Controlling health hazards

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NSW mining and extractives industry

A control either prevents the release of a hazard or mitigates the consequences of its release.

A control can prevent the release or transfer of energy at three points:

- → at the hazard source
- → along the transmission path, or
- → isolate the worker from the hazard.

Critical controls and material unwanted events (MUEs)

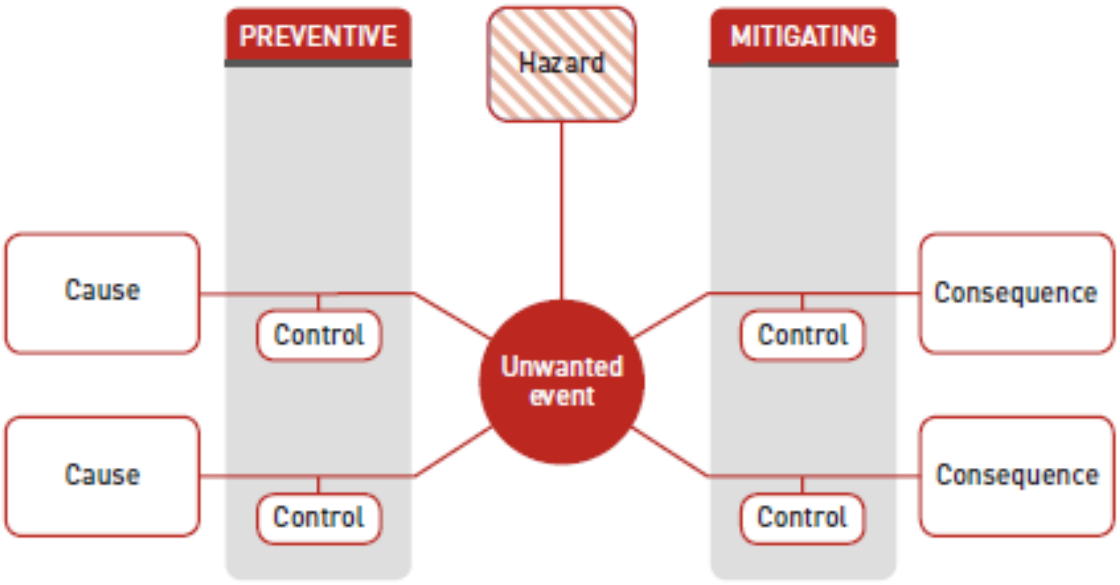
The term critical control refers to a control that is absolutely essential in preventing a material unwanted event. The term material unwanted event (MUE) describes a situation where the potential or real consequences exceeds a threshold defined by the company as warranting the highest level of attention. Material unwanted events (MUEs) are sometimes called initiating events.

Examples of a health hazards and MUEs are:

- → dust containing silica (hazard) and the liberation of silica dust into the work atmosphere above 'safe' exposure limits (MUE)
- → diesel exhaust emission (hazard) and the concentration of these emissions into the work environment above mandated limits (MUE)
- → loud noise (hazard) and at level and duration beyond safe exposure limits (MUE)
- → hazardous manual tasks (hazard) with one or more contributing risk factors (MUE)

Bowties are a useful way of organising controls, threats to them and the consequences of failure graphically. It clearly separates those control used preventatively and those used to mitigate the outcomes.

Example bow-tie structure



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The hierarchy of controls

The hierarchy of controls should be used when controlling health hazards. If you are unable to eliminate a hazard you are required to consider these in order:

- → **Substitution controls**: Changing the way something works can sometimes reduce the risks, e.g. electric drills which may emit less noise or vibration than pneumatic drills.
- → **Isolation controls:** These controls 'isolate' the worker/s from the hazard, either by distance or barriers. Sometimes the hazard itself is enclosed, so as to be effectively 'isolated' from anyone in the vicinity, e.g. fully enclosed and pressurised cabins on plant and vehicles can isolate workers from risk from airborne contaminants[1].
- → **Engineering controls:** Vacuum systems or ducted venting can reduce risks associated with dusts or chemicals. Pallet lifters, suction devices can reduce hazardous manual task risks associated with moving product or equipment around[2].
- → **Administrative controls:** Procedures and training are not considered to be controls under the definition above. The act of a person is the control as the action as it is the action that prevents the release of energy or mitigates the consequences. Procedures and training support actions by providing clear guidance, instructions and understanding. For example, warning signs can alert people to a high noise area but the control is workers' action - either staying outside the area or using hearing protection.
- → **Personal protective devices (PPE):** These protection (not prevention) devices come in many forms. Dust or gas masks, earplugs or muffs, fall protection devices (like safety harnesses), protective eyewear, gloves and clothing (including Hi Vis). These are the last line of defence. If used properly, these devices can provide valuable reductions in health risks.

Which control is right for my risk?

Personal protective equipment will often form part of the control strategy. In circumstances where the risks are high (fatal consequences) higher order controls should form part of the strategy.

Choose the most reliable and effective control available. This usually means selecting and implementing a prevention control over, or in conjunction with a protection control (or several).

Control the highest risks first, such as respirable dust not just inhalable dust.

Test or monitor the effectiveness of controls to ensure that are fully implemented and continue to operate as expected.

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[1] Engineering control means a control measure that is physical in nature, including a mechanical device or process.

[2] In some cases, engineering and isolation controls will essentially fall into one category. Both are likely to be design 'engineered' and so are technically an engineering control. The difference may simply be at which point does the control act on the hazard? Does it act at the source of the hazard (preferred) or does it act on the path of transmission (sometimes the 'next best' option)?

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Monitoring the effectiveness of controls

Even the 'most effective' controls might become 'less effective' over time. It is important to ensure that chosen controls are maintained and monitored for their continued effectiveness. Equipment may deteriorate over time e.g. clogged dust masks, cracks in a pressurised vehicle cabin etc. This could involve:

- → pressure testing of sealed cabins
- → fit testing of PPE
- → fixed position monitoring to identify levels of airborne contaminants
- → personal exposure monitoring to detect exposure levels of workers
- → visual inspection of control devices to ensure they function properly (pre-start and during maintenance)
- → worker surveys to detect not easily identified effects of hazards on workers (e.g. in determining sleep patterns impacting fatigue)
- → incident data in for identified similar exposure groups (SEGs) - this can be compared to company or industry data (if available).

Ineffective controls should be identified early and improved. Personal exposure monitoring provides timely information about hazard levels and can be an indication of control effectiveness.

Health monitoring is not a control measure and should not be used as a means of determining the effectiveness of controls due to the time between exposure and disease onset[3], however it could be utilised as a lag indicator for effectives of controls.

Managing controls

To ensure controls are fully implemented and effective requires ongoing monitoring and management review. The risk control plan should allocate responsibilities to ensure activities which form part of the health risk management process are carried out.

In small sites one person might have control of the entire process. However, if this is the case, then another person should be tasked (and have responsibility) to review the process is being done.

Normally several people would be tasked with responsibilities. An operations manager might review monitoring results and ask questions to ensure that things are being done as planned.

A maintenance manager might review work orders for example on diesel engine maintenance to ensure engines and filters are maintained.

A compliance officer would keep up to date on the latest changes that might affect the current control strategy and then report this up the line to management.

3 Health monitoring is required by legislation for particular health hazards such as coal and silica dusts and diesel exhaust emissions. Other chemical exposures requiring health monitoring are listed in Schedule 14 of the Work Health and Safety Regulation 2017.

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