

**02 | SESSION PLANS**  
**SCAFFOLD FUNDAMENTALS**

# COURSE OPENING: OVERVIEW

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## SESSION PURPOSE

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The purpose of this session is to introduce yourself, and establish a safe learning environment for the trainees. This is essential to start off the training in a positive way so trainees are focussed on what they have to learn and know what to expect from the training. It is important to let trainees know what will and won't be included in the course and provide them with an overview of the scheduled activities.

## LEARNING OUTCOMES

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By the end of this session, your trainees should be able to:

- Know your name and the names of the other trainees
- Know what to expect from the course and what is expected of them
- List the topics that will be covered in the course
- Feel relaxed and prepared to learn in a positive learning environment

## DURATION

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Approximately 15 - 20 minutes MAX (it should not take any longer than this due to time constraints)

## PREPARATION REQUIRED

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- Review the PowerPoint introductory slides and the Trainer Notes
- Choose an ice-breaker activity from the list provided at the back of this manual.

## FLEXIBILITY

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The instructions in this Trainer Manual are a recommended delivery option. You may need to adapt the activities and timings to suit the needs of trainees.

# COURSE OPENING: SESSION PLAN

SLIDE(S)	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>TITLE SLIDE: Leave this slide on the screen until all trainees arrive or until the official start time. <i>(there is not much time to wait for latecomers so go ahead and start on time).</i></li> </ul>
	<ul style="list-style-type: none"> <li>Acknowledgement Slide - show this slide briefly</li> </ul>
	<ul style="list-style-type: none"> <li>SAIA INTRO: Explain briefly about the SAIA and the types of training provided through the SAIA University</li> </ul>
	<ul style="list-style-type: none"> <li>WELCOME SLIDE: Explain that this course is designed to provide trainees with the knowledge and skills they require to be deemed a Competent Person by their employer. EMPHASIZE that ONLY their employer has the authority to designate them as Competent Person.</li> </ul>
	<ul style="list-style-type: none"> <li>COURSE AGENDA: Briefly outline the course agenda and let the trainees know what to expect during the day</li> <li>CLICK - for each agenda item to appear on screen (continues through to slide 8)</li> </ul>
<h2>ICEBREAKER / INTRODUCTION ACTIVITY</h2>	
<p>Choose an ice-breaker activity from those provided at the back of this manual. A variety of icebreakers have been provided that take different amounts of time. Choose one that fits within your allocated time and that you feel is appropriate for your trainees.</p> <p>If they already know each other, just spend a few minutes to have trainees introduce themselves to you briefly.</p>	



- Explain that there are a few ground rules and expectations you want to agree on so everyone benefits from this training. Review each of these ground rules – clarify your expectations around each of these rules
- FEEDBACK – explain that at the end there will be a course evaluation and you welcome honest feedback
- HOUSEKEEPING – go over any housekeeping details (location of bathrooms, emergency exits etc.)



## NOTES

*Use this space to reflect on what worked well and what didn't work well in this session and make a note to yourself about what you will do differently the next time.*

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# SESSION 1: OVERVIEW

## TYPES OF SCAFFOLDS

### SESSION PURPOSE

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The purpose of this session is to familiarize trainees with the three main types of supported scaffolds, their typical uses and possible configurations so they can choose the appropriate scaffold for a given application.

### LEARNING OUTCOMES

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By the end of this session, your trainees should be able to:

- Identify the three main types of supported scaffolds and their basic components
- Describe some typical uses for each type of scaffold
- List the advantages and disadvantages of each type of scaffold
- Describe different scaffold configurations and their uses
- Choose appropriate equipment for a given job

### DURATION

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Approximately 15 - 20 minutes

### PREPARATION REQUIRED

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- Read Section 1 of the Study Guide and familiarize yourself with the Key Points
- Review the PowerPoint slides for Section 1 and the Trainer Notes
- Gather a selection of some basic scaffold components to be able to show trainees and demonstrate their use.

### FLEXIBILITY

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The instructions in this Trainer Manual are a recommended delivery option. You may need to adapt the activities and timing to suit the needs of your trainees.



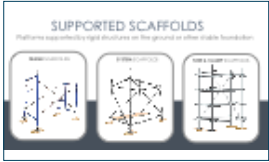

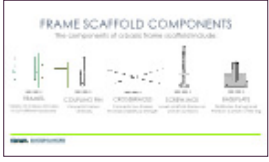
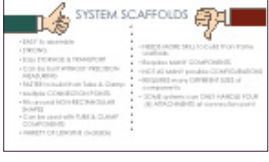

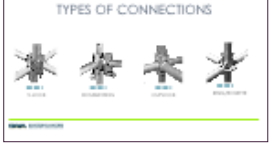


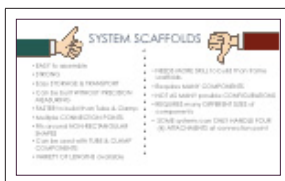

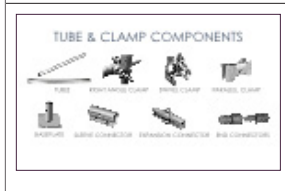
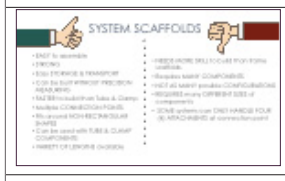
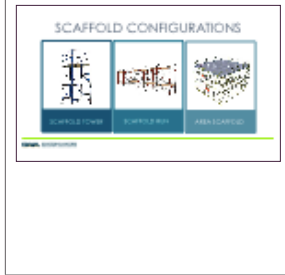
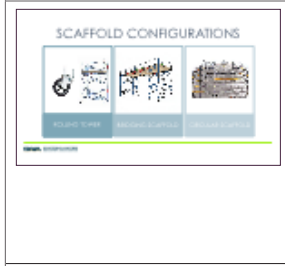
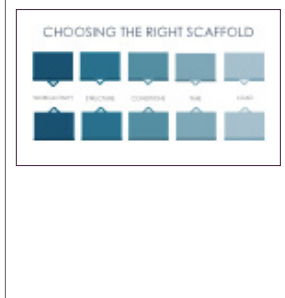
For *less-experienced trainees*, it is recommended that more time is spent familiarizing them with the scaffold components and if possible providing sample components for trainees to see and handle.




For *experienced trainees*, you can spend less time discussing the types and components and have a more in-depth discussion of the advantages and disadvantages and the Learning Activity.

# SESSION 1: SESSION PLAN

SLIDE	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>TYPES OF SCAFFOLDS Intro Page: Tell the trainees you will begin with a brief introduction to (or review of) the different types of scaffolds.</li> </ul>
	<ul style="list-style-type: none"> <li>Explain the difference between <b>Supported</b> and <b>Suspended</b> Scaffolds and give a few examples of each type.</li> </ul>
	<ul style="list-style-type: none"> <li>Provide the definition of Supported Scaffolds and briefly introduce the three main types of supported scaffolds.</li> </ul>
	<ul style="list-style-type: none"> <li>Point out the different components of the frame scaffold. CLICK- once for each label to appear.</li> <li>Explain the purpose of each component as the label appears.</li> </ul>
	<ul style="list-style-type: none"> <li>Discuss in more detail the function of each Frame Scaffold Component.</li> </ul>
	<ul style="list-style-type: none"> <li>List some ADVANTAGES of Frame Scaffolds</li> <li>CLICK Discuss some DISADVANTAGES of Frame Scaffolds</li> </ul>
	<ul style="list-style-type: none"> <li>Describe the different components of System Scaffolds - CLICK once for each label to appear.</li> </ul>
	<ul style="list-style-type: none"> <li>Describe each of the different types of connections and explain the unique features of each type.</li> <li>CLICK - for each type of connection to appear. Describe how the connection is made and discuss the advantages/disadvantages of each type.</li> <li>(OPTIONAL) If you have some examples show them to trainees and demonstrate how they work.</li> </ul>

 <p><b>SYSTEM SCAFFOLDS</b></p> <ul style="list-style-type: none"> <li>• Easy to assemble</li> <li>• Erection</li> <li>• Easy to dismantle &amp; transport</li> <li>• Can be built without previous knowledge</li> <li>• Can be used with Tube &amp; Clamp</li> <li>• Components</li> <li>• Variety of erection options</li> <li>• Erection time is shorter than for other types of scaffolds</li> <li>• Requires heavy components</li> <li>• Must be erected on a level surface</li> <li>• Must be erected on a firm base</li> <li>• Must be erected on a level surface</li> <li>• Must be erected on a firm base</li> <li>• Must be erected on a level surface</li> <li>• Must be erected on a firm base</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the ADVANTAGES of System Scaffolds</li> <li>• CLICK - Discuss the DISADVANTAGES of System Scaffolds</li> </ul>
 <p><b>TUBE &amp; CLAMP SCAFFOLDS</b></p> <p>Tube &amp; Clamp scaffolds are the most common type of scaffolding used in the construction industry.</p>	<ul style="list-style-type: none"> <li>• Identify the different components of Tube &amp; Clamp Scaffolds and explain their function</li> <li>• CLICK once for each component label to appear and describe the purpose of each component.</li> </ul>
 <p><b>TUBE &amp; CLAMP COMPONENTS</b></p> <p>Labels for components: Tube, Horizontal Clamp, Vertical Clamp, Diagonal Clamp, End Post, End Connector, Vertical Connector, End Connector.</p>	<ul style="list-style-type: none"> <li>• CLICK - for each component to appear and briefly describe how they are used / what they are used for.</li> <li>• (OPTIONAL) If you have some examples show them to trainees and demonstrate how they are used.</li> </ul>
 <p><b>SYSTEM SCAFFOLDS</b></p> <ul style="list-style-type: none"> <li>• Easy to assemble</li> <li>• Erection</li> <li>• Easy to dismantle &amp; transport</li> <li>• Can be built without previous knowledge</li> <li>• Can be used with Tube &amp; Clamp</li> <li>• Components</li> <li>• Variety of erection options</li> <li>• Erection time is shorter than for other types of scaffolds</li> <li>• Requires heavy components</li> <li>• Must be erected on a level surface</li> <li>• Must be erected on a firm base</li> <li>• Must be erected on a level surface</li> <li>• Must be erected on a firm base</li> <li>• Must be erected on a level surface</li> <li>• Must be erected on a firm base</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the ADVANTAGES of Tube &amp; Clamp Scaffolds</li> <li>• CLICK - Discuss the DISADVANTAGES of Tube &amp; Clamp Scaffolds</li> </ul>
 <p><b>SCAFFOLD CONFIGURATIONS</b></p> <p>Labels for configurations: Scaffold Tower, Scaffolding Run, Area Scaffolding.</p>	<ul style="list-style-type: none"> <li>• Describe Scaffold Towers and explain their typical uses.</li> <li>• CLICK- Describe Scaffolding Runs and explain their typical uses.</li> <li>• CLICK- Describe Area Scaffolding and explain their typical uses. Explain that we will look at these in more detail later in the course.</li> </ul>
 <p><b>SCAFFOLD CONFIGURATIONS</b></p> <p>Labels for configurations: Rolling Tower, Bridging Scaffold, Circular Scaffold.</p>	<ul style="list-style-type: none"> <li>• Describe Rolling Towers and explain their typical uses</li> <li>• CLICK- Describe Bridging Scaffolds and explain their typical uses</li> <li>• CLICK - Describe Circular Scaffolds and explain their typical uses.</li> </ul>
 <p><b>CHOOSING THE RIGHT SCAFFOLD</b></p> <p>Labels for factors: Material, Erection, Cost, Time, Risk.</p>	<ul style="list-style-type: none"> <li>• List the factors that are considered when choosing a scaffold for a given job.</li> <li>• Provide examples to give trainees something to visualize.</li> <li>• Ask the trainees to think of what some other considerations might be: (workers' experience using the type of scaffold, availability, safety etc...)</li> </ul>

## LEARNING ACTIVITY

	<ul style="list-style-type: none"> <li>• Tell the trainees that we are going to apply what we have just learned to a specific job scenario. Tell them that this scenario can be found on page 28 in their Study Guide.</li> <li>• CLICK – Ask what is the first thing that needs to be known – pause and wait for the trainees to answer.</li> <li>• CLICK – Ask what is the first thing that needs to be known – pause and wait for the trainees to answer.</li> <li>• CLICK – WORK/ACTIVITY Ask the trainees to read the scenario and tell what work or activity is to be done on the scaffold (wait for the answer then CLICK) – Repeat for each factor then discuss what might be the most appropriate type of scaffold to use. *Remember to point out the need for the scaffold to be enclosed to protect the environment, and point out the need for ties.</li> </ul>
	<ul style="list-style-type: none"> <li>• Review the KEY POINTS from this session</li> </ul>



## NOTES





## LEARNING ACTIVITY

For the following scenario, use the checklist provided and determine which type and configuration of scaffold would be best suited for the job:

### SCENARIO:

A historic 45ft (13.7m) lighthouse is being restored as part of a local tourism initiative. The surface of the lighthouse needs to be sandblasted (to remove the old paint) and then re-painted. The old paint contains lead and must be prevented from contaminating the land and water. Four painters will be working on this job but may need to be working at different levels at the same time (because the job must be completed in two weeks). There will be no loads other than the workers themselves, their equipment, large buckets of paint and their painting equipment (brushes and rollers). The lighthouse is located at the top of a cliff by the lake where the wind can be quite strong. The ground around the lighthouse is bedrock but not perfectly flat. There is not a lot of space around the lighthouse.



### JOB REQUIREMENT CHECKLIST:

Type of work or activity:	<i>sandblasting and painting</i>
Type and shape of structure	<i>Lighthouse - (45ft (13.7m) high) Round structure</i>
Conditions	<i>Near a cliff, strong wind, bedrock foundation (not perfectly flat), narrow space around structure</i>
Length of time needed	<i>two weeks</i>
Loads	<i>4 workers, sandblasting equipment, paint, brushes, and rollers</i>

### Recommended Scaffold Type and Configuration:

*Various options - Systems or Tube & Clamp scaffold (to fit around narrow space)  
Circular scaffold - permits workers to be anywhere around the structure without moving it*

- \* Will require enclosure to protect the environment*
- \* Will require ties due to wind and enclosure and height*
- \* Fall protection will be required*



## KEY POINTS

*The most important information you MUST cover in this session:*

- There are two basic types of scaffolds: **supported scaffolds** and **suspended scaffolds**.
- Frame, System and Tube & Clamp, are the most common types of supported scaffolds.
- Frame Scaffolds** are the most common type of scaffold used in commercial and residential construction. They are easy to build and don't require much expertise. They are well suited for square and rectangular structures with easy access and level foundations.
- System Scaffolds** have fixed connection points at equal intervals along the posts (also called **standards** or **uprights**). They are versatile, quick and fairly easy to use.
- Tube & Clamp Scaffolds** are flexible and suited for access to irregular work areas. There are no restrictions as to where connections must be made so they can be adapted to suit many sizes and shapes.
- Supported Scaffolds** can be configured in many different ways to suit the requirements of different jobs. Some types of scaffolds are better suited for certain jobs than others.
- Tube & Clamp components can be used with Frame or System Scaffolds for lacing & bracing or making up irregular spaces.
- The factors you should consider when choosing a scaffold for your job.
  1. The **type of work** or activities that will be done on the scaffold;
  2. The **type and shape of the structure** you are working on;
  3. The **conditions** under which the scaffold will be used;
  4. The **length of time** the scaffold is needed;
  5. The **load** the scaffold will need to support.

# SESSION 2: OVERVIEW

## SCAFFOLD HAZARDS

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# 2

### SESSION PURPOSE

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The purpose of this session is to raise trainees' awareness of the five most common scaffold hazards and alert them to their obligation to comply with local regulations, codes and industry standards to minimize these hazards. Highlight local regulations that trainees must be aware of that pertain to the 5 main scaffold hazards, and other aspects of scaffold building.

### LEARNING OUTCOMES

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By the end of this session, your trainees should be able to:

- List the five most common scaffold hazards, identify hazardous scaffolding situations and explain what to do to minimize the risk;
- Describe scaffold builders' responsibilities in terms of Regulations, Codes & Industry Standards;
- Identify aspects of scaffold building which are governed by regulations;
- Compile a list of important local regulations to be aware of

### DURATION

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Approximately 45 mins to 1 hour

### PREPARATION REQUIRED

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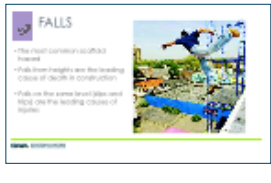

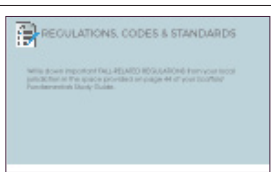
- Read Section 2 of the Study Guide and familiarize yourself with the Key Points
- Review the PowerPoint slides for Section 2 and the Trainer Notes
- (Essential) Review local scaffold regulations record relevant regulations in the space provided on pages 32 - 33.
- Prepare copies of local scaffold regulations for trainees
- *(Recommended)* Think of some personal stories of scaffold accidents/injuries/unsafe practices and their consequences from your own experiences that you can share with trainees to provide greater context to this session. *(Without disclosing potentially sensitive information)*


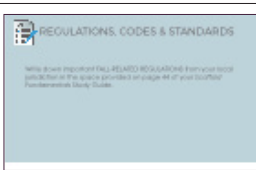



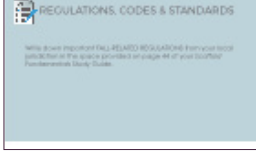

### FLEXIBILITY

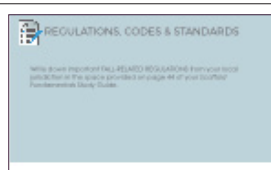
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Discussion is encouraged in this session to reinforce the importance of the content. Share your personal stories and/or encourage trainees to share their stories *(being mindful of the time)*.

# SESSION 2: SESSION PLAN

SLIDE(S)	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>• SCAFFOLD HAZARDS Intro Page</li> </ul>
	<ul style="list-style-type: none"> <li>• Review this list of responsibilities of the competent person and discuss the importance of continuously training and staying up-to date on local regulations, codes &amp; standards to be able to carry out these responsibilities effectively.</li> </ul>
	<ul style="list-style-type: none"> <li>• Explain the different Regulations, Codes and Standards that relate to scaffolds (and where to find them). Make it very clear which are enforceable by law and which supersede others.</li> </ul>
	<ul style="list-style-type: none"> <li>• Tell trainees you are going to list the 5 Most Common Scaffold Hazards.</li> <li>• CLICK – Describe FALLS and how common these are in scaffold/construction industry</li> <li>• CLICK – Describe USAFE ACCESS and provide examples</li> <li>• CLICK – Describe how scaffold builders can be STRUCK BY FALLING OBJECTS</li> <li>• CLICK – Describe ELECTROCUTION hazards</li> <li>• CLICK – Describe SCAFFOLD COLLAPSE and give an indication of how common this is.</li> </ul>
	<ul style="list-style-type: none"> <li>• Discuss Falls in more detail and share a personal story or ask trainees to share a fall-related story.</li> </ul>
	<ul style="list-style-type: none"> <li>• Discuss Personal Fall Protection and the Competent Person's responsibilities in relation to fall protection on scaffolds. Point out the different components of the personal fall protection system and briefly explain how they work.</li> </ul>
	<ul style="list-style-type: none"> <li>• Provide trainees with the relevant FALL-RELATED REGULATIONS and have them write them into the space provided in their Study Guides.</li> </ul>

 <p><b>UNSAFE ACCESS</b></p> <ul style="list-style-type: none"> <li>• Examples of UNSAFE ACCESS include:             <ul style="list-style-type: none"> <li>• Climbing on ladders or other parts of scaffold not meant to be climbed</li> <li>• Ladders with wings, built-in steps</li> <li>• Climbing over/along/under scaffolding</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Describe some other examples of unsafe access that you have seen.</li> <li>• Discuss available options and important considerations for safe access.</li> </ul>
 <p><b>REGULATIONS, CODES &amp; STANDARDS</b></p> <p>Write down important FALL-RELATED REGULATIONS from your local jurisdiction in the space provided on page 44 of your Scaffold Fundamentals Study Guide.</p>	<ul style="list-style-type: none"> <li>• Provide trainees with the relevant ACCESS-RELATED REGULATIONS and have them write them into the space provided in their Study Guides.</li> </ul>
 <p><b>STRUCK BY FALLING OBJECT</b></p> <ul style="list-style-type: none"> <li>• Tools, materials can accidentally be dropped, kicked or slip off the scaffold.</li> <li>• Falling objects can potentially cause damage to property, injury or death.</li> <li>• SCAFFOLD BARRIERS CAN USE VARIOUS types of material construction, so check all areas where objects are put.</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss falling object protection briefly</li> <li>• If possible share a personal experience.</li> </ul>
 <p><b>REGULATIONS, CODES &amp; STANDARDS</b></p> <p>Write down important FALL-RELATED REGULATIONS from your local jurisdiction in the space provided on page 44 of your Scaffold Fundamentals Study Guide.</p>	<ul style="list-style-type: none"> <li>• Provide trainees with the relevant FALLING OBJECT RELATED REGULATIONS and have them write them into the space provided in their Study Guides.</li> </ul>
 <p><b>ELECTROCUTION</b></p> <ul style="list-style-type: none"> <li>• Electrocution is common scaffold hazard.</li> <li>• Always use a permit system throughout the scaffold.</li> <li>• Stay safe distance from power lines.</li> <li>• Lockout/Tagout procedure must be followed when power has been isolated on-site.</li> <li>• Before climbing a utility scaffold, check utility lines.</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss Electrocution and Electrical Hazards and share a related story (or ask trainees to share one). Make sure to discuss minimum safe distances according to locally-applicable regulations.</li> </ul>
 <p><b>REGULATIONS, CODES &amp; STANDARDS</b></p> <p>Write down important FALL-RELATED REGULATIONS from your local jurisdiction in the space provided on page 44 of your Scaffold Fundamentals Study Guide.</p>	<ul style="list-style-type: none"> <li>• Provide trainees with the relevant ELECTRICITY-RELATED REGULATIONS and have them write them into the space provided in their Study Guides. Make sure to let trainees know if the minimum safe distances in their jurisdiction differs from those listed in the chart on page 40.</li> </ul>
 <p><b>SCAFFOLD COLLAPSE</b></p> <ul style="list-style-type: none"> <li>• Scaffold collapse for inexperienced:             <ul style="list-style-type: none"> <li>• overloading</li> <li>• improper erection</li> <li>• improper bracing</li> <li>• inadequate foundation</li> <li>• improper tie-in to structure</li> <li>• use of damaged or broken materials or components</li> <li>• extreme weather conditions (high wind)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• List and explain some reasons why scaffolds collapse</li> <li>• (If anyone asks about the collapse in this image: This collapse was in Houston. One of the companies was fined \$14,700 for the following violations: support scaffold poles were missing base plates, the footing of scaffolds was not rigid or sound and the scaffolding wasn't inspected by a competent person before each work shift or after an occurrence that could affect the scaffolding's structural integrity. The second company involved was fined \$6,300 for not initiating and maintaining a safety program that regularly inspects job sites, materials and equipment and because the scaffold and scaffold components weren't inspected.)</li> </ul>

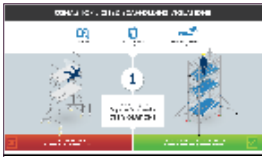


- Explain that because there are many reasons why scaffolds collapse, there are several related regulations. There may not be space in their Study Guides to write in all the regulations but they should at least write in the regulation page numbers or standard numbers in the space provided.

### LEARNING ACTIVITY #1



- Have trainees work in pairs and assign each pair a few questions from the learning activity.
- Provide them with copies of locally applicable regulations and have the pairs practice looking through the regulations to find the answers
- Ask the trainees to share the answers they have found

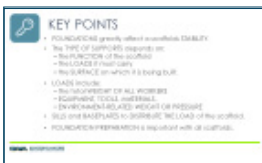


- **(SLIDES 44 - 48)**
- Explain to participants that every year OSHA publishes the top ten most common violations. Scaffolding violations rank third on OSHA's top 10. On the list of the most serious violations scaffolding even ranks second. On average, a violation is detected with five percent of OSHA's inspections.

### LEARNING ACTIVITY #2



- Ask the trainees to list the possible consequences of violating regulations (injury, death, fines, damage to reputation etc.)
- Discuss reasons why scaffold builders violate these regulations.
- Ask trainees if they believe the potential consequences are worth the risk.



- Review the KEY POINTS of this session



## LEARNING ACTIVITY #1

Using OSHA's Code of Federal Regulations 1926.451-454 **OR your local regulations**, locate the following information:

### FALL PROTECTION:

What are the two types of fall protection that are used with scaffolds?

What do the regulations say about working on scaffolds covered with snow, ice or other slippery material?

### UNSAFE ACCESS

What do the regulations say about the use of crossbraces as a means of access?

What is the minimum width allowed for working platforms and walkways?

### STRUCK BY FALLING OBJECTS

When is falling object protection required?

What is the minimum height that toeboards must be from the top edge of the walking/working surface?

### ELECTROCUTION

What is the minimum distance a scaffold must be built away from power lines?

### SCAFFOLD COLLAPSE

What do the regulations say about working on a scaffold during storms or high winds?

What methods can be used to prevent tipping of a supported scaffold with a height-to-base ratio of more than four to one (4:1) ?



## KEY POINTS



The most important information you **MUST** cover in this session:

- The five most serious scaffold hazards are **Falls, Unsafe Access, Struck by Falling Objects, Electrocutation, and Scaffold Collapse**. (FUSES).
- The Scaffold Industry is governed by various Regulations, Codes and Standards.
- In the US, the **Occupational Safety and Health Administration (OSHA)** is the mandatory standard governing scaffolds. Several states also have their own Occupational Safety and Health Regulations.
- There are many different codes including the **International Building Code**, that affects the design and use of scaffolds.
- Industry standards should be followed when building and/or using scaffolds such as the **SAIA Code of Safe Practices**.
- It is important to be aware of the Regulations, Codes and Standards affecting scaffolds so you can build them safely without presenting hazards to workers or to the general public.
- Falls are the most common scaffold hazard and leading cause of death in construction. Falls on the same level (slips and trips) are one of the leading causes of injuries. Falls are addressed in the OSHA *CFR 1926.451- General Requirements, Sub-section (g)*
- Improperly constructed scaffolds or scaffolds with unsafe access are hazardous. Unsafe Access is addressed in the OSHA *CFR 1926.450-451- General Requirements, Sub-section (e)*
- Scaffold builders can use various types of restraint, protection, or close off access to areas where objects may fall from the scaffold. Falling Object Protection is addressed in the OSHA *CFR 1926.451 -General Requirements, Sub-section (h)*.
- Electrocutation is a common hazard scaffold builders may encounter on a job site. Electrocutation is addressed in the OSHA *CFR 1926.451 - General Requirements, Sub-section (f)*, which is the *Use of Scaffolds*.
- Scaffolds collapse due to: overloading, improper erection, improper bracing, inadequate foundation, or not being properly tied, guyed or secured to a structure. Also use of damaged or poorly maintained components or extreme weather conditions such as high winds.





## KEY POINTS

The most important information you **MUST** cover in this session:



- The five most serious scaffold hazards are **Falls, Unsafe Access, Struck by Falling Objects, Electrocutation, AND Scaffold Collapse**. (FUSES).
- The Scaffold Industry is governed by various Regulations, Codes and Standards.
- In Canada, provinces each have their own **Occupational Health and Safety Act** which has specific regulations that apply to industries such as mining, construction etc.
- The **National Building Code** affects the design and use of scaffolds.
- There are industry standards that should be followed when scaffolds are designed and/or used such as the **CSA Code of Practice for Access Scaffolds Z797** and the **SIAC Codes of Safe Practice**.
- It is important to be aware of the Regulations, Codes and Standards affecting scaffolds so you can build them safely without presenting hazards to workers or to the general public.
- Falls are the most common scaffold hazard and leading cause of death in construction. CSA Z797 requires **workers to be protected against falls when there is a risk of falling more than 2.4m (8ft)** or the distance specified by province or local authority. Falls and Fall Protection are addressed in Section 6: Fall Protection and information about guardrails can be found in Section 5.
- Improperly constructed scaffolds or scaffolds with unsafe access are hazardous. Access and Egress standards can be found in Sections 5 & 7 of CSA Z797
- Scaffold builders can use various types of restraint, protection, or close off access to areas where objects may fall from the scaffold. Falling Object Protection is addressed in Section 5 of CSA Z797.
- Electrocutation is a common hazard scaffold builders may encounter on a job site. Electrical Hazards are addressed in Sections 5 & 7 of CSA Z797 which includes minimum safe distances.
- Scaffolds collapse due to: overloading, improper erection, improper bracing, inadequate foundation, or not being properly tied, guyed or secured to a structure. Also use of damaged or poorly maintained components or extreme weather conditions such as high winds.

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# TRAINER TOOL: REGULATIONS LIST

*Record all relevant regulations for the location where you are doing training. Make copies for additional locations and/or to provide to trainees (OPTIONAL)*

<b>FALL/FALL PROTECTION-RELATED REGULATIONS</b>		
Regulation Number	Description	Page(s)
<b>ACCESS-RELATED REGULATIONS</b>		

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<b>FALLING OBJECT-RELATED REGULATIONS</b>		

<b>ELECTRICITY-RELATED REGULATIONS</b>		

<b>SCAFFOLD STABILITY-RELATED REGULATIONS</b>		



# NOTES

# SESSION 3: OVERVIEW

## FOUNDATIONS

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### SESSION PURPOSE

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The purpose of this session is to give trainees a basic understanding of the importance of scaffolding supports and how to ensure a foundation is stable before constructing a scaffold.

### LEARNING OUTCOMES

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By the end of this session, your trainees should be able to:

- Describe the three types of loads
- Identify the basic scaffold foundation components and their purpose
- Explain how sills distribute scaffold leg loads
- Describe how to prepare a foundation before building a scaffold
- Describe the bearing capacity of different ground surfaces and soil types
- Describe how to address challenging foundation situations before scaffolds can be safely built

### DURATION

---

Approximately 40 - 45 minutes

### PREPARATION REQUIRED

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- Read Section 3 of the Study Guide and familiarize yourself with the Key Points
- Review the PowerPoint slides for Section 3 and the Trainer Notes
- (Optional) - Print copies of the images from WALL OF SHAME
- (Optional) - Print and cut out the three SCENARIO DESCRIPTIONS

### FLEXIBILITY

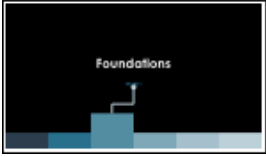


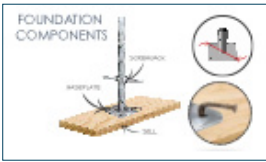

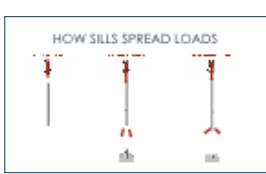

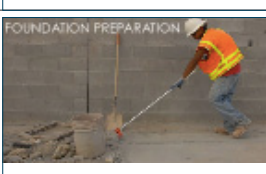
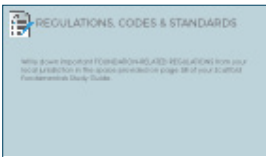
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The instructions in this Trainer Manual are a recommended delivery option. You may need to adapt the activities and timings to suit the needs of your trainees.




With experienced trainees you can go quickly through the foundation components and go into further detail about the way loads are distributed. Perhaps do a sample calculation showing how the load on a leg is reduced by adding baseplates and sills.

# SESSION 3: SESSION PLAN

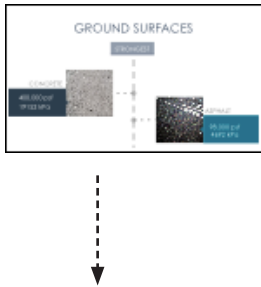
SLIDE(S)	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>FOUNDATIONS: Intro Page</li> </ul>
	<ul style="list-style-type: none"> <li>Explain that scaffolds are subjected to three different types of loads.</li> <li>List the three types of loads and give examples</li> </ul>
	<ul style="list-style-type: none"> <li>Ask trainees to identify the loads they see on this scaffold.</li> <li>Discuss the effect of wind on enclosed scaffolds</li> </ul>
	<ul style="list-style-type: none"> <li>List the three basic foundation components</li> <li>Remind trainees that baseplates are required by law</li> <li>Discuss the foundation components and the importance of using baseplates and sills</li> </ul>
	<ul style="list-style-type: none"> <li>Explain that it is good practice to secure the baseplate to the sill</li> <li>Explain how the size and length of sill is determined</li> </ul>
	<ul style="list-style-type: none"> <li>Show the first animation (how load travels down a scaffold leg)</li> <li>Show how the load is distributed by adding a baseplate (second animation)</li> <li>Click - show how it is distributed further with a sill</li> <li>Explain why we want to distribute loads</li> </ul>
	<ul style="list-style-type: none"> <li>Explain how loads travel down a 45 degree path</li> <li>Describe how the load is reduced with sills.</li> <li>Explain why the surface area increases because of the sill</li> </ul>
	<ul style="list-style-type: none"> <li>Explain the importance of preparing the foundation before building a scaffold</li> <li>Give some examples of preparations that might be required</li> </ul>
	<ul style="list-style-type: none"> <li>Provide trainees with the relevant FOUNDATION-RELATED REGULATIONS and have them write them into the space provided on page 58 in their Study Guides.</li> </ul>

## LEARNING ACTIVITY



- Divide the participants into pairs or small groups.
- Give each group one of these images.
- Tell them they will play the role of an OSHA inspector and spot violations/hazards.
-  Have experienced trainees identify or locate the specific regulations that are being violated.
- Ask each group to present their list of the hazards they identified and the possible violations

## SLIDE(S)



- Define bearing capacity as it relates to ground surfaces
- Describe foundation properties and considerations for concrete (very strong/high bearing capacity, sills may not be required)
- CLICK – Describe foundation properties and considerations for asphalt (*softens when heated, bearing capacity lowers*)
- Discuss what can be done to be able to safely build scaffolds on ground surfaces with lower bearing capacity.

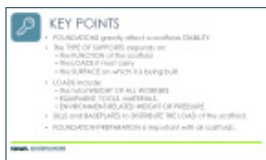


- Go through the list of Challenging Foundations one by one (describing what needs to be done to prepare the foundation to build the scaffold safely) **(You may need to refer trainees to the corresponding images in the Study Guide for clarification)**

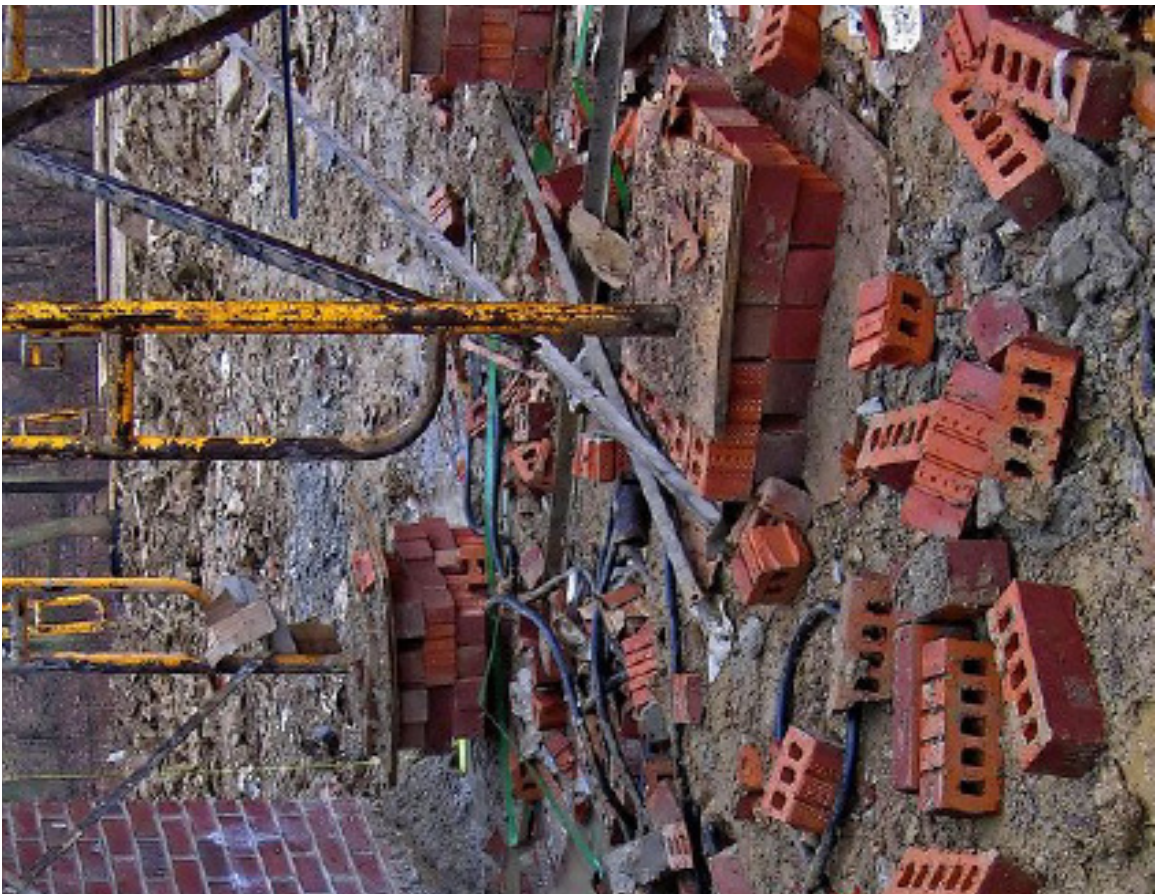
## LEARNING ACTIVITY



- Divide trainees into three groups and assign each group one of the three scenarios
- Give trainees 10 - 15 minutes to read over the scenario and discuss what preparations (if any) and what foundation components they would use



- Review the KEY POINTS of this session







3









## LEARNING ACTIVITY

*What are some actions you can take to ensure the scaffolds you build would be safe on the following challenging foundations?*



### SCENARIO #1



You are building a scaffold indoors as part of a historic church renovation. The job is to rehang a large bell in the belfry. The loads on the scaffold will include three men, and a bell that weighs between 1100 and 1200 lbs (exclusive of fittings). The floors are made of wood and there is a basement below the floor.



### SCENARIO #2



You are preparing to build a scaffold outdoors to work on the upper level of a building. The ground surface is dry clay. The weather has been hot and dry for the past few weeks but the weather forecast is calling for heavy rainfall around the time you expect to be working on the scaffold.



### SCENARIO #3



You have to build a scaffold for workers to install windows on the upper level of a house. Unfortunately, a trench has been dug very close to the side of the house where you need to put up your scaffold.





## KEY POINTS

*The most important information you MUST cover in this session:*

- A scaffold's foundation is a very important factor in its strength and stability.
- The types of supports for a given scaffold depend on several factors including the **function of the scaffold**, the **loads it must carry** and the **ground surface**.
- Loads** include the **total weight of all workers, equipment, tools, materials**, and **environment-related weight or pressure** that will be applied to a scaffold.
- Sills** are used under baseplates or screwjacks with baseplates to distribute the load of the scaffold and to protect floor/ground surfaces.
- Foundation preparation is important with all scaffolds.
- Different ground surfaces have different bearing capacities. It is important to know how much different surfaces can support safely.
- Differential settlements may damage scaffold components.
- To support scaffolds, backfilled soils must be well compacted and leveled. Mud and soft soil should be replaced with compacted gravel or crushed stone.
- Do not use bricks, short pieces of lumber, pallets or other scrap materials, either under scaffold feet or under sills as blocking or packing.
- Where sills must be placed on sloping ground, leveling the sill area should be done, wherever possible, by excavating rather than backfilling.
- When a scaffold is being built near an excavation, the leg should be at least **as far away from the edge** of the excavation **as the excavation is deep**.



# NOTES

# SESSION 4: OVERVIEW

## PLATFORMS

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### SESSION PURPOSE

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The purpose of this session is to familiarize trainees with the basic types and styles of platforms, their usual application. It is also to help trainees identify potential platform hazards.

### LEARNING OUTCOMES

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By the end of this session, your trainees should be able to:

- Identify the basic types and styles of platforms
- Describe how platform materials are used to build safe working surfaces.
- Determine the allowable loads on platform materials
- Identify potential platform hazards
- List the local regulations as they apply to scaffold platforms and platform materials.

### DURATION

---

Approximately 45 minutes

### PREPARATION REQUIRED

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- Read Section 4 of the Study Guide and familiarize yourself with the Key Points
- Review the PowerPoint slides for Section 4 and the Trainer Notes
- Familiarize yourself with the applicable regulations in your jurisdiction pertaining to scaffold platforms and platform materials.

### FLEXIBILITY

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The instructions in this Trainer Manual are a recommended delivery option. You may need to adapt the activities and timings to suit the needs of trainees.

# SESSION 4: SESSION PLAN

SLIDE(S)	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>PLATFORMS Intro page</li> </ul>
	<ul style="list-style-type: none"> <li>Discuss the three types of platform materials</li> <li>List some advantages and disadvantages of each type</li> </ul>
	<ul style="list-style-type: none"> <li>Discuss Solid Sawn Wood Planks, their characteristics/properties (explain why you can't just use any plank)</li> <li>CLICK - Discuss Laminated Scaffold Planks and their characteristics/properties.</li> </ul>
	<ul style="list-style-type: none"> <li>Point out the mandatory markings found on a scaffold grade plank (if required in your jurisdiction)</li> <li>Explain reasons why a scaffold grade plank might not have a visible stamp (fading, cut off etc.)</li> <li>CLICK - Discuss false grade stamps and what to look out for and what to do if you are unsure</li> </ul>
	<ul style="list-style-type: none"> <li>Discuss the different types of damage that can make wood planks unsafe.</li> <li>Explain what to do if you see any of these signs of damage.</li> <li>Discuss warping, and other types of damage.</li> </ul>
	<ul style="list-style-type: none"> <li>Provide tips or Do's and Don'ts pertaining to plank storage and handling.</li> <li>Remind trainees dropped planks or planks that have been used as sills must never be used on a platform.</li> </ul>
LEARNING ACTIVITY	
	<ul style="list-style-type: none"> <li>Tell the trainees you are going to play a game called "Use it or Lose it?"</li> <li>The purpose of this game is to inspect scaffold planks and determine if it is safe to use or should be removed from service.</li> </ul>
	<ul style="list-style-type: none"> <li>Click and show the first image - ask the participants to vote whether to Use it or Lose it</li> <li>Click and show the answer <b>x</b> or <b>✓</b> and describe why this plank is safe/unsafe to use</li> <li>Continue this way for each image</li> </ul>



## SLIDE(S)

## INSTRUCTIONS



- Describe the different types of metal planks and how to check for damage.
- Share tips on proper storage and handling.
- Explain how to find out their duty rating



- Describe Scaffold Decks – also discuss other styles available (ones with hatches etc).
- Discuss their advantages/disadvantages.
- Explain that scaffold decks are rated by uniform loads, (ie. 50 psf (2.5 kN/m²) or 75 psf (3.6 kN/m²).



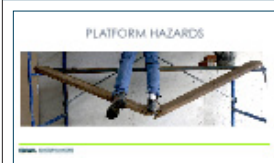
- Describe composite planks and their advantages/disadvantages.
- Provide tips on proper storage and handling as well as how to recognize if they are damaged.



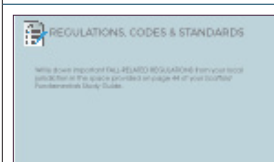
- Discuss loads on platforms and the necessity of every scaffold component being able to support its own weight and 4 times the maximum intended load.



- Go slowly through each step in the calculation explaining why each step is done –
- *(remember that some trainees may have difficulty following if they are not strong in math.)*




- Describe various platform hazards (insufficient or excessive overhang, lapped without bearer below etc.)

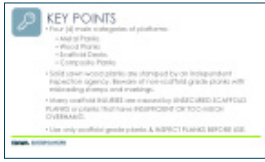


- *Provide trainees with the relevant PLATFORM-RELATED REGULATIONS and have them write them into the space provided on page 64 in their Study Guides.*
- (Make sure to include: Minimum width of work area, allowable space between platform and work area, allowable space between planks/decks, minimum height where platforms must be fully-planked, maximum allowable deflection, minimum distance from platform to structure etc.)

## LEARNING ACTIVITY



- Divide the participants into pairs or small groups.
- Give each group one image. Tell them to play the role of an inspector and spot violations/hazards.
-  Have experienced trainees identify or locate the ***specific regulations*** that are being violated.
- Ask each group to present their list



- Review the KEY POINTS for this session.



## LEARNING ACTIVITY

*These are some of the hazards - you may be able to identify others*

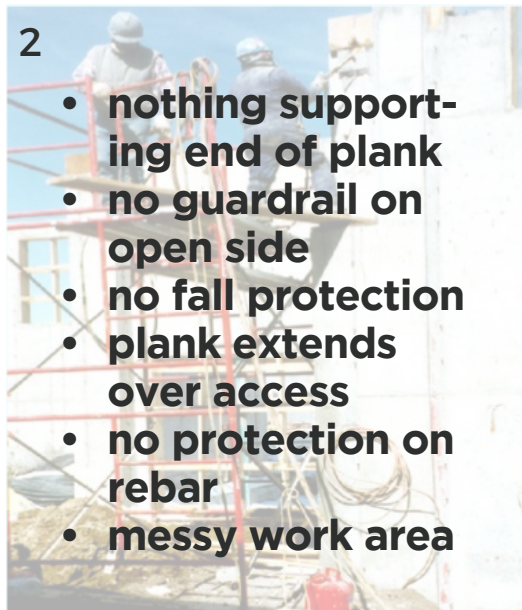
1

- improper access
- not fully planked
- no fall protection or guardrails
- no crossbraces
- no protection on rebar
- excessive overhang



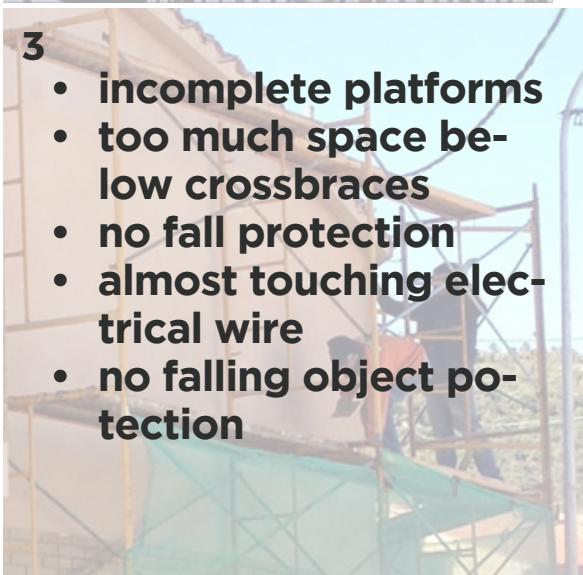
2

- nothing supporting end of plank
- no guardrail on open side
- no fall protection
- plank extends over access
- no protection on rebar
- messy work area



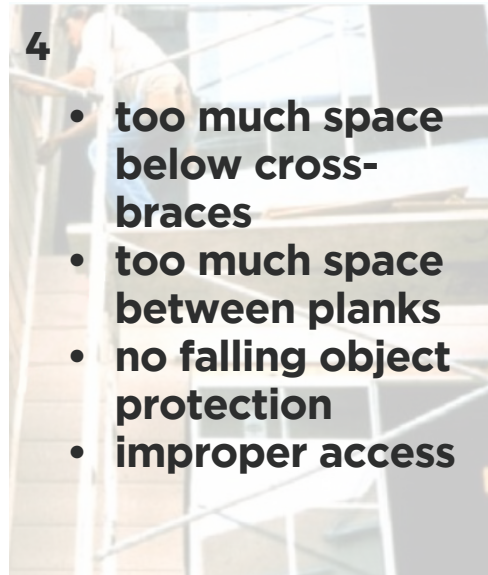
3

- incomplete platforms
- too much space below crossbraces
- no fall protection
- almost touching electrical wire
- no falling object protection



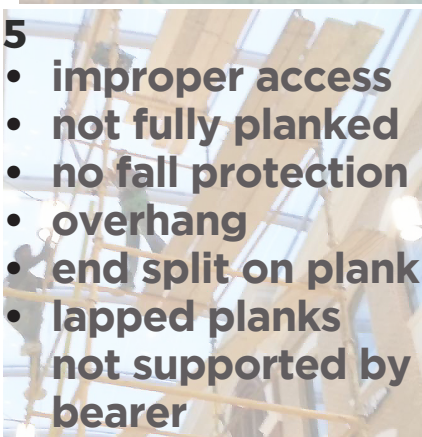
4

- too much space below crossbraces
- too much space between planks
- no falling object protection
- improper access



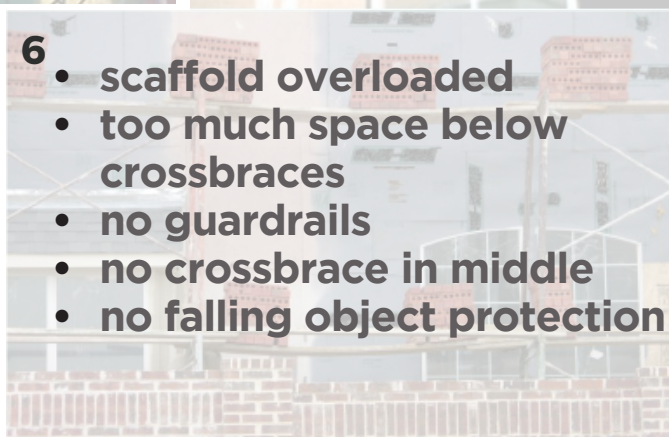
5

- improper access
- not fully planked
- no fall protection
- overhang
- end split on plank
- lapped planks not supported by bearer

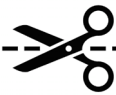


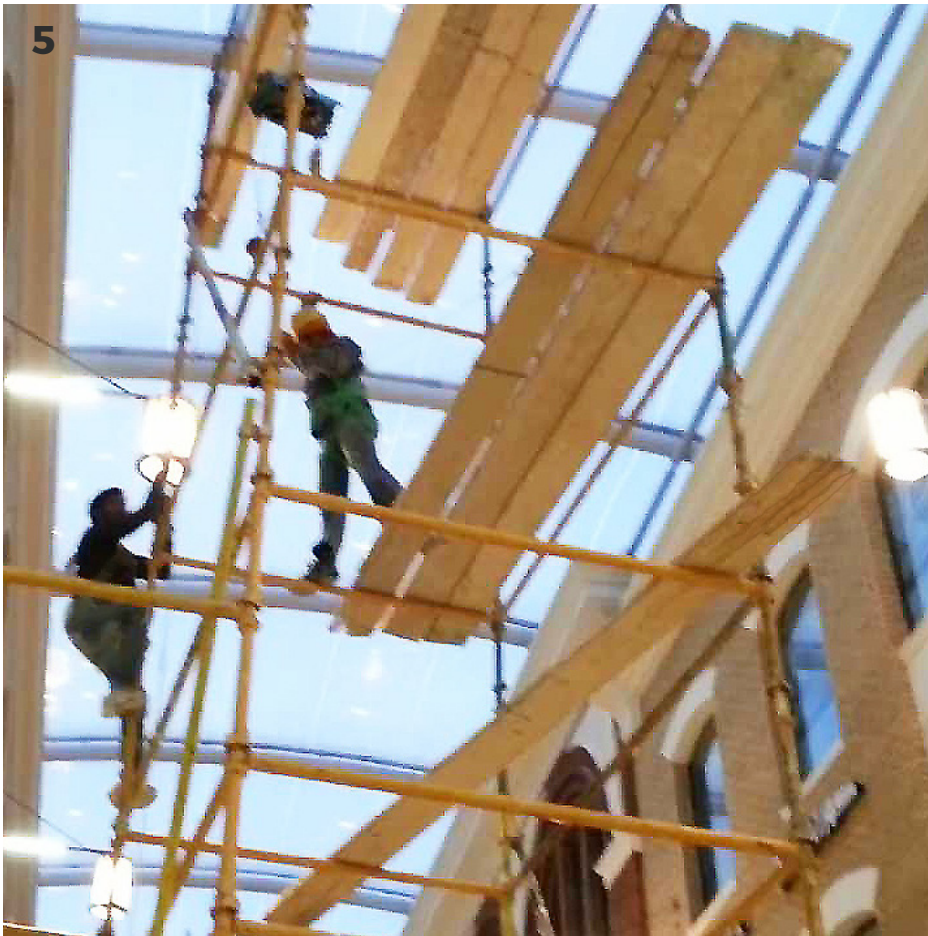
6

- scaffold overloaded
- too much space below crossbraces
- no guardrails
- no crossbrace in middle
- no falling object protection



4







## KEY POINTS

*The most important information you must cover in this session:*

- Access to working platforms must be adequate and safe for the working conditions and type of work to be carried out.
- A scaffold platform should always be fully planked edge-to-edge across the scaffold between the uprights.
- Every platform must support the loads applied to it, so the quality of materials and manufacturing of every scaffold platform is very important.
- Every scaffold component is required to be capable of supporting its own weight and ***at least 4 times the maximum intended load*** applied or transmitted to it.
- Different types of planks and decks have different load capacities that you need to be aware of. Always consult manufacturer's specifications for permissible loading which will be in pounds per square foot (psf) or the maximum number of persons.
- There are Four (4) main categories of platforms: Metal Planks, Wood Planks, Scaffold Decks and Composite Planks.
- Solid sawn wood planks are made from lumber specifically graded for use as scaffold planks. These are stamped by an independent inspection agency as Scaffold Plank indicating that the lumber is suitable for use as scaffold planking. Beware of non-scaffold grade planks that have misleading stamps and markings.
- Many scaffold injuries are caused by scaffold planks that do not have sufficient overhang, too much overhang, or are uncleaned or otherwise unsecured.
- Scaffold planks can break if they are in poor condition or overloaded. It is important to use scaffold grade plank and to inspect planks before using them to ensure that there are no weak areas, deterioration, or cracks.
- Excessive overhang can cause a plank to tip up when a worker stands on the overhanging portion. Insufficient overhang can allow the plank to slip off its supports.



# NOTES

4

# SESSION 5: OVERVIEW

## GUARDRAILS & TOEBOARDS

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### SESSION PURPOSE

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The purpose of this session is to familiarize trainees with the guardrail fall prevention system and falling object protection.

### LEARNING OUTCOMES

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By the end of this session, your trainees should be able to:

- Describe a scaffold fall protection system known as a guardrail system.
- Identify the various components of a guardrail system
- Describe toeboards and other types of falling object protection.

### DURATION

---

Approximately 15- 20 minutes

### PREPARATION REQUIRED

---

- Read Section 5 of the Study Guide and familiarize yourself with the Key Points
- Review the PowerPoint slides for Section 5 and the Trainer Notes
- Review the locally applicable regulations pertaining to fall protection and falling object protection make note of these to be able to provide this information to trainees.





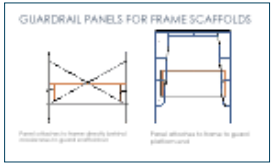
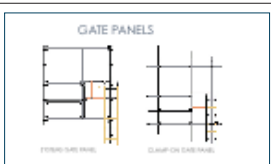

### FLEXIBILITY


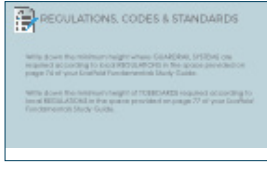


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The instructions in this Trainer Manual are a recommended delivery option. You may need to adapt the activities and timings to suit the needs of trainees.



# SESSION 5: SESSION PLAN

SLIDE(S)	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>• GUARDRAILS &amp; TOEBOARDS: Intro Slide</li> </ul>
	<ul style="list-style-type: none"> <li>• Explain that a guardrail system is one form of fall protection and point out the basic components.</li> <li>• Explain that a toeboard is also just one type of falling object protection but it also can prevent a worker's foot from slipping off the platform.</li> <li>• Describe how a toeboard is attached.</li> </ul>
	<ul style="list-style-type: none"> <li>• Explain when guardrails are required and the required height for top rails and midrails (make sure to tell trainees their locally applicable guardrail regulations)</li> <li>• Describe guardrail gates and how they must be attached.</li> <li>• Explain the reason why the gate must swing into the platform.</li> </ul>
	<ul style="list-style-type: none"> <li>• Describe how and when a crossbrace can be used as part of a guardrail system on a Frame Scaffold.</li> </ul>
	<ul style="list-style-type: none"> <li>• Explain that there are also special guardrail panels available for Frame Scaffolds. Guardrail panels are made to fit common bay sizes and scaffold frames.</li> </ul>
	<ul style="list-style-type: none"> <li>• Explain that System Scaffolds and Tube &amp; Clamp Scaffolds usually use clamp-on gates that can be used at all platform locations.</li> </ul>
	<ul style="list-style-type: none"> <li>• Explain when toeboards are required, the required specifications (height above platform, max. allowable clearance below etc.) and describe how they are installed.</li> </ul>

SLIDE(S)	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>• Discuss the other falling object protection options that may be used with scaffolds.</li> <li>• Give examples of each.</li> </ul>
	<ul style="list-style-type: none"> <li>• Provide trainees with the relevant GUARDRAIL AND TOEBOARD REGULATIONS and have them write them into the spaces provided on pages 74 and 77 in their Study Guides</li> </ul>
LEARNING ACTIVITY	
	<p>Ask the trainees to turn to page 78 in their Study Guides. Read the first sentence (without filling in the blank) and ask the trainees to suggest what to put for an answer.</p> <p>CLICK - to reveal the correct answers. Explain or clarify answers if necessary.</p>
	<p>Review the KEY POINTS from this session.</p>



## LEARNING ACTIVITY

Fill in the blank spaces in the following text about scaffold hazards. Include all relevant measurements (according to your local regulations)

### **Methods of addressing some common scaffold hazards:**

Falls from heights are a concern at many work sites - especially when scaffolds are used. Many deaths in the construction industry are a result of falling from heights. Fall-related injuries are also common in the construction industry.

Local regulations require guardrail systems to be used when work is being performed on platforms higher than 10ft (3m) or ?

A guardrail is a vertical barrier, normally consisting of top rails, midrails and posts, erected to prevent employees from falling to lower levels. A standard toprail has a vertical height of 38in (0.97m) to 45in (1.2m) or ? from the upper surface of the top rail to working surface. The top rail must be smooth-surfaced throughout the length of the railing. There must be an intermediate railing approximately halfway between the top rail and the working surface.

When an external ladder or stair system is installed, a guardrail gate should be installed to allow workers to access the working platform. It is important that this is always opening into the working platform to prevent an accidental fall when it is closed.

Guardrails are required on all open sides and ends of scaffold platforms unless an alternate fall prevention system is used.

Falling objects also can be hazards, especially tools accidentally dropped or kicked from scaffolds or work platforms.

A toeboard is a barrier placed to prevent the fall of materials to a lower level, or to keep employees' feet from slipping over an edge. These should be at least 3½in (89mm) high above the platform. It has to be securely fastened in place and with not more than ¼in (6mm) clearance above the platform.

If there will be tools or materials piled higher than the height of the toeboard, screening should be installed from the toprail to either the toeboard or the platform surface. It is important to make sure that the openings in the material you choose are small enough to prevent objects from passing through.



## KEY POINTS

*The most important information you MUST cover in this session:*

- Whenever a worker is positioned above the ground or other similar safe surface, the worker is exposed to a possible fall.
- One method of fall protection on scaffolds is the use of a guardrail system.
- A guardrail is a barrier consisting of top rails, midrails and posts, erected to prevent workers from falling to lower levels.
- A toeboard is a barrier placed to prevent materials or tools from accidentally being kicked or dropped off the work platform to a lower level, or to keep workers' feet from slipping over an edge.
- Guardrail systems are required on all platform levels 10ft (3m) or less in some jurisdictions (Check your locally applicable regulations). Guardrails must be used on all open sides and ends of all elevated scaffold platforms unless an alternate fall protection system is used.
- When installing guardrail systems you should also include safe movement from the access area onto or off the platform. A simple chain may suffice, especially on narrow scaffolds. On other scaffolds, the use of a swinging gate or possibly even a duck-through opening with grab rails might be appropriate.
- When installing a swing gate make sure it always swings INTO the platform, not away from the platform.
- Toeboards must be at least 3½in (89mm) high above the platform, and be positioned so as not to provide more than 1/4 in (6mm) clearance to the platform
- When materials and tools are piled higher than the toeboard, paneling or screening can be installed to prevent these objects from falling off the scaffold.



# NOTES

# SESSION 6: OVERVIEW

## TIES & GUYS

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### SESSION PURPOSE

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The purpose of this session is to familiarize trainees with the concepts of scaffold stability and how ties or guys can be used to stabilize scaffolds when the height exceeds the maximum allowable height-to-base ratio.

### LEARNING OUTCOMES

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By the end of this session, your trainees should be able to:

- Explain the height-to-base ratio and how it applies to supported scaffold stability.
- List some other factors that could affect the stability of a scaffold.
- Describe different types of ties and explain their purpose
- Identify when ties are required and where ties must be located on a given scaffold according to local regulations
- Identify situations where ties could be needed even if the scaffold does not exceed the allowable height-to-base ratio
- Describe guys and when they are used

### DURATION

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Approximately 40 minutes

### PREPARATION REQUIRED

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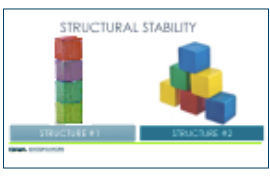
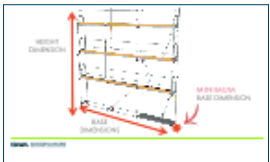
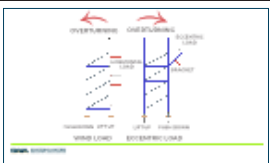
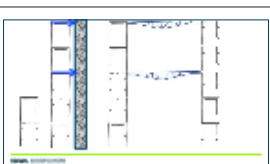


- Read Section 6 of the Study Guide and familiarize yourself with the Key Points
- Review the PowerPoint slides for Section 6 and the Trainer Notes
- Insert locally applicable regulations into the customizable slide provided


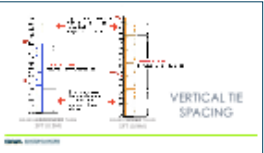

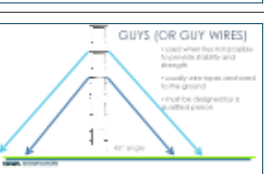

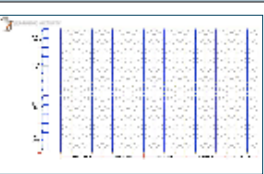

### FLEXIBILITY

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The instructions in this Trainer Manual are a recommended delivery option. You may need to adapt the activities and timings to suit the needs of trainees.

# SESSION 6: SESSION PLAN

SLIDE(S)	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>TIES &amp; GUYS: Intro Slide</li> </ul>
	<ul style="list-style-type: none"> <li>Ask the participants to look at each of the two structures and then take a vote on which they think is the most stable.</li> <li>(Most will vote for #2) Ask the trainees why they voted for this one (<b>wider base</b>).</li> </ul>
	<ul style="list-style-type: none"> <li>Explain that when we are calculating height-to-base ratio that we are dealing with the MINIMUM base width.</li> </ul>
	<ul style="list-style-type: none"> <li>Describe the effects of horizontal loads such as wind or eccentric loads such as side brackets on scaffold stability.</li> </ul>
	<ul style="list-style-type: none"> <li>Ask trainees to suppose you were building a scaffold from 5ft (1.52m) wide frames</li> <li>CLICK - When you add an additional lift it is still stable because the height-to-base ratio is still between 3:1 or 4:1</li> <li>CLICK - This is a Stable Scaffold</li> <li>CLICK - Suppose you were to add several additional lifts - this scaffold becomes unstable</li> <li>CLICK - One way to stabilize this scaffold is to attach it to a secure structure with ties - now it becomes stable.</li> </ul>
	<ul style="list-style-type: none"> <li>Ask Trainees to hold their hands together as shown and push them together - Explain that this force is what we call compression. Ask trainees to hold their fingers together as shown and try to pull them apart. - Explain that this force is what we call tension.</li> </ul>
	<ul style="list-style-type: none"> <li>Explain to participants that this is a common type of tie and CLICK for the animation</li> <li>Ask trainees to guess which was the Tension Component and which was the Compression Component</li> </ul>

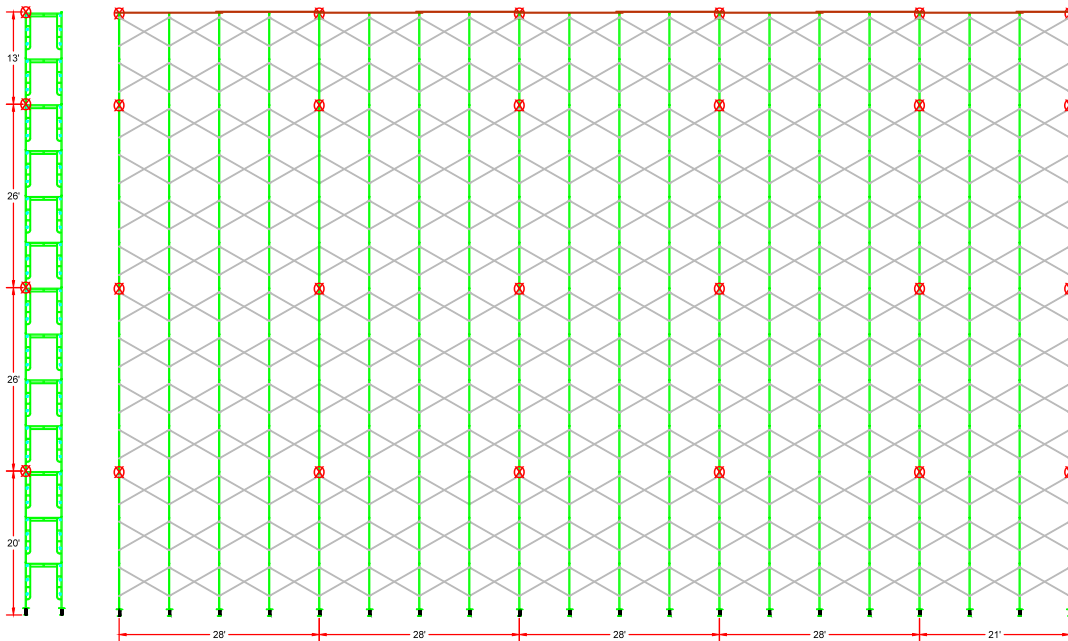
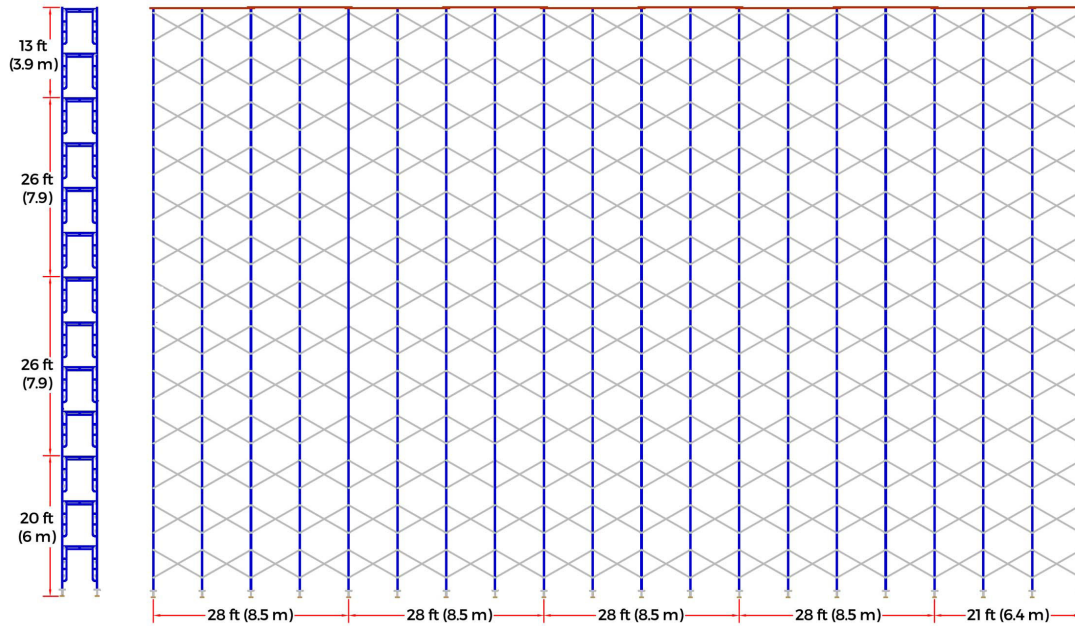
SLIDE(S)	INSTRUCTIONS
	<ul style="list-style-type: none"> <li>Discuss anchor options and how they are fastened to a structure</li> </ul>
	<ul style="list-style-type: none"> <li>Discuss the locally applicable regulations regarding vertical tie spacing (clarify if local regulations differ from what is shown in the illustration).</li> </ul>
	<ul style="list-style-type: none"> <li>Discuss the regulations related to horizontal tie spacing and point out the tie placement that is required in your jurisdiction (if this is different from what is shown in the illustration).</li> </ul>
	<ul style="list-style-type: none"> <li>Explain when guying would be necessary and how this is normally done.</li> <li>Remind trainees about consequences if wires are too tight or too loose and importance of regular inspection</li> <li>Discuss important considerations when building and dismantling guyed scaffolds.</li> </ul>
	<ul style="list-style-type: none"> <li>Provide trainees with locally required TIE SPACING and have them write them into the space provided on page 88 of their Study Guide.</li> </ul>
LEARNING ACTIVITY	
	<ul style="list-style-type: none"> <li>Ask a trainee to volunteer to come and point out on the board (draw with a dry-erase marker if you can project onto a whiteboard) where the first tie should go - ACCORDING TO LOCAL REGULATIONS.</li> <li>Continue for each subsequent tie location.</li> <li>Discuss how many ties you might add (and where they would be located) if the scaffold were to be enclosed and how you determine this.</li> </ul>
	<ul style="list-style-type: none"> <li>Review the KEY POINTS from this session.</li> </ul>





## LEARNING ACTIVITY

Draw (with an X or a circle) where ties should be placed on the following illustration of a scaffold (according to your local regulations).





## KEY POINTS

*The most important information you must cover in this session:*

- Scaffolds are stable if the minimum base of the scaffold is sufficiently large, generally at least one fourth (25%) to one third (33%) the height of the scaffold.
- Height-to-base ratio compares the **smallest** base dimension to the height of the scaffold. Depending on local regulations, this ratio will be either 3:1 or 4:1. This means that the height of the scaffold can be no higher than either 3 or 4 times the smallest base dimension.
- When the height of a scaffold is greater than this minimum requirement, it is necessary to either tie the scaffold to a sufficiently strong anchor (such as another structure) or the scaffold must be anchored with cables to a suitable anchor.
- A scaffold's stability is affected when it is exposed to **horizontal loads**. Horizontal loads most frequently are a result of either environmental loads such as wind or an **eccentric load**, such as load on a side bracket.
- Horizontal forces can push or pull on a scaffold. If these horizontal forces are strong enough, they will make the scaffold unstable and fall over.
- Ties are used between scaffold components and a building or structure to provide stability. Ties provide stability in a number of different ways:
  - 1) ties prevent the scaffold from falling **into** the structure
  - 2) ties prevent the scaffold from falling **away from** the structure
  - 3) ties help to **resist horizontal forces** due to cantilevers, environmental factors such as wind, or the scaffold being out of plumb.
- Where ties are located is very important to the stability of the structure. If there are not enough ties or the ties are not placed in the correct locations, the stability of the scaffold will be affected. Regulations are minimum standards for the placement of ties both **vertically** and **horizontally**.
- Guy wires typically take the place of ties when there is no adjacent structure, if the adjacent structure is not strong enough to support the ties, or if ties to the adjacent structure are not permitted.



# NOTES



# NOTES