

# MACHINERY SAFETY WEBINAR SERIES

Module 6: Common types of machinery controls.



## Welcome and background

- Presenter: Brent Sutton

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# Module Overview

Building your knowledge and understanding in managing the risk of machinery across 9 key areas including;

1. Trends and duty holder responsibilities
2. AS/NZS4024 standards in managing machinery risk
3. How machine risk is reduced
4. Understanding physical risks of machinery
5. Understanding common health risks of machinery
6. Common types of machinery risk controls
7. Undertaking a meaningful risk assessment with workers
8. Common safe systems of work and lock out-tag out

# Module 6

In this module we will explore:

1. Safe guards and Safeguarding and the relationship to the hierarchy of controls
2. Common Safe Guards
3. Choosing the right guard
4. Common Safeguarding
5. Management of gaps and danger zones



# New Zealand Standards



**AS/NZS 4024.1601:2014**

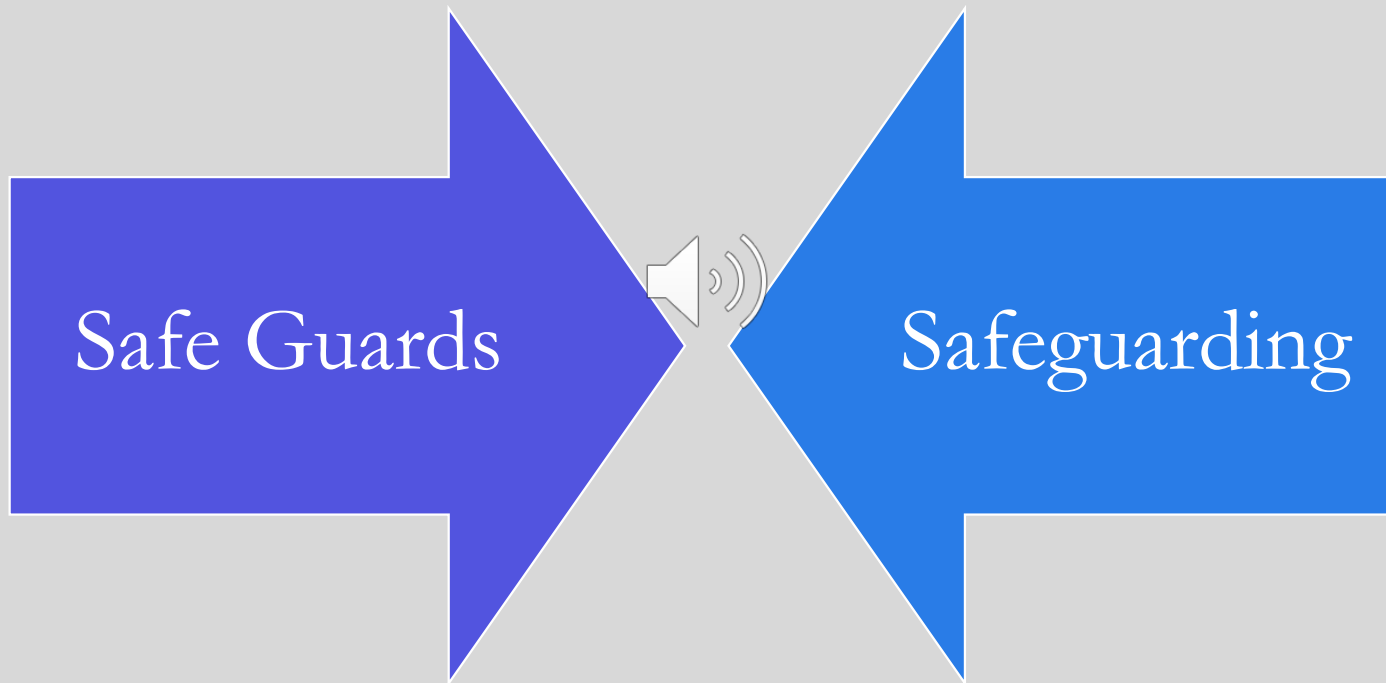
(EN 953:1997 inc A1:2009, IDT)

Australian/New Zealand Standard

## **Safety of machinery**

**Part 1601: Design of controls, interlocks and guarding—Guards—General requirements for the design and construction of fixed and movable guards**

# Common Controls



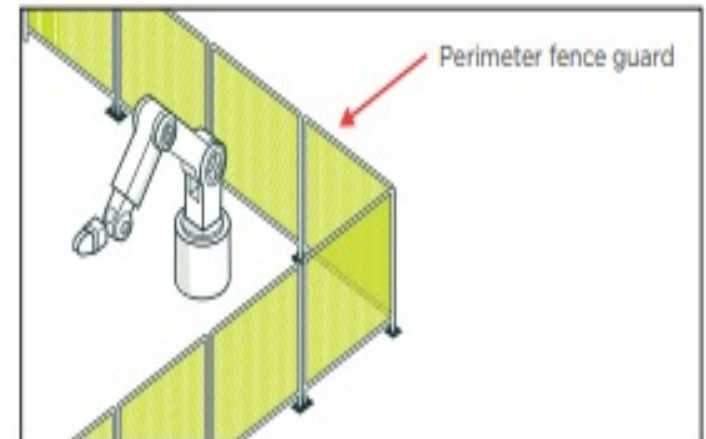
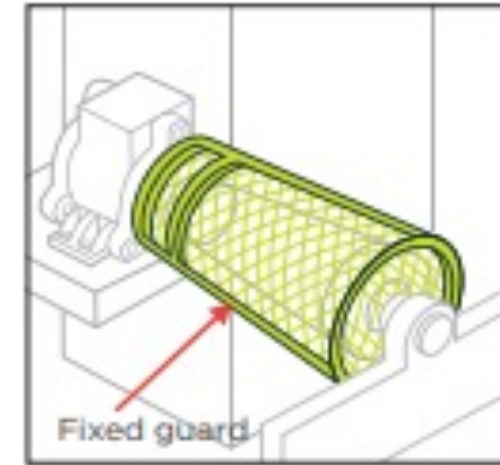
# Hierarchy of Controls

|  | HIERARCHY OF CONTROLS | GROUP CONTROLS   | INDIVIDUAL CONTROLS   |
|--|-----------------------|--|---|
|  | <b>ELIMINATE</b>      | <ul style="list-style-type: none"> <li>&gt; Design or modify machine to eliminate the hazard</li> <li>&gt; Eliminate by substitution</li> <li>&gt; Eliminate human interaction (eg automate handling)</li> <li>&gt; Eliminate pinch points</li> <li>&gt; Increase clearances or remove forces</li> </ul> |   |
|  | <b>ISOLATE</b>        | <ul style="list-style-type: none"> <li>&gt; Fixed guard</li> <li>&gt; Interlock guard</li> <li>&gt; Interlock distance bars</li> <li>&gt; Failsafe interlocking</li> </ul>   | <ul style="list-style-type: none"> <li>&gt; Safe by position</li> </ul>                               |
|  | <b>MINIMISE</b>       | <ul style="list-style-type: none"> <li>&gt; Presence sensing devices</li> <li>&gt; Light curtains</li> <li>&gt; Computer warnings</li> <li>&gt; Light beacons and strobe lights</li> <li>&gt; Lock-out systems</li> </ul>  | <ul style="list-style-type: none"> <li>&gt; Two-hand controls</li> <li>&gt; Emergency stop</li> </ul> |
|  | <b>MINIMISE</b>       | <ul style="list-style-type: none"> <li>&gt; Safe system of work</li> <li>&gt; Signage</li> <li>&gt; Training</li> <li>&gt; Supervision</li> <li>&gt; Safe operating procedures and instructions</li> <li>&gt; Administrative controls (eg safety inspections)</li> </ul>                                 | <ul style="list-style-type: none"> <li>&gt; Personal protective equipment</li> </ul>                  |

# Common Guarding Types

## Fixed and Distance Guards


Fixed guards and Distance guards are physical barriers that keep people out of dangerous areas during normal use, maintenance or cleaning.

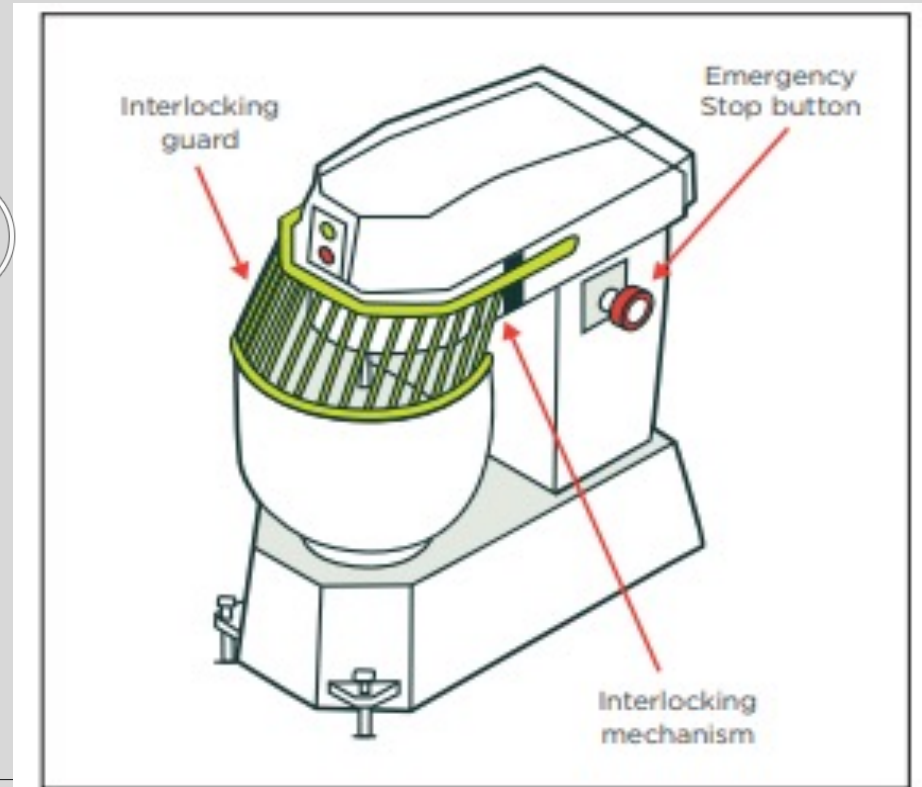




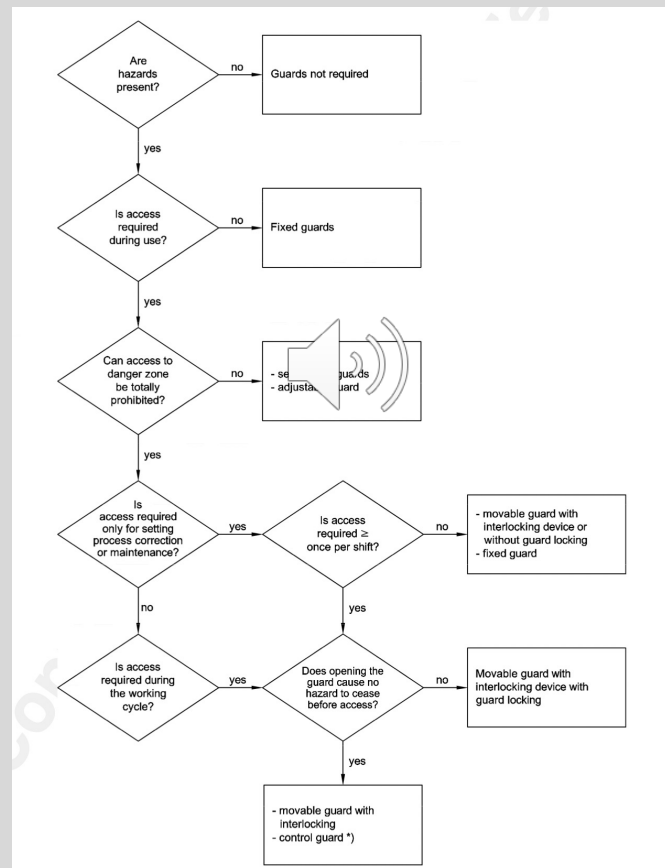
# Common Guarding Types

## Removal, Adjustable and Movable Guards with secondary Safeguarding device

Interlocked guards work by cutting power to the machine when the guard is opened. They are a good guard to use when a machine needs to be accessed often. 



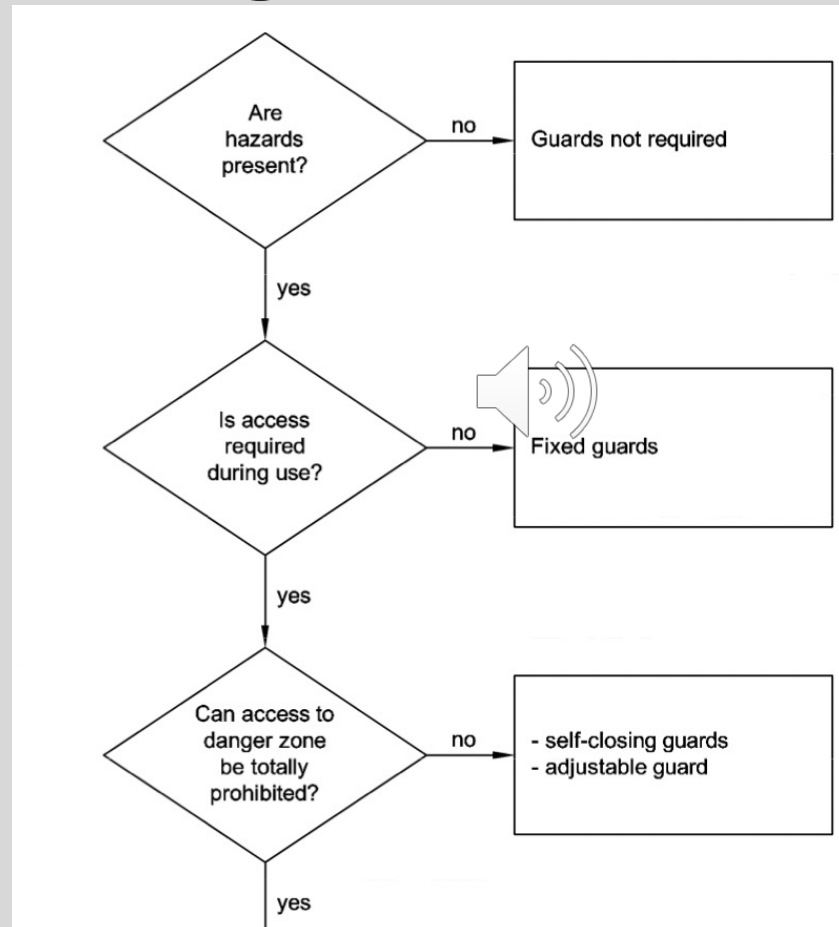
# Choosing the Right Guard



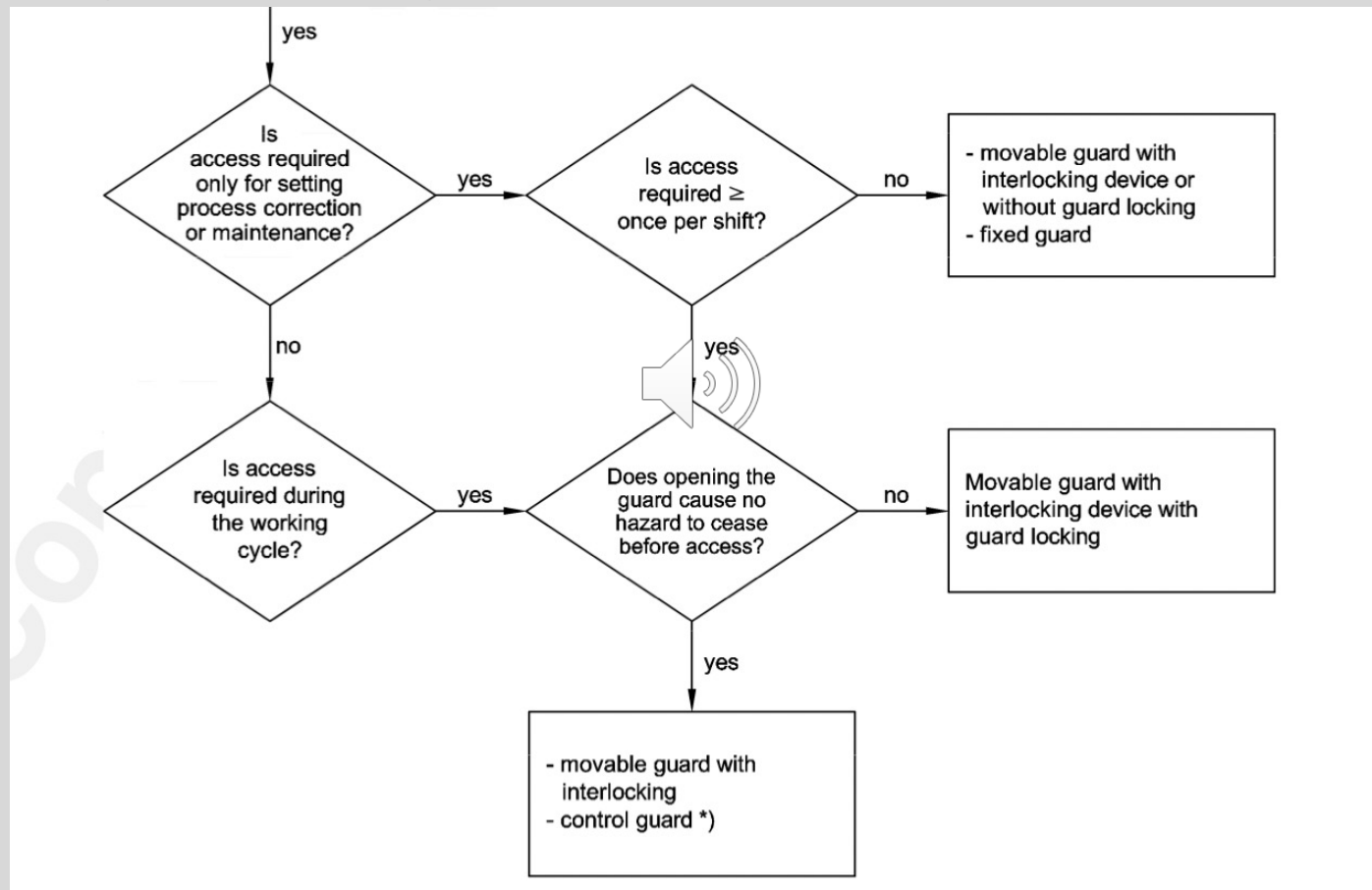
AS/NZS 4024.1601:2014 Annex A

Guidelines to assist in the selection of guards against hazards generated by moving parts.

# Choosing the Right Guard

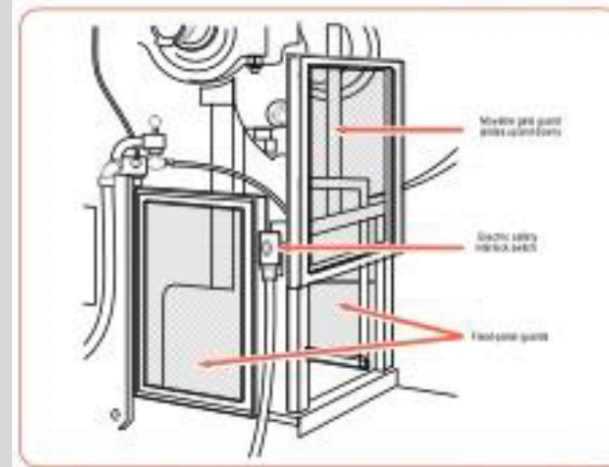
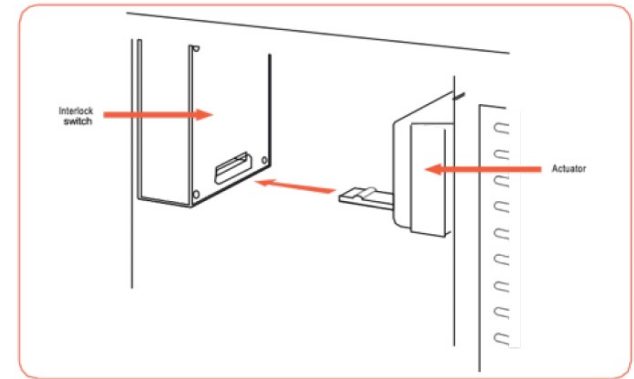


# Choosing the Right Guard



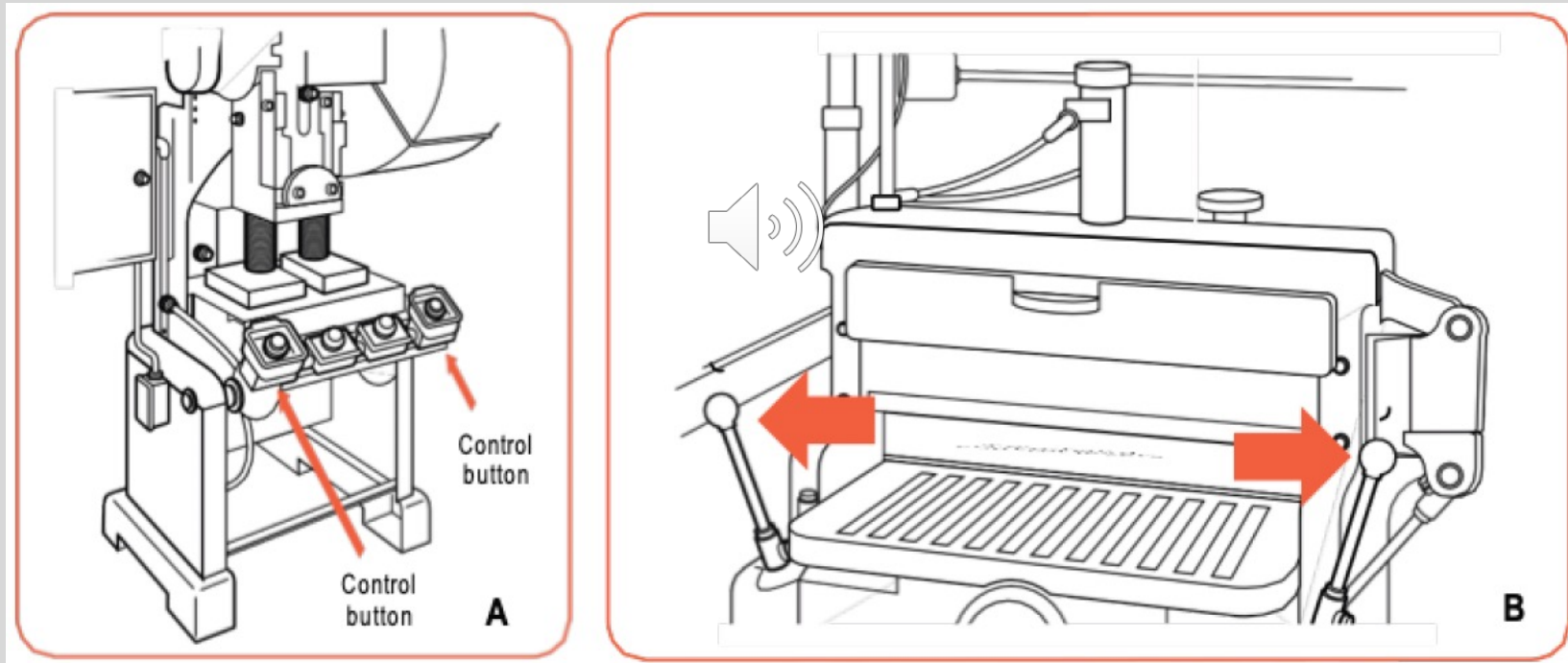
# Common Safe Guarding

## Interlocks



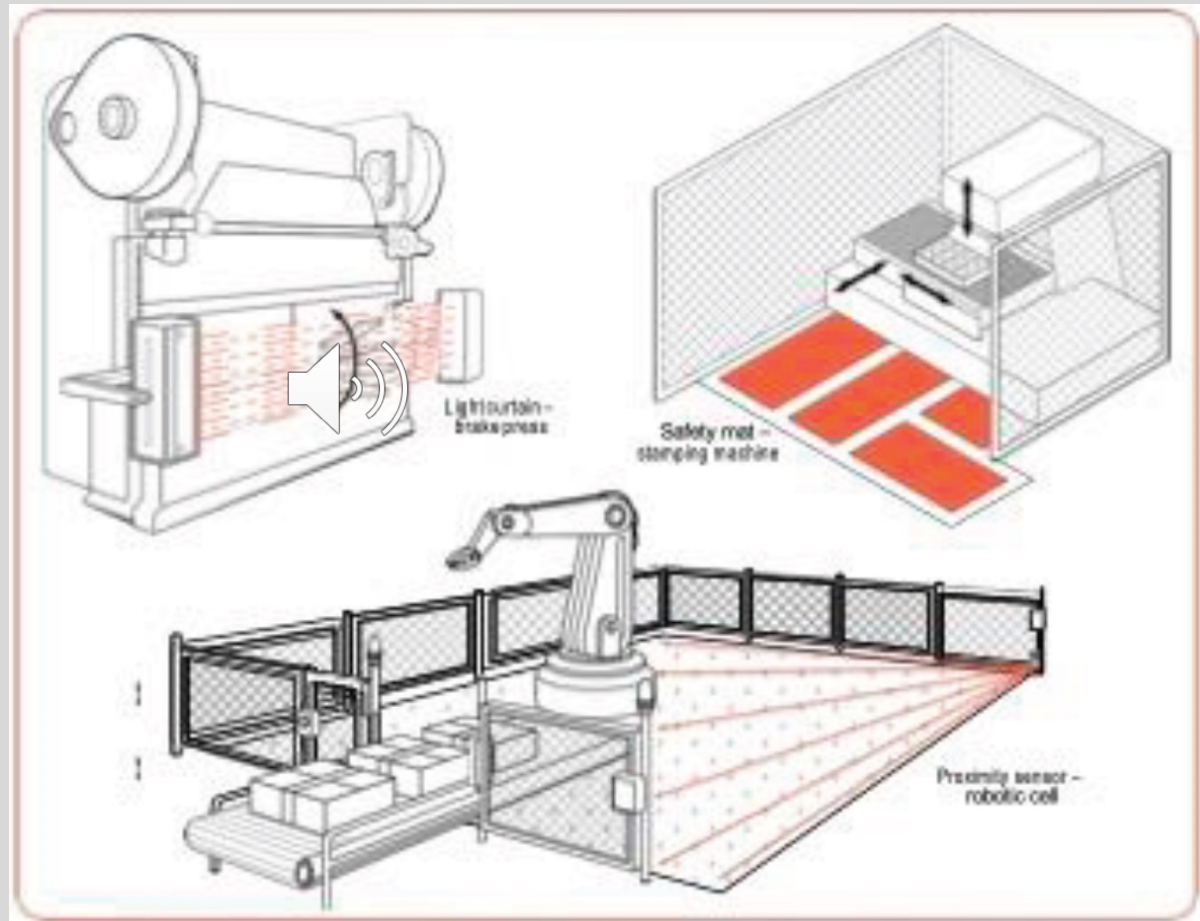
# Common Safe Guarding

## Two-hand controls/Hold-Run controls



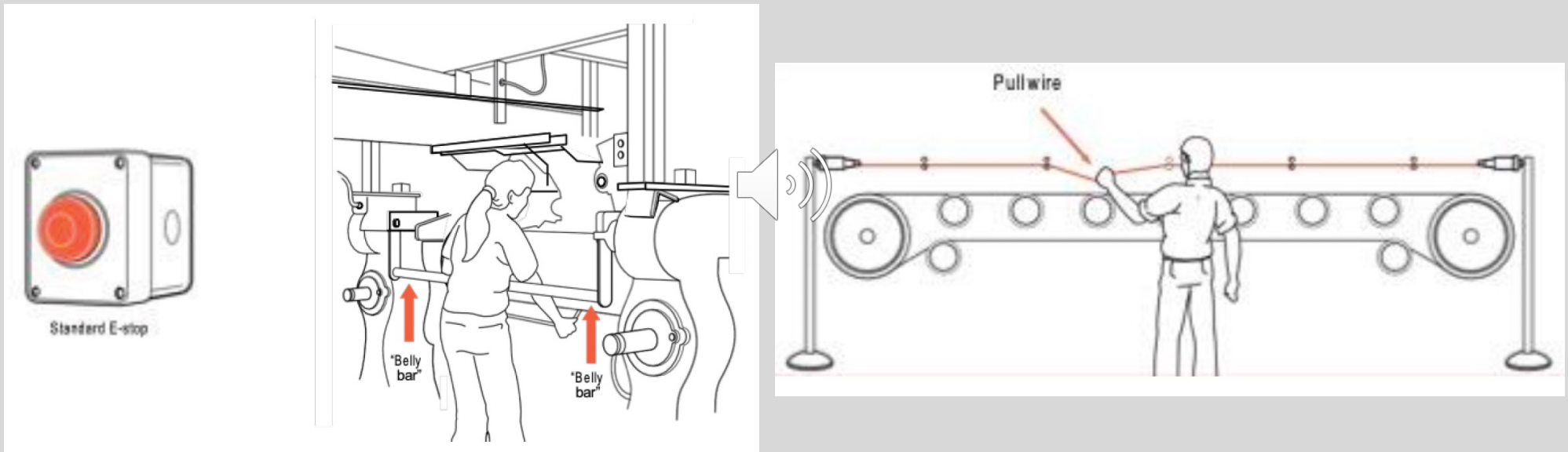
# Common Safe Guarding

## Presence Sensing Devices



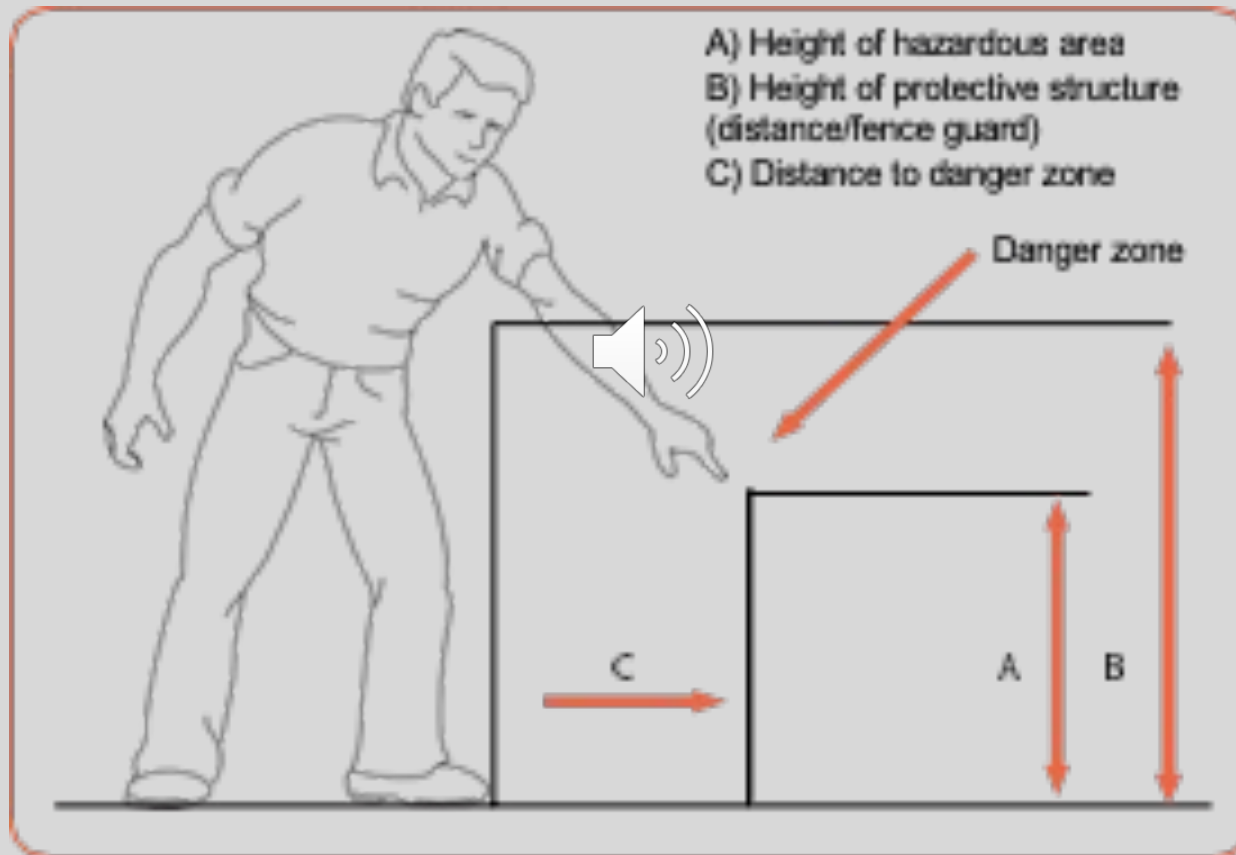
# Common Safe Guarding

## Emergency Stop






# Management of Gaps and Danger Zones

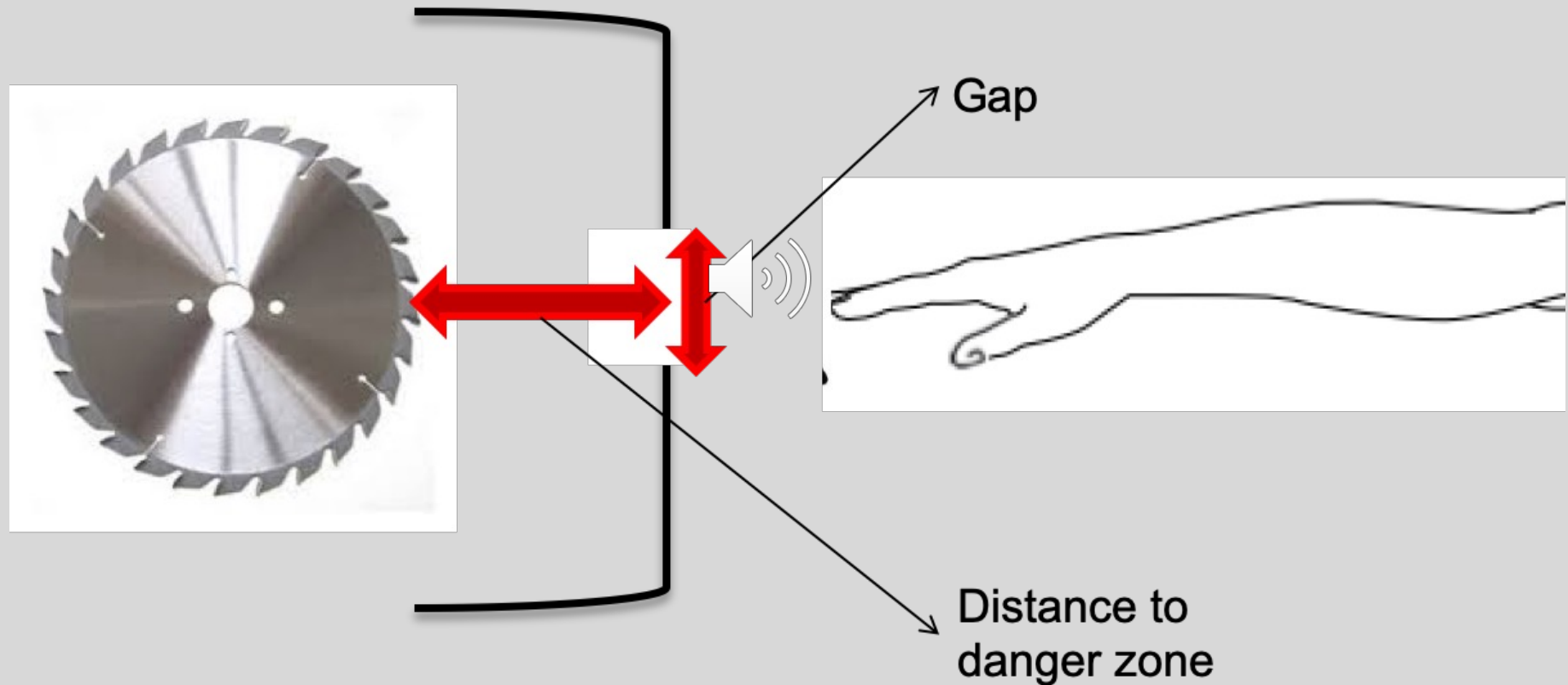


# Management of Gaps and Danger Zones

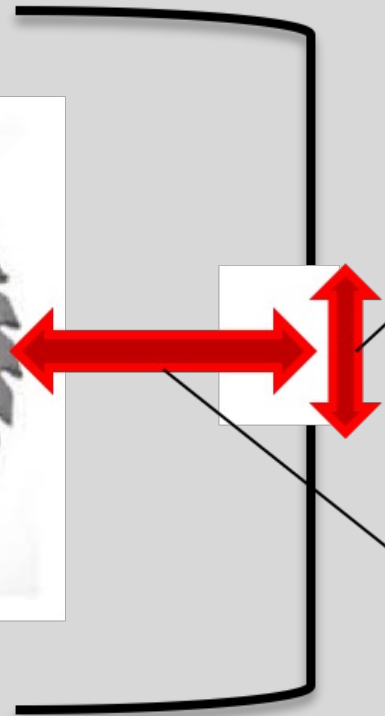
AS/NZS 4024 has a series of standards to determine gap and reach. Those standards are:

- ✔ AS/NZS 4024.1701: 2014 Safety of machinery Part 1701: Human body measurements-Basic human body measurements for technology design
- ✔ AS/NZS 4024.1702: 2014 Safety of machinery Part 1702: Human body measurements-Principles for determining the dimensions required for openings for whole body access into machine 
- ✔ AS/NZS 4024.1703: 2014 Safety of machinery Part 1703: Human body measurements-Principles for determining the dimensions required for access openings
- ✔ AS/NZS 4024.1704: 2014 Safety of machinery Part 1704: Human body measurements-Anthropometric data
- ✔ AS/NZS 4024.1801: 2014 Safety of machinery Part 1801: Safety distances to prevent danger zones being reached by upper and lower limbs
- ✔ AS/NZS 4024.1803: 2014 Safety of machinery Part 1803: Safety distances and safety gaps-Minimum gaps to prevent crushing of parts of the human body

# Management of Gaps and Danger Zones



# Management of Gaps and Danger Zones

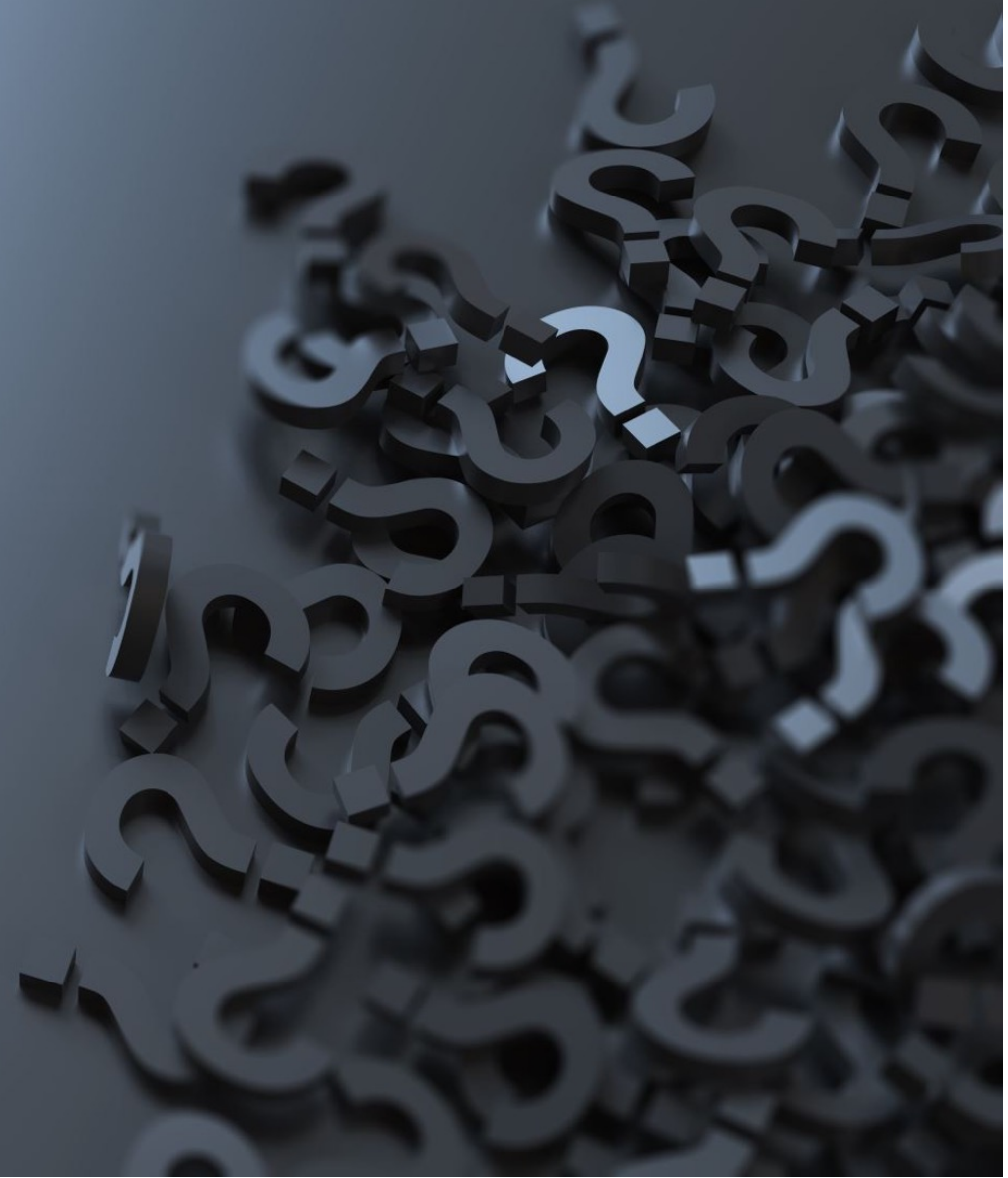


| Part of body that can enter | Gap (maximum size of any aperture or opening) | Minimum separation distance from danger zone |
|-----------------------------|---|--|
| Fingertip/Toe Tip           | 4mm   | 2mm  |
| Finger/Toe                  | 6mm   | 20mm Finger/25mm Toe                         |
| Hand                        | 20mm  | 120mm  |
| Foot                        | 35mm  | 180mm  |
| Leg (up to knee/crotch)     | 80mm  | 1100mm                                       |
| Arm (bent at wrist)         | 120mm   | 230mm  |
| Arm (bent at elbow)         | 120mm   | 550mm  |
| Arm (whole length)          | 120mm   | 850mm  |
| Arm (reaching above head)   |   | 2,700mm                                      |
| Whole body to enter         | 180mm   |  |

## Next Module (7)

Undertaking a meaningful risk assessment.

QUESTIONS?





THANK YOU FOR YOUR  
ATTENDANCE