

UNI ROOF™

USER GUIDE





Foreword

DESSA offers efficient lightweight temporary roofing, encapsulation solutions, aluminium lattice girders and safety products. DESSA's unique and distinctive aluminium solutions are suitable for not only grandstands, stages and events but also public utility works, local authorities, government buildings, historic buildings, highways, bridges and industrial market sectors. Time proven on demanding and complex applications across varied climates throughout the UK, Canada, UAE, Australia and Europe, DESSA offer unrivalled span capabilities and alternative configurations. From a choice of roofing solutions and general purpose lattice girders providing unrivalled cost to strength ratio, to high capacity lattice girders complete with a dedicated bracing system, we provide the industry with an ever widening range of cost effective products along with extensive after sales support to the highest professional standards. At DESSA we develop innovative and practical solutions for the support, access and weather protection industries. All of our designs are technically proven and are registered with protected design rights meaning only DESSA can offer superior solutions through our products. Our senior management team at DESSA offer considerable experience in the fields of contracting, engineering, manufacture and customer service. Having introduced a number of class leading products into the UK market and we have worked closely with a number of key clients in developing bespoke solutions to their problems which we manufacture on an exclusive basis.

UNI Roof Introduction

The UNI Roof System by DESSA is a fully modular temporary roofing solution that offers users significant operational, time and cost benefits:

- Fully modular, proven over 25 years of continual use.
- Lightweight aluminium system, reducing the need for crane assisted erection.
- All beams are universal and can be configured to suit a variety of roofing and scaffold requirements.
- Different beam depth options (0.45m, 0.78m).
- Wide range of beam lengths available (from 0.5 to 6m).
- Can be formed in staggered bays.
- Achieve span clearances of up to 35m with an unrivalled cost to strength ratio.
- Multi-purpose weather proofing fits roofs and walls.
- Provides mono pitch roofing solutions along with 12, 18 and 36 degree duo pitch.
- Rapid platform creation using steel decks.
- Rapid creation of mobile shelters.
- Boltless technology means UNI Roof can be erected without tools.
- Parts connected using spring pins, rather than bolts, saving time and reducing quantity of components.
- Minimal number of different parts.
- Modular tie chord option.
- Variety of support options.



Contents

1.0 Part Recognition..... 1

2.0 Pre-Installation and Safety Considerations 10

2.1 Handling of Components 10

2.2 Materials..... 10

2.3 Risk Assessments and Method Statements 11

2.4 Construction Methods 11

2.5 Safe locations to secure fall prevention equipment..... 11

2.6 Supporting Structure 11

2.7 Ground Conditions 11

2.8 Overhead Electricity..... 12

2.9 Adverse Weather 12

2.10 Scaffold Interface..... 13

2.11 Choosing The Appropriate Span Type..... 14

2.12 Installation Method Considerations 16

2.13 Support Options 18

3.0 Basic Assembly Procedures 20

3.1 Tools Required..... 20

3.2 Connecting Beams..... 21

3.3 Attaching Braces 22

3.4 Bracing Patterns..... 26

3.5 Installing Sheet Tracking..... 27

3.6 Fitting Track Compressors..... 29

3.7 Installing Roller Braces 29

3.8 Sheeting a Roof..... 30

3.9 Tie Bar Installation 32

3.10 Quickstart Guides..... 33

4.0 Roof Installation By Hand 34

4.1 Duopitch 34

4.2 Duopitch with Tie Bar 40

4.3 Monopitch Roofs..... 41

4.4 TRAX Tube Holder 42

5.0 Roof Installation By Rollout 43

5.1 Duopitch 43

5.2 Duopitch with Tie Bar 50

5.3 Monopitch Roofs..... 52

6.0 Roof Installation By Crane..... 53

6.1 Crane Lifting 53

6.2 Duopitch 55

6.3 Duopitch with Tie Bar 59

6.4 Monopitch By Crane..... 60

6.5 Single Bay Lifting Data..... 61

6.6 Double Bay Lifting Data 62

6.7 Monopitch Single Bay Lifting Data..... 63

6.8 Monopitch Double Bay Lifting Data..... 64

7.0 Techniques..... 65

7.1 Tie Bars 65

7.2 Staggered Bays 68

7.3 Early Sheet Termination..... 69

7.4 Dealing with excess sheeting..... 70

7.5 Encapsulations..... 72

7.6 Roof Walkways 73

7.7 Rain Water Management..... 73

8.0 Openings in Completed Roofs..... 74

8.1 Roof-on-Roof Openings..... 74

8.2 Cantilever Openings..... 75

8.3 Telescopic Roofs..... 76

8.4 Constructed Openings..... 77

9.0 Technical Data 78

10.0 Typical Parts Lists 83



References

All references relate to current editions.

1.1 British / European Standards

BS EN 12810-1	Facade scaffolds made of prefabricated components
BS EN 12811-1-3	Scaffolds - performance requirements and general design
BS EN 16508	Temporary works equipment, encapsulation constructions - performance requirements and general design
BS EN 13374	Temporary edge protection systems - product specification, test methods
BS EN 1991-1-3	Snow loading
BS EN 1991-1-4	Wind loading

1.2 Technical Guidance Documents

NASC TG4	Anchorage systems
NASC TG9	Guide to the design and construction of temporary roofs and buildings
NASC TG20	Guide to good practice for scaffolding with tubes & fittings
BS 5975	Code of practice for temporary works procedures and the permissible stress design of false work

1.3 Safety Guidance Documents

NASC SG4	Preventing falls in scaffolding operations
NASC SG6	Manual handling in the scaffolding industry
NASC SG9	Use, inspection and maintenance of lifting equipment
NASC SG19	A guide to formulating a rescue plan
NASC SG35	Handover of scaffold structures

1.4 Regulatory

Working at Height Regulations
Construction (Design and Management) Regulations
Management of Health and Safety Regulations

Only **trained** and **competent** site operatives should be involved in the **erection, dismantling or modification** of UNI Roof temporary structures.

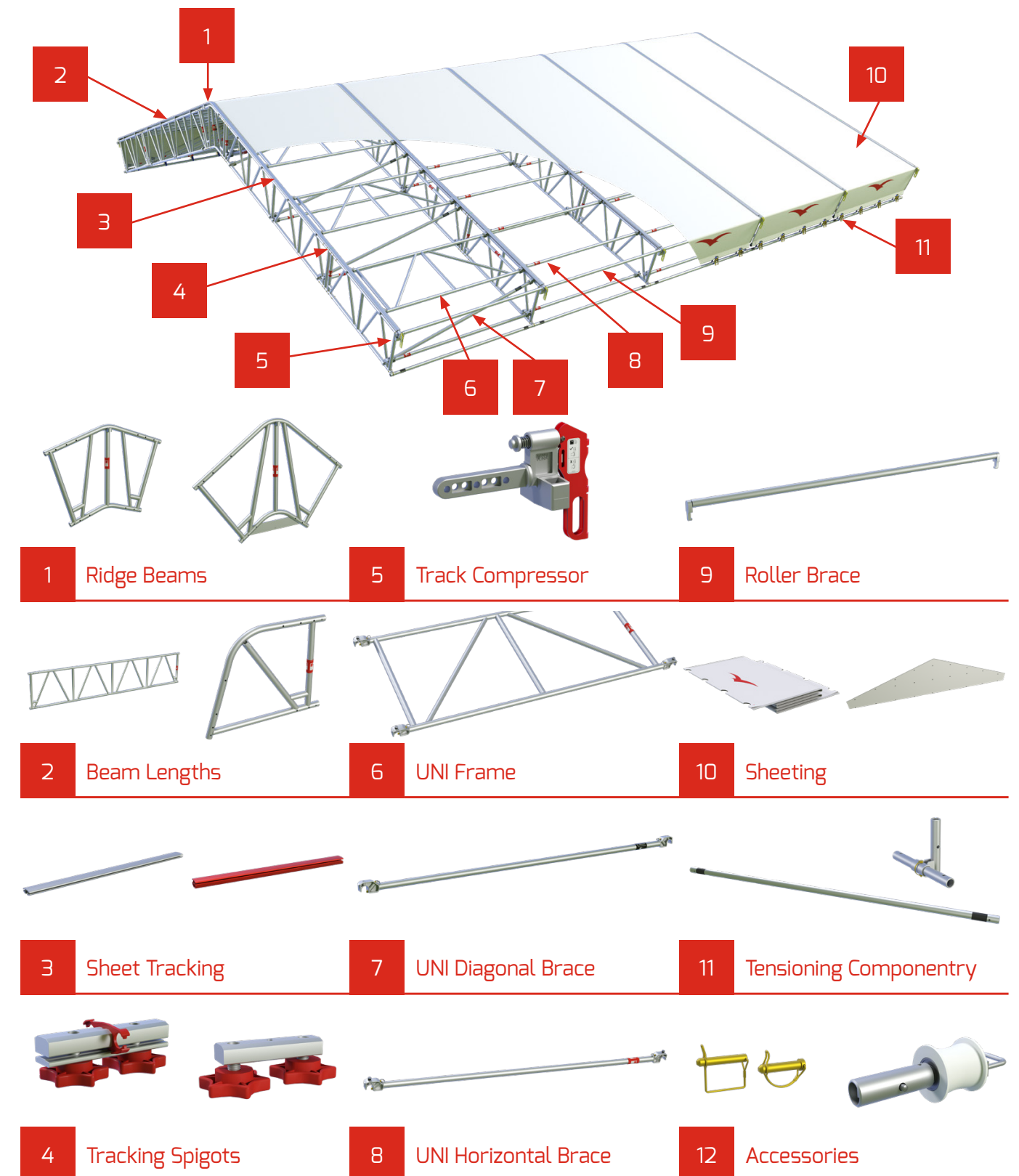
Each project **MUST** be designed and certified by an appropriately qualified temporary works / scaffold design Engineer and local regulations must be complied with.







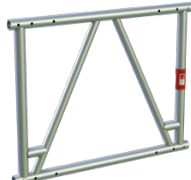
The forces exerted on the supporting structure by a temporary roof can be significant, and it is therefore imperative that the connection interface and supporting structure are designed to accommodate these loads.

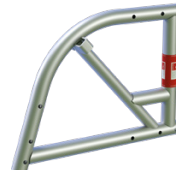
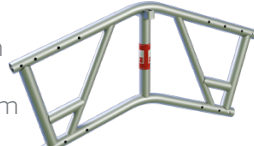
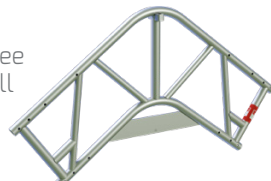
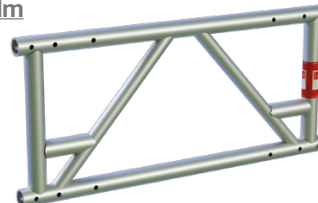







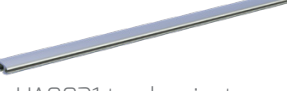
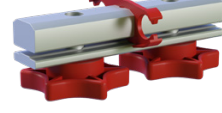




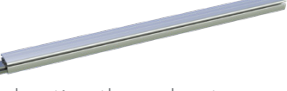
1.0 Part Recognition



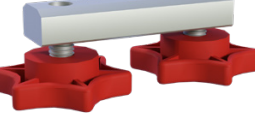

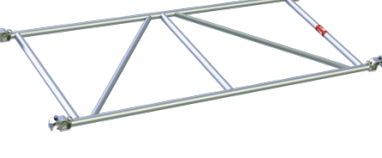

The diagram below provides an overview to the parts that form DESSA UNI Roof. The full parts list and accessories can be found in the UNI Roof catalogue CTG001.




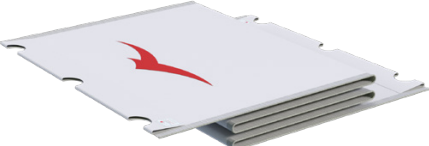



DESCRIPTION	PART No.	WEIGHT (kg)	DIM 1 (m)	DIM 2 (m)
D78 Eaves Beam with support bottom chord, 1m Beam designed to be positioned at the end of a roofing span to provide a more aesthetically pleasing finish, enhanced weather proofing and structural capability. 	BA0218	9.63	1.01	0.96
D78 Eaves Beam with support bottom chord, 2m Beam designed to be positioned at the end of a roofing span to provide a more aesthetically pleasing finish, enhanced weather proofing and structural capability. 	BA0318	18.59	2.01	0.96
D78 Eaves Beam 18 degrees Beam designed to be positioned at the end of a roofing span to provide a more aesthetically pleasing finish and enhanced weather proofing. 	BA0118	9.20	0.96	0.78
D78 Ridge Beam 18 degrees Can be used singularly to form an 18 degree duo pitch roof or can be used in multiples to form perfect dome structures. 	BA0018	7.45	1.28	0.93
D78 Ridge Beam 36 degrees Can be used to form 36 degree duo pitched roofs to cover tall buildings. Can also be used at the eaves to form building structures and shelters. 	BA0036	12.00	1.69	1.17
D78 Aluminium Beam with support bottom chord, 1m Beam support compatible reinforced bottom chord. 	BA0001	9.75	1.00	0.89
D78 Aluminium Beam 	BA1000 BA2000 BA3000 BA4000 BA5000 BA6000	6.34 11.63 16.92 22.21 27.50 32.79	1.00 2.00 3.00 4.00 5.00 6.00	0.78


DESCRIPTION	PART No.	WEIGHT (kg)	DIM 1 (m)	DIM 2 (m)
D45 Eaves Beam 18 degrees Beam designed to be positioned at the end of a roofing span to provide a more aesthetically pleasing finish and enhanced weather proofing. 	BB0118	3.48	0.63	0.45
D45 Ridge Beam 18 Degrees Can be used singularly to form an 18 degree duo pitch roof or can be used in multiples to form perfect dome structures. 	BB0018	6.40	1.28	0.62
D45 Ridge Beam 36 Degrees Can be used to form 36 degree duo pitched roofs to cover tall buildings. Can also be used at the eaves to form building structures and shelters. 	BB0036	9.90	1.69	0.91
D45 Aluminium Beam 1m 	BB1000 BB2000 BB3000 BB4000 BB5000 BB6000 BB8000	5.50 9.52 14.08 18.30 23.21 28.60 36.24	1.00 2.00 3.00 4.00 5.00 6.00 8.00	0.45
Beam Spigot 6HS Used to connect all D78 & D45 beams together. Simply secured in place using quick release pins AF0001 or M12 bolts AF0007. 	B50001	1.49	0.50	ø 38.1mm
UNI Ridge Track for BA0018 and BB0018 Track section for ridge beams BA0018 and BB0018, connected using AF0002 spring pins. Profile allows for simple installation of roof sheets. 	UT0018	2.41	1.31	0.22
UNI Ridge Track for BA0036 and BB0036 Track section for the ridge beam BA0036, connected using AF0002 spring pins. Profile allows for simple installation of roof sheets. 	UT0036	3.62	1.75	0.52
UNI Eaves Track for BA0118 Track section for the eaves beam BA0118, connected using AF0002 spring pins. Profile allows for simple installation of roof sheets. 	UT0218	3.10	1.02	0.84

DESCRIPTION	PART No.	WEIGHT (kg)	DIM 1 (m)	DIM 2 (m)
UNI Eaves Track for BB0118 Track section for the eaves beam BB0118, connected using AF0002 spring pins. Profile allows for simple installation of roof sheets. 	UT0518	2.14	0.68	0.50
UNI Track Special aluminium keder profile supplied in variable lengths and connected using UA0021 track spigot. Provides seamless sheeting throughout the roof length. 	UT1000 UT2000 UT3000 UT4000 UT5000 UT6000	1.80 3.50 5.30 7.10 8.90 10.60	1.00 2.00 3.00 4.00 5.00 6.00	0.03
UNI Alloy Spigot including Gasket Ensures unrivalled joint stability between track lengths and provides an effective seal between adjacent track lengths. 	UA0021	0.26	0.14	0.04
DeepFlow™ Ridge Track for BA0018 and BB0018 Special aluminium keder profile. Provides seamless sheeting throughout the roof length. Higher profile section and spigot placement provide advanced weatherproofing. 	US0018	3.88	1.33	0.24
DeepFlow™ Ridge Track for BA0036 and BB0036 Special aluminium keder profile. Provides seamless sheeting throughout the roof length. Higher profile section and spigot placement provide advanced weatherproofing. 	US0036	5.97	1.78	0.59
DeepFlow™ Track Eaves Track for BA0118 Connected using AF0002 spring pins. Profile allows for simple installation of roof sheets. Higher profile section and spigot placement provide advanced weatherproofing. 	US0218	4.56	1.03	0.85
DeepFlow™ Track Eaves Track for BB0118 Connected using AF0002 spring pins. Profile allows for simple installation of roof sheets. Higher profile section and spigot placement provide advanced weatherproofing. 	US0518	3.08	0.52	0.72
DeepFlow™ Track Special aluminium keder profile supplied in various lengths. Provides seamless sheeting throughout the roof length. Higher profile section and spigot placement provide advanced weatherproofing. 	US1000 US2000 US3000 US4000 US5000 US6000	2.65 5.23 7.82 10.44 13.00 15.60	1.00 2.00 3.00 4.00 5.00 6.00	0.04

DESCRIPTION	PART No.	WEIGHT (kg)	DIM 1 (m)	DIM 2 (m)
DeepFlow™ Track End Piece  Special end piece colour coded for easy recognition on site. Required at eaves when used in conjunction with track compressors and at staggered bays.	US0001	2.58	1.00	0.04
DeepFlow™ Spigoted Track End Piece  Special end piece colour coded for easy recognition on site. Required at top end of monopitch roofs when used in conjunction with track compressors.	US0002	2.6	1.02	0.04
DeepFlow™ Alloy Spigot Connects DeepFlow tracks together, ensuring safety and limiting loads. 	UA0035	0.54	0.10	0.04
Plastic keder Profile Plastic profile for connecting roof sheets keder-to-keder. Available in lengths of 3m to be cut down to the desired lengths. 	Z00073	1.74	3.00	0.07
UNI Frame Fitted to the roof beam chords to provide stiffness and structural integrity, each corner is fitted with a special tracking button that is used to secure sheet tracking in place when required. 	UK1000 UK1088 UK1500 UK1572 UK2000 UK2072 UK2500 UK2572 UK3000 UK3072	7.80 8.00 8.94 9.09 11.08 11.22 12.30 12.47 13.61 13.76	1.00 1.09 1.50 1.57 2.00 2.07 2.50 2.57 3.00 3.07	1.00
UNI Horizontal Brace  Single horizontal brace used for top and bottom chord lacing and connection of infill bays. A special coloured button is fitted to each end to enable identification and keder sheet tracking to be installed where required.	UH0300 UH0390 UH1000 UH1088 UH1500 UH1572 UH2000 UH2072 UH2500 UH2572 UH3000 UH3072	1.41 1.47 2.14 2.21 2.64 2.71 3.15 3.22 3.66 3.73 4.17 4.24	0.30 0.39 1.00 1.09 1.50 1.57 2.00 2.07 2.50 2.57 3.00 3.07	0.10

DESCRIPTION	PART No.	WEIGHT (kg)	DIM 1 (m)	DIM 2 (m)
UNI Diagonal Brace D78  Connects to the top and bottom chords of adjacent beam lines to ensure frame stability.	UD1669 UD1734 UD2130 UD2198 UD2605 UD2674 UD3088 UD3158	2.65 2.75 3.34 3.44 3.85 3.94 4.36 4.44	1.50 1.57 2.00 2.07 2.50 2.57 3.00 3.07	0.73
UNI Diagonal Brace D45  Connects to the top and bottom chords of adjacent beam lines to ensure frame stability.	UD1552 UD1622 UD2040 UD2110 UD2532 UD2603 UD3027 UD3098	2.46 2.57 3.24 3.35 3.74 3.85 4.27 4.37	1.50 1.57 2.00 2.07 2.50 2.57 3.00 3.07	0.40
UNI Roller Brace  Non-structural element used at changes in sheeting direction ensures even tension is applied to the sheets when tensioned. Connects into track compressor, intermediate roller brace coupler or directly to eaves and ridge beams.	UR0300 UR0390 UR1000 UR1088 UR1500 UR1572 UR2000 UR2072 UR2500 UR2572 UR3000 UR3072	1.98 2.37 5.04 5.42 7.22 7.54 9.41 9.72 11.59 11.91 13.78 14.09	0.30 0.39 1.00 1.09 1.50 1.57 2.00 2.07 2.50 2.57 3.00 3.07	0.13
Plas™ Sheet  Flame retardant heavy duty 610gsm sheets with 8mm keder to suit installation into UNI tracks ensuring complete weather protection.	CA01XX CA02XX CA03XX CA04XX CB01XX CB02XX CB03XX CB04XX	610g/m ²	10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0	2.07 2.57 3.07 1.57 1.50 2.00 2.50 3.00
Gable Sheet 610gsm Optional gable sheet used to close each gable end and for improved weather protection. Can be ordered with lugs and eyes or perimeter keder track.	CA0001	0.61	1.00	1.00
Additional Sheet Pocket  One or several additional pockets can be added to provide flexibility and utilisation of roof sheets, additional sheet pockets enable sheets to be used on several different spans and ensure tensioning positions are always correct.	CA0002	0.44	DOA	0.21

DESCRIPTION	PART No.	WEIGHT (kg)	DIM 1 (m)	DIM 2 (m)
UNI Sheet Tensioning Bar  Special length tubes to be used in the ends of each roof sheet to enable connection of installation aids. Tensioning is also used to form a continuous tube at the eaves for sheet termination. Colour coded appropriate to relevant bay size.	UB0300 UB0390 UB1000 UB1088 UB1500 UB1572 UB2000 UB2072 UB2500 UB2572 UB3000 UB3072	0.79 1.11 3.38 3.69 5.25 5.68 7.12 7.39 8.96 9.26 10.86 11.13	0.30 0.39 1.00 1.09 1.50 1.57 2.00 2.07 2.50 2.57 3.00 3.07	ø 48.3mm
Ratchet Straps 460kg SWL Enables sheets to be tensioned and to be connected to the scaffold structure.	AR0001	0.48	2.00	35mm
UNI Track Compressor Installed at beam ends of each span and secured using AF0001 spring pin. Maintains track compression and allows installation of roller braces.	UA0005	1.55	0.29	0.22
Detachable Sheet Pulling Wheel Fitted to the sheet tensioning bar ends. Nylon wheels locate over the track to enable ease of sheet installation. Removed after sheet installation.	UA0025	1.51	0.26	ø 80mm (wheel)
Eaves Offset Tube Connector w/ Spigot Steel component that provides a consistent tensioning point or rubbing pole for roof sheet. Secured into 48.3mm dia tube.	UA0016	2.32	0.38	0.22
Eaves Offset Tube Connector w/ Sleeve Steel component that provides a consistent tensioning point or rubbing pole for roof sheet. Inserted over beam spigot or base jack.	UA0017	2.08	0.38	0.12
Eaves continuous tube connector Steel component that provides a consistent tensioning point for roof sheet. Secured into 48.3mm dia tube.	UA0027	2.00	0.38	0.20

DESCRIPTION	PART No.	WEIGHT (kg)	DIM 1 (m)	DIM 2 (m)
Tie Tube Connection Plate 18 Degrees Connection plates used in pairs at beam joints to ensure that loads from the tie bar are introduced at a structurally optimal location. 	UU0018	1.79	0.59	0.15
Tie Tube End Piece 18 Degrees D78 End connector for the tubular tie bar. Connects to the connection plates using AF0004 30mm locking pins. 	UU7818	11.38	2.99	0.08
Tie Tube End Piece 18 Degrees D45 End connector for the tubular tie bar. Connects to the connection plates using AF0004 30mm locking pins. 	UU4518	5.04	1.19	0.08
Tubular Tie Bar Tie bar in three lengths enabling all spans to be achieved, connected using BS0001 spigots and quick release pins AF0001. 	UU0218 UU0318 UU0618	7.11 10.66 21.32	1.90 2.85 5.71	0.05
Quick Release Pin M12 x 60 for round tube A direct replacement for a nut and bolt, enables rapid assembly of beam spans. 	AF0001	0.07	66mm	ø 12mm
Quick Release Pin M12 x 70 for UNI Track To connect ridge and eaves sheet tracks to ridge and eaves beams. 	AF0002	0.10	82mm	ø 12mm
Locking Pin 30mm High capacity connecting pin used to connect tie bars and support components. 	AF0004	0.55	112.5mm	ø 30mm

DESCRIPTION	PART No.	WEIGHT (kg)	DIM 1 (m)	DIM 2 (m)
Linch pin 6mm Used in conjunction with AF0004. 	AF0039	0.02	53.5mm	ø 6mm
Hex Bolt BZP G8.8 Steel M12 x 90 High capacity bolt used to connect roof tie bar end plates UU0018 to beam joints. 	AF0006	0.09	97.5mm	ø 12mm
Hex Lock Nut BZP G8.8 Steel M12 For use in conjunction with M12 bolts. 	AF0021	0.05	19.0mm	ø 12mm

2.0 Pre-Installation and Safety Considerations

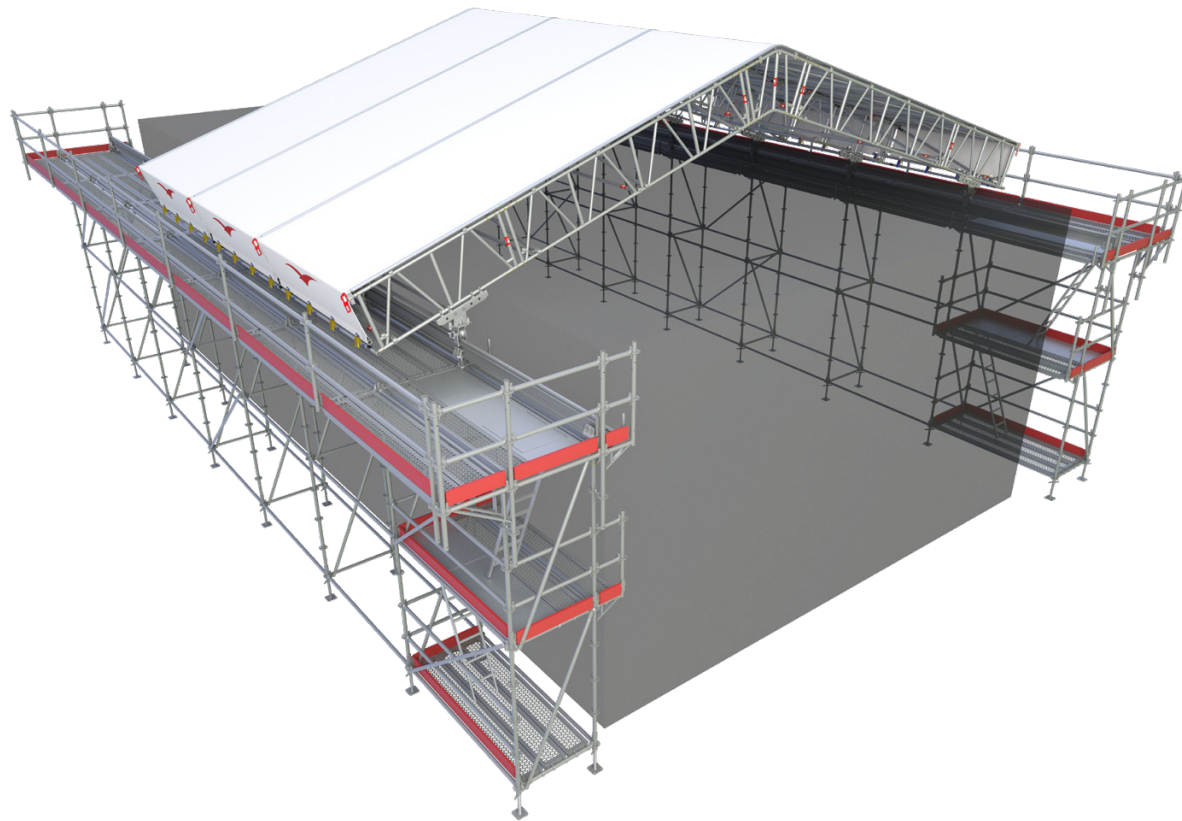
2.1 Handling of Components

The Management of Health and Safety at Work Regulations 1999 require employers to make a "suitable and sufficient assessment" of the risks to the health and safety of their employees whilst at work. As such, the Manual Handling Operations Regulations 1992 must be adhered to, along with SG9 "Manual Handling in the Scaffolding Industry". In addition to the above, the Construction (Design and Management) Regulations (CDM) make specific reference to manual handling as a consideration in the design process by Architects, Design Engineers and employers.

In light of the above, DESSA has taken pro-active measures to ensure that our UNI Roof components are made from the lightest materials without compromising structural stability. The individual product weights demonstrate DESSA's commitment to ensuring no single product presents significant manual handling issues.

2.2 Materials

All UNI Roof components have been extensively tested and modelled in exceptional weather / environmental conditions. If there are additional risks for the structure, DESSA's technical department should be contacted. Typical examples of this may include a high saline or chemical content in the atmosphere.



2.3 Risk Assessments and Method Statements

Risk Assessments and Method Statements (RAMS) must be produced by a competent person detailing the method of installation and the risks associated with such activities.

In all instances, the scaffold or supporting structure must be designed by a competent Engineer to ensure structural stability. Consideration must be made for a safe working method to efficiently rescue operatives suspended by fall arrest equipment as a result of a fall from height. Personnel should be fully trained to use the required rescue equipment in the event of a casualty suspended at height.

2.4 Construction Methods

When constructing a roof using the UNI roof system, all operatives must closely follow the guidelines and local regulations. Suitable fall arrest equipment must be worn by all working operatives during the installation process. Ideally this will be a minimum of: a harness with a twin tailed energy absorbing lanyard, with a common energy absorber.

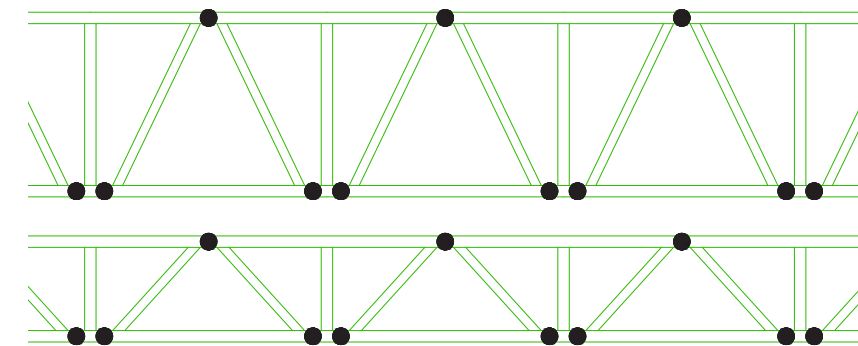
A safe working method should be planned and instigated, with reference to all the required activities during the construction process.

2.5 Safe locations to secure fall prevention equipment

Knowing where to attach to the UNI roof beams is critical when completing work at height in a safe way. On both the D78 and D45 aluminium beams, the safe connection locations are on the top chord between the diagonals, and the bottom chord between the diagonals and the posts. In an ideal situation, safety harnesses would be clipped to the chord in tension, generally this is the bottom chord when beams are subject solely to their own self-weight during erection.

Any operatives climbing a roof truss must, at minimum, follow local/national guidelines for fall mitigation.

Suitable harness connection locations for fall prevention equipment:



2.6 Supporting Structure

It is essential that all UNI Roof structures are supported on a solid structure, whether this be an access scaffold, or directly on the ground; the UNI Roof will only be as stable as the structure it is supported from. In all instances, a Design Engineer must be consulted to calculate the loads the supporting structure will need to withstand as well as the loads to be imparted to the ground or restraining structure.

2.7 Ground Conditions

In addition to the scaffold interface, the ground conditions under a supporting structure are critical in ensuring its overall stability and its subsequent ability to support the loads generated from the temporary structure. Reactions at ground level are to be verified by a competent Engineer.

2.8 Overhead Electricity

Extreme caution should be taken when installing the UNI Roof system near overhead power lines. The method statement and risk assessment accompanying the design documents should cover this aspect of the installation.

2.9 Adverse Weather

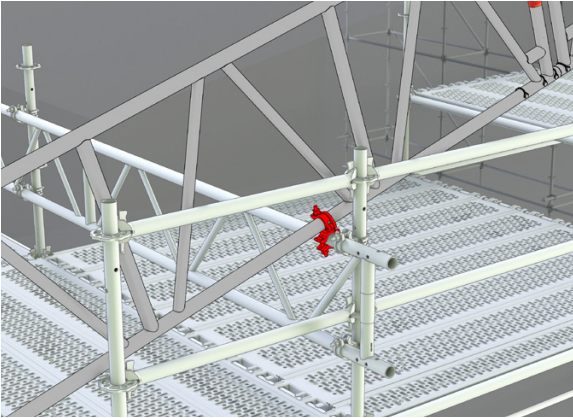
The structure must be inspected for integrity following adverse weather. An Engineer will stipulate the snow load class that the temporary roof has been designed for and this inspection should cover sheeting, braces, connections, ballast and anchorages. Any lost/damaged item should be repaired or replaced immediately.



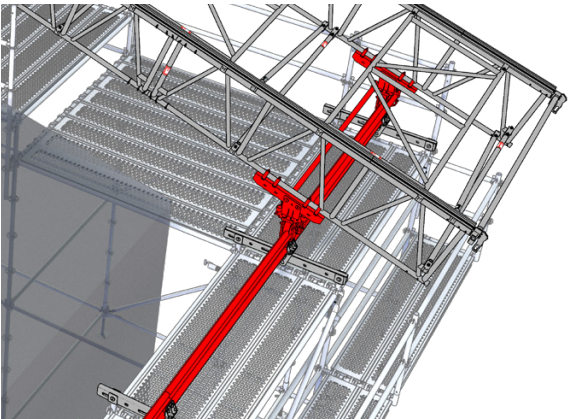
2.10 Scaffold Interface

It is essential that all UNI Roof structures are connected effectively and efficiently with the supporting structure. There are several ways to achieve this as shown below (this is not an exhaustive list of options):

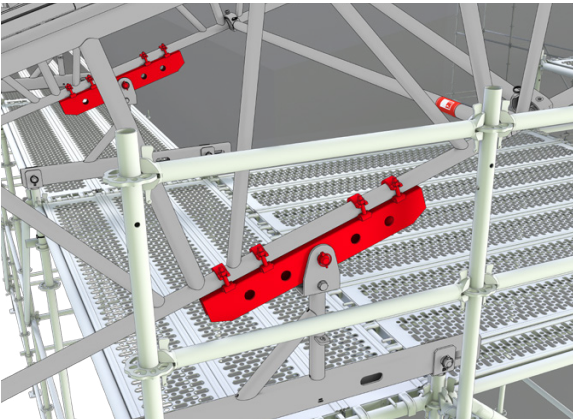
- Header Beam



- DESSA Trax Systems



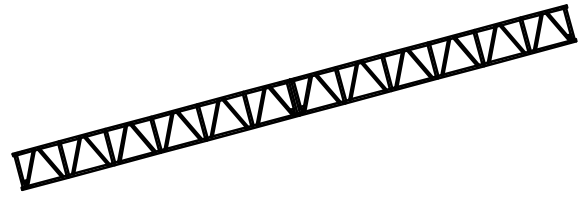
- DESSA Beam Support Assembly



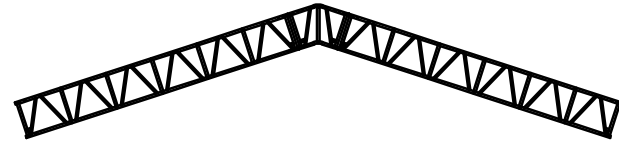
2.11 Choosing The Appropriate Span Type

UNI Roof can be configured in various span arrangements as shown below:

1 Monopitch

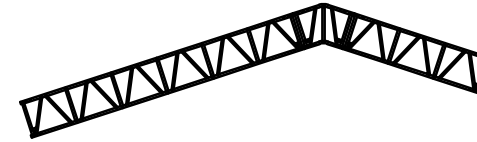


2 Duopitch 18



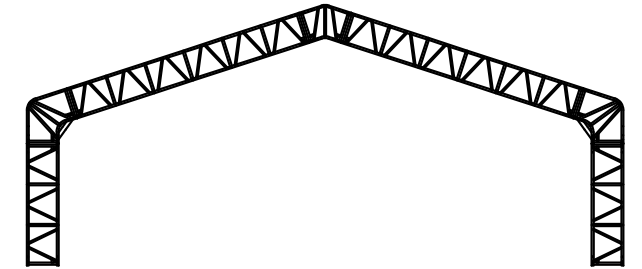
Asymmetric

5

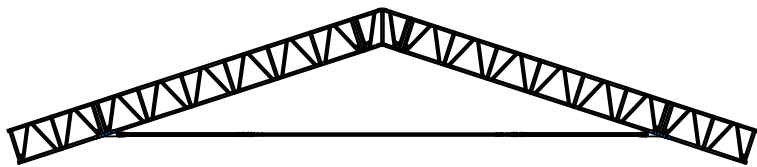


Shelter

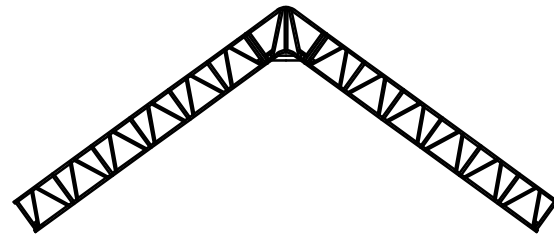
6



3 Duopitch with Tie Bar

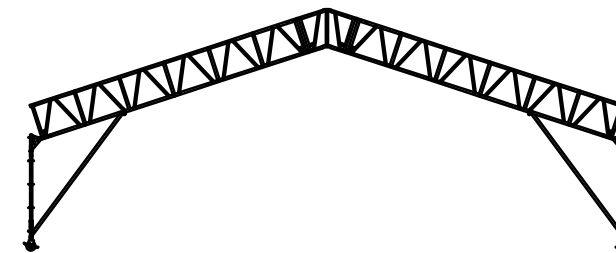


4 Duopitch 36



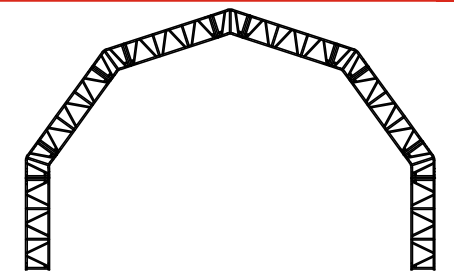
UNI Shelter

7



Dome

8



2.11.1 Monopitch

Generally suited to shorter spans and small buildings, Monopitch roofs have an optimal pitch angle of 15 degrees. No Monopitch should be pitched at less than 10 degrees. Below 15 degrees and greater than 15m length we recommend that DeepFlow™ tracking is fitted to enhance protection. Eaves beams can be installed at both ends of the Monopitch span to provide increased weather protection at each end.

2.11.2 Duopitch

Erected using standard DESSA ridge beams, the most frequently used span type within the DESSA offering. Suitable for a variety of applications.

2.11.3 Duopitch with Tie Bar

For larger spans and increased loading applications, the DESSA systemised tie bar can be fitted to the bottom chord of a duo pitch roof. This assists in reducing the horizontal loading on the scaffold and stops the roof beams from over-deflecting under heavy load. The DESSA tie bar system can also be braced to provide effective compressive capacity in the presence of high wind uplift such as for canopy roofs.

2.11.4 Duopitch 36

Erected using the DESSA 36 degree ridge beam, this span type is ideal for coverage of steep pitched buildings. This span type will reduce the amount of scaffold required to support the temporary roof. Typically this could be anywhere between 1 - 4 2m lifts, depending on site conditions.

2.11.5 Asymmetric

This span type allows an offset ridge to clear low level obstructions and installation of staggered bay roofs. A typical example is "L" or "H" shaped buildings. The main span on this type of building would be symmetrical, with the narrower spans being asymmetrical. DESSA intermediate roller brace couplers are used at the location of stagger.

2.11.6 Shelter

Time saving and practical solution for temporary coverages, this span type utilises DESSA beams as sidewalls which are braced using the same roofing elements. 36 degree ridge beams are fitted at the eaves of the shelter to provide the sidewalls. Shelters can be erected on the ground, static or mobile. Alternatively shelters can be erected from a scaffold to reduce the number of lifts of scaffold untied, ideal for mansard or dormer type roofs.

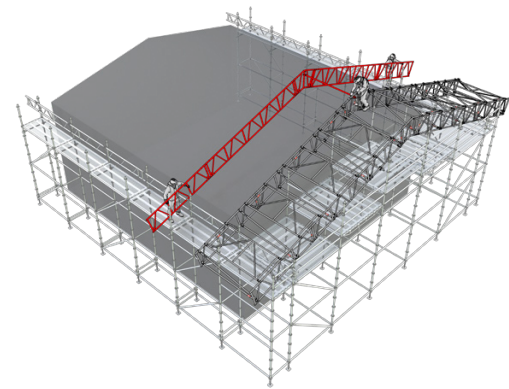
2.11.7 UNI Shelter

Lightweight, smaller spanning shelter for frequent movement utilising the DESSA UNI Shelter bracket and Altrad system scaffolding. Simple sidewalls are formed using standards, ledgers, braces and scaffold castors. Roof sheeting can be extended down the sidewalls. Mobile ballast units or temporary ground anchors need to be fitted when in the static state.

2.11.8 Dome

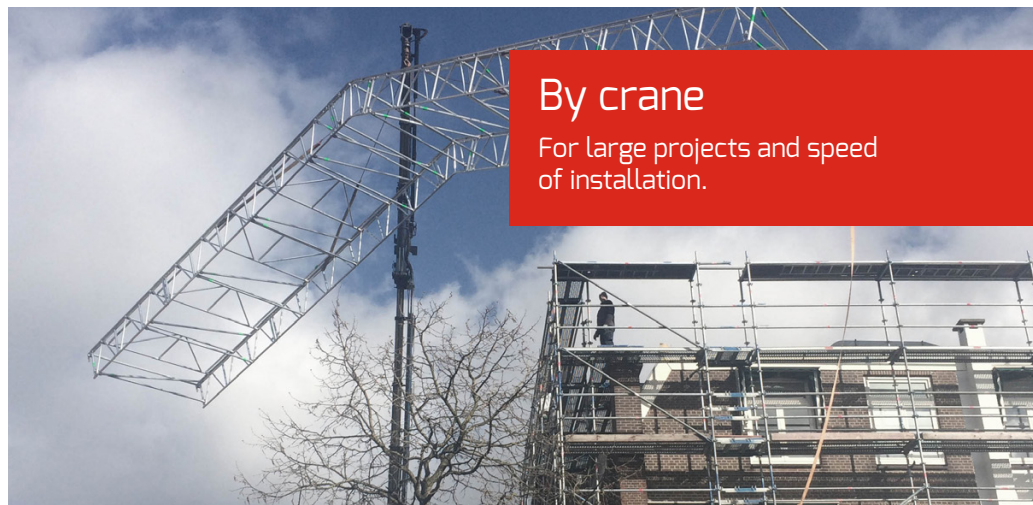
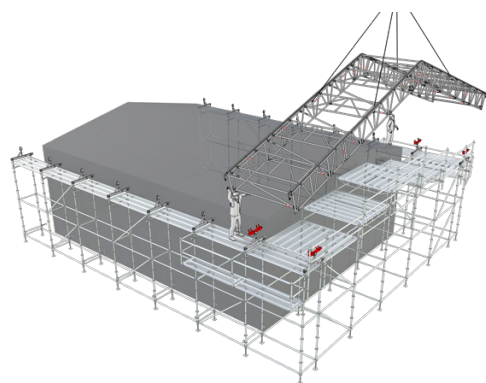
By utilising 5no. 18 degree ridge beams and straight beams, domes can be formed. These are large spanning and large load bearing assemblies ideal for events based structures or mansard/ dormer type roofs.

2.12 Installation Method Considerations



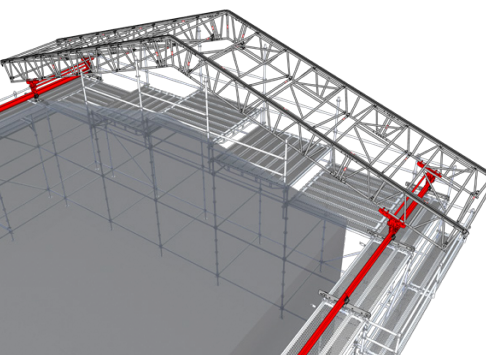
By hand

For restricted access and small projects.



By crane

For large projects and speed of installation.



By rollout

For any size project and to minimise work at height.

2.12.1 General

There are three main erection methods for UNI Roof; by hand, by crane, by rollout. The method of erection should be planned around many factors such as site conditions, working space, limited access areas, time constraints and operational capability. The method should be planned in conjunction with the scaffold design/erection and the support scaffold must be fully prepared to receive the temporary roof prior to the commencement of roof installation.

When building the UNI Roof system, it is important to ensure braced bays are constructed correctly for stability. You must always start and end a UNI Roof with a braced bay.

A braced bay consists of UNI frames spaced at 2m c/c (effective 1m c/c), UNI diagonals at 2m c/c, and UNI horizontal braces at 2m c/c on the bottom chord adjacent to each diagonal.

2.12.2 By Hand

Building UNI Roof by hand involves considerable working at height but is sometimes the only option available. This could be due to several factors; restricted access for crane installation, no scope for rollout or being the preferred method due to small size and manageable spans. Typically 1 bay in each 5 would be fully braced.

2.12.3 By Crane

Installing the UNI Roof with a crane reduces work at height and allows quick installation. Fully braced bays are built in a designated area near the supporting structure and are lifted into place. The infill bay bracing equipment can be loaded onto the braced bays, minimising material to be raised by hand. Crane lifted roofs are braced every other bay.

When crane lifting a roof, it is important to sling from the correct locations to prevent damage occurring to the beams and to control deflections. See Section 9 for technical information regarding sling locations and lifting procedures.

2.12.4 By Rollout

A sysTRAX™/TRAX UB

Ideal for roofs requiring regular opening and closing for access, sysTRAX™ is a fully modular track system to suit system scaffolding. TRAX UB is a universal track system requiring intermediate transoms for support. The rollout method eliminates work at height, bays are built from the safety of a gable end scaffold and extended out over the scaffold as work progresses. This method enables rapid installation. sysTRAX™ and TRAX UB have fully integrated anti-uplift brackets ensuring built in safety.

B TRAX Tube Holder

TRAX Tube Holder provides a simple solution to moving complete bays, utilising existing tube and fitting stock. No anti uplift restraint is provided. Once the bays are in position, they are secured to the supporting structure using tubes and couplers.

2.13 Support Options

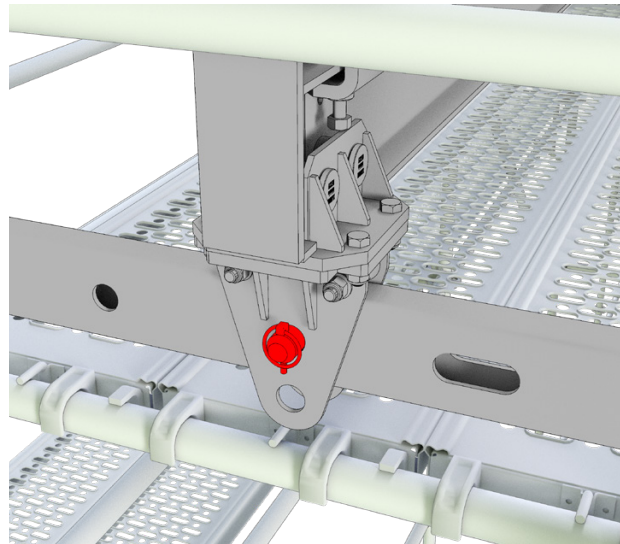
2.13.1 Sliding Support Assembly

Utilising sysTRAX™, a roof can be mounted in either a **Fixed-Fixed** or **Fixed-Free** manner. Fixing one side of the roof and allowing the opposite support to slide will reduce the lateral loads exerted on the support scaffold. Only **Fixed-Fixed** or **Fixed-Free** are permissible configurations. It is **not** permissible to install as **Free-Free**.

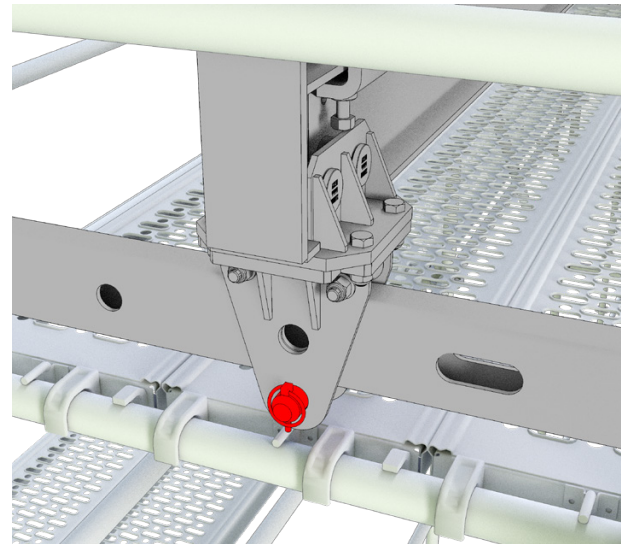
Fixed: secured through the central hole of sliding assembly and bearer, providing horizontal and vertical restraint.

Free: secured through the lower hole of sliding assembly and underneath bearer, providing vertical restraint only.

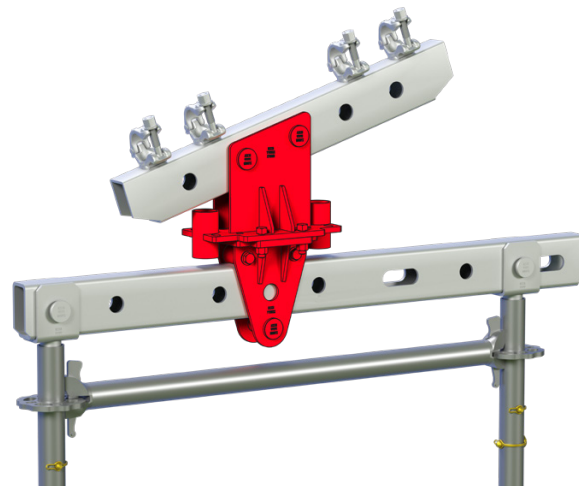
FIXED



FREE

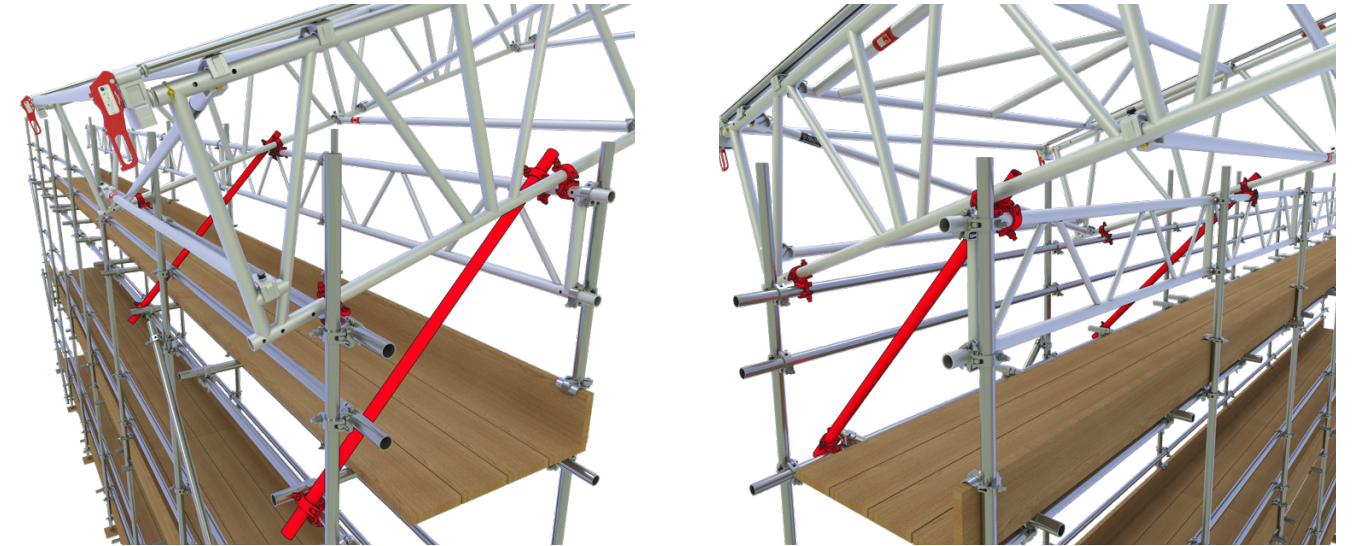


Alternatively for crane built roofs, the sysTRAX™ sliding support can be utilised in conjunction with castor top plates to enable **Fixed-Fixed** or **Fixed-Free** support types in line with the supporting structure method below:



2.13.2 Tubes and Couplers

In typical hand or crane build scenarios, the roof is landed on a header beam attached to the scaffold. This allows for transfer of loads from the roof into the scaffold and creates a strong physical connection, preventing uplift. DESSA recommends installing the header beam on the inside standard whilst running a continuous tube along the outside standard, both of which must be secured to the roof truss. Diagonal bracing should also be installed running from the top chord of the header beam down to the next available ledger.

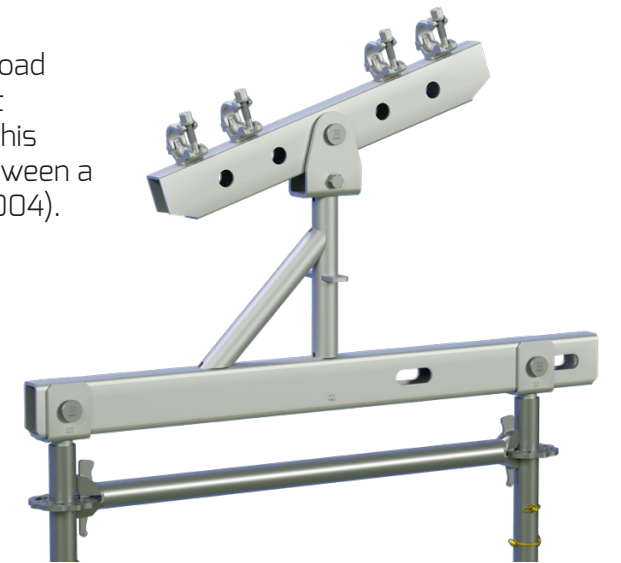


2.13.3 Beam Support Assembly

Beam Support Assembly (TA0001) provides an easy-to-use roof support solution for all system scaffold widths. The assembly has a range of potential system sizes ranging from 700mm to 1088mm, allowing for compatibility with most system sizes.

The assembly is installed with a roof support bearer (UA0011), allowing for fixed connections and a direct load path to the standards. Alternatively the beam support assembly can be fitted without a beam connector, in this instance the bottom chord of the beam is secured between a nylon roller in the U-head and the 30mm bullet (AF0004).

The beam support assembly (TA0001) is fixed to the standard using a U-head adapter (TA0002, TA0003, TA0006) which are pinned or bolted into position. The beam support assembly is fixed using 2no. 30mm bullet (AF0004) and linch pin (AF0039).



3.0 Basic Assembly Procedures

Throughout the following section QR codes are displayed adjacent to each assembly step. Scanning these tags with a mobile device will open a short video guide on the DESSA YouTube channel.

3.1 Tools Required

The unique point of the UNI Roof is that no tools are required to assemble it but the following tool can be useful during assembly:

- A scaffold spanner, or hammer/podger, with a spike at one end. This is particularly useful when lining-up spigots with corresponding beam holes and the installation of the spring clips or bolts

It is important to remember that all components have been designed and manufactured to fit in the locations highlighted in this User Guide. If, for whatever reason, a component does not fit then there are two probable causes:

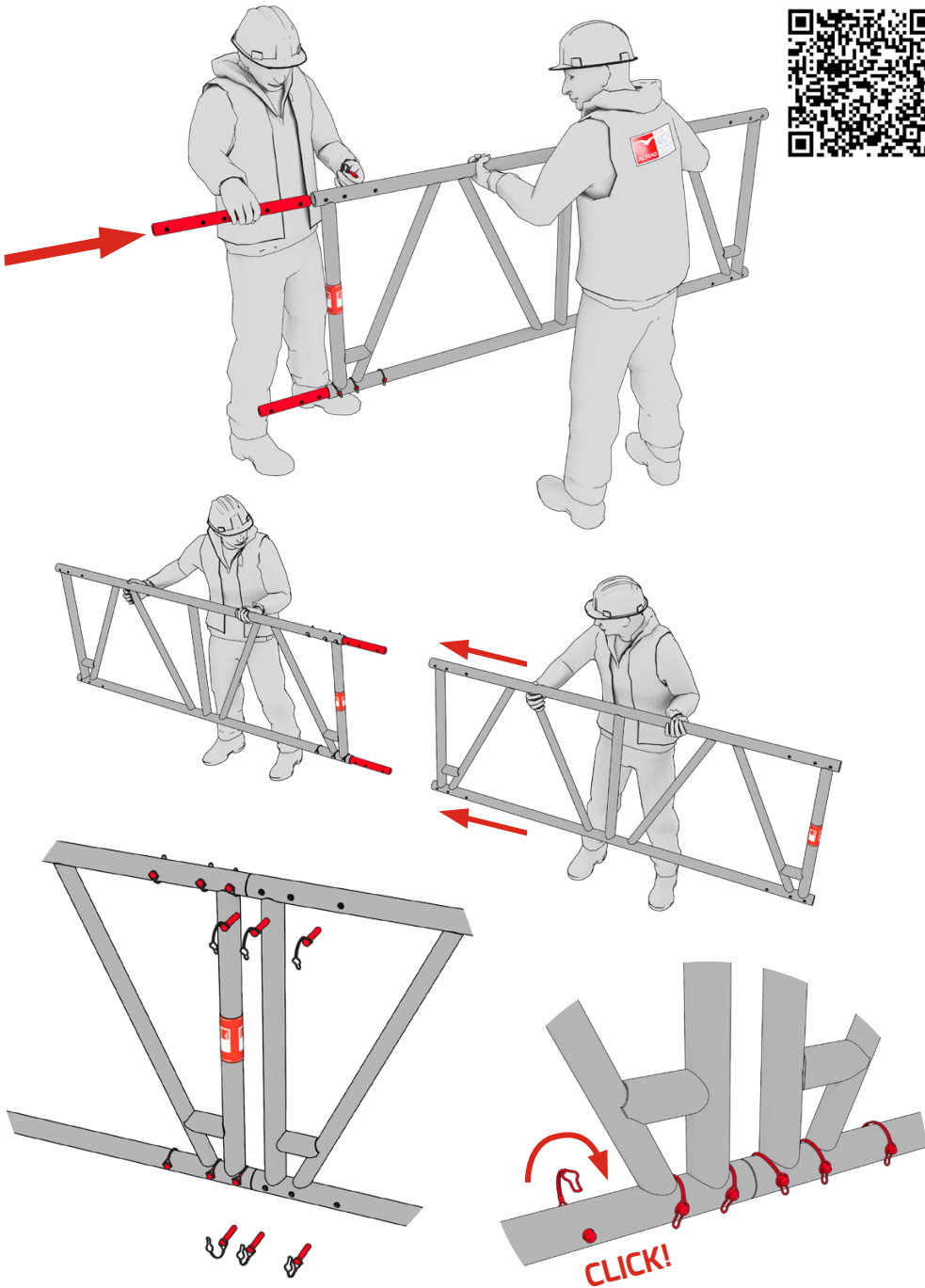
- The component is the incorrect size for the intended application
- The component is not true or level. If this is the case then agitating the component slightly will determine where the true location should be

Under no circumstances should the components be struck with a hammer. This will cause damage and possibly render the component un-usable.

3.2 Connecting Beams

All beams should be connected together using DESSA beam spigots (BS0001) with either DESSA quick release pins (AF0001) or M12x60 bolts (AF0007) and M12 nuts (AF0021), or a combination of the two fixing types in accordance with the diagrams below.

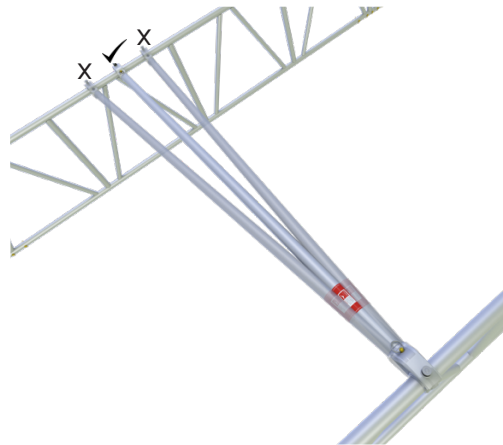
NOTE – Minimum of 6 pins or nuts to be used for each joint to achieve full beam capacity.



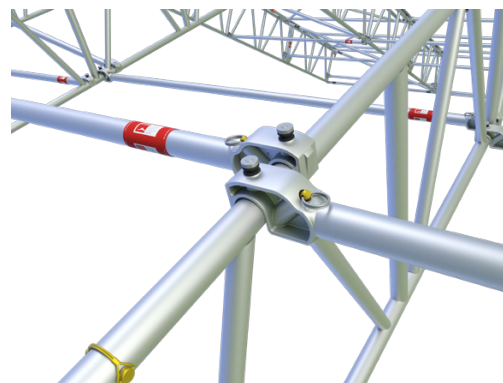
3.3 Attaching Braces

All braces are connected by push fit. Ensure that the braces are held at 90 degrees to the beam line prior to installation. To find this position connect the brace on one side only, hold the loose end and move up slope until the engaged claw bites against the beam, then move downslope until the engaged claw bites against the beam. Half way between these two bite points will be the 90 degree position and the claw will engage freely with no resistance.

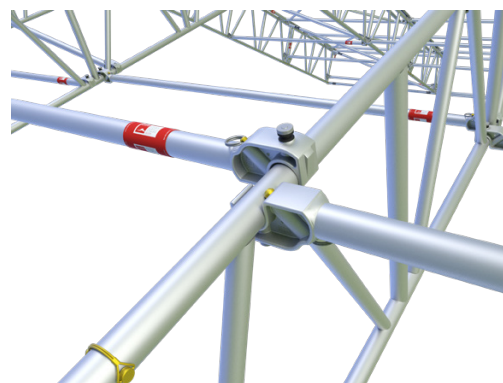
NOTE – If the claw has to be forced onto the beam chord then it is not square. Release and find the correct position.



Braces should be installed to the beam chords with the button nuts facing upwards to receive the sheet tracking. These will be at nominal 1m c/c when installing top chord bracing and at 2m c/c when installing bottom chord bracing.

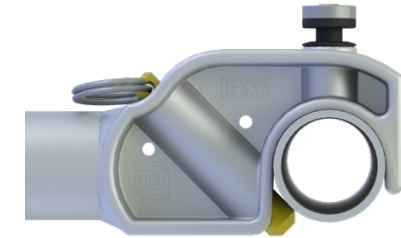


Where braces are required to link pre-sheeted bays or require later removal, these can be fitted to the underside of the top chord with the button nuts facing downwards. This should be verified by a competent Engineer as in some high load applications, adjacent pairs of button nuts may be required to support the track.



On the top chord, braces should be installed between the beam diagonals or upslope of a post or diagonal connection. On the bottom chord, braces should be installed as close to as possible and upslope of a diagonal or post connection.

The following image shows the steel latch pin of the claw fully extended so that the ring pull is in contact with the claw extrusion. Some agitation on the pin head/ring pull may be necessary to ensure the ring pull sits down as shown.



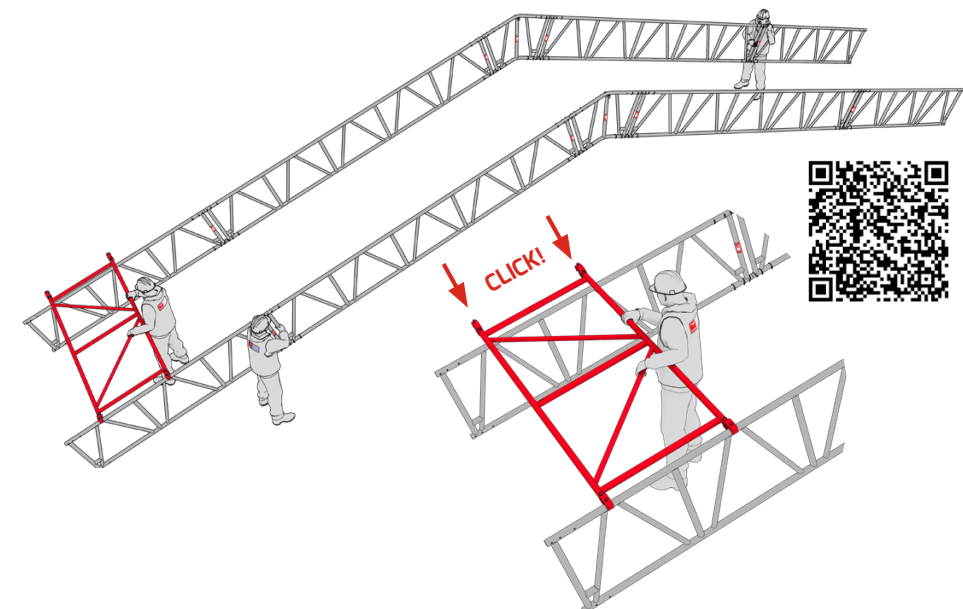
NOTE - Failure of this pin to engage is a clear indication that the brace is not square to the beam and should be realigned. It is not necessary to use a hammer to fit braces. If aligned correctly they will engage into position with ease.

3.3.1 Brace Frames

All brace frames are connected on the top chord of the truss between the diagonal braces. This prevents any lateral movement.

Ensure claws are correctly seated and fully engaged onto the top chord of one beam line only. Lower the brace frame to the second beam line and adjust the beam line position to ensure identical locations prior to connection to the second truss.

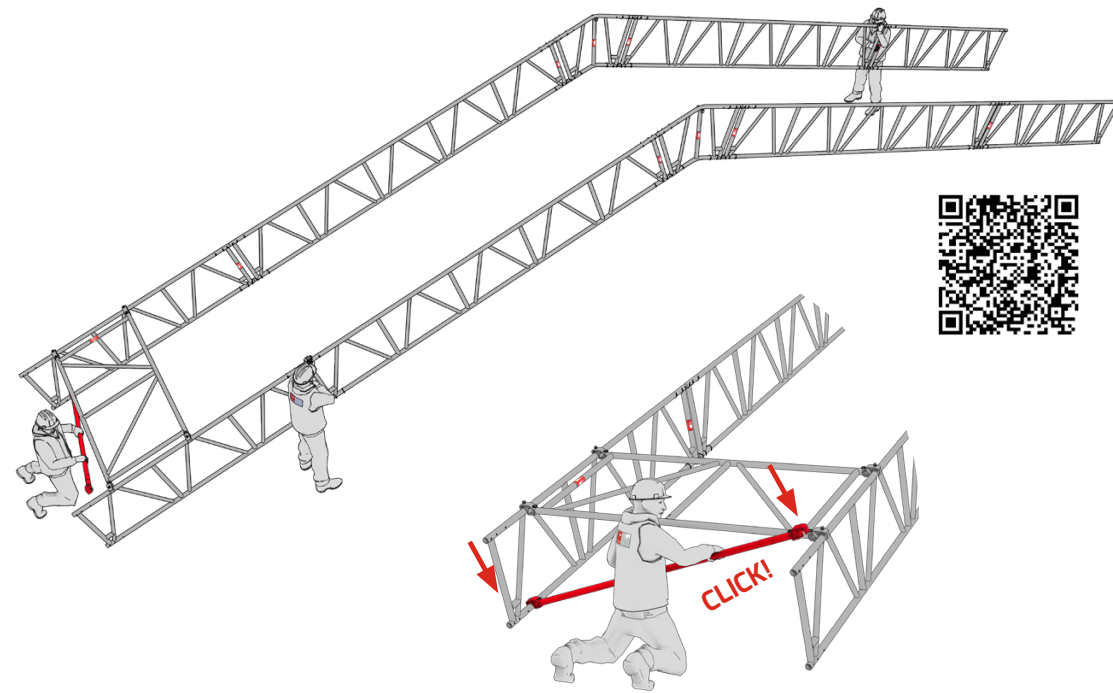
NOTE - Brace frames may need to be agitated slightly to ensure that the claw pins are engaged fully.



3.3.2 Diagonal Braces

Diagonal braces should be installed between each brace frame at 2m centres. One end of the brace attaches to the bottom chord and the opposite end attaches to the top chord of two adjacent beam lines.

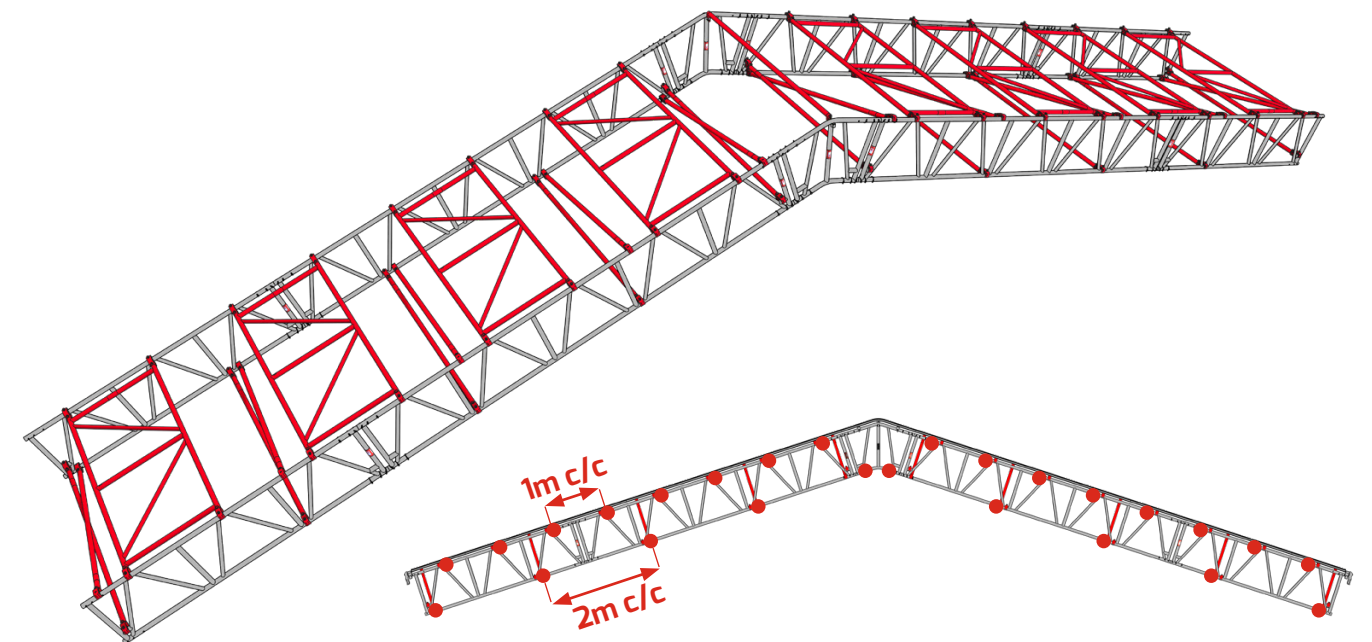
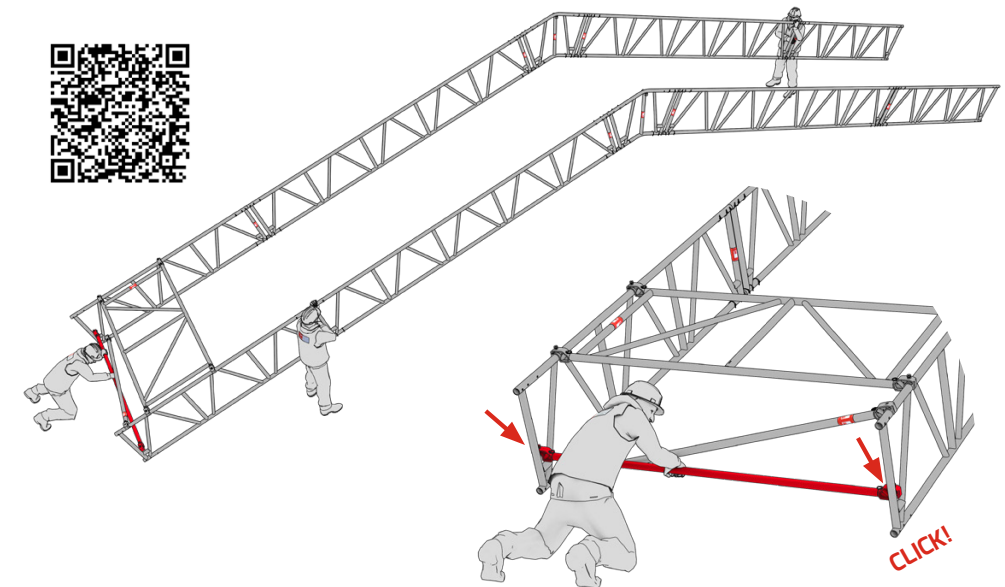
Diagonal braces should be located upslope of the beam posts. Diagonal braces are not fitted with button nuts and feature a black identification label.



3.3.3 Horizontal Braces

Horizontal braces are used to link adjacent beams laterally and are used on both the top and bottom chords of the beam. The horizontal brace claws are fitted with two part button nut assemblies that allow keder track sheeting profiles to be installed.

Ensure one claw is correctly seated and fully engaged onto the chord (or on the stiffener located at the end of each beam). Lower the brace and connect it to the second truss at right angles, ensuring the claw engages.



3.4 Bracing Patterns

A braced bay consists of brace frames at 2m c/c (1m c/c effective) with diagonal and horizontal braces at 2m c/c from the bottom chord.

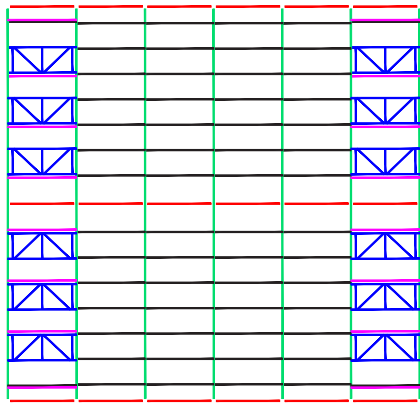
An infill bay will consist of only horizontal braces at 1m c/c on the top chord and at 2m c/c on the bottom chord.

The bracing pattern used for the roofing application will depend on the build method chosen for the erection of the braced bays.

NOTE - All roofs must start and end with a braced bay.

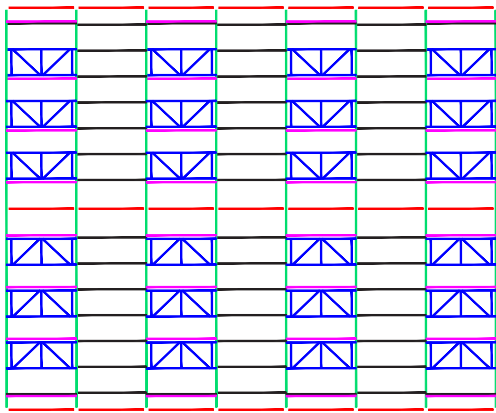
3.4.1 By Hand - 1 in 5

Every fifth intermediate bay is a braced bay with up to 4no. infill bays between.



3.4.2 By Crane - 1 in 2

Every second intermediate bay is a braced bay with 1no. infill bay between.



3.4.3 By Rollout

If the roof is being constructed by hand from a gable scaffold, a hand build bracing pattern can be used. Every fifth intermediate bay is a braced bay with up to 4no. infill bays between.

If the roof bay is being built on the ground and lifted up to the runway, then a crane build bracing pattern must be used. Every second intermediate bay is a braced bay with only 1no. infill bay between.

3.5 Installing Sheet Tracking

DESSA sheet tracking is used to house and secure the PVC roof sheets and to prevent water ingress into the structure below. DESSA offers two sheet tracking styles - original (UT Series) and DeepFlow™ (US Series).

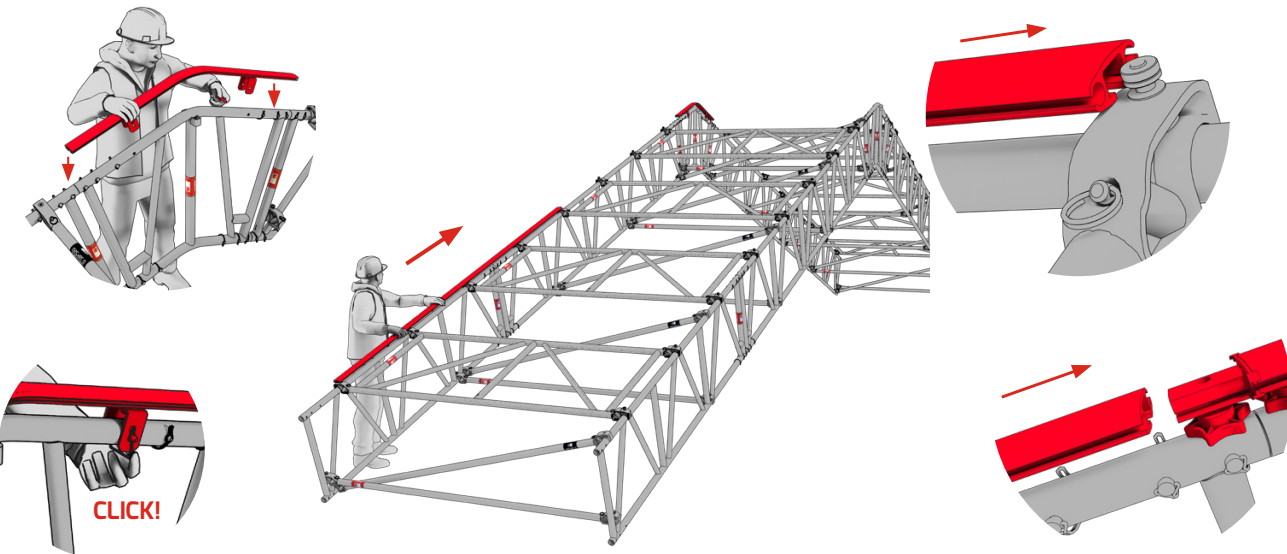
DeepFlow™ tracking offers unrivalled levels of weather protection by virtue of its integrated drainage channels and spigot end connection. We recommend DeepFlow™ for all roof types as water security is ensured irrespective of roof slope, wind induced movements and rainfall intensity.

Sheet tracks are installed from the eaves upwards and tracking is installed by sliding over a button nut on the top of horizontal braces or brace frames. Track lengths are connected using alloy tracking spigots, for roofs not using eaves beams a track compressor is used to compress the tracking and ensure all gaps remain sealed as the roof flexes under the influence of environmental loads.

3.5.1 Original Tracking (UT Series)

DESSA original tracking uses a shallow profile that requires the use of a spigot complete with rubber gasket at each joint to ensure a seal to prevent water ingress.

Install the ridge track on the ridge beam. Slide lengths of tracking up over the button nuts, joining the lengths together using the required tracking spigot (UA0021).

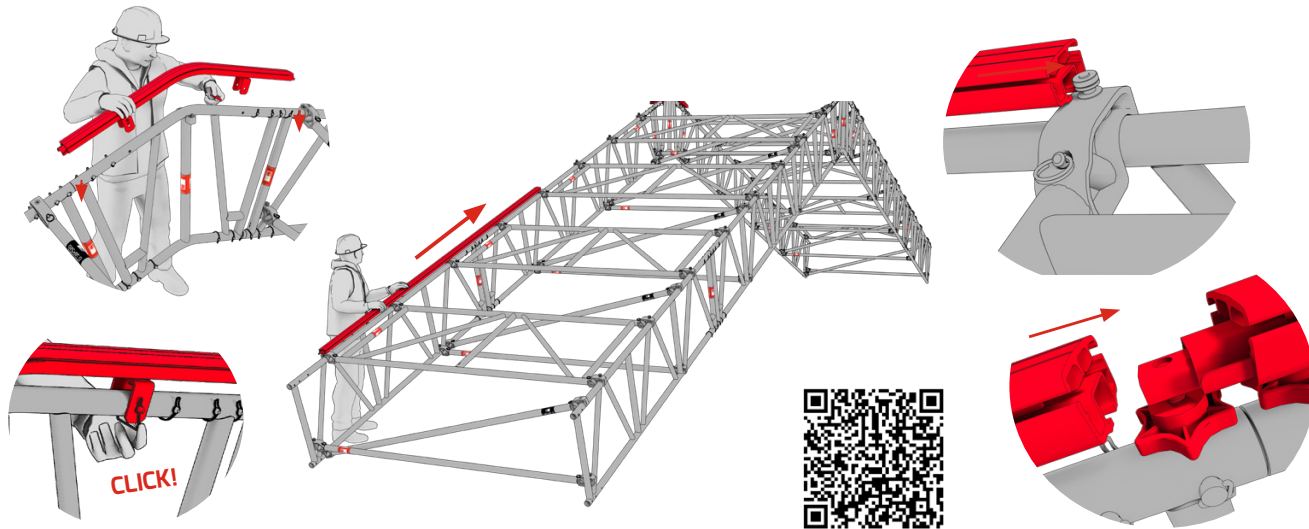


The alloy track spigot with rubber gasket (UA0021) must be placed between lengths of tracking, sliding into the tracking profile. Tighten the hand wheel against the track to hold it in place but do not fully tighten it until track compressors have been installed.

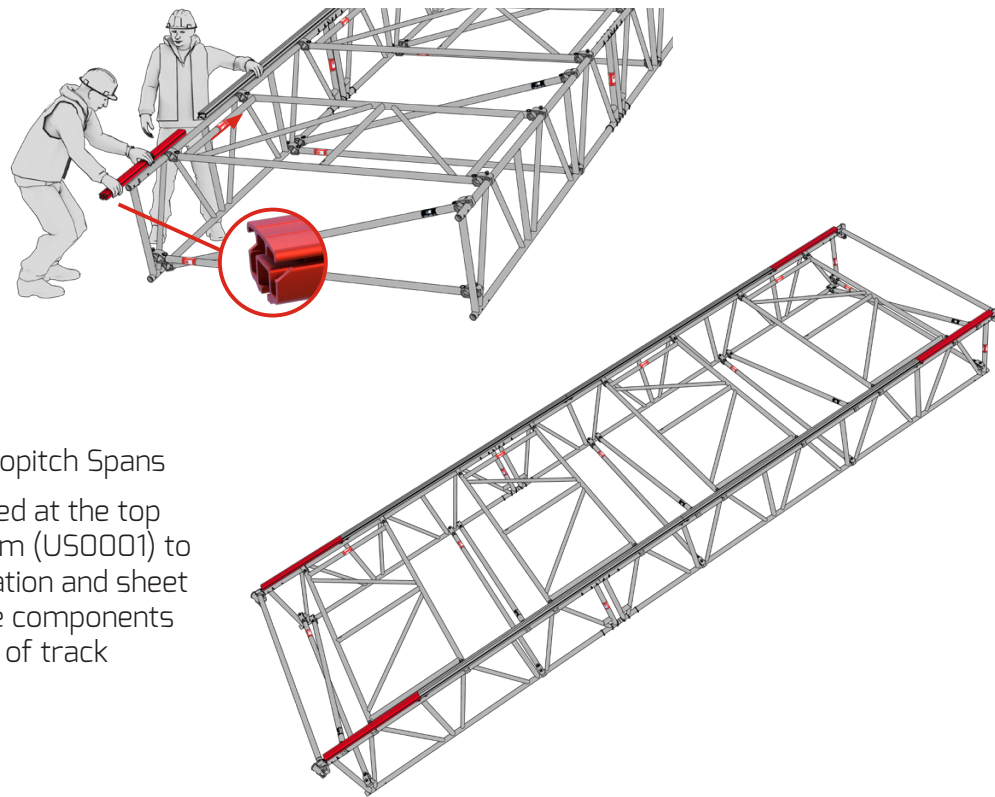
3.5.2 DeepFlow™ on Duopitch Spans

DESSA DeepFlow™ utilises a deep profile with integrated water management. The DeepFlow™ profile has dedicated channels incorporated into the extrusion that allow water to travel down the tracking to the eaves of the roof, where it is discharged. The integrated spigot also provides a continuous seal within the tracking, preventing leaks and water ingress.

Install the DeepFlow™ ridge track to the ridge beam. Slide up lengths of tracking over the button nuts and join together ensuring the integrated spigots are fully engaged. The DeepFlow™ alloy track spigot (UA0035) should also be installed at joint locations to provide an installation safety aid.

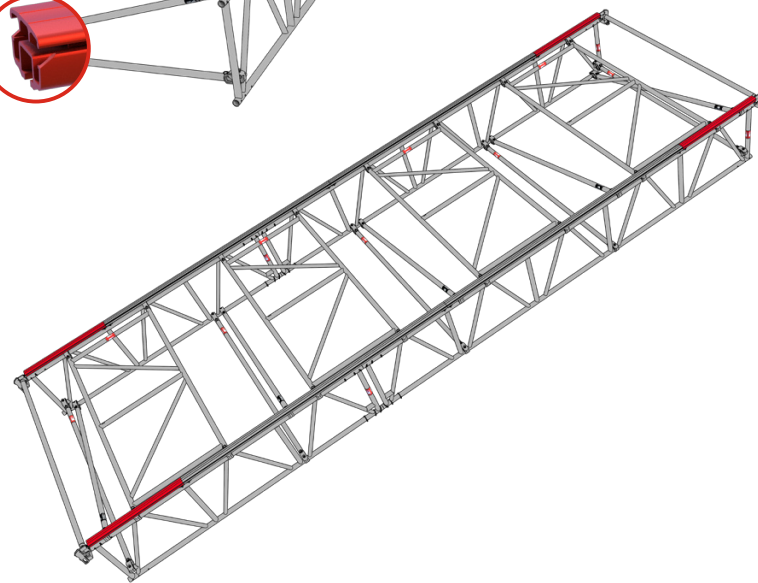


To finish a roof using DeepFlow™ a 1m end piece (US0001) must be installed. This part features additional chamfers with no integrated spigot assisting sheet installation and removal. The end piece is powder coated red for easy identification.



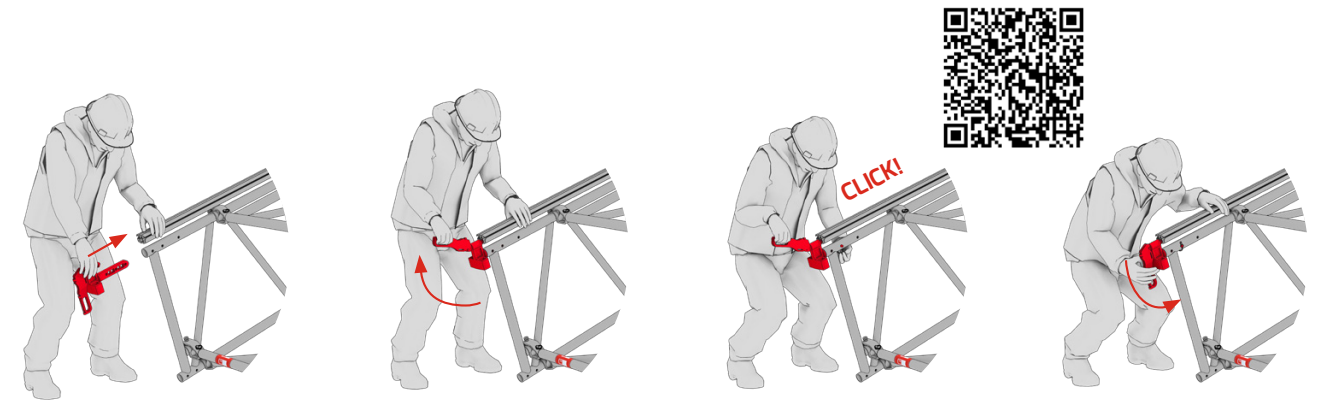
3.5.3 DeepFlow™ on Monopitch Spans

End pieces should be used at the top (US0002) and the bottom (US0001) to assist with sheet installation and sheet tensioning. Use of these components reduces the total length of track required by 2m.



3.6 Fitting Track Compressors

Track compressors (UA0005) are fitted after the installation of the sheet tracking and provide a compressive force equivalent to 100kg along the sheet tracking to ensure the joints remain closed. Track compressors are inserted into the end of the beam line and the handle positioned up which allows the track compressor to be further engaged, so that the steel plunger locates into the track ends. Quick release pins (AF0001) are used to fix the track compressor into position. The handle of the track compressor should then be pushed into a downward position, compressing the tracking lengths and closing any joints.



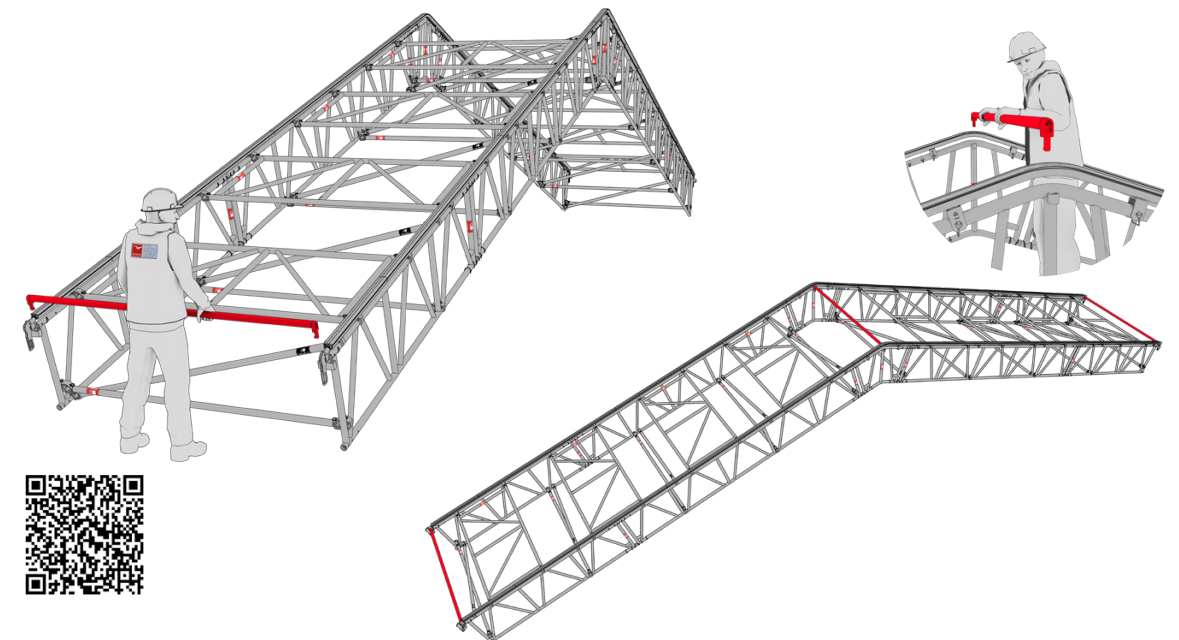
Finally, ensure that all alloy track spigots are fully tightened off using the hand wheel.

NOTE - it is usual for the track compressor handle to feel loose once installed. This shows the compressive force is being exerted along the sheet tracking.

3.7 Installing Roller Braces

Roller braces (UR####) are inserted into the pockets located on the track compressor and on all ridge and eaves beams. The spring-loaded pegs enable each side of the roller brace to be located in turn ensuring the safety barbs are fully engaged.

Roller braces are not structural components and are used to assist with sheet installation and sheet tensioning processes.



3.8 Sheeting a Roof

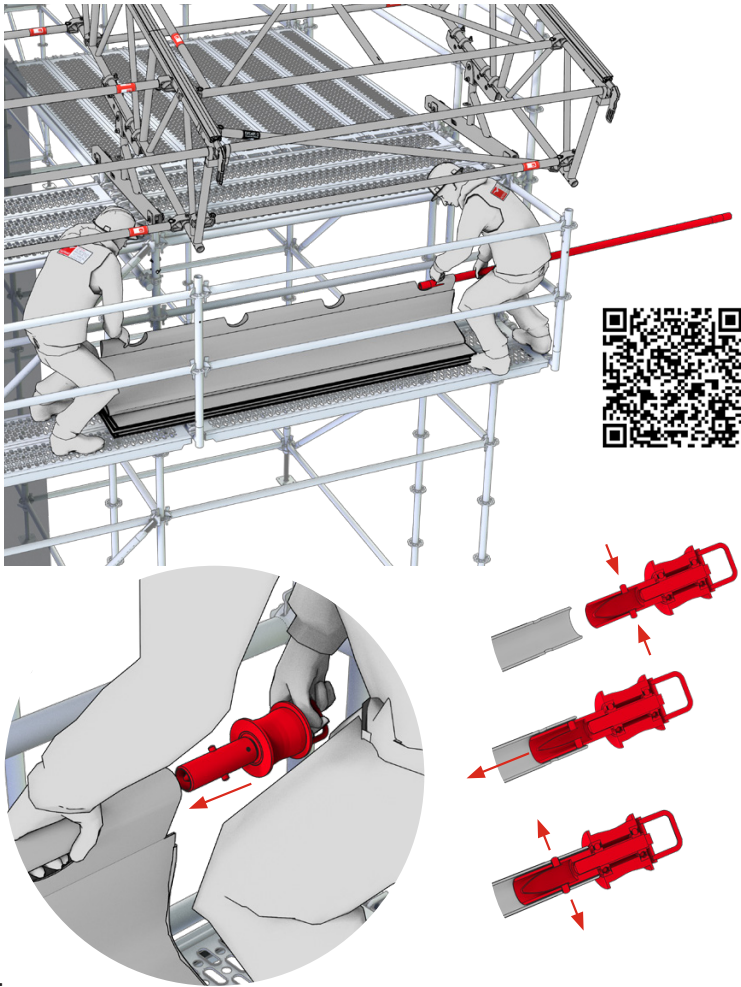
Ideally the installation of roof sheeting will be carried out by four operatives, two feeding from one side and two pulling from the other. Safe working platforms should be incorporated into the supporting structure for these operatives.

Prior to the installation process, verify that all sheets are leaf folded, clean, and fit for use. It is important to also check that the keder bead along the length of the sheet is undamaged. If the sheet is deemed unfit for use, it should not be installed.

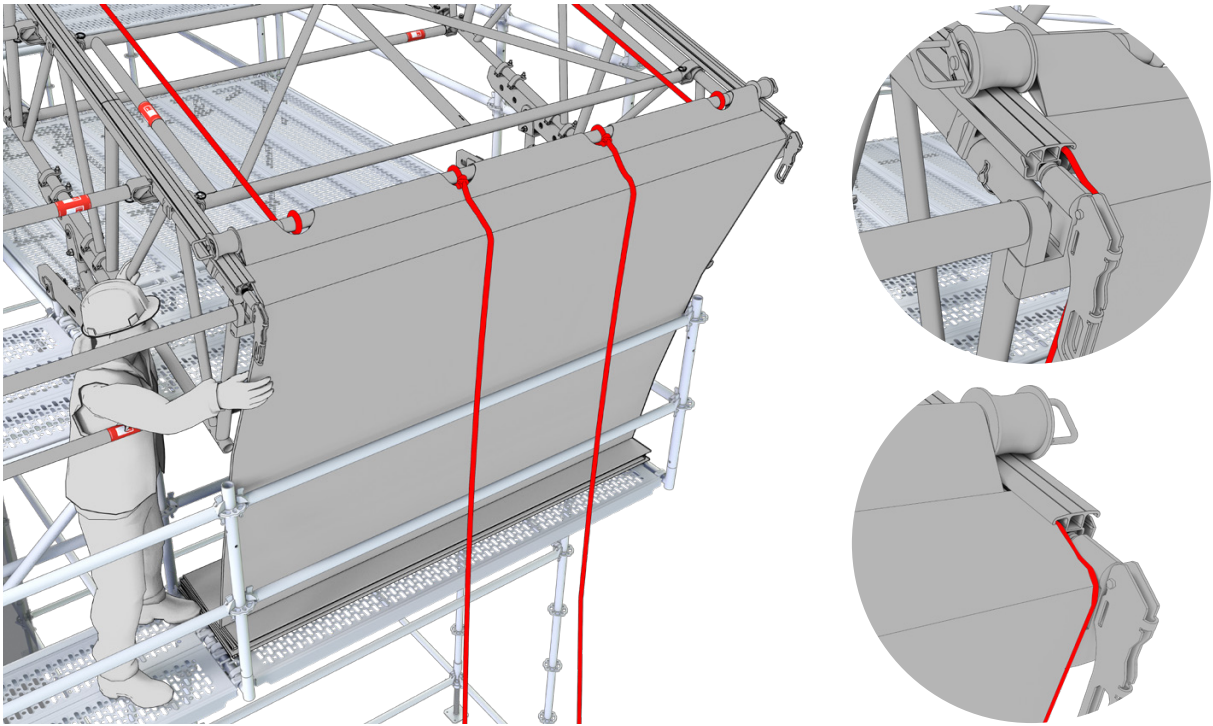
Insert the sheet tensioning bar (UB####) into the leading pocket of the sheet. Ropes run over the assembled bay and should be attached to the sheet tensioning bar in the cut-outs on the edge on the leading edges. The ropes should be of sufficient length to extend from the bottom chord of each beam, over the assembled bay, plus a minimum of 4m (i.e. for 15.0m of roof truss, rope lengths should be 19.0m) and be of 10mm minimum diameter.

We recommend jute rope of minimum 10mm diameter, 6mm nylon rope is **NOT** suitable.

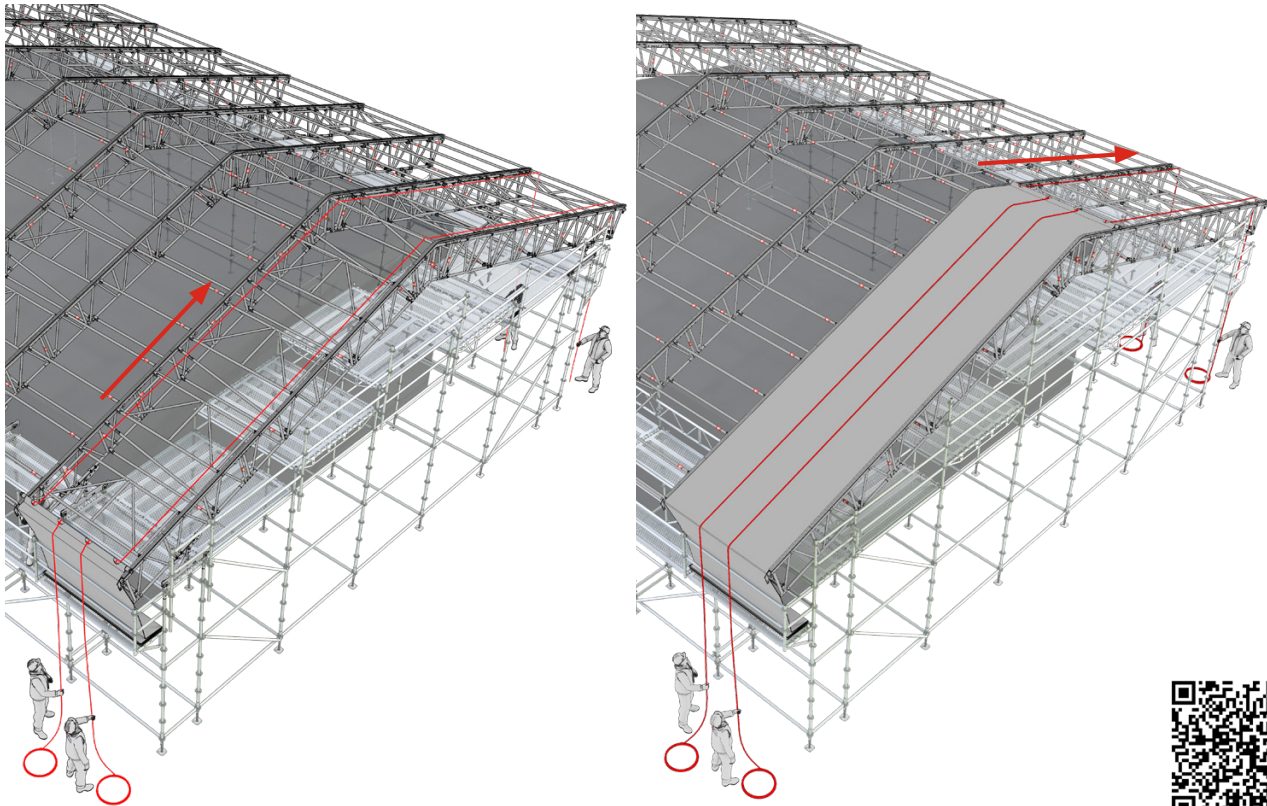
Sheet pulling bar wheels (UA0025) must be inserted into the sheet tensioning bar (UB####) by depressing the spring pin and engaging the sheet pulling bar wheel with the sheet tensioning bar. The sprung pin in the wheel assembly must be aligned with the pre-drilled holes in the sheet tensioning bar to secure it in place. Each wheel must then be positioned over the sheet tracking on each side of the roof bay.



The sheet keder bead should be fed manually approximately 300mm into the sheet tracking each side to ensure correct alignment.

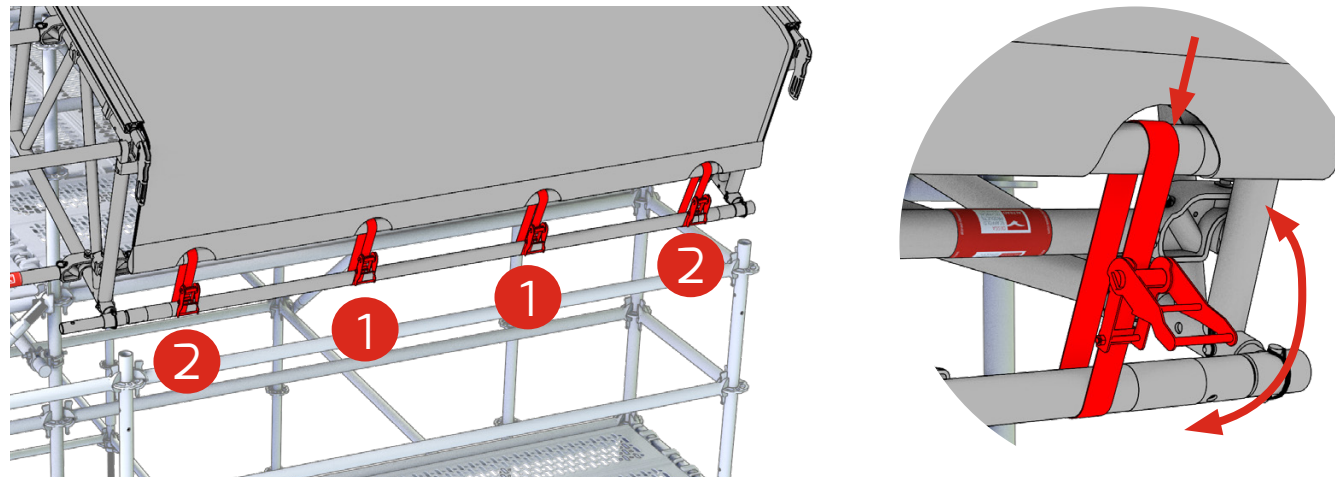


After the keder bead is aligned and the sheet pulling bar wheels are located onto the roof tracks, the sheet is ready to be pulled over the roof. At this stage it is recommended that two extra ropes are attached to the sheet tensioning bar so that once the sheet pull is complete, the ropes are available for the following sheet. The sheet should be pulled gradually and evenly without stopping by two operatives.



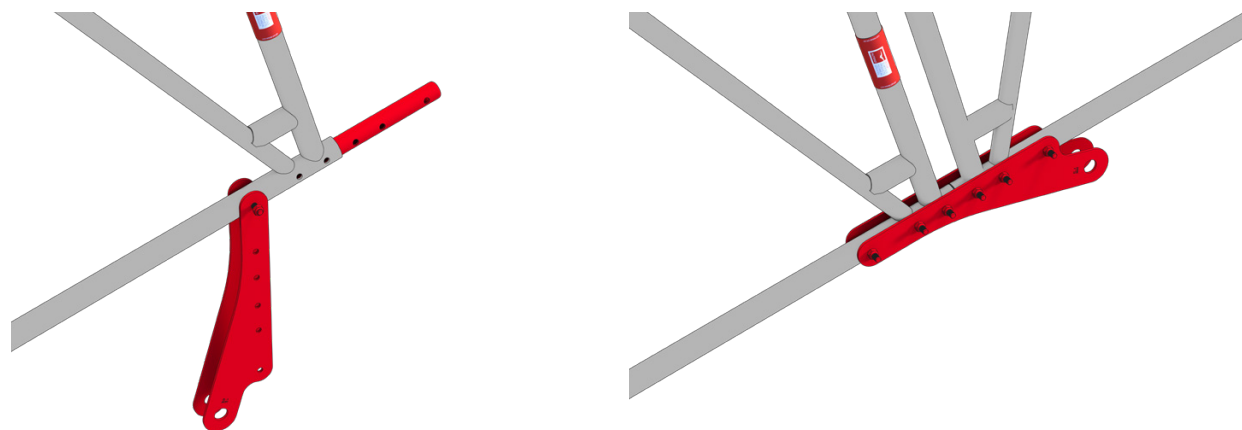
Following the sheet pull, a second sheet tensioning tube should be installed into the trailing sheet pocket. The sheet should then be tensioned to the appropriate location as detailed on the project drawings using the required number (typically 4no.) ratchet straps. Tension the sheet fully by first using the inner ratchet straps (1) followed by the outer ratchet straps (2). Care must be taken not to overtighten as this may damage the sheets on supporting components.

Suitable locations to tension the sheet to include scaffold ledgers or a continuous tube running along the beam. Continuous tubes can be made using the continuous tube connector (UA0027) or the eaves tube holder (UA0016 or UA0017).

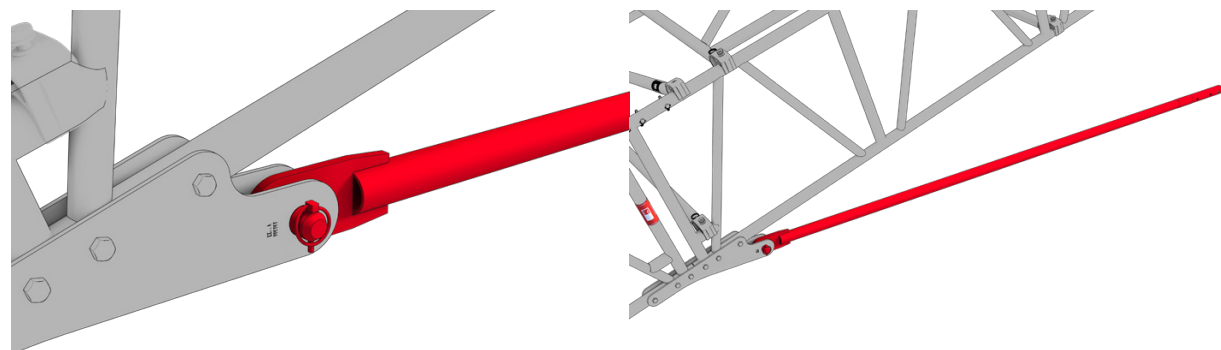


3.9 Tie Bar Installation

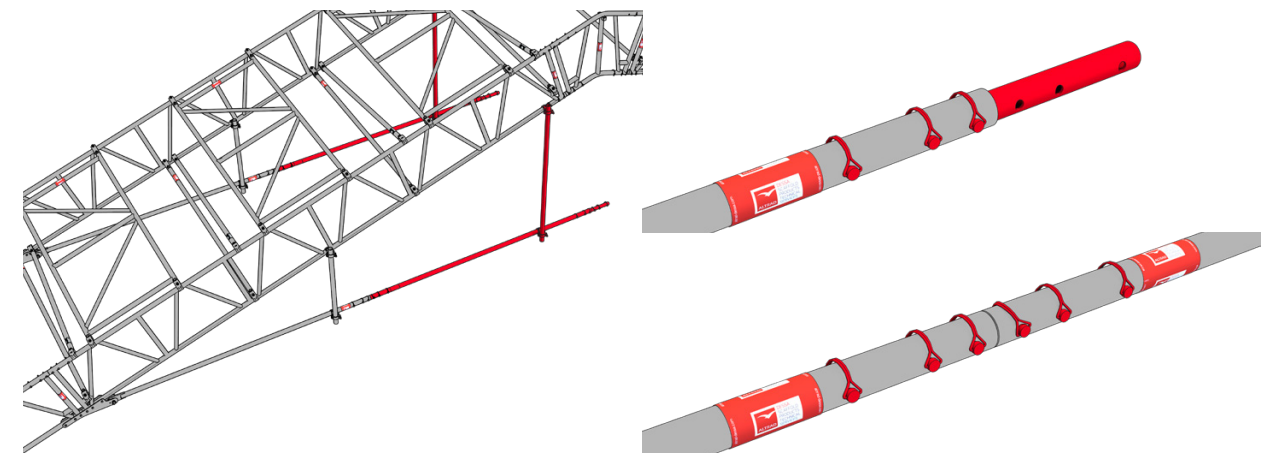
3.9.1 At the location of the tie bar connection position the beam spigot and install 2no. tie bar connector plates (UU0018), one per side of the bottom chord, and 6no. hex bolts (AF0006) and nuts (AF0021).



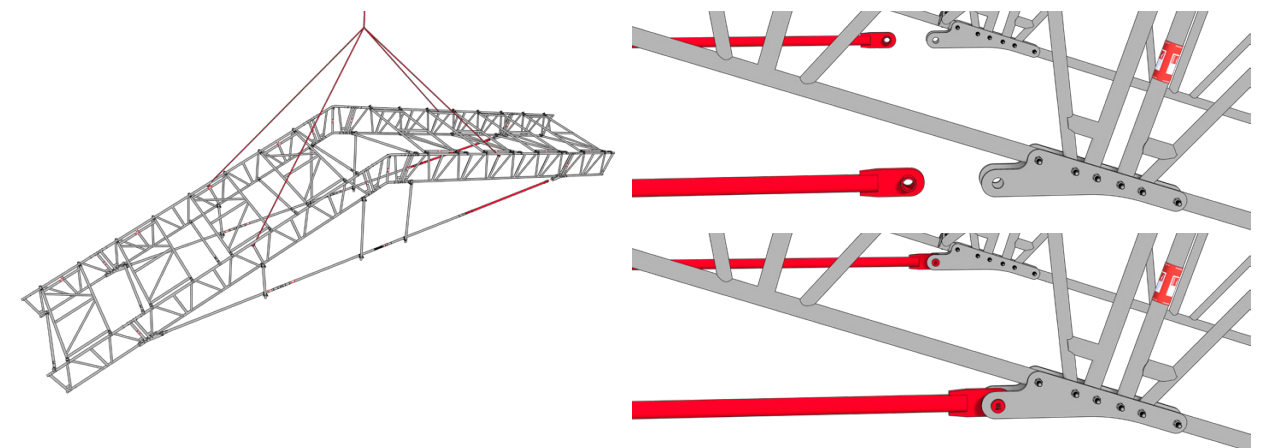
3.9.2 Install the tie bar end piece between the 2no. connector plates using 1no. 30mm locking bullet (AF0004) and linch pin (AF0039).



3.9.3 Tie bar lengths are installed using the same spigot as the UNI roof beams (BS0001). Add the modular tie bar lengths onto the tie bar end piece using the required spigot and 6no. quick release pins (AF0001). Continue until the tie bar lengths are all fitted. Add droppers to the tie bar at the required intervals as shown in Section 7.1 to support it appropriately.



3.9.4 Once all the tie bar lengths are fitted, install the end piece by first connecting it to the intermediate lengths and then fitting it between the 2no. connector plates (UU0018) and locking it into place using 1no. 30mm locking bullet (AF0004) and linch pin (AF0039).



NOTE: it may be necessary to lift the beam lines upwards to ensure a successful connection, as the roof will naturally deflect under it's own self-weight meaning the tie bar may appear too short.

NOTE: Tie bars must be installed in a level plane as close to the support locations of the roof as possible. They must be integrated into the roof at joint locations only and use the DESSA tie bar connector plates (UU0018).

3.10 Quickstart Guides

Full quickstart guides can be found on the DESSA website or by using the QR codes. Full step-by-step video playlists can also be found on the DESSA YouTube channel.

<https://www.altrad-dessa.com>

DESSA VidAssist on YouTube

Quick Start
Guide By
Crane



Quick Start
Guide By
Rollout



Quick Start
Guide By
Hand



4.0 Roof Installation By Hand

Before constructing the roof it is necessary to create a safe working platform at one or both gable-ends; this can be an access scaffold, the installation of a beam span over the roof to link the front and rear scaffolds or a scaffold built from the structure over the proposed roof. The working platform should be, where possible, at least as wide as the smallest roof bay. A header beam should be installed on the inside standard at the required height along each side of the structure where the roof will be landing. Once this platform is established it enables the operatives to build the first roof bay from the safety of the scaffold.

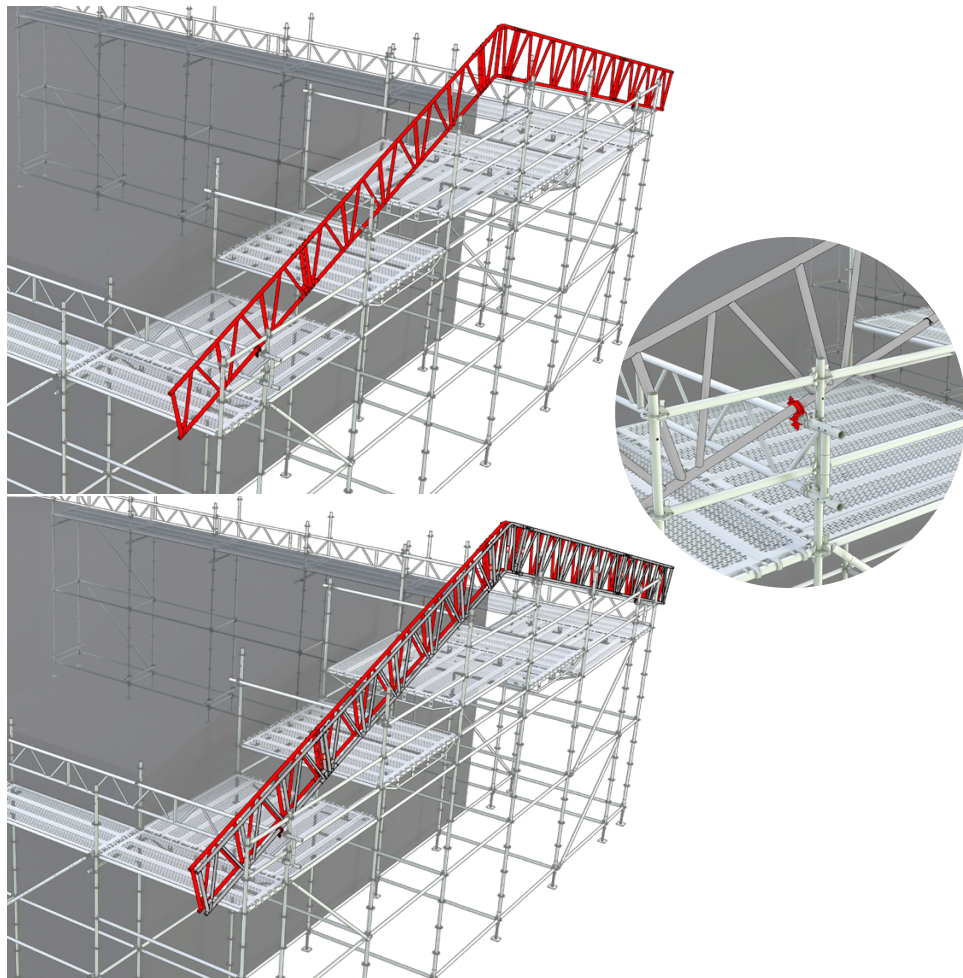
4.1 Duopitch

4.1.1 Attach ridge tracks to the ridge beam using the required quick release pins (AF0002). Secure the alloy track spigot (UA0021 or UA0035) to the ridge tracking by inserting it and tightening against the ridge track. Loosen the open side to accept the straight tracking later.

This is shown in Section 3.5 "Installing Sheet Tracking".

4.1.2 Next, build the first beam line from the gable-end platform. The beam line should be supported at several points along its span by installing temporary transoms between the standards up to ridge level. It is important that the first beam line is secured level in the vertical plane. This can be achieved by levelling the post near a node point and then fastening a right-angled coupler to hold it in place. A section brace can be installed from the scaffold lift to the top-chord of the beam to further support the truss where required. Repeat this to erect the next beam line.

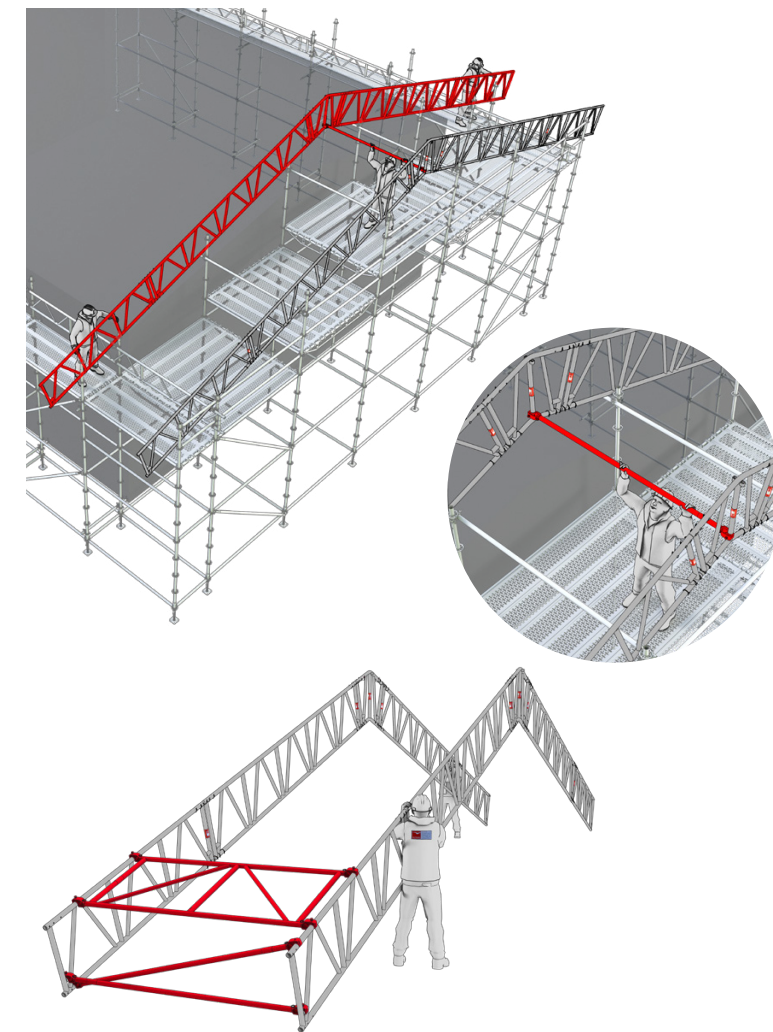
Beam connections are shown in Section 3.2 "Connecting Beams".



4.1.3 Following the completion of the first beam lines, the first UNI roof bay can be assembled.

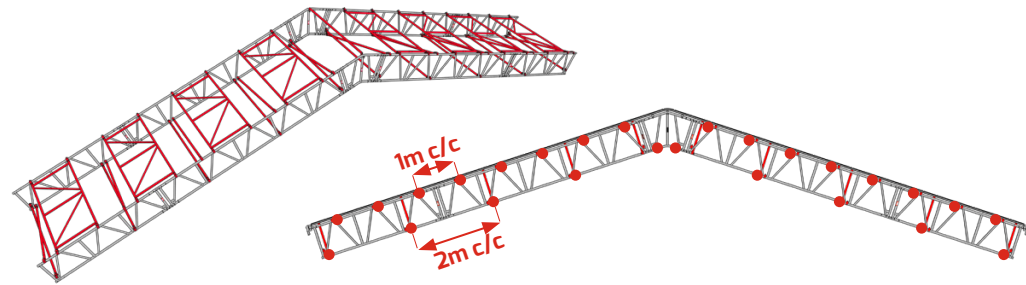
- Mark out the centres of the roof trusses by attaching right-angled couplers to the header beam so that when it is time to install subsequent trusses, the fixing is in place and ready to accept the truss.
- The second beam line can be moved into position and secured to the header beam using scaffold couplers. It is recommended that three operatives perform this operation; two at either end of the truss and one in the centre. The operative in the centre stands on the stepped gable scaffold and attaches a temporary horizontal brace to the ridge post of the second truss. In unison, the operatives at each eaves slide the truss out to the desired location – the operative in the centre only has to stop the truss from overturning. For spans in excess of 20m we recommend the use of five operatives with the additional 2 at mid-span of each roof slope.
- Once in position, connect the beam lines with a horizontal brace on the ridge post. The operatives at either end land the trusses in the prepared right-angled couplers. A UNI frame, horizontal brace and diagonal brace are then installed at each eaves, ensuring that the spacing is correct and that the beam lines are square with one another. These should be installed as shown in Section 3.3 "Attaching Braces".

An alternative method to lifting the beam line by hand into the desired location would be to use scaffold castors with vertical tubes connected to the beam chords with scaffold fittings.



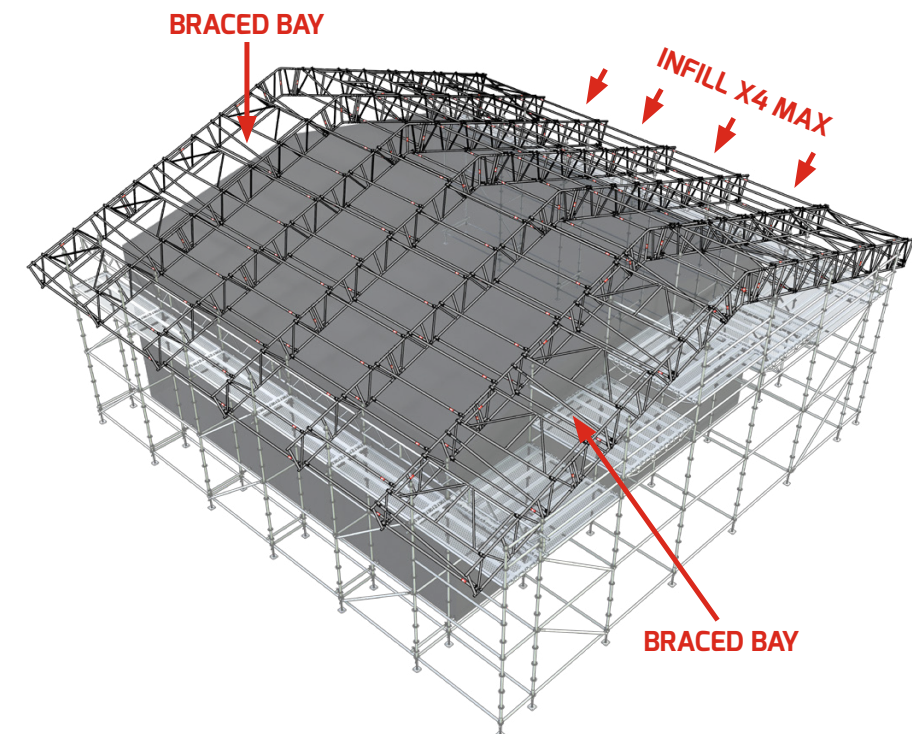
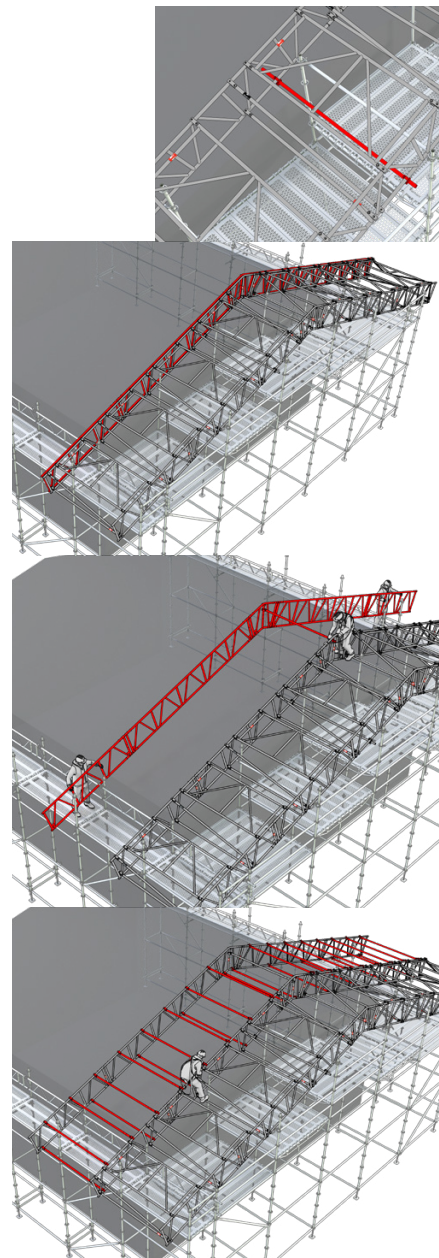
4.1.4 It is recommended that bracing elements are installed by working up from the eaves to the ridge. Horizontal braces must be secured to the bottom chord of the beam lines at 2m centres. Diagonal braces are installed at 2m centres from the bottom chord to the top chord. UNI frames are installed at each “V” node on the top chord, creating effective bracing at 1m centres. The roller brace used at the ridge can also be installed here.

These should be installed as shown in Sections 3.3 “Attaching Braces” and 3.7 “Installing Roller Braces”.



4.1.5 Once the first bay is constructed the subsequent bays of roof can be erected. They must be installed using the “By Hand” bracing pattern as shown in Section 3.4 “Bracing Patterns”, with a maximum of 4no. infill bays between each braced bay.

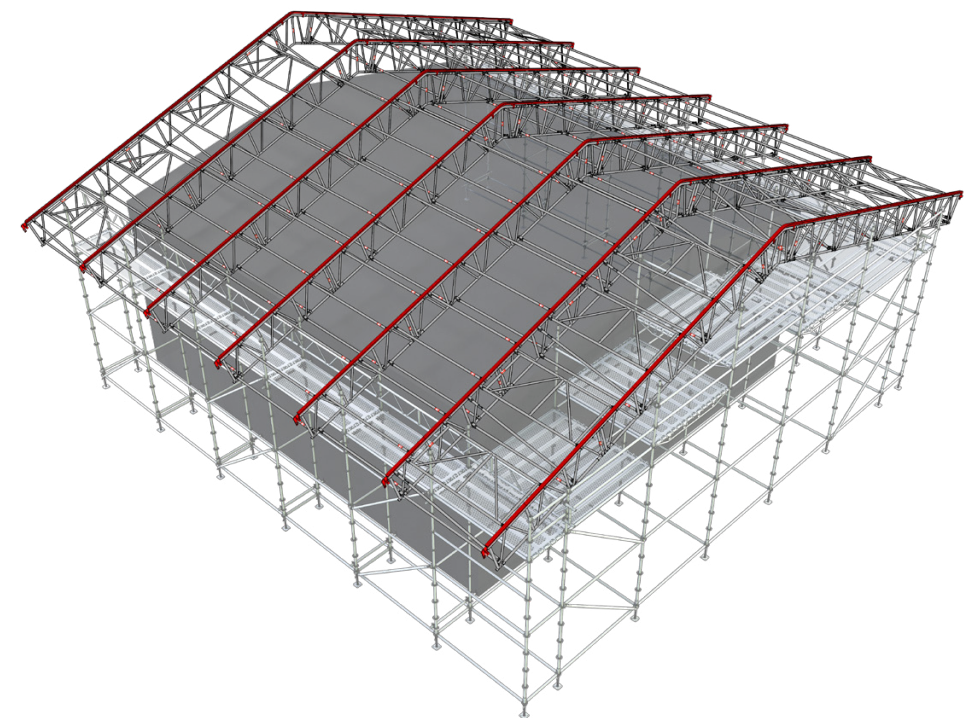
- Firstly install scaffold tube under the bottom-chords of the erected trusses at the junctions using right-angled couplers. The scaffold tubes should cantilever a minimum of 500mm from the beam line.
- Once the tubes have been installed along the entire beam line, the subsequent trusses can be built on top of these tubes. One operative remains at the ridge level of the trusses to guide the newly erected trusses into place.
- Connect the ridge track to the ridge beam and pass to the operative at ridge level. Secure the beam to the scaffold tube using right-angled couplers.
- Connect subsequent beams to the fixed ridge beam using the support tube and right-angled couplers until the beam line is complete on both sides of the ridge.
- On one side of the new beam secure horizontal braces at each operative position. Release all right-angled couplers holding the new truss and move it into position. In unison the operatives at each position slide the truss out to the desired location, controlling with the braces and by hand at the eaves.
- Once in position connect the beam lines with horizontal braces. The operatives at either end position the trusses in the prepared right-angled couplers.
- The new bay is completed by infilling with horizontal braces at 1m centres on the top chord and 2m centres on the bottom or with UNI frame at 2m c/c on the top and horizontals at 2m c/c on the bottom chord for infill or braced bays respectively.



4.1.6 After installing the required beam lines and bracing, the sheet tracking should be installed. Feed lengths of sheet tracking over the brace buttons from the eaves of the roof and locate over the pre-installed alloy tracking spigot (UA0021 or UA0035). Hand tighten the spigot using the hand wheel to hold the track in place. This process is repeated until all tracks are installed.

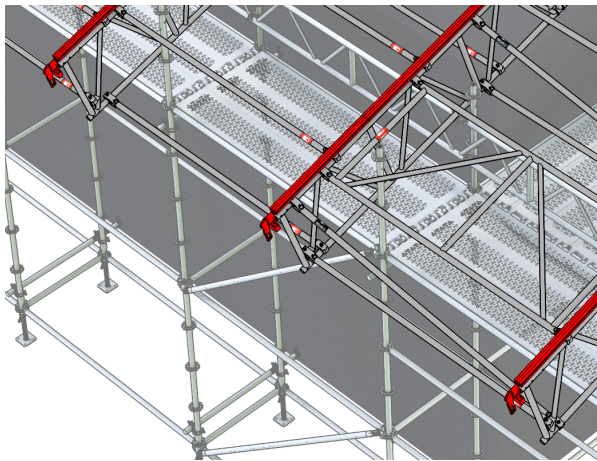
Tracking installation is detailed in Section 3.5 “Installing Sheet Tracking”.

NOTE: Care needs to be taken as differences in height between adjacent beams can cause difficulties when trying to install tracking over double button nuts. Adjacent beams should be level.



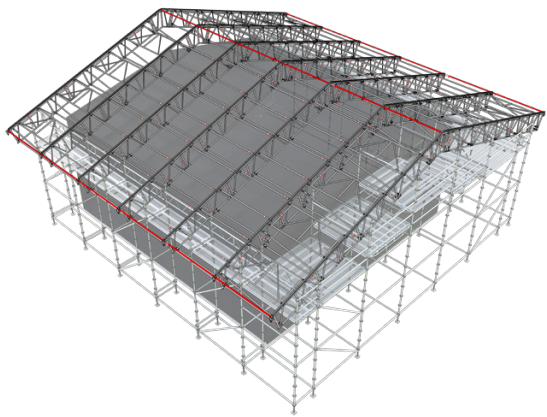
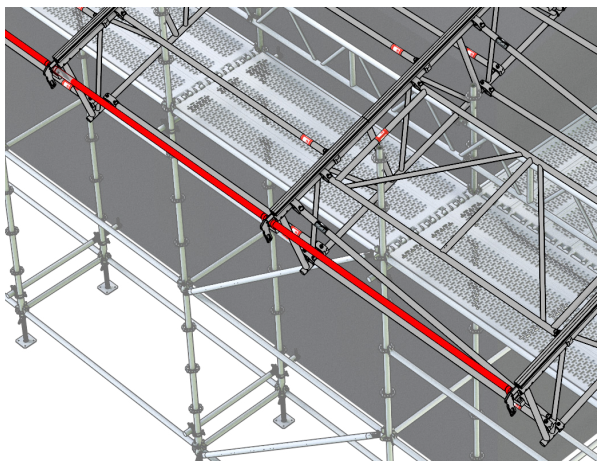
4.1.7 Following sheet track installation, track compressors (UA0005) should be fitted. The track compressor is inserted into the end of the truss, the handle is raised and the quick release pin (AF0001) is located. The handle is then compressed, exerting a force up the tracking line. Once the handle has been compressed all spigot retaining bolts can be tightened to prevent any movement at the joint.

Track compressor installation is detailed in Section 3.6 "Fitting Track Compressors".



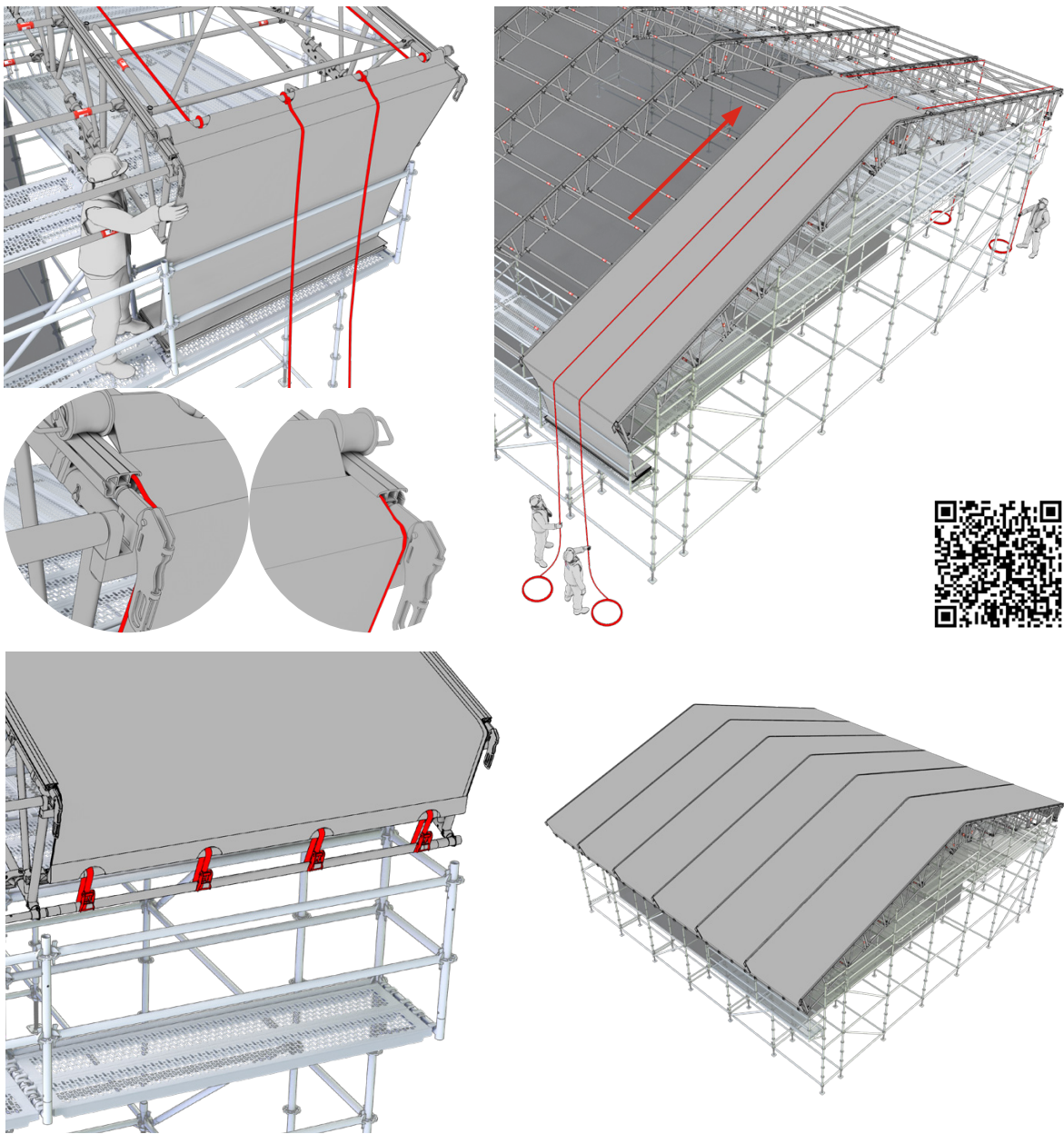
4.1.8 Roller braces are installed into the track compressor to allow for sheet installation. Track compressors have integrated pockets on either side of the handle that house the roller brace. Roller braces are also installed at the ridge and/or eaves beam using the welded pockets attached to either side of the respective beam.

These should be installed as shown in Section 3.7 "Installing Roller Braces".



4.1.9 With the structure completed, it should be sheeted. It is good practice to place all sheets under the bays where they are required so that when it is time to raise them they are all in the correct position.

Details for sheeting installation can be found in Section 3.8 "Sheeting a Roof".



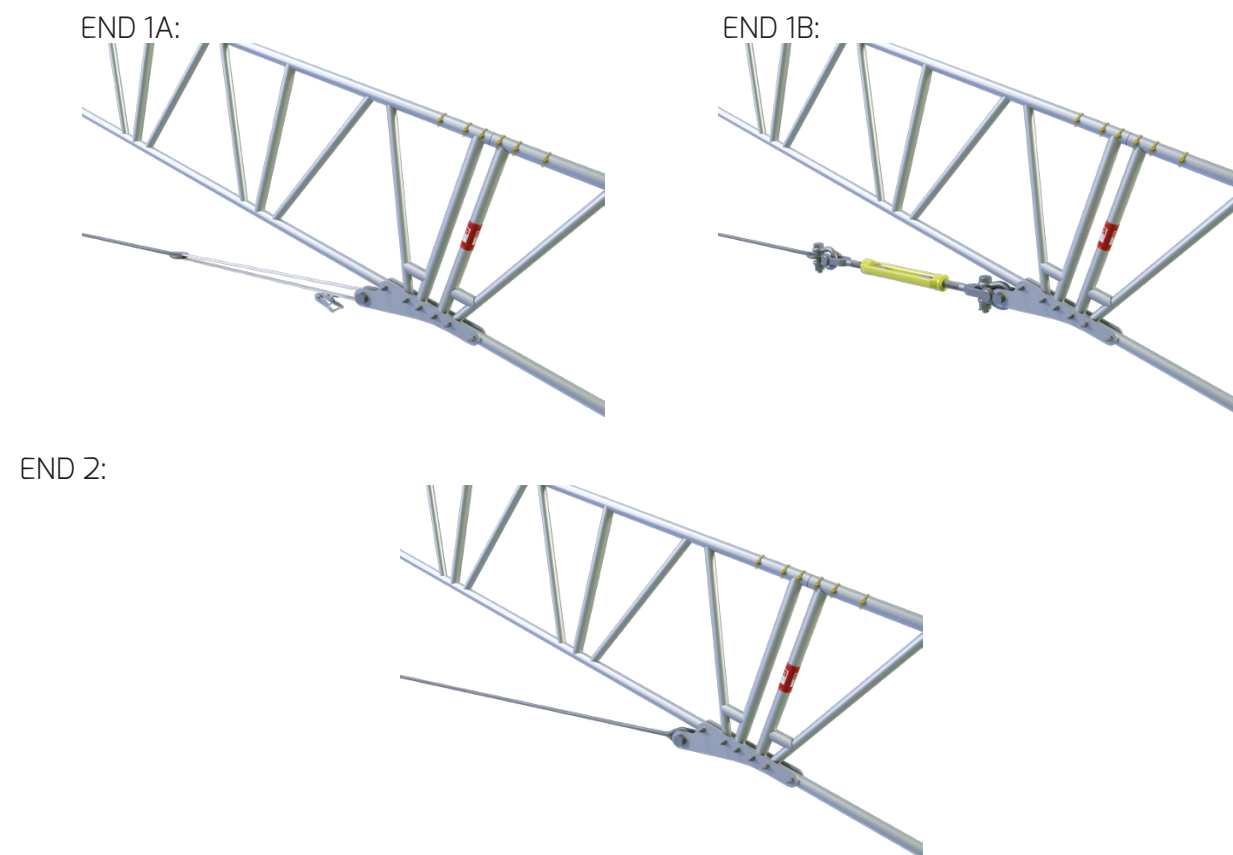
4.2 Duopitch with Tie Bar

DESSA recommends use of the systemised tubular tensioning bar where possible to ensure roof geometry is maintained and maximum compressive and tensile capacity is achieved. Ideally a roof will be built using either the crane or roll-out build method to ensure safe installation of the systemised tie bars. Details on tubular tie bar installation and connections can be found in Section 3.9 "Tie Bar Installation".

For hand built or small roofs, steel wire rope or heavy duty ratchet straps can be used to provide tensile restraint. These will require inspection and tightening at regular intervals throughout the duration of the project to ensure adequate performance. **This style of tie bar will not provide any support when under compression.** Droppers are required to support the tension cable and prevent it from sagging and these can be made from either scaffold tube or additional steel wire rope attached to the bottom chord of the beam above.

If this method of tensioning the roof is chosen, instead of the tubular tie bar equipment changes will be required. The 30mm bullet (AF0004) and lynch pin (AF0039) typically used with the tie bar system are replaced by a scaffold tube sleeve of 45mm length that must be installed between the connector plates (UU0018) using an M30 x 100 bolt with nut.

To tension the steel wire, either a pre-stretched heavy duty ratchet strap or turnbuckle should be used at one end of the wire. The opposite end of the steel wire should have a hard thimble eye and be installed over the tube sleeve between the connector plates.



Consideration should also be given to the factors explained in Section 7.1 "Tie Bars" before commencing with the installation of tie bars.

NOTE: Tie bars must be installed in a level plane, as close to the support locations of the roof as possible. They must be integrated into the roof at joint locations only and use the DESSA tie bar connector plates (UU0018).

4.3 Monopitch Roofs

Monopitch roof spans are typically built on smaller roofing projects, but combined with intermediate supports are also suitable for the largest of spans. When erecting a roof using a monopitch span, the build method is very similar to that of constructing a duopitch roof although there are some variables to consider during the building process:-

4.3.1 Supporting Structure

Consideration must be given to the support heights in order to achieve the required angle on a monopitch roof and the supports must be built to the designed height. A survey of the site should be conducted prior to installing the monopitch roof to determine if the supporting structure has been erected correctly so that the desired roof pitch is achieved without the need of additional measures. This is advised for all build methods to ensure that all monopitch roof spans are built correctly and with adequate pitch for water run-off.

4.3.2 Roof Angle

Monopitch roofs can be constructed at a lesser angle than typical duopitch spans. A monopitch span is typically built at 15-degrees, as opposed to the 18-degree pitch when erecting a duopitch with an absolute minimum pitch of 10-degrees. It is not recommended to build below this pitch as this can significantly impact water run-off and create ponding on the roof. A qualified Engineer should be charged with determining the appropriate angle for the monopitch based on the project location, duration and climate.

We strongly recommend the use of Deepflow™ keder tracking for all monopitch roofs.

4.3.3 Deepflow™

Using Deepflow™ sheet tracking on a monopitch requires an upper end piece (US0002) and lower end piece (US0001). Together, these two tracking lengths occupy 2m of beam when installed and are required as they eliminate the integrated spigots, allowing sheet installation and removal. The Deepflow™ end pieces are powder coated red, the upper end piece (US0002) also features an integrated spigot.

4.4 TRAX Tube Holder

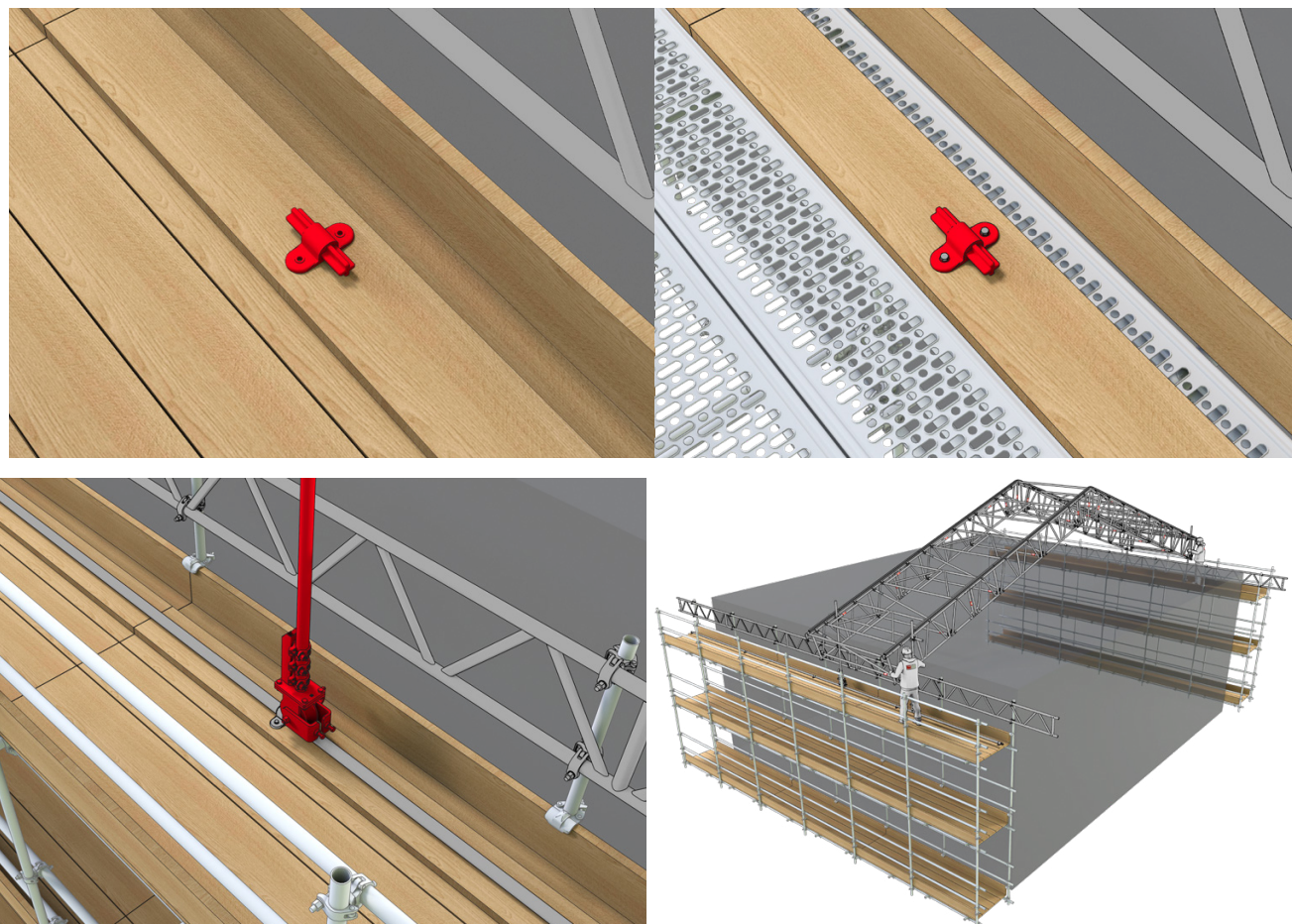
When building a roof by hand, manually moving the beam lines after each build requires considerable effort and control measures. For this reason, DESSA offers the TRAX tube holder.

TRAX tube holder is a small component that, in conjunction with traditional scaffold tube, can be used to build a runway that allows for the roof to be moved significantly easier. The use of scaffold tube with TRAX tube holder also makes this a highly cost effective solution for roofs built by hand whilst reducing the risk of injury to operatives and manual lifting requirements during the works.

TRAX tube holder is secured to the working platform using 2no. M6 or M8 coach bolts or timber screws (AF0013). DESSA recommends stacking 2no. timber scaffold boards to make the platform stronger and more resistant to the point load from the castor assembly.

For scaffolds using metal decking, we recommend placing a wooden scaffold board on top of the deck and screwing this into place using woodscrews from underneath the deck. With the scaffold board held in place, the runway can then be installed onto the scaffold board as normal.

After the truss line is positioned, the castor assembly can remain in-situ until the roof is dismantled or it can be removed and used to install further trusses. The completed roof must be fixed into position.

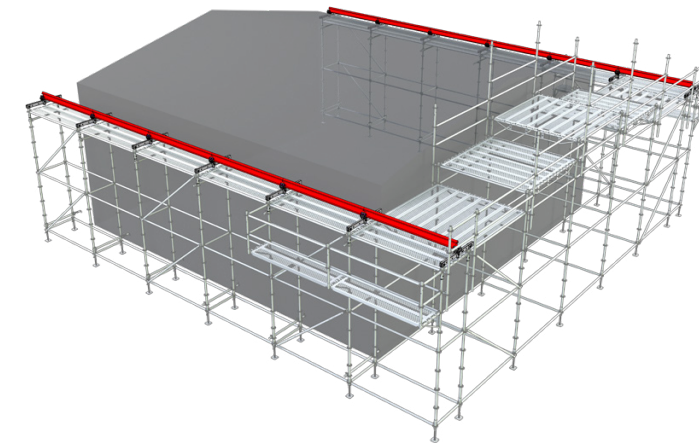


5.0 Roof Installation By Rollout

Before construction of the roof commences, create a stepped platform at a minimal of one gable-end; this can be a table lift on the access scaffold or installation of a beam span over the roof to link the front and rear scaffolds. The working platform should be, where possible, at least as wide as the smallest roof bay with working platforms immediately below the planned lower chord position. Once this platform is established it enables the operatives to build the first roof bay from the safety of the scaffold, eliminating work at height.

5.1 Duopitch

5.1.1 First, install the runway using the required working method. Refer to the sysTRAX™ user guide, or TRAX UB user guide to see detailed installation processes.



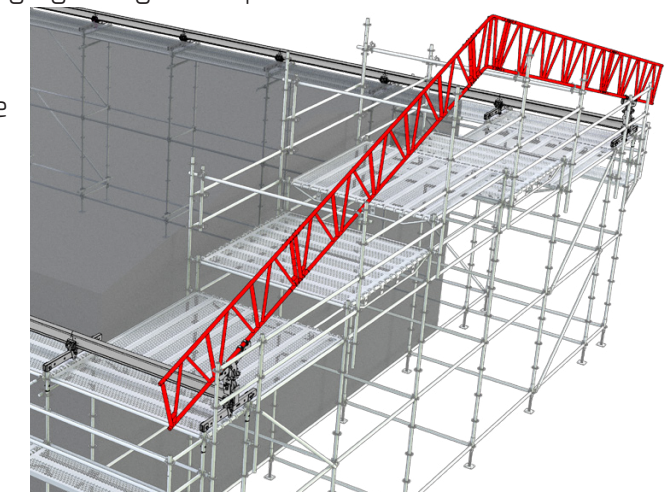
5.1.2 Before erecting the first beam lines, attach the ridge track to the ridge beam using the required quick release pins (AF0002). Secure the alloy track spigot to the ridge track by inserting it and tightening the hand wheel against the ridge track. Loosen the open side to accept the straight track lengths later.

This is shown in Section 3.5 “Installing Sheet Tracking”.

5.1.3 Next, build the first roof truss from the gable-end platform. The base of the truss is secured to the beam connector (UA0011) on top of a castor wheel assembly. DESSA offers a variety of top plates to deal with different site requirements, the method of securing the roof truss differs depending on the top plates in question. The middle of the truss can be supported at several points along its span by installing temporary transoms between the standards up to ridge level. The beams can then be secured to these transoms along the bottom-chord using right-angled couplers.

It is important that the first beam line is secured level in the vertical plane. This can be achieved by levelling the post near a node point and then fastening the right-angled coupler to hold it in place. A section brace can be installed from the scaffold lift to the top-chord of the beam to further support the truss where required. Repeat this to erect the next beam line. The same process is repeated to form the next beam line.

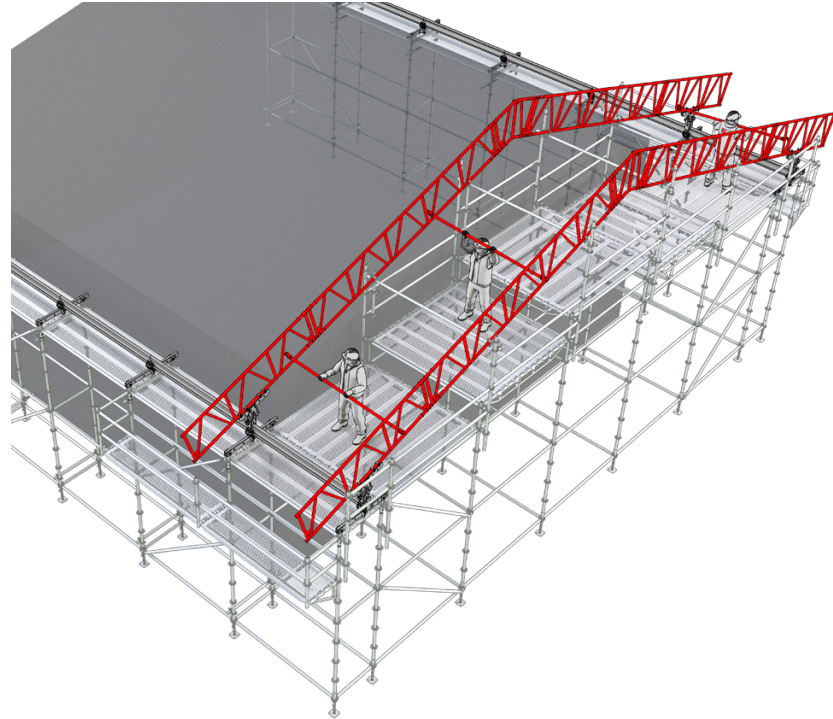
Beam connections are shown in Section 3.2 “Connecting Beams”.



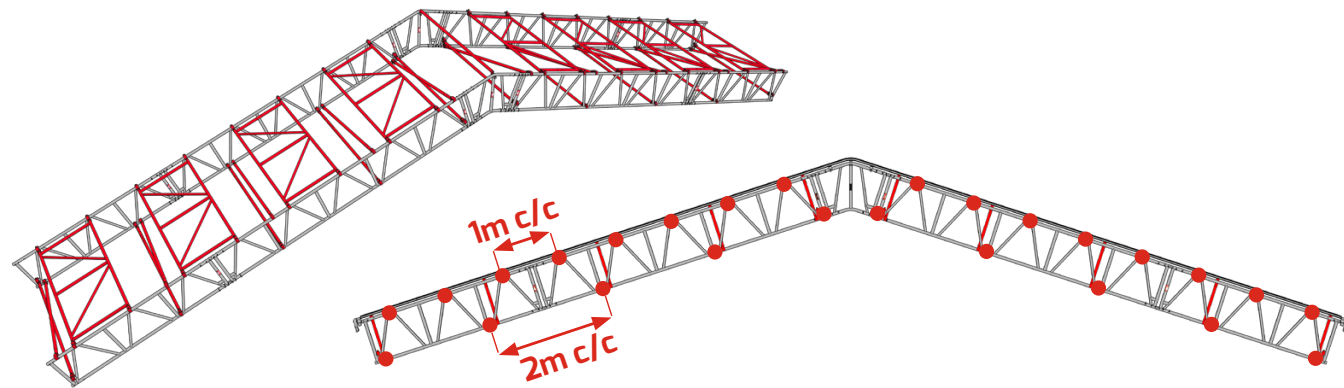
5.1.4 Following the completion of the first beam lines, the first UNI roof bay is ready to be assembled.

- Leaving the first beamline attached to the scaffold facade, roll the second beam line along the runway until the desired bay size is achieved. The beam line should then be braced back to the scaffold temporarily.
- Once in position, connect the beam lines with a UNI frame, horizontal brace and diagonal brace at each eaves.

These should be installed as shown in Section 3.3 "Attaching Braces".

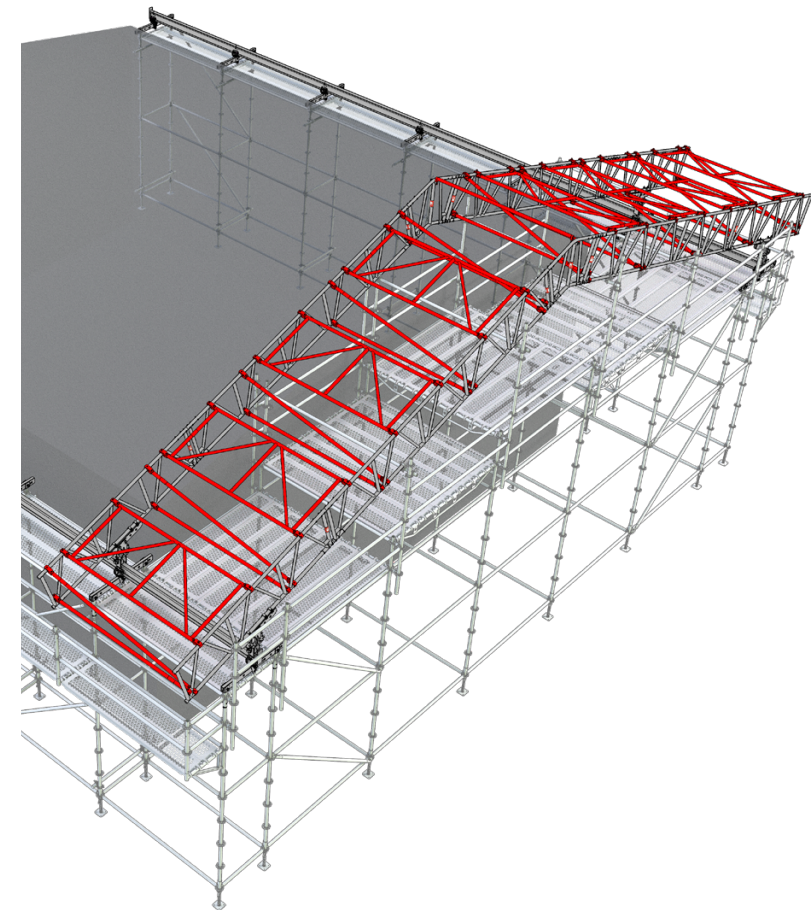
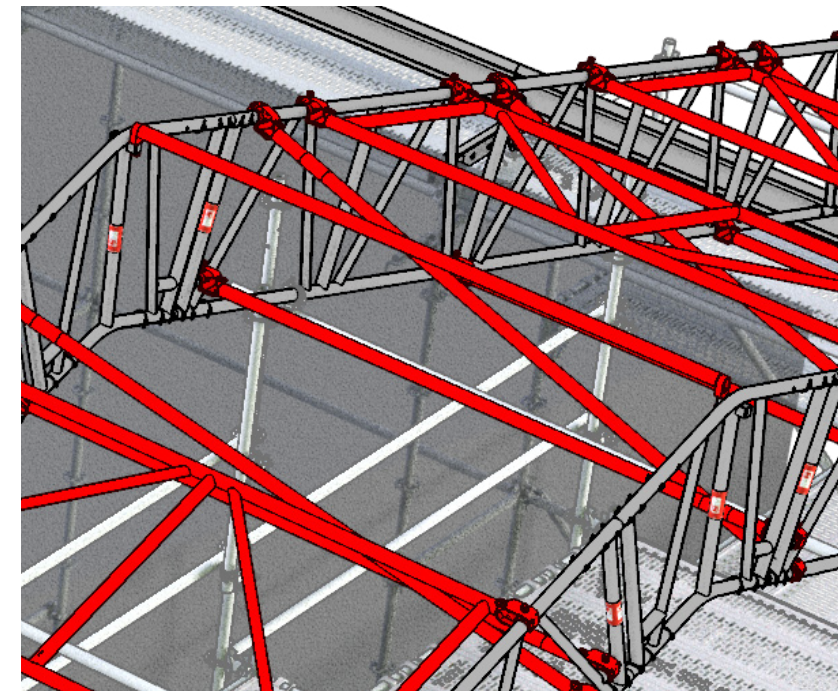


5.1.5 Horizontal braces must be secured to the bottom chord of the beam lines at 2m centres. Diagonal braces are installed at 2m centres from the bottom chord to the top chord. UNI frames are installed at each "V" node on the top chord, creating bracing at 1m centres. Roller braces should be installed at the ridge end. These should be installed as shown in Section 3.3 "Attaching Braces".



5.1.6 A roller brace should be installed into the welded pockets on the ridge beams either side of the bay to allow for the sheet installation later on.

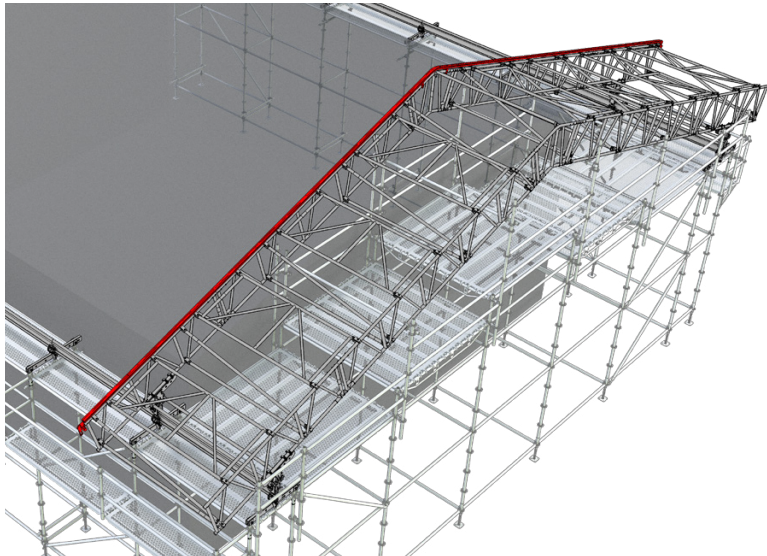
These should be installed as shown in Section 3.7 "Installing Roller Braces".



5.1.7 After installing the required bracing, the sheet tracking can be fitted to the inner beam line. To avoid difficulties when trying to install tracking over double button nuts, ensure TRAX beams are level.

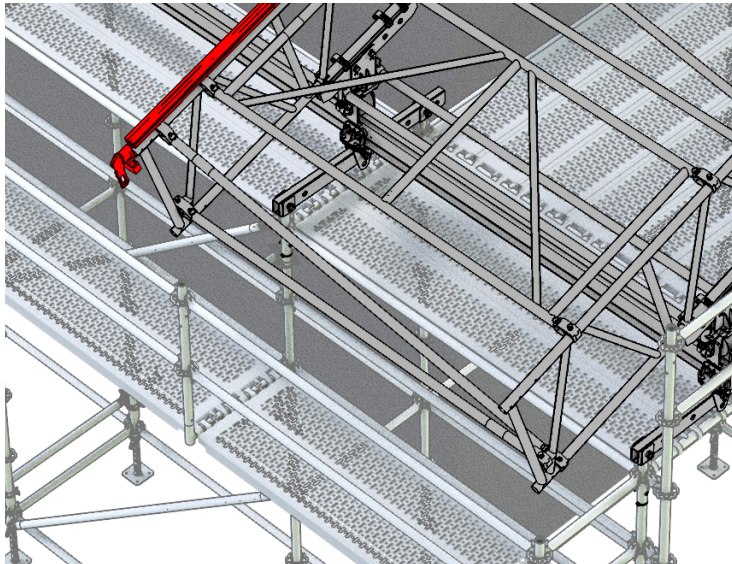
Feed a length of sheet tracking over the brace buttons from the end of the roof and locate over the pre-installed alloy track spigot. Loosely tighten the spigot using the hand wheel to hold the track in place. This process is repeated until all tracks are installed up to the track compressor.

Tracking installation is detailed in Section 3.5 "Installing Sheet Tracking".

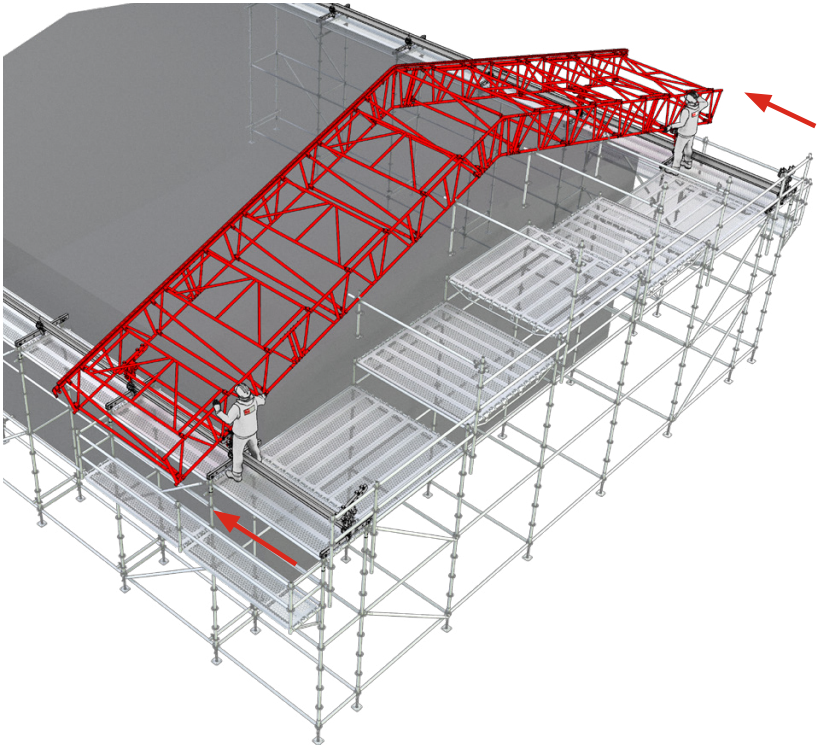


5.1.8 With the sheet track in place along one beam line, a track compressor (UA0005) should be installed. The track compressor is inserted into the end of the truss, the handle is raised and the quick release pin (AF0001) is located. The handle is then compressed exerting a force up the tracking line. Once the handle has been compressed all spigot retaining bolts can be tightened to prevent any movement at the joint.

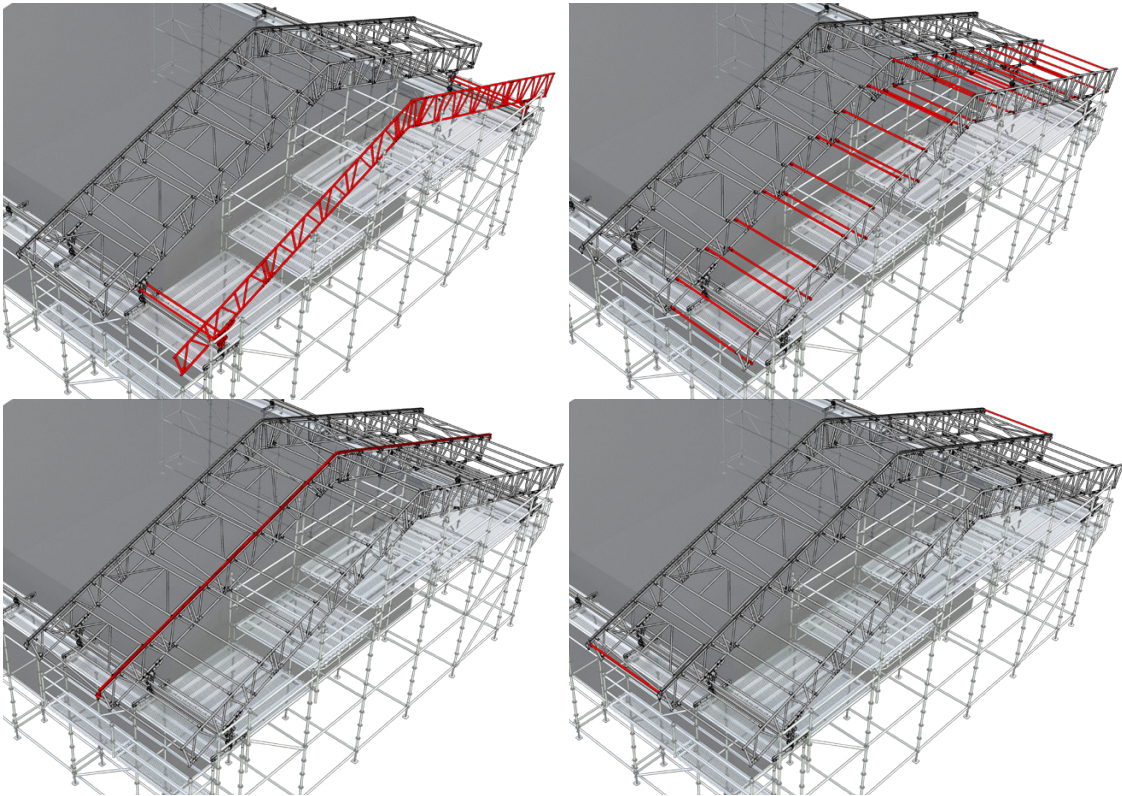
Track compressor installation is detailed in Section 3.6 "Fitting Track Compressors".



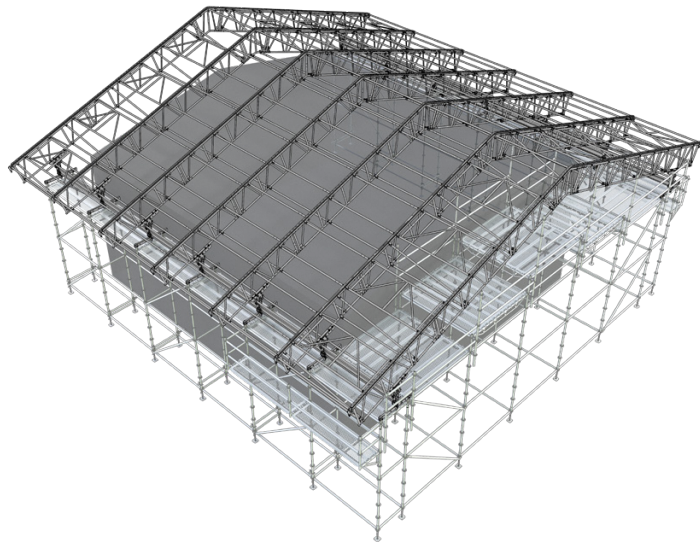
5.1.9 The completed braced bay is moved along the structure so that the outer beam is in line with the inner standards of the gable-end scaffold.



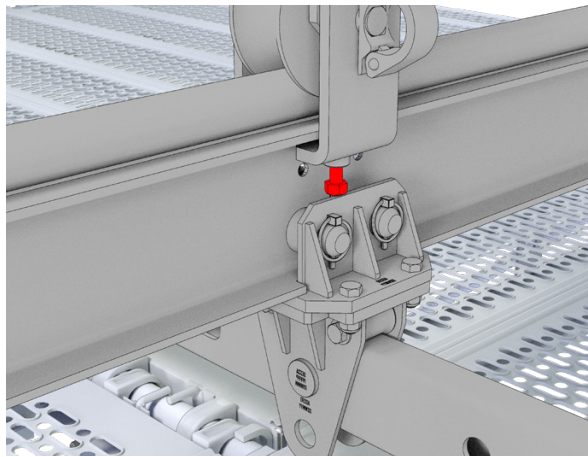
5.1.10 With the first complete bay erected, each following beam line is constructed. These should be connected to the existing bays using horizontal braces or UNI frames as required, and tracking should be installed. The remaining roller braces can then be added, before the structure is rolled to allow further bays to be added. Up to 4no. infill bays can be connected to the braced bay before another braced bay is required.



5.1.11 The roll out process is repeated until all bays are installed and in their correct locations. . If the roof is being built on a scaffold then a minimum of every fifth bay and each end must be fully braced. If the roof is being built by crane first and lifted up, every second bay should be fully braced ensuring the end bays are braced.

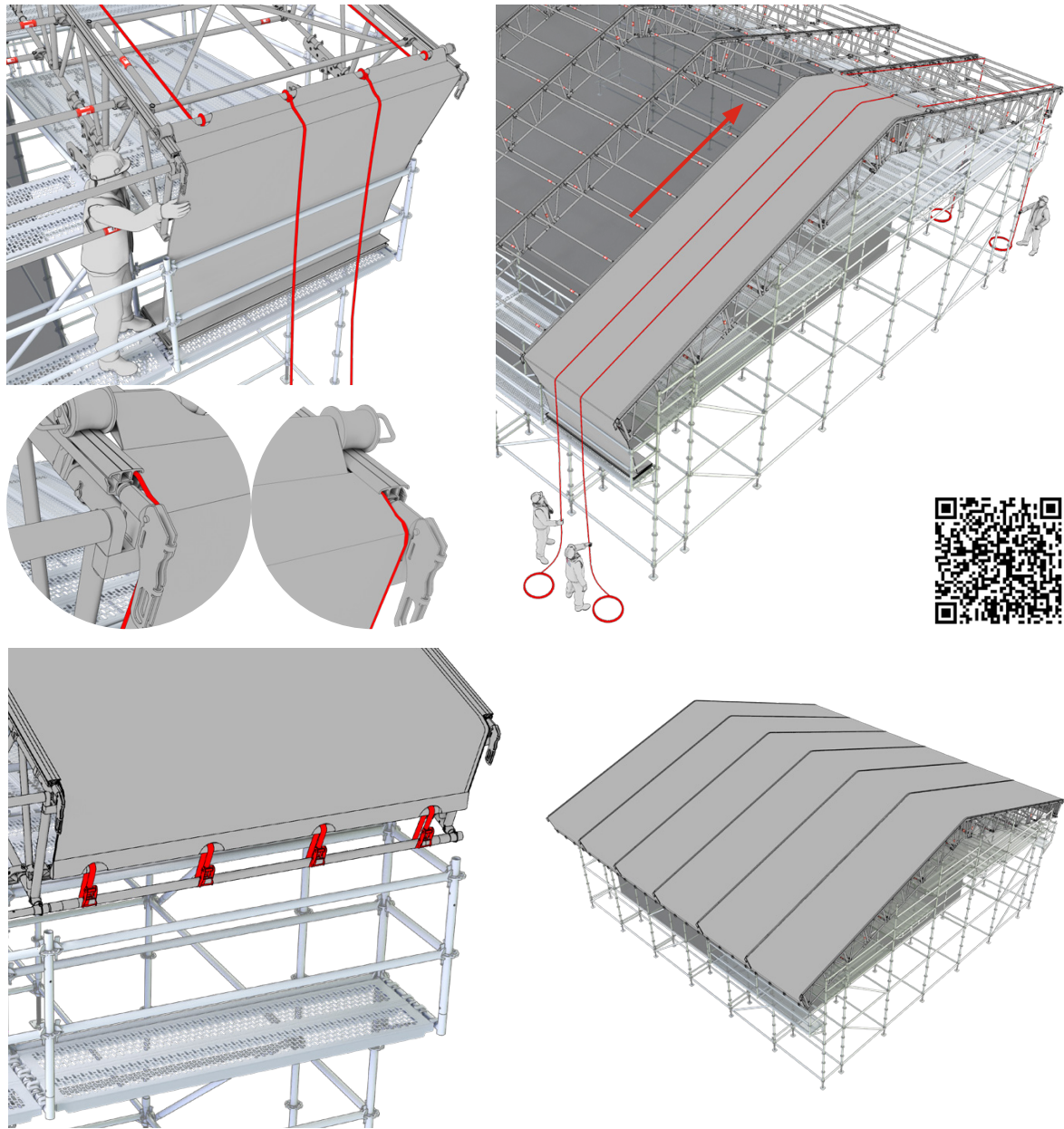


5.1.12 Using a 19mm flat spanner the anti-uplift castors should now be tightened to prevent vertical and horizontal movement. Any additional restraint as determined by the design drawings should be installed at this stage.



5.1.13 With the structure completed, it should be sheeted. It is good practice to place all sheets under the bays where they are required so that when it is time to raise them they are all in the correct position.

Details for sheeting installation can be found in Section 3.8 "Sheeting a Roof".



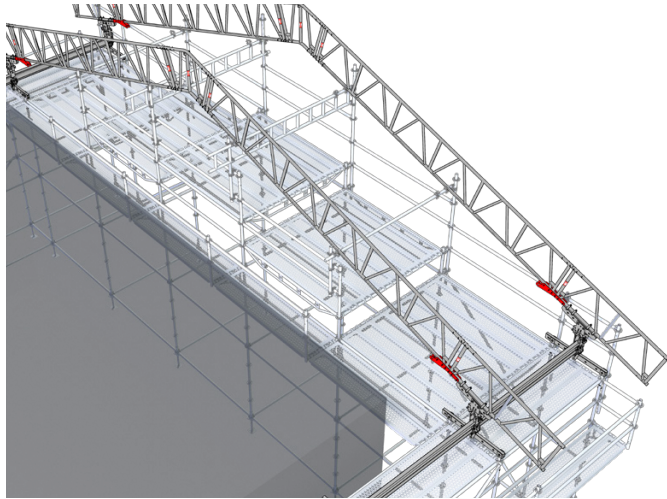
5.2 Duopitch with Tie Bar

Installing a tie bar when building a roll-out roof requires planning. Once the bay is fully built, each beam line should be rolled so that the inner beam line sits just beyond the edge of the working platform. This way, operatives can safely access the different points along the tie bar and install each modular length correctly.

Consideration should also be given to the factors explained in Section 7.1 "Tie Bars" before commencing with the installation of any tie bar componentry.

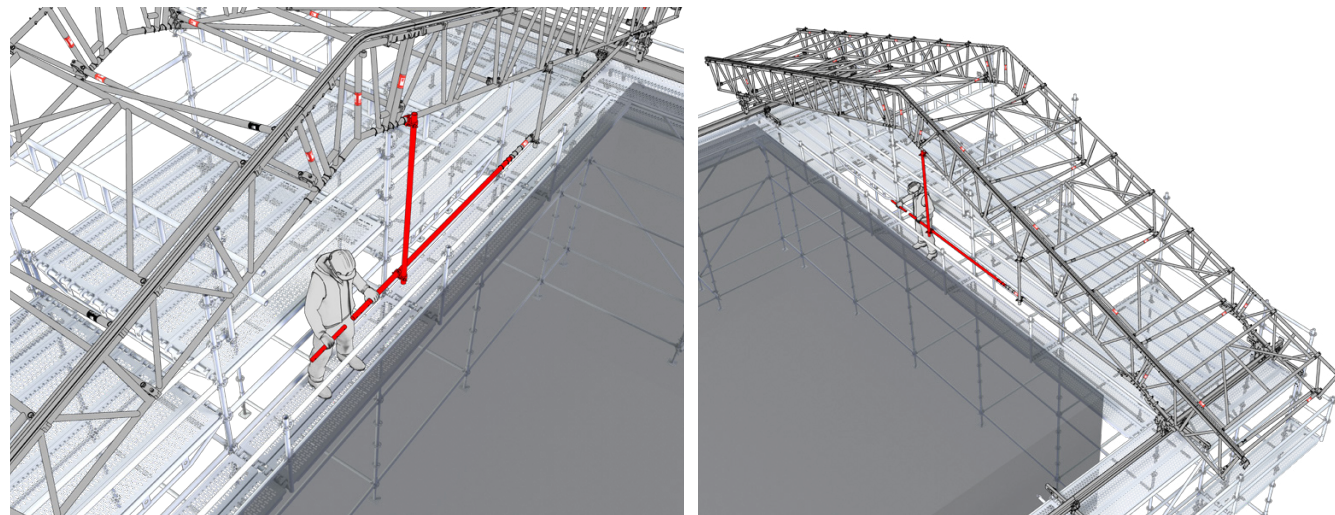
Details on tie bar installation and connections can be found in Section 3.9 "Tie Bar Installation".

5.2.1 Start by constructing a beam line using the required beam lengths, spigots and quick release pins. At the location of the tie bar connection, install 2no. tie bar connector plates (UU0018), one per side of the bottom chord and 6no. M12x90 bolts (AF0006) and nylok nuts (AF0021).

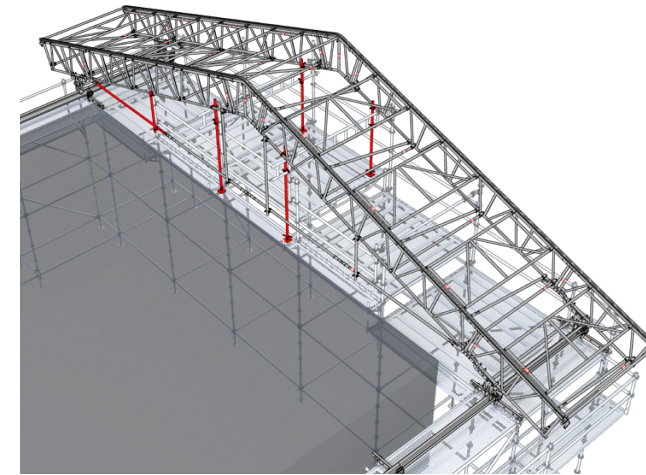


5.2.2 Complete construction of the roof bay, building out the second beam line and adding the required bracing components (horizontal braces, diagonal braces, UNI frames and roller braces) as normal.

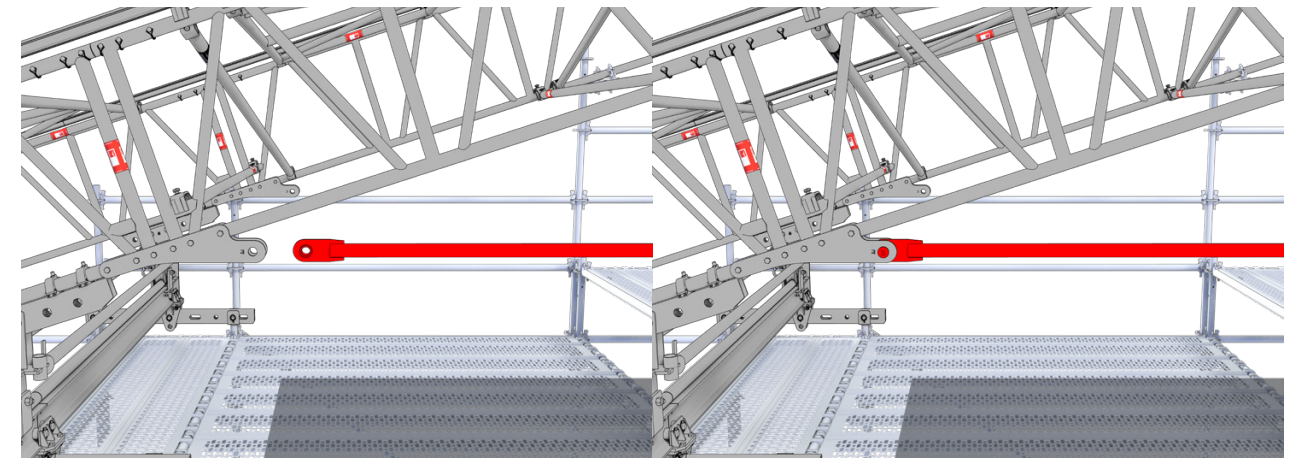
5.2.3 Release the constructed bay and roll it down so that the first beam line sits beyond the end of the gable end scaffold. From a suitable hop-up platform with edge protection, install the tie bar end piece (UU7818) and consecutive tie bar lengths using the required spigots (BS0001) and quick release pins (AF0001).



5.2.4 Droppers should be installed in a level plane from a safe working platform along the tie bar, as shown in Section 7.1 "Tie Bars".



5.2.5 Make the connection between the open tie bar end piece and the connector plate using 1no. 30mm bullet and linch pin (AF0039). It may be necessary to loosen the supports and jack the roof up from a suitable working platform using a safe method to close off the tie bar.



5.2.6 Lower the roof back down, where required, allowing it to relax. The roof can now be rolled down the runway and off the subsequent roof bay and tie bar installation can begin. It may be necessary to adjust the tie bar droppers at this time.

NOTE: it may be necessary to agitate the beam lines upwards to ensure a successful connection as the roof will naturally deflect under its own weight, placing all the bottom chord joints in tension.

NOTE: Tie bars must be installed in a level plane, as close to the support locations of the roof as possible. They must be integrated into the roof at joint locations only and use the DESSA tie bar connector plates (UU0018).

5.2.7 The above process should be repeated for each consecutive beam line in turn, pushing the roof assembly away from the boarded scaffold on completion of each beam line. The table lift scaffold may prevent installation of the tie bar on the last two beamlines. In these locations the tie bar should be threaded through the scaffold, or the table lifts must be removed.

5.3 Monopitch Roofs

Monopitch roofs erected using the roll out method should be assembled in the same way as for hand built monopitch roofs, detailed in Section 4.3 “Monopitch Roofs”.

Trusses should be assembled on a gable end scaffold, secured to support puncheons and rolled away from the gable end scaffold, adding beam lines progressively. Dependant on the choice of TRAX system the roof should be anchored in locations on completion of each installation shift or on completion of the overall structure.

6.0 Roof Installation By Crane

When building a roof by crane, appropriate planning is required before commencing work. The site should be assessed to determine the positioning of the crane and for bays on the ground, as well as a suitable location to crane the completed trusses up to the installation platform. For crane builds and in the absence of roll-out equipment, ideally the crane will be located to reach every roof bay from one location.

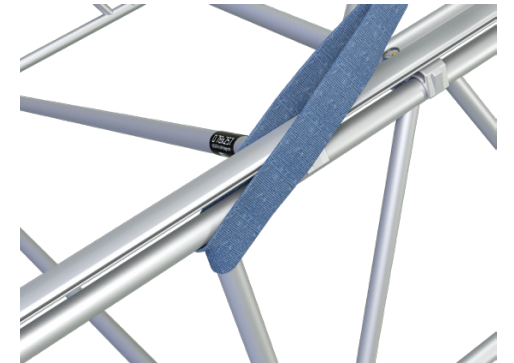
DESSA recommends laying scaffold boards under the end of each beam during construction. This prevents the ends of the beams dragging on the concrete during any lifting processes, preventing unnecessary damage to the beams.

All crane lifting technical data can be found in Sections 6.5 through to 6.8.

6.1 Crane Lifting

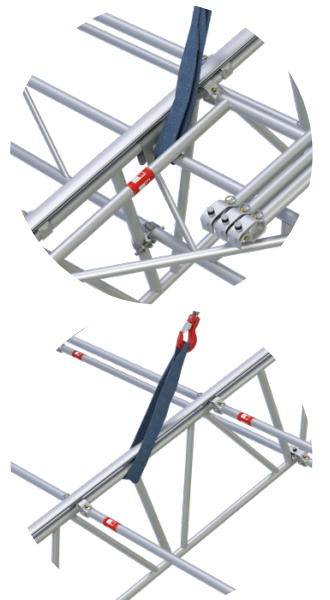
6.1.1 General Rules

Correctly securing a sling before the lifting process is key to ensuring the product is not damaged during this operation. DESSA recommends that when lifting a bay of roof that a **soft webbing sling** is run under the top chord of the beam, downslope of a post. The chord and post of the beam distribute the load from this location therefore ensuring no damage occurs. The roof should be constructed including tracking, with the sling wrapped around as shown.



When lifting multiple bays the roof should be lifted with a lifting beam or a 450mm or equivalent beam slung through to support all the beam lines.

- If the roof is to be lifted by attaching the sling to a 450mm beam, DESSA recommends installing the beam in a vertical orientation. The 450mm beams should be secured to the top chord of the roof truss using a band and plate connection and the bottom chord should be attached to a nearby post.
- If the roof is to be lifted by way of a crane lifting beam, the slings should be installed downslope of a post.



Crane lifting is a specialised activity and we recommend professional guidance is obtained.

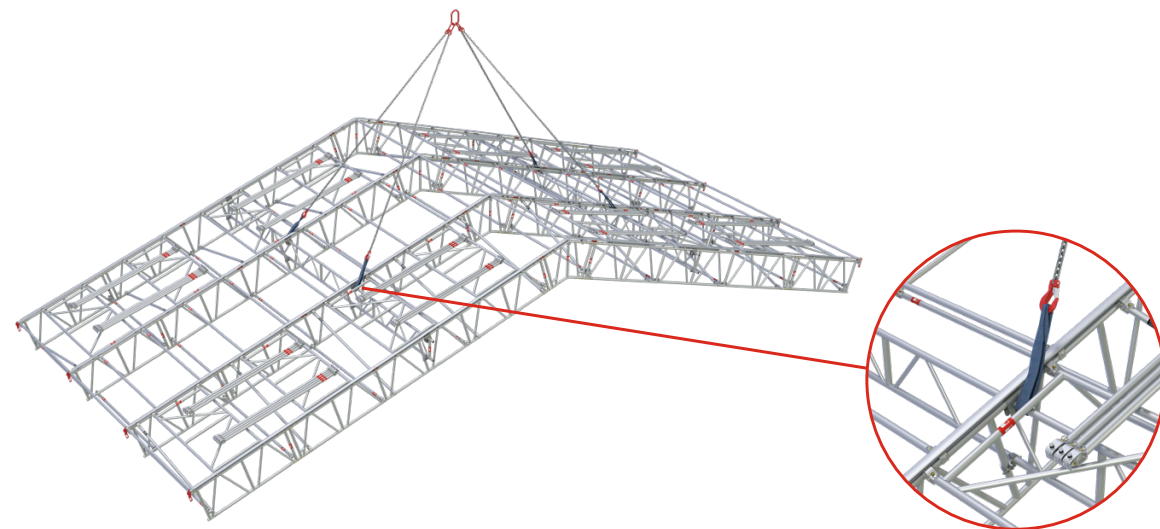
During the crane build procedure, the roof is typically assembled at ground level or from a low working platform. Depending on the overall size of the roof, it may be prudent to complete progressive lifts to ease truss construction, as shown in Section 6.2.2. For example, when erecting a 10m-Ridge-10m roof section, it is easier to erect and brace the first 5m of beam, before lifting up the truss to add the next beam lengths.

It is crucial that before each progressive lift is undertaken, the sling positions are checked and adjusted correctly for the beam length.

It is important that the sling positions are approximately central to each side of the duopitch bay. This means for large spans it will be necessary to move the slings during the bay build process. If the truss is to be lifted multiple times during the build process, we recommend no more than 6m of beam be added per side, lowering and reslinging. **The slings must be adjusted each time a lift is performed to prevent damage to the product.**

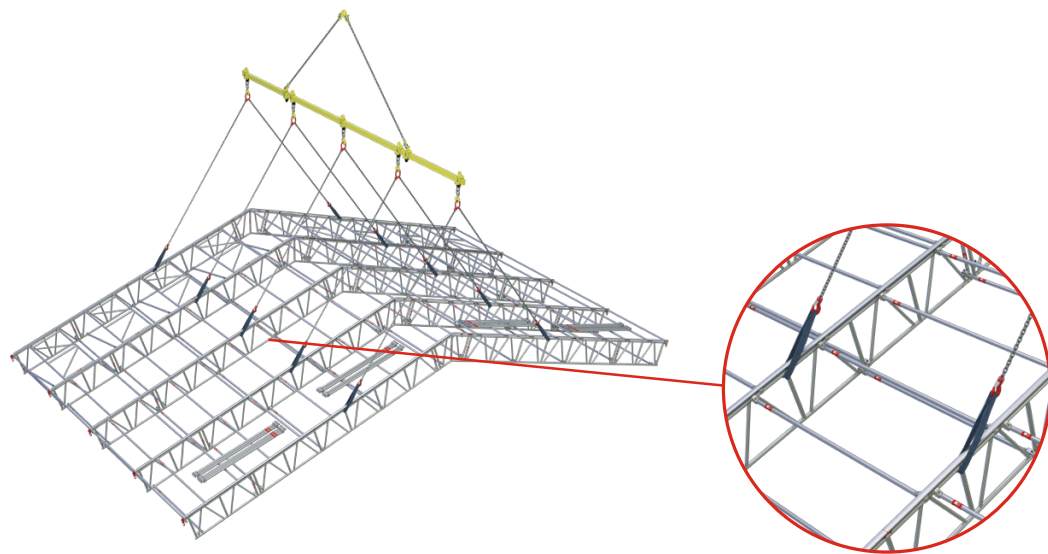
6.1.2 Lifting Multiple Bays

Lifting more than 1 roof bay is also possible providing an appropriately sized crane and equipment are used. 450mm beams must be installed between all the beam lines to provide appropriate support throughout the entire lifted roof section.



Beyond 3 bays, a lifting beam may be required to provide additional support during the lifting operation.

NOTE: The crane operator MUST ensure the lifting beam is correctly installed before beginning any lifting procedures.

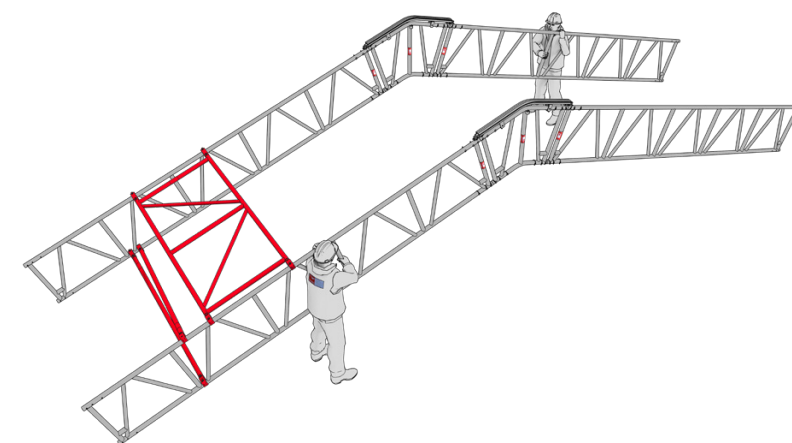


6.2 Duopitch

6.2.1 The first step is to build the first beam line and secure it into position using bracing components, ensuring the truss is level in the vertical plane. Start by installing the ridge tracks using quick release pins (AF0002) and track spigots onto the ridge beam as this reduces working at height risks. Install beam spigots (BS0001) and quick release pins (AF0001) and join the ridge to the first beam lengths. With the first truss completed, the second truss is then constructed and secured to the first truss using 1no. horizontal brace, 1no. diagonal brace and 1no. brace frame.

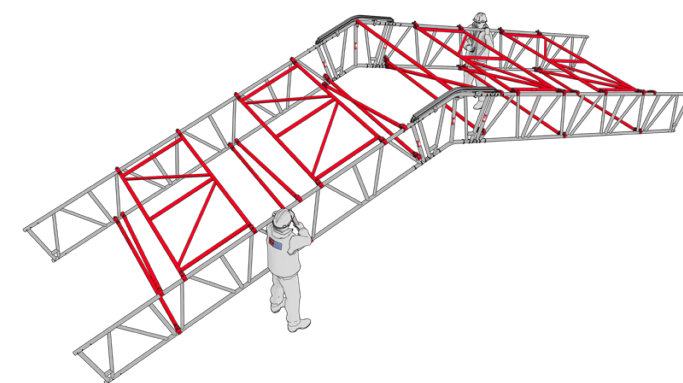
Truss to be assembled using details as shown in Section 3.2 "Connecting Beams".

Braces to be installed as shown in Section 3.3 "Attaching Braces".



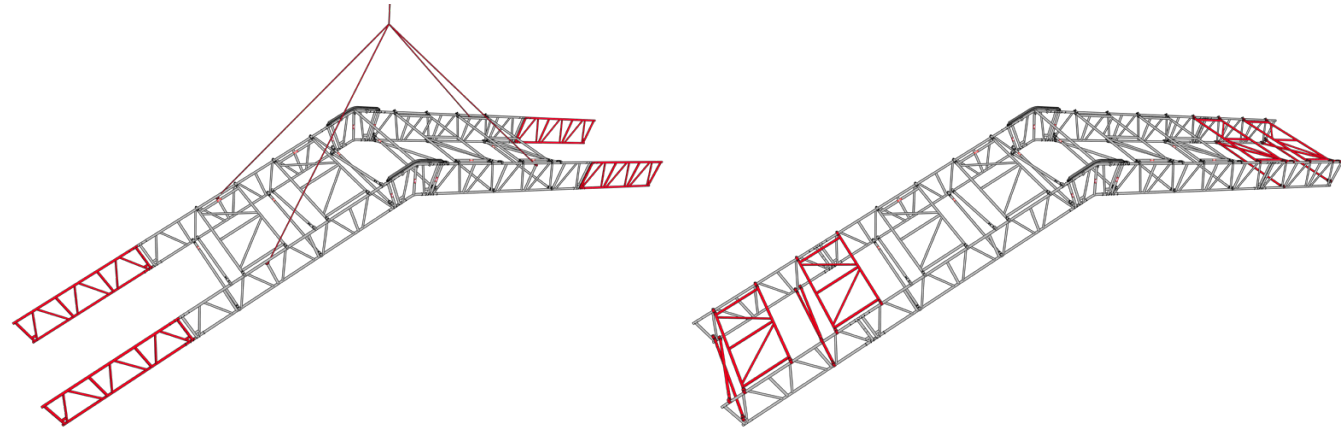
Following the connection of the beam lines horizontal braces, diagonal braces and UNI frames are installed at 2m intervals. UNI frames are installed on the top chord, creating 1m c/c effective bracing, while the horizontal and diagonal braces are installed from the bottom chord at 2m c/c. The ridge roller brace should also be installed into the ridge beam at this stage from a safe platform.

Braces to be installed as shown in Section 3.3 "Attaching Braces".



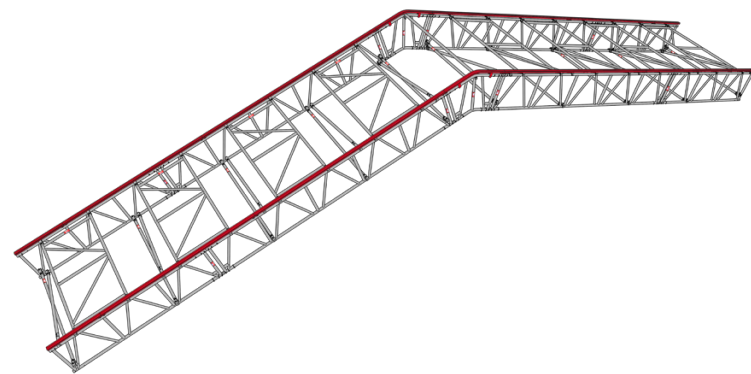
6.2.2 The truss should be lifted using the appropriate sling locations and the next lengths of beam installed. Lower the truss to the ground and continue to install the bracing components as per Section 3.3 “Attaching Braces”.

Crane lifting data can be found in Section 6.5 through to 6.8.



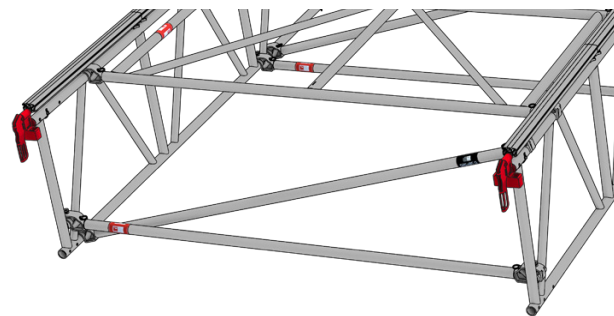
6.2.3 Slide tracking over the button nuts on the bracing components up to the ridge and engage on to the spigot. Loosely tighten the retaining bolt using the hand wheel to hold the track in place. This process is repeated until all tracks are installed. If using Deepflow™ tracking, the 1m end piece (U50001) must be installed.

Tracking installation is detailed in Section 3.5 “Installing Sheet Tracking”.



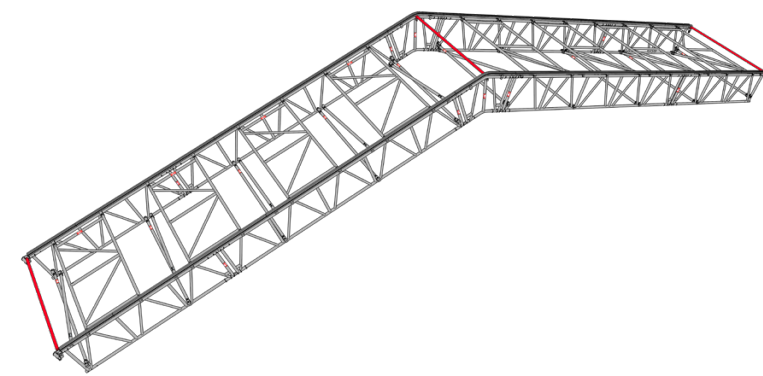
6.2.4 With the sheet tracks in place on both sides of the roof bay, connect the track compressors (UA0005). The track compressor is inserted into the end of the truss, the handle is raised and the quick release pin (AF0001) is located. The handle is then lowered, exerting a compressive force up the tracking line. Once the handle has been compressed all tracking spigot retaining bolts can be tightened, using the hand wheels to prevent any movement at the joint.

Track compressor installation is detailed in Section 3.6 “Fitting Track Compressors”.



6.2.5 Roller braces (UR####) are installed into the track compressor (UA0005) and also into the pre-welded pockets of the ridge beams to allow for the sheet installation. Track compressors have integrated pockets on either side of the handle that the roller brace must be seated in.

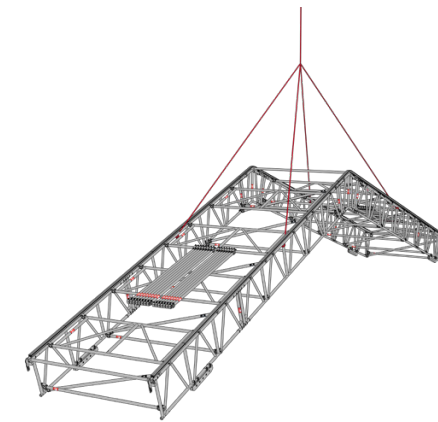
These should be installed as shown in Section 3.7 “Installing Roller Braces”.



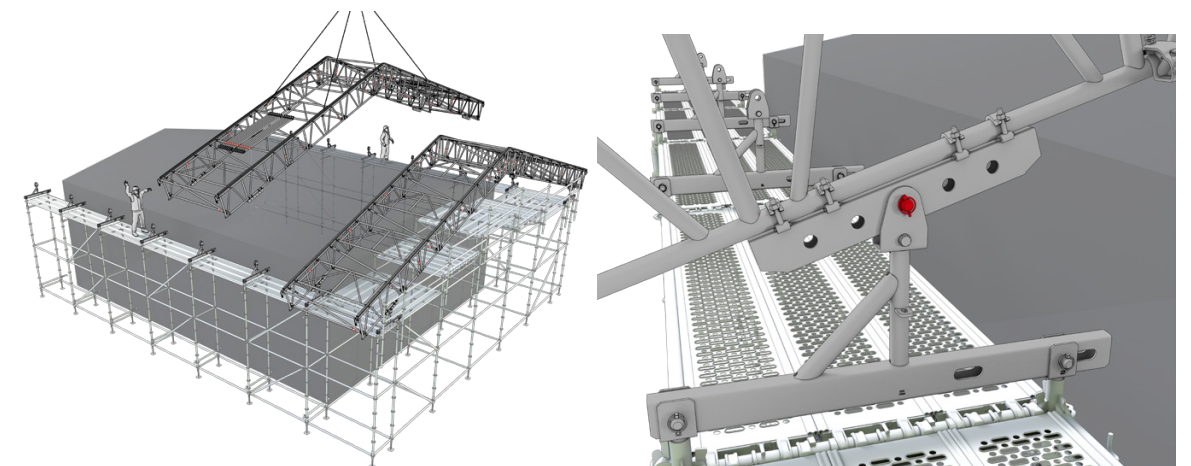
6.2.6 Equipment for the adjacent infill bays should then loaded onto the completed roof bay ready for lifting into place. The sheeting should NOT be installed at this stage. Sling locations should be determined as per the tables given in Sections 6.5 “Single Bay Lifting Data” and 6.6 “Double Bay Lifting Data”.

If the project states multiple bays are to be lifted, the appropriate supporting or lifting beams must be installed at this stage as per Section 6.1 “Crane Lifting”.

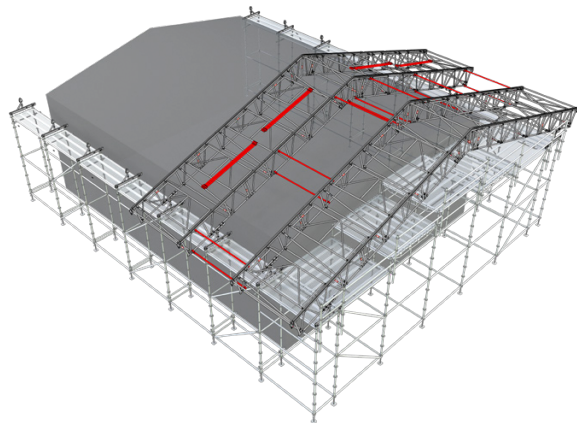
The above procedures should be followed for each bay assembled for lifting.



6.2.7 Once the bays are lifted into place, secure the roof to the supporting structure using the designed connection (header beam, beam support assembly, rolling runway).

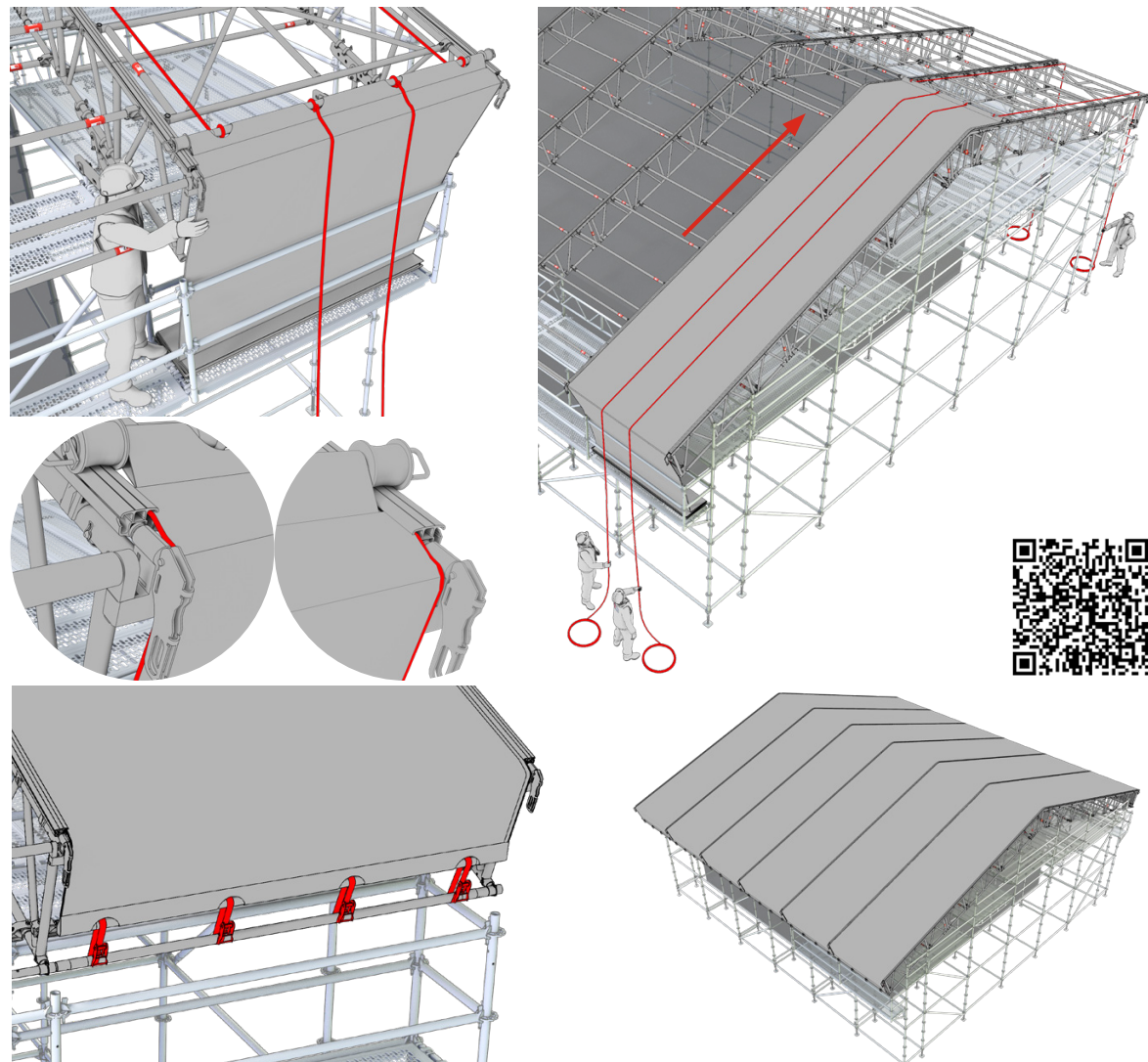


6.2.8 Operatives can then scale the landed roof trusses using the appropriate safety equipment and precautions, then infill the roof bays with the horizontal braces brought up by the craned bay. Horizontal braces used in infill bays must be installed on the underside of the top chord between each braced bay as shown in Section 3.3 “Attaching Braces”. Repeat this process until the roof structure is complete.



6.2.9 With the structure completed, it should be sheeted. It is good practice to place all sheets under the bays where they are required so that when it is time to raise them they are all in the correct position.

Details for sheeting installation can be found in Section 3.8 “Sheeting a Roof”.



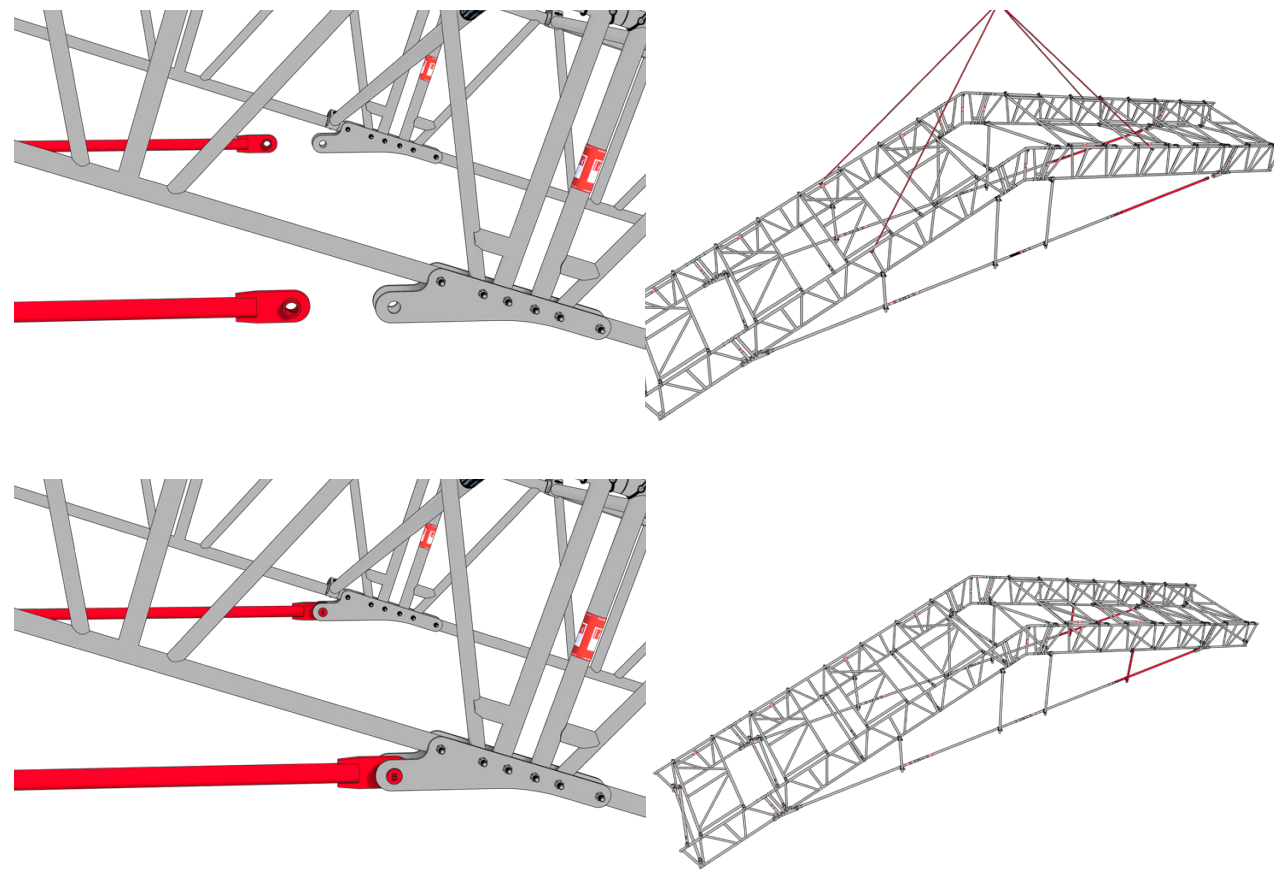
6.3 Duopitch with Tie Bar

Tie bar installation using a crane is the easiest method for tie bar installation. Under its own weight, the roof truss will naturally spread off the eaves, preventing tie bar completion.

To install the tie bar, a complete braced bay should be fully erected with all required components. The roof section can then be raised by the crane which allows the beam lines to sag under their own weight and creates the opportunity to pin the tie bar components into place. Once the tie bar is installed, the roof can be placed back on the ground and droppers can be fitted to support the tie bar. Finally, the assembled braced bay can be raised to the supporting structure above.

Consideration should also be given to the factors explained in Section 7.1 “Tie Bars” before commencing with the installation of any tie bar componentry.

Details on tie bar installation and connections can be found in Section 3.9 “Tie Bar Installation”.



NOTE: it may be necessary to agitate the beam lines upwards to ensure a successful connection as the roof will naturally deflect under its own weight, placing all the bottom chord joints in tension.

NOTE: Tie bars must be installed in a level plane, as close to the support locations of the roof as possible. They must be integrated into the roof at joint locations only and use the DESSA tie bar connector plates (UU0018).

6.4 Monopitch By Crane

When lifting monopitch roof sections constructed from the UNI roof system, changes to the lift procedure should be made. A certified Engineer should calculate the overall weight of the structure and the sling lengths so that the roof truss can be safely lifted into place.

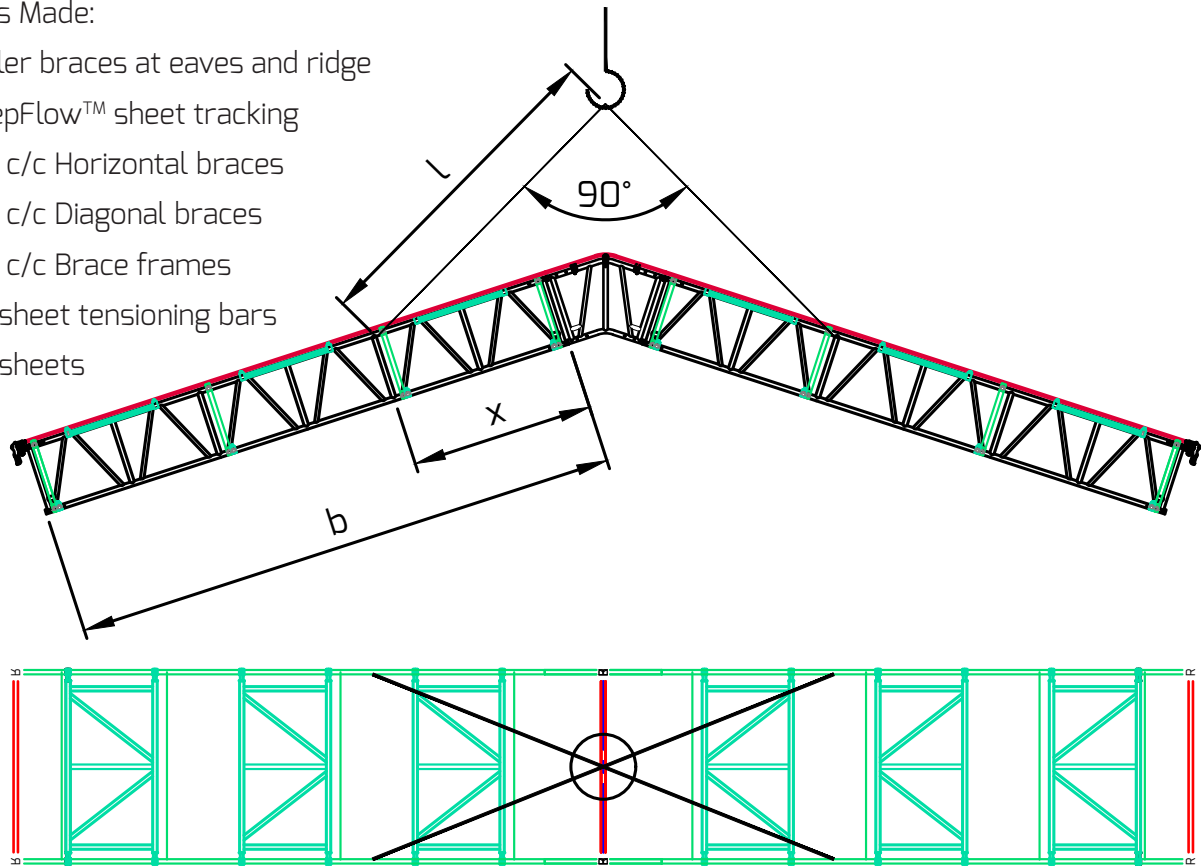
As the roof is lifted, it must remain balanced and pitched correctly so that it can safely land on the supporting structure. The sling lengths must be sized so that the lifted bay angle compliments the expected installation angle.

Further information on monopitch roof considerations can be found in Section 4.3, "Monopitch Roofs".

6.5 Single Bay Lifting Data

Assumptions Made:

- Roller braces at eaves and ridge
- DeepFlow™ sheet tracking
- 2m c/c Horizontal braces
- 2m c/c Diagonal braces
- 2m c/c Brace frames
- No sheet tensioning bars
- No sheets



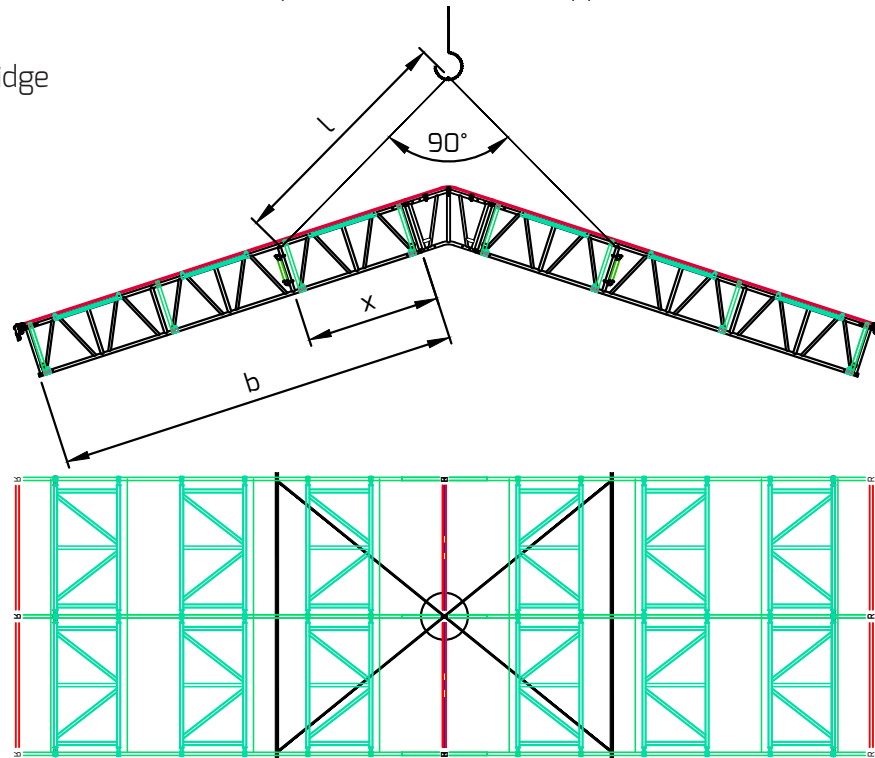
BEAM LENGTH, b (m)	SLING DIST, x (m)	2072 BAY SIZE		2572 BAY SIZE		3072 BAY SIZE	
		SLING LENGTH, l (m)	WEIGHT (kg)	SLING LENGTH, l (m)	WEIGHT (kg)	SLING LENGTH, l (m)	WEIGHT (kg)
6	2	3.68	391	3.76	415	3.85	437
7	3	5.00	462	5.06	488	5.13	514
8	3	5.00	511	5.06	538	5.13	566
9	4	6.32	562	6.37	593	6.42	623
10	4	6.32	612	6.37	644	6.42	676
11	5	7.65	664	7.69	698	7.73	734
12	5	7.65	713	7.69	749	7.73	786
13	6	8.91	783	8.95	822	8.99	862
14	6	8.91	833	8.95	874	8.99	916
15	7	10.31	884	10.35	928	10.38	973
16	7	10.31	933	10.35	978	10.38	1025
17	8	11.66	985	11.68	1033	11.71	1082
18	8	11.66	1035	11.68	1084	11.71	1135
19	9	13.00	1105	13.02	1158	13.04	1215
20	9	13.00	1154	13.02	1208	13.04	1264

6.6 Double Bay Lifting Data

When crane lifting 2 roof bays at once, it is important that they are appropriately supported. Therefore, to ensure stability between the roof trusses, 450mm beams must be run through the entire lifted section on the same post where the sling is attached to the beam. This must be done on both sides of the ridge and the 450mm supporting beams must be secured with scaffold couplers, or using a band and plate connection to the top chord for vertical support beams.

Assumptions Made:

- Roller braces at eaves and ridge
- DeepFlow™ sheet tracking
- 2m c/c Horizontal braces
- 2m c/c Diagonal braces
- 2m c/c Brace frames
- No sheet tensioning bars
- No sheeting

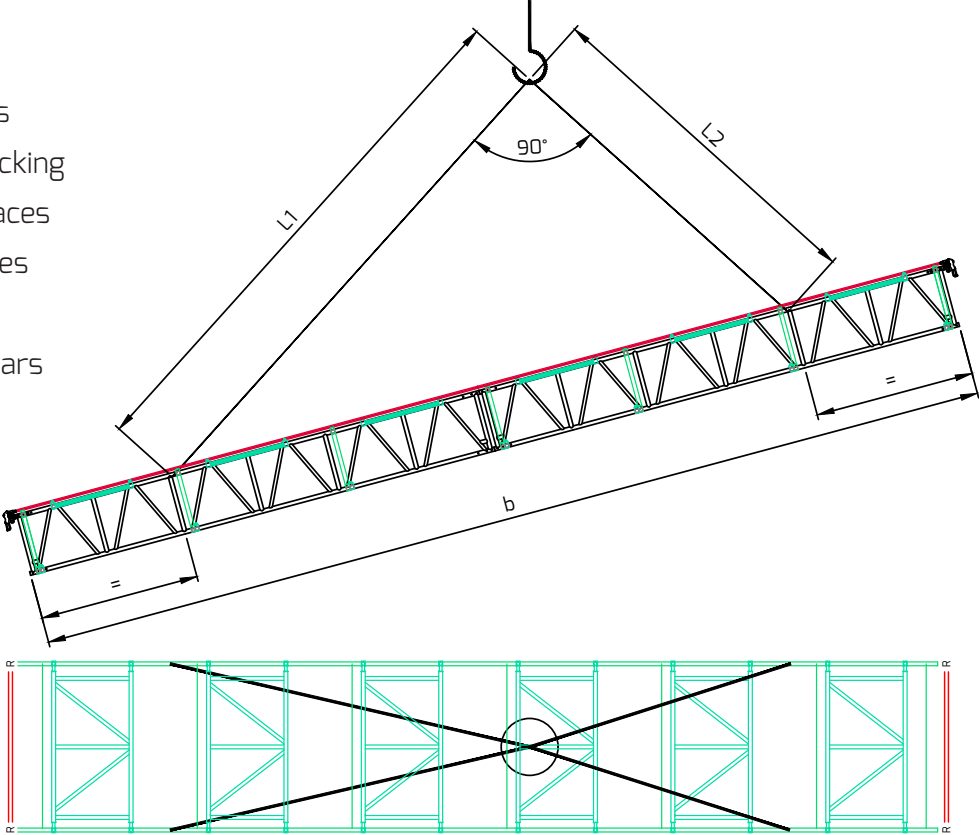


BEAM LENGTH, b (m)	SLING DIST, x (m)	2072 BAY SIZE		2572 BAY SIZE		3072 BAY SIZE	
		SLING LENGTH, l (m)	WEIGHT (kg)	SLING LENGTH, l (m)	WEIGHT (kg)	SLING LENGTH, l (m)	WEIGHT (kg)
6	2	4.10	663	4.37	704	4.68	754
7	3	5.31	778	5.53	831	5.78	882
8	3	5.31	861	5.53	915	5.78	970
9	4	6.57	947	6.74	1008	6.95	1069
10	4	6.57	1031	6.74	1095	6.95	1159
11	5	7.86	1118	8.00	1188	8.18	1260
12	5	7.86	1200	8.00	1273	8.18	1346
13	6	9.09	1316	9.22	1394	9.37	1474
14	6	9.09	1400	9.22	1481	9.37	1564
15	7	10.47	1487	10.58	1574	10.72	1663
16	7	10.47	1569	10.58	1659	10.72	1751
17	8	11.79	1655	11.89	1751	12.01	1850
18	8	11.79	1739	11.89	1838	12.01	1940
19	9	13.12	1855	13.20	1960	13.31	2068
20	9	13.12	1937	13.20	2045	13.31	2156

6.7 Monopitch Single Bay Lifting Data

Assumptions Made:

- Roller braces at eaves
- DeepFlow™ sheet tracking
- 2m c/c Horizontal braces
- 2m c/c Diagonal braces
- 2m c/c Brace frames
- No sheet tensioning bars
- No sheeting



DISTANCE TO BEAM END, =	SPAN (m)
1	UP TO 10
2	11 - 15
3	15 - 20

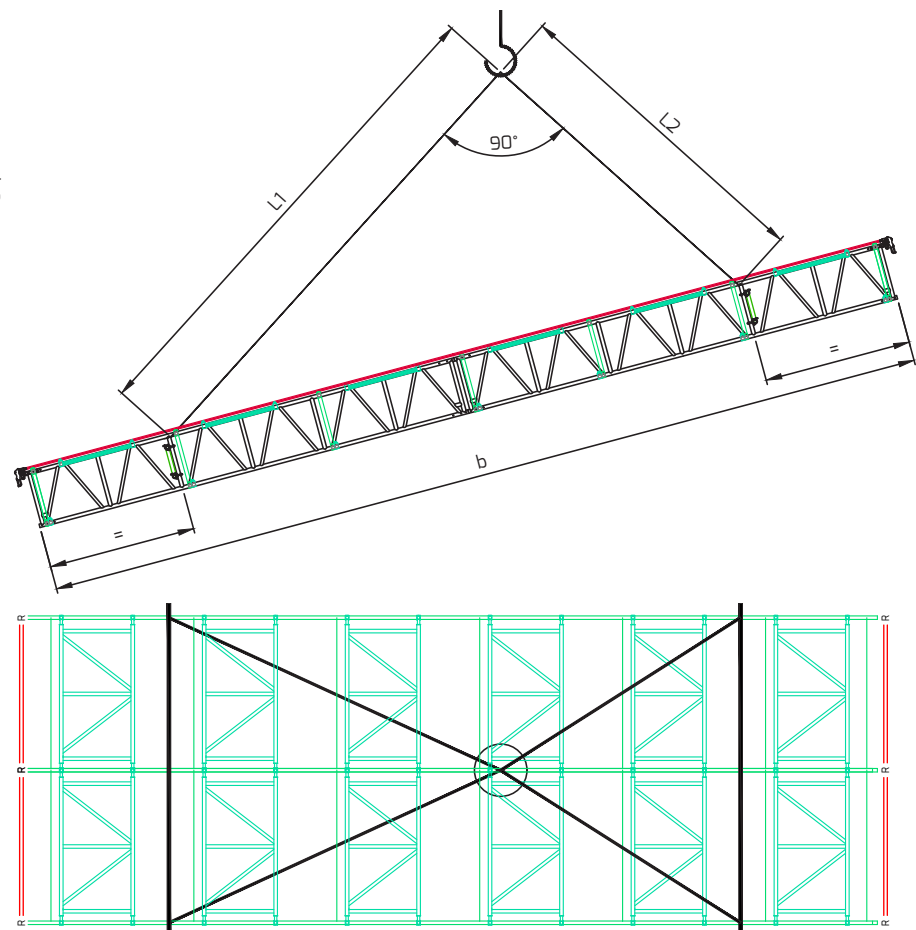
BEAM LENGTH b (m)	2072 BAY SIZE			2572 BAY SIZE			3072 BAY SIZE		
	SLING LENGTH L1 (m)	SLING LENGTH L2 (m)	WEIGHT (kg)	SLING LENGTH L1 (m)	SLING LENGTH L2 (m)	WEIGHT (kg)	SLING LENGTH L1 (m)	SLING LENGTH L2 (m)	WEIGHT (kg)
6	3.56	2.39	183	3.54	2.51	195	3.64	2.64	208
7	4.28	2.88	218	4.35	2.98	233	4.43	3.09	247
8	5.10	3.39	243	5.16	3.47	258	5.23	3.57	273
9	5.91	3.91	268	5.96	3.98	280	6.02	4.07	301
10	6.75	4.43	293	6.80	4.50	311	6.85	4.58	328
11	5.92	3.93	319	5.70	4.00	338	6.02	4.07	356
12	6.75	4.43	343	6.76	4.50	363	6.85	4.58	382
13	7.76	4.99	379	7.61	5.05	400	7.66	5.12	421
14	8.41	5.53	404	8.44	5.58	426	8.48	5.64	447
15	9.22	6.07	429	9.27	6.11	453	9.31	6.17	476
16	8.41	5.53	454	8.44	5.58	478	8.48	5.64	502
17	9.22	6.07	480	9.25	6.11	505	9.29	6.17	531
18	10.10	6.60	505	10.08	6.65	531	10.12	6.70	557
19	10.93	7.17	540	10.96	7.20	567	10.99	7.26	596
20	11.76	7.71	564	11.79	7.75	593	11.82	7.79	622

6.8 Monopitch Double Bay Lifting Data

Assumptions Made:

- Roller braces at eaves
- DeepFlow™ sheet tracking
- 2m c/c Horizontal braces
- 2m c/c Diagonal braces
- 2m c/c Brace frames
- No sheet tensioning bars
- No sheeting

DISTANCE TO BEAM END, =	SPAN (m)
1	UP TO 10
2	11 - 15
3	15 - 20



BEAM LENGTH b (m)	2072 BAY SIZE			2572 BAY SIZE			3072 BAY SIZE		
	SLING LENGTH L1 (m)	SLING LENGTH L2 (m)	WEIGHT (kg)	SLING LENGTH L1 (m)	SLING LENGTH L2 (m)	WEIGHT (kg)	SLING LENGTH L1 (m)	SLING LENGTH L2 (m)	WEIGHT (kg)
6	3.90	2.99	314	4.19	3.35	340	4.51	3.75	365
7	4.64	3.39	372	4.89	3.72	401	5.17	4.08	429
8	5.41	3.83	413	5.62	4.13	443	5.86	4.46	473
9	6.18	4.30	457	6.36	4.56	490	6.58	4.86	522
10	6.99	4.78	499	7.15	5.02	533	7.35	5.29	567
11	6.19	4.32	542	6.37	4.58	579	6.59	4.88	617
12	6.98	4.80	583	7.15	5.04	622	7.31	5.31	661
13	7.79	5.30	641	7.93	5.52	683	8.11	5.77	725
14	8.60	5.81	683	8.73	6.00	726	8.89	6.24	770
15	9.41	6.32	726	9.54	6.51	772	9.68	6.72	819
16	8.60	5.81	767	8.73	6.00	815	8.89	6.24	863
17	9.39	6.32	811	9.52	6.51	944	9.66	6.71	913
18	10.21	6.84	853	10.33	7.01	905	10.46	7.21	958
19	11.07	7.39	911	11.18	7.54	966	11.30	7.73	1022
20	11.90	7.92	952	11.99	8.06	1008	12.11	8.23	1066

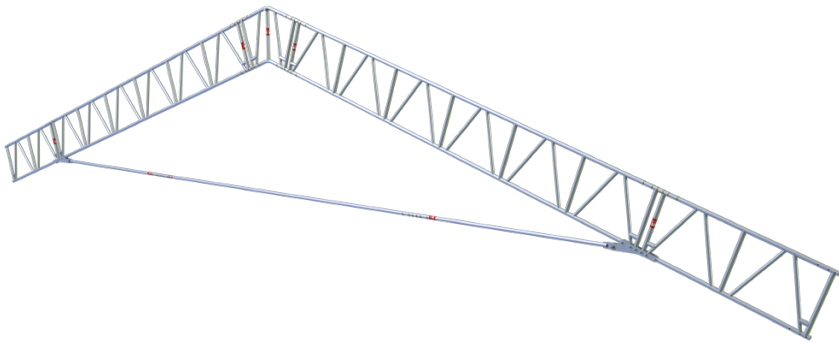
7.0 Techniques

Key and unique to UNI Roof are several techniques that can be applied to the finished roof structure which make it more adaptable to site-specific needs. The UNI Roof:

- Can use tie bars to increase the load bearing capacity of the roof in both tension and compression
- Can be installed with staggered bays
- Can terminate sheeting before the end of the beam line
- Can utilise sheets that are longer than the actual constructed bay
- Can create full encapsulations for complete coverage
- Can be opened and closed for access
- Offers options for managing rain-water

7.1 Tie Bars

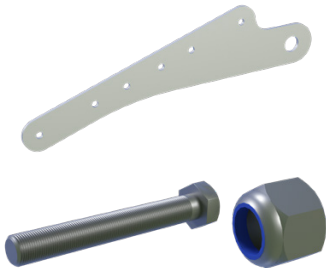
A tie bar is a systemised set of tubular elements that provide a connection between the bottom chords of roof trusses on a duo-pitch roof span. This system prevents the roof from spreading under large downward loads and when laced effectively, it also provides additional resistance against uplift forces. It is used for projects requiring a large span, subject to heavy snow or downward wind loads, or projects with limited anchorage possibilities.



7.1.1 Connector Plates

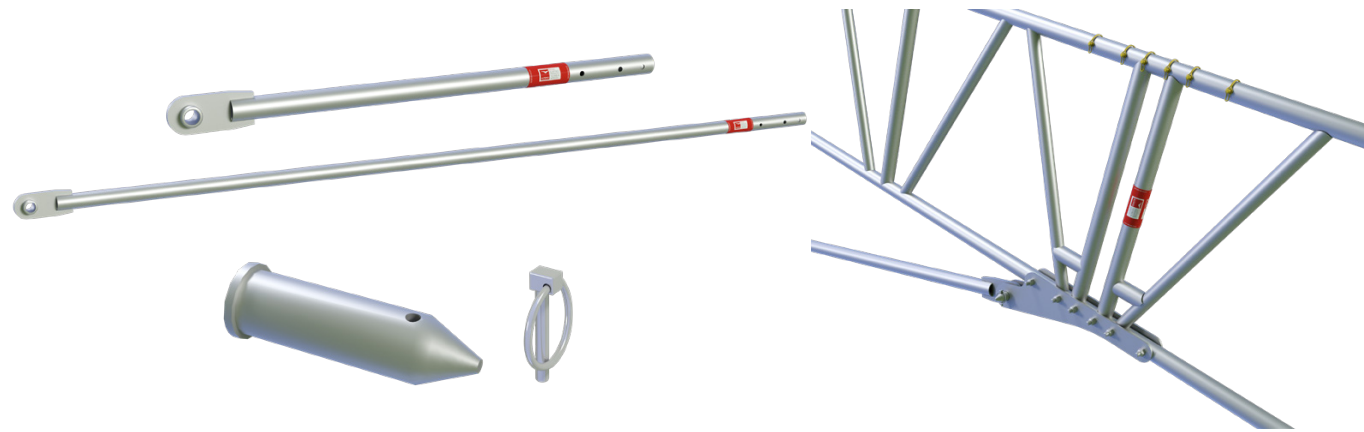
Tie bar connector plates (UU0018) should be installed during beam line construction. These can only be introduced at a beam joint and should be positioned as close to the roof supports as possible. Therefore prior planning is required to ensure a joint is at the desired location, with beam line composition adjusted accordingly.

Tie bar connector plates should be connected through the bottom chord of the roof truss and the beam spigot. They are installed on each side of the beam line joint, using 6no. M12 x 90 bolts (AF0006) and nylok nuts (AF0021).



7.1.2 End Pieces

Tie bar end pieces (UU7818 and UU4518) are installed between the connector plates and are secured in position using 1no. 30mm bullet (AF0004) and linch pin (AF0039).



7.1.3 Modular lengths

Modular tie bar lengths are installed sequentially from one side to the other using a spigot (B50001) and quick release pins (AF0001) at each joint location. Once the final modular length is fitted, the opposite end piece will be installed between the 2no. connector plates.

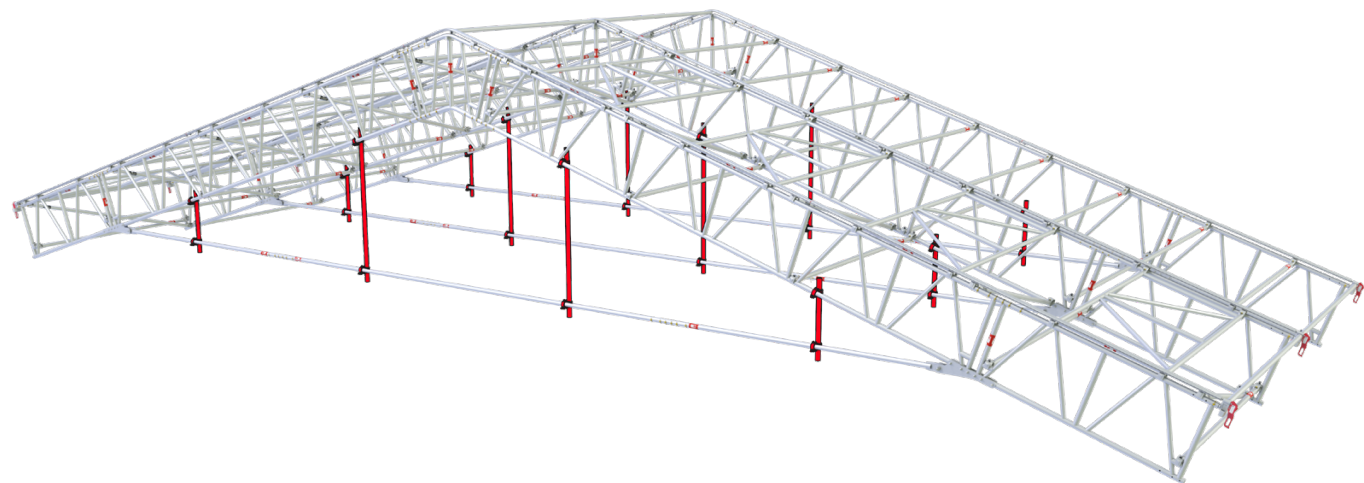
NOTE: It may be necessary to agitate the roof beam lines upwards to ensure a successful connection as the roof will naturally deflect under its own self-weight, therefore placing the joints containing the connector plates into tension.



7.1.4 Support droppers

Vertical support droppers should be installed to support the self-weight of the tensioning bar components. These should be installed as the modular lengths and end pieces proceed from one connection point to the next. Droppers should be suspended off the bottom chord of the roof truss and at nominal centres, dependent on the intended design application. Typical applications require 3m c/c for droppers to provide sufficient support to the tensioning bar.

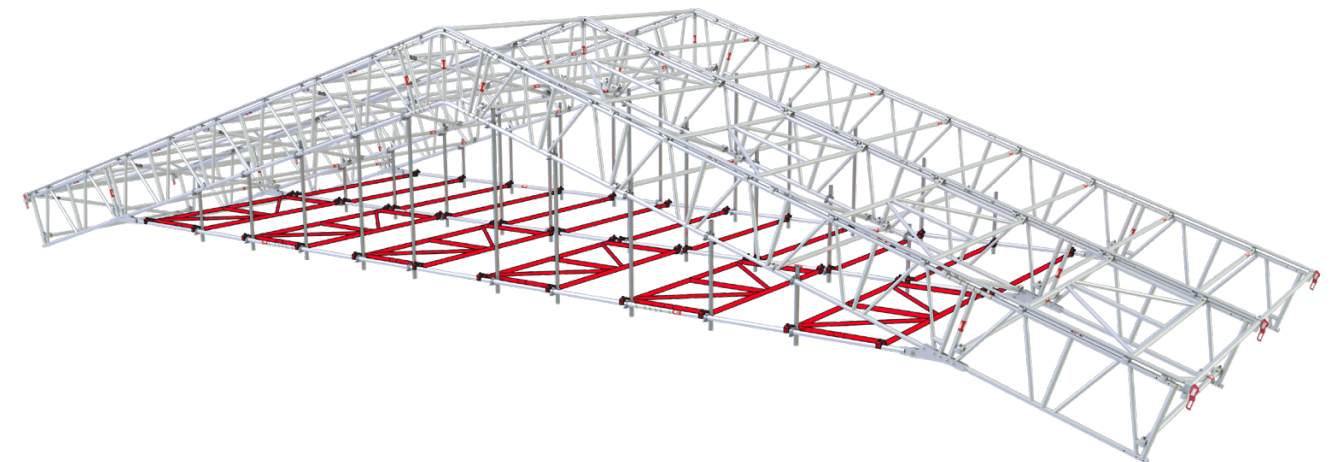
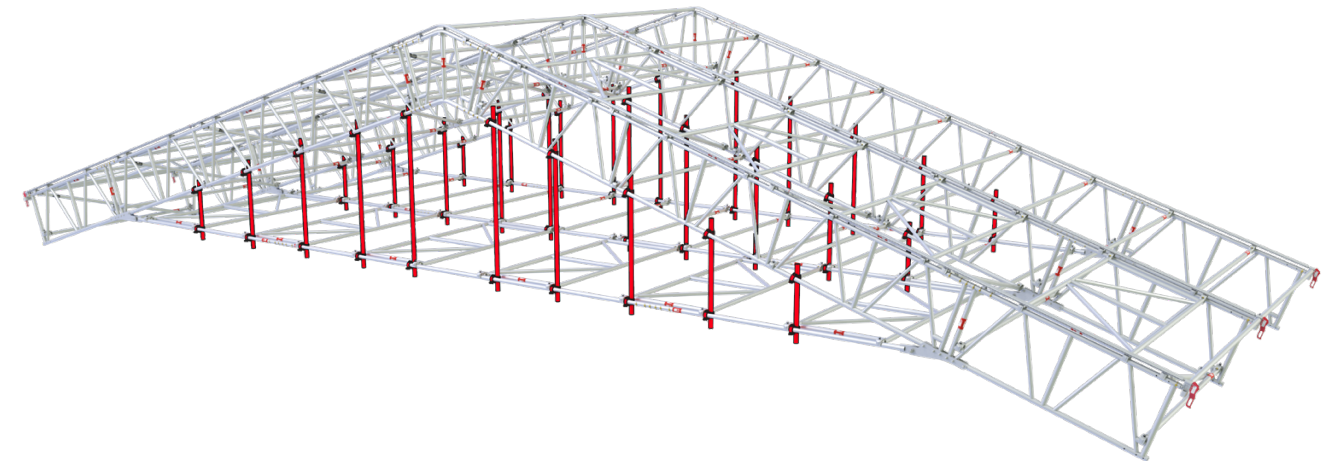
The vertical droppers can be formed from scaffold tube and fittings, wires or ratchet straps. If ratchet straps are used, they will need checking and re-tensioning throughout the project duration.



7.1.5 Lacing and bracing

Effectively lacing and bracing the modular tie bar system can provide compressive capacity. This is especially useful for projects where wind uplift is anticipated to be an issue. Often, vertical dropper spacing can decrease from 3m c/c to 1m c/c, with additional plan bracing installed to effectively restrain the tie bar. The vertical droppers should be made from scaffold tube and fittings to properly absorb the compressive forces exerted on the roof.

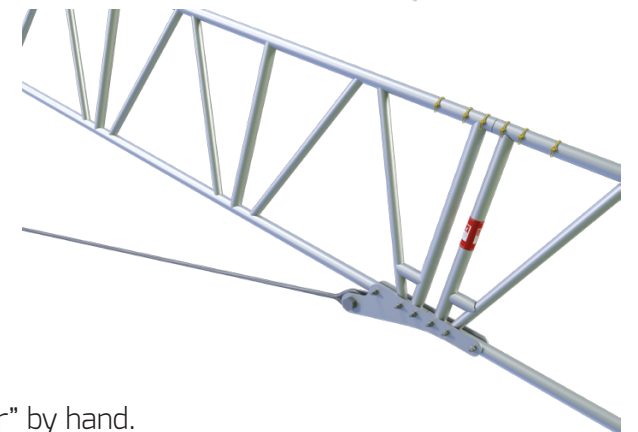
DESSA bracing components can be applied to ensure effective lacing and bracing between each tie bar and beam line. UNI frames offer plan bracing when installed onto the tie bars, they should be installed on braced bays with horizontal braces being used on infill bays. UNI frames are installed at 2m c/c (1m c/c effective bracing) where required and horizontal braces should be installed at 1m c/c.



7.1.6 Alternative Tensioning Methods

Sometimes a tensioning element can only be installed once the roof is in place, therefore making the DESSA systemised tensioning bar components difficult to retro-fit into the roof space. Alternative tensioning methods such as a designed steel wire rope could be used, although they would need inspecting and re-tensioning at regular intervals throughout the duration of the project to ensure optimal performance.

For more detail, see Section 4.2 "Duopitch with Tie Bar" by hand.



7.2 Staggered Bays

Staggered bays are used predominantly in two situations:

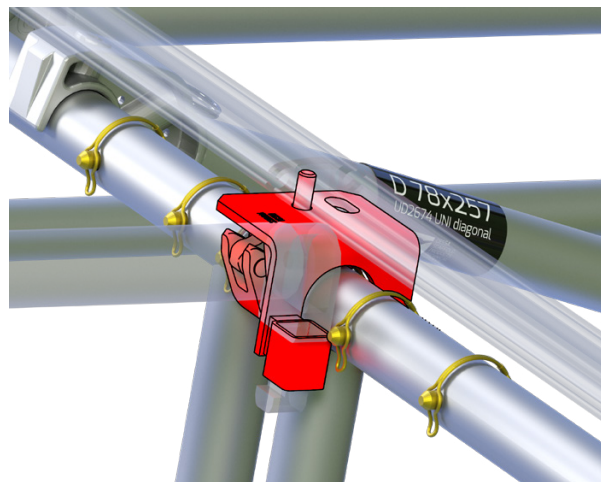
- When installing a bay around an obstacle, such as a chimney
- When it is necessary to follow a natural step in the building

Staggered bays are installed in the same way as regular UNI roof bays but the bay changes when it comes to installing sheet tracks and sheeting. Using the intermediate roller brace coupler (UA0001), sheets can exit the sheet tracking at the desired location as it creates a break in the tracking. Tracking lines on a bay where a stagger will occur must be adjusted to suit a break at the right location. The “track stop” part of the intermediate roller brace coupler must be removed before installing at a tracking break.

A roller brace can then be installed between the integrated pocket on the side of the intermediate roller brace coupler and the track compressor on the next beam line.

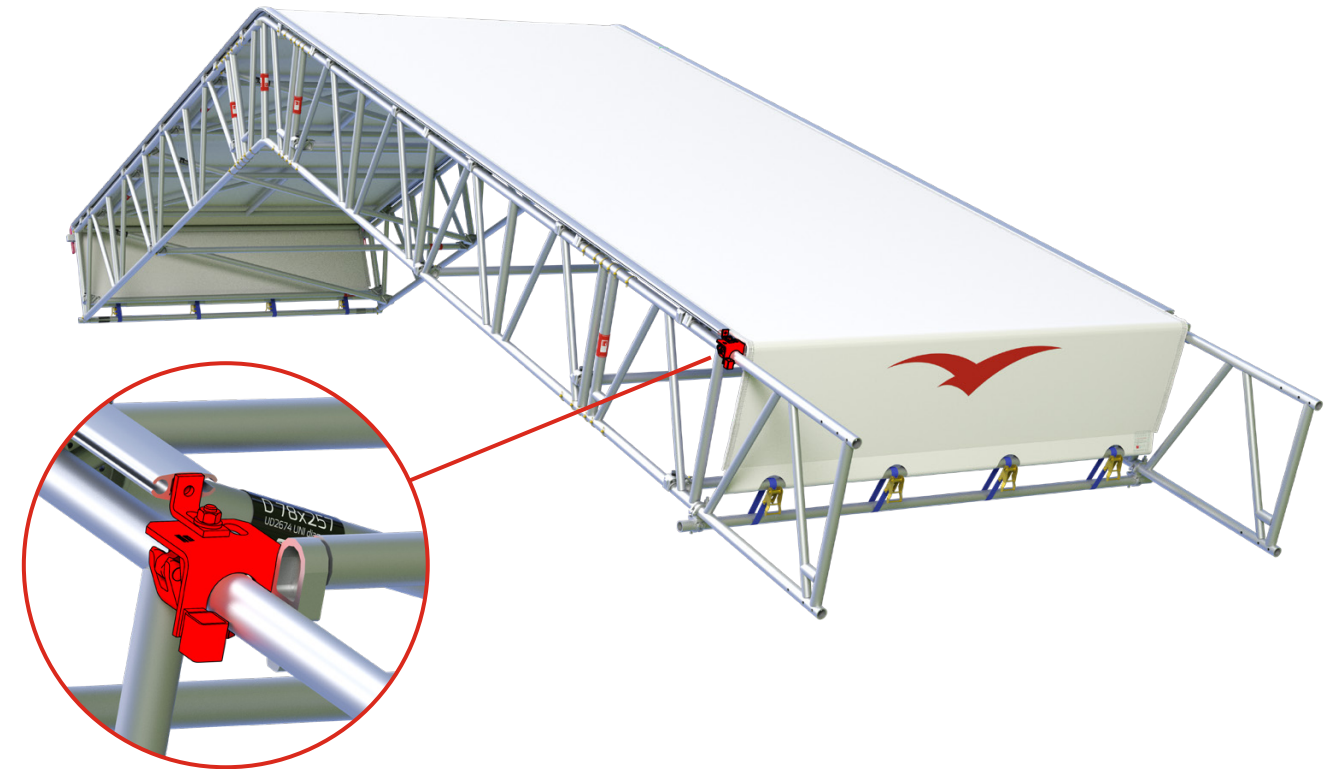
It is therefore very easy to integrate staggered beam lines into the overall roof structure. This can be done at multiple locations along a project, allowing for traditional rectangular roof bays to be constructed over more unique buildings, such as L-shaped or triangular buildings.

A continuous tube cannot be installed at the eaves on a staggered bay using the continuous tube connector (UA0027) or eaves tube holder (UA0016 or UA0017) and instead must be constructed by fitting a length of tube below the bottom chord of the beam using scaffold fittings.



7.3 Early Sheet Termination

The intermediate roller brace coupler (UA0001) can also be used to terminate sheet tracking on a roof where the beam lines overrun the length of the sheet. This can be completed by installing 1no. intermediate roller brace coupler on each beam line at the desired length, with the stop end installed to prevent tracking movement. A roller brace (UR####) is fitted between 2no. adjacent couplers, allowing the sheets to pass between beam lines to a tensioning point.



7.4 Dealing with excess sheeting

UNI roof allows for re-use of roof sheets. Consequently, roof sheets may not fit the bay lengths for subsequent temporary roofs so it may be necessary to deal with sheet excess in order to use existing sheets. The best way to deal with this is to pull the sheets down the façade of the scaffold on one, or either side, connecting them to the supporting structure.

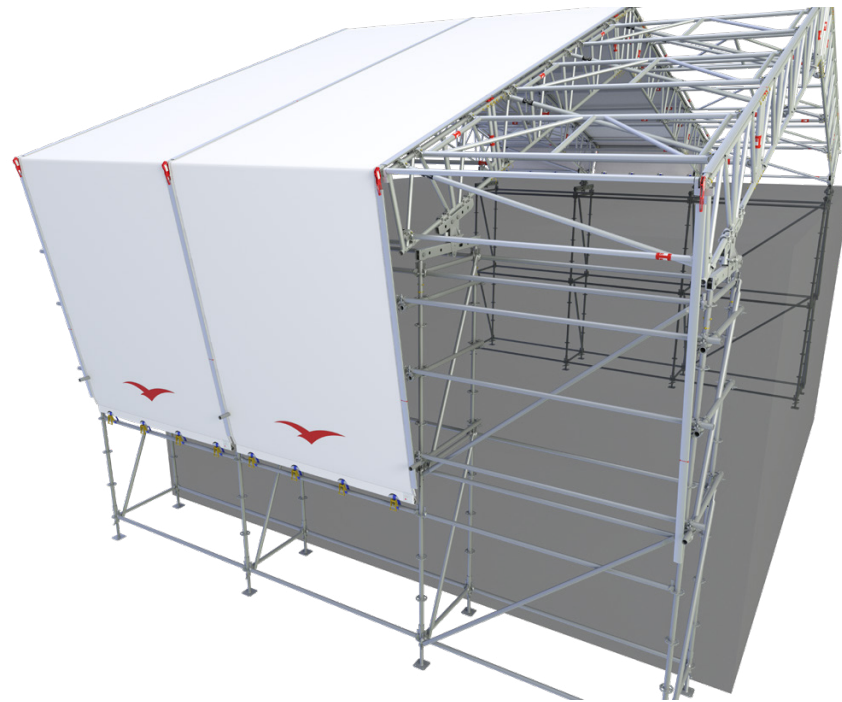
Above 2m in length, sheet tracking must be installed in the vertical plane so that the sheets will be restrained. If tracking is not installed and the excess is simply secured to lower-level fixings then damage may occur during high winds.

There are two ways to achieve this depending on the supporting structure type:

- Installation of structural transoms, ledgers and puncheons to carry sheet tracking
- Direct fixing of sheet tracking to scaffold using tracking couplers

7.4.1 Option 1 - Angled Tracking

Structural transoms from the supporting scaffold are extended away from the building façade at different lengths and in 1m c/c vertical increments, so that an angle is created. A ledger is then installed on top of these transoms using right-angled couplers. Puncheons are subsequently attached to these ledgers at the centres of the roof bays above using right-angled couplers and sheet tracking is then secured to these puncheons using either the long or short UNI track couplers.

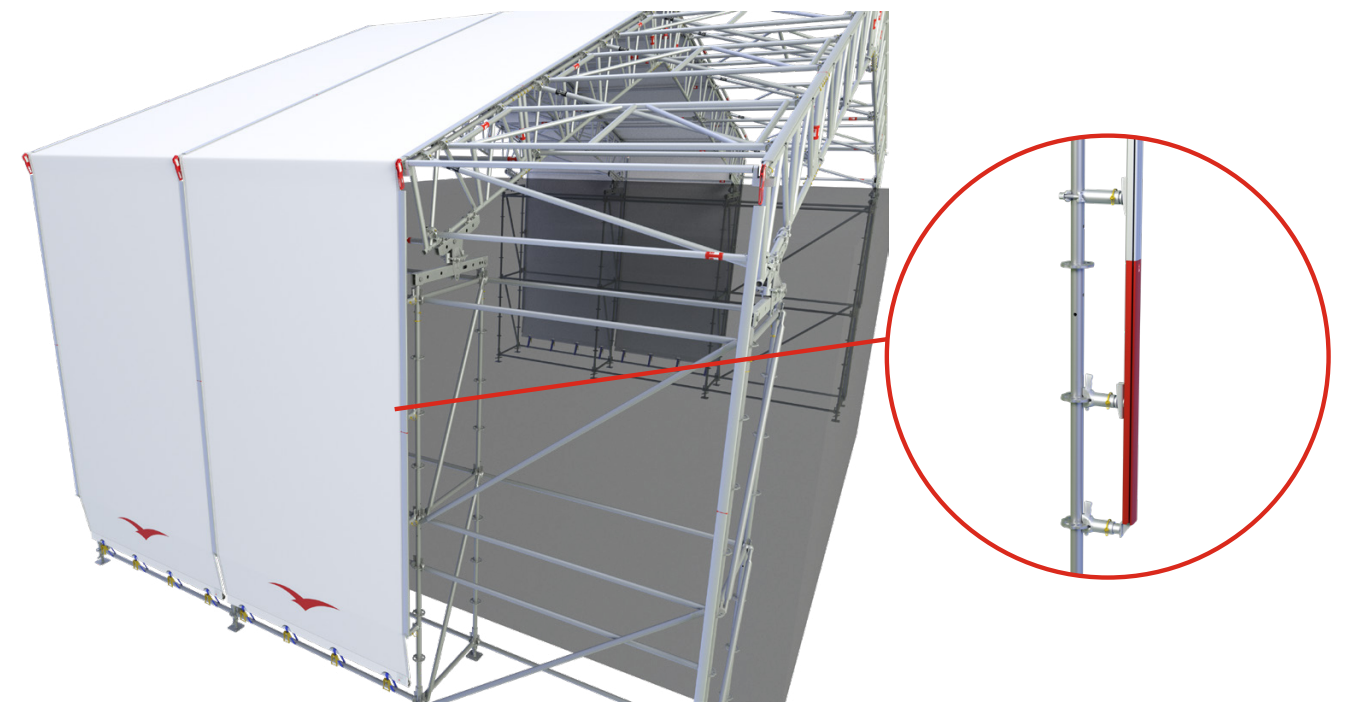


7.4.2 Option 2 - Vertical Tracking

UNI track couplers, or two-part tracking couplers, are secured directly to the standards (or ledgers) of the supporting structure in order to accept the sheet tracking with minimal offset from each standard. It is preferable that standards are arranged so that they are directly in line with the roof truss above.

- For system scaffolds, the UNI track coupler long (UA0020) must be used to extend the tracks past any rosettes or cups
- For tube and fitting scaffolds, the UNI track coupler short (UA0002) is used to sit the tracking almost flush with the standards

Alternatively the two-part tracking coupler can be used to offset the tracking from the structure. The wedge head connector (UA0032) allows for connections into rosettes on system scaffolds. The scaffold fitting head (UA0033) allows for it to be secured to any 48.3mm tube. Both of these heads use the same offset distance and are fully compatible with the tracking wedge (UA0031) and tracking stop brackets (UA0034), meaning they can also be used together on the same structure to form sidewall sheeting.



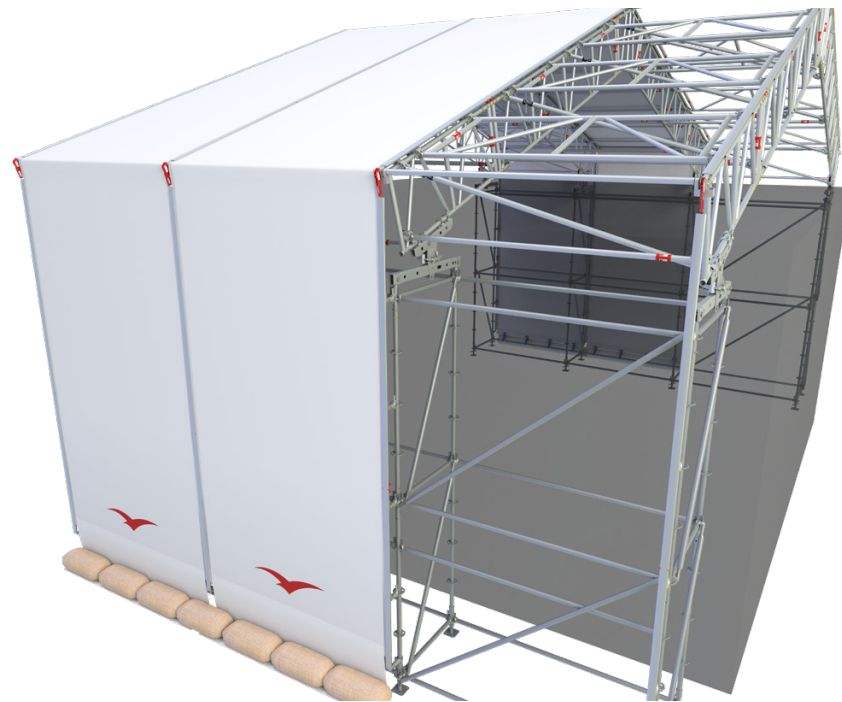
7.5 Encapsulations

With UNI roof, the option to seamlessly integrate sidewall sheeting on a structure is possible using DESSA components to achieve a full encapsulation. To achieve this, the beam line can be terminated using the required equipment, followed by installing DESSA tracking couplers up the vertical standards of the structure. Tracking can be installed vertically or horizontally:

- Vertical tracking allows for a continuous single sheet to be used per bay, going from the ground on one side, up and over the structure and back to ground
- Horizontal tracking requires the use of separate roof and sidewall sheeting, with the two sheet elements running perpendicular to one another

Alternatively 36-degree ridge beams can be installed on the eaves of the structure, with beams used to create the sidewalls. This is ideal for projects where a single continuous sheet is used as DESSA bracing components and sheet tracking can be combined to create a complete shelter, as shown in Section 2.0 “Pre-installation and Safety Considerations”.

Single sheets are used creating a fully encapsulated structure. If the project requires 100% encapsulation, then the addition of gable end sheeting can create a fully enclosed structure with complete weather protection in all directions.

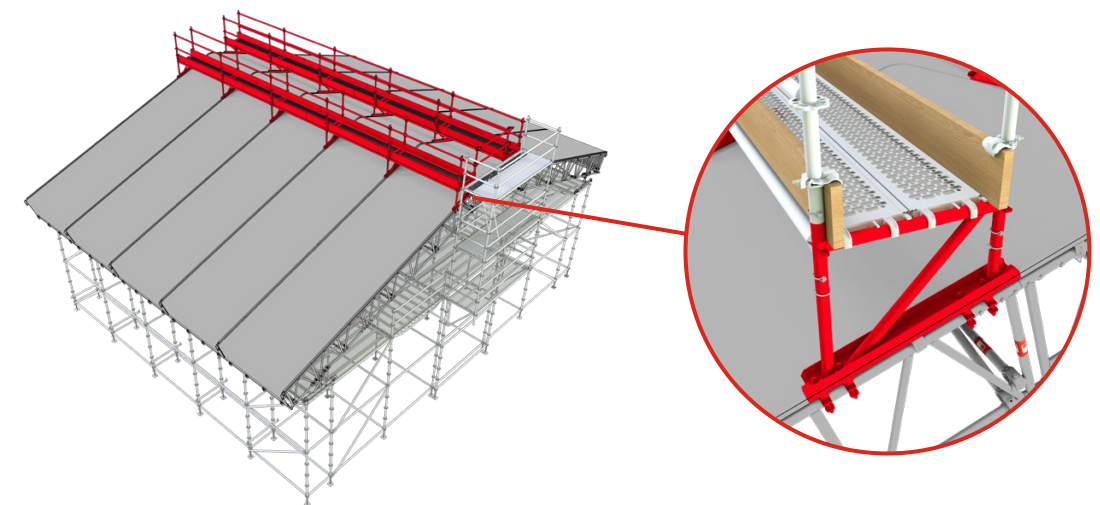


DESSA roof sheets can be fitted with a 'valance flap' allowing sand bags or weights to seal the flap down to the ground. This allows for the sheet to be tensioned correctly whilst covering the gap that would form below this, enabling complete covering of the structure and preventing water ingress.

7.6 Roof Walkways

Utilising the DeepFlow™ track with bolt-through frame, UNI Roof can be equipped with a walkway that allows access to any roof section. The module occupies a 1m length of DeepFlow™ tracking, meaning a continuous tracking run is maintained.

Access and edge protection can be fitted to the module by installing system standards, ledgers, decks and toeboards affixed with single couplers. Having access to the roof bays from this walkway aids inspection, maintenance and snow removal.



7.7 Rain Water Management

Using gutter bracket UA0038, a scaffold board or timber eaves can be installed allowing commercial guttering to be installed on the roof structure. The gutter bracket (UA0038) mounts to the bottom chord of the beam. Guttering is screwed to the scaffold boards along the side of the structure, design advice should be sought regarding the installation of downpipe intervals.

A flap of additional sheet material can be secured to the wooden boards with wooden battens, enabling complete protection across the roof space and into the guttering.



8.0 Openings in Completed Roofs

A unique feature of UNI Roof is the variety of ways openings can be formed in the roof to allow for plant and material access throughout a project. With a range of techniques available, UNI roof is the complete roofing system for projects that require access through the roof.

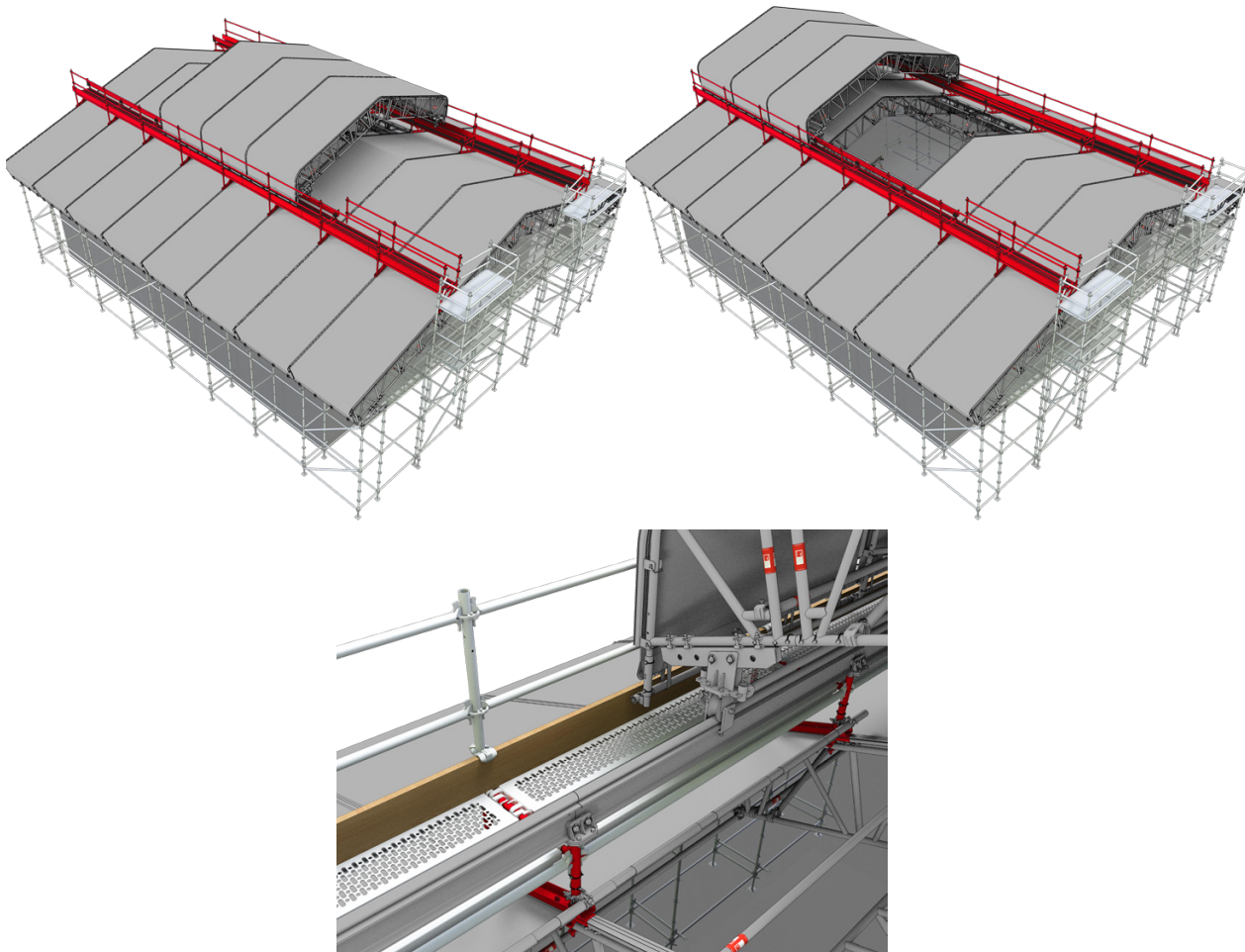
8.1 Roof-on-Roof Openings

For roofs with an 18-degree pitch, the DeepFlow™ track with bolt through frame allows for sysTRAX™ components to be installed to support an additional roof above the main roof. The runway should be constructed using the sysTRAX top plate support for OE standard (TA0005) allowing sysTRAX™ installations straight into the inside standard. Openings can be created by removing the central area of a beam line either side of the ridge, and instead building a 'tophat' roof to roll over the exposed area.

NOTE: Roofs constructed with this opening method must be validated by a qualified engineer. Appropriately sized support beams must be installed to support the shorter beamlines around the opening. DESSA recommends supporting the shorter beamlines using tri-beams BT4250 and BT5250.

To incorporate this roof design, the frame modules must be planned and fitted during the build process of the roof erection. Once the roof has been constructed, it can be decked out along with edge protection and the sysTRAX™ runway can be installed. The roof can then be erected and rolled along the upper runway, over the opening to provide complete weather protection.

When the opening is required, the upper roof can be manually moved out of its closed position and returned thereafter.



8.2 Cantilever Openings

Cantilever openings allow for the construction of two separate mobile roof structures that share a common runway beam. Through the use of various castor top plates, one of these roofs will be fixed higher than the other.

The end bay of the upper roof can be fitted with UNI cantilever braces to the top chord, allowing for the installation of the cantilever componentry. This gives a 0.5m overhang off the final bay. The installation of these components should be planned and incorporated at the construction stage. The cantilever braces will be installed at 1m c/c on the top chord, prior to the tracking installation.

When the higher and lower roofs are pushed together the 0.5m cantilever bay will overlap the lower, providing the coverage with an optional drape sheet if desired. To form the opening to gain access, simply pull the two roofs apart.

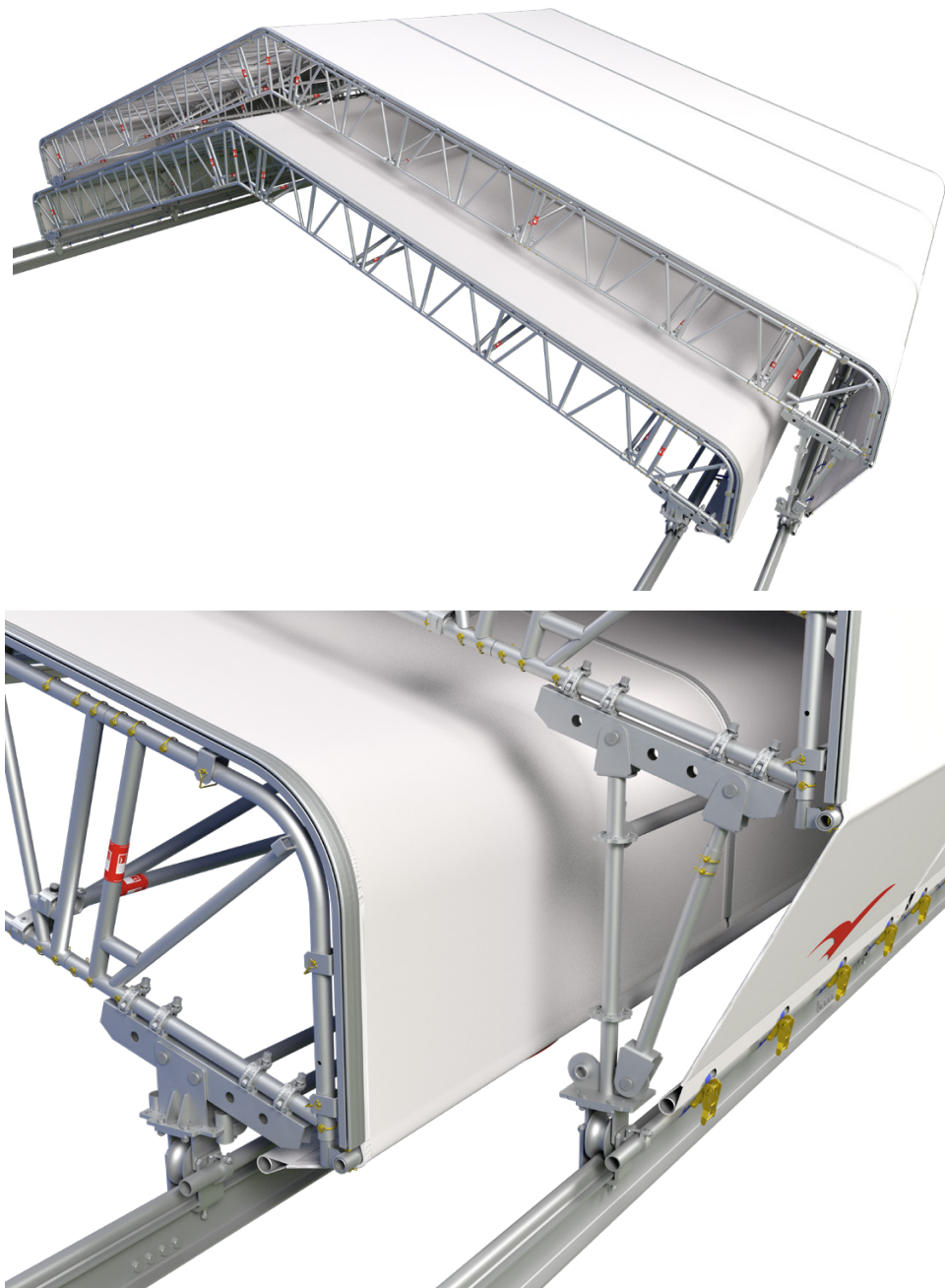
It should be noted that for cantilever roofs with 100% coverage when closed, the runway beam of the scaffold would need to be extended/cantilevered out at one end of the scaffold. This should be supported appropriately.



8.3 Telescopic Roofs

Telescopic roofs can be constructed by erecting multiple roofs on separate supports. Both roofs can be supported using sysTRAX™ or TRAX UB runways, as this allows the roofs to be moved in either direction, or alternatively one roof could be fitted into position whilst the second roof is mobile. This technique can be used to create large openings, as the two roofs function entirely independently and can be freely moved.

Utilising the UNI Beam Support (AA0007, AA0008, AA0009), the upper roof can be installed in close proximity to the lower roof to reduce the need for additional scaffold width to support the two runways. With custom gable sheeting, water ingress can be fully prevented. Alternatively, standard DESSA castor top plates can be used, though this means the supports may need to be planned and provided at separate heights thereby requiring more consideration during the design phase.

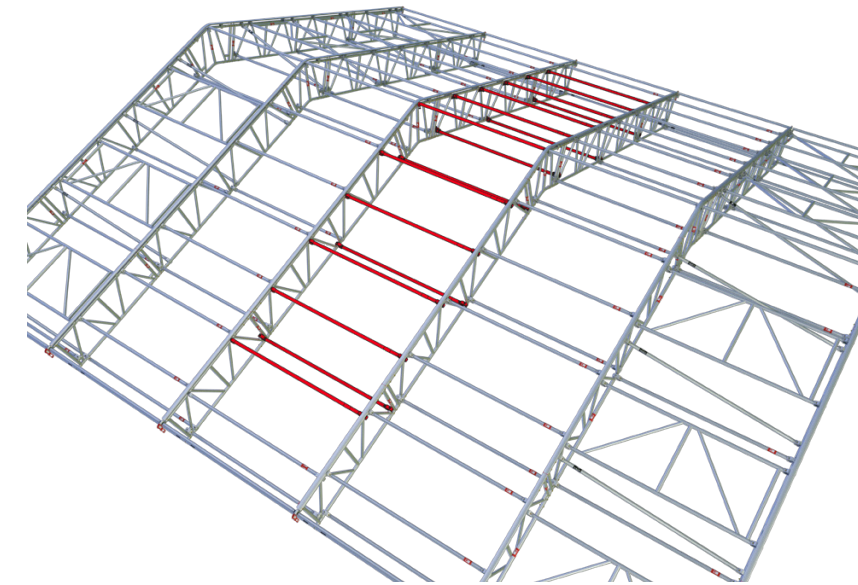


8.4 Constructed Openings

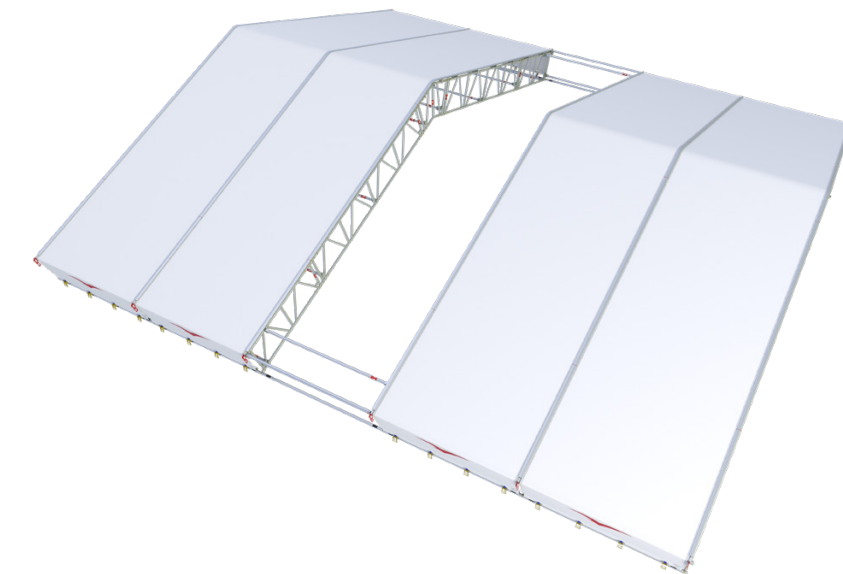
A key feature of the UNI roof system is that openings can be formed in completed roof bays by removing the sheeting and horizontal braces. Prior planning is essential to ensure the opening bay is positioned appropriately. This technique offers a quick and easy solution to opening up the temporary roof structure for access without the complete removal of the entire roof.

All bays to be opened should be infill bays with no diagonal braces or UNI frames, as once the sheet tracking is installed these components cannot be easily removed. All bays to be opened should be constructed with the horizontal brace claws downwards, under the top-chord of the trusses as shown in Section 3.3 “Attaching Braces”.

This allows for easy removal without disturbing the sheeting and tracking of adjacent bays.

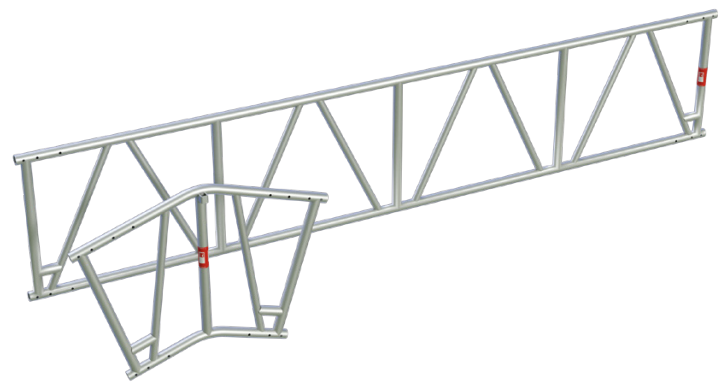


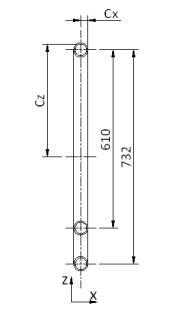
Remove the roof sheet by releasing the ratchet straps from the tensioning tube and pulling it back through the sheet tracking. All braces are then removed in the open bay, allowing for access in or out of the structure. Once the lifting operations are completed, the bracing components must be re-installed, and the sheet is pulled back over the roof space and tensioned appropriately.



9.0 Technical Data

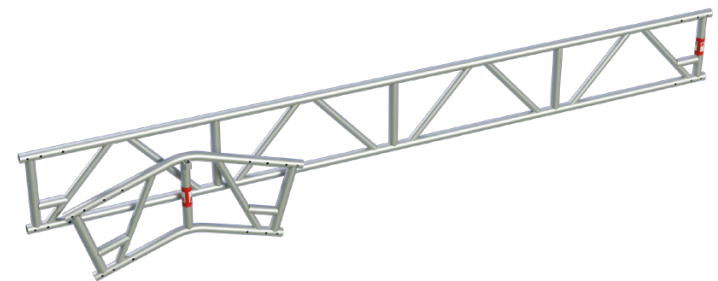
9.1 D78 Beams

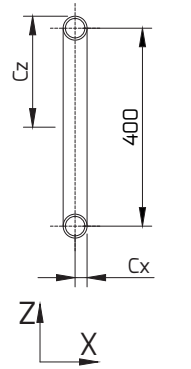


CROSS SECTIONAL PROPERTIES	
	Cx: 2.415 cm Cz: 36.60 cm Ax: 12.3 cm ² Ixx: 16519.9 cm ⁴ Izz: 29.9 cm ⁴

PERMISSIBLE BENDING MOMENT (kNm)		PERMISSIBLE SHEAR FORCE (kN)	
Joint, 1 bolt each side, all lacing intervals (not recommended) :	18.80	All restraint intervals :	23.71
Joint, 2 bolts each side, all lacing intervals :	36.70		
Joint, 3 bolts each side, all lacing intervals :	54.50		
Beam, compression chord lacing at 1.0m c/c (Assume 6 pin connection) :	38.84	MAXIMUM SINGLE POINT LOAD LIMITED TO 23.7kN ACROSS ALL LOAD CONDITIONS.	

9.2 D45 Beams

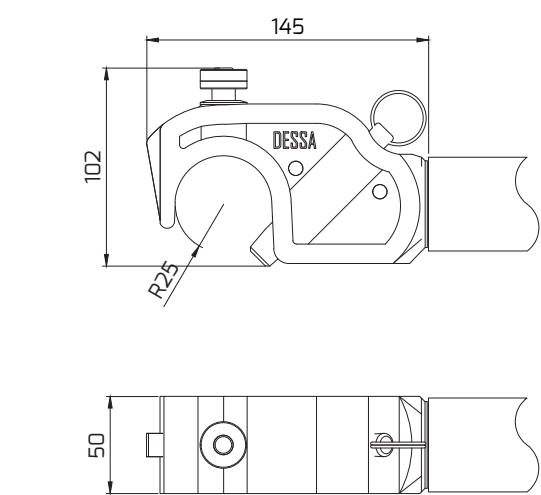
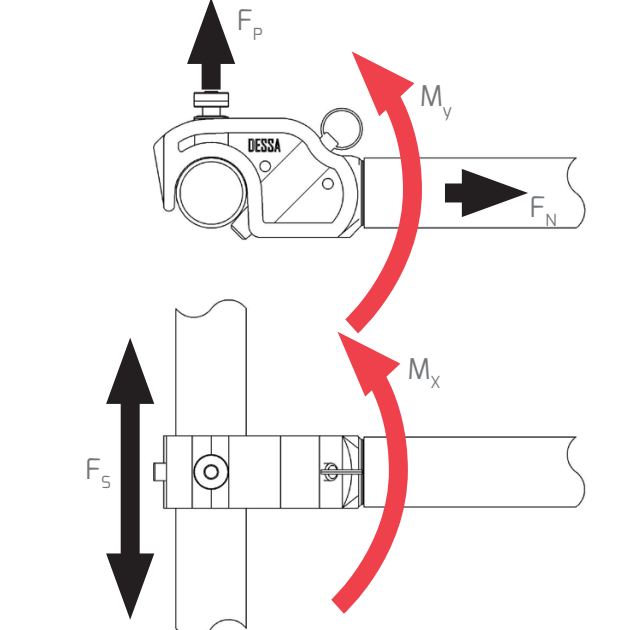


CROSS SECTIONAL PROPERTIES	
	Cx: 2.415 cm Cz: 224.2 cm Ax: 12.31 cm ² Ixx: 4953.9 cm ⁴ Izz: 29.9 cm ⁴

PERMISSIBLE BENDING MOMENT (kNm)		PERMISSIBLE SHEAR FORCE (kN)	
Joint, 1 bolt each side, all lacing intervals (not recommended) :	10.75	All restraint intervals :	18.10
Joint, 2 bolts each side, all lacing intervals :	20.51		
Joint, 3 bolts each side, all lacing intervals :	30.26		
Beam, compression chord lacing at 1.0m c/c(Assume 6 pin connection) :	22.80	MAXIMUM SINGLE POINT LOAD LIMITED TO 18.10kN ACROSS ALL LOAD CONDITIONS.	

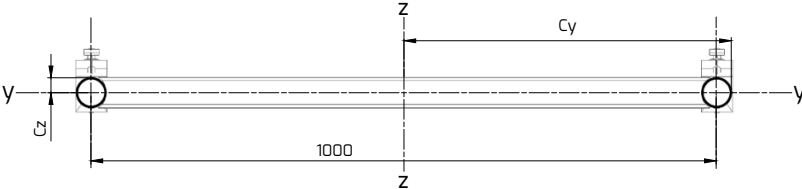
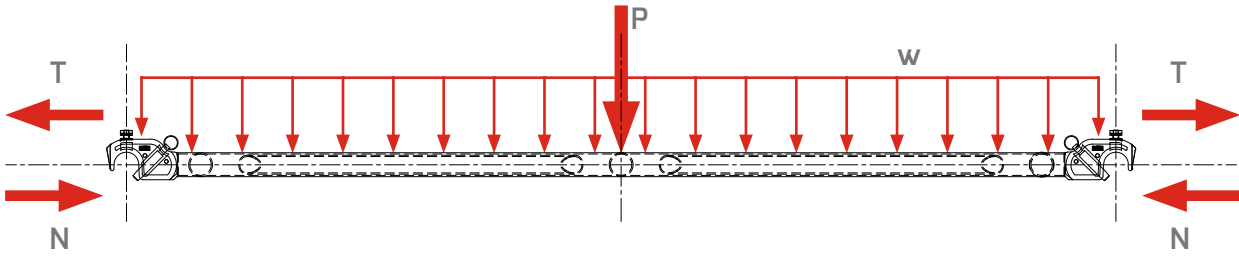
9.3 DESSA Claw

ARTICLE	DESCRIPTION	WEIGHT (KG)	MATERIAL GRADE
Z00181	DESSA BRACE CLAW	0.55	LM25 TE

PRODUCT DIMENSIONS	FORCES APPLIED
	

FORCE SYMBOL	DESCRIPTION	PERMISSIBLE LOAD
F _p	PULL-OFF	7.47kN
F _N	NORMAL FORCE	6.68kN
F _s	SLIP RESISTANCE	0
M _x	ROTATIONAL RESISTANCE (X)	0.41kNm
M _y	ROTATIONAL RESISTANCE (Y)	0

9.4 Brace Frames

CROSS SECTIONAL PROPERTIES					<div><div></div><div><div>Cy: 52.41 cm</div><div>Cz: 2.41 cm</div><div>Ax: 7.46 cm²</div><div>Iyy: 19.55 cm⁴</div><div>Izz: 18683.75 cm⁴</div></div></div>			
FORCES APPLIED								
								
ARTICLE	DESCRIPTION	WEIGHT (kg)	BRACE LENGTH (m)	COLOUR CODING	PERMISSIBLE LOADINGS			
					POINT LOAD "P" (kN)	UDL "w"(kN/m)	*TENSION "T" (kN)	BUCKLING "N" (kN)
UK1000	UNI Frame 1.0mx1.0m	7.80	1.00		5.69	11.38	23.20	77.58
UK1088	UNI Frame 1.09x1.0m	8.00	1.088		5.23	9.62	23.2	75.22
UK1500	UNI Frame 1.5mx1.0m	8.94	1.50		3.79	5.06	23.20	55.82
UK1572	UNI Frame 1.57mx1.0m	9.09	1.572		3.62	4.61	23.20	52.10
UK2000	UNI Frame 2.0mx1.0m	11.08	2.00		2.85	2.85	23.20	34.56
UK2072	UNI Frame 2.07mx1.0m	11.22	2.072		2.75	2.65	23.20	32.40
UK2500	UNI Frame 2.5mx1.0m	12.30	2.50		2.28	1.82	23.20	22.72
UK2572	UNI Frame 2.57mx1.0m	12.47	2.572		2.21	1.72	23.20	21.50
UK3000	UNI Frame 3.0mx1.0m	13.61	3.00		1.90	1.26	23.20	15.86
UK3072	UNI Frame 3.07mx1.0m	13.76	3.072		1.85	1.21	23.20	15.12

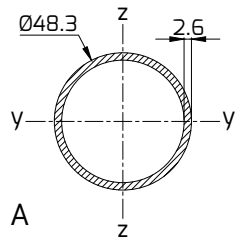
*LIMITED BY CLAW TENSION FAILURE

9.5 Horizontal Braces

SECTION		SECTION PROPERTIES			MATERIAL			
		A: 3.73 cm² Cz, Cy: 2.41 cm Izz, Iyy: 9.77 cm⁴			EN AW 6082-T6 Fy = 250N/mm² Fu = 290N/mm²			
ARTICLE	DESCRIPTION	WEIGHT (kg)	BRACE LENGTH (m)	COLOUR CODING	PERMISSIBLE LOADINGS			
					POINT LOAD (kN)	UDL (kN/m)	TENSION (kN)*	BUCKLING (kN)
UH0300	UNI horizontal brace 0.30m	1.41	0.30	-	9.49	63.25	11.60	39.39
UH0390	UNI horizontal brace 0.39m	1.47	0.39	-	7.30	37.42		39.21
UH1000	UNI horizontal brace 1.00m	2.12	1.00		2.85	5.69		26.61
UH1088	UNI horizontal brace 1.09m	2.21	1.088		2.62	4.81		23.90
UH1500	UNI horizontal brace 1.50m	2.64	1.50		1.90	2.53		14.80
UH1572	UNI horizontal brace 1.57m	2.71	1.572		1.81	2.30		13.71
UH2000	UNI horizontal brace 2.00m	3.15	2.00		1.42	1.42		9.10
UH2072	UNI horizontal brace 2.07m	3.22	2.072		1.37	1.33		8.54
UH2500	UNI horizontal brace 2.50m	3.66	2.50		1.14	0.91		6.06
UH2572	UNI horizontal brace 2.57m	3.73	2.572		1.11	0.86		5.74
UH3000	UNI horizontal brace 3.00m	4.17	3.00		0.95	0.63		4.28
UH3072	UNI horizontal brace 3.07m	4.24	3.072		0.93	0.60		4.09

*LIMITED BY CLAW TENSION FAILURE

9.6 Diagonal Braces

SECTION	SECTION PROPERTIES	MATERIAL
	A: 3.73 cm ² Cz, Cy: 2.41 cm Izz, Iyy: 9.77 cm ⁴	EN AW 6082-T6 Fy = 250N/mm ² Fu = 290N/mm ²

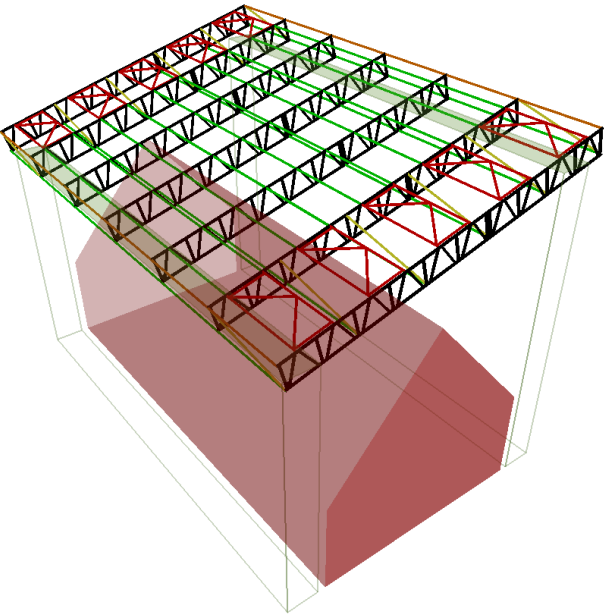
ARTICLE	DESCRIPTION	WEIGHT (kg)	BRACE LENGTH (m)	PERMISSIBLE LOADINGS			
				POINT LOAD (kN)	UDL (kN/m)	TENSION (kN)*	BUCKLING (kN)
UD1077	UNI diagonal 0.45x1.00m	2.27	1.077	2.64	4.91	11.60	24.22
UD1222	UNI diagonal 0.75x1.00m	2.42	1.222	2.33	3.81	11.60	20.30
UD1239	UNI diagonal 0.78x1.00m	2.44	1.239	2.30	3.71	11.60	19.90
UD1552	UNI Diagonal 0.45x1.5m	2.46	1.552	1.83	2.36	11.60	14.00
UD1622	UNI Diagonal 0.45x1.57m	2.57	1.622	1.75	2.16	11.60	13.03
UD1656	UNI Diagonal 0.75x1.5m	2.59	1.656	1.72	2.08	11.60	12.58
UD1669	UNI Diagonal 0.78x1.5m	2.65	1.669	1.71	2.04	11.60	12.42
UD1722	UNI Diagonal 0.75x1.57m	2.69	1.722	1.65	1.92	11.60	11.78
UD1734	UNI Diagonal 0.78x1.57m	2.75	1.734	1.64	1.89	11.60	11.65
UD2040	UNI Diagonal 0.45x2.0m	3.24	2.04	1.40	1.37	11.60	8.78
UD2110	UNI diagonal 0.45x2.07m	3.35	2.11	1.35	1.28	11.60	8.27
UD2120	UNI diagonal 0.75x2.0m	3.3	2.12	1.34	1.27	11.60	8.20
UD2130	UNI Diagonal 0.78x2.0m	3.34	2.13	1.34	1.25	11.60	8.13
UD2188	UNI diagonal 0.75x2.07m	3.43	2.188	1.30	1.19	11.60	7.74
UD2198	UNI diagonal 0.78x2.07m	3.44	2.198	1.29	1.18	11.60	7.68
UD2532	UNI Diagonal 0.45x2.5m	3.74	2.532	1.12	0.89	11.60	5.91
UD2597	UNI Diagonal 0.75x2.5m	3.84	2.597	1.10	0.84	11.60	5.64
UD2603	UNI diagonal 0.45x2.57m	3.85	2.603	1.09	0.84	11.60	5.61
UD2605	UNI Diagonal 0.78x2.5m	3.85	2.605	1.09	0.84	11.60	5.61
UD2666	UNI diagonal 0.75x2.57m	3.93	2.666	1.07	0.80	11.60	5.37
UD2674	UNI diagonal 0.78x2.57m	3.94	2.674	1.06	0.80	11.60	5.34
UD3027	UNI Diagonal 0.45x3.0m	4.27	3.027	0.94	0.62	11.60	4.21
UD3081	UNI Diagonal 0.75x3.0m	4.3	3.081	0.92	0.60	11.60	4.07
UD3088	UNI Diagonal 0.78x3.0m	4.36	3.088	0.92	0.60	11.60	4.05
UD3098	UNI diagonal 0.45x3.07m	4.37	3.098	0.92	0.59	11.60	4.03
UD3151	UNI diagonal 0.75x3.07m	4.42	3.151	0.90	0.57	11.60	3.90
UD3158	UNI diagonal 0.78x3.07m	4.44	3.158	0.90	0.57	11.60	3.88

*LIMITED BY CLAW TENSION FAILURE

10.0 Typical Parts Lists

10.1 MonoPitch Roof

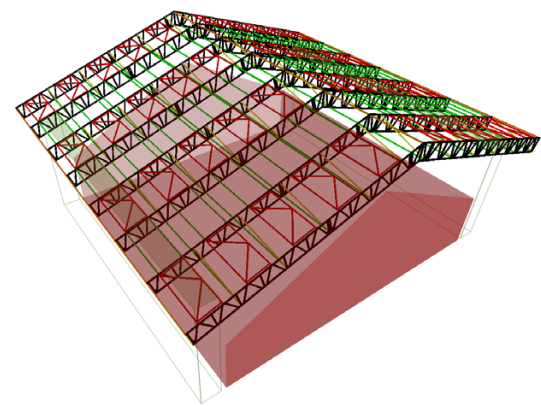
- Hand build method
- 6no. 2.57m bays of 10m, 2no. braced.
- DeepFlow™ sheet tracking
- Nearest 5m sheet



ARTICLE	DESCRIPTION	QUANTITY	ITEM WEIGHT (KG)	TOTAL WEIGHT (KG)
AF0001	Spring pin M12x60 for round tube	98	0.07	6.86
AR0001	Ratchet straps 460kg SWL x 2m	48	0.48	23.04
BA4000	D78 Aluminium beam 4.0m	7	22.21	155.47
BA6000	D78 Aluminium beam 6.0m	7	32.79	229.53
BS0001	Beam Spigot D78 6HS	14	1.49	20.86
CA0215	Roof sheet white 610gsmx8mm 15.00x2.57m	6	20.2	121.2
UA0005	UNI track compressor	14	1.09	15.26
UA0025	Integrated pulling bar wheel	2	1.51	3.02
UA0035	Alloy track spigot	21	0.24	5.04
UB2572	UNI sheet tensioning bar 2.57m	12	9.26	111.12
UD2674	UNI diagonal 0.78x2.57m	12	3.94	47.28
UH2572	UNI horizontal brace 2.57m	76	3.73	283.48
UK2572	UNI frame 1.00x 2.57m	10	13.14	131.4
UR2572	UNI roller 2.57m	12	11.4	136.8
US0001	DeepFlow™ track end piece 1m	7	2.58	18.06
US0002	DeepFlow™ track end piece with spigot 1m	7	2.59	18.13
US4000	DeepFlow™ track 4m	14	10.36	145.04

10.2 DuoPitch Roof

- Crane build method
- 7no. 2.57m bays of 10m - R - 10m, 4no. braced.
- DeepFlow™ sheet tracking
- Nearest 5m sheet



ARTICLE	DESCRIPTION	QUANTITY	ITEM WEIGHT (KG)	TOTAL WEIGHT (KG)
AF0001	Spring pin M12x60 for round tube	400	0.07	28
AF0002	Spring pin M12x70 for ridge track	16	0.1	1.6
AR0001	Ratchet straps 460kg SWL x 2m	56	0.48	26.88
BA0018	D78 Ridge 18 degrees	8	7.45	59.6
BA4000	D78 Aluminium beam 4.0m	16	22.21	355.36
BA6000	D78 Aluminium beam 6.0m	16	32.79	524.64
BS0001	Beam Spigot D78 6HS	64	1.49	95.36
CA0225	Roof sheet white 610gsmx8mm 25.00x2.57m	7	33.7	235.9
UA0005	UNI track compressor	16	1.09	17.44
UA0025	Integrated pulling bar wheel	2	1.51	3.02
UA0035	Alloy track spigot	64	0.24	15.36
UB2572	UNI sheet tensioning bar 2.57m	14	9.26	129.64
UD2674	UNI diagonal 0.78x2.57m	48	3.94	189.12
UH2572	UNI horizontal brace 2.57m	144	3.73	537.12
UK2572	UNI frame 1.00x 2.57m	40	13.14	525.6
UR2572	UNI roller 2.57m	21	11.4	239.4
US0001	DeepFlow™ track end piece 1m	16	2.58	41.28
US0018	DeepFlow™ ridge track UNI 18deg	8	3.94	31.52
US2000	DeepFlow™ track 2m	16	5.23	83.68
US3000	DeepFlow™ track 3m	16	7.82	125.12
US4000	DeepFlow™ track 4m	16	10.36	165.76



