

Managing the Unloading, Storage, Transportation, Lifting and Installation of Prefabricated Roof Trusses & Spandrel Panels



Contents

1. Introduction	3
2. Scope.....	3
3. Pre-Construction Planning & Design	4
4. Risk Assessment	5
5. Temporary Works	7
6. Safe Delivery, Unloading, Transport and Manoeuvring of Prefabricated Trusses & Spandrel Panels	7
7. Lifting of Trusses onto Roof.....	12
8. Truss Install Methodology and Sequencing	12
9. Party Wall Spandrel Panel	16
10. Assembly of Prefabricated Trusses at Ground Level.....	16



1. Introduction

This guidance has been prepared by the Home Builders Federation's Health & Safety Committee to assist members and others to plan and implement safe systems of work from taking delivery of prefabricated trusses on site to safely installing them in plots.

This guidance is not intended to be authoritative, comprehensive and prescriptive, but aims to draw industry best practice, key information and principles from authoritative trade associations et al so as to provide example methodologies and principles which home builders and their contractors could incorporate or develop further. From this, organisations can then adopt these principles and methodologies into their own safe systems of work and risk assessments for this activity.

It is important to note that the installation of trusses involves temporary works not just during the installation of the trusses but also for the associated access and working platforms. It is therefore imperative that a Temporary Works Designer is engaged in advance of any works to calculate and design all aspects of the temporary works so that risks to people/property are avoided or mitigated.

Key outputs

- **Designers of roofs should, when preparing or modifying designs, eliminate, reduce, or control foreseeable risks that may arise during the construction, maintenance and use of a building once it is built.**
- **All duty holders (Designers, Principal Contractors and Contractors) should ensure that they cooperate and engage, so that measures introduced to reduce and control risk are embedded in the agreed working methods.**
- **The use of cranes, telehandlers, mechanical handling equipment, lifting equipment, methods for the unloading, storage, transportation, lifting and installation of roof trusses and spandrel panels should be subject to risk assessment and be specified within written safety systems of work/procedures.**
- **The installation of roof trusses should only be carried out in accordance with the temporary works design.**

2. Scope

The scope of this document is intended to cover key health and safety considerations from taking delivery of prefabricated trusses on site, storage, transportation within the site, the lifting of trusses on to the plot, the incorporation of a spandrel panel and truss installation on simple traditionally built houses.

This document does not include guidance on more complex roof designs whether they be prefabricated or not and timber frames houses.

The illustrations and work at height control measures detailed within this guidance document include the use of decking systems below the truss bottom chord as part of the fall prevention system, meeting the requirements for the hierarchy of fall prevention.

Note: This guidance should be read in conjunction with more detailed & specialist guidance by:

- The Trussed Rafter Association www.tra.org.uk
- Health & Safety Executive www.hse.gov.uk
- Structural Timber Association www.structuraltimber.co.uk
- Temporary Works Forum www.twforum.org.uk
- HBF Temporary Works Guidance www.hbf.co.uk



- Strategic Forum for Construction, Plant Safety Group (PSG) www.cpa.uk.net
 - Safe use of telehandlers in construction – CPA 1101
 - Lifting and travelling with suspended loads using telehandlers

3. Pre-Construction Planning & Design

Planning

A Principal Designer is a designer who is an organisation or individual (on smaller projects) appointed by the client to take control of the pre-construction phase of a project with more than one contractor.

Principal Designers have an important role in influencing how risks to health and safety are managed throughout a project. Design decisions made during the pre-construction phase have a significant influence in ensuring the project is delivered in a way that secures the health and safety of everyone affected by the work.

Principal Designers should:

- Plan, manage, monitor, and coordinate health and safety in the pre-construction phase. In doing so they should take account of relevant information that might affect design work carried out both before and after the construction phase has started
- Help and advise the client in bringing together pre-construction information, and provide the information designers and contractors need to carry out their duties
- Work with any other designers on the project to eliminate foreseeable health and safety risks to anyone affected by the work and, where that is not possible, take steps to reduce/control those risks
- Ensure that everyone involved in the pre-construction phase communicates and cooperates, coordinating their work wherever required
- Liaise with the principal contractor, keeping them informed of any risks that need to be controlled during the construction phase.

Design

A designer is an organisation or individual whose business involves preparing or modifying designs for construction projects, or arranging for, or instructing, others to do this. Designs include drawings, design details, specifications, bills of quantity and design calculations.

Designers can be architects, consulting engineers, quantity surveyors and interior designers, or anyone who specifies and alters designs as part of their work. They can also be any other individual or company if they get actively involved in design work for their project.

On each project, there should be a clear understanding of who is responsible for the building design and who is responsible for the roof design and/or the elements within it, such as trussed rafters, party wall spandrels, and gable wall spandrel panels.

Designers of roofs should:

When preparing or modifying designs, eliminate, reduce, or control foreseeable risks that may arise during:

- Construction,
- Maintenance,
- Use of a building once it is built.



They should also provide information to other members of the project team to help them fulfil their duties.

Construction (Design & Management) Regulations - Designers Duties

Principal Design Risk Considerations for Designers

- Designers should consider the risk of injury and ill health to those erecting the roof. This includes; maximising off-site prefabrication and consideration if it is safer to construct the roof at eaves level or safer to build the roof or elements of the roof at ground level and lift them up in to place. Note: Standard trussed rafter designs are intended for assembly at wall plate level in their permanent location. Where the build process requires the whole trussed rafter roof or elements within it to be assembled at ground level, this should be specified at the start of the design process and temporary works designers consulted to design a suitable lifting frame or support structure.
- Where high level bracing is specified in the design, you should consider the practicalities of accessing this area and fixing the bracing safely.
- If the stability of the trusses during construction relies on temporary bracing, then this should be specified by the temporary works designer including at what locations it is required and what that bracing actually consists of in terms of material specification and fixings.
- Designers also have a responsibility to ensure the thing they have designed can be maintained and used safely by the end use.
- You should ensure you provide sufficient information with the design to allow any user of your design who may be exposed to a risk to manage that risk appropriately. This may mean notes on drawings, printing weights etc. on truss packs, providing information with deliveries etc.
- When using spandrel panels, the panels should be designed to comply with structural, thermal and fire resistance (where required) performance standards and current building standards and regulations
- Where specified for supply, gable wall spandrel panels will be engineered by the manufacturer to meet stated requirements and withstand the specified design loads provided by the building designer. These will include wind loads – both pressure and suction – and the acceptable/permitted deflection limit of the outer leaf of masonry
- If the information is relevant to the end user of the structure i.e. information concerning on-going maintenance, loading of the trusses in situ i.e. homeowners overloading attic space...then this information needs to be passed to the Principal Designer for the project for inclusion in the Health and Safety File that will be passed to the homeowner/end user of the structure. Guidance relating to the Health & Safety File can be found on www.hbf.co.uk

4. Risk Assessment

Lifting Operations & Lifting Equipment

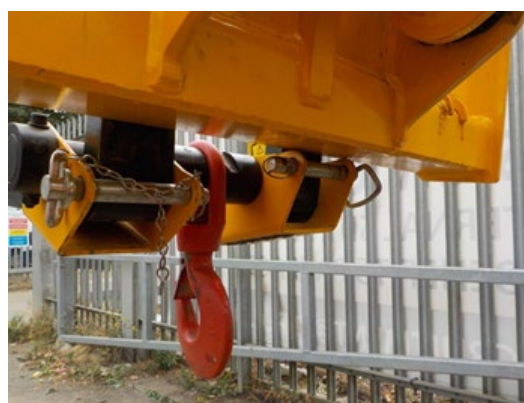
Telehandlers are one of the most versatile pieces of construction site equipment, making a significant contribution to the efficient delivery of the construction process. Unfortunately, the very versatility that makes them so useful also makes them unsafe when used incorrectly and has led to a significant number of serious and fatal accidents. As with all lifting equipment, safe operation of telehandlers depends on a number of factors including the selection and maintenance of the telehandler, planning and supervision of its use and competence of the operator. If any of



these are deficient, the risk of a serious accident increases significantly and it is therefore essential that organisations and their site managers ensure that all telehandler operations are planned, supervised and carried out safely by competent people.

Telehandlers are generally designed to European Standard BS EN1459. The scope of this Standard very clearly states that it applies only when the telehandler is stationary and lifting on substantially flat, level and compacted ground. It also applies only to use with forks. Consequently, if a telehandler is used in other circumstances such as travelling with loads on the forks, travelling or lifting on slopes or with attachments other than forks or lifting and travelling with suspended loads, the additional risks need to be reassessed.

The process from the delivery of prefabricated trusses through to their installation requires a number of lifting operations utilising various lifting equipment and competent persons. Where a telehandler is to be used as a crane for lifting suspended loads and travelling with those loads, an organisation carrying out these operations should undertake a 'risk assessment' to determine the lifting operations and equipment to be used so that safe systems of work can be developed and deployed. Where a lifting attachment is decided upon, an 'original equipment manufacturer' (OEM) approved and rated attachment is required to be used. An example of such an attachment is illustrated below:



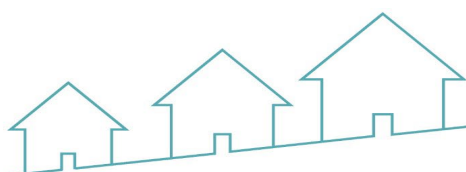
Further and more detailed guidance to support in this risk assessment relating to planning and the safe use of telehandlers can be found in the strategic forum for construction plant safety group good practice guides 'Safe Use of Telehandlers in Construction' and 'Lifting and Travelling with Suspended Loads using Telehandlers' published by the CPA www.cpa.uk.net

Installing trussed rafters

Installing trussed rafters requires specific construction skills which involve working at height and handling dynamically unstable materials. This should only be undertaken by suitably experienced and qualified personnel, such as those with a Level 2 Diploma in Site Carpentry.

A full and specific risk assessment for installing prefabricated trussed rafters should be undertaken by a competent person before any work commences. When completing a risk assessment, the following hazards are to be considered as a minimum:

- Delivery to site
- Competency of individuals
- Loading and unloading



- Storage of trusses
- Movement of trusses
- Lifting of trusses
- Work at height
- Access and egress
- Slips and trips
- Falling objects
- Structural collapse
- Manual handling
- Overhead services
- Proximity of trees
- Temporary bracing

5. Temporary Works

It is important to note that the installation of trusses involves temporary works not just during the installation of the trusses but also for the associated access and working platforms. It is therefore imperative that a Temporary Works Designer is engaged in advance of any works to calculate and design all aspects of the temporary works so that risks to people and property are avoided or mitigated.

When developing the temporary works designs, consideration should be given to:

- House type
- Height of the truss installation
- Site location for wind calculations
- Weight of a complete pack of trussed rafters
- Stage of installation at which the trussed rafters become self-supporting
- Dimensions, surface area and weight, of the trussed rafters
- Bracing and fixing components between the table lift scaffold and the trussed rafters
- Amount of space available onsite for scaffold buttresses and rakers

By producing calculations and engineered drawings and safe methodologies for house types, truss type and given windspeed location on a newbuild site, contractors can be confident that safe and suitable solutions are available. These designs would then need to be agreed and approved by the Temporary Works Coordinator appointed for the site. Further and more detailed guidance can be found in the HBF Temporary Works guidance at www.hbf.co.uk

6. Safe Delivery, Unloading, Transport and Manoeuvring of Prefabricated Trusses & Spandrel Panels

6.1 Telehandlers used as a crane for lifting and travelling with suspended loads

When trusses are being delivered, the most efficient and safest way of unloading trusses and placing them directly on to the roof is for the trailer carrying the trusses to locate itself adjacent to the plot where a crane can lift them off straight on to the roof – ‘just in time’ management. This for various reasons isn’t always possible and therefore requires trusses to be unloaded by the telehandler and stored either in a truss rack integrated into the plot scaffolding, a truss rack located adjacent to the plot or a remote truss rack situated elsewhere on site. Where telehandlers are to be used as a crane for lifting and travelling with suspended loads, the employer undertaking this type of work, should



carry out a risk assessment to determine the risks associated with this process and the safest method of lifting and travelling with suspended loads such as trusses and spandrel panels. Where it is determined that material handling attachments are to be used and fitted to the forks of a telehandler, 'original equipment manufacturer' (OEM) approved and rated attachments should be used.

Further and more detailed guidance on planning and the safe use of telehandlers can be found in the Strategic forum for construction, Plant Safety Group good practice guides 'Safe Use of Telehandlers in Construction' and 'Lifting and Travelling with Suspended Loads using Telehandlers' published by the CPA www.cpa.uk.net

6.2 Safe Unloading of Trusses on Site

Trussed rafters vary considerably in size and weight depending on their type and application, generally between 50Kg and 150kg per truss. Manufacturers can provide information about the specific dimensions of products to be delivered to each site and this information provided to the designers as early as possible to enable the development of a site-specific plan for safe unloading and storage of these products. This will require appropriate material handling equipment, such as a crane, HIAB or telehandler, to enable the safe unloading and manoeuvring of these large units. It will also require a flat level unloading area with suitable ground conditions, which is free of overhead obstructions and sufficiently large to accommodate the size of vehicle and handling equipment required for the trusses to be delivered and unloaded.

Trussed rafters will be delivered in tight bundles using appropriate straps. The number of items within bundles will depend on their size and weight. Contractors should discuss with their chosen trussed rafter manufacturers the maximum weight of bundles they can accept on each site. This is likely to be around 1000kg but will depend on equipment available and site logistics. Each bundle will be individually secured to a central frame on the vehicle and the overall load secured using transit straps.

All transit straps can be released from ground level meaning there is no need for anyone to access the lorry deck where material handling equipment is used. Where requested in advance bundles can be pre-slung to assist with crane offload. To keep vehicles within UK road height limits some very large, trussed rafters are inverted for delivery. **Note: This will require careful specification of the slings, which will need to be tied back to the rafters during transit in such a fashion that they can be released from ground level. The bottom loop of the sling needs to be accessible from ground level. Depending on the telehandler reach distance required, lifting capacities will need careful planning, particularly if pick & carry is required. Further more detailed information and illustrations can be found at www.tra.org.uk**

Party wall spandrel panels are heavy products, generally not bundled and usually unloaded individually. Material handling equipment, such as a crane, HIAB or telehandler are essential for unloading these products.

Contractors should discuss with their chosen manufacturer the maximum weight of spandrel panels they can accept on each site as this will affect whether panels can be delivered as a single unit or in multiple parts. Each spandrel panel will be individually secured to a central frame on the vehicle and the overall load secured using transit straps.

Spandrel panels should be pre-slung to facilitate unloading. Contractors should discuss with their chosen manufacturers the unloading equipment which will be used to ensure the correct slings are provided. **Note: This will require careful specification of the slings and specified in such a way that they can be released from ground level. The bottom loop of the sling needs to be accessible from ground level. Depending on the telehandler reach distance required, lifting capacities will need careful planning, particularly if pick & carry is required. Further more detailed information and illustrations can be found at**



6.3 Transport and Manoeuvring of Trusses

The following hierarchy should be applied to the transport and manoeuvring of trusses on site.

- Trussed rafters and spandrel panels **should not** be lifted on to a roof via the telehandler. A recognised exception to this being single storey structures with standard trusses.
- Where practicable, trusses should always be lifted via a mobile crane direct from the delivery vehicle on to the roof i.e., 'just in time delivery'. This will require planning of both the site and delivery of trusses and should be the primary method of delivery and lifting.
- Where 'just in time' deliveries are not possible, trusses should be lifted from the delivery vehicle via the telehandler onto truss racks, specifically designed loading bays or gable end scaffolds with integral truss racks. The delivery vehicle should be positioned as close as possible to the plot under construction and the distance to be travelled by the telehandler limited. The storage of trusses should not impede the safe operation of the telehandler or access to the loading bays.
- If the above is not practicable and/or access to the construction area is restricted for the delivery vehicle, the trusses can be lifted from the vehicle on to an appropriately designed freestanding truss storage rack. The rack should be positioned as close to the plots under construction to limit the distance the trusses need to be moved when required. The truss rack should be continually re-sited as close to the work area as possible and be fully accessible by delivery vehicles. Note: truss racks should be subject to regular inspection as per the organisations temporary works requirements.

6.4 Safe Unloading of Trusses & Spandrel Panel using a Telehandler

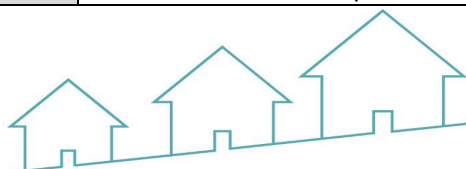
Step 1	<ul style="list-style-type: none"> • Prior to commencement of any unloading operation, the delivery driver should check and confirm that the load is secure ensuring all associated transport straps are in place. Individual truss packs will be secured to the trailer using polypropylene rope/straps. • Delivery driver should wear 3 points of PPE as a minimum (Hard Hat, Hi Vis and Safety Boots)
Step 2	<ul style="list-style-type: none"> • The delivery driver should release the transport straps on the side being unloaded, whilst ensuring no-one else is located within the 'danger area' between the load and the telehandler.
Step 3	<ul style="list-style-type: none"> • If a lifting attachment is to be used, the telehandler driver should use a specific OEM approved and rated attachment and refer to the appropriate load chart when unloading trusses/panels from the delivery vehicle. • Operators should be familiar with the lift plan, trained in the use of attachments and be familiar with each specific attachment and associated load chart. • Telehandler operators should always follow the lift plan provided by the Appointed Person. • Ensure no-one is within the 'danger area'
Step 4	<ul style="list-style-type: none"> • The telehandler will then take up the slack and support the weight of the load using a specific OEM approved and rated attachment ensuring the 'danger area' is clear. • Use a pre-agreed signal such as a 'thumbs up' to alert the delivery driver that the load is supported



Step 5	<ul style="list-style-type: none"> The delivery driver should cut the polypropylene rope/straps which are used to secure the load to the delivery vehicle using the appropriate means. This should be undertaken from a safe position.
Step 6	<ul style="list-style-type: none"> Inverted Truss - The telehandler operator should lift the trusses from the delivery vehicle, position the apex of the pack onto a timber bearer or tyre, and reverse back slowly lowering the pack to the ground. This will require careful planning and operator coordination of controls for vertical and horizontal movement of the telehandler to ensure that the lifting strops are kept vertical. Lifting equipment is not designed to have diagonal loads imposed. Many Lateral Load Movement Indicators (LLMI's) will not give warnings when the machine is travelling.
Step 7	<ul style="list-style-type: none"> Inverted Truss - Once lowered the telehandler should reinvert the truss pack at the apex and position them onto the truss rack. As with step 6 above, this will require careful planning and operator coordination of controls for vertical and horizontal movement of the telehandler to ensure that the lifting strops are kept vertical. Lifting equipment is not designed to have diagonal loads imposed. Many Lateral Load Movement Indicators (LLMI's) will not give warnings when the machine is travelling. Ensure no-one is within the 'danger area' behind the truss pack.
Notes:	<ul style="list-style-type: none"> Nobody should access the rear of the delivery vehicle unless a suitable safe system of work is in place. The maximum weight of any pack of trusses should be 1000kg. With the exception of the delivery driver to remove transport straps, nobody should enter the danger area between the telehandler and delivery vehicle at any stage of unloading. Telehandler operator to confirm with delivery driver that he is in control of supporting the trusses prior to him entering the danger area. The telehandler operator should take reasonable steps to ensure the telehandler or boom do not move whilst the straps are being removed.

6.5 Safe Unloading of Spandrel Panels (with straps) using a Telehandler

Step 1	<ul style="list-style-type: none"> Prior to commencement of any unloading operation, the delivery driver should check and confirm that the load is secure ensuring all associated transport straps are in place. Unload area is to be firm and level.
Step 2	<ul style="list-style-type: none"> Individual clad panels will be secured to the trailer using polypropylene rope/straps. When the order for the panels is placed, ensure that the correctly rated lifting slings are ordered and pre-attached ready for lifting on site. Note: Ensure that the slings and straps to be used are the correctly rated ones. When slings and straps have been provided by the manufacturer/supplier, ensure that their guidance in relation to unloading, transporting, lifting and subsequent use is followed. Clad panels will normally arrive pre-slung with lifting slings which will be reachable from the ground.
Step 3	<ul style="list-style-type: none"> The telehandler operator must be familiar with the lift plan, compliant with its requirements and attach the straps on the panels to the lifting attachment.
Step 4	<ul style="list-style-type: none"> The telehandler will then take up the slack and support the weight of the load. The telehandler operator should confirm to the delivery driver that the weight of load



	is supported.
Step 5	<ul style="list-style-type: none"> The delivery driver will release the transport straps on the side being unloaded, The delivery driver from a safe position, will use a telescopic cutter to cut the polypropylene rope/straps which are used to secure the clad panels to the delivery vehicle.
Step 6	<ul style="list-style-type: none"> The telehandler operator should lift the spandrel panels from the delivery vehicle and position them onto the truss rack. Do not retract the boom until the delivery driver has confirmed that all securing straps/ropes have been removed.
Step 7	<ul style="list-style-type: none"> Nobody should access the rear of the delivery vehicle unless a suitable safe system of work is in place. With the exception of the delivery driver to remove transport straps, nobody should enter the danger area between the telehandler and delivery vehicle at any stage of unloading. Telehandler operator to confirm with delivery driver that he is in control of supporting the panels prior to him entering the danger area.

6.6 Necessary Movement of Trusses within Site using a Telehandler

The following conditions apply if trusses are to be suspended using an appropriate OEM attachment and transported on a development. Note: A suitable safe system of work should be in place to control load swing. If taglines or poles are to be used then the slinger/signaller must not be in a position whereby if they stumble they could be run over.

Step 1	<ul style="list-style-type: none"> The route from the truss rack or delivery vehicle to the plot should not be through occupied areas of the development.
Step 2	<ul style="list-style-type: none"> The route should be reviewed prior to transporting the trusses and an assessment made if any obstacles such as lamp posts or scaffold will affect the ability of the operator to maneuver the telehandler and load safely. Ground conditions should also be confirmed as suitable including consideration of inclines and cambers.
Step 3	<ul style="list-style-type: none"> The maximum load of trusses that can be transported via a telehandler from a truss rack or delivery vehicle to a plot is 1000kg. The weight of all trusses installed on site should be known by site management. This is the maximum load, but this may need to be reduced depending on the span/pitch of the trusses, potential obstructions and capabilities of the machine.
Step 4	<ul style="list-style-type: none"> The telehandler should be driven extremely slowly and never above walking pace (commonly considered to be 4mph) with no sharp turns or maneuvers.
Step 5	<ul style="list-style-type: none"> An appropriately trained slinger/signaller should be available to provide agreed signals to the operator and ensure no other persons are affected by the movement of the trusses.
Step 6	<ul style="list-style-type: none"> The operator should have full vision from the driving position and the trusses suspended from the forks so that the lowest point of the truss, (i.e. top chord overhang) is within 300-500mm of the ground.



- | | |
|---------------|--|
| Step 7 | <ul style="list-style-type: none">• Trusses should not be moved when wind speeds at ground level are forecast to be or exceed 7m/s or 16mph. Note: A working anemometer should be available and used during these works. |
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7. Lifting of Trusses onto Roof

Lifting of trusses onto the wall plate should as far as is practicable, always be undertaken by a mobile crane with the truss(s) laid in the flat position ready for handling in to position at each end by two individuals. Note: The maximum weight of a pack/number of trusses to be stored on the wall plate and their location along the wall plate should be discussed with and determined by the Temporary Works Designer. All equipment used in roof truss installation should be suitable for carrying out the task safely. Therefore, in most cases the safest method of choice will be a crane.

A crane lifting plan needs to be completed ahead of the task and the Principal Contractor needs to ensure the suitability of the ground conditions before a lift takes place. If an alternative method is utilised to lift roof trusses on to a roof, then this will need to be justified by the completion of a lifting plan for each plot, by an appropriately trained competent person, which will take into consideration;

- the capabilities of the lifting appliance and lifting equipment/accessories used
- any restrictions to the lifting operation i.e. scaffolding or other obstructions.
- height of the structure.
- handling the trusses by workers on the scaffold working platform.
- method of lifting the trusses safely including considering the pitch, size and weight of the truss.

A crane exclusion zone is required around the crane and wagon to ensure the segregation of plant and pedestrians. As well as this consideration the telehandler driver will be required to have the appropriate training for attachments when moving and lifting trusses.

Note: For crane lifts, the Appointed Person and/or the Lift Supervisor is to be on site to monitor all lifts working in conjunction with the qualified crane operator and the slinger/signaller. Refer to the code of practice for the safe use of cranes (BS7121) for more detailed information

8. Truss Install Methodology and Sequencing



Before you begin

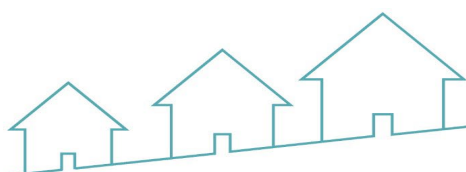
1. Check that the trusses to be installed have been lifted and laid in to the required position flat on the wall plates.
2. Ensure the competencies of the joiner(s). The installation of trussed rafters should only be undertaken by suitably experienced and qualified personnel, such as those with a Level 2 Diploma in Site Carpentry possessing a CSCS skilled (blue) card. NOTE: the install of each truss should involve at least 3 individuals with at least one being a joiner.
3. Check and read all assembly drawings and information provided by the truss supplier.
4. Check that all temporary works drawings and information is available and understood by the Joiner.
5. Check that all wall plate straps are in place and fixed.








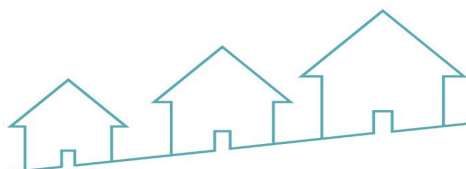
6. Ensure all personal protective equipment (PPE) is worn and correctly fitted
7. Ensure scaffolding is in place and signed off
8. A safe working platform within the structure is also provided
9. Where bracing is required to be attached at the top of the trusses, a ‘truss-safe’ access ladder should be used.
10. Ensure hop-ups and scaffolding edge protection are in place
11. After reading the truss layout drawings, identify the easiest starting point using the simplest roof of trusses.
12. Check the weather forecast for projected wind speeds and ensure that a working anemometer is available. The Work at Height Regulations specifically require weather conditions to be considered when planning any work. Wind loading presents a particular risk for trussed rafters that are not installed and fully braced. Roof installation activity involving components greater than 5m long should cease when the mean wind speed reaches 17 mph (gusting to 26 mph or over)




Note – the following methodology and sequencing (safe system of work) whilst considered safe and practicable is by way of example. Whatever methodology, sequencing, bracing and fixings are used, it must be reviewed and approved by a temporary works designer.

<p>Step 1</p>	<ul style="list-style-type: none"> • <i>Pre-erection</i> – a scaffold table lift to be erected in accordance with a temporary works design in preparation for receiving and fixing the first truss. • Alternate bay ledger bracing is to be fitted with a third guardrail. 	
<p>Step 2</p>	<ul style="list-style-type: none"> • 1st truss placed up onto wall plate adjacent to table lift and held in place to commence securing into position. Check overhang at each wall plate and ensure truss is vertical. • Do not lean the truss against the table lift 	




<p>Step 3</p>	<ul style="list-style-type: none"> Trussed rafters are fixed to the wall plate using nails or using proprietary truss clips as specified by the TW bracing schedule. 	 
<p>Step 4</p>	<ul style="list-style-type: none"> Fix a temporary horizontal member to the face of the trussed rafter. It's height, size and fixings should be in accordance with the Temporary Works design. 	
<p>Step 5</p>	<ul style="list-style-type: none"> Brace the truss to the table lift. Truss is plumbed and bracing timbers are to be added from the table lift to the temporary horizontal brace. Both ends of bracing timber secured by the appropriate numbers of screws / nails as per Temporary Works design. 	
<p>Step 6</p>	<ul style="list-style-type: none"> Second Truss is placed up onto wall plate adjacent to first truss and held in place to commence securing into position. Check overhang at each wall plate and ensure truss is vertical. Trussed rafters are fixed to the wall plate using the requisite nails or using proprietary truss clips Lateral temporary bracing structural timbers, are added to each side, keeping the brace as close as possible to the horizontal brace on the first truss. Each piece not less than 2100mm long allowing fixing to a minimum of four trussed rafters. The temporary braces can be prepared with a 	



	<p>nail at each 600mm centre which is fixed to each truss it crosses.</p> <ul style="list-style-type: none"> Operatives can release truss once both horizontal bracing timbers are fixed. Further truss is then located in to position on the wall plate, plumbed up and secured to the previous truss by lateral temporary bracing applied to each side of the trusses each piece not less than 2100mm long allowing fixing to a minimum of four trussed rafters. NOTE: Temporary bracing is affixed to outer face of truss rafters while permanent bracing is fixed to inner face. 	
<p>Step 7</p>	<ul style="list-style-type: none"> Previous step is repeated ensuring lateral temporary bracing is fixed to each truss. Further lateral temporary bracing is added as necessary always overlapping at least two trusses. Operatives can release truss once both horizontal bracing timbers are fixed 	
<p>Step 8</p>	<ul style="list-style-type: none"> Permanent longitudinal and diagonal bracing should be added to the inner faces of the trussed rafters at the earliest opportunity in line with the defined bracing schedule given on the drawings. 	
<p>Step 9</p>	<ul style="list-style-type: none"> Steps 6 – 8 can then be repeated until the whole of the roof is installed. 	



NOTE	<p>There are two main types of proprietary high level access systems.</p> <ul style="list-style-type: none"> Adapted ladders such as the safe truss access system which uses a specially adapted ladder to be supported within the truss structure providing variable height access as required. Such ladders should be moved between each fixing location. Temporary support beams such as the DTE safe step system which allow a temporary working platform to be created along the length of the truss structure at an appropriate height. <p>If considered sufficiently in advance of the trussed rafter design stage it is also possible for additional members to be incorporated within the design of each truss as an alternative method to allow a temporary working platform to be created along the length of the truss structure at an appropriate height.</p>	
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9. Party Wall Spandrel Panel

Once trussed rafters on both sides of the party wall have been installed and permanently braced, they provide a firm structure from which the much heavier dual clad party wall spandrel panels can be safely supported. This means the permanent bracing can be applied immediately from both sides to support the panel during installation. Such party wall spandrel panels should never be installed prior to the fully braced trussed rafter structure as there is no means to provide safe temporary bracing for panels of this weight. Ensure that the spandrel panel manufacturer's installation methodology is adopted into your RAMS/safe system of work.

10. Assembly of Prefabricated Trusses at Ground Level

Standard trussed rafter designs are intended for assembly at wall plate level in their permanent location. If the build process requires the whole trussed rafter roof or elements within it to be assembled at ground level, then this should be specified at the start of the design process and temporary works designers consulted to design a suitable lifting frame or support structure.

More detailed guidance can be found at www.tra.org.uk

