

Conducting Occupational Safety and Health Risk Assessments for Vulnerable Groups

Presented by

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Before we begin...

GENERAL HOUSEKEEPING

- Review Emergency Warning and Exit Procedures
- Verify Assemble Point
- Indicate location of Fire Extinguishers
- Indicate location of Sanitary Conveniences
- Review Arrangements for ailing persons

Topics to be Covered

1. Selected OSH Terms & Functional Definitions
2. The concept of "Risk Assessment"
3. Who or what are "Vulnerable Groups"?
4. Overview of applicable Risk Assessment requirements under the SHaW Act 2005
5. Consideration of specific workplace hazards, risks and challenges for "Vulnerable Groups"
6. Controls & Protective Measures

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Terms and Functional Definitions to Guide this Presentation...



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Definitions

Work:

- A form of employment, a vocation, pursuit or calling which is often (but not always) associated with some form of remuneration
- The activities being performed as well as the locations at which these are done (i.e. may be defined to include the workplace).

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Definitions cont...

Safety:

- The protection of people from physical **traumatic injury**.

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Definitions cont...

Health:

- The protection of people from physiological and/or psychological **diseases and disorders.**

Definitions cont...

Welfare:

- The provision of **facilities and amenities** which enhance or cater to employee comfort, wellbeing and basic human needs.

Definitions cont...

Young Person:

SHaW Act definition (16-18)

- "young person" means a person who has attained the age of 16 years but is under the age of 18 years.

Definitions cont...

Youth (young persons):

- "the *United Nations*, for statistical purposes, defines those persons between the ages of **15 and 24** as youth without prejudice to other definitions by Member States."



Functional Definitions...

For the purposes of this presentation we will generically use the *United Nations* definition of 15-24, since it also captures the age range in the SHaW Act of 16-18.

N.B. Many of our local children are older than 18 by the time they finish studying and/or find their FIRST real job!



Definitions cont...

Reasonable Accommodation:

- The assistance or changes to a task or workplace (including alternative work or employment) that will enable an employee to do his or her job, despite having some challenge or disability.

Definitions cont...

HAZARD:

- Anything with the potential to cause harm!

Definitions cont...

HAZARDS may have safety, health or environmental impacts, and can be categorized as:

- Physical (objects and energies)
- Chemical
- Biological
- Ergonomic
- Psychological

Definitions cont...

OCCUPATIONAL HAZARD:

- Anything with the potential to cause harm and which would not normally be encountered away from work, or not to the same degree.

General Note...

- Many occupational hazards (especially chemicals, biological and physical agents) pose elevated risk to the **very young, very old, women (and unborn children) during pregnancy and/or persons with compromised immune systems.**

Definitions cont...

- **RISK:** is the realistic chance that a hazard will actually impact.

RISK DEFINED

RISK is the product of the degree of severity and the likelihood

$$\text{RISK} = \text{SEVERITY} \times \text{LIKELIHOOD}$$

Definitions cont...

- **RISK ASSESSMENT** is the process of identifying sources of potential harm (HAZARDS), predicting the possible **SEVERITY** of the consequences, determining WHO/WHAT can be affected and assessing the **LIKELIHOOD** (RISK) that harm will actually occur; as well as additional **controls** required to adequately reduce the likelihood of harm.

RISK ASSESSMENT

Risk Assessments may be:

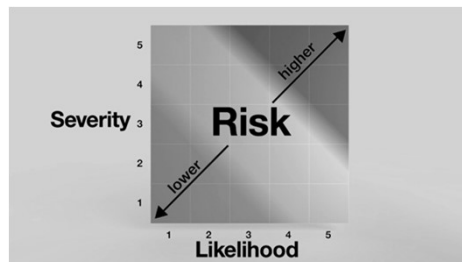
- Qualitative
- Semi-quantitative
- Quantitative

Qualitative Risk Assessment

- A Qualitative risk assessment is based on **informed judgements** and reference to appropriate guidance.

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EXAMPLE 1



British BS8800 3 X 3 Risk Assessment Matrix

	Slightly harmful	Harmful	Extremely harmful
Highly Unlikely	TRIVIAL	TOLERABLE	MODERATE
Unlikely	TOLERABLE	MODERATE	SUBSTANTIAL
Likely	MODERATE	SUBSTANTIAL	INTOLERABLE

→ Increasing Risk

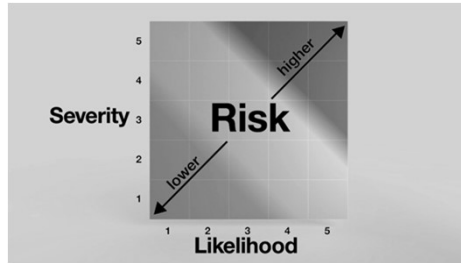
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Semi-quantitative Risk Assessments

- A Semi-quantitative Risk Assessments applies basic numeric measuring methods or **simple modelling techniques** to indicate the likelihood of harm occurring to people, property or the environment.

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EXAMPLE 2



3 X 3 Risk Assessment Matrix

SEVERITY	H	M	H	H
	M	M	M	H
	L	L	M	M
THE DEGREE OF RISK		L	M	H
		LIKELIHOOD		

EXAMPLE 3



5 X 5 Numeric Matrix

		Severity				
		Negligible (1)	Marginal (2)	Moderate (3)	Critical (4)	Catastrophic (5)
Probability	Almost certain (5)	Medium (5)	High (10)	High (15)	High (20)	High (25)
	Likely (4)	Low (4)	Medium (8)	High (12)	High (16)	High (20)
	Possible (3)	Low (3)	Medium (6)	Medium (9)	High (12)	High (15)
	Unlikely (2)	Low (2)	Low (4)	Medium (6)	Medium (8)	High (10)
	Rare (1)	Low (1)	Low (2)	Low (3)	Low (4)	Medium (5)

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Quantitative Risk Assessments

- Quantitative risk assessment (QRA) involves obtaining a numerical estimate of the risk via consideration of event probabilities and consequences.
- Special quantitative tools and techniques are used for hazard identification, and to estimate the severity of the consequences and the likelihood of an impact.

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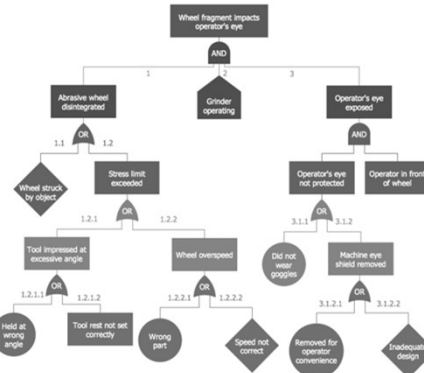
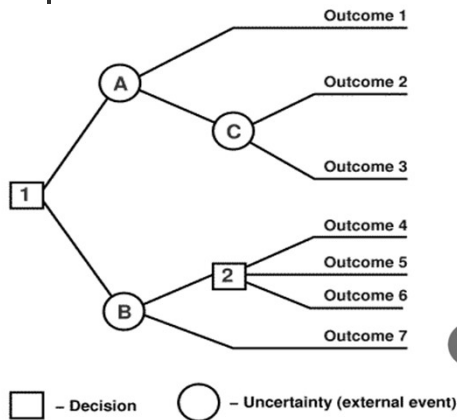
Quantitative Risk Assessments

Examples of such complex Risk Assessment techniques are:

- "Decision Tree Analysis"
- "Fault Tree Analysis", and
- "Probabilistic Safety Analysis".

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Quantitative Risk Assessments ("Decision Tree" & "Fault Tree")



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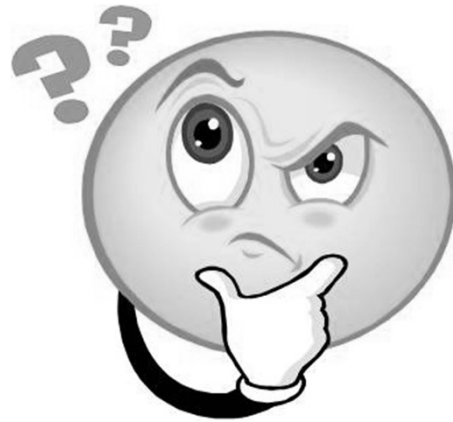
Risk Assessment

- Thus **RISK ASSESSMENT** is a careful and systematic process of examination, determination, followed by implementation (of correction actions).

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Questions & Answers



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Vulnerable Groups



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Vulnerable Groups Definitions



- Several Definitions of “Vulnerable Groups” exists
- Each definition has a different focus (e.g. safety and health, ability to respond to disasters, discrimination, exploitation, etc.)
- Examples follow...

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Vulnerable Groups Definitions cont...



- **HSE** defines vulnerable workers as those who are at risk of having their workplace entitlements denied, or who lack the capacity or means to secure them.

Health and Safety Executive (UK)

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Vulnerable Groups

Definitions cont...



- Vulnerability is the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters.
- Children, pregnant women, elderly people, malnourished people, and people who are ill or immunocompromised, are particularly vulnerable...

Environmental health in emergencies and disasters: a practical guide. (WHO, 2002)

Vulnerable Groups

Definitions cont...



- **Human Rights Centre of Iceland** focuses on groups that are especially vulnerable to abuse of human rights or that have difficulties defending themselves. These include:
 1. women and girls
 2. children
 3. refugees
 4. internally displaced persons
 5. stateless persons

Vulnerable Groups

Definitions cont...



- These include (cont...):
 6. national minorities
 7. indigenous peoples
 8. migrant workers
 9. disabled persons
 10. elderly persons
 11. persons living with AIDS or HIV positive
 12. lesbian, gay and transgender people.

Vulnerable Groups

Definitions cont...



- The **Institute for Work & Health** (Canada): Vulnerable workers may include young workers, recent immigrants (newcomers), aboriginal peoples, older workers, those new to their jobs or working for new businesses, temporary foreign and seasonal workers, workers holding multiple, part-time or low-paying jobs, and workers involved in temporary employment.

Vulnerable Groups under SHaW Act 2005



- The **Safety and Health at Work Act 2005** does NOT explicitly define “Vulnerable Groups”

Vulnerable Groups under SHaW Act 2005



- However, the **Safety and Health at Work Act 2005** makes specific reference to:
 - a. Young persons [Sec 2 & Sec 67 – 73]
 - b. Pregnant employees [Sec 6(7), 6(8), 6(9)]
 - c. Nursing mothers [Sec 6(9)]
 - d. New mothers [Sec 6(10)]
 - e. Employees with special needs [Sec 7(1)]

So, who are considered as the “Vulnerable Groups”?



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Who are the Vulnerable Groups?

Vulnerable Groups are those who are at special risk by virtue of their condition, limitation(s) or disposition.

Such vulnerability may be permanent or transient.

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Who are the Vulnerable Groups?

Vulnerable Groups include:

- Very young workers
- Trainees & Inexperienced staff
- Old or Aging Employees



Who are the Vulnerable Groups?

Vulnerable Groups include:

- Persons with PHYSICAL Disabilities or MOBILITY CHALLENGES.
- Persons with MENTAL or LEARNING Disabilities, or other SPECIAL NEEDS



Who are the Vulnerable Groups?

Vulnerable Groups include:

- Ladies during pregnancy (Expectant mothers)
- Ladies immediately after pregnancy (New and Nursing mothers)



Who are the Vulnerable Groups?

- ONE individual may simultaneously be included within several "vulnerable groups".
- E.g. a young¹, inexperienced², female employee may be pregnancy³, and also have some physical or cognitive challenges⁴.

Other Vulnerable Groups*

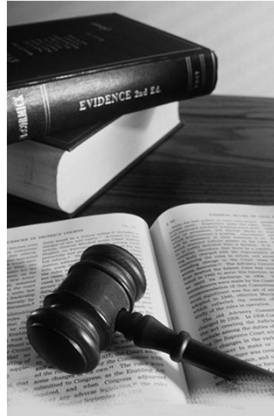
- Lone Workers
- Persons with compromised immune systems
- Persons with language differences (Non-English speaking or whose first language is NOT English)
- Socially and/or Financially Disadvantaged persons (including Migrant Workers)

*These will NOT be considered in this current session.

Questions & Answers



LEGISLATIVE FRAMEWORK



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Common Law Duty

The **DUTY OF CARE** requires the employer to:

- provide a competent staff;
- provide adequate plant and equipment;
- provide a safe system of working, with effective supervision; and
- provide a safe place of work.

(To fulfil the above requirements, some degree of **Risk Assessment** must first be done!)

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Safety and Health at Work Act Risk Assessment requirement



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SHaW Act 2005

Risk Assessment requirement

- **6. (1)** It shall be the duty of any person who undertakes the design, importation or manufacture of any article for use at work to carry out or arrange for the carrying out of any necessary research...(for).. the elimination or minimisation of any risks to health or safety to which the design or article may give rise.

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SHaW Act 2005

Risk Assessment requirement

- **Sec 6.(2)** No occupier shall carry on any work or put into use any equipment, material, article or substance in a workplace unless a suitable and sufficient assessment of the risk likely to arise in the circumstances and of the steps to be taken to eliminate or minimise such risks to safety or health has been undertaken.

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SHaW Act 2005

Risk Assessment requirement

- **6. (3)** The assessment required by subsection (2) shall be reviewed where there has been a material change in the work or the circumstances under which the work is carried on.

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SHaW Act 2005

Risk Assessment requirement

- **Sec 6. (5)** It shall be the duty of every occupier to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees.

SHaW Act 2005

Risk Assessment requirement

- **6. (6)** ...the matters to which subsection (5) extends include in particular
 - *(a)* ... plant and systems of work...
 - *(b)* arrangements for ensuring...safety and the absence of risks to health in connection with the use, handling, storage and transport of articles and substances;

SHaW Act 2005

Risk Assessment requirement

- **6. (6)** ...the matters to which subsection (5) extends include in particular
 - *(c)* the provision of such information, instruction, training and supervision as is necessary to ensure, ...the health and safety at work of employees;

SHaW Act 2005

Risk Assessment requirement

- **6. (6)** ...the matters to which subsection (5) extends include in particular
 - *(d)* ...as regards any place of work, the maintenance of it in a condition that is safe and without risks to health and the provision and maintenance of means of access to and egress from it that are safe and without such risks;

SHaW Act 2005

Risk Assessment requirement

- **6. (6)** ...the matters to which subsection (5) extends include in particular
 - *(e)* the provision and maintenance of a working environment for employees that is..., safe, without risks to health, and adequate as regards facilities and arrangements for their welfare at work; and...

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SHaW Act 2005

Risk Assessment requirement

- **6. (6)** ...the matters to which subsection (5) extends include in particular
 - *(f)* ensuring that the workplace, work spaces and procedures meet prescribed ergonomic standards.

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SHaW Act 2005

Risk Assessment requirement

- **6. (9)** No employer shall require or permit a pregnant employee or an employee who is nursing her child to perform work that is hazardous to her health or the health of the child.

SHaW Act 2005

Risk Assessment requirement

- **6. (10)** ...during an employee's pregnancy and for a period of 6 months after the birth of her child, the employer shall offer her suitable alternative employment ...where the employee is required to perform work that poses a danger to her safety or health or that of her child,...

SHaW Act 2005

Risk Assessment requirement

- **(7)** An employer shall, after being notified by a female employee that she is pregnant...adapt the working conditions...to ensure that she is not
 - *(a)* involved in the use of, or exposed to chemicals, substances or anything dangerous to the health of the unborn child; or

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SHaW Act 2005

Risk Assessment requirement

- **(7)** An employer shall, after being notified by a female employee that she is pregnant...adapt the working conditions...to ensure that she is not
 - *(b)* subjected to working conditions dangerous to the health of the unborn child, and where appropriate, the employer may assign alternative work, where available, to her without prejudice to her right to return to her previous job.

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SHaW Act 2005

Risk Assessment requirement

- **67.** Where the Minister is advised by the factory doctor and is of the opinion
 - (a) that in a workplace,
 - (iii) young persons are or are about to be employed in work which may cause risk of injury to their health;...
 - he may make Regulations specifying the arrangements to be made for the medical supervision of those employees or young persons...

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SHaW Act 2005

Risk Assessment requirement

- **73.** No woman or young person shall be employed in any of the following, namely,
 - (a) work at a furnace involving the reduction or treatment of zinc or lead ores;
 - (b) the manipulation, treatment or reduction of ashes containing lead, the desilvering of lead or the melting of scrap lead or zinc;
 - Etc.

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Questions & Answers



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Risks Assessment & Controls for Vulnerable Groups



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Vulnerable Groups



- Very young workers
 - Trainees & Inexperienced staff
 - Old or Aging Employees
 - Persons with PHYSICAL Disabilities or other MOBILITY CHALLENGES.
 - Persons with MENTAL or LEARNING Disabilities, or other SPECIAL NEEDS
 - Ladies during pregnancy (Expectant mothers)
 - Ladies immediately after pregnancy (New and Nursing mothers)

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Vulnerable Groups



Young workers / Youth, Trainees and Inexperienced staff are vulnerable since:

- they lack experience
- lack of maturity (physically and mentally)
- lack awareness of hazards and risks
- lack skills and training
- may be unaware health and safety precautions
- may be reluctant to speak out about problems

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Vulnerable Groups



Young workers / Youth are vulnerable because:

- immune systems not fully developed
- often susceptible to several allergens or workplace products
- are keen to please and impress their new employer

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Vulnerable Groups



Older workers may be vulnerable as some functional capacities decline e.g.

- reduced vision
- reduced hearing (from prolonged occupational exposures)
- presbycusis (age-related hearing loss and tingling)
- reduced range of motion
- musculoskeletal pains and restrictions (arthritis)

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Vulnerable Groups



Older workers may be vulnerable as some functional capacities decline e.g.

- reduced muscular strength
- decreased ability to judge the speed of moving objects
- slower reflexes
- immune systems degradation and failure

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Vulnerable Groups



Persons with **disabilities, challenges** or **special needs** may:

- not be capable of detecting various warning signals or alerts
- be unable to perform various physical or cognitive tasks for themselves
- may be deployed in work areas (or workplaces) which are not "disabled friendly"
- may be omitted from routine drills or forgotten during emergencies.

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Vulnerable Groups



Ladies during **pregnancy** (or their unborn child) and **new and nursing mothers** may be vulnerable due to:

- hormonal changes in the body
- greater absorption of various workplace substances
- exposure to biological entities
- exposure to physical agents (noise, vibration, ionising radiations)
- sustaining trauma (slips, trips, falls, strikes to body)
- poor workstation ergonomics or design of work

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SAFETY HAZARDS



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Slip, Trip & Fall Hazards



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Who are at special Risk?



- Very young workers
- Trainees & Inexperienced staff
- Old or Aging Employees
- Persons with PHYSICAL Disabilities
- Persons with MOBILITY CHALLENGES
- Persons with MENTAL Disabilities or SPECIAL NEEDS
- Expectant mothers & Foetus

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Control Measures



- Strict housekeeping
- Rapid response to incidents (e.g. spillages)
- Highly visible signage
- Awareness Training & Regular refreshers

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Fire & Emergencies



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Who are at Risk?



- Very young workers
- Trainees & Inexperienced staff
- Old or Aging Employees
- Expectant mothers
- New and Nursing mothers

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Who are at Risk?



- Persons with **PHYSICAL** Disabilities (including hearing and/or sight limitations)
- Persons with **MOBILITY CHALLENGES**
- Persons with cognitive limitations or **SPECIAL NEEDS**

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Mobility Challenged



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Control Measures

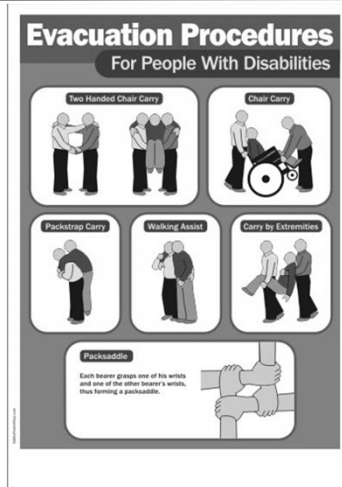


- Specific Alert and Response methods
- Alarms should be "audible and visible" Sec 38.(2)
- Place Extinguishers and Alert Points at accessible positions
- Assigned wardens or "buddy" personnel
- Evacuation procedures and equipment
- Specific accessible "Muster Point"

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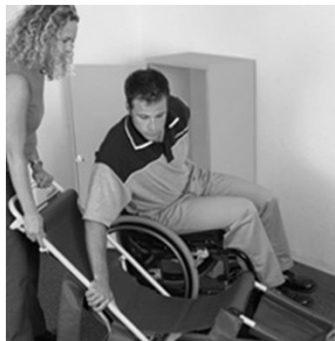
Evacuation



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Evacuation



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Establish Refuge Point



A vertical column of four icons: a wheelchair symbol, a checkmark, an exclamation mark inside a circle, and a prohibition sign (a circle with a diagonal slash).

**Disabled persons
refuge/evacuation**

This refuge point gives
safe refuge from the
effects of smoke and
fire for approximately

The safe evacuation
plan within this building
makes provisions for help
and assistance to be
available within

You should keep calm
and avoid any unnecessary
stress. Wait in the designated
refuge area until assistance
arrives.

**Do not take risks
Do not leave the refuge
area without assistance**

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Manual Handling (Lifting)



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Who are at Risk?



- Very young workers
- Trainees & Inexperienced staff
- Old or Aging Employees
- Persons with PHYSICAL Disabilities
- Persons with MOBILITY CHALLENGES
- Persons with MENTAL Disabilities or SPECIAL NEEDS
- Expectant mothers
- New and Nursing mothers

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Control Measures



- AVOID Manual Handling where possible
- Use manually operated load handling equipment
- Break down loads
- Practice "buddy lifting"
- Provide additional instruction & training
- Use full Mechanical Handling procedures

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HEALTH HAZARDS



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Chemical Substances



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Who are at Risk?



- Very young workers
- Trainees & Inexperienced staff
- Old or Aging Employees
- Persons with PHYSICAL Disabilities
- Persons with MOBILITY CHALLENGES
- Persons with MENTAL Disabilities or SPECIAL NEEDS
- Expectant mothers and Foetus
- New and Nursing mothers

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Reproductive Toxins



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Who are at Risk?



- Expectant mothers
- Unborn Child (foetus)

Reproductive Toxicity


- Pregnant employees and unborn children are vulnerable to chemical which can penetrate the placenta.

Reproductive Toxicity

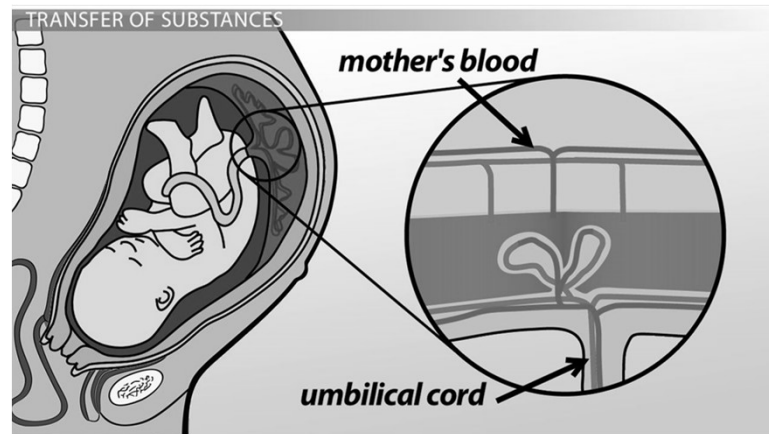
- When researchers examined the umbilical cord blood of 10 U.S. babies born in August and September 2004, they found a total of **287 industrial chemicals**, of which 180 were carcinogens and 217 were neurotoxic (toxic to the brain).

Reproductive Toxicity



- 
- REPRODUCTIVE WASTAGE
 - Early pregnancy loss
 - Spontaneous abortion
 - GENETIC DEFECTS
 - Single gene defects
 - Chromosomal abnormalities
 - CONGENITAL MALFORMATIONS
 - LOW BIRTH WEIGHT
 - Intrauterine growth/retardation
 - Preterm delivery
 - MORTALITY
 - Late foetal deaths
 - Perinatal mortality
 - Infant mortality
 - FUNCTIONAL DISORDERS
 - Developmental disabilities
 - Behavioural disorders
 - MALIGNANCIES

How substances reach the foetus



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Some Chemicals which cross the Placenta and reach the foetus (1)

- Organic solvents generally
- Benzene
- Carbon disulphide
- Some ethylene glycols
- Tetrachloroethylene (Perchloroethylene "Perc")
- Toluene
- Pesticides

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Some Chemicals which cross the Placenta and reach the foetus (2)

- Cadmium
- Lead
- Mercury (inorganic)
- Zinc
- PCBs (Polychlorinated biphenyls)
- Perchlorate
- Bisphenol A (BPA)

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Control Measures



- Avoid exposure by providing **alternative tasks** or **alternative employment**
- Substitute with less hazardous substances
- Segregate process or Isolate worker
- Limit time of exposure (e.g. job rotation)
- Provide adequate PPE
- Conduct personal air sampling
- Institute Biological Monitoring

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Controls & Reasonable Accommodations



- Allow for more frequent work breaks to use the SC
- Move workstation closer to the SC
- Provide a private rest area to lie down during breaks
- Allow access to a refrigerator to store food and drinks
- Modify policy to allow eating/drinking at workstation to increase caloric intake and keep hydrated
- Adjust lighting
- Reduce noise
- Reduce or eliminate physical exertion and workplace stress

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Controls & Reasonable Accommodations



- Limit walking around the workplace / worksite
- Provide a day shift
- Limit lifting, bending, reaching, pushing, and pulling
- Provide assistance moving objects or people
- Reduce weight to be lifted by separating items
- Provide compact lifting devices to lift, push, and pull items
- Provide a cart to move items
- Place frequently used tools and supplies at or near waist height

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Controls & Reasonable Accommodations



- Provide low task chairs for work that cannot be brought to waist height
- Temporarily reassign to light duty position or modify duties
- Schedule periodic rest breaks away from the workstation
- Provide anti-fatigue matting on the floor if standing
- Implement ergonomic workstation design
- Provide parking as close to the work-site as possible
- Designate a parking space

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Controls & Reasonable Accommodations

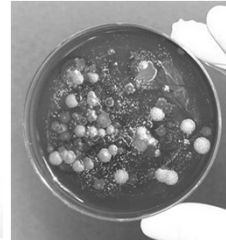
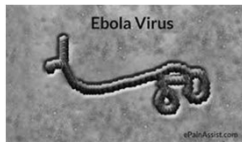


- Allow flexible schedule to access public transportation
- Provide a straight shift instead of rotating shifts
- Allow flexible schedule, reduced work schedule, flexible use of leave time
- Limit overtime
- Allow work from home

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Biological Agents



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Who are at Risk?

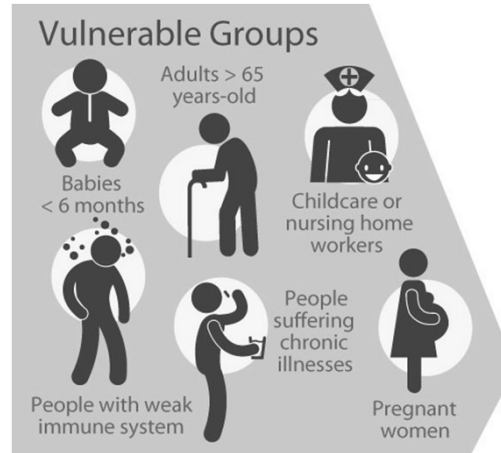


- Very young workers
- Old or Aging Employees
- Expectant mothers and Foetus
- New and Nursing mothers
- Persons with compromised immune systems

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Who are at Risk?



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Control Measures



- Should have a regular systematic approach to Workplace Hygiene
- Have period “deep cleaning” executed
- Provide information, instruction & training
- Encourage reporting and feedback
- Consider implementing a structured Sanitation & Disinfection Programme

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Noise (Physical Agent)



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Who are at Risk?



- Very young workers
- Old or Aging Employees
- Foetus (unborn child)



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Noise during Pregnancy

- Increased **noise** levels can cause stress. This can cause changes in a **pregnant** woman's body that can affect her developing baby.



Noise during Pregnancy

- **Sound** can travel through the body and reach your baby. Although this **sound** will be muffled in the womb, very loud **noises** may still be able to damage a baby's hearing.

Noise during Pregnancy

- There is evidence to suggest that noise exposure in excess of TWA **115 dBC** or a peak exposure of **155 dBC** to the abdomen of pregnant workers beyond the fifth month of pregnancy may cause hearing loss in the fetus.

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Control Measures

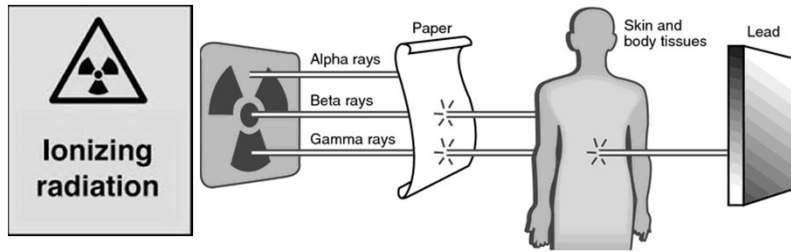


- Avoid excessive noise exposure (alternative tasks)
- Limit duration of noise exposure
- Conduct personal noise monitoring of employee using simultaneously BOTH the dBA and dBC scales

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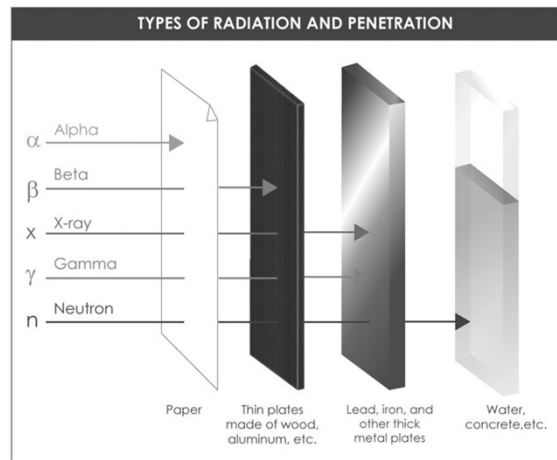
Ionising Radiation (Physical Agent)



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Ionising Radiation (Physical Agent)



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Who are at Risk?



- Very young workers
- Trainees & Inexperienced staff
- Old or Aging Employees
- Persons with MENTAL Disabilities
- Expectant mothers

Who are at Risk?



- Prenatal exposure to ionizing radiation may induce brain damage in fetuses following an acute dose exceeding 100 mSv between weeks 8-15 of pregnancy and 200 mSv between weeks 16-25 of pregnancy.

Control Measures



- Avoid exposure by providing **alternative tasks** or **alternative employment**
- Provide Shielding
- Segregate process or Isolate worker
- Limit time of exposure (e.g. job rotation)
- Provide adequate PPE
- Provide additional Awareness Training

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Control Measures



To reduce doses from intake of radioactive substances, the following basic countermeasures can be considered:

- preventing surface contamination;
- preventing inhalation of radioactive contaminants in air; and
- preventing ingestion of contaminated materials

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Principles of Control



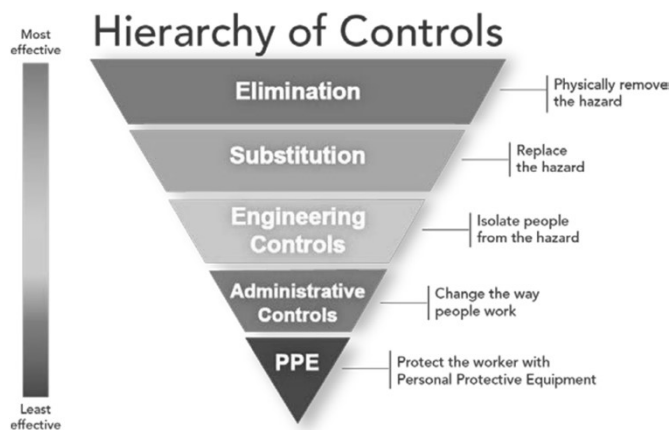
For the young and inexperienced, the following **ADDITIONAL** measures should be used:

- set clear learning objectives focused on skill development
- use a good balance between theory and practice
- use suitable teaching resources and methods
- implement a mentoring programme
- make OSH an integral part of induction training
- cover both 'female' and 'male' jobs
- maintain a high level of supervision

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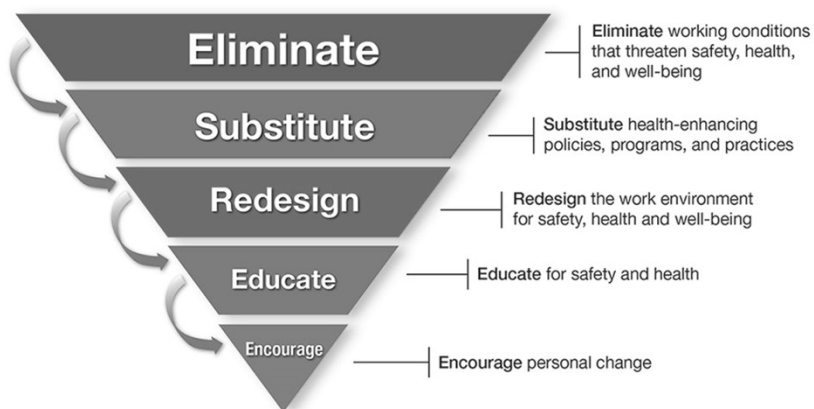
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Thank You.



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