Ordinance on Industrial Safety and Health (BetrSichV) must be complied with.

A detailed list of articles can be found in our catalogue, and information on structural values in our technical documents.

2. GENERAL

Description

The Layher keder roof is a lightweight and aesthetic weather protection roof for rapid assembly, if necessary even without a crane. It can be constructed as a mono-pitch or double-pitch roof. The roof trusses are made using aluminium lattice beams. Special roof supports ensure a secure connection to the supporting scaffold. PVC roof tarpulins with a weatherstrip on both sides can be inserted without problem into the top chords of the lattice beams and thus form the roof covering.

Table of spans

Double-pitch roof

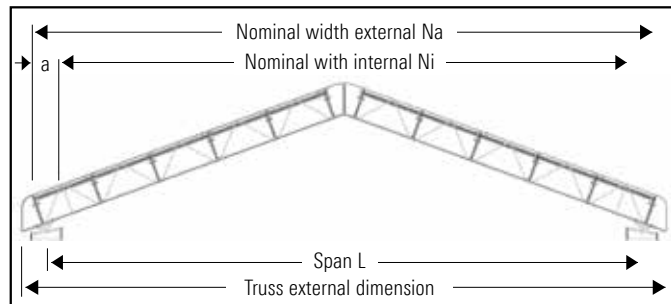


Figure 3

Number of lattice beams – length of roof tarpaulin for each truss

Model	Span L	Eaves section	Ridge section	Lattice beam 1.50 m	Lattice beam 2.13 m	Lattice beam 3.0 m	Roof tarpaulin [m]	Gable tarpaulin [m]
I	6.1 m	2	1	2	0	0	11.00	7.15
II	9.0 m	2	1	0	0	2	14.00	10.00
III	11.8 m	2	1	2	0	2	17.00	12.80
IV	14.6 m	2	1	0	0	4	20.00	15.60
V	18.0 m	2	1	0	2	4	24.00	19.60

¹ The mentioned span L is valid for following changeable characteristic impacts:

Wind suction: $w_1 = 0.5 \text{ kN/m}^2 \times (-0.6) = -0.3 \text{ kN/m}^2$

Snow: $s_0 = 0.25 \text{ kN/m}^2$

Technical data

- Double-pitch roof (roof angle 20°)
- Mono-pitch roof (roof angle 15° - 20°)
- Spans up to max. 18.0 m
- Bay widths up to 2.57 m
- Substructure: SpeedyScaf 0.73 / 1.09 m or Allround 0.73 / 1.09 m
- Stiffening bay with horizontal bracing of top chord in every 5th bay in the case of spans up to 14.6 m
- Stiffening bay with horizontal bracing of top and bottom chord in every 5th bay and additionally in every edge bay in the case of spans wider than 14.6 m

Truss external dimension [m]	Span L ¹
7.15	6.1 m
10.00	9.0 m
12.80	11.8 m
15.62	14.6 m
19.62	18.0 m

Nominal widths: $N_a = L + a$

$N_i = L - a$

a – axis dimensions of frame 0.73 / 1.09 m

Mono-pitch roof

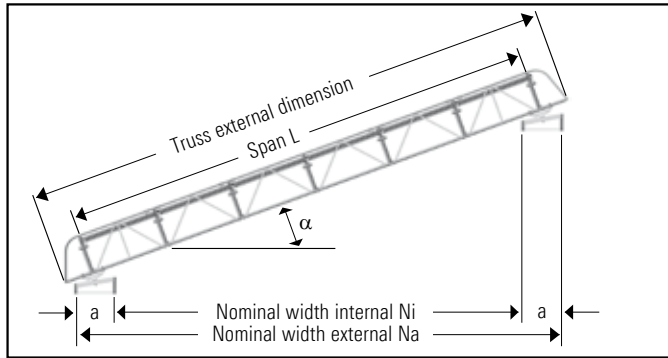


Figure 4

Nominal widths: $N_e = L \times \cos \alpha + a$

$N_i = L \times \cos \alpha - a$

a – axis dimension of frame 0.73 / 1.09 m

α – roof angle 15 – 20 degrees

Number of lattice beams – length of roof tarpaulin for each truss

Model	Truss external dimension	Span L	Eave section	Mono-pitch roof lattice beam 1.65 m	Lattice beam 1.50 m	Lattice beam 3.0 m	Roof tarpaulin [m]
I	5.6 m	4.6 m	2	1	0	0	11.00
II	7.1 m	5.9 m	2	1	1	0	11.00
III	8.6 m	7.5 m	2	1	0	1	11.00
IV	10.1 m	8.9 m	2	1	1	1	14.00
V	11.6 m	10.5 m	2	1	0	2	14.00
VI	13.1 m	11.9 m	2	1	1	2	17.00
VII	14.6 m	13.5 m	2	1	0	3	17.00
VIII	16.1 m	15.1 m	2	1	1	3	20.00

3. MEASURES TO PREVENT FALLS

In line with local regulations or as the result of a risk analysis, fall prevention measures are necessary when assembling the keder roof.

Attachment points for the personal safety apparatus (PSA)

If the use of personal safety apparatus (PSA) is required for assembling and dismantling the keder roof, the bottom chords of the roof beams must be used as attachment points.

The suitability of PSA for preventing falls must be checked for the specific application. Particular attention must be paid here to the minimum fall heights (clear height underneath the user) as stated in the manufacturer's specifications for the connectors.

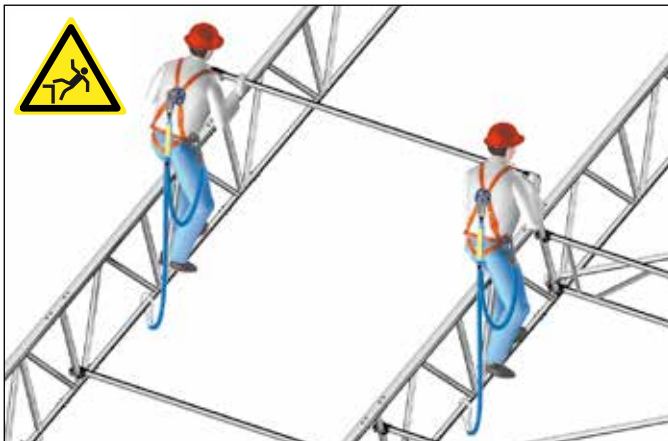


Figure 5

4. ASSEMBLY

Assembly of the support scaffolding

Layher SpeedyScaf or Layher Allround equipment with the axis dimensions 0.73 or 1.09 m can be used as the support scaffolding for the Layher keder roof. The scaffolding must be assembled in accordance with the appropriate assembly and use instructions. The stability of the overall structure must be verified. The support scaffolding must be secured with locking pins, then ballasted or anchored to meet structural requirements.

Preventing falls during assembly and dismantling of the support scaffolding

In line with local regulations or as the result of a risk analysis performed by the scaffolding erector, either personal safety apparatus (PSA) or an advance guardrail may be necessary for assembly and dismantling of the support scaffolding (see instructions for assembly and use of Layher SpeedyScaf / Layher Allround Scaffolding).

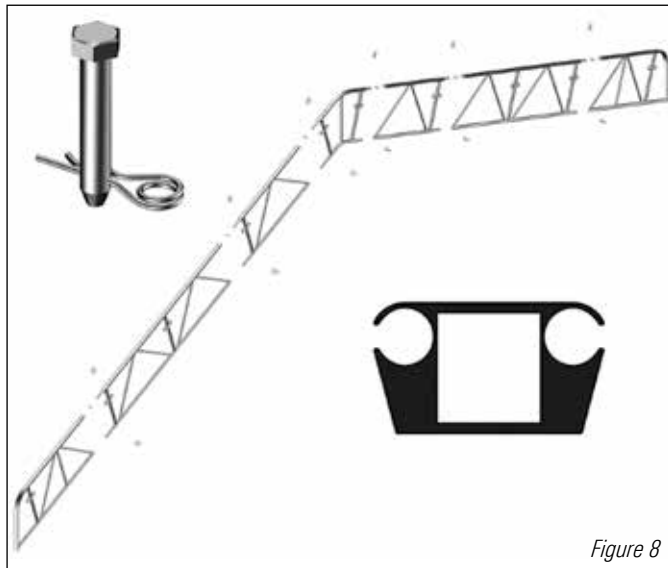
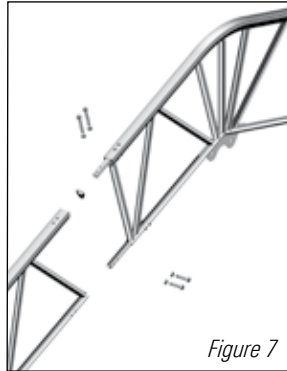
Assembly of the roof trusses

First position the roof supports (5971.120 / 130) on the support scaffolding to conform with the scaffolding width, then secure them with locking pins (4000.001) (Figure 6).



Figure 6

Pre-assemble the lattice beams (5971.150 / 300), eaves sections (5971.100) and ridge sections (5971.110) on the ground to make trusses. To do so, insert a seal (5971.000) at every joint on the top chord before the beams are put together. Then pin the connected beams using bolts 14 x 77 mm (5906.077) and locking pins (4905.000) (Figures 7 and 8). Four bolts with locking pins are needed for each beam joint.



WARNING

Missing bolts reduce the stability of the overall structure and can lead to collapse of the roof.

Lift the trusses pre-assembled in this way using a crane or with ropes (up to 14.6 m span) onto the support scaffolding and place them inside the half-couplers of the supports. The trusses must be supported in the centre of the bay (e.g. with a rolling tower). Close the covers of the half-couplers and lightly tighten the screws so that the trusses can still be turned inside the coupler shells. Now swing the truss upwards (Figure 9) and firmly bolt it to the support (tightening torque 50 Nm).

Important: Safeguard the truss against tilting sideways during assembly! To do so, a scaffolding tube can be run up the outer frame, to which the truss is then attached using ropes (Figure 9).



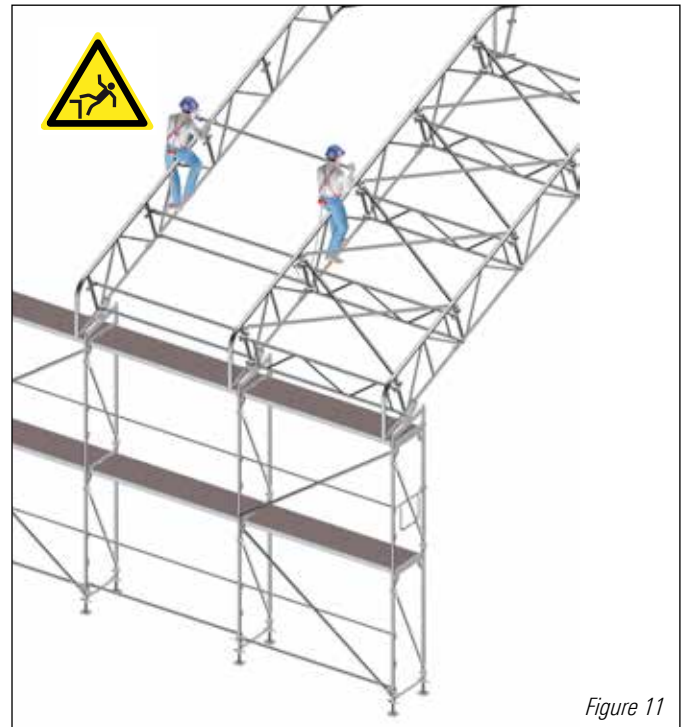
WARNING

Missing securing tubes can lead to collapse of the roof truss.

Once the first truss has been assembled, repeat the procedure for the second one. When this has been firmly bolted to the roof supports and secured against tilting, make a start on stiffening the first truss bay (Figure 10). Install the stiffeners (5971.257) starting from the eaves. They are snapped onto the short tube connections of the lattice beams and onto the bottom chord, spaced 1.5 m apart. Once the first two stiffeners have been fitted, install the first diagonal cross-brace. Fasten the diagonal braces (5971.297) underneath the top chord to the vertical tubes using snap-on claws. This procedure is repeated, over the ridge to the opposite eaves, until the stiffening bay has been completely assembled.



Next, pre-assemble the third truss on the ground as described above and position it on the support scaffolding. Once it has been positioned, connect it to the stiffened truss bay using ledgers (5972.257). These longitudinal ledgers are attached in pairs, 1.5 m apart, to the short tube connectors and to the bottom chord of the lattice beams (Figure 11), similarly to the beam stiffeners.



The bracketed article numbers relate to a bay length of 2.57 m.

WARNING

Snap-on claws must engage completely, as poor connections reduce stability.

Another four non-stiffened bays can be attached to each stiffening bay. They must then be followed by a stiffened bay again.

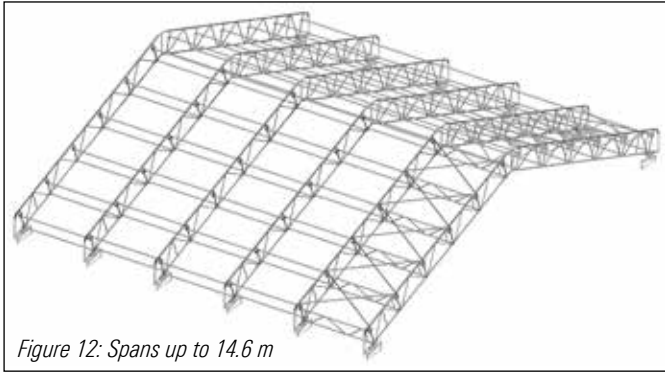


Figure 12: Spans up to 14.6 m

WARNING

Missing stiffening bays reduce stability and can lead to collapse of the roof.

With spans of more than 14.6 m, an additional diagonal brace (cross-brace) is needed on the bottom chord of the lattice beams in the entire stiffening bay (Figure 13), and each end bay must also be designed as a stiffening bay.

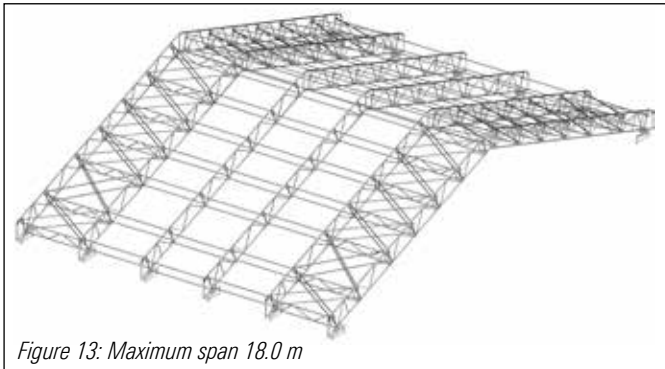


Figure 13: Maximum span 18.0 m

WARNING

Missing stiffening bays reduce stability and can lead to collapse of the roof.

Assembly of keder hall

Support structure of keder halls up to 12.80 m

Special eaves and wall elements can be used for assembling Keder Halls with up to 12.80 m external truss dimension. These elements also have a keder section for pulling through the roof tarpaulin as far as the ground.

Stiffen every fifth bay with keder roof diagonal braces in a crosswise configuration and with keder roof stiffeners. In the four intermediate bays keder roof ledgers need to be installed (see Figure 30).

An adjustable base plate can only be installed on the inside at the base.

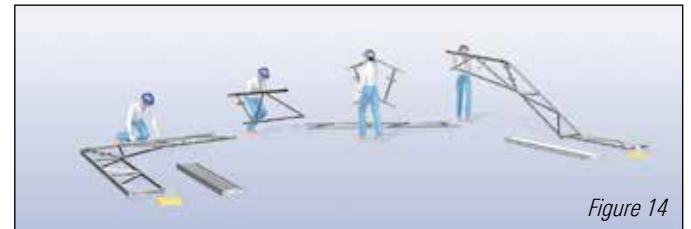


Figure 14

The individual hall trusses are preassembled on the ground. They comprise a bending-resistant corner (5971.160), wall elements (5971.170), the appropriate lattice beams (5971.150 / 300), the ridge section (5971.110) plus seals (5971.000) and bolts (5906.077) with locking pins (4905.000).

Important: A maximum of two wall elements (5971.170) can be fitted one above the other.

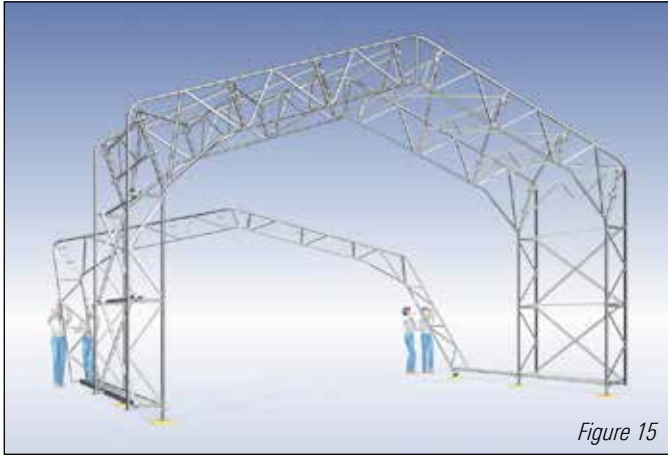


Figure 15

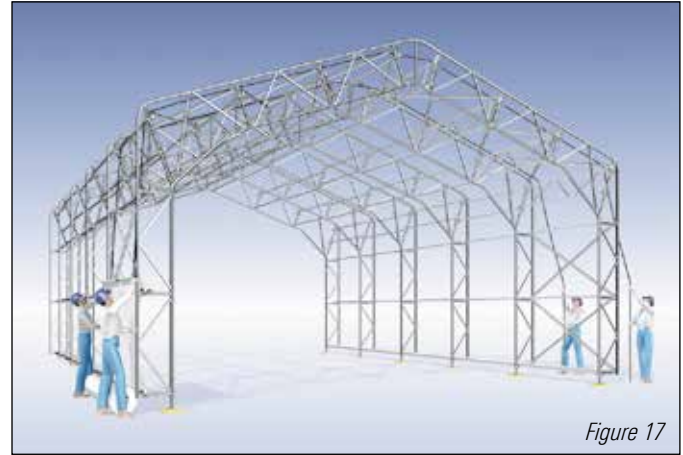


Figure 17

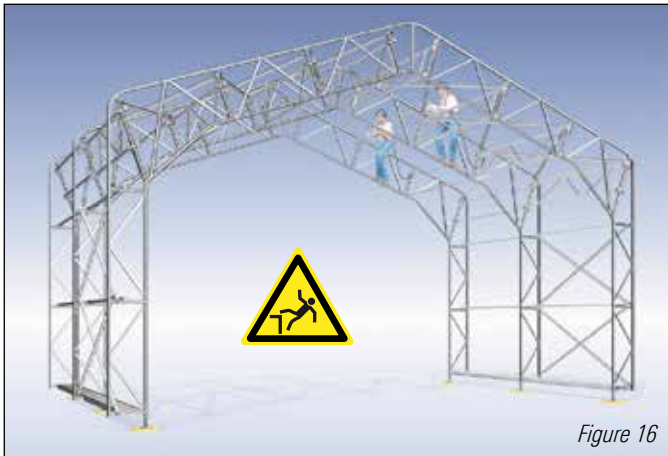


Figure 16

The first two trusses are assembled and braced with ledgers, diagonal braces and stiffeners. On the wall elements, the ledgers are 1.5 m apart. In the roof area, stiffeners are used. In the lower area, one O-steel deck T4, 2.57 x 0.32 m, is installed on each side. It is used as the base for the ballast and acts as the lower pivot point during assembly of the further hall trusses (Figure 15). Once the first hall bay has been stiffened, the next preassembled truss can be set up. It is connected to the first stiffened hall bay using ledgers.

Important: A maximum of four non-stiffened bays can be attached to each stiffened hall bay.

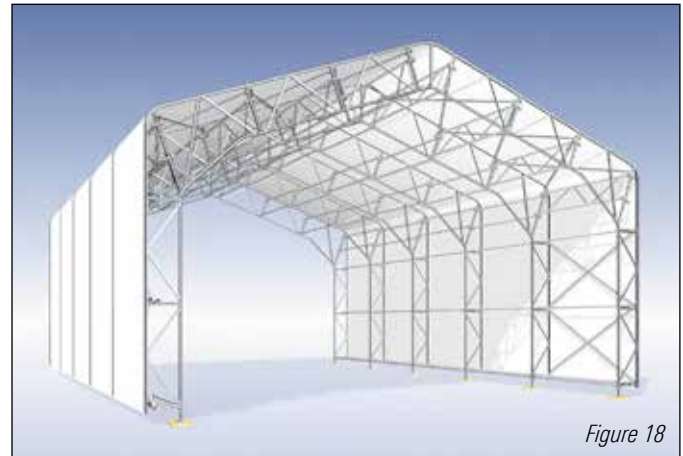


Figure 18

For fitting the tarpaulins, a scaffolding tube is inserted at the end of the tarpaulin, to which the pulling ropes are attached on the outside. Two erectors guide the tarpaulin during pulling, two further erectors pull the tarpaulin from the opposite side.

Gable tarpaulins can also be fitted. See chapter 5.

5. FITTING OF TARPAULINS

Fitting of the gable tarpaulins

To close the roof on the gable ends, it is possible to attach gable tarpaulins. These tarpaulins are in two parts, and must be pulled, starting from the eave section, into the outer keder groove of the eave truss (Figure 19). Once both tarpaulin halves have been pulled in, connect them vertically using the velcro strips provided. A horizontal eyelet strip on each gable tarpaulin allows wall tarpaulins to be attached (Figure 20).



Figure 19



Figure 20

Fitting of the roof tarpaulins

Position the roof tarpaulin centrally in front of the truss bay. Pull a 3.0 m scaffolding tube through the hollow border of the tarpaulin, and attach ropes to its ends. Lay the ropes over the roof, position the tarpaulin at the keder grooves and then insert it (Figure 21). Now pull the tarpaulin using the ropes evenly from the opposite eaves through the entire truss (Figure 24). To prevent it skewing, it is recommended that the tarpaulin be guided at the starting side.

Tip: Easy movement is aided by silicone oil or simple detergent.

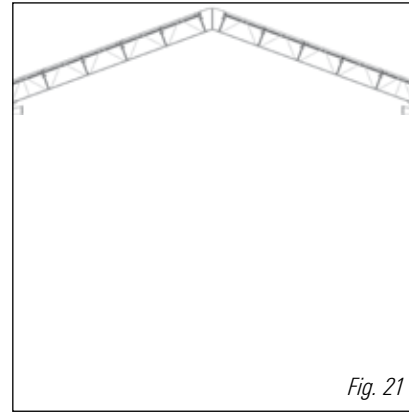


Fig. 21

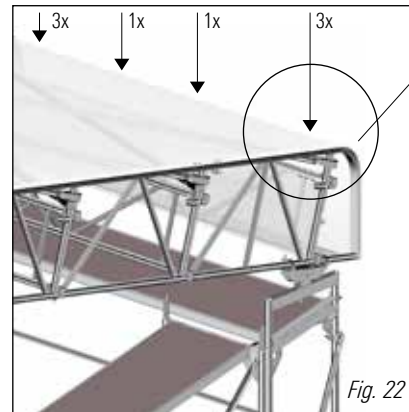


Fig. 22

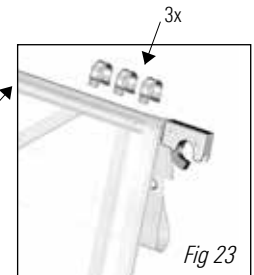


Fig 23

Once the roof tarpaulin has been pulled over the opposite eaves and centered over the truss length, secure it using three locking pins (5971.140) at the edges of the roof bays (Figures 22 and 23). In the central bay area, single locking pins spaced 30 – 40 cm apart are sufficient.

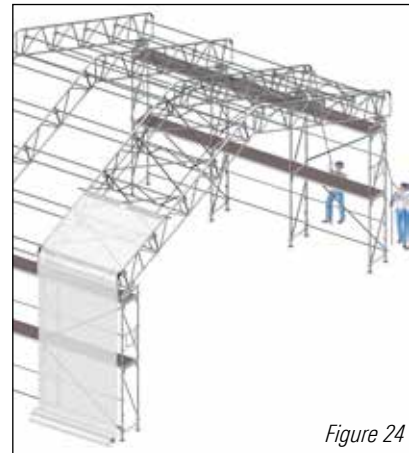


Figure 24

6. VERIFICATION OF SUPPORT SCAFFOLDING STABILITY

Calculate the support scaffolding separately for every specific case. The loads resulting from the roof and the scaffolding must be traced all the way to the ground for assembly.

The support forces of the roof structure resulting from dead weight and wind suction are given in Table 1. Dead weights and cross-sections of individual components for the SpeedyScaf or Allround support scaffolding can be found in the respective approvals.

For verification of the stability of the support scaffolding, DIN EN 12811 applies.

Tip: It is recommended in any event that the standards of the support scaffolding be secured with locking pins.

Support forces

The support forces for each truss stated in Table 1 are working loads for roofs of weather protection buildings closed on all sides and open* at the sides. The boundary conditions set forth under chapter 2 apply!

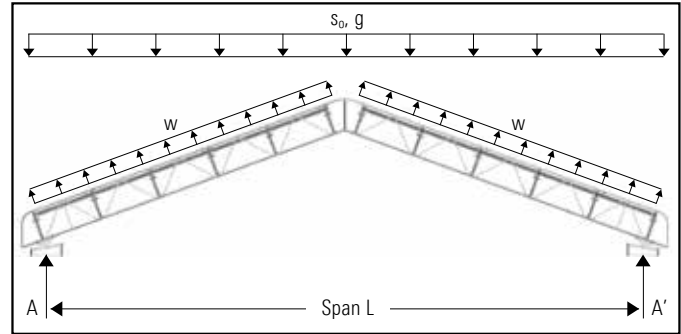


Figure 25

Snow: $s_0 = 0.25 \text{ kN/m}^2$
 Dead weight: $g = 0.09 \text{ kN/m}^2$

Wind suction:
 Hall closed on all sides:
 $w_1 = -0.5 \times 0.6 = 0.3 \text{ kN/m}^2$

Hall open at sides*:
 $w_2 = -0.5 \times (0.6 + 0.8) = 0.7 \text{ kN/m}^2$

*open on one side or on three sides

Span L [m]	Dead weight A_g [kN]		Snow loads A_s [kN]		Wind suction in hall closed on all sides A_{w1} [kN]		Wind suction in hall open at sides* A_{w2} [kN]	
6.1 m	0.8	0.6	2.2	1.7	-2.8	-2.2	-6.5	-5.2
9.0 m	1.1	0.9	3.0	2.4	-3.9	-3.1	-9.0	-7.3
11.8 m	1.4	1.1	3.9	3.1	-4.9	-4.0	-11.5	-9.3
14.6 m	1.7	1.4	4.7	3.8	-6.0	-4.9	-14.1	-11.3
18.0 m	2.1	1.7	5.9	4.8	-7.6	-6.1	-17.7	-14.2
Bay width [m]	2.57	2.07	2.57	2.07	2.57	2.07	2.57	2.07

Table 1

Suspension loads per roof truss

Span [m]	18.0	14.6	11.8	9.0
Individual load F [kN]	5.0	5.0	5.0	5.0
Line load P [kN/m]	0.6	0.7	0.9	1.4

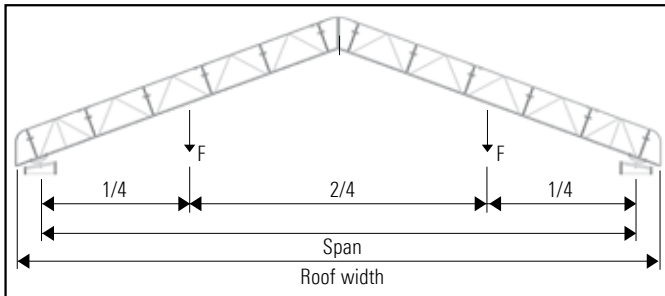


Figure 26

The following boundary conditions have been taken on the basis:

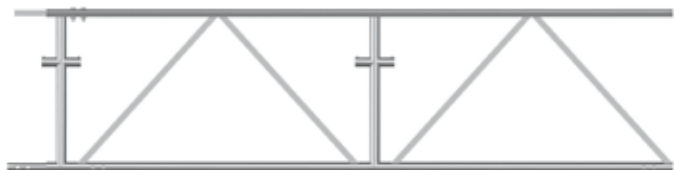
- **Without snow load!**
- Bay length up to 2.57 m
- Horizontal bracing in every 5th bay and in every edge bay
- Roof height max. 12.0 m

7. COMPONENTS

Keder roof lattice beam

L = 1.5 m, Ref. No. 5971.150, weight 8.9 kg

L = 3.0 m, Ref. No. 5971.300, weight 16.4 kg



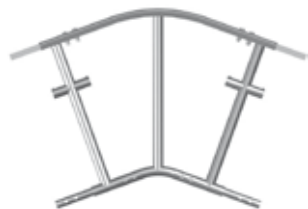
Keder roof mono-pitch lattice beam

L = 1.65 m, Ref. No. 5972.150, weight 12.1 kg



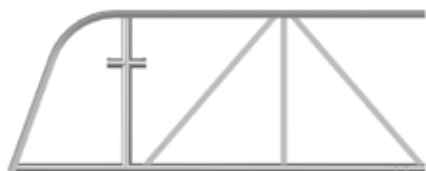
Keder roof ridge section

L = 1.2 m, Ref. No. 5971.110, weight 9.7 kg



Keder roof eaves section

L = 2.0 m, Ref. No. 5971.100, weight 11.9 kg



Keder roof stiffener

L = 2.07 m, Ref. No. 5974.207, weight 8.3 kg

L = 2.57 m, Ref. No. 5971.257, weight 9.7 kg



Keder roof diagonal brace

L = 2.56 m (bay 2.07 m), Ref. No. 5971.299, weight 4.2 kg

L = 2.97 m (bay 2.57 m), Ref. No. 5971.297, weight 4.7 kg



Keder roof ledger

L = 2.07 m, Ref. No. 5971.207, weight 3.6 kg

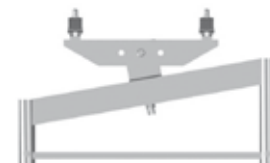
L = 2.57 m, Ref. No. 5972.257, weight 4.2 kg



Roof support

L = 0.73 m, Ref. No. 5971.120, weight 12.7 kg

L = 1.09 m, Ref. No. 5971.130, weight 15.2 kg



Tarpaulin clip

Ref. No. 5971.140, weight 0.3 kg

Bolt 14 x 77 mm

Ref. No. 5906.077, weight 0.11 kg

Locking pin

Ref. No. 4905.000, weight 0.01 kg



Keder roof seal

Ref. No. 5971.000, weight 0.01 kg

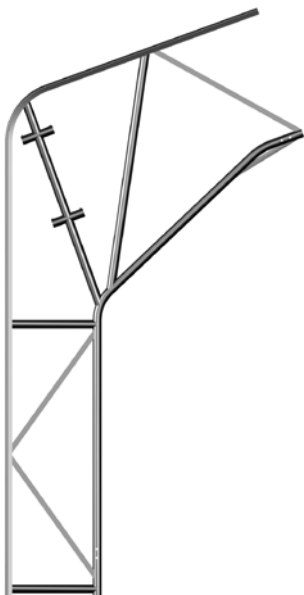


Roof and gable tarpaulins

see catalogue protective systems

Bending-resistant corner

L = 3.34 m, Ref. No. 5971.160, weight 20.5 kg



Keder roof-wall element

L = 1.50 m, Ref. No. 5971.170, weight 8.2 kg



ANNEX 01: MATERIAL REQUIRED FOR DOUBLE-PITCH ROOF (BAY LENGTH 2.57 / 2.07 M)

Span L (truss ext. dimension)	Roof length Bay length 2.57 m (2.07 m)	System data						Locking pin	Bolt 14 x 77 mm + locking pin	Keder roof seal	Keder roof eaves section	Keder roof ridge section	Keder roof support 0.73 (1.09) m	Keder roof tarpaulin clip	Keder roof lattice beam 1.50 m	Keder roof stiffener 2.57 (2.07) m	Keder roof diagonal brace 2.97 (2.56) m	Keder roof lattice beam 3.0 m	Keder roof ledger 2.57 (2.07) m	Keder roof lattice beam 2.13 m	Keder roof diagonal brace 3.34 m	Keder roof gable tarpaulin	Keder roof roof tarpaulin
		Number of trusses	Number of bays	Stiffened bays	Non-stiffened bays	End bay additionally stiffened in top and bottom chords	4000.001																
6.1 (7.15)	5.14 (4.14)	3	2	1	1	0	12	48	12	6	3	6	40	6	6	8		12				2	2
	7.71 (6.21)	4	3	1	2	0	16	64	16	8	4	8	60	8	6	8		24				2	3
	10.28 (8.28)	5	4	1	3	0	20	80	20	10	5	10	80	10	6	8		36				2	4
	12.85 (10.36)	6	5	1	4	0	24	96	24	12	6	12	100	12	6	8		48				2	5
	15.42 (12.43)	7	6	2	4	0	28	112	28	14	7	14	120	14	12	16		48				2	6
	17.99 (14.50)	8	7	2	5	0	32	128	32	16	8	16	140	16	12	16		60				2	7
	20.56 (16.57)	9	8	2	6	0	36	144	36	18	9	18	160	18	12	16		72				2	8
	23.13 (18.64)	10	9	2	7	0	40	160	40	20	10	20	180	20	12	16		84				2	9
25.70 (20.72)	11	10	2	8	0	44	176	44	22	11	22	200	22	12	16		96				2	10	
9.0 (10.0)	5.14 (4.14)	3	2	1	1	0	12	48	12	6	3	6	40		8	12	6	16				2	2
	7.71 (6.21)	4	3	1	2	0	16	64	16	8	4	8	60		8	12	8	32				2	3
	10.28 (8.28)	5	4	1	3	0	20	80	20	10	5	10	80		8	12	10	48				2	4
	12.85 (10.36)	6	5	1	4	0	24	96	24	12	6	12	100		8	12	12	64				2	5
	15.42 (12.43)	7	6	2	4	0	28	112	28	14	7	14	120		16	24	14	64				2	6
	17.99 (14.50)	8	7	2	5	0	32	128	32	16	8	16	140		16	24	16	80				2	7
	20.56 (16.57)	9	8	2	6	0	36	144	36	18	9	18	160		16	24	18	96				2	8
	23.13 (18.64)	10	9	2	7	0	40	160	40	20	10	20	180		16	24	20	112				2	9
25.70 (20.72)	11	10	2	8	0	44	176	44	22	11	22	200		16	24	22	128				2	10	
11.8 (12.8)	5.14 (4.14)	3	2	1	1	0	12	72	18	6	3	6	40	6	10	16	6	20				2	2
	7.71 (6.21)	4	3	1	2	0	16	96	24	8	4	8	60	8	10	16	8	40				2	3
	10.28 (8.28)	5	4	1	3	0	20	120	30	10	5	10	80	10	10	16	10	60				2	4
	12.85 (10.36)	6	5	1	4	0	24	144	36	12	6	12	100	12	10	16	12	80				2	5
	15.42 (12.43)	7	6	2	4	0	28	168	42	14	7	14	120	14	20	32	14	80				2	6
	17.99 (14.50)	8	7	2	5	0	32	192	48	16	8	16	140	16	20	32	16	100				2	7
	20.56 (16.57)	9	8	2	6	0	36	216	54	18	9	18	160	18	20	32	18	120				2	8
	23.13 (18.64)	10	9	2	7	0	40	240	60	20	10	20	180	20	20	32	20	140				2	9
25.70 (20.72)	11	10	2	8	0	44	264	66	22	11	22	200	22	20	32	22	160				2	10	
14.6 (15.6)	5.14 (4.14)	3	2	1	1	0	12	72	18	6	3	6	40		12	20	12	24				2	2
	7.71 (6.21)	4	3	1	2	0	16	96	24	8	4	8	60		12	20	16	48				2	3
	10.28 (8.28)	5	4	1	3	0	20	120	30	10	5	10	80		12	20	20	72				2	4
	12.85 (10.36)	6	5	1	4	0	24	144	36	12	6	12	100		12	20	24	96				2	5
	15.42 (12.43)	7	6	2	4	0	28	168	42	14	7	14	120		24	40	28	96				2	6
	17.99 (14.50)	8	7	2	5	0	32	192	48	16	8	16	140		24	40	32	120				2	7
	20.56 (16.57)	9	8	2	6	0	36	216	54	18	9	18	160		24	40	36	144				2	8
	23.13 (18.64)	10	9	2	7	0	40	240	60	20	10	20	180		24	40	40	168				2	9
25.70 (20.72)	11	10	2	8	0	44	264	66	22	11	22	200		24	40	44	192				2	10	
18.0 (19.6)	5.14 (4.14)	3	2	1	0	1	12	96	24	6	3	6	40		28	80	12		6	16		2	2
	7.71 (6.21)	4	3	1	1	1	16	128	32	8	4	8	60		28	80	16	28	8	16		2	3
	10.28 (8.28)	5	4	1	2	1	20	160	40	10	5	10	80		28	80	20	56	10	16		2	4
	12.85 (10.36)	6	5	1	3	1	24	192	48	12	6	12	100		28	80	24	84	12	16		2	5
	15.42 (12.43)	7	6	2	4	1	28	224	56	14	7	14	120		28	80	28	112	14	16		2	6
	17.99 (14.50)	8	7	2	4	1	32	256	64	16	8	16	140		42	120	32	112	16	24		2	7
	20.56 (16.57)	9	8	2	5	1	36	288	72	18	9	18	160		42	120	36	140	18	24		2	8
	23.13 (18.64)	10	9	2	6	1	40	320	80	20	10	20	180		42	120	40	168	20	24		2	9
25.70 (20.72)	11	10	2	7	1	44	352	88	22	11	22	200		42	120	44	196	22	24		2	10	

ANNEX 02: MATERIAL REQUIRED FOR MONO-PITCH ROOF (BAY LENGTH 2.57 / 2.07 M – PART 1)

Truss external dimension	Roof length Bay length 2.57 m (2.07 m)	System data				4000.001	Locking pin	Bolt 14 x 77 mm + Locking pin	Keder roof seal	Keder roof eaves section	Keder roof support 0.73 (1.09) m	Keder roof tarpaulin clip	Keder roof lattice beam 1.50 m	Keder roof stiffener 2.57 (2.07) m	Keder roof diagonal brace 2.97 (2.56) m	Keder roof lattice beam 3.0 m	Keder roof mono-pitch roof lattice beam	Keder roof ledger 2.57 (2.07) m	Keder roof roof tarpaulin
		Number of trusses	Number of bays	Stiffened bays	Non-stiffened bays														
5.64	5.14 (4.14)	3	2	1	1	12	24	6	6	6	40		4	6		3	8	2	
	7.71 (6.21)	4	3	1	2	16	32	8	8	8	60		4	6		4	16	3	
	10.28 (8.28)	5	4	1	3	20	40	10	10	10	80		4	6		5	24	4	
	12.85 (10.36)	6	5	1	4	24	48	12	12	12	100		4	6		6	32	5	
	15.42 (12.43)	7	6	2	4	28	56	14	14	14	120		8	12		7	32	6	
	17.99 (14.50)	8	7	2	5	32	64	16	16	16	140		8	12		8	40	7	
	20.56 (16.57)	9	8	2	6	36	72	18	18	18	160		8	12		9	48	8	
	23.13 (18.64)	10	9	2	7	40	80	20	20	20	180		8	12		10	56	9	
25.70 (20.72)	11	10	2	8	44	88	22	22	22	200		8	12		11	64	10		
7.14	5.14 (4.14)	3	2	1	1	12	36	9	6	6	40	3	5	8		3	10	2	
	7.71 (6.21)	4	3	1	2	16	48	12	8	8	60	4	5	8		4	20	3	
	10.28 (8.28)	5	4	1	3	20	60	15	10	10	80	5	5	8		5	30	4	
	12.85 (10.36)	6	5	1	4	24	72	18	12	12	100	6	5	8		6	40	5	
	15.42 (12.43)	7	6	2	4	28	84	21	14	14	120	7	10	16		7	40	6	
	17.99 (14.50)	8	7	2	5	32	96	24	16	16	140	8	10	16		8	50	7	
	20.56 (16.57)	9	8	2	6	36	108	27	18	18	160	9	10	16		9	60	8	
	23.13 (18.64)	10	9	2	7	40	120	30	20	20	180	10	10	16		10	70	9	
25.70 (20.72)	11	10	2	8	44	132	33	22	22	200	11	10	16		11	80	10		
8.64	5.14 (4.14)	3	2	1	1	12	36	9	6	6	40		6	10	3	3	12	2	
	7.71 (6.21)	4	3	1	2	16	48	12	8	8	60		6	10	4	4	24	3	
	10.28 (8.28)	5	4	1	3	20	60	15	10	10	80		6	10	5	5	36	4	
	12.85 (10.36)	6	5	1	4	24	72	18	12	12	100		6	10	6	6	48	5	
	15.42 (12.43)	7	6	2	4	28	84	21	14	14	120		12	20	7	7	48	6	
	17.99 (14.50)	8	7	2	5	32	96	24	16	16	140		12	20	8	8	60	7	
	20.56 (16.57)	9	8	2	6	36	108	27	18	18	160		12	20	9	9	72	8	
	23.13 (18.64)	10	9	2	7	40	120	30	20	20	180		12	20	10	10	84	9	
25.70 (20.72)	11	10	2	8	44	132	33	22	22	200		12	20	11	11	96	10		
10.14	5.14 (4.14)	3	2	1	1	12	48	12	6	6	40	3	7	12	3	3	14	2	
	7.71 (6.21)	4	3	1	2	16	64	16	8	8	60	4	7	12	4	4	28	3	
	10.28 (8.28)	5	4	1	3	20	80	20	10	10	80	5	7	12	5	5	42	4	
	12.85 (10.36)	6	5	1	4	24	96	24	12	12	100	6	7	12	6	6	56	5	
	15.42 (12.43)	7	6	2	4	28	112	28	14	14	120	7	14	24	7	7	56	6	
	17.99 (14.50)	8	7	2	5	32	128	32	16	16	140	8	14	24	8	8	70	7	
	20.56 (16.57)	9	8	2	6	36	144	36	18	18	160	9	14	24	9	9	84	8	
	23.13 (18.64)	10	9	2	7	40	160	40	20	20	180	10	14	24	10	10	98	9	
25.70 (20.72)	11	10	2	8	44	176	44	22	22	200	11	14	24	11	11	112	10		

ANNEX 03: MATERIAL REQUIRED FOR MONO-PITCH ROOF (BAY LENGTH 2.57 / 2.07 M – PART 2)

Truss external dimension	Roof length Bay length 2.57 m (2.07 m)	System data				Locking pin 4000.001	Bolt 14 x 77 mm + locking pin 5906.077 + 4905.000	Keder roof seal 5971.000	Keder roof eaves section 5971.100	Keder roof support 0.73 (1.09) m 5971.120 (5971.130)	Keder roof tarpaulin clip 5971.140	Keder roof lattice beam 1.30 m 5971.150	Keder roof stiffener 2.57 (2.07) m 5971.257 (5974.207)	Keder roof diagonal brace 2.97 (2.56) m 5971.297 (5971.299)	Keder roof lattice beam 3.0 m 5971.300	Keder roof mono-pitch roof lattice beam 5972.150	Keder roof ledger 2.57 (2.07) m 5972.257 (5971.207)	Keder roof roof tarpaulin see price list
		Number of trusses	Number of bays	Stiffened bays	Non-stiffened bays													
11.64	5.14 (4.14)	3	2	1	1	12	48	12	6	6	40		8	14	6	3	16	2
	7.71 (6.21)	4	3	1	2	16	64	16	8	8	60	8	14	8	4	32	3	
	10.28 (8.28)	5	4	1	3	20	80	20	10	10	80	8	14	10	5	48	4	
	12.85 (10.36)	6	5	1	4	24	96	24	12	12	100	8	14	12	6	64	5	
	15.42 (12.43)	7	6	2	4	28	112	28	14	14	120	16	28	14	7	64	6	
	17.99 (14.50)	8	7	2	5	32	128	32	16	16	140	16	28	16	8	80	7	
	20.56 (16.57)	9	8	2	6	36	144	36	18	18	160	16	28	18	9	96	8	
	23.13 (18.64)	10	9	2	7	40	160	40	20	20	180	16	28	20	10	112	9	
25.70 (20.72)	11	10	2	8	44	176	44	22	22	200	16	28	22	11	128	10		
13.14	5.14 (4.14)	3	2	1	1	12	60	15	6	6	40	3	9	16	6	3	18	2
	7.71 (6.21)	4	3	1	2	16	80	20	8	8	60	4	9	16	8	4	36	3
	10.28 (8.28)	5	4	1	3	20	100	25	10	10	80	5	9	16	10	5	54	4
	12.85 (10.36)	6	5	1	4	24	120	30	12	12	100	6	9	16	12	6	72	5
	15.42 (12.43)	7	6	2	4	28	140	35	14	14	120	7	18	32	14	7	72	6
	17.99 (14.50)	8	7	2	5	32	160	40	16	16	140	8	18	32	16	8	90	7
	20.56 (16.57)	9	8	2	6	36	180	45	18	18	160	9	18	32	18	9	108	8
	23.13 (18.64)	10	9	2	7	40	200	50	20	20	180	10	18	32	20	10	126	9
25.70 (20.72)	11	10	2	8	44	220	55	22	22	200	11	18	32	22	11	144	10	
14.64	5.14 (4.14)	3	2	1	1	12	60	15	6	6	40		10	18	9	3	20	2
	7.71 (6.21)	4	3	1	2	16	80	20	8	8	60		10	18	12	4	40	3
	10.28 (8.28)	5	4	1	3	20	100	25	10	10	80		10	18	15	5	60	4
	12.85 (10.36)	6	5	1	4	24	120	30	12	12	100		10	18	18	6	80	5
	15.42 (12.43)	7	6	2	4	28	140	35	14	14	120		20	36	21	7	80	6
	17.99 (14.50)	8	7	2	5	32	160	40	16	16	140		20	36	24	8	100	7
	20.56 (16.57)	9	8	2	6	36	180	45	18	18	160		20	36	27	9	120	8
	23.13 (18.64)	10	9	2	7	40	200	50	20	20	180		20	36	30	10	140	9
25.70 (20.72)	11	10	2	8	44	220	55	22	22	200		20	36	33	11	160	10	
16.14	5.14 (4.14)	3	2	1	1	12	72	18	6	6	40	3	11	20	9	3	22	2
	7.71 (6.21)	4	3	1	2	16	96	24	8	8	60	4	11	20	12	4	44	3
	10.28 (8.28)	5	4	1	3	20	120	30	10	10	80	5	11	20	15	5	66	4
	12.85 (10.36)	6	5	1	4	24	144	36	12	12	100	6	11	20	18	6	88	5
	15.42 (12.43)	7	6	2	4	28	168	42	14	14	120	7	22	40	21	7	88	6
	17.99 (14.50)	8	7	2	5	32	192	48	16	16	140	8	22	40	24	8	110	7
	20.56 (16.57)	9	8	2	6	36	216	54	18	18	160	9	22	40	27	9	132	8
	23.13 (18.64)	10	9	2	7	40	240	60	20	20	180	10	22	40	30	10	154	9
25.70 (20.72)	11	10	2	8	44	264	66	22	22	200	11	22	40	33	11	176	10	

ANNEX 04: EXAMPLES FOR ASSEMBLY

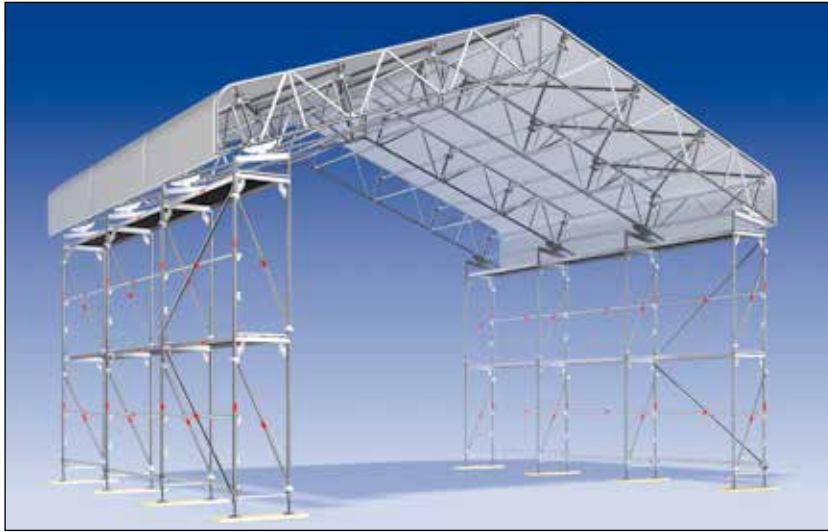


Figure 27: Double-pitch roof (span 9.0 m)

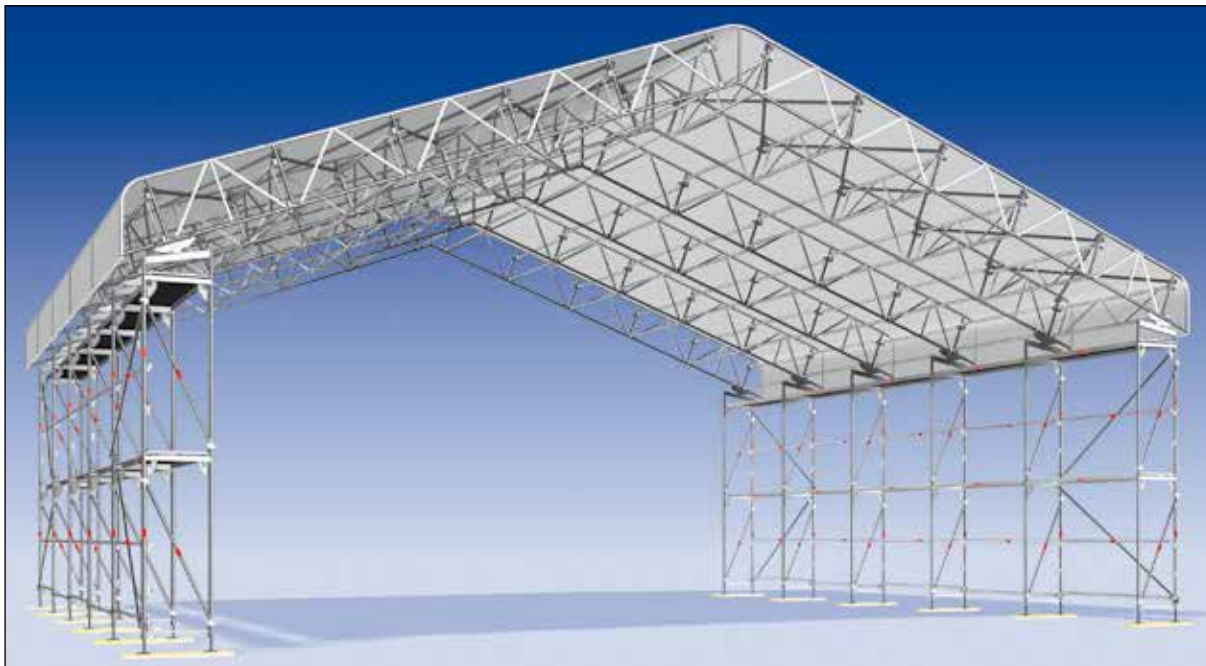


Figure 28: Double-pitch roof (span 14.6 m)

ANNEX 05 / 06: EXAMPLES FOR ASSEMBLY

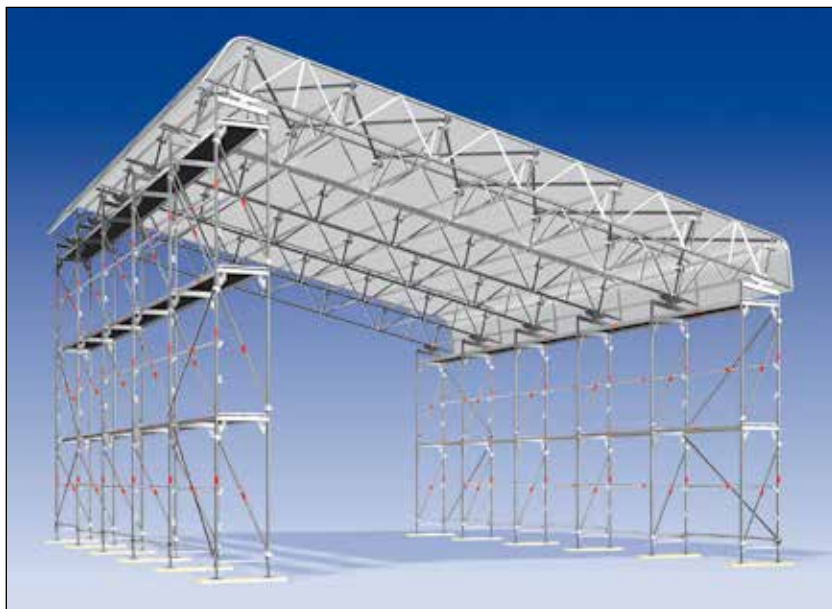


Figure 29: Mono-pitch roof (truss external dimension 10.14 m)

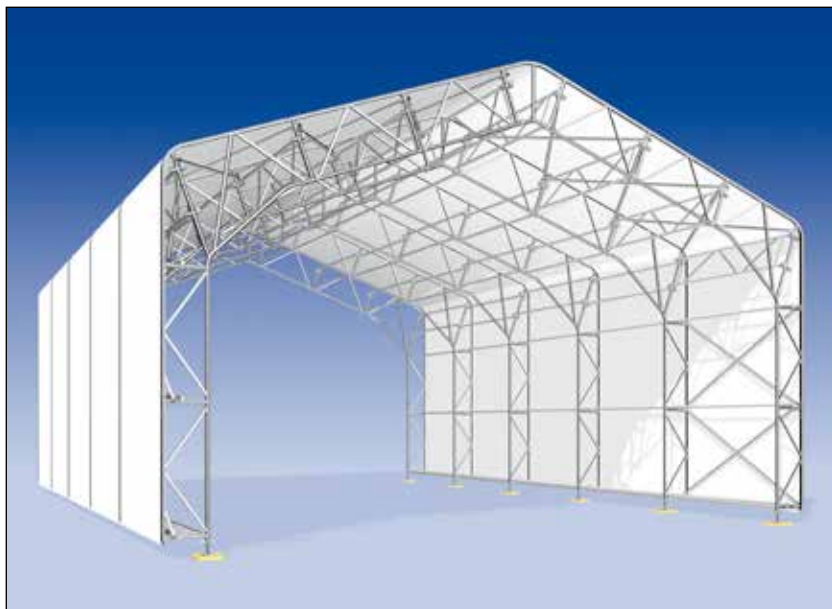


Figure 30: Keder hall (truss external dimension 10.0 m)



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