

TIMBER FRAME WORKBOOKS

Manufacturing

HEALTH AND SAFETY



**ACCIDENTS
PREVENTION**
and more

CONTENTS

1. Introduction and Welcome	5
1.1 The STA Manufacturing Training Programme	5
2. Aims and Objectives	7
2.1 Health and Safety at work	7
2.2 What is in this workbook	7
3. Health and Safety at Work	11
3.1 Overview	11
3.2 Employer responsibilities	11
3.3 Employee responsibilities	11
3.4 Improving health and safety in your workplace	12
3.5 Risk assessment and communication	14
3.6 Risk assessment process	14
3.7 Hierarchy of risk control	15
3.8 Review of risk assessment	15
3.9 The role of the HSE	15
4. Accidents	18
4.1 Reporting accidents	18
4.2 Prevention	19
4.3 First aid and welfare arrangements	19
4.4 Calling the emergency services	21
5. General Hazards	23
5.1 Do you know your signs?	23
5.2 Electricity and portable tools	23
5.3 Site traffic	24
5.5 Reporting of Injuries, Diseases & Dangerous Occurrences Regulation (RIDDOR)	26
5.6 Manual handling	27

5.7	Lifting Operations and Lifting Equipment Regulations (LOLER)	29
6.	Working at Heights	32
6.1	Platforms	32
6.2	Ladders	33
6.4	Leading edges and openings	34
7.	Fire Prevention	36
7.1	Overview	36
7.2	The fire plan	36
7.3	Dealing with fires	36
7.4	Evacuating your workplace in an emergency	37
7.6	Fire fighting equipment	37
7.7	When Not to Tackle a Fire	37
8.	Personal Protective Equipment	39
8.1	Overview	39
8.2	Noise when working with machines	39
8.2	PPE use and care	40
9.	Nail Guns	42
10.	Woodworking Machinery	44
10.1	Training and supervision	45
10.2	Safety Solutions	45
10.3	Competence checklist	45
11.	Final Review	47
	Candidate and supervisor's final sign off	49

1. Introduction and Welcome

1.1 The STA Manufacturing Training Programme

Welcome to your Knowledge Skills Workbook.

The production of these workbooks has been **supported financially** by **The Construction Industry Training Board (CITB)**. **The Structural Timber Association (STA)** is extremely grateful to them.

The Structural Timber Association, on behalf of the industry, has developed this training programme with CITB to provide recognition of the skills and competencies of existing timber frame designers together with raising the skill levels of any unskilled or untrained timber frame designers to an acceptable level of competence.

The programme will also provide career paths for timber frame designers and assist young entrants to the timber frame industry. Over time the intention is to allow only those designers who are qualified to design timber frame buildings.

A structured training programme has been devised at three levels:

- Design
- Manufacture
- Erection

Each of the three levels is split in to three modules:

- Health and Safety
- Knowledge
- Practical Skills

For most of us, our home is our largest expense and we expect it to be built to the highest standards by well trained and suitably qualified people. By using these workbooks, we, as an industry, can now provide you with the opportunity to achieve this goal. Also by having a qualified workforce we can compete with the rest in quality and workmanship.

We hope you enjoy working through this workbook. Please add to it in any way you wish. We look forward to awarding you with your Timber Frame Competency Award qualifications in the near future.



Andrew Carpenter,
Chief Executive, STA.

Education and training. STA/CITB.

If you have any queries or require any further information regarding this booklet seek advice within your own company. You may also contact:

Structural Timber Association

The e-Centre

Cooperage Way Business Village

Alloa

FK10 3LY

United Kingdom

Tel: 01259 272140

Fax: 01259 272141

Email: office@structuraltimber.co.uk

If you have any general enquiries on any other education and training matter, again either seek advice within your company, or visit

goconstruct.org



**STRUCTURAL
TIMBER ASSOCIATION**

Building solutions in timber

2. Aims and Objectives

2.1 Health and Safety at work

The aims and objectives of this workbook are to assist you to:

- Work more safely yourself - we must all work in ways that minimise the risks to ourselves and to others;
- Implement Health & Safety more effectively - there will be no improvement in safety performance without effective implementation;
- Contribute to the Health & Safety of the workplace - you are required to comply with safety rules in your work place and to react adequately if you are involved in or witness an accident.
- where you see a blue pencil symbol, this indicates that there is a task for you to do to reinforce and enrich your learning. If you can't fit your answers in the space provided, please use a separate sheet of paper
- the activities are designed to help you find out about different topics within the workbook
- at the end of each section there are some questions for you to answer. These are designed to check your understanding and to identify any areas that you may need to brush up on
- the workbooks have been designed to be enjoyable as well as informative
- on completion of this course you will understand what your employer expects from you.

Overall safety in the workplace can only improve if we all work together.

2.2 What is in this workbook

This workbook is divided in to sections, which follow a logical sequence. Please refer to the Contents page for an overview of the sections which are covered in this workbook.

Each section follows a similar pattern:

- you will be given the information to read that explains what you will be required to do, followed by some exercises to complete



Activity example

Take a moment to reflect on the knowledge you would like to gain from this workbook and how it will be useful for your career. Make notes below, these will serve as a motivation reminder throughout your work.

What I already know about health and safety:

Why is it important to know health and safety law:

What I want to know about risk assessment and control:

What I want to know about making my workplace safer:





3. Health and Safety at Work

3.1 Overview

Timber Frame workplaces such as workshops factories and construction sites contain many Health & Safety hazards. The 1974 Health & Safety at Work Act was introduced to protect all people at work. In addition the European Union has introduced legislation that also serves to protect us at work through the introduction of specific regulations which in turn become part of health & safety laws in the UK.

Everyone working in the Timber Frame Industry has an important part to play as well as legal responsibilities in keeping the workplace safe for themselves and others.

3.2 Employer responsibilities

Section 2(1) of the Health and Safety at Work Act states that **"It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees."**

One of the duties the employer must carry out by law is to make sure that employees are informed about Health & Safety. This is one of the reasons for this section of this Handbook.

To carry out their duties concerning Health & Safety all employers must provide:

- Plant, equipment and systems of work that are safe and without

risk to health

- Safe arrangements for the use, handling, storage and transport of articles and substances used for work
- Necessary instruction, information, training and supervision of employees to ensure safety at work
- Maintenance of the workplace
- Safe and well maintained access and egress entrances and exits
- A safe working environment that has adequate facilities and arrangements for employee welfare at work
- A written Health & Safety Policy must be provided if there are more than 5 or more employees
- Where requested and under certain circumstances employers must agree to the appointment of safety representatives (both Union and Non Union) and where appropriate a safety committee may be provided.

3.3 Employee responsibilities

In the same way that the employer has responsibility for health and safety, so too does the employee.

The employer takes responsibility for providing employees with a safe working environment and relies upon employees to work and act in a safe manner. Employees are legally responsible for their actions if they adversely affect the safety of themselves or others.

Section 7 of the Health & Safety at

Work Act requires every employee while at work to:

“Take reasonable care for the Health & Safety of yourself and of other persons who may be affected by your acts or omissions at work”

In other words, according to the law you are responsible for your own health and safety and also for the impact of your actions or lack of actions on your colleagues’ health and safety.

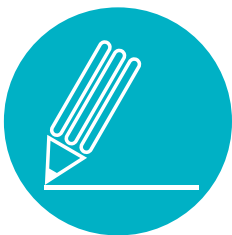
Employees must also:

- Cooperate with your employer to enable him to comply with their legal duties
- Not recklessly or intentionally misuse anything provided under the law for health safety or welfare

3.4 Improving health and safety in your workplace

There is always something everyone can do to improve Health and Safety. Below are some methods to consider:

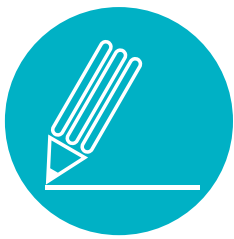
- Always be aware of the hazards in your factory before you start work
- Always make sure that guards are correctly fitted to machinery and tools
- Always use personal protective equipment provided
- Always ensure that materials and products are stacked safely
- Always keep the work areas tidy
- Always clean up spillages promptly
- Always follow correct operating procedures
- Never obstruct fire exits
- Never obstruct walkways
- Never operate woodworking machinery without authorisation or having first been trained by a competent person.



Activity

Make a list of 5 ways of improving health and safety in your workplace, which you are already implementing. Then list another 5, which you will start implementing.





Activity

Speak with your supervisor about the most important health and safety legislation you should be aware of. Make some notes below on their full names, access methods and key-points you should implement.

3.5 Risk assessment and communication

Seeking out and identifying hazards that could cause potential harm or injury is an essential first step in controlling risk. Furthermore, employers and their Employees who know their business should also know the risks involved with its activities and should manage these risks like any other part of the business. Risk assessment techniques are therefore an integral part of everyone's job.

A Risk Assessment is necessary in order to:

- Identify the significant risks
- Identify how best to eliminate or reduce the effects from them

It contains public sector information published by the Health and Safety Executive and licensed under the Open Government Licence.

3.5.1 Definition of a risk

Hazard	Something with the potential to cause harm.
Risk	The likelihood of the harmful event occurring.
Extent of Risk	The number of people who may be affected and any other consequences.

3.6 Risk assessment process

Carrying out a Risk Assessment is not complicated, but it is an essential part of making the workplace safe for us all. The method is based on the following 5 step process as recommended by

the HSE to assess risks:

5 Steps to Risk Assessment:

- **Step 1:** Look for the Hazard
- **Step 2:** Decide who might be harmed
- **Step 3:** Evaluate the risk and decide whether existing precautions are adequate or does more need to be done
- **Step 4:** Record your findings
- **Step 5:** Review your Assessment and revise if necessary

Having identified the hazards & the risks you must now give an estimate of the likelihood of an accident happening and also to the severity of the accident. To give a value to the above the HSE recommend using the following simple table. Using the table below you can now compare the risk by:

Risk= Likelihood x Severity

Likelihood rating	Severity rating
High (3)	Major (3).
Medium (2)	Serious (2)
Low (1)	Slight (1)

Using the above calculate values between 1 and 9; the lower the number the lower the risk.

3.7 Hierarchy of risk control

After the risk ratings have been calculated, the risk assessment creator should make decisions on how to control the risks. In general a hierarchy of risk elimination, reduction or control should be used when dealing with each risks. The control measures should target to reduce both the likelihood and the severity of the risk, however on some occasions only one factor may be realistically reduced. A risk

with an overall score of 9 might need to be stopped all together in order to eliminate the risk. The list below shows a typical hierarchy of risk control, however the learner is advised to consult their company for the exact terminology used in their risk assessments.

- Elimination
- Substitution
- Physical Controls
- Administrative controls
- Information, instruction, training & supervision
- Personal Protective Equipment

More information can be found on the HSE website:

www.hse.gov.uk/risk/

3.8 Review of risk assessment

You do risk assessments many times a day. At work do a risk assessment where an activity is different to normal. Think about how it is different, if it introduces different hazards or means that the usual controls cannot be applied to the method of working.

The risk assessments **must** be reviewed regularly and maintained up to date. If you notice that the process of completing a task has changed from that in the risk assessment, then contact the Health and Safety person at your factory immediately.

3.9 The role of the HSE

We are all responsible, under the common law duty of care for employees, visitors, members of the public and anyone whom we can reasonably foresee would be affected by our activities. The law

When completing a risk assessments, think about the practical steps with which you can make your and your colleagues' working environment safer.

is enforced by Inspectors from the Health & Safety Executive (HSE).

The HSE:

- have wide powers to entire sites and premises to inspect the work and equipment
- may issue notices requiring employers to make improvements when standards do not comply with legal requirements
- may shut down unsafe sites or premises to stop unsafe activities
- may prosecute employers and employees who break the law.

You may not be aware that The Health and Safety Executive (HSE) Inspectors are visiting your place of work. Also Local Authority Safety Officers from the Local Authority may also occasionally visit premises and sites and have similar powers as HSE Inspectors.

Inspectors can issue two types of notice if they feel that safety or health is threatened. These are:

- **An Improvement Notice:** This type of notice requires matters to be put right within a specified period. The notice will refer to a specific breach of the law.
- **A Prohibition Notice:** This type of notice requires that a particular activity is stopped until matters have been put right. The Notice need not refer to law, only that, in the opinion of the Inspector, there is a risk of serious personal injury.

After a serious accident, the Police turn up first, then an Inspector will visit the site and a full investigation will be conducted. The outcome could lead to prosecution.



Activity

Complete the risk assessment template below with some main considerations at your workplace. Consider some of the main manufacturing stages in subsequence, including materials loading, using saws, frame assembly, nail-guns, lifting of assembled timber frames and floor/roof cassettes, packaging and dispatch. Also consider what impact your work could have on subsequent project stages including timber frame erection on-site, external and internal finishes, maintenance and in-use.

What are the hazards?	Who might be harmed and how?	What are you already doing?	Risk assessment before additional control	Do you need to do anything else to control this risk?	Action by who and when?	Completed date	Risk assessment after additional control

4. Accidents

4.1 Reporting accidents

All accidents and 'near misses' at work must be reported.

The definition of an accident is any unplanned event leading to injury or damage. A 'near miss' is anything that had the potential to cause an accident, i.e. "it nearly did, but we got away with it this time": a 'free lesson'!

How could an accident affect you?

You could suffer:

- Temporary or permanent disability
- Inability to carry out your normal work
- Loss of earnings
- Inability to take part in recreational activities
- A serious accident could result in death.

This would also have an effect on your family and others who may depend on your fitness and wages.

Your employer could also suffer:

- Loss of output and loss of time
- Cost of repairing damage
- Wastage of materials or product
- Effect on the workforce e.g. low morale
- Possible prosecution leading to fines and/or imprisonment
- In an extreme case the Health & Safety Executive could shut down a dangerous site.

Bear in mind that you could also be prosecuted if you knowingly work in an unsafe manner that endangers yourself and/or other.

You, your colleagues and your employer all need to work together to **prevent** accidents **before** they occur.

You should report all accidents, near misses and dangerous occurrences to your supervisor (or other person required by your employer).

By doing this you will ensure a proper investigation is carried out and help to prevent a recurrence.

Your employer must report all serious accidents and accidents causing more than 7 days absence to the Health & Safety Executive. You must tell your employer all you know about the accident so that this report may be made fully and correctly.

Accident, near miss and dangerous occurrence reporting will vary from site to site. Certainly you must give a verbal report about any incident that caused injury or had the potential to cause injury. You may also have to give a verbal or written statement in the course of an accident investigation.

When making notes of the important facts of an accident, near miss or dangerous occurrence the following should be included:



**ALL ACCIDENTS
CAN BE
PREVENTED**

WHO

- Who was injured and to what extent?
- Who else was present?
- Who were the other witnesses?

WHEN

- The date and exact time the accident occurred

HOW

- What happened before, at the point of and after the accident and any other relevant information
- The machinery, equipment, tools involved and any other relevant information
- What caused the accident (if known) and any other relevant information

Remember – today's near miss could be tomorrow's fatality, SO REPORT IT!

4.2 Prevention

There is generally a best way to do a job. The best way should also be the safest way. This is usually the way you have been trained to do a job. There are advantages to companies and individuals if everyone works consistently using similar work methods and procedures, e.g. 'Safe Systems of Work'. This is especially important in team working where one team has to hand over to another. Accidents can easily occur when there is confusion in the workplace.

There are a number of ways for recording best practice and preventing accidents:

- Risk assessments (with risk control measures)
- Method statements
- Training manuals often include operating procedures
- Safe Systems of Work are

provided for hazardous jobs

- Safety Rules will usually be written for activities that have more general applications
- Quality Manuals sometimes include operating procedures
- Permits to Work apply to some hazardous procedures.

You must make yourself aware of all the procedures that apply to your work. They have been written for your protection and you must follow them. They will also have been written to ensure that what you do complies with legal requirements.

Don't be tempted to think that you can do better by taking short cuts. Short cuts lead to accidents and you may be breaking the law.

If you find a better way of doing something, tell your supervisor they may be able to have the work procedure changed. Then everyone will benefit from the improvement and safety will be the winner.

4.3 First aid and welfare arrangements

4.3.1 First aid

Unfortunately accidents do happen. When they do you need to act quickly and effectively. An emergency, such as a serious accident or sudden illness can occur at any time. Prompt and effective action is essential to help the injured and limit further injury or damage.

IT COULD BE YOU!

Prompt first aid treatment is essential and can be the most important factor in the recovery of a casualty. Woodworking is generally regarded as a higher risk activity and therefore requires the presence of a trained First Aider in

Your company may have all or some of these and others which are not mentioned.

your Company. In case of accident or illness, summon the First Aider immediately.

Your employer should tell you who the First Aider is, where they work and how they are contacted. **If you don't know – ASK!**

Caring for the casualty:

- Only take First Aid action for which you are qualified. However, there are some basic actions that you can take while waiting for qualified help.

The hazard that caused the accident may still be present with the potential to cause:

- Further injury to the casualty
- Injury to you and other persons in the area
- Damage to plant and equipment or the environment.

You may need to deal with hazards before first aid treatment is applied. The steps you take will depend upon the circumstances but there are some actions that have general application:

- Call for further assistance e.g. a First Aider
- Remove the hazard if possible and if it is safe to do so
- Remove the casualty from the danger area if medically safe to do so and if you know how to do it safely
- Shut down any plant and equipment involved using emergency shut down procedures if necessary; Isolate the source of power if appropriate
- Isolate the source of spillage, leakage or contamination if appropriate
- Erect safety barriers and warning signs to prevent entry of unauthorised persons to the area
- Clean up spillages and leakages when instructed to do so by an

authorised person

- Ensure plant and equipment has been checked by an authorised person prior to re-starting if it has been involved in the incident.

4.3.2 Welfare arrangements

Welfare facilities are just as important as Safety Laws and Regulations for the protection of your Health.

You should have access to the following and remember your workmates will also use them so you should contribute to them remaining clean and tidy.

- Suitable, clean toilets
- Clean washbasins, warm water, soap and towels
- Suitable clothing if you have to work in wet, dirty or other poor conditions
- Changing facilities for changing, drying and storing clothes
- Drinking water.

There are additional aspects of personal hygiene that you should bear in mind:

- If you wear protective clothing make sure that you remove it as soon as it is no longer needed. Don't visit food vending machines or the canteen in protective clothing or you may pass contamination on to others. This applies to dirty overalls as well
- If you use earplugs in noisy areas, use only clean plugs. Inserting dirty plugs in your ears can lead to infection and damaged hearing
- Keep personal protective equipment clean to avoid contamination. This particularly applies to face masks and the inside of gloves
- Wash your hands thoroughly before eating or smoking
- Wash your hands thoroughly

Remember what you observed and what actions you have taken. It will be important evidence for the accident investigation.

Keep a written record of events if possible and take photographs if appropriate.

after visiting the toilet

- Don't use compressed air to clean dusty clothing. It is dangerous as air bubbles can get into the blood stream. Damage to your eyes is also a possibility. You could also injure other people.

4.4 Calling the emergency services

Emergency Services normally refer to the Police, Ambulance Service and Fire Brigade.

There will be established procedures for calling the emergency services at your place of work **make sure you know them.**

In case of emergency call 999 straight away.

There may be different procedures for calling an ambulance or summoning the fire service. For example, in some work places or sites only authorised personnel (e.g. First Aiders) are allowed to call an ambulance, if the situation is not a life threatening emergency.

In case of fire everyone must be able to raise the alarm. This may involve operating a fire alarm and can also involve telephoning 999 to report the details of the fire.

Your health is important so do not let your standards drop. If you do then you will be affecting others and increase the health risks to them.

In case of emergency call 999 straight away.

Check all documents, and method statements and risk assessments first.



5. General Hazards

5.1 Do you know your signs?

Red Signs

These are prohibition signs and include prohibitions on smoking (as illustrated). Other common prohibition signs are those showing that there is no access for pedestrians or no access for vehicles. Red signs are also used for fire-fighting equipment.

Blue Signs

These are referred to as mandatory signs and they indicate that a specific action is required, for example, wear a hard hat (as illustrated). Other common mandatory signs are hearing protection must be worn and face protection must be worn.

Yellow or Amber Signs

These are warning signs and are used to warn against such things as electricity (as illustrated), radioactive material and biological risks.

Green Signs

These signs are for emergency escape routes and First Aid provisions, for example, first aid posts and emergency showers.

5.2 Electricity and portable tools

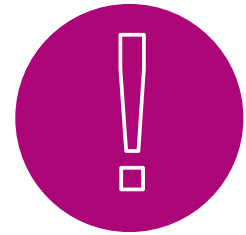
This is a significant hazard and you should be aware of electrical supplies close to your work area for machinery, portable tools and overhead cranes.

The Main Dangers are electrocution, electric shock, burns and fire:

- These dangers are all possible when you use damaged electrical equipment or use the equipment with faulty cables and/or connections
- Any noticeable problems should be reported and the faulty equipment put aside with the supply disconnected until repaired. This includes equipment that trips the power supply or RCD.

The following will help keep you safe when working with electricity:

- If you have to use 230v (mains) equipment, ensure it is fitted with RCD protection and has been tested before use
- Keep cables clear of walkways, heat sources and sharp objects
- Always switch off and disconnect electrical equipment when making adjustments, cleaning, etc.
- Do not touch electrical equipment with wet hands
- All portable equipment should be tested regularly
- Do not overload power points and sockets
- Know where the isolation points and emergency stops are located
- Check equipment is safe before you use it
- Never distract anyone using equipment
- Wear proper clothing as appropriate



The most important factor before starting any job is to:

SEE THE METHOD STATEMENT!

IF THE METHOD STATEMENT IS NOT AVAILABLE THEN DO NOT START THE WORK!



- Do not tamper with guards
- Disconnect when not in use
- Only use equipment for what it is intended
- Use battery operated and reduced voltage (110v) portable tools where possible.
- You may also want to check the fuse rating protecting the equipment.

Note the above list is for the manufacturing workplace only as lower voltage e.g. 110v and battery powered tools are generally used on site.

5.3 Site traffic

Site Plant can be very dangerous and should only be operated by those who are qualified. Accidents involving plant are usually serious!

If there are vehicles and plant operating in your workplace or you are the operator, make sure you are familiar with the site traffic plan.

Unfortunately all too many accidents involving vehicles happen in our industry. The vehicles involved include cranes, forklift trucks and Lorries and /or the loads they are carrying.

It is important to keep people and vehicles separated where possible (the general term for this is segregation) as well as considering the correct driving techniques, etc.

5.3.1 Pedestrian and Vehicle Areas

- These should be clearly marked on the ground and segregation will normally be achieved with the use of barriers
- It is very important that drivers and pedestrians recognise and use these areas properly - even if this means going a longer way round

- Don't take short cuts and walk across vehicle areas or drive in pedestrian only areas. Observe and use the walkways – you wouldn't drive your car down the pavement and nor should you drive industrial vehicles over ground reserved for people.

5.3.2 Key Workplace Precautions

- Do not walk or stand in roadway
- Do not remove barrier without permission
- Use pedestrian routes when available
- Treat on-site roads as public highways
- Always wear hi-visibility clothing.

5.3.3 Loading/Unloading in Public Areas

Make sure you use the safe system of work when loading or unloading vehicles and members of the public are not in your working area. If they are, then stop what you are doing until it is safe.

If you are a driver and are having your truck loaded or unloaded by someone else remember your safe system of work - stay in the cab or keep a safe distance from the activity.

5.3.4 Accidents from Delivery Vehicles

A Banksman should always guide the driver. When unloading, do not climb on the back of the lorry or its load. Ladders should always be used for access when placing slings under the loads. There is a serious risk of injury if you fall from a lorry.

5.3.4 Forklift Trucks

You must only drive/operate a forklift truck if you are qualified and

Plant access and driveways should be clearly marked and free of obstruction.

It is important to separate people in work areas away from moving vehicles.

It is also important to make sure that if the markings become covered by dirt or anything else they are kept clear & clean



authorised to do so. Far too many accidents happen with forklift trucks, many of them resulting in very serious accidents with people getting killed.

A common mistake made by forklift truck drivers is driving forward with a load that is too big and blocks their view. **You should be driving backwards in these circumstances.**

Another major cause of accidents involving fork lift trucks is unsecured loads - you know the sort of thing where something is sitting loose on top of a clamped load – where a pothole or sudden stop causes the top load to fall and hit someone. **You should not be driving a forklift with unstable or unsafe loads.**

5.4 Control of Substances Hazardous to Health (COSHH)

The COSHH Regulations are designed to protect persons from hazardous substances at work. They include any dangerous materials you use at work whether in a workshop or site environment. Examples are things such as corrosive chemicals.

There are many hazardous substances such as biological agents like rat's urine that can lead to infections in humans known as leptospirosis or Weil's disease.

During your work as a timber frame manufacturer you will most likely encounter hazardous substances associated with woodworking such as solvents, adhesives and fire retardant treatments among others. In the case of wood preservatives for example three toxic chemicals (pentachlorophenol, creosote, and arsenicals) protect the timber from living organisms, but can also have a negative impact on

human health. When working with solvents, adhesives and retardants always follow the correct and safe application method including use of PPE as necessary.

An important potentially hazardous material in timber frame manufacturing or joinery manufacturing industries is the wood dust generated by wood working machines.

In addition to the tiny particles of wood produced during processing, wood dust can also contain bacterial, fungal and moss spores. The quantity and type of wood dust will depend on the wood being cut and the machine you are using, for example:

- Whether the timber is green or seasoned
- Whether it is a hardwood, softwood or composite material
- How aggressive the machine cutter or blade profile is

The biggest risk is from fine dust, as you can breathe this deep into your lungs where it will do the most damage. Fine dust will also spread further from the cutting process so it is important to clean ledges and other workroom surfaces regularly to prevent dust accumulating.

The table below outlines some of the hazards and the control measures that will need to be considered to reduce the risk to health and safety and the environment.

5.4.1 Why is it Necessary to Control Wood Dust?

Wood dust is a substance hazardous to health because it can cause serious non-reversible health problems including:

- Skin disorders
- Obstruction in the nose and rhinitis

It is important for those working with wood machines to understand the types of wood dust and possible effects health and the importance of systems to control the impact and the use of PPE.

N	Likelihood rating	Severity rating
1	Identify the presence of a potential hazard	Identify substances used on the site and how they are used
2	Assess the risk to health and safety	Evaluate any risks to health, who could be affected and in what circumstances
3	Eliminate the hazard if practicable	Consider: <ul style="list-style-type: none"> ▪ Changing to a non-hazardous substance ▪ Enclosing the process ▪ Change to an alternative process
4	If not practicable, reduce the risk by putting in place control measures	Control exposure to as low a level as possible and at least below any limits laid down. Monitor and make sure that control measures and protective equipment are effective. Consider: <ul style="list-style-type: none"> ▪ Providing extraction for fumes and dust ▪ Using the minimum possible quantity of the substance ▪ Carry out the process in a separate area to reduce the number of people who may be exposed
5	If this is not possible, reduce the risk by protecting the person	If means of control do not adequately reduce the risk, provide suitable secondary protection masks, gloves, overalls etc. as well as facilities for washing, changing contaminated clothing and storing PPE
6	Provide employees with information about health risks and training in the use of control measures and equipment.	Provide: <ul style="list-style-type: none"> ▪ COSHH data sheets for substances used in the workplace ▪ Training in use of substances ▪ Training in use of control measures and PPE ▪ Instructions for cleaning and decontamination of people and surfaces

- Asthma
- A rare type of nasal cancer.

5.4.2 Legal Duties Under the COSHH Regulations

Under the COSHH Regulations it is necessary to:

- Use control measures properly, particularly wood dust collection equipment on fixed and portable tools
- Take part in any training arranged
- Use and look after personal protective equipment
- Report any defects in control measures.

5.5 Reporting of Injuries, Diseases & Dangerous Occurrences Regulation (RIDDOR)

There is a legal requirement in the UK to report injuries, diseases and other dangerous occurrences to the relevant enforcing authority. For more information the learner is encouraged to refer to the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, 2015.

The responsibility for reporting lays with the employer, the self-employed or the person in control of work. The following types of accidents must be reported:

- fatality as a result of an accident.
- major injury to a person at work as a result of an accident.

- an accident that results in a person not at work being taken to a hospital.
- a dangerous occurrence.

The notification must be by the quickest practicable means and this is usually by telephone.

The notification must be followed by a written report within ten days and this is usually done using Form F2508.

RIDDOR also has reporting requirements for incidents with the following outcomes:

- absence from normal work for over seven days.
- death of an employee within a year
- specified occupational diseases

You should make yourself aware of the conditions under which these requirements occur!

Records of reportable incidents must be kept by the organisation, not just sent to the Enforcing Authority.

In addition, records of individual incidents must be retained for at least three years.

The reporting of incidents involving less serious outcomes is not a legal requirement under **RIDDOR**.

Examples of these will include minor injuries requiring first aid or resulting in less than 73 days off work, “near misses” and property damage. However, it is good practice to report these for the following reasons:

- it provides a more sensitive measure of safety performance.
- we can learn from data analysis.
- by looking for patterns in the way incidents occur.
- we can learn from individual incidents.

- it is usually the case that incidents have the same range of causes, and the nature of the outcome, near miss to serious, is a matter of chance.

However, none of these aspects of good practice are possible unless the incidents are reported in the first place.

Your organisation may also use an “Accident Book” (B I510), instead of, or in addition to, the in-house incident form.

Often in timber panel factories and on building sites there will be an accidents book where accidents are recorded and described.

5.6 Manual handling

It is important to ensure that hoists, telehandlers and other plant or equipment are available so that manual handling and lifting are kept to a minimum.

- Always check to see if handling heavy items can be done in other ways! If not then you must handle or lift correctly and to do this you must be trained in the correct lifting and handling techniques.

5.6.1 Manual Handling Operations Regulations

Manual handling operations: any moving or supported of a load (including the lifting, pushing, pulling, or carrying) by hand or by bodily force.

It’s not only the weight, the awkwardness of the lift has to be taken into account as well. Does it involve body movements such as bending, stretching, and twisting as all of these will reduce the weight a person can safely lift?

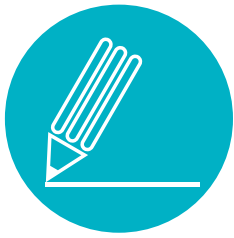
Remember that mechanical lifting methods should be used if it is

More than a THIRD of accidents reported each year are associated with manual handling.

foreseeable that manual handling is likely to cause injury. You must follow the Risk Assessments and take steps to reduce the risk of personal injury.

The table below outlines some of the hazards and the control measures that will need to be considered to reduce the risk of lifting and handling operations:

N	General Risk Assessment	What this means for the Manual Handling Regulations
1	Identify the presence of a potential hazard	Identify the manual handling operations that take place
2	Assess the risk to health and safety	Identify the manual handling operations that involve risk of injury. Consider Task, Individual, Load and Environment. Keep assessment under review
3	Eliminate the hazard if practicable	As far as is reasonably practicable avoid the need for manual handling which involves the risk of injury. Consider: <ul style="list-style-type: none"> ▪ Alternative methods that avoid handling ▪ Alternative transport methods e.g. pallet truck ▪ Powered handling equipment"
4	If not practicable, reduce the risk by separating people from it	Take appropriate steps to reduce the risk to the lowest that is reasonably practicable Consider: <ul style="list-style-type: none"> ▪ Methods that reduce weight of single items (e.g. smaller boards or smaller weight packs) ▪ Methods that reduce bending and reaching movements (e.g. pallet lifters or tables) ▪ Manage routes (e.g. change storage to reduce the distance items are carried manually, and keep routes clear)
5	If this is not possible, reduce the risk by protecting the person	In certain circumstances there may be aides that may support individuals to reduce the risk of injury such as lifting belts
6	Provide employees with information about health risks and training in the use of control measures and equipment.	<ul style="list-style-type: none"> ▪ Provide training for using handling equipment ▪ Provide training on appropriate lifting techniques e.g. the weight of the load and the location of the centre of gravity



Activity

Describe two manual handling operations you do and the controls in place to reduce risk of injury.

5.7 Lifting Operations and Lifting Equipment Regulations (LOLER)

Although you may work in the manufacture of Timber Frame Buildings, it is not inconceivable that you might also become involved in the erection of Timber Frame structures on site or loading consignments of Timber Frame Products onto transport systems. Bearing this in mind it is worthwhile understanding the dangers that can occur during lifting operations and the limitations of what your involvement might be in such activities. The following information may help to understand the risks and how things should be done correctly. Lifting Operations and Lifting Equipment Regulations (LOLER).

The Lifting Operations and Lifting Equipment Regulations (LOLER) place duties on people and companies who own, operate or have control over lifting equipment. This includes all businesses and organisations whose employees use lifting equipment, whether owned by them or not.

All lifting operations involving

lifting equipment must be properly planned by a competent person, known as the appointed person and operations are appropriately supervised and carried out in a safe manner, following the lift plan.

Lifting equipment includes overhead cranes, mobile cranes and tower cranes and also lifting accessories such as slings, chains and lifting beams.

These regulations do not apply to the use of fork lift trucks although there are still legal requirements for operator training and FLT maintenance and inspection.

The LOLER Regulations also requires that all equipment used for lifting is fit for purpose, appropriate for the task, suitably marked and, in many cases, subject to statutory periodic thorough examination. Records must be kept of all thorough examinations and any defects found must be reported to both the person responsible for the equipment and the relevant enforcing authority.

5.7.1 Lifting Operations

During the manufacturing of timber frame panels you will very likely need to unload materials and lift

We all have duties under the Manual Handling Regulations. You must make full and proper use of any safe system of work provided under these Regulations.

The appointed person does not need to be on site during the lift but the Lift Supervisor must strictly follow the lifting plan.

components safely. If you work in a modular or volumetric timber frame manufacturing company, then you will likely also need to be familiar with the safe methods to assemble and lift the modules. You might also become involved in the erection of Timber Frame structures on site or loading consignments of Timber Frame Products onto transport systems. Bearing this in mind it is worthwhile understanding the dangers that can occur during lifting operations and the limitations of what your involvement might be in such activities. The following information may help to understand the risks and how things should be done correctly.

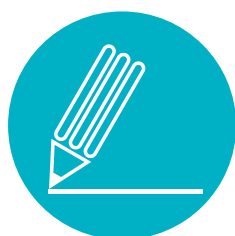
5.7.2 Main risks during lifting operations

Some of the main issues that may lead to an accident or hazard are:

- Failure to observe the relevant legal requirements
- Ergonomic design of the lifting equipment
- Whether the lifting equipment is the appropriate type
- Failure of lifting equipment
- Strength, stability and location of the lifting equipment
- Toxicity and/or flammability of chemicals being lifted or in area of lift
- Ability of plant to withstand collisions or impacts from dropped loads
- Poorly managed safety systems in place to deal with lifting equipment
- Safe access and egress of the lifting equipment to and from the site
- Unconscious and conscious incompetence.

Some of the main hazards that should be considered when planning lifting operations are:

- Consequences of collision/impacts of mobile lifting equipment, loads and dropped loads with process plant, pipework, electrical cables and people
- Control of lifting operations to prevent collisions/impacts
- Adequacy of management systems to identify human failings during the use of lifting equipment
- Adequacy of inspection regime
- Training of operators in the use of



Activity

Compare the health and safety aspects of 'collective protection systems' and lightweight metal work platforms or similar. Outline a few advantages and disadvantages for each.

lifting equipment

- Risk assessments of lifting operations
- Overturning and overloading
- Power failure of lifting equipment during lifting mode.

In addition to previously discussed forklifts, you should also be familiar with the safe operation procedures for overhead cranes. The LOLER Regulation 7(a) refers to lifting equipment with one fixed Safe Working Load (SWL) such as an overhead crane, some forklift trucks or an accessory such as a shackle or sling. Where possible, the actual value of the SWL should be marked on the equipment but where this is not possible a coding system should be used which easily provides the user with the SWL. Examples of such systems may include colour coding or attaching some form of label. One of the main hazards when using overhead cranes is proximity. Where anyone is working near the wheel tracks of an overhead crane, the crane should not be allowed to approach within 6 m of them if they would be liable to be struck by it.

5.7.3 Control of Lifting Operations

The type and scale of lifting operations will depend on the nature of the workplace and the size of components being manufactured, e.g. cassette floors will require more sophisticated lifting operations to be undertaken.

If you are not trained to take this role DO NOT undertake it, as you will need to be able to:

- Assess the proposed lift to provide for selection of equipment, position of the Crane and draw up a plan for instruction and supervision to enable the work to be carried out safely
- Ensure that all tests, inspections, examinations and maintenance

have been carried out, and that there is a procedure for reporting defects and completing necessary works

- Have the confidence to stop lifting operations if you think there is a danger and to carry out additional assessment to ensure that the lifting operation can be completed safely.

5.7.4 Lift Supervisor and Slinger Banksman

When cranes are in use on-site and operating, the following qualified personnel are required:

- **Driver:** Responsible for operating the crane
- **Lift Supervisor:** Responsible for the lifting operations
- **Banksman:** Responsible for communicating with the driver to ensure safe movement of the load
- **Slinger:** Responsible for securing the load to the crane correctly and safely.

Even if you do not have a formal role in lifting operations you need to be aware of:

- When lifting by crane is taking place in your work area,
- Where loads are or might be suspended and being moved,
- Ensuring these routes are kept clear,
- Ensuring that any fabricated lift points are fitted to the correct specification,
- That lifting accessories are properly stored when not in use to prevent damage.

If you would like to find out more you should refer to the Lifting Operations and Lifting Equipment Regulations (LOLER):

<http://www.legislation.gov.uk>

For more detailed guidance on lifting operations health and safety please refer to the HSE 'Approved Code of Practice and guidance'

6. Working at Heights

6.1 Platforms

Working at heights is inherently dangerous and if it cannot be avoided, it is best to use what is termed collective protection. Collective protection systems are active even if they are not in use by the individual and act by protecting all workers. Examples of collection protection systems are listed below:

- Mobile Elevating Work Platforms (MEWPs)
- Push Around Vertical (PAV)
- Mobile Vertical Platform (Scissors lift)
- Boom (Cherry Picker)
- Tower scaffolds
- Access decks
- Trestles

When selecting the type of equipment to use for a task you should consider the following points:

- How can the equipment be set up safely
- Are you trained to operate the equipment safely
- Has the equipment been maintained and is it in good working condition
- Are all components of the equipment in place (especially for scaffold towers)
- The duration of the task
- The type of work, light or heavy, and your experience with it
- The risk of a fall
- How to evacuate in case of an emergency.

Some of the basic rules when working on platforms include:

- Make sure they are level, well balanced and have sufficient supports to carry the load
- Use only suitable boards as the platform that reduce bounce and provide good grip
- Make sure they are wide enough to allow you sufficient room to comfortably turn around
- Make sure you can stand up when working on them and are not crouched
- Remove any obstacles on which you could bang your head or make you lose your balance
- Do not leave loose items on the boards that you can later trip over
- Keep a constant look out for anyone near your trestle as they may accidentally knock it
- Keep your work space clean and tidy as it is your responsibility to yourself and others.

More information can be found on the HSE website:

www.hse.gov.uk/pubns/geis6.pdf

www.hse.gov.uk/construction/safetytopics/scaffold.htm

6.1.1 Trestles

Typically when working in timber frame manufacturing you should not need to work from a trestle. However, because it is very easy to fall from a trestle, you should be aware of the correct procedure. Traditional trestles are disappearing from workplaces as

more modern alternatives are now available, including trestles fitted for guardrails. Lightweight metal work platforms are increasingly popular for heights up to 1 metre as they can be folded up and easily moved from place to place. The correct equipment has to be chosen after an assessment of the task is made.

A properly designed trestle is one which is stable, in good condition, fitted with the correct pins for adjusting height and with the boards adequately secured to prevent twisting or toppling. Even when you are not at any significant height, the fall can still put you in hospital.

6.2 Ladders

There are many stories about whether or not ladders are allowed to be used nowadays, but the short answer is that they can be used where appropriate. This will generally be for short duration tasks or where it is too awkward to use a safer alternative such as a working platform with guardrails and toe boards.

You will have either known someone or heard of someone falling off a ladder with serious results. You don't need to be at the top either to suffer serious injury. That's why if possible you should avoid using ladders in favour of safer working platforms.

It is essential that you observe the following when using ladders:

- Only use approved, industrial duty grade ladders
- Only use for short duration work if no other method is reasonably practicable
- Ensure the ladder is tied off or footed
- Try to pitch the ladder with a 1:4

ratio

- Always be able to maintain 3 points of contact
- Is a ladder the right means of access for the job or would stairs be a safer option?
- Is the ladder in good condition?
- Make sure the ladder is secure and cannot slip sideways or outwards
- Make sure you have at least one metre of the ladder above the working height or, if not, that other handholds are available
- Select the best position for the ladder so that you don't have to stretch or climb over obstacles
- The angle of lean should be correct and most ladders will have a red vertical arrow that needs to be perpendicular no matter what the height or ladder extension being used
- Extension ladders should only be used for access
- Step ladders should only be used when no other method of access is available.

More information can be found on the HSE website and relevant legislation:

www.hse.gov.uk/pubns/indg455.pdf

Work at Heights Regulation 2005

www.legislation.gov.uk/uksi/2005/735/contents/made

6.4 Leading edges and openings

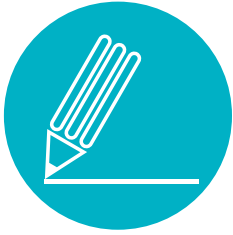
Typically when working in timber frame manufacturing you should not be required to work at height near a leading edge or opening. But as timber frame construction varied from company to company, if yours used timber frame to make modules, you might be working at the leading edge of modules. Or you might even be asked to be involved with timber frame erection.

At any case, if you are working at height and near a leading edge or opening then extra care is required. You must always refer to the method statement and risk assessment. You must eliminate as much of the risk as possible with collective means of protection e.g. guardrails, a fall mitigation system

such as nets or a suitable soft landing system, or other means of controlling the risk e.g. a fall restraint system.

It may be necessary to wear suitable harnesses that are securely fastened to a reliably strong part of the structure or scaffold, but you should be trained specifically for this work and have evidence that the harness has been properly examined and is in good order. In all conditions always make sure you have sufficient lighting available.





Activity

Speak with your supervisor about the types of working at heights fall prevention systems that you will most likely be using. Make notes below on the most important health and safety considerations when using each.

7. Fire Prevention

7.1 Overview

An emergency, such as an accident, sudden illness or fire, can occur at any time. Prompt and effective action is essential to help the injured and limit further injury or damage.

IT COULD BE YOU!

7.2 The fire plan

You should be instructed on the following during site induction. If not, you should make sure you find out when first arriving at a site:

- How to raise the alarm and what action to take
- What the alarm sounds like
- Where the fire extinguishers are situated
- Where the assembly points are.

7.3 Dealing with fires

Dealing with a fire can be dangerous and dealing with the aftermath of fire can also be costly. It is better to follow good safety practice to prevent fires from starting in the first place.

Too many fires are caused by carelessness or poor safety practices.

Common causes include:

- Sparks from welding or grinding equipment etc. Sparks can fly a long distance
- Smoking in unauthorised areas
- Temporary or faulty electrical cables

- Friction in moving machinery caused by poor lubricants or parts rubbing together can also generate enough heat to start a fire, particularly if dust and/or oil are present

Note that this is not an exhaustive list; you may be able to think of many more.

The following measures may help to prevent fires:

- Wood is a combustible material. Keep the minimum quantity of wood required in work areas to prevent fire spreading through the work shop
- Remove wood dust regularly from around your work area and any machines
- Check that dust extraction systems on tools and wood working machines are free-flowing and report any issues immediately
- Use cutting machines and tools correctly
- Use nail guns correctly and dispose of gas canisters in a suitable container
- Keep the minimum amounts of flammable material on site
- Proper storage areas should be used for flammable liquids and gases e.g. LPG and acetylene
- You should return all containers to the proper storage areas at the end of the day
- If you pour flammable liquid into another container make sure it is suitable and safe e.g. most plastic containers are not suitable for petrol
- Smoking should be banned in

Whatever the procedures are you should know them and be able to follow them promptly.

Make sure you see the site fire plan for your factory and know what it contains and what you should do in the event of a fire.

and around storage areas

- Close gas cylinder valves when they are not in use and keep all LPG cylinders upright
- Use the bins or skips for all waste material. These should be removed frequently
- Have a suitable fire extinguisher to hand when carrying out hot work

Note again that this is not an exhaustive list.

7.4 Evacuating your workplace in an emergency

You should know the Emergency Evacuation/Fire Alarm system in use and the safest route to your assembly area.

When the Alarm sounds move in an orderly fashion to your assembly area; you should warn others to do the same as you proceed.

You should make sure you always have a means of escape from your work area, preferably in more than just one direction. Never put yourself in a position where you can be trapped by fire.

7.5 Three things needed to start a fire

Three things are needed to start a fire:

- **Fuel:** Something that can burn. This may be a solid such as paper, wood or a flammable liquid such as oil or gas
- **Heat:** To raise the temperature of the fuel. A small source of heat such as a spark or cigarette end can provide enough heat particularly if the fuel is easily ignited e.g. petrol, a gas or a finely divided solid such as loosely packed fibrous materials

or dust

- **Oxygen:** To keep the fire burning. Oxygen in the air is sufficient to do this

7.6 Fire fighting equipment

Manually operated fire-fighting equipment is typically separated in to two categories:

- Hose reels (water)
- Fire extinguishers

Fire extinguishers work either by cooling the fire to remove heat or by smothering the flames to deprive them of oxygen.

Five types of extinguishing equipment are in common use and they can be identified by their colour-coded label as outlined in the table below:

7.7 When Not to Tackle a Fire

Certain circumstances may occur when you **should not** tackle a fire:

- When you may be trapped by the fire
- When you may be exposed to smoke or toxic fumes
- When there is a risk of explosion e.g. from gas bottles
- If you are not trained to use the appropriate extinguishers
- Never use water or foam on electrical fires if the power is turned on and never use water on flammable liquid fires

Do not put yourself at risk when fighting a fire.

More information on fire safety can be found on the Health and Safety Executive website

<http://www.hse.gov.uk/toolbox/index.htm>

Good fire prevention ensures that heat and fuel are kept apart.

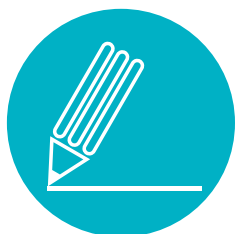
Note:

Care is required when holding the extinguisher because of the extremely low temperature of the expellant.

Three things are needed to start a fire:

**FUEL,
HEAT AND
OXYGEN**

Extinguisher content	Colour	Application
Water DO NOT use on electrical fires or fires involving flammable liquids	Red	Solid fuel fires such as wood, paper or textiles
Carbon Dioxide DO NOT use on solid fuel fires	Red with black	Small liquid fires, electrical fires
Foam DO NOT use on electrical fires	Red with cream	Flammable liquid fires e.g. petrol
Powder	Red with blue	Safe on all types of fire
Fire blanket	Red container	Small fires e.g. chip pan fires and when someone's clothes are on fire



Activity

Check what the fire evacuation plan in your workplace is and attach a copy here. Make some notes below on how you should effectively evacuate the building.

8. Personal Protective Equipment

8.1 Overview

In most cases you will need to wear personal protective equipment (PPE) to protect you against a hazard that cannot be eliminated by other means, but it is important to realise that PPE is a last resort once other methods of hazard reduction have been tried and ruled out.

PPE should be provided free of charge by your employer, but you may have to buy it yourself if you are self-employed. You will not be allowed in the workshop, factory or on construction site unless you have the appropriate PPE.

On construction sites there are a number of essential items of PPE. These are:

- **Hard hats:** To protect against bumps or falling objects.
- **Safety footwear:** To protect against moisture, chemicals, and heavy articles.
- **Hi-vis clothing:** Such as a vest or jacket

Other specific items include:

- **Gloves:** To protect against cuts, abrasions or chemicals.
- **Overalls/jackets/trousers:** To protect against dust, dirt, moisture, weather or chemicals.
- **Ear defenders:** To protect against noise.
- **Goggles/eye protection:** To protect against flying particles and chemical sprays.
- **Face masks and specialised respirators:** To protect against dust and fumes.

- **Other specialist PPE:** Designed specifically for a work activity or task e.g. harnesses etc.

PPE aims to protect you against a particular hazard. For example, gloves issued to protect against cuts and abrasions may not be suitable for protection against chemicals.

It is important that you wear the correct PPE for the job. Incorrect PPE will not protect you.

8.2 Noise when working with machines

Loud noise at work can cause hearing damage as well as causing other safety risks such as difficulties with communication and not being able to hear warning signals, or approaching plant or machinery. In companies working with timber noise can be a significant health and safety issue. The level of noise when working (measured in decibels dB) tends to increase if stiffer timber such as oaks are used, if the tools are not sharpened, and if tools are operated at high speeds, among others. For these reasons, careful planning and training are required in setting, operating and maintaining equipment for low-noise working and in the correct use of any noise control equipment.

One of the most important factors for working with woodworking machines is to wear the provided hearing protection. Employers

If a risk assessment has identified that you must wear PPE to protect you from a hazard you are obliged to do so.

This is a legal requirement placed on you.

More information on PPE can be found on the HSE website:

www.hse.gov.uk/toolbox/ppe.htm

tend to offer staff a selection of comfortable ear protectors, and where possible try to ensure that you can still communicate effectively with others around you. These may be earmuffs, semi-aural/semi-insert earplugs or basic earplugs.

8.2 PPE use and care

When wearing more than one type of PPE, make sure that they are compatible, e.g. hearing defenders and goggles which allow the other to work effectively etc.

Check that PPE is undamaged before use. Also check if damaged during use – for instance always replace a hard hat when it has been subjected to impact. If you are not sure, have your PPE checked by an approved person

Always store PPE correctly and in the correct location so that it is always ready for use when required. Do not put it away dirty and know how to clean it properly

It's better to be safe than sorry.

There is nothing macho in NOT wearing PPE. You know it makes sense!

Failure to wear PPE is like driving a car without fastening your seat belt – it is dangerous and is breaking the law.

Make sure to wear your noise PPE as instructed

To see an example woodworking company risk assessment, see the HSE case study:

<http://www.hse.gov.uk/risk/casestudies/pdf/woodworking.pdf>

Always wear the PPE required for the task.



9. Nail Guns

Nail guns are used in workshops during assembly in timber frame manufacturing. They also get used a lot in timber frame erection etc. The use of nail guns has increased dramatically over recent years and nail gun incidents now feature in high numbers in HSE's woodworking accident statistics.

Mechanics of nail gun use:

Nail guns use a piston that is driven at high speed onto the head of a nail (or large staple) to force the fixing into the timber in one adjustable strike. The fasteners range in size and application and are typically held in strips or coils in a magazine.

The most important part of the nail gun is the trigger mechanism. The safest type of nail gun trigger is the 'full sequential trigger', which is activated only if controls are manipulated in a certain order and has a safety tip (www.ncbi.nlm.nih.gov/pmc/articles/PMC4562888/). The least safe type of nail gun can fire if the controls are manipulated in any order, and if a second nail can be fired by moving the nail gun without releasing the safety tip. The difference in productivity between the two types was found to be only 1% of overall time, so the full sequential trigger should preferably be used.

3 main types of nail gun are most commonly used:

- For factory use the type operated by compressed air is most common
- For site use the type using

butane gas is widely used. The butane is mixed with air in a combustion chamber and ignited by an electric spark when the trigger is pulled

- The third type are light weight and much less powerful and use an electric motor and spring to drive the piston - some of these are battery operated.

Nail guns for timber have built in safety features and typically before the gun can be fired by pulling the trigger the nose guard must be retracted a sufficient distance to activate the firing mechanism (safety tip). This is designed to occur when the gun is pressed against the timber; however analysis of nail gun incidents investigated by the HSE has found that these safety features can be defeated, either accidentally or sometimes intentionally.

When using nail guns following guidance should be observed to avoid the most common cause of accidents when using nail guns:

Operatives should always ensure that:

- they are not firing into split or weak timber, or firing in to features such as knots which may change the trajectory of the nail
- the head of the nail gun is fully on the timber member. If the head is too close to the edge of the member then the safety mechanism may release and allow the nail to skim off or fire through the member
- the nail gun is angled slightly down towards the table/bench

Nail guns are one of the most common and serious risks when manually assembling a timber frame.

- their 'holding' hand is an adequate distance away from the nailing point in case the nail fully penetrates the member and protrudes through the other side. A useful rule of thumb is to keep the 'holding' hand at least 300mm from the nailing point
- they are not firing towards another operative, particularly if the assembly is being undertaken in pairs
- they are wearing protective equipment including eye protection
- the safety features of the nail gun are operational

In addition to these, some examples of common nail gun incidents:

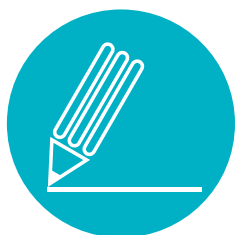
- Operator's position and gun angle – placing themselves in line of fire and shooting own torso
- Operator accidentally shooting themselves during nail gun maintenance without disconnecting airline (or removing battery, gas canister) and nails first
- Operator carrying the gun with a finger on the trigger, then making accidental contact with someone's head, or own leg etc.
- Operators hand positioned too close to work piece and shooting own hand, sometimes through

the work piece

- Deliberate act of stupidity by the operator, shooting another worker. This happens faster than the operator is able to react
- Double fire – a second nail is fired unintentionally because the work piece was recontacted or the safety tip slipped
- Awkwardly positioned nails such as in corners, obstructed or beyond a comfortable reach distance.

9.1 Eye Protection When Using Nail Guns

- Appropriate eye protection must be rated to provide adequate impact protection to the lenses
- Manufacturer's safety leaflets all state that eye protection should be worn at all times when using nail guns.
- Under certain circumstances the use of safety helmets with integral retractable visors which do not restrict peripheral vision will be acceptable.



Activity

Ask your colleague responsible for Health and Safety on the shop floor to demonstrate the best practice nail gun handling in your company.

10. Woodworking Machinery

Historically, it used to be the case that there were as many as many as 800 accidents in woodworking environments - nearly twice the rate of any other industry. However, there are other risks of equal importance such as dust, noise and potential injuries from handling wood. There is also the obvious hazard of fire and wood dust explosion, so what can be done to control these risks? The answer lies in the professional management of health & safety.

Around two thirds of all accidents occur on just three types of wood working machines:

- Circular saws
- Vertical spindle moulders
- Surface planers

Circular saws

The largest number of accidents in woodworking are caused by circular saws. The majority of accidents could have been prevented by setting up the saw guard correctly, using a push stick to protect the fingers and adequate training. It is very important to use the safety features of circular saws because this can prevent finger amputation.

More information can be found on the HSE website:

www.hse.gov.uk/pubns/wis16.pdf

Vertical spindle moulders

Injuries from using vertical spindle moulders result from contact between the operative's hand

and the cutters and can result in the loss of several fingers. In an HSE survey of 1000 woodworking accidents, 14% occurred on vertical spindle moulding machines. Of these, 42% occurred on straight through work, 34% on stopped work and 15% on curved work (ref: Accidents at woodworking machines WIS7(rev) HSE Books 1999). These types of accidents can be prevented by correct use of false fences and pressure pads for the straight work pieces; and for curved pieces injuries can be prevented by correct use of backstops, jigs and work piece holders.

More information can be found on the HSE website:

www.hse.gov.uk/pubns/wis18.pdf

Surface planers

In an HSE survey of 1000 woodworking machinery accidents, 20% occurred on handfed surface planing machines. Of these, 80% occurred during edging or flattening, rather than the specialised operations such as rebating, moulding or chamfering which accounted for some 10% of the total (ref: Accidents at woodworking machines WIS7(rev) HSE Books 1999). The accidents were caused by incorrect use of the provided safe guard so it is very important that this is adjusted properly when in use. Ensure that the bridge guard is strong and rigid, not easily deflected, long enough, wide enough and adjustable without the use of a tool.

More information can be found on the HSE website:

www.hse.gov.uk/pubns/wis17.pdf

10.1 Training and supervision

Poor supervision and inadequate training are two of the main causes of accidents. The law requires that all workers must receive adequate training, including refresher training. It also makes good business sense to make sure your employees are working efficiently and safely.

Training can be in-house, as long as competent staff are able to provide it. It can also be external or a combination of both. It must cover the type of machine and work the operator will be expected to do. This is doubly important if you work on more than one machine.

The following personnel should be trained:

- Machine operators
- People who assist in the machining process, such as taking off, feeding and loading the work pieces
- People who, set, clean and maintain the machines

10.2 Safety Solutions

- **Braking:** Many serious hand injuries have occurred because workers have accidentally touched tools that are running down, sometimes when the machine has been switched off and left unattended. This is why you need to fit braking devices to reduce the rundown time for cutting tools. All woodworking machines, where a risk assessment shows it

to be necessary, should have been fitted with braking by 5 December 2008

- **Chip Limiting:** Old style tooling tended to pull the hand in to the cutters, often resulting in serious amputations. Although limited cutter projection tooling will not prevent an accident it is designed and constructed to significantly reduce the extent of an injury if the worker touches the cutters. If injuries do occur they are likely to be lacerations requiring stitches rather than amputations

Additional and essential safety solutions include:

- The use of equipment such as push sticks
- Restricted access to areas around the machines
- Machine guards that must not be removed or interfered with or modified in any way
- Using the correct Personal Protective Equipment (PPE)
- Understanding the risk assessment process
- Complying with permits to work and safe systems of work

10.3 Competence checklist

A competent worker should be able to demonstrate that they;

- Can select the correct machine, tooling and protection devices
- Have the ability and confidence to say 'this is the wrong machine for this job; it can be done more safely on...'
- Know what functions guards perform and how to use and adjust them properly, as well as any other protection devices. For example, on a circular saw, why you need a riving knife and how to set it and adjust the top guard
- Have knowledge of safe methods

of working including appropriate selection of jigs, holders, push-sticks and similar protection appliances

- Understand of the legal requirements for the guards to be used correctly
- Have knowledge of the nature of

the wood and the hazards that this can cause, such as kickback, snatching and ejection.



11. Final Review

Congratulations!

On behalf of the STA and CITB we hope you have enjoyed this workbook on Health and Safety for Timber Frame Manufacture.

As a reminder we have included below a simple checklist for you in this final review. When arriving on site you should now know what key points to consider before you start work.

Most importantly, once you have been assessed on these Health and Safety in combination with the Knowledge and Practical Skills training, you will have reached a level of qualification the industry wishes all timber frame designers to achieve over the next few years.

We hope that you will feel sufficiently pleased with your training experience to encourage other colleagues to use this training and to continue their own personal development.

For most of us our home is our largest expense and we expect it to be built to the highest standards by well-trained and suitably qualified people. By using these Workbooks, we as an industry, can now provide you with the opportunity to achieve this goal. Also by having a qualified workforce we can compete with the rest in quality & workmanship.

Thank you for taking part in this training experience and we hope you will enjoy a successful and satisfying career in our Timber Frame industry.

Below is a summary of the main points discussed in this workbook:

- Timber Frame workplaces such as workshops factories and construction sites contain many Health & Safety hazards. The 1974 Health & Safety at Work Act was introduced to protect all people at work. Everyone working in the Timber Frame Industry has an important part to play as well as legal responsibilities in keeping the workplace safe for themselves and others.
- The employer takes responsibility for providing employees with a safe working environment and relies upon employees to work and act in a safe manner. Employees are legally responsible for their actions if they diversely affect the safety of themselves or others.
- The learner should be aware of the general hazards at their workplace and the relevant signage used.
- In the case of fire, the employee must be aware of the fire alarm location, fire extinguisher locations, evacuation route and safe gathering point in the building. The staff should not attempt to extinguish a fire if this will put them in danger.
- The learner should be aware of site traffic rules in their workplace, including pedestrian and vehicle access, loading an unloading areas, possible accidents and forklift trucks.
- The learner must be aware of the risks and control of hazardous

substances in the workplace.

- It is important to ensure that hoists, telehandlers and other plant or equipment are available so that manual handling and lifting are kept to a minimum.
- All accidents and 'near misses' at work must be reported. The definition of an accident is any unplanned event leading to injury or damage. A 'near miss' is anything that had the potential to cause an accident.
- Best practice of risk prevention should be recorded, for example via risk assessments (with risk control measures), method statements and training manuals, which include operating procedures
- Accidents should be reported, investigated and reviewed using structured processes.
- Unfortunately accidents do happen and all too frequently. When they do you need to act quickly and effectively. An emergency, such as an accident or sudden illness can occur at

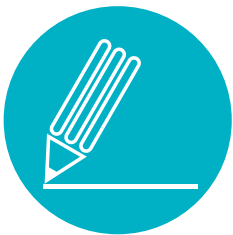
any time. Prompt and effective first aid is essential to help the injured and limit further injury or damage.

- PPE such as hard hats must always be worn when required.
- Nail guns must be used safely according to manufacturer's instructions and risk assessments
- Woodworking machinery guns must be used safely according to manufacturer's instructions and risk assessments.

These workbooks have been prepared by the Structural Timber Association, in conjunction with CITB, on behalf of the industry.

STA and CITB operates a continuous improvement policy and would therefore be very grateful to receive any review comments for further editions.

Thank you.



Activity

Take a moment to reflect on what you have learnt by completing this workbook and how you would like to improve these skills to advance your future career.

Candidate and supervisor's final sign off

On completion of this workbook the named candidate and authorised supervisor are required to complete this final sign off declaration to confirm that:

- All aspects of the workbook have been successfully completed by the named candidate in accordance with the workbook and scheme requirements
- The named candidate has met the minimum experience requirements (1 year) in accordance with scheme requirements
- The named candidate is ready to register and undertake the online test.

CANDIDATE NAME	
COMPANY	
TEL No.	
EMAIL	

Candidate declaration

I can confirm that I have successfully completed this workbook in accordance with workbook and scheme requirements, have met the scheme minimum experience requirement of 1 year and am ready to register and undertake the online test.

CANDIDATE NAME _____
CANDIDATE SIGNATURE _____
DATE OF DECLARATION _____

SUPERVISOR NAME	
JOB TITLE	
COMPANY	
TEL No.	
EMAIL	

Authorised supervisor declaration

I can confirm that the named candidate has successfully completed this workbook in accordance with workbook and scheme requirements, has met the scheme minimum experience requirement of 1 year and is ready to register and undertake the online test.

SUPERVISOR NAME _____
SUPERVISOR SIGNATURE _____
DATE OF DECLARATION _____

NOTE: This workbook must be retained and presented for STA audit purposes upon request.

Structural Timber Association

Head Office

The e-Centre

Cooperage Way Business Village

Alloa

Clacks

FK10 3LP

Tel: 01259 272140

Fax: 01259 272141

Website:

www.structuraltimber.co.uk

CITB

Unit 1 and 2

674 Melton Road

Thurmaston

Leicester

LE4 8BB

Tel: 0300 456 5561

Fax: 0300 456 5562

Email:

enquiries@citb.co.uk

The production of these workbooks has been supported financially by CITB and, without their help, would not have been possible. The industry acknowledges this fact and is extremely grateful to them.

Whilst the STA/CITB have had these workbooks prepared to provide guidance on timber frame construction, the STA/CITB accepts no liability and offers no warranties in relation to them and their contents to the fullest extent applicable law can exclude such liability. Users therefore are required to satisfy themselves as to the suitability of the contents of this guidance for their specific intended purpose.

**Structural Timber Association/
CITB 2017.**

Industry consultation acknowledgements:

DBM Consultants

Hale Construction

Milner Associates

Robertson Timber Engineering

Stewart Milne Timber Systems

Images acknowledgements

Radar Communications

CCG (OSM)

Stewart Milne Timber Systems

Kingspan

John Meiling

Tsvetomila Duncheva

Authors

Dr. Tsvetomila Duncheva

Mark Milne

Prof. Robert Hairstans

Carola Calcagno

Edinburgh Napier University

Project team members

Andrew Carpenter (STA)

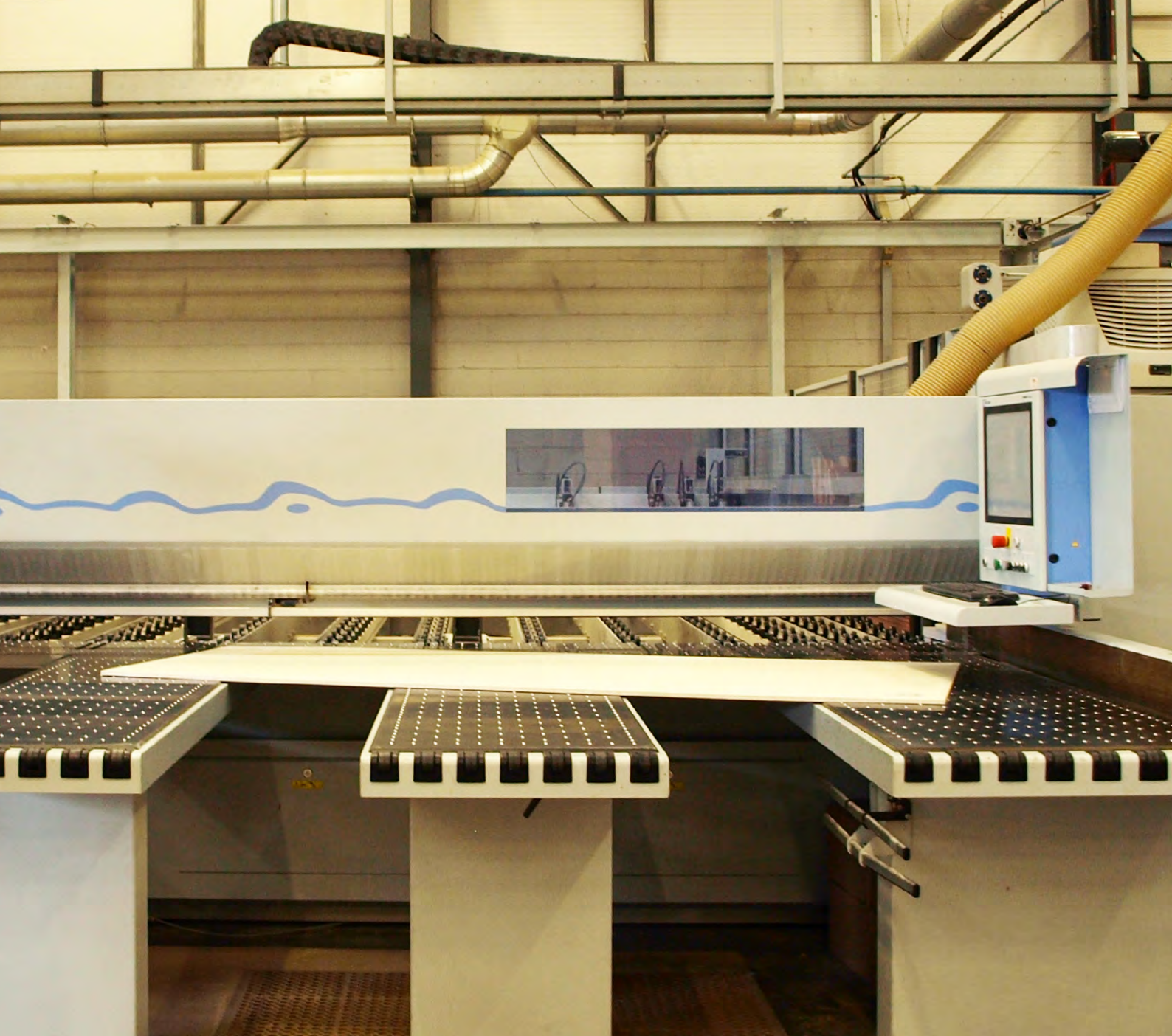
Bob Davis (STA)

Tony Batchelor (BWF)

Paul Allford (CITB)

Martin Bruton (CITB)

Susan Hudson (SMTS)



TIMBER FRAME WORKBOOKS



CITB is a registered charity in England and Wales (Reg No 264289) and in Scotland (Reg No SC044875).