Unit 6
Risk Assessment And Risk Response
Today’s objectives are:

- A justification for risk assessment
- 5 steps to risk assessment
- Risk Assessment methods
- Compare and contrast qualitative and quantitative risk assessment
- How to record risk assessment
- Hierarchy of risk control
RISK ASSESSMENT
Required under:

- Management of Health & Safety at Work Regulations 1999
- Manual Handling Operations Regulation
- Personal Protective Equipment at Work Regulations
- Health & Safety (Display Screen Equipment) Regs
- Noise at Work Regulations
- Control of Substances Hazardous to Health Regulations
- Control of Asbestos at Work Regulations
- Control of Lead at Work Regulations

Note all of these apply to construction operations and many will apply on all sites.
A risk assessment is simply a careful examination of what, in your work, could cause harm to people, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm.

(Source: HSE, Five Steps to Risk Assessment)
Five steps to risk assessment:

1. Look for the Hazards
2. Decide who might be harmed and how
3. Evaluate the risks and decide what to do
4. Record your findings
5. Review and revise
Five steps to risk assessment

STEP 1

Look for the hazards

• If you are doing the assessment yourself, walk around your workplace and look afresh at what could reasonably be expected to cause harm. Ignore the trivial and concentrate on significant hazards which could result in serious harm or affect several people.

• Ask your employees or their representatives what they think. They may have noticed things which are not immediately obvious.

• Manufacturers’ instructions or data sheets can also help you spot hazards and put risks in their true perspective.

• Accident and ill-health records are also good pointers to potential risks.
<table>
<thead>
<tr>
<th>Hazards</th>
<th>Examples of potential harms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in scaffoldings, roofs, incomplete floors, floors with lack of edge protection</td>
<td>Resulting in falls from height leading to fatal physical injuries, serious physical injuries</td>
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<tr>
<td>Working in poorly maintained floors or stairs, untidy sites, trailing cables, slippery floors</td>
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<td>Flammable materials, poor storage, smoking on site</td>
<td>Fire</td>
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<tr>
<td>Manual handling such as lifting steelwork or bags of cement</td>
<td>Ill health (e.g. Back injuries, muscle pains, and long-term pains etc.)</td>
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<tr>
<td>Poor lighting, for example in partly completed buildings or in winter resulting in slips and trips</td>
<td>Serious physical injuries, minor physical injuries</td>
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<tr>
<td>Low temperature, for example in winter working, or at altitude</td>
<td>Dermatitis</td>
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<tr>
<td>High temperatures in summer, or underground, or near machinery</td>
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<tr>
<td>Solar radiation, for example in summer, or at altitude</td>
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<tr>
<td>Ultra Violet radiation, for example near welding operations</td>
<td>Dermatitis</td>
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<tr>
<td>Poor electricity wiring</td>
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<tr>
<td>Vehicles such as fork-lift trucks, excavators resulting in struck by or run over</td>
<td>Electrocution</td>
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<tr>
<td>Pressure systems such as steam boilers, gas cylinders</td>
<td>Explosions</td>
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<td>Chemicals such as cleaning materials, cement, acid</td>
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<td>Moving parts of machinery (e.g. blades)</td>
<td>Cuts</td>
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<tr>
<td>Dust from grinding, cutting slabs or concrete</td>
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<tr>
<td>Noise generated from drills, concrete breakers</td>
<td>Hearing loss</td>
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</tbody>
</table>
Five steps to risk assessment

**STEP 2**

Decide who might be harmed, and how

Don’t forget:

- staff with disabilities, young workers, trainees, new and expectant mothers, visitors, lone workers etc who may be at particular risk
- cleaners, visitors, contractors, maintenance workers, etc who may not be in the workplace all the time
- members of the public, or people you share your workplace with, if there is a chance they could be hurt by your activities
STEP 3

Evaluate the risks and decide whether existing precautions are adequate or more should be done

• Consider how likely it is that each hazard could cause harm

• This will determine whether or not you need to do more to reduce the risk

• Even after all precautions have been taken, some risk usually remains

• What you have to decide for each significant hazard is whether this remaining risk is high, medium or low
Quantitative or Quantitative Risk Analysis

Quantitative risk analysis;
• provides some numerical results that allow more informed decision-making by the team.
• Although the term risk analysis suggests some detailed numerical or statistical work, it is often the case that there is no actual number crunching to be made in a risk analysis exercise.

Qualitative risk analysis;
• does not involve any mathematical manipulation or application of numerical techniques.
• Instead, a subjective assessment based on the experience and intuition of the team may be used to determine risk impact.
## Qualitative Risk Matrix

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>M</th>
<th>H</th>
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<tbody>
<tr>
<td><strong>Severity of consequence of hazard</strong></td>
<td>L</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td><strong>Frequency of hazard causing harm</strong></td>
<td>(Likelihood of harm occurring)</td>
<td>(Potential severity of harm)</td>
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<tr>
<td>Frequency of hazard causing harm</td>
<td>Severity of consequence of hazard</td>
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<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
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</table>
In a small group, identify principle differences, similarities, difficulties, benefits and limitations of each approach from construction industry point of view.

**Quantitative VS Qualitative Risk Matrix**

**Qualitative Risk Matrix**

<table>
<thead>
<tr>
<th>Severity of consequence of hazard</th>
<th>L</th>
<th>M</th>
<th>H</th>
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<tbody>
<tr>
<td>Low (L)</td>
<td>H</td>
<td>M</td>
<td>L</td>
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<tr>
<td>Medium (M)</td>
<td>H</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>High (H)</td>
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</table>

**Quantitative Risk Matrix**

<table>
<thead>
<tr>
<th>Frequency of hazard causing harm (Likelihood of harm occurring)</th>
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<tbody>
<tr>
<td>1 2 3 4 5</td>
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<tr>
<td>1 2 3 4 5</td>
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</table>

**Severity of consequence of hazard (Potential severity of harm)**

<table>
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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
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A Qualitative Method for Risk Analysis
Using one of the following scenarios as a group, identify 15-20 of the risks involved, and create a qualitative risk matrix.

A. You are a contractor specialised in underground water distribution contracts. You are awarded a £1.000.000 contract.

B. You are the contractor employing 50 permanent employees in a series of retail shop refurbishment projects. You will need to strip-off the 25 existing chain retail shop branches located in various locations in Scotland, and re-fit them in 10 months.

C. A large holding company wants to procure a brand new high-end 60 storey tower block as their future headquarters building. You are the main contractor employed to deliver it.

D. As a contractor, you are specialised in road constructions. You have to deliver 10 miles strip of a dual carriage way.
Five steps to risk assessment

STEP 3 continued

• First, ask yourself whether you have done all the things that the law says you have got to do (e.g.:- there are legal requirements on prevention of access to dangerous parts of machinery)

• Then ask yourself whether generally accepted industry standards are in place

• But don’t stop there - think for yourself, because the law also says that you must do what is reasonably practicable to keep your workplace safe

• Your real aim is to make all risks small by adding to your precautions as necessary
• If you find that something needs to be done, draw up an ‘action list’ and give priority to any remaining risks which are high and/or those which could affect most people

• In taking action ask yourself:
  a) can I get rid of the hazard altogether?
  b) if not, how can I control the risks so that harm is unlikely?
STEP 3 continued

• But what if the work you do tends to vary a lot, or you or your employees move from one site to another?

  • Identify the hazards you can reasonably expect and assess the risks from them. After that, if you spot any additional hazards when you get to a site, get information from others on site, and take what action seems necessary.

• But what if you share a workplace?

  • Tell the other employers and self-employed people there about any risks your work could cause them, and what precautions you are taking. Also, think about the risks to your own workforce from those who share your workplace.
Record your findings

- If you have fewer than five employees you do not need to write anything down, though it is useful to keep a written record of what you have done
- But if you employ five or more people you must record the significant findings of your assessment
- Examples might be ‘Electrical installations: insulation and earthing checked and found sound’ or ‘Fume from welding: local exhaust ventilation provided and regularly checked’
- You must also tell your employees about your findings
STEP 4

Record your findings

Suitable and sufficient - not perfect!

- Risk assessments must be suitable and sufficient. You need to be able to show that:
  - a proper check was made
  - you asked who might be affected
  - you dealt with all the obvious significant hazards, taking into account the number of people who could be involved
  - the precautions are reasonable, and the remaining risk is low
Five steps to risk assessment

STEP 4

• Keep the written record for future reference or use; it can help you
  ➢ if an inspector asks what precautions you have taken, or if you become involved in any action for civil liability
  ➢ by reminding you to keep an eye on particular hazards and precautions
  ➢ to show that you have done what the law requires

• There is an example at the end of HSE guide to Risk Assessment which you may find helpful to refer to, but you can make up your own form if you prefer
STEP 4

• To make things simpler, you can refer to other documents, such as manuals, the arrangements in your health and safety policy statement, company rules, manufacturers’ instructions, your health and safety procedures and your arrangements for general fire safety.

• These may already list hazards and precautions. You don’t need to repeat all that, and it is up to you whether you combine all the documents, or keep them separately.
STEP 5

Review your assessment and revise it if necessary

- Sooner or later you will bring in new machines, substances and procedures which could lead to new hazards.

- If there is any significant change, add to the assessment to take account of the new hazard.

- Don’t amend your assessment for every trivial change or still more, for each new job, but…

- In any case, it is good practice to review your assessment from time to time to make sure that the precautions are still working effectively.
### HSE Recommended risk assessment format

**Company name:** TVW Contract Bricklayers  
**Date of risk assessment:** 6/3/2006  

**Important reminder**

This example risk assessment shows the kind of approach a small business might take. Use it as a guide to think through some of the hazards in your business and the steps you need to take to control the risks. Please note that it is not a generic risk assessment that you can just put your company name on and adopt wholesale without any thought. This would not satisfy the law – and would not be effective in protecting people.

Every business is different – you need to think through the hazards and controls required in your business for yourself.

<table>
<thead>
<tr>
<th>What are the hazards?</th>
<th>Who might be harmed and how?</th>
<th>What are you already doing?</th>
<th>What further action is necessary?</th>
<th>Action by who?</th>
<th>Action by when?</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Falling from height</strong></td>
<td>Serious injury or even fatal injury could occur if a worker falls.</td>
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</tbody>
</table>
- Agree scaffolding requirements at contract stage, including appropriate load rating and provision of loading bays.  
- Bricklayers’ supervisor to check with the site manager that the correct scaffold is provided and inspected.  
- Workers instructed not to interfere with or misuse scaffold – supervisor to keep an eye out for problems.  
- Ladders in good condition, adequately secured (lashed) and placed on firm surface.  
- Band stands with handrails to be used for work on internal walls.  
- Workers trained to put up bandstands. |  
- Scaffold requirements agreed, including loading bays and appropriate load rating. | TB | 20/3/06 | 20/3/06 |
| **Collapse of scaffold** | All operatives on scaffold may incur crush injuries, or worse, if the scaffold collapses on top of them. |  
- Agree scaffolding requirements at contract stage, including appropriate load rating and provision of loading bays.  
- Bricklayers’ supervisor to check with the site manager that the correct scaffold is provided and inspected. |  
- Supervisor to speak regularly to site manager to arrange scaffold alterations and ensure that weekly inspections have been carried out. | LG | From 1/5/06 | |
| **Falling objects hitting head or body, including feet** | Serious head and other injuries to workers, others on site and members of the public. |  
- Brick guards kept in position on scaffold lifts.  
- Waste materials removed from scaffolding and placed in skip.  
- Safety helmets and protective footwear (with steel toecaps and mid-soles) supplied and worn at all times. |  
- Supervisor to monitor use of safety hats and protective footwear. | LG | From 1/5/06 | |
The Hierarchy of Risk Control:  
*The risk response*

- If the risk assessment identifies a risk which needs to be reduced, then there are usually a number of things which could be done to achieve that reduction.
- So how do we choose what to do first?
- Natural reaction in business may be to choose the cheapest option first – and this is often to simply issue Personal Protective Equipment (PPE)…..but this is wrong

Working as a small group, kindly create a principle hierarch of actions for risk control which might be used at all times, each time you want to respond to a risk.
In just the same way there is a hierarchy of safety controls which is as follows:

1. **Elimination** of the hazard at source if possible
2. **Substitution** of safer materials or methods
3. **Isolation** of the worker from the hazard by distance or shielding
4. **Engineering controls** such as guarding, insulation or ventilation
5. **Reduced time exposure** to the hazard
6. **Good housekeeping** and **cleaning**
7. **Safe systems** of work
8. **Training and information**
9. **Personal protective equipment**

Each of these should be considered in turn to reduce the risk to its lowest level before **PPE is considered as a last resort when nothing else will work.**
Example

So the thought process would go like this, if we consider for example a **welding operation** on site:

- [http://www.youtube.com/watch?v=veMaMZBh1b8](http://www.youtube.com/watch?v=veMaMZBh1b8)
- [http://www.youtube.com/watch?v=S1H_mV3Webo&feature=related](http://www.youtube.com/watch?v=S1H_mV3Webo&feature=related)
- [http://www.youtube.com/watch?v=MVrI2kuRKdA](http://www.youtube.com/watch?v=MVrI2kuRKdA)

- Can we **eliminate** the need to weld on site by having the welding done elsewhere?
  - *(maybe) No, that would be impractical, we need it to be done here.*

- OK, then can we **substitute** something less hazardous than gas welding?
  - *Yes we can use electric welding instead.*
• Can we **isolate** people from the hazard?
  • Yes, we can keep non essential workers away from the welding while it is being done by stopping any nearby work, and we can put up anti glare screens to stop people getting UV eye burns (welders flash).

• Can we use any **engineering controls**?
  • Yes we can use local exhaust ventilation to clear away fumes quickly. [http://www.youtube.com/watch?v=XClEVg3LIXI](http://www.youtube.com/watch?v=XClEVg3LIXI)

• Can we **reduce exposure time**?
  • Maybe we can make sure welders take regular breaks to cool down and rest.
• What about **good housekeeping**?
  • *The risk of fires can be reduced by making sure that there are no flammables or waste in the area before welding starts. Fire fighting equipment will be available too.*

• Do we have **safe systems of work**?
  • *Yes, we have been through the job with the welders and they have safe equipment which they know how to use safely. A permit to work will be issued to the welders when the site is ready for them to start. Trained first aiders will be available on site to deal with burns, electric shock, or other injuries.*
Would **training and information** help?

- Yes, we can check that the welders are qualified and competent for this type of work, and that other workers will be informed of the welding location as part of the permit to work system.

Are there any risks left for which **PPE** is needed?

- Yes, to protect the welder and his mate from heat, sparks and UV light they will be using welders face shields, leather aprons and gauntlets, and spark proof boots.
The end result...cntd

• This is the really important part that many people – including safety officers – forget.

• The whole reason for carrying out a risk assessment is to arrive at a **SAFE WORKING METHOD** for a particular job - that is the conclusion of the exercise

• The risk assessment is not the answer itself, it is just the method we use to ask the right questions

• It is easy to get lost in the detail of the assessment and lose sight of why we were doing it in the first place
The end result

• In the example above, what would the final working method for the job of welding on site look like?
• Is that what welding on a building site always looks like?
• If not, then why not?
Codes of Practice (CoP)

• It is logical that, if you do a risk assessment of the same job a number of times in similar circumstances, then you are going to end up with the same answer – a consistent safe working method for that type of work.

• This is where CoPs come from. They are an agreed and accepted safe way to carry out a type of work

• If you follow a CoP method then you can be almost certain that you are complying with the law UNLESS there is something different about the circumstances that the CoP does not cover.
Codes of Practice (CoP)……cntd…….

• The things that might be different and need special consideration could include things like bad weather conditions, working at height, foreign workers, presence of the public etc.

• Just like hazard spotting, realizing that there is something different to deal with is a skill that takes training, experience, knowledge and observation. In other words – competence.

• And there is only one way to know what a CoP covers and what it doesn’t. You have to read it and understand it!
• In so many accident investigations all the information needed to prevent it was already available on site, but no-one had read it or realized the significance of it. Failure to follow published guidance is a key piece of evidence in many successful criminal prosecutions and civil suits for compensation.

• So, if there is a CoP for the work you are doing, then follow it. In effect the risk assessment has been done for you. All you have to do then is to consider whether there is anything different about this job that you have to take account of, and deal with it.
Conclusions

- Health and Safety legislation requires you to undertake risk assessment.
- If you have more than 5 employees, you have to record it.
- There are qualitative and quantitative risk evaluation methods, which might be right for different situations.
- Risk assessment would not resolve a risk on its own.
- Risk response philosophy must be preventative and proactive first, rather than reactive.
- HSE recommends a format for risk assessment and it is a crucial skill to be able to use it effectively.
Tutorial Exercise 1

As a group, looking at one of the 4 images you are given create a risk matrix as recommended by the HSE.
Working as a group of 2 students, this time look at the risk assessment you have performed in the exercise 1, Identify 3 of the hazards and perform a risk response using 9 step hierarch of risk control. One hazard will be dealt with by a single group.