# Training Note: Machine Safeguarding Solutions

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<td><strong>Guards:</strong> protective physical barrier used to prevent access.</td>
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| Fixed Guard | Provides a fixed barrier to the hazard | • Low maintenance  
• Long life  
• Low cost for small areas  
• Protects all individuals  
• Can contain ejected materials | • Poor ergonomics  
• Limited visibility  
• Limited access  
• Costly for large areas  
• Maintenance may require removal of guard | • Protect from identified hazard  
• User should not be able to reach over, under, around or through the barrier  
• Provide safe openings | • ANSI B11.19  
• ISO 14120  
• ISO 13852  
• ISO 13853  
• ASME B15.1 |
| Interlocked Guard | Interrupts power to machine when guard is opened | • Low initial investment  
• Can be placed close to hazard  
• Protects all individuals  
• Can contain ejected materials | • Costly for large areas  
• Increased maintenance | • Must not be easy to defeat  
• Guard may open only after machine has stopped or must be installed at a safe distance | • ANSI B11.19  
• NFPA 79  
• ISO 14119  
• IEC 60204-1 |

| **Safeguarding Devices:** components, attachments or mechanisms designed to perform a specific safeguarding function. | | |
| Safety Light Screen | Arrests power to machine when sensing field is interrupted | • Excellent ergonomics  
• Allows frequent access  
• Protects all individuals  
• Cost effective for large areas  
• Allows for good visibility | • Limited to machines that can be stopped quickly  
• No protection from ejected parts  
• May require the use of additional guards  
• May create a pass-through hazard | • Initiate immediate stop when sensing field is interrupted  
• Appropriate resolution required to detect objects the size of a torso, ankle, hand or finger | • ANSI B11.19  
• IEC 61496  
• ISO 13855 |
| Multiple-Beam System:  
• Grids  
• Points | Arrests power to machine when sensing field is interrupted | • Low initial investment  
• Allows frequent access  
• Allows for good visibility  
• Protects all individuals  
• Operator’s hands are away from hazardous area  
• Low initial investment  
• Low maintenance | • Limited to machines that can be stopped quickly  
• No protection from ejected parts  
• Large safety distance  
• May create a pass-through hazard | • Initiate immediate stop when sensing field is interrupted  
• Appropriate resolution required to detect objects the size of a torso | • ANSI B11.19  
• IEC 61496  
• ISO 13855 |
| Two-Hand Control | Operator must use both hands to actuate machine motion thereby preventing operator access to hazardous area | • Operator’s hands are away from hazardous area  
• Low initial investment  
• Low maintenance | • Potential ergonomic impact  
• Provides protection only for operator  
• No protection from ejected parts | • Concurrent actuation  
• Release and reactivation required before machine motion may be reinitiated | • ANSI B11.19  
• NFPA 79  
• ISO 13855  
• ISO 13856  
• IEC 60204-1 |
| Safety Mat Monitor | Interrupts power to machine when a minimum pressure is applied | • Excellent ergonomics  
• Protects all individuals  
• Allows for good visibility | • Costly for large areas  
• Maintenance intensive  
• Large safety distance | Minimum object sensitivity of 66 lbs on and 3-1/8" surface to detect a foot | • ANSI B11.19  
• ISO 13855  
• ISO 13856 |

| **Complementary Safety Devices:** used to supplement a primary safeguard. | | |
| E-Stop  
• Button  
• Rope-Pull | Operator activates button in emergency situation to shut off power to machine | • Immediate response  
• Safe shutdown of machine process  
• Not considered a safeguard  
• Requires conscious act of operator  
• Limits injury or machine damage but typically does not prevent it | • Overrides all other functions and operations  
• Reset of E-stop doesn’t initiate machine motion  
• Button must be red with yellow background  
• Should be located at each operation station  
• Final removal of power done by electromechanical components | | • ANSI B11.19  
• NFPA 79  
• ISO 12100  
• IEC 60204-1  
• ISO 13850 |

*Partial list