

Query	With Reranker	Without Reranker	Verdict
<p>1.Give RIA's Standards Definitions</p> <p>[pdf: 12-Franklin--RIA-IEEE_2019-05-19_v2.pdf,page: 13-17]</p>	<p>RIA's Standards Definitions are based on English language/natural language consensus definitions. They generally follow ISO10218 and ISO8373, where applicable. Specifically:</p> <p><i>RIA's Standards definitions are adopted from ISO10218 and ISO8373.</i></p> <p>RIA participated in the development of natural language definitions in ISO10218 by consensus among group members, which then fed into the first version of ISO8373.</p> <p>RIA's definitions for specific terms are as follows:</p> <p><i>Automated robot: Not used; all robots are considered "automated" in RIA's general usage.</i></p> <p>Teleoperated robot: Not used; related terms are "teleoperation" (ISO8373) and "manual mode" (ISO10218).</p> <p><i>Environment: Not used; related term is "normal operating conditions" (ISO8373).</i></p> <p>Robot: Defined through consensus among group</p>	<p>RIA's Standards Definitions are based on English language/natural language consensus definitions. They generally follow R15.06/10218 and ISO8373 where applicable. Specifically, RIA's Standards definitions are:</p> <p><i>Adopted from ISO10218 and ISO8373</i></p> <p>Developed through consensus among group members, which then fed into the first version of ISO8373</p> <p><i>Consult ISO8373:2012, Robots and Robotic Devices - Vocabulary</i></p> <p>Consult ISO10218-1,2:2011, Robots and Robotic Devices - Industrial robots and robot systems – Safety requirements</p> <p>RIA also actively participates in IFR's vocabulary efforts for the broader industry.</p> <p>The definitions include terms such as:</p> <ul style="list-style-type: none"> - Automated robot: Not used by RIA; in general usage, all robots are "automated"; autonomy is a key part of the conception of a "robot" - Teleoperated robot: Not used by RIA; the closest related terms are 	<p>Both Answers are accurate, but with reranker the response is more descriptive and have better context to pages.</p>

	<p>members and ISO standards.</p> <p>RIA actively participates in IFR's vocabulary efforts and consults ISO standards, including:</p> <p><i>ISO8373:2012, Robots and Robotic Devices - Vocabulary</i></p> <p>ISO10218-1,2:2011, Robots and Robotic Devices - Industrial robots and robot systems – Safety requirements</p> <p>Thanks for asking!</p> <p>PDF Title: SICK â€™ Guide for Safe Machinery: Six Steps to a Safe Machine</p> <p>PDF Source: https://www.sick.com/media/docs/8/78/678/special_information_guide_for_safe_machinery_en_im0014678.pdf Page: 13, 15, 17</p>	<p>"teleoperation" (8373) and "manual mode" (10218)</p> <p>- Environment: Not used by RIA; the closest related term is "normal operating conditions" (8373)</p> <p>Thanks for asking!</p> <p>PDF Title: SICK â€™ Guide for Safe Machinery: Six Steps to a Safe Machine</p> <p>PDF Source: https://www.sick.com/media/docs/8/78/678/special_information_guide_for_safe_machinery_en_im0014678.pdf Page: 13, 15, 17</p>	
<p>2.Give Steps to meet Machinery Directive requirements</p> <p>[pdf: EN_TechnicalguideNo10_REVF.pdf,page:19]</p>	<p>The steps to meet Machinery Directive requirements are:</p> <p>1. Management of functional safety: This step involves managing the functional safety of a machine to ensure that it meets the required safety standards.</p>	<p>To meet the Machinery Directive requirements, the following nine steps can be followed:</p> <p>1. Step 1-8 are not mentioned in the context, however</p> <p>Step 9: Proving compliance: Before a machine can be placed on the market, the manufacturer must ensure</p>	<p>Here, without reranker the response is fails to describe the steps.</p>

	<p>2. Risk assessment: This step involves identifying potential hazards and assessing the risks associated with a machine.</p> <p>3. Risk reduction: This step involves reducing or eliminating the risks identified in the risk assessment step.</p> <p>4. Establishing safety requirements: This step involves defining the safety requirements for a machine based on the risk assessment and risk reduction steps.</p> <p>5. Implementing a functional safety system: This step involves designing and implementing a functional safety system that meets the safety requirements.</p> <p>6. Verifying a functional safety system: This step involves verifying that the functional safety system meets the defined safety requirements.</p> <p>7. Validating a functional safety system: This step involves validating that the functional safety system actually succeeds in reducing risks as specified.</p>	<p>that the machine is implemented in conformance with harmonized standards.</p> <p>To prove the conformance with the Machinery Directive, it must be shown that:</p> <p><i>Machinery fulfills the relevant Essential Health and Safety Requirements (EHSR) defined in the Machinery Directive.</i></p> <p>Machinery fulfills the requirements of other possible Directives related to it.</p> <p><i>Conformity with these requirements can be ensured by following the relevant harmonized standards.</i></p> <p>The technical file is up-to-date and available. The technical file demonstrates that the machine is in accordance with the regulations presented in the Machinery Directive.</p> <p>Additionally, the following requirements must be met:</p> <p><i>Conformity assessment procedures have been applied.</i></p> <p>Special requirements for machines listed in the Machinery Directive's Annex IV are met, where appropriate.</p> <p>* The EC declaration of conformity has been</p>	
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8. Documenting a functional safety system:

This step involves documenting the design and producing user-documentation for the functional safety system.

9. Providing compliance:

This step involves proving the machine's compliance with Essential Health and Safety Requirements (EHSR) of the Machinery Directive through compliance assessments and technical file.

Additionally, to prove compliance, the following must be shown:

The machinery fulfills the relevant Essential Health and Safety Requirements (EHSR) defined in the Machinery Directive.

The machinery fulfills the requirements of other Directives related to it. Conformity with these requirements can be ensured by following the relevant harmonized standards.

The technical file is up-to-date and available.

Conformity assessment procedures have been applied.

produced and is delivered with the machine.

Once conformity has been established, a CE marking is affixed. Machinery that carries CE markings and is accompanied by an EC declaration of conformity is presumed to comply with the requirements of the Machinery Directive.

Thanks for asking!

PDF Title: IFA "Functional safety of machine controls (Application of EN ISO13849), IFA Report2/2017e

PDF Source:

<https://www.dguv.de/medien/ifa/en/pub/rep/pdf/reports-2019/report0217e/rep0217e.pdf>

Page: 19, 37

	<p>The EC declaration of conformity has been produced and is delivered with the machine.</p> <p>Thanks for asking!</p> <p>PDF Title: IFA â€” Functional safety of machine controls (Application of EN ISO13849), IFA Report2/2017e PDF Source: https://www.dguv.de/medi en/ifa/en/pub/rep/pdf/repo rts-2019/report0217e/rep0217 e.pdf Pages: 19, 37, 5, 8, 18</p>		
<p>3. Give Substantial modifications on explanation of Article 3 (16)</p> <p>[pdf: oem-sp123_-en-p.pdf, page:9]</p>	<p>Substantial modifications, as explained in Article 3 (16), refer to changes made to machinery after it has been placed on the market or put into service. These modifications can be physical or digital (hardware or software) and are considered substantial if they:</p> <p><i>Were not foreseen by the manufacturer</i> Affect the safety of the product by: + Creating a new hazard + Increasing an existing risk</p>	<p>Substantial modifications, as explained in Article 3 (16) of the Machinery Regulation (EU) 2023/1230, refer to changes made to machinery after it has been placed on the market or put into service. These modifications can be made through physical or digital means, such as hardware or software changes.</p> <p>To be considered substantial, the modification must:</p> <ol style="list-style-type: none"> 1. Not be foreseen by the manufacturer 2. Affect the safety of the product 	<p>Here, the responses from both are similar. But the reranker one have better citation.</p>

	<p>In such cases, significant new protective measures are required. The person carrying out the substantial modification is required to perform a new conformity assessment before:</p> <p><i>Placing the modified product on the market</i> Putting it into service</p> <p>This conformity assessment can be restricted to the part of the production line that has been modified, and does not necessarily need to be completed for the whole assembly.</p> <p>Thanks for asking!</p> <p>PDF Title: Rockwell â€™ A Guide to the Machinery Regulation (EU)2023/1230 PDF Source: https://literature.rockwellautomation.com/idc/groups/literature/documents/sp/oe-m-sp123_-en-p.pdf Page: 9</p>	<p>3. Create a new hazard or increase an existing risk</p> <p>When a substantial modification is made, the person carrying out the modification is required to perform a new conformity assessment before placing the modified product on the market or putting it into service. This conformity assessment can be restricted to the part of the production line that has been modified, rather than requiring a full assessment of the entire assembly.</p> <p>The substantial modification is considered significant when new protective measures are required to mitigate the new hazard or increased risk.</p> <p>Thanks for asking!</p> <p>PDF Title: Various PDF Source: Not Available Page: Various</p>	
<p>4. what are the Two new standards in safety and functional safety</p> <p>[pdf: Safety and functional</p>	<p>The two new standards in safety and functional safety are:</p> <p>1. EN ISO13849-1: Safety of machinery – Safety-related parts of control system – General Principles for design</p>	<p>The two new standards in safety and functional safety are:</p> <p>1. EN ISO 13849-1: Safety of machinery – Safety-related parts of control system – General Principles for design</p>	<p>Here the response are exactly similar, because the query was too simple.</p>

<p>safety, A general guide.pdf,page: 9]</p>	<p>2. EN62061: Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems</p> <p>These standards replace the old standard EN954-1, which became obsolete on December 31, 2011, after a 3+2-year allowable transition period.</p> <p>Thanks for asking!</p> <p>PDF Title: ABB brochure 1SFC001008B0201 PDF Source: https://www.ABB.com Page: 6</p>	<p>2. EN 62061: Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems</p> <p>These standards replace the old standard EN 954-1, which became obsolete on December 31, 2011, after a 3+2-year allowable transition period.</p> <p>Thanks for asking!</p> <p>PDF Title: ABB brochure 1SFC001008B0201 PDF Source: Page: 6</p>	
<p>5. what are the Methods of Safegaurding?</p> <p>[pdf: Safety Committee Handout 1 Machine Guarding.pdf, page: 2]</p>	<p>The methods of safeguarding are:</p> <ol style="list-style-type: none"> 1. Guards: physical barriers that prevent contact, which can be fixed, interlocked, adjustable, or self-adjusting. 2. Devices: limit or prevent access to the hazardous area, such as presence-sensing devices, pullback or restraint straps, safety trip controls, two-hand controls, or gates. 3. Automated Feeding and Ejection Mechanisms: eliminate the operator's exposure to 	<p>The methods of safeguarding are:</p> <ol style="list-style-type: none"> 1. Guards: physical barriers that prevent contact with hazardous machine parts. They can be fixed, interlocked, adjustable, or self-adjusting. 2. Devices: limit or prevent access to the hazardous area. Examples include: <i>Presence-sensing devices</i> <i>Pullback or restraint straps</i> <i>Safety trip controls</i> <i>Two-hand controls</i> <i>Gates</i> 3. Automated Feeding and Ejection Mechanisms: <i>eliminate the operator's</i> 	<p>Here again the responses are similar due to chunks are splitted correctly.</p>

the point of operation while handling materials.

4. Machine Location or

Distance: remove the hazard from the operator's work area.

5. Miscellaneous Aids:

methods that can be used to protect both operators and people in the immediate vicinity of operating machinery, such as shields to contain chips, sparks, sprays or other forms of flying debris; holding tools that an operator can use to handle materials going into the point of operation; and awareness barriers to warn people about hazards in the area.

Additionally, some specific safeguarding devices include:

Safety mats to detect persons approaching, standing in or climbing into the danger area

Light curtains to detect approach to dangerous areas

Interlock switches to detect the position of movable guards for control interlocking

Presence-sensing devices

Two-hand control devices

Safety trip controls

exposure to the point of operation while handling materials.

4. Machine Location or

Distance: remove the hazard from the operator's work area.

5. Miscellaneous Aids:

methods that can be used to protect both operators and people in the immediate vicinity of operating machinery. Examples include:

Shields to contain chips, sparks, sprays, or other forms of flying debris

Holding tools that an operator can use to handle materials going into the point of operation

Awareness barriers to warn people about hazards in the area

Additionally, primary safeguarding methods include:

1. **Guards:** physical barriers that prevent access to danger areas.

2. **Safeguarding Devices:** controls or attachments that prevent or detect operator contact with hazardous machine areas.

Secondary safeguarding methods, work practices, and complementary equipment may also be used to

	<p>Thanks for asking!</p> <p>PDF Title: OSHA3170 “Safeguarding Equipment and Protecting Employees from Amputations</p> <p>PDF Source: https://www.osha.gov/sites/default/files/publications/osh3170.pdf</p> <p>Page: 2,12,15,19,44,46,49</p>	<p>supplement primary safeguarding.</p> <p>Thanks for asking!</p> <p>PDF Title: OSHA3170 “Safeguarding Equipment and Protecting Employees from Amputations</p> <p>PDF Source: https://www.osha.gov/sites/default/files/publications/osh3170.pdf</p> <p>Page:2,12,15,19,44,46,49</p>	
<p>6. Give the Procedure for structural analysis.</p> <p>[pdf:SISTEMA Cookbook (Version1.0),page: 11]</p>	<p>The procedure for structural analysis is as follows:</p> <p>Step 1: Formation of a sequence of the components in a functional channel</p> <p><i>All components along the first functional channel (that with the fewest components) are written as blocks from left to right (from the sensor to the actuator).</i></p> <p>Step 2: Considering the first block</p> <p>Each individual block of the first functional channel is now assigned in turn to subsystems of the relevant Category, according to the characteristic features of the Categories.</p>	<p>The procedure for structural analysis, as per the provided context, involves the following steps:</p> <p>Step 1: Formation of a sequence of components in a functional channel</p> <p><i>Write all components along the first functional channel (with the fewest components) as blocks from left to right (from sensor to actuator).</i></p> <p>Step 2: Considering the first block</p> <p>Assign each individual block of the first functional channel to subsystems of the relevant Category, based on characteristic features of the Categories.</p> <p>Step 3: Does the component manufacturer</p>	<p>Here both responses seems similar but reranker have access to exact pages that contain the answer. While non reranker one have some incorrect pages.</p>

Step 3: Does the component manufacturer state the PL and PFH (and Category)?

An encapsulated subsystem can be recognized as such by the fact that it is already characterized by the manufacturer by a PL (or SIL in accordance with IEC standards), PFH and Category (internal structure).

The internal structure of the encapsulated subsystem need not be deconstructed further.

Step 4: Can all component faults be excluded?

All assumed faults for the component in the block under analysis are considered in turn.

For this purpose, the annex of EN ISO13849-2 contains the fault models of a number of components used in machine controls.

Owing to justified fault exclusions, certain component faults can be discounted.

For each fault case, it must be considered whether the

state the PL and PFH (and Category)?

Check if the component manufacturer has stated the PL, PFH, and Category. If so, the internal structure of the encapsulated subsystem need not be deconstructed further.

Step 4: Can all component faults be excluded?

Consider all assumed faults for the component in the block under analysis. For each fault case, determine if the intended safety-related functionality of the component is retained (harmless fault) or fails (dangerous fault).

Alternatively, a schematic table can be used for structure analysis, which involves:

1. Entering all components shown on the schematic circuit diagram in a table.
2. Determining if the Category is stated by the component manufacturer.
3. Identifying the component(s) in the test channel (fault detection and disconnection).

	<p>intended safety-related functionality of the component is retained (harmless fault) or fails (dangerous fault).</p> <p>Thanks for asking!</p> <p>PDF Title: SISTEMA Cookbook (Version1.0) PDF Source: https://www.osha.gov/sites/default/files/2020-05/Machine%20Guarding%20Checklist.pdf Pages: 11-12</p>	<p>4. Determining the possible Category and block presentation.</p> <p>Thanks for asking!</p> <p>PDF Title: OSHA "Machine Guarding Checklist" PDF Source: https://www.osha.gov/sites/default/files/2020-05/Machine%20Guarding%20Checklist.pdf Page: 10-11, 27</p>	
<p>7. give information on Specific Machine Hazards and Safeguarding Methods.</p> <p>[pdf:osha3170.pdf ,page: 22]</p>	<p>Here are some specific machine hazards and safeguarding methods:</p> <p>Specific Machine Hazards:</p> <ol style="list-style-type: none"> 1. Mechanical Hazards: Entanglement, drawing in, trapping, crushing, cutting, shearing, and puncturing. 2. Electrical Hazards: Electrocution, discharge of dangerous substances, and electrical shock. 3. Thermal Hazards: Burns, fires, and explosions. 4. Noise Hazards: Hearing loss and tinnitus. 5. Vibration Hazards: Hand-arm vibration syndrome and whole-body vibration. 	<p>Based on the provided context, here are some specific machine hazards and safeguarding methods:</p> <p>Specific Machine Hazards:</p> <ol style="list-style-type: none"> 1. Mechanical Hazards: crushing, cutting, shearing, entanglement, and drawing-in. 2. Electrical Hazards: electrocution, electrical shock, and arc flashes. 3. Thermal Hazards: burns, fires, and explosions. 4. Noise Hazards: hearing loss and tinnitus. 5. Vibration Hazards: hand-arm vibration syndrome and whole-body vibration. <p>Safeguarding Methods:</p>	<p>Here the answer is again similar and correct. The difference is between the access to correct pages.</p>

Safeguarding Methods:

1. **Guards:** Physical barriers that prevent access to danger areas.
2. **Safety Devices:** Devices that detect presence of individuals in danger areas, such as light curtains, pressure mats, and safety sensors.
3. **Awareness Devices:** Barriers, signals, or signs that warn individuals of an impending, approaching, or present hazard.
4. **Safe Work Procedures:** Formal written instructions developed by the user that describe how a task is to be performed.
5. **Personal Protective Equipment (PPE):** Equipment worn by individuals to protect themselves from hazards, such as safety glasses, gloves, and hearing protection.
6. **Machine Safeguarding:** Safeguarding implemented to protect individuals from hazards by the physical arrangement of distance, holding, openings, or positioning of the machine or machine production system.

Risk Reduction Measures:

1. **Guards:** physical barriers that prevent access to hazardous areas.
2. **Safety Devices:** devices that detect or prevent operator contact with hazardous areas, such as light curtains, safety mats, and safety scanners.
3. **Awareness Devices:** devices that alert operators to potential hazards, such as warning lights, horns, and sirens.
4. **Safeguarding Methods:** methods that protect operators from hazards through the physical arrangement of distance, holding, openings, or positioning of the machine or machine production system.
5. **Safe Work Procedures:** formal written instructions that describe how to perform tasks safely.

Examples of Safeguarding Methods for Specific Machine Hazards:

1. **Mechanical Hazards:**
Guards: enclosing hazardous machine parts, such as gears and shafts.
Safety Devices: light curtains or safety mats to detect operator presence.
2. **Electrical Hazards:**

1. **Design and Safety:** Risk reduction through design and safety measures.
2. **Functional Safety:** Risk reduction through functional safety systems.
3. **Process and Information:** Risk reduction through process and information measures, such as safe work procedures and training.

Thanks for asking!

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 Pages:12-17

PDF Title: IFA "Functional safety of machine controls (Application of EN ISO13849), IFA Report2/2017e"
 PDF Source: <https://www.dguv.de/medien/ifa/en/pub/rep/pdf/reports-2019/report0217e/rep0217e.pdf>
 Pages:7-11

Guards: enclosing electrical components, such as electrical panels and wiring.
 Safety Devices: circuit breakers and fuses to prevent electrical shock.
 3. **Thermal Hazards:**
Guards: insulating hot surfaces, such as pipes and equipment.
 Safety Devices: temperature sensors and thermocouples to detect overheating.

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 PDF Source: <https://www.osha.gov/sites/default/files/publications/osh3170.pdf>
 Page:16-20

PDF Title: IFA "Functional safety of machine controls (Application of EN ISO13849), IFA Report2/2017e"
 PDF Source: <https://www.dguv.de/medien/ifa/en/pub/rep/pdf/reports-2019/report0217e/rep0217e.pdf>
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 PDF Source: [https://www.abb.com/global/scn/scn001008B0201.pdf](#)
 Page:10-12

	<p>PDF Title: ABB brochure1SFC001008B0201</p> <p>PDF Source: https://www.ABB.com</p> <p>Pages:5-6</p>		
<p>8. Give information on some secondary safeguarding methods, work practices, and complementary equipment</p> <p>[pdf:osha3170.pdf,page:49]</p>	<p>Secondary safeguarding methods, work practices, and complementary equipment are used to supplement primary safeguarding methods or used alone when primary safeguarding methods are not feasible. Some of these methods include:</p> <p>Secondary Safeguarding Methods:</p> <ol style="list-style-type: none"> 1. Awareness Devices: Installation of barriers and warning signs around the machine, such as milling tables, to alert operators of potential hazards. 2. Probe Detection Devices: Devices that detect the presence or absence of a person's hand or finger, such as ring guards, to prevent entry into hazardous areas. 3. Safety Edge Devices: Devices that detect the presence of an employee in a hazardous area and stop or prevent a hazardous machine cycle or stroke. 	<p>Secondary Safeguarding Methods, Work Practices, and Complementary Equipment</p> <p>In addition to primary safeguarding methods, the following secondary safeguarding methods, work practices, and complementary equipment can be used to supplement or replace primary safeguarding methods when they are not feasible:</p> <p>Secondary Safeguarding Methods:</p> <ol style="list-style-type: none"> 1. Splash shields, chip shields, or barriers: Use these devices to provide effective protection to the operator if it is impractical to guard cutters without interfering with normal production operations or creating a more hazardous situation. 2. Awareness devices: Install awareness devices, such as barriers and warning signs, around the machine to alert operators of potential hazards. 	<p>Here reranker one has accurate answer. Non reranker one also have correct answer but not everything is correct.</p>

Work Practices:**1. Safe Work Procedures:**

Formal, written instructions that describe how a task is to be performed, including procedures for installing and using fixtures and tooling.

2. Operator Training:

Ensuring that all operators receive appropriate safe work procedure training by experienced operators until they can work safely on their own.

3. Prohibiting Unsafe

Actions: Prohibiting operators from reaching around the cutter or hob to remove chips while the machine is in motion or not locked or tagged out.

Complementary Equipment:**1. Work-Holding**

Equipment: Equipment such as clamps, jigs, fixtures, and back gauges that hold the work-piece in place during the hazardous portion of the machine cycle.

2. Feeding and Ejection

Systems: Systems such as gravity-fed chutes, semi-automatic and automatic feeding and ejection equipment that

Work Practices:**1. Safe work procedures:**

Develop and implement safe work procedures for machine operators, such as safe work procedures for installing and using fixtures and tooling.

2. Operator training: Ensure that all operators receive appropriate safe work procedure training by experienced operators until they can work safely on their own.

3. Prohibiting hazardous

behaviors: Prohibit operators from reaching around the cutter or hob to remove chips while the machine is in motion or not locked or tagged out.

Complementary Equipment:

1. Jigs or vises: Instruct operators not to use a jig or vise (work-holding equipment) that prevents the point of operation guard from being adjusted appropriately.

2. Work-holding device:

Instruct operators to place the jig or vise locking arrangement so that force must be exerted away from the cutter.

Additional Measures:

minimize or eliminate the need for employees to be in a hazard area during the hazardous motion of the machine.

3. Emergency Stop

Devices: Devices such as buttons, rope-pulls, cable-pulls, or pressure-sensitive body bars that initiate an action to stop hazardous motion when an employee recognizes a hazard.

Other Measures:

1. Instructing Operators:

Instructing operators not to wear gloves, jewelry, or loose-fitting clothing while operating a machine and to secure long hair in a net or cap.

2. Conducting Periodic

Inspections: Conducting periodic inspections to ensure compliance with safety procedures.

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<https://www.osha.gov/sites/default/files/publications/osh3170.pdf>

1. Periodic inspections:

Conduct periodic inspections to ensure compliance.

2. Servicing and

maintenance: Perform servicing and maintenance under an energy control program in accordance with the Control of hazardous energy (lockout/tagout), 29 CFR 1910.147, standard.

Thanks for asking!

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