ESTEEM

European Safety Training and Evaluation supporting European Mobility

WALL 3

Co-funded by the Erasmus+ Programme of the European Union

Materials were developed by:

UNIBO Team

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IIPLE Team

(Gazmend Llanaj)

All the partners of the project collaborated and supervised the Safety Training Package Development

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FEEDBACK ON THE PLATFORM

Training online platform
http://esteem.unibo.it/

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Reminder! last lesson we asked you…

Which chemical products do you use most during your work?

You brought with you the products you use most?

You will use them at the end of the lesson during a group exercise

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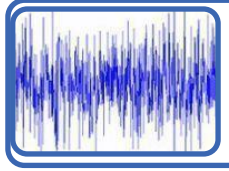
Today we will talk about:

Mechanical hazards, electrical hazards, machinery, equipment

Hazards of falling from height and explosions during digging



Physical hazards, noise, vibration in the workplace

Chemical hazards

Situation awareness

Communication

Decision making

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RELATIONSHIP BETWEEN RISK AND DAMAGE

CAUSE

Hazard

- PHYSICAL
- MECHANICAL
- ELECTRICAL
- CHEMICAL
- WORK ORGANISATION
- MANUAL HANDLING

EFFECT

Damage

- INJURY
- OCCUPATIONAL DISEASE
- UNSPECIFIED DISEASE

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NTS definitions: decision making

The precise decision concerns the ability to *formulate judgments and/or reach a choice* by evaluating the options available on the basis of safety.

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How to decide which behaviours are safe

Choose to operate with the lowest possible risk

Prioritise safety over productivity

(even when they are in conflict)

Choose not to operate if the risk is not manageable

Prioritise safety over speed

(even when they are in conflict)

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FALLING FROM HEIGHT HAZARD

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HEAVY LIFTING

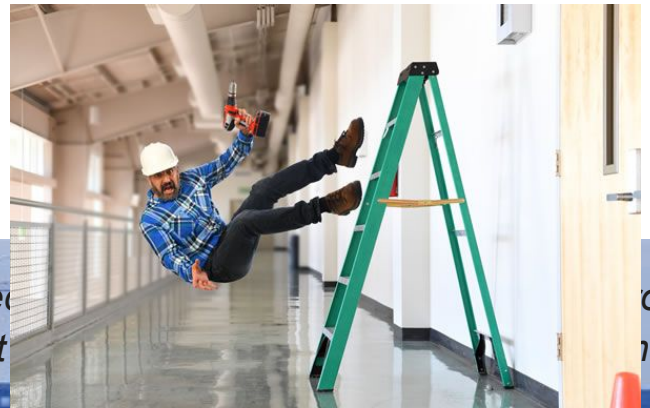
DEMOLITIONS

WORK ON ROOFS

What are the situations that can potentially cause falls from height?

EXCAVATIONS

USE OF LADDERS



DRAWBRIDGE

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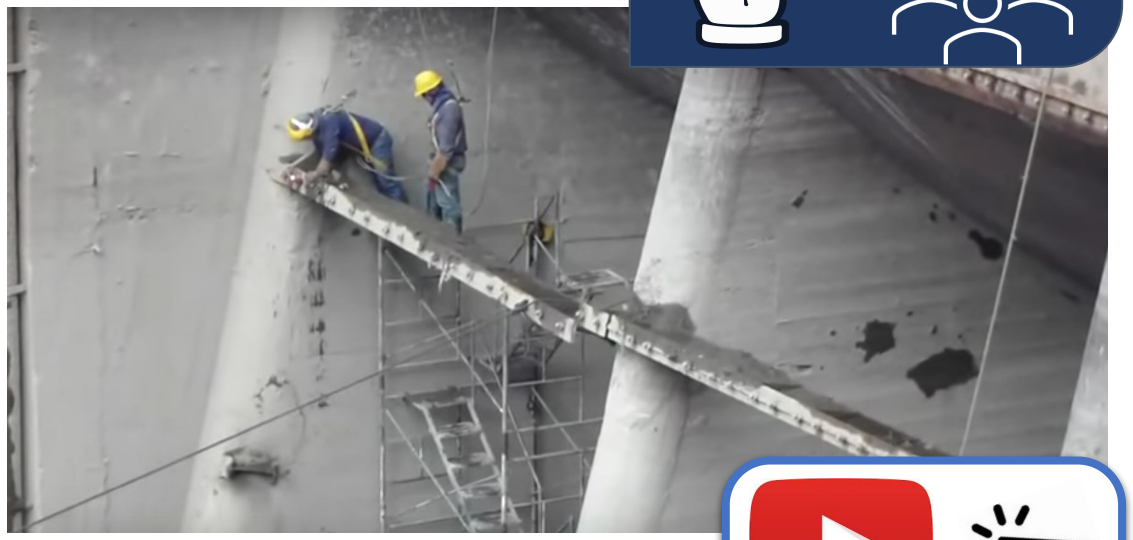
Plenary exercise

Participative activity

Watch the video and **analyse the decisions** made by the workers in the **first situation**.

Are these decisions appropriate with respect to safety??

What are the potential consequences for safety?



watch here!

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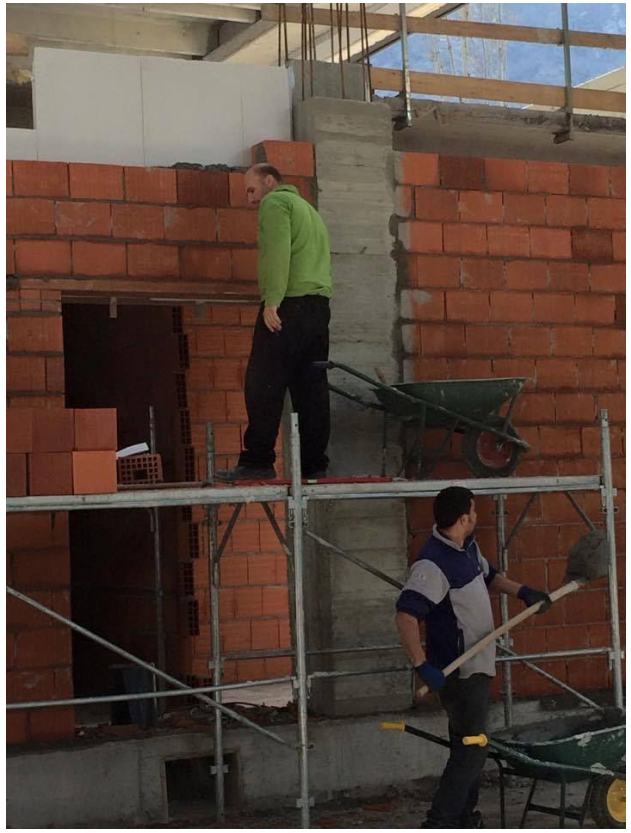
How to reduce the level of risk when working at heights?



Above 2 meters it is necessary to set up adequate **protection measures**!

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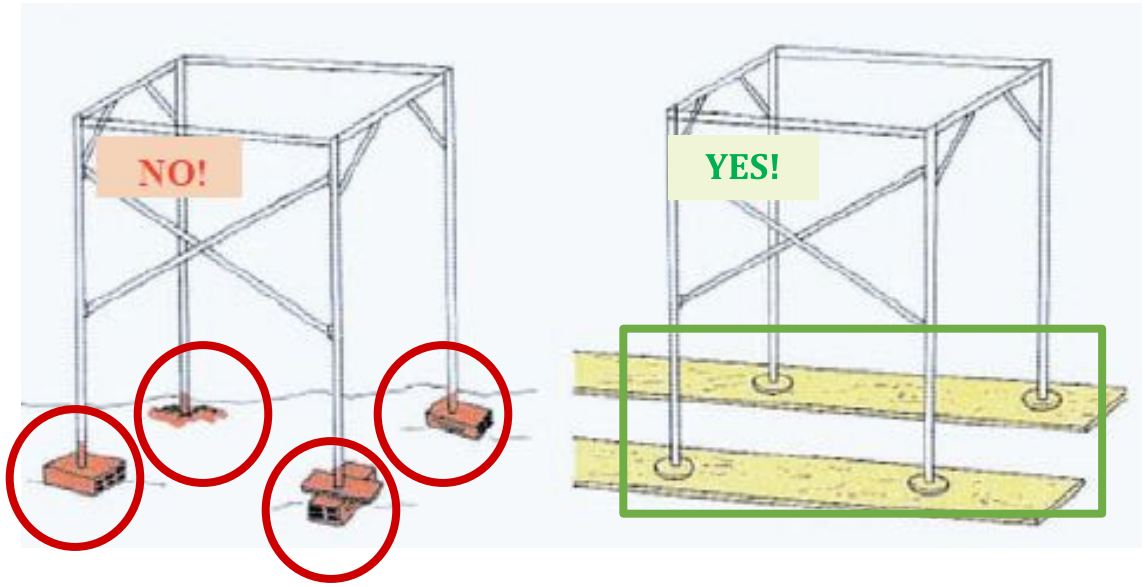
Falling from height risk



Correctly setting up the scaffolding safely will ensure **safety**

The scaffolding needs to be **horizontal**

If there are gradients, set these on **correct bases** instead of impromptu materials.

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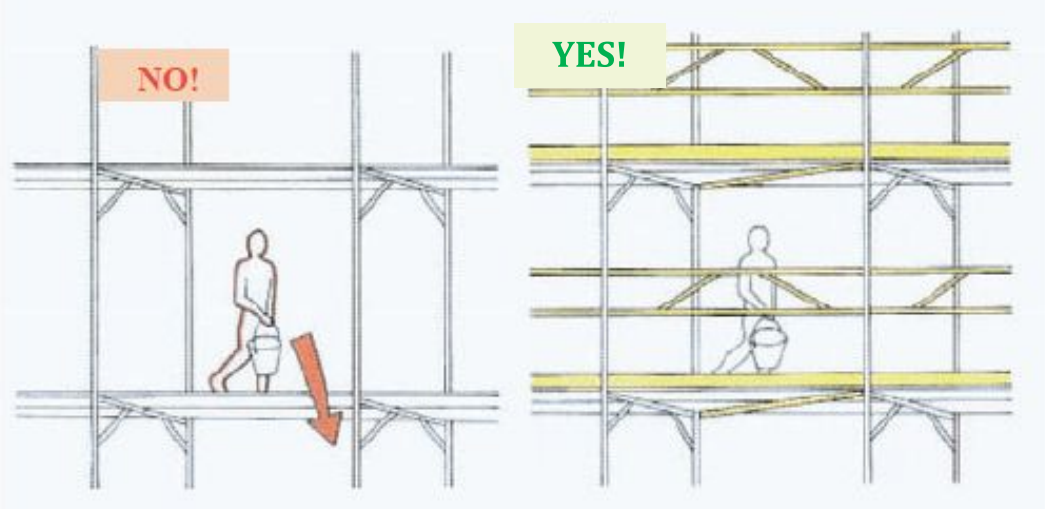
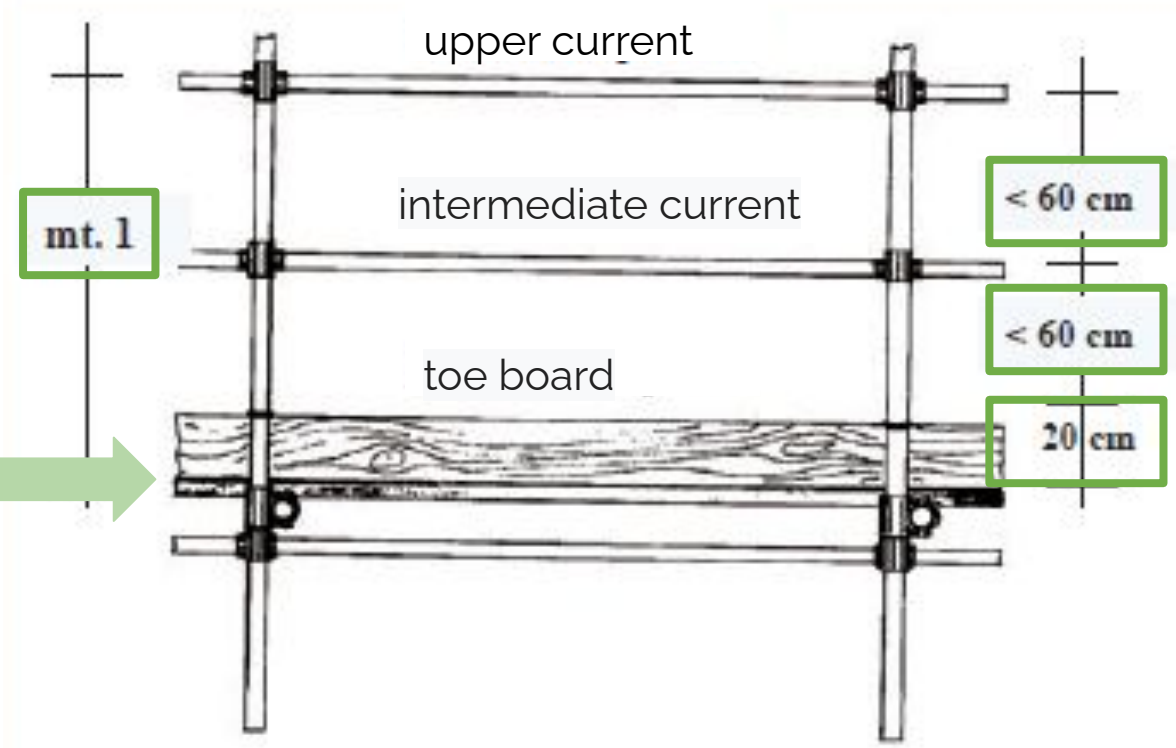
Falling from height risk



Metallic panels or good quality **bridge boards** of 5 centimeters (without cracks or breaks)



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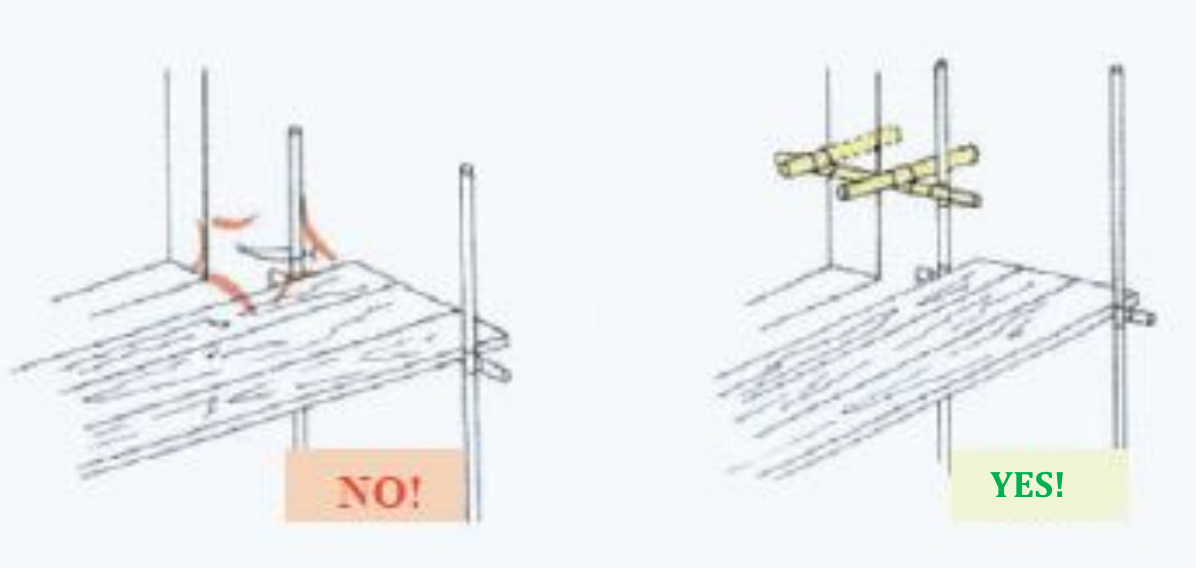
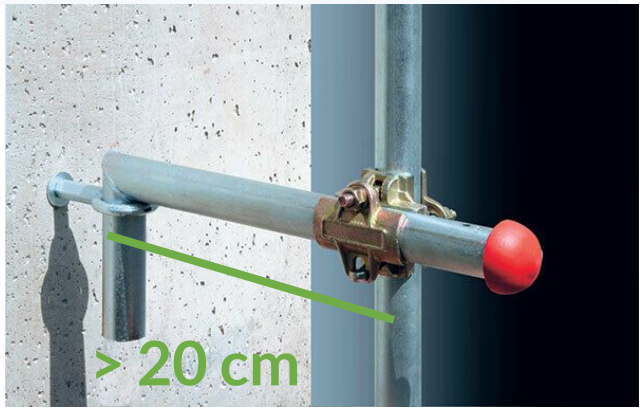
Falling from height risk





Anchor the scaffolding **every 20 meters** to secure parts of the building.

Use the **anchors** suggested by the **manufacturer**. **Do not use impromptu materials**.

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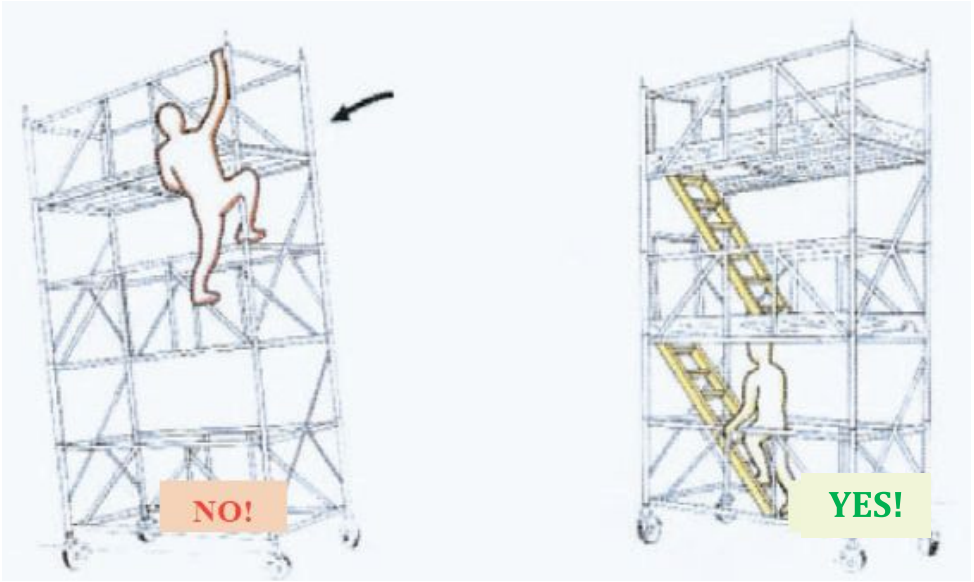
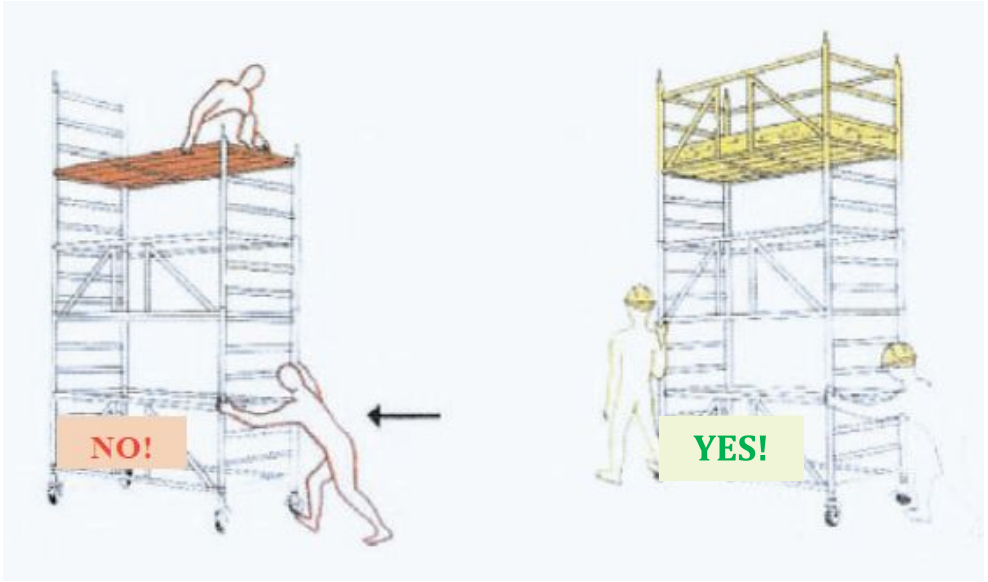
Falling from height risk



Do **not climb**!



Do **not move** with people on it!

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Falling from height risk

Do **not use impromptu tools** even for short jobs!

Use the **telescopic lifts** with the appropriate cabin and **wear a safety harness!**

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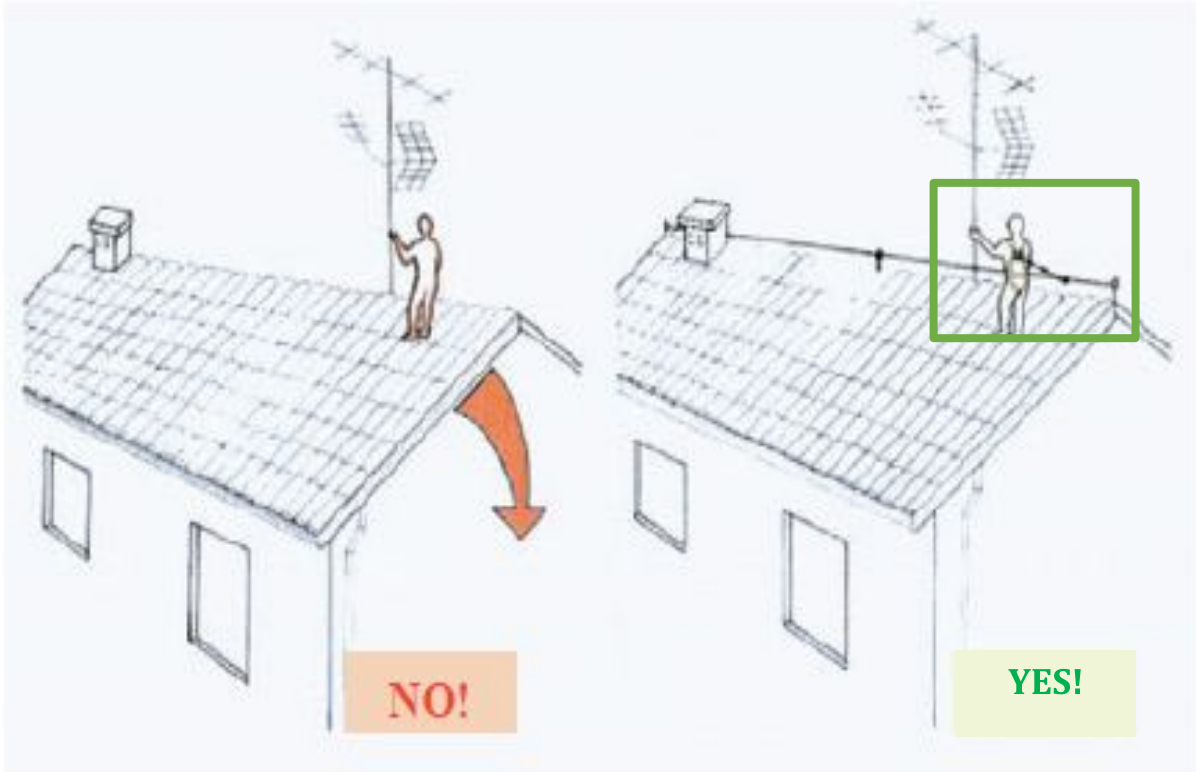
Falling from height risk



In case of small tasks (e.g. maintenance of roof covering, chimneys, tv antennas, or roof repairs) **use a safety harness**. Connect it with retaining ropes **firmly fixed** to stable parts of the building

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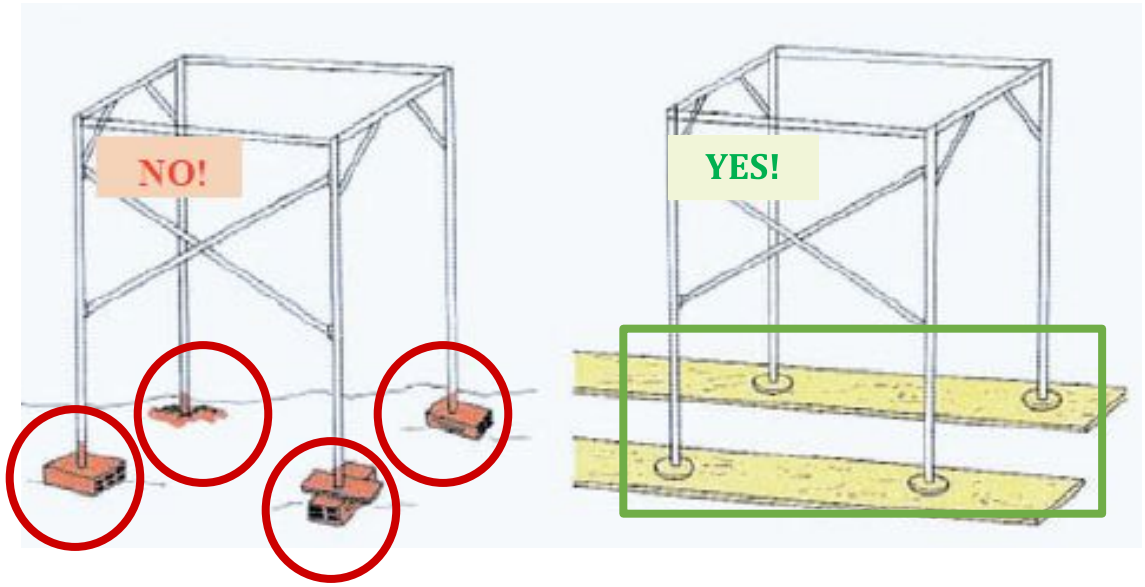
Falling from height risk



Correctly setting up the scaffolding safely will ensure **safety**

The scaffolding needs to be **horizontal**

If there are gradients, set these on **correct bases** instead of impromptu materials.

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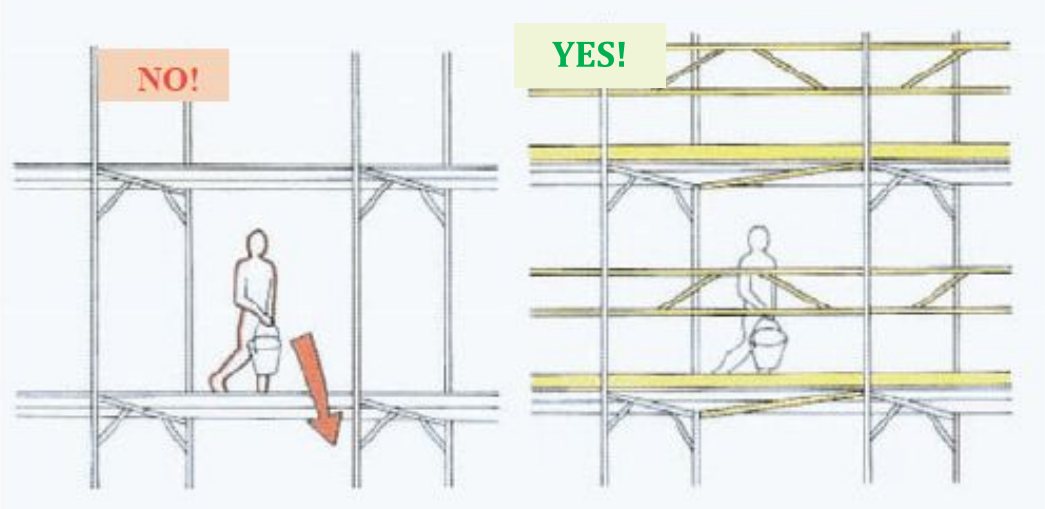
Falling from height risk



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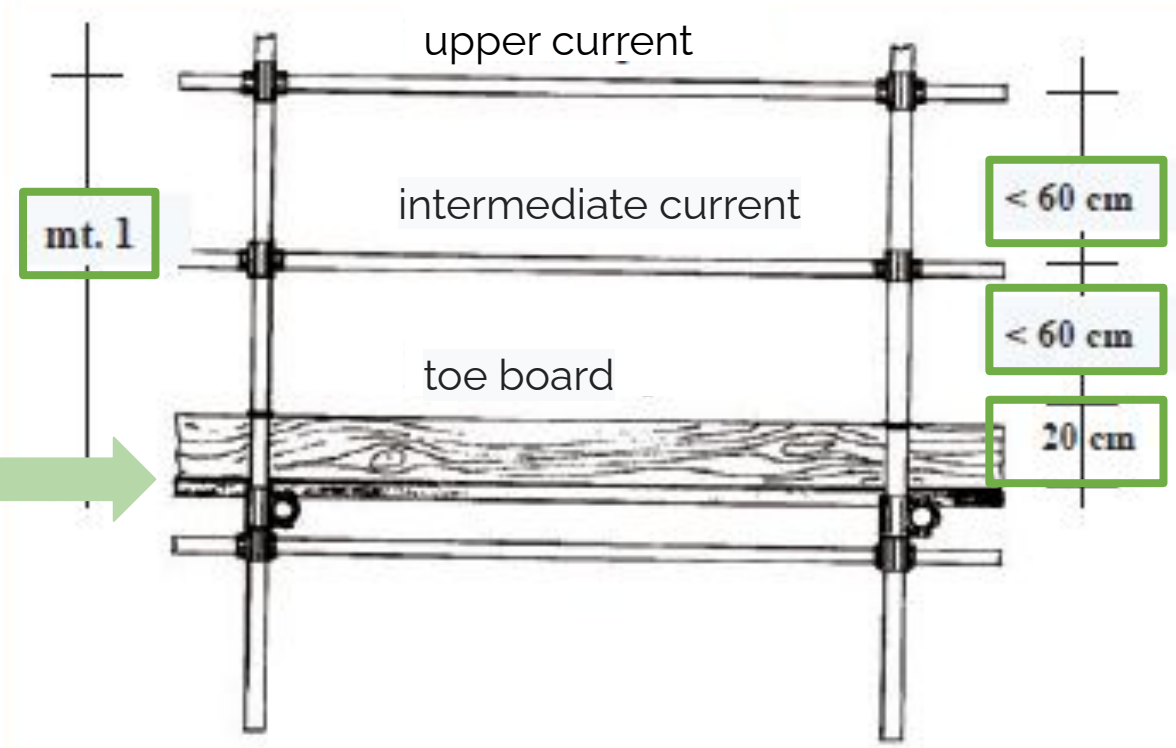

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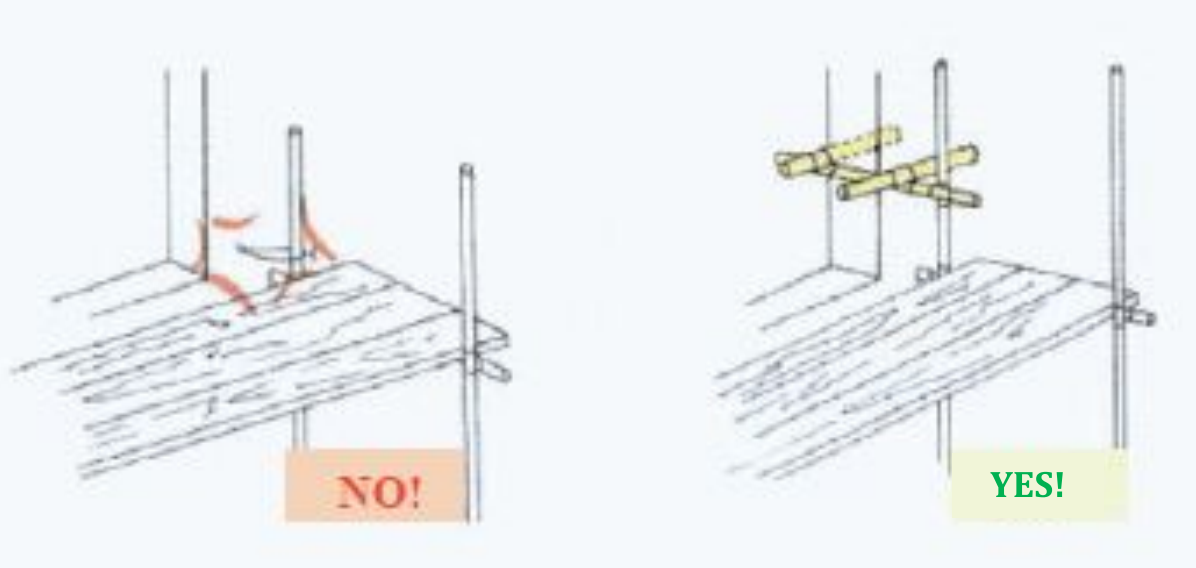
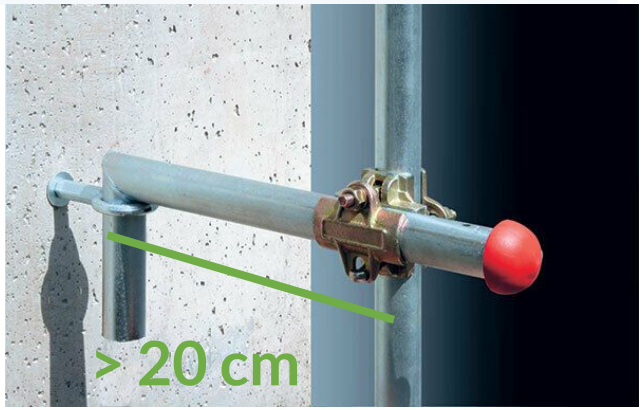
Falling from height risk





Anchor the scaffolding **every 20 meters** to secure parts of the building.

Use the **anchors** suggested by the **manufacturer**. **Do not use impromptu materials**.

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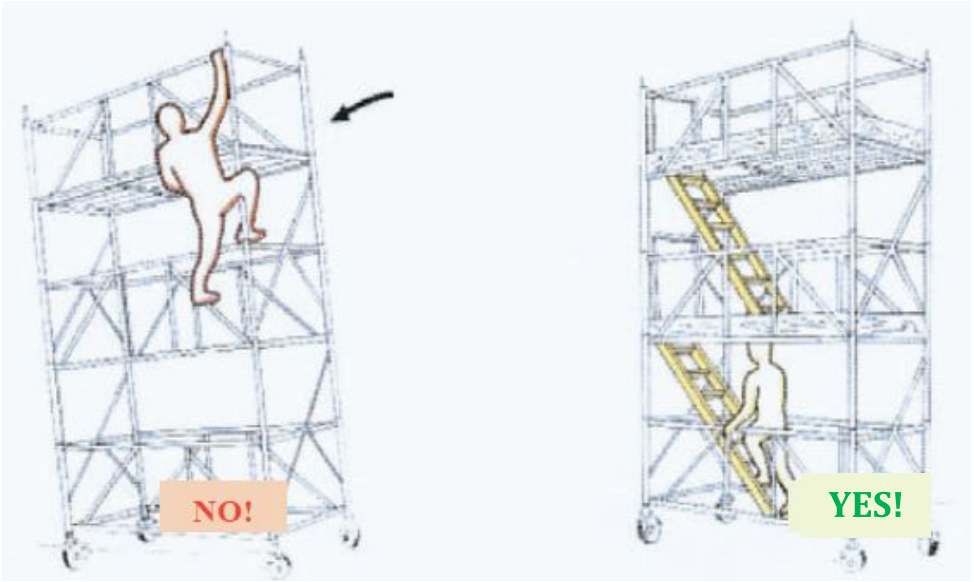
Falling from height risk



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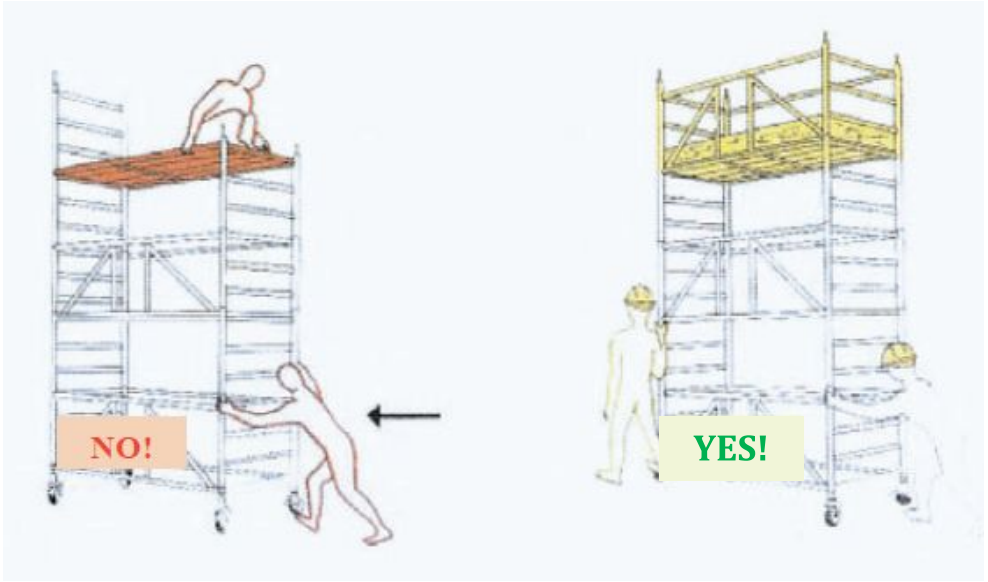

Do **not move** with people on it!

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Falling from height risk

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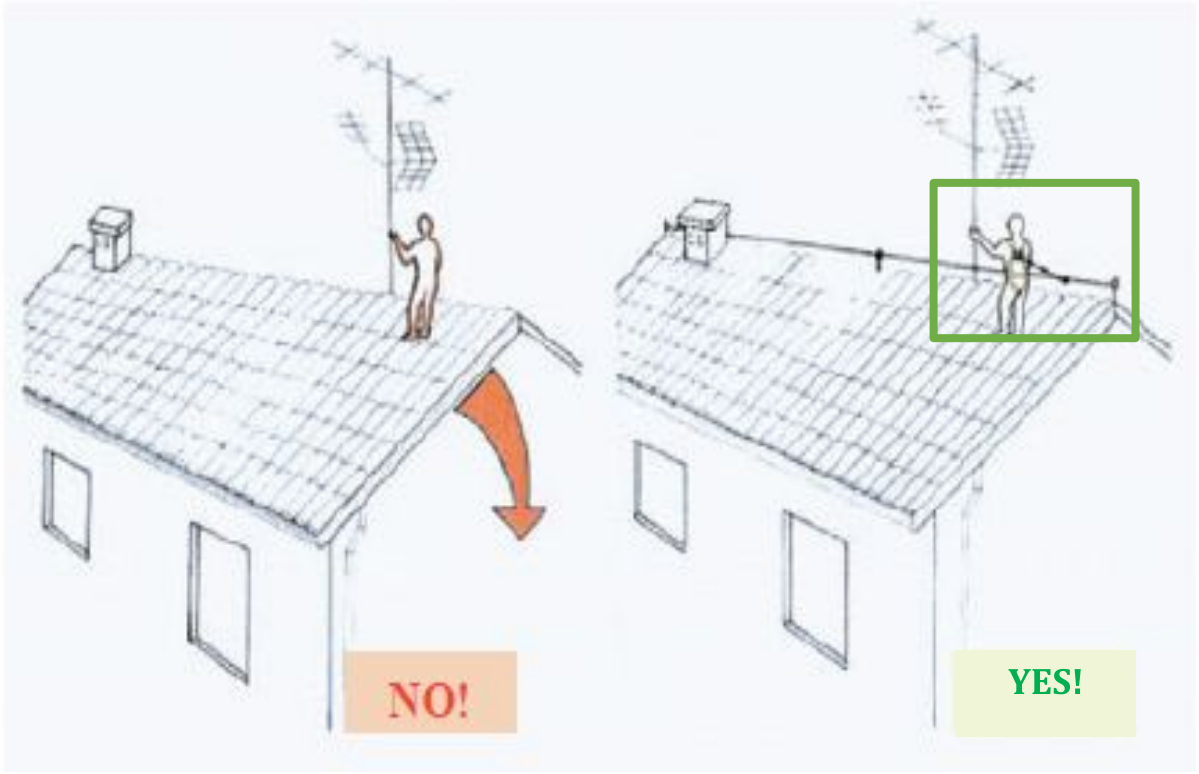
Falling from height risk



In case of small tasks (e.g. maintenance of roof covering, chimneys, tv antennas, or roof repairs) **use a safety harness**. Connect it with retaining ropes **firmly fixed** to stable parts of the building

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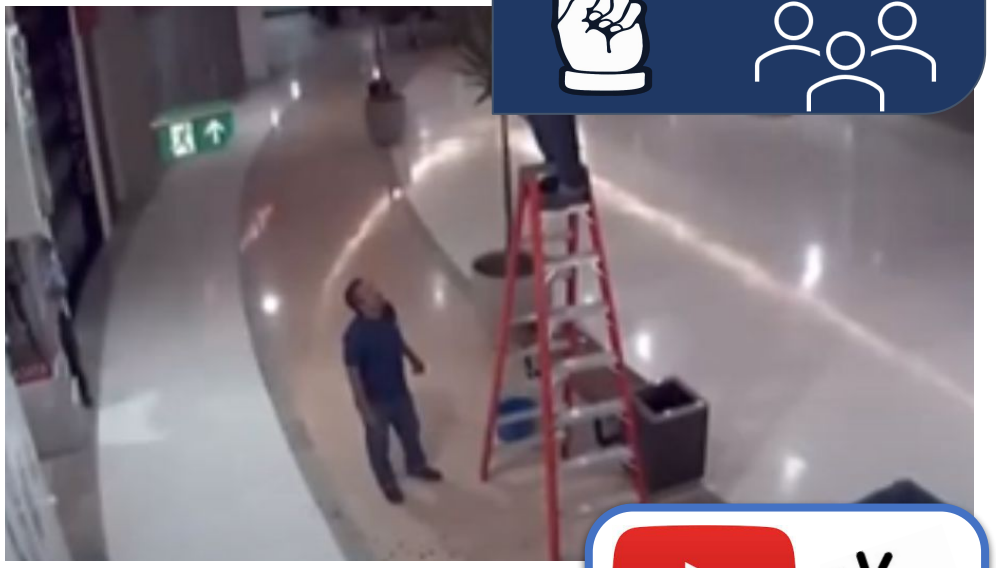
Plenary exercise

Participative activity

Watch the video and **analyse the decisions** made by the workers in the **second** and **third** situation.

Are these decisions appropriate with respect to safety??

What are the potential consequences for safety?



From 0:36 to 1:09

watch here!

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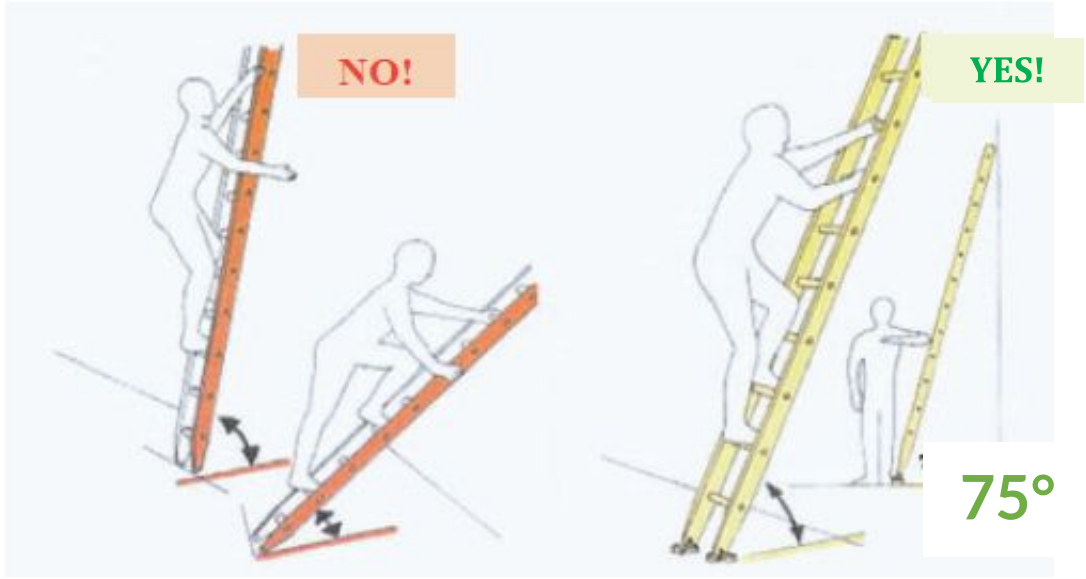
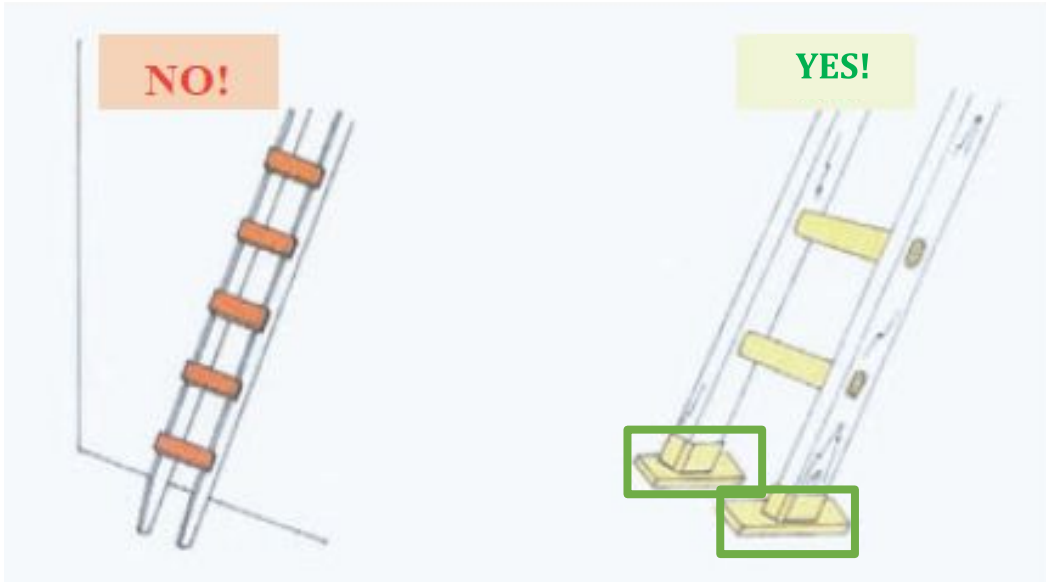
Falling from height risk





The **correct inclination** is 75 degrees.

Use slip feet and **be anchored** at the base!

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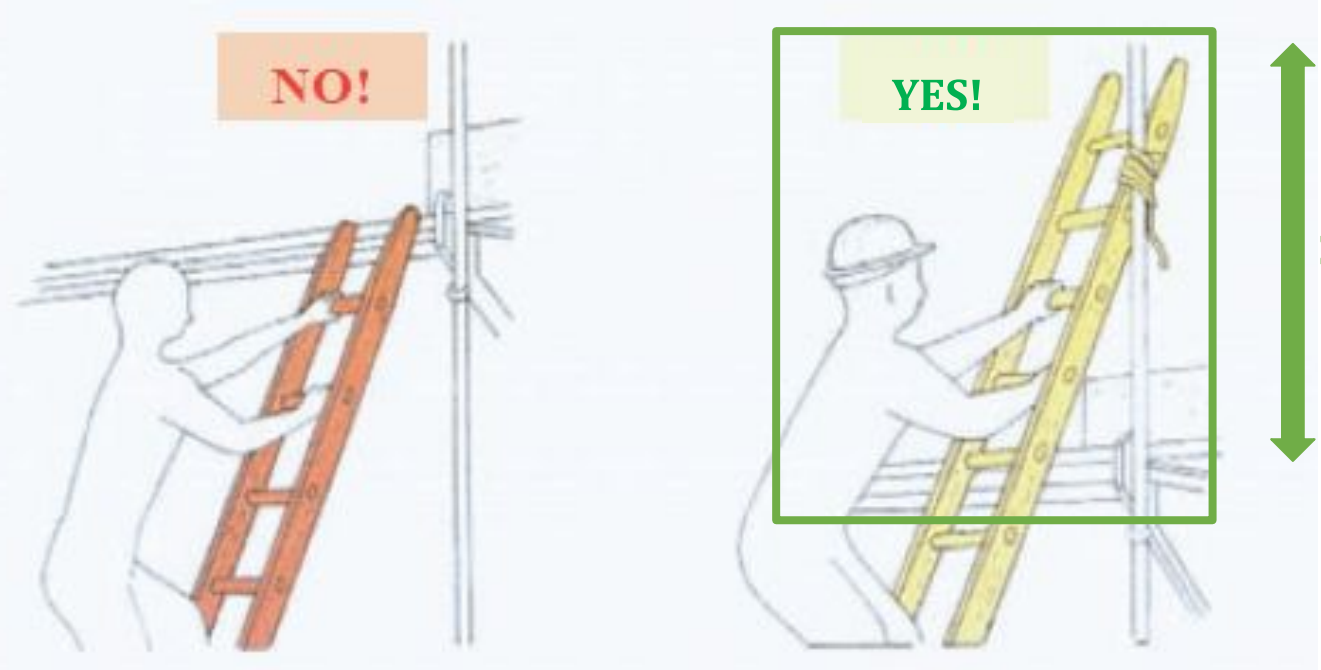
Falling from height risk



Anchor appropriately the ladder!

Do not move the ladder when **someone** is **on it**!

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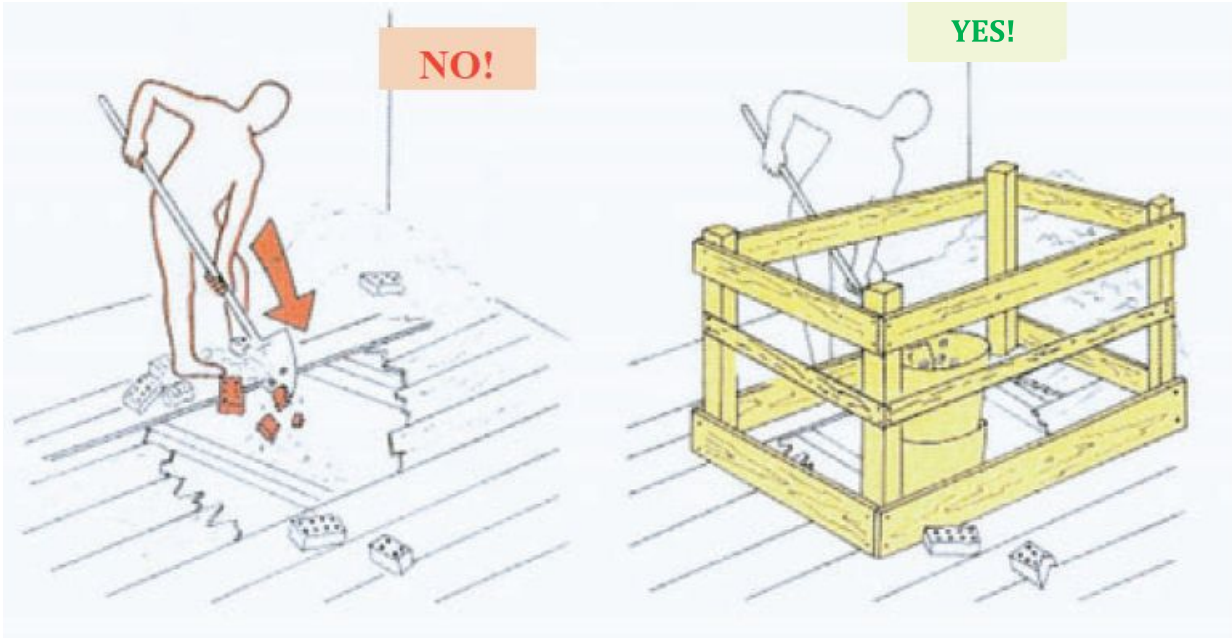
Falling from height risk



During **demolition** use **robust parapets** around **holes!**

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Falling from height risk

In case of open excavations **create safe passages** between excavation trenches!

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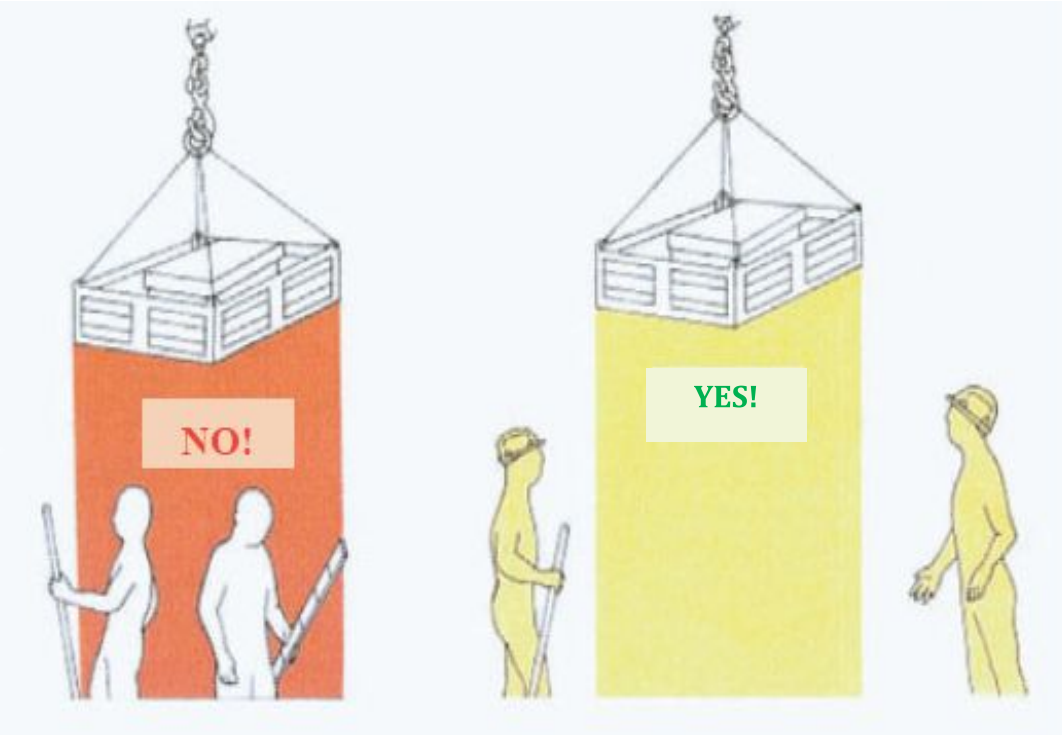
Falling from height risk



In case of **suspended load**

always **wear** a **safety helmet**!

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Plenary exercise

Participative activity

Watch the video and **analyse the decisions** made by the workers.

Are these decisions appropriate with respect to safety??

What are the potential consequences for safety?

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HAZARD OF EXCAVATION COLLAPSE

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What situations result in the potential of excavation collapse?

TRENCHES

WEATHER CONDITIONS

TUNNELS

VEHICLES

WELLS

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What are your experiences?

Participative activity

Volunteering one participant (or more participants) share with the class a **personal experience** (or ad **accident that happened to a friend**) of accident due to excavation collapse.

Focus on:

- ***What happened****?*
- *What could have been the **cause** of the incident? (eg. characteristics of the workers or of the work context)*
- *What should the workers do to **work safely**?*
- ***How** could the incident have been **avoided**?*

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Read the news and reply to the following questions:

- ***What happened****?*
- *What could have been the **cause** of the incident?*
- *Could the cause of the accident depend on the **characteristics** of the two **workers** (e.g. they had done similar jobs frequently) or the **work context** (e.g., time pressure, weather conditions)?*
- *What should the workers do to **work safely**?*
- ***How** could the tragic incident have been **avoided**?*

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A health and safety consultant has been jailed for nine months and a company director for over three years for their "shocking" failures that led to a labourer being crushed to death when an ***excavation collapsed.*** *Anghel Milosavlevici,* ***37****, was working for Siday Construction Ltd on a basement extension when the unsupported wall of a trench dug in preparation for underpinning the walls of the property gave way. The* ***emergency services*** *were called but he was* ***pronounced dead at the scene****. The firm's commercial director, Conrad Sidebottom, was found guilty of* ***gross negligence*** *manslaughter and jailed for three years and three months. The jury was told that Sidebottom, the site manager, was aware of the dangerous state of excavations at the west London property but took no steps to ensure they were made safe. Self-employed health and safety consultant Richard Golding, 43, was contracted to provide advice for the project on Ellersby Street, Fulham. He wrote a* ***safe system*** *of work for the task, but it was found to be* ***inadequate*** *and was ultimately not followed.*

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He was also responsible for carrying out health and safety inspections on site and had authority to ***stop dangerous works****, but failed to do so. The jury at Southwark Crown Court found him guilty of breaching section 7 of the Health and Safety at Work etc Act 1974.* ***Health and Safety Executive inspector*** *Dominic Long said: "Had Richard Golding inspected the site properly during his earlier visits he would have identified both that work wasn't being carried out in accordance with a written safe system of work, and that the excavations posed a* ***clear risk****. By failing in his duty, he* ***allowed unsafe work practices*** *to continue with devastating consequences." In a statement, Anghel's sister Cristina and fiancée Claudia said: "Anghel's death is such a tragic loss. He was the most gentle, kind-hearted and generous man you could ever hope to meet. "We hope [the] verdict makes other construction company directors take stock of their own working practices, and ensure that they are doing everything possible to keep their workers safe."*

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Risk of excavation collapse

During excavations whether carried out by hand or mechanical means, there is a risk of collapse and landslides.

They must therefore have appropriate support, in relation to the nature of the terrain, to prevent landslides.

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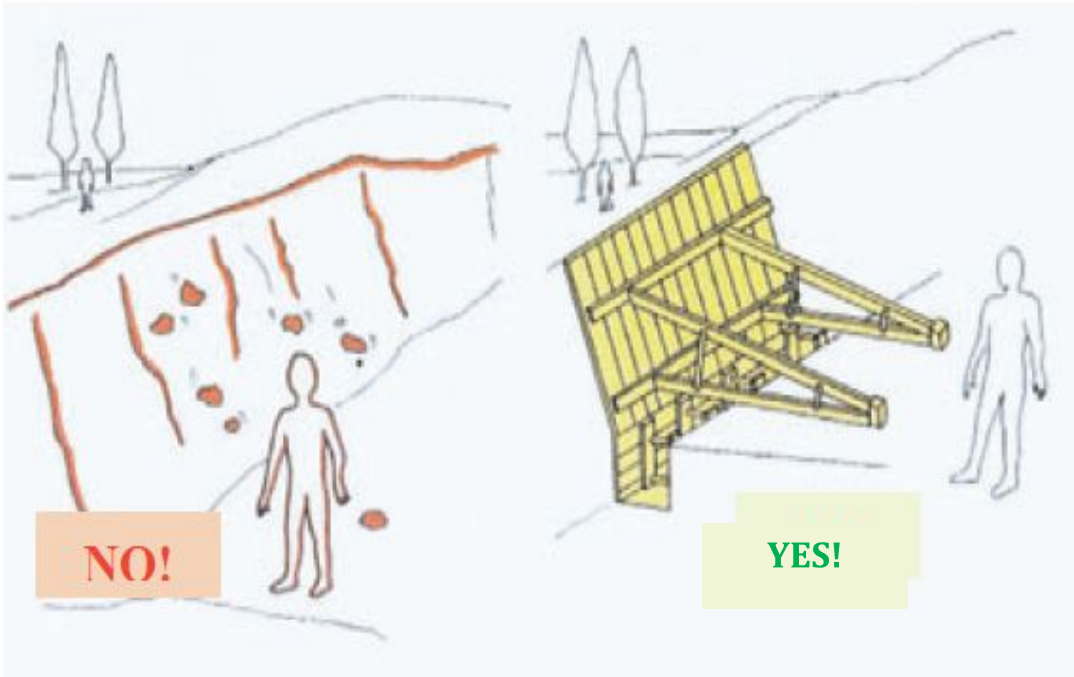
Ways to reduce the likelihood of being buried



Provide **reinforcement** or **consolidation** of the trench wall!

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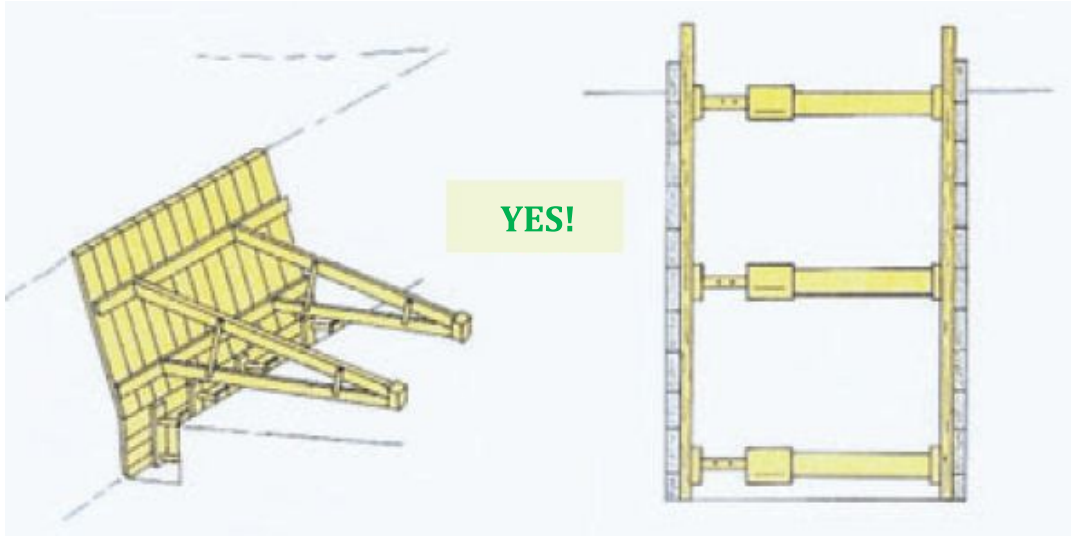
Risk of excavation collapse



During the excavation of wells, tunnels and deep trenches of more than 1.50 meters, when the nature of the land may not be stable, it is necessary to reinforce the trench wall before proceeding with work

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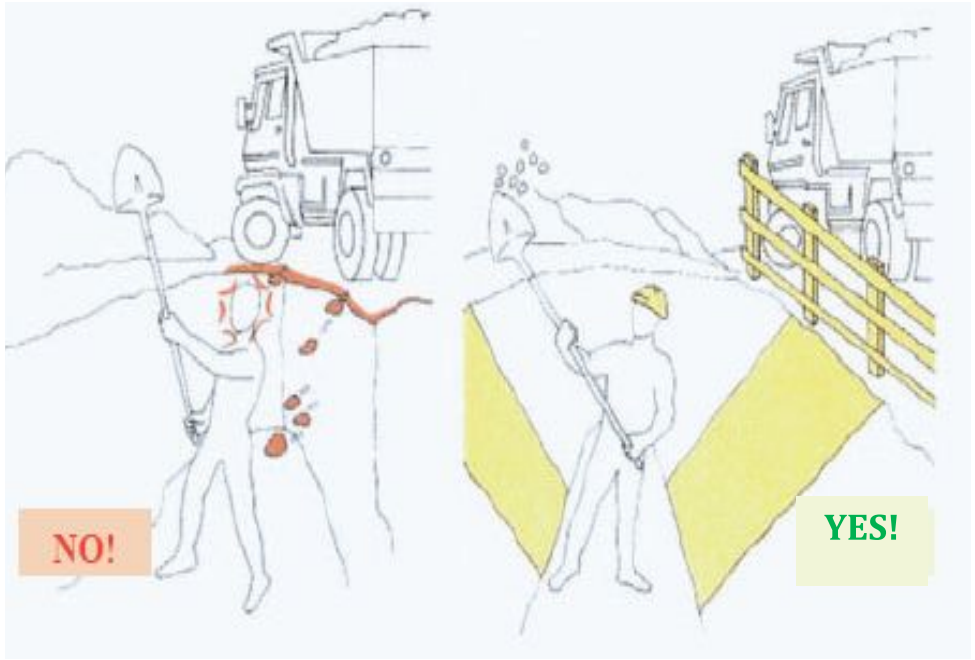
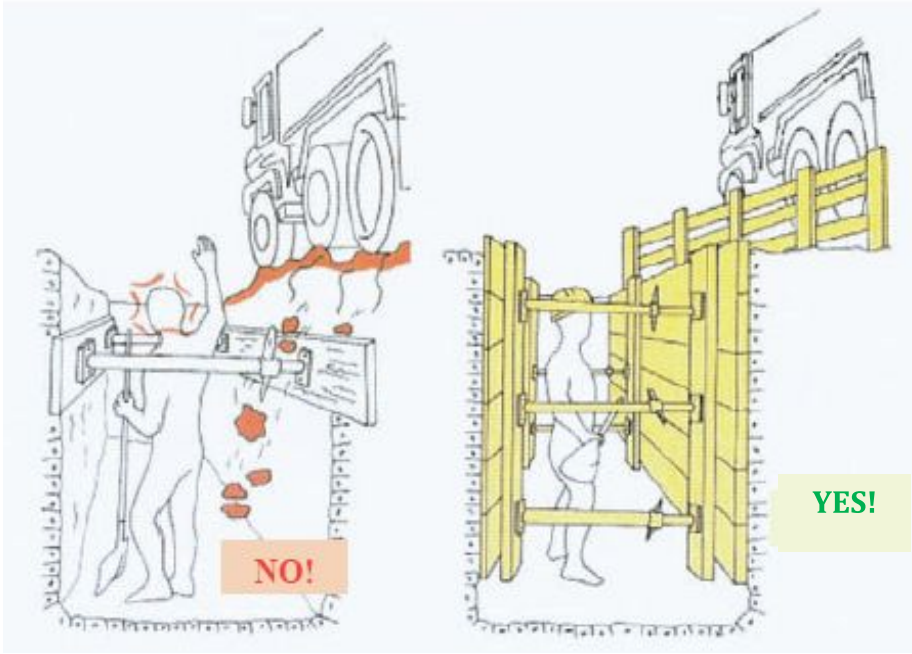
Risk of excavation collapse





Protect **parapets** to avoid people or objects falling into it!

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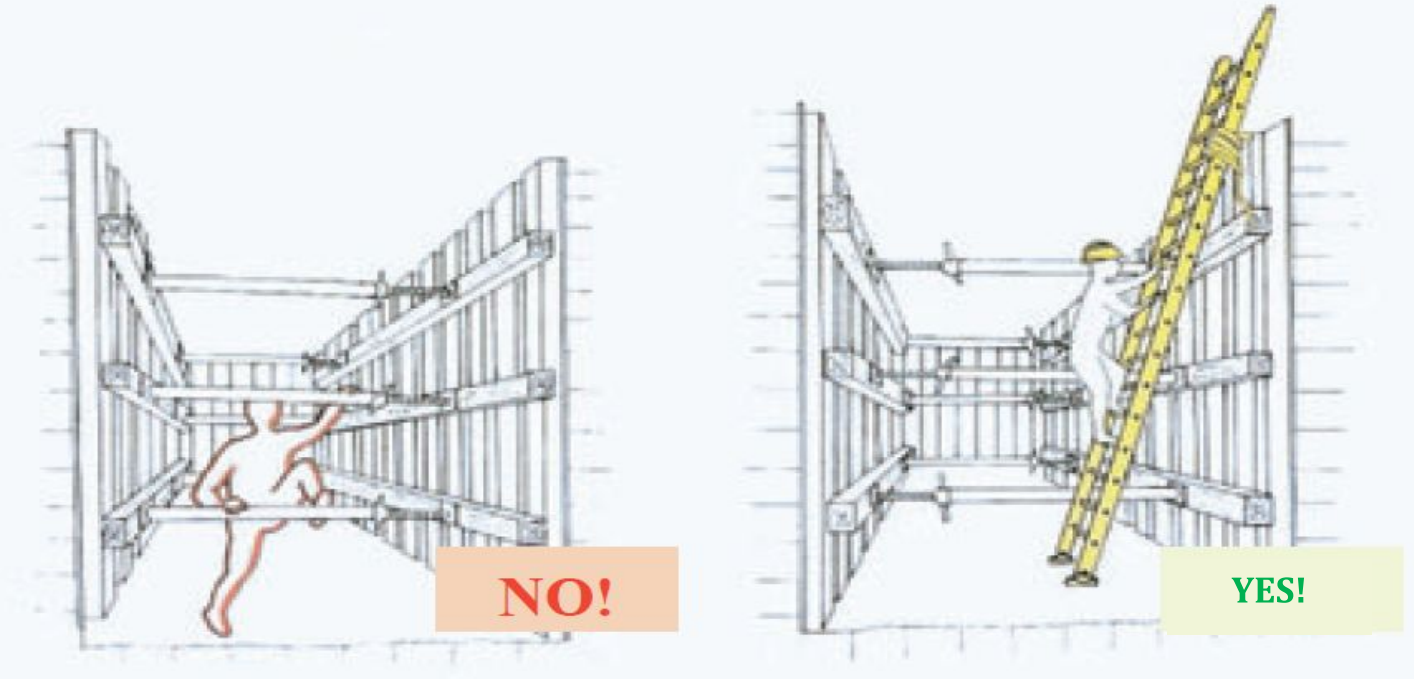
Risk of excavation collapse



Go out from the excavation **using** the **ladder**

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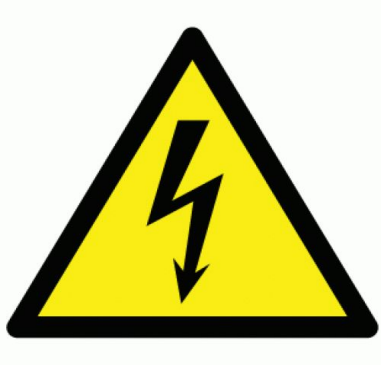
ELETRICAL HAZARDS



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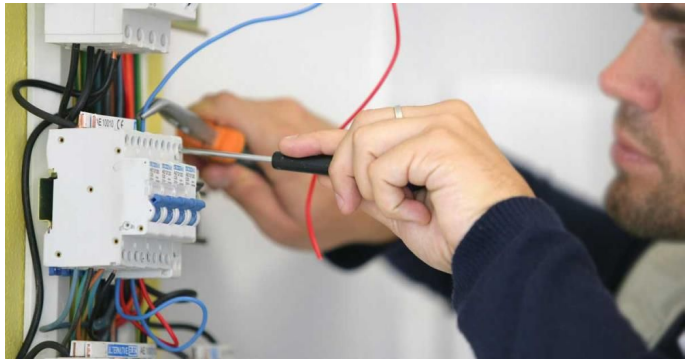
What are the situations of potential electrical hazards?

INDIRECT CONTACT WITH LIVE ELECTRICAL PARTS

USE OF CABLES



DIRECT CONTACT WITH LIVE ELECTRICAL PARTS

USE OF MACHINES

USE OF OUTLETS

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PLENARY ACTIVITY

Look at the pictures and answer to the following questions:

- ***What risks*** *could you encounter?*
- *What could be the* ***consequences*** *if this plug was used?*
- ***What should you do*** *to work safely?*

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What risks *could you encounter?*

What could be the ***consequences*** *if this plug was used?*

What should you do *to work safely?*

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What risks *could you encounter?*

What could be the ***consequences*** *if this plug was used?*

What should you do *to work safely?*

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What risks *could you encounter?*

What could be the ***consequences*** *here?*

What should you do *to work safely?*

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***What risks** could you encounter?*

*What could be the **consequences** if this plug was used?*

***What should you do** to work safely?*

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What risks *could you encounter?*

What could be the ***consequences*** *if this plug was used?*

What should you do *to work safely?*

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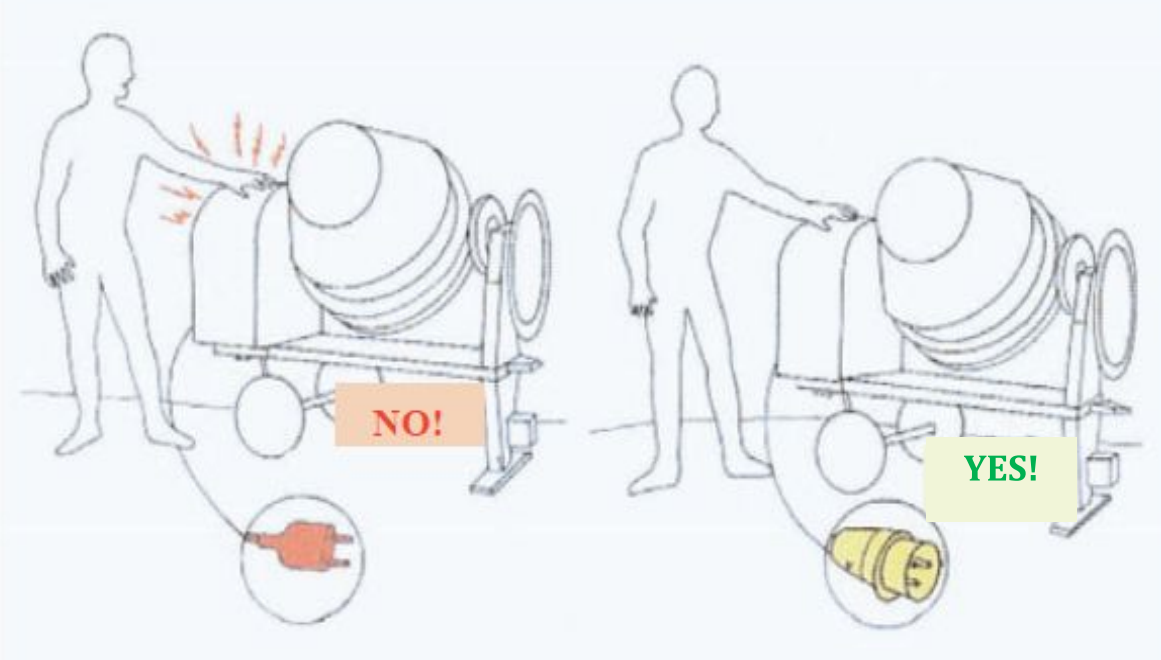
Electrocution hazard



Before using, **check cable** and **push-botton panel** are not damaged!

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Reducing the likelihood of being electrocuted

Prevent the cable from coming into contact with water. It is important to **operate in dry conditions**.

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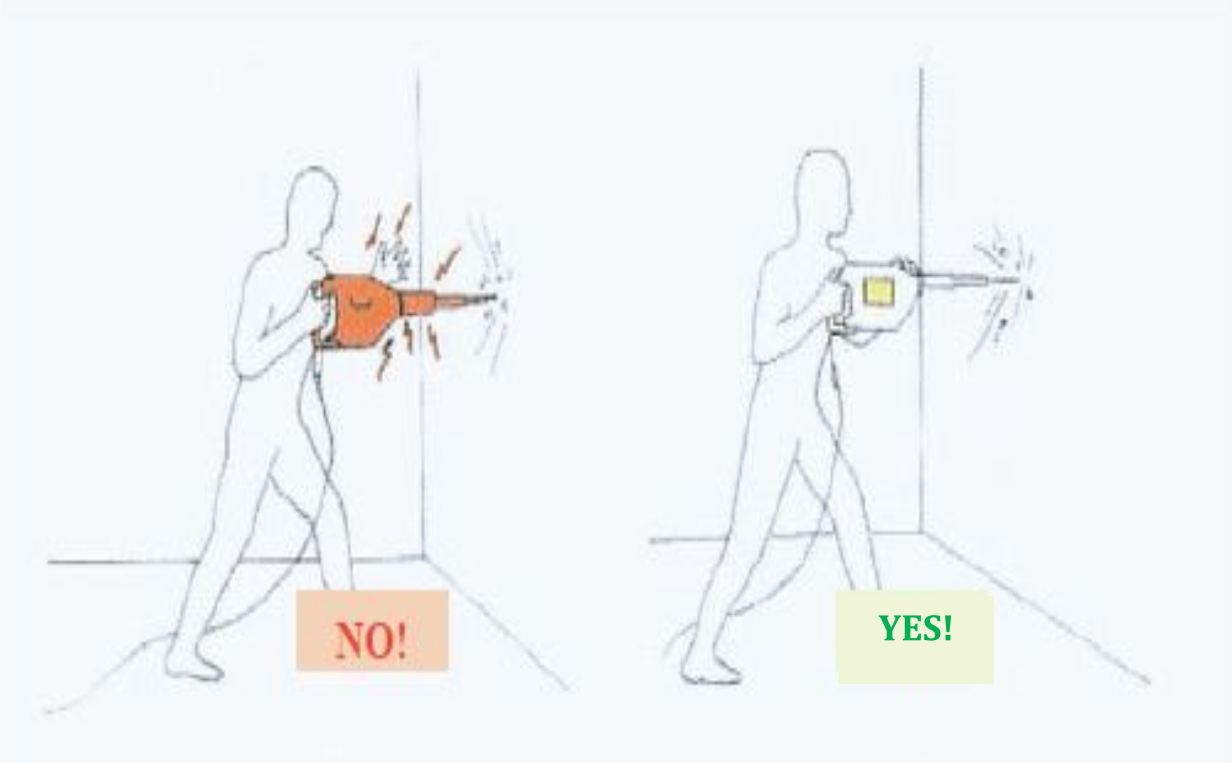
Electrocution risk



Check the **enclosures** and **components** of electrical appliances before using them!

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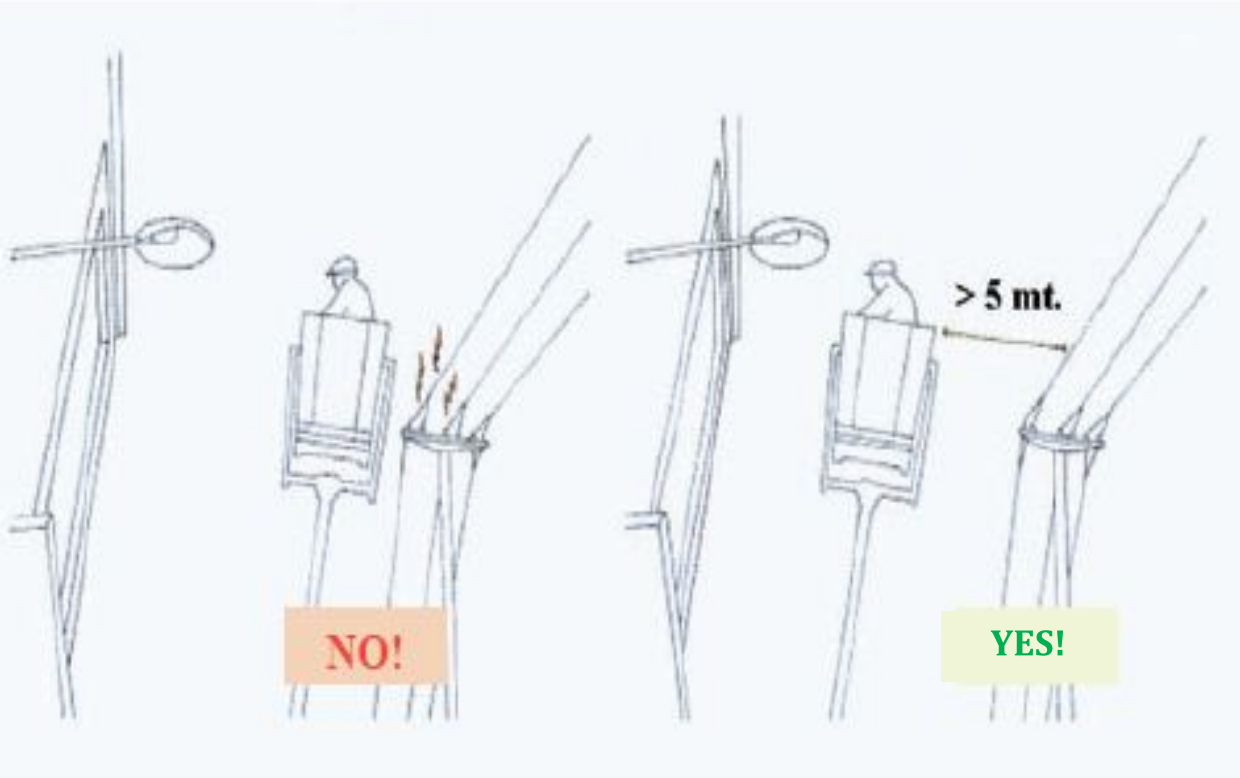
Electrocution risk

Do **not operate** at a distance **within 5 meters** of overhead power lines.



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NTS definition: communication

The communication concerns the ability to *receive and transmit information* relevant to one's own safety and that other people and the environment

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Plenary exercise

Watch the video and **analyse the decisions** made by the workers:

- *How should the two workers communicate with each other?*
- *What should the two workers do to communicate with each other?*
- *What decisions did the workers make?*
- *What would have been the best decisions to make?*

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Different communication methods

ONE-WAY COMMUNICATION		TWO-WAY COMMUNICATION
The message must be **simple**	⟷	The message can be **complex**
You can communicate to **many people** at once	⟷	**Few people** are involved
You **don't need much time**	⟷	You **need time** to communicate

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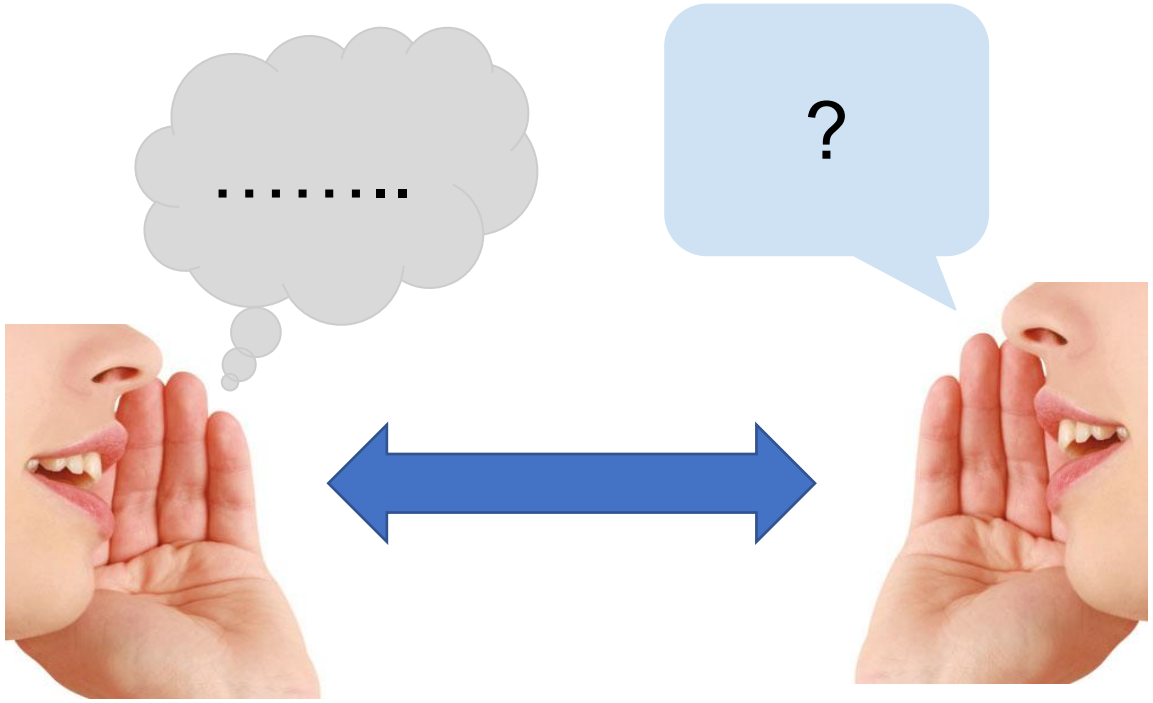
How can you make two-way communication effective?

1. Exchange and **feedback**
2. Ask **questions** and make sure you have understood the message correctly
3. Consistency between **verbal** and **non-verbal communication**



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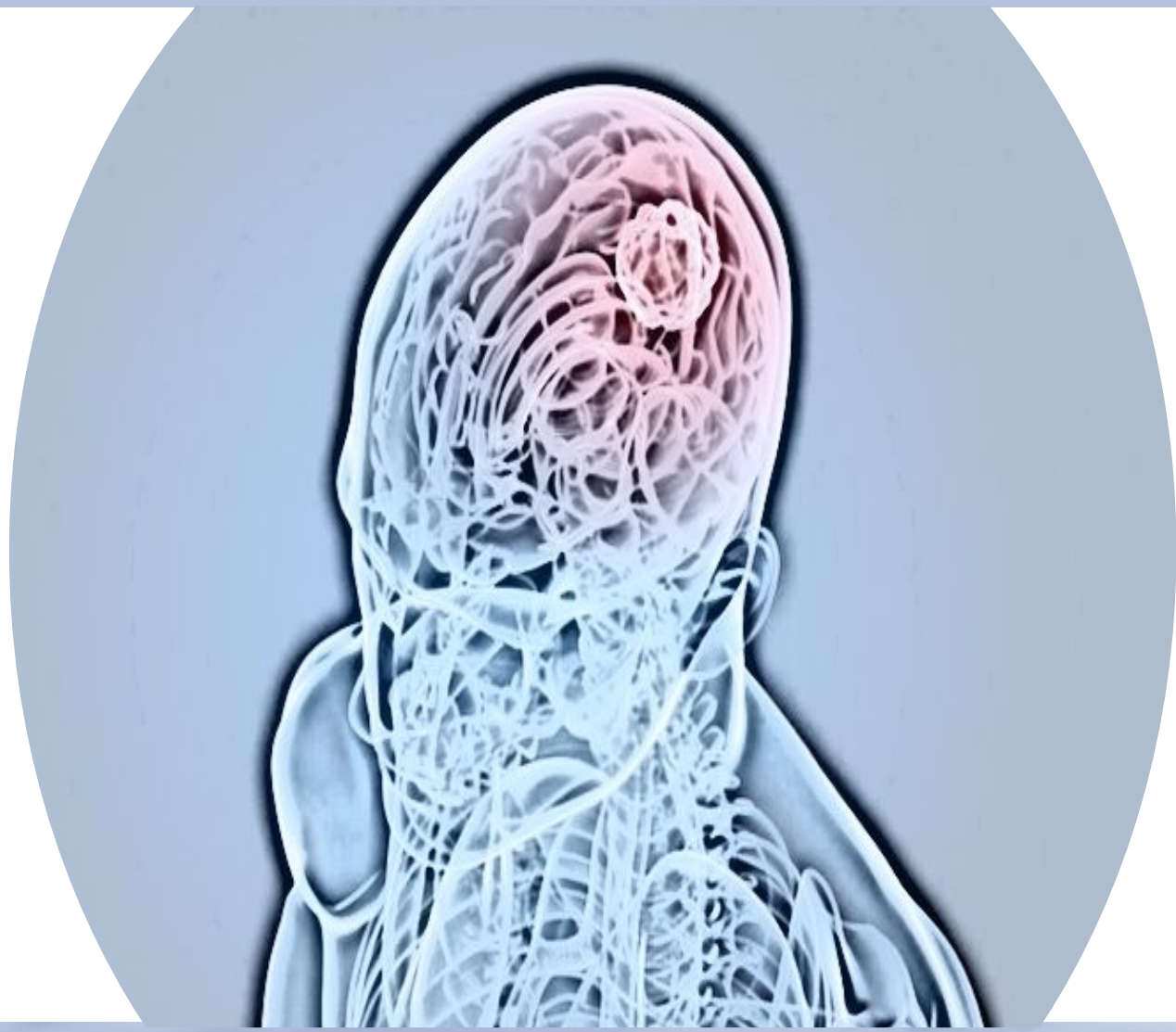
PHYSICAL HAZARDS



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LONG-TERM USE OF CABLES

USE OF MACHINES

NOISE AND VIBRATIONS

What are the situations of potential physical hazards?

USE OF OUTLETS

CRUSHING BY MACHINES

DIRECT AND INDIRECT CONTACT WITH LIVE ELECTRICAL PARTS

RADIOACTIVE MATERIALS

LIGHTING

ELECTROMAGNETIC FIELDS

MICROCLIMATE

What are the causes of potential physical risk?

VIBRATIONS

COMPRESSED AIR TOOLS

MICROWAVES

LASER, ARC WELDING

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NOISE HAZARDS AND VIBRATIONS

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How many decibels are the sound of the wind?

10-20 dB

watch here!

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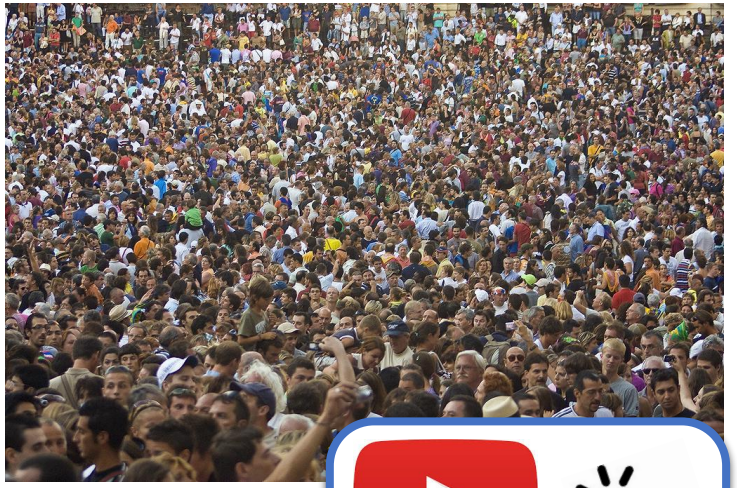
Participative activity

Listen to these clips and try to guees:
How many decibels are these sounds?

watch here!



watch here!

watch here!

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How many decibels would a large crowd make?

60-100 dB

watch here!

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How many decibels is the noise of a pneumatic hammer?

100-130 dB

watch here!

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Noise and intensity

Normal conversation
60 dB

Hairdryer
80-90 dB

Rock concert in the front row
110 dB

Jet taking-off, siren
120 dB

Firearm shot, fireworks
120-150 dB

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PLENARY DISCUSSION

- *What are the **most frequent noises** at a construction site?*
- ***How** can noise be **reduced**?*
- *What could be the **consequences** of prolonged exposure to noise?*

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Noise and vibrations

>85 dB ⟹ partial deafness

near 140 dB ⟹ deafness and rupture eardrums

Wear ear protection both when you are exposed to noise and when you do not use the machines directly but they are used by other workers on site!

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Exposure to noise and vibrations

Angle grinders, **drills** and **demolition hammers** expose workers to vibrations that affect the **hands** and **arms**.

Equipment such as **scrapers**, **mechanical shovels** and **excavators** expose workers to vibrations that affect the **whole body.**

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Exposure to noise and vibrations

The employer must assess the degree of exposure to vibration risk and take steps to reduce it by:

- replacing the equipment with other equipment that vibrates less
- limiting the duration and intensity of vibration exposure
- allowing workers to take rest periods between one exposure period and another
- providing equipment and accessories to reduce the risk of injury
- providing workers with suitable gloves to mitigate hand-arm vibrations
- providing workers with adequate training
- Providing exposed workers with health checks

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RISK OF CRUSHING BY OPERATING MACHINES

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RISK OF CRUSHING BY OPERATING MACHINES

Workers using construction machinery must **be trained** on the **use** of a **specific machine**.

Make sure that the machines are tested, equipped with CE marking

Always keep the machines "in order”!
Check their maintenance status!

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RISK OF CRUSHING BY OPERATING MACHINES

Stay away from "manoeuvering" machines!

Pay attention to illuminated and auditory signals!

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PLENARY ACTIVITY

Read the news and reply to the following questions

- ***How*** *should the two workers* ***communicate*** *with each other?*
- ***What*** *should the two workers* ***communicate****?*
- ***What decisions*** *did the workers* ***make****?*
- ***What*** *would* ***have been*** *the* ***best decision to make****?*

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Worker crushed by a forklift goes to the hospital with a fracture

*A worker has been **hit** by the **forklift** that **crushed** his **leg**. The accident took place yesterday morning at 6:40 am in Wentworth spa on Winchester Road Mr Alek Nowak, **33 years old**, a Polish worker had been working in Sheffield since March. Mr Nowak was working on a machine and extracting a jammed tube, he stepped back and was hit by a forklift truck, which at that moment was **turning a corner** and **the driver had little visibility**. The forklift crushed Mr Nowak's leg. He was rescued and transported first to Sheffield Teaching Hospital and then transferred to Guy's Hospital, London. He suffered a **serious fracture** and **deep wounds.** The colleagues of the worker, in solidarity, have decided to interrupt their shifts and not to work for the whole morning. «The company has opened an internal investigation into the accident to identify the causes, in collaboration with the HSE» a spokesman for the construction company says in a press release.*

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CHEMICAL HAZARD

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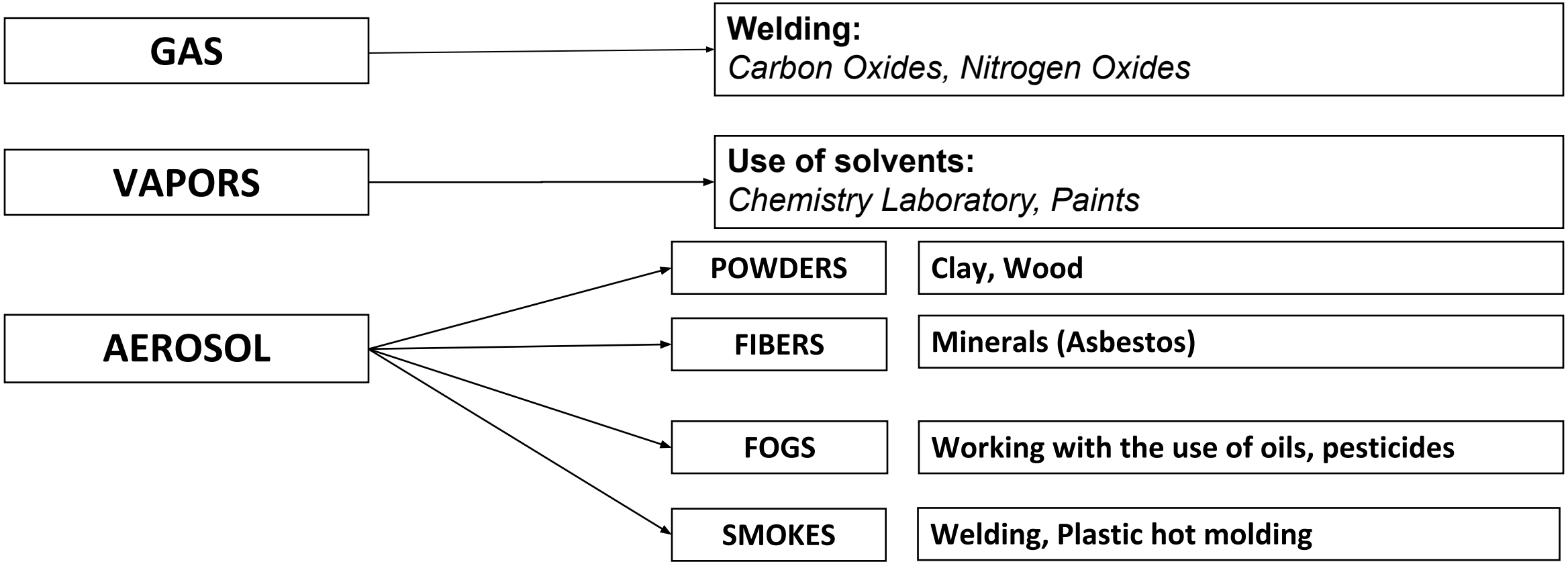
Risk due to polluting substances that interact with the human body and which can cause acute, chronic and irreversible diseases



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CHEMICAL HAZARD

Do not to use **unlabeled products**!

Do not pour chemicals into **bottles** used to store **other chemicals**!

Do not **mix** different products!

Wear protective equipments during use!

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CHEMICAL RISK

Cement, adhesives, disarming agents, hardeners and primers used in construction are dangerous for health and safety (fire, explosion, corrosion).

Chemical risks can be through contact, inhalation, ingestion.

Labels and safety data sheets should be attached to dangerous products and a report of health and safety information.

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CHEMICAL RISK

Before using a product or substance, check the label on the package. The label will give you information about:

1. **Safety symbols**
2. **Risk phrases (R)**
3. **Phrases of advice / prudence (S)**

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Participative activity

Reminder! Last lesson we asked you…

Which chemical products do you use most during your work?

You brought with you the products you use most?

You will use them during a group exercise

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Group Exercise

1) Analyze the labels based on the risk matrix

Risk levels

Probability		Consequences		
		Slightly harmful	*Harmful*	*Extremely harmful*
	Low *L*	❑ Trivial risk T	❑ Tolerable risk TO	❑ Moderate risk MO
	Medium *M*	❑ Tolerable risk TO	❑ Moderate risk MO	❑ Important risk I
	High *H*	❑ Moderate risk MO	❑ Important risk I	❑ Intolerable risk IN

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Making Risk Objective

Trivial

No specific actions are required

Tolerable

It is not required to improve preventive actions

Moderate

Efforts have to be made to reduce the risk by interventions and control measures

Important

The work should not begin until the risk has not been reduced

Intolerable

Until the risk has not been reduced, no work should start or continue

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		Risk levels Consequences		
		Slightly harmful	Harmful	Extremely harmful
Probability	*Low* *L*	Trivial risk T	Tolerable risk TO	Moderate risk MO
	Medium *M*	Tolerable risk TO	Moderate risk MO	Important risk I
	High *H*	Moderate risk MO	Important risk I	Intolerable risk IN

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Answer the following questions:

1) *What are the **main hazards** listed on the label?*
2) *In which **situation** do you usually **use it**? or in which situation it is possible to use it?*
3) *Basing on the situation you chose: What **level of risk** does this product present? Analyse it referring to the risk matrix*
4) *Which **behaviours** are **needed** to use it safely. Which **protective equipment** would you need to wear in order to use them safely?*

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Hazard pictograms (GHS/CLP)

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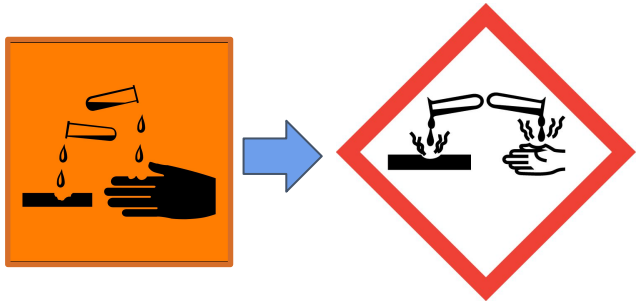
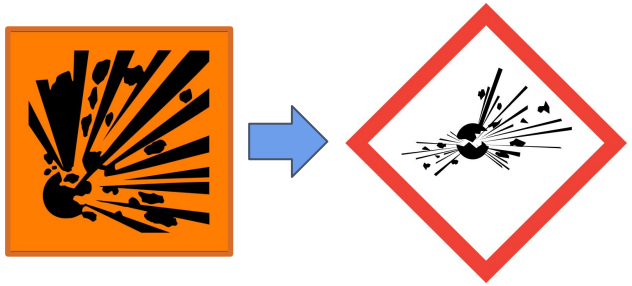
From the old to the new symbols for safety!

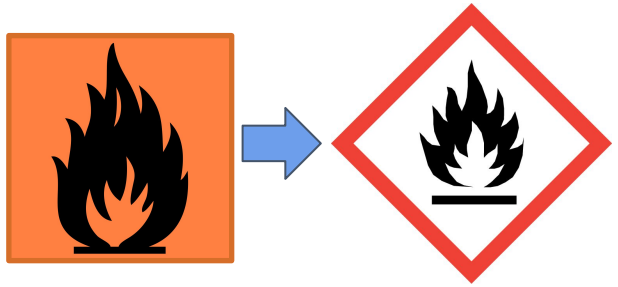
Corrosive



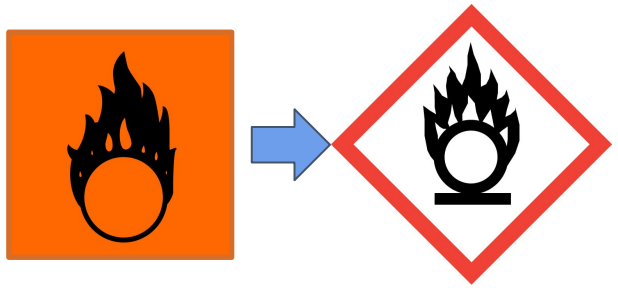
Explosive



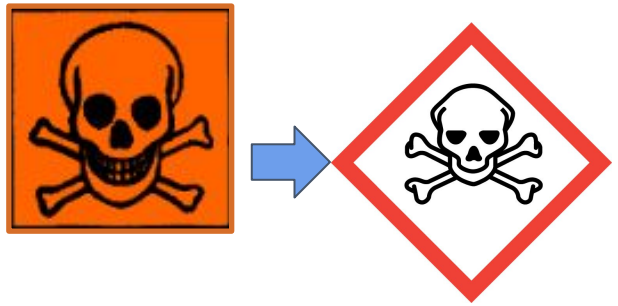
Flammable



Oxidising



Toxic



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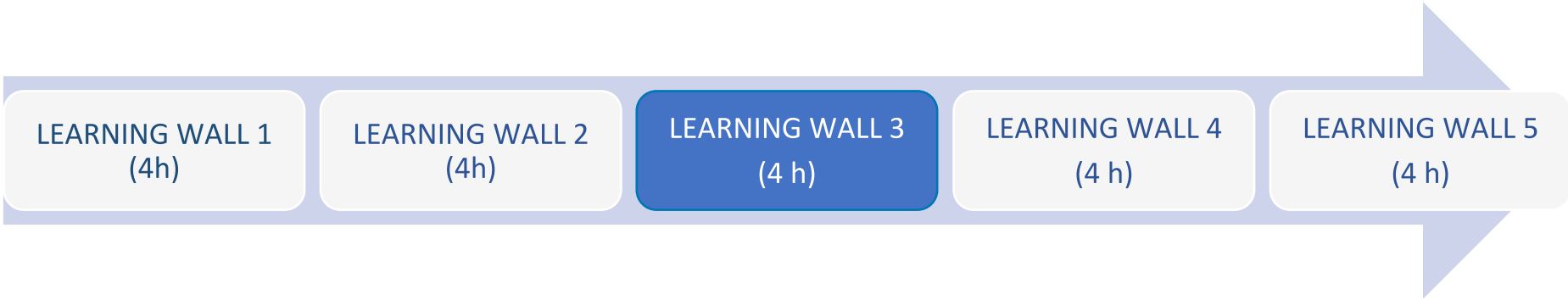
What we have learned today



- ✔ Mechanical hazards, electrical hazards, machines, equipment
- ✔ Fall from height hazard and explosions during digging
- ✔ Physical hazards, noise, vibration in the workplace
- ✔ Chemical hazards

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NTS discussed today

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Content of the next learning wall

- ✔ Work organisation and cargo handling
- ✔ PPE
- ✔ Safety signage
- ✔ Interference risk

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Keep in mind!

Next lesson we will focus on PPE

Which PPE do you use most during your work?

Next lesson, bring with you the PPE you use most. You will use it during a group exercise.

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ESTEEM

The University Of Sheffield.

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WALL 3 - Contents of the online platform

SLIDES

5 ACTIVITIES
6 GAMES

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