DALHOUSIE UNIVERSITY
Inspiring Minds

Hierarchy of Implementation

Elimination	Always try to eliminate hazards through design.				
Engineered Safeguards	Engineered safeguards are used to provide a level of protection equivalent to lockout to prevent the unexpected energization of equipment being serviced. The following are examples of engineering safeguards:				
	Individual personal controls - Locks, pendants, locking guards, as well as location and proximity to control devices.	**Light curtains and single opto-electronic beams -** Create a sensing plane. When object interrupts beam signal is sent to controls.	**Area scanners -** Detect objects or persons entering sensing field or hazardous area.	**Guards -** Fixed or moveable; fixed guards need tools for removal, moveable guards should be interlocked.	**Stop devices:** Usually push buttons, cables or position or edge sensors that activate a switch.
	Pressure mats - Detects presence of person or object. A signal is sent to controls when pressure is applied to mat.	**Control system integrity -** Authorized employees identify involved tasks, hazards, potential severity of injury and exposure and shall have personal control over the means for maintaining the control system in a protective mode.	**Safety-rated switches -** Tamper-resistant and mechanically actuated devices with positively driven multiple contacts.	**Hold-to-run devices -** A device providing individual protection through the application of direct pressure to one or more buttons or switches by one or both hands.	**Trapped key devices:** Mechanically attached to power circuits, switches, valves and access points and require a predetermined sequence of actions.
Warning and Alerting Techniques	Warning and alerting techniques are implemented where engineered safeguards alone do not provide an effective level of protection or when their use would be beneficial to risk control. The following are examples of warning and alerting techniques:				
	An attendant – used in addition to other control methods to warn exposed personnel of problems or monitor effectiveness of safeguards.	**Automated warning systems –** Automated audible and/or visual devices are used to warn personnel of hazards.	**Barricades –** Can be used with warning signs, placards and tags to prevent access to hazardous areas.	**Warning signs, placards and tags –** Used to warn personnel of hazards.	
Administrative Controls	When a risk assessment indicates their use would be beneficial or engineered safeguards, warning and/or alerting techniques do not provide an effective level of protection, administrative controls are implemented to assist with risk control. The following are to be considered when safe work practices and procedures are being developed:				
	Safe work procedures – Development of practices or procedures with hazard information. (considering using manufacturer's specifications for development assistance)	**Apparel, jewellery and hair -** In electrical contact areas all exposed conductive articles of jewellery and clothing shall not be allowed to be worn, including metalized aprons, cloth with conductive thread and metal headgear. Unsecured long hair that presents a hazard and must not be allowed.	**Illumination -** Allow for sufficient illumination for task to be performed safely.	**Preparation for work -** Before starting work, authorized employees, will review all hazards, documented practices and documented control measures.	**Training -** Training on the use of other control methods to be conducted.
Personal Protective Equipment	When a risk assessment indicates their use would be beneficial or engineered safeguards, warning and alerting techniques, safe work procedures and practices, or combinations thereof do not provide an effective level of protection, authorized employees are to be protected by appropriate personal protective equipment.				