Ensuring that processes are safe and productive

Machine Safeguarding Assessments

Safeguarding Assessment

Start by assessing the machine or process.

1. Why should I have a formal assessment done?

To help ensure that your machines are guarded correctly (safe), ensure safeguards are compliant with applicable standards, make sure the machine remains productive after the guarding is installed and to save money by doing it right the first time. OSHA cites a 6-to-1 benefit to cost ratio and Liberty Mutual states a 3-to-1 benefit to cost ratio when investing in safeguarding and safeguarding programs. The key to realizing this benefit to cost ratio is making sure the machines are safeguarded correctly. Information gathered by Omron indicates that 93% of the machines on the factory floor are not guarded in accordance with relevant regulations and standards. The proper and best way to safeguard a machine correctly and ensure the existing safeguards are adequate is by conducting and documenting a machine safeguarding assessment to validate the selected safeguarding system.

2. What is the value and advantage of a documented machine safeguarding assessment / risk reduction plan?

A documented machine safeguarding assessment provides a clear plan to reduce risk and bring non-compliant machines into compliance. The report contains a high level overview as well as machine-specific risk reduction recommendations based on the identified risk level of the equipment as used in your production facility. The format of the report is designed to help communicate the current status of your machine safeguarding program to all levels within your organization.

A documented assessment also helps establish priorities for safeguarding based on identified risk levels. This assists in targeting funds where the most benefit will be realized while also planning for future upgrades. The documented assessment can be used for years to come to ensure machines remain in compliance by comparing the machine's existing guarding system with the detailed guarding recommendations and drawings in the assessment, allowing any deviations to be easily identified and addressed.

The assessment / risk reduction report can serve to show OSHA, your insurance company and corporate headquarters what the action plan is to achieve compliance.

3. What is the assessment process?

The assessment process is a two part process (Risk Level Identification and Risk Reduction).

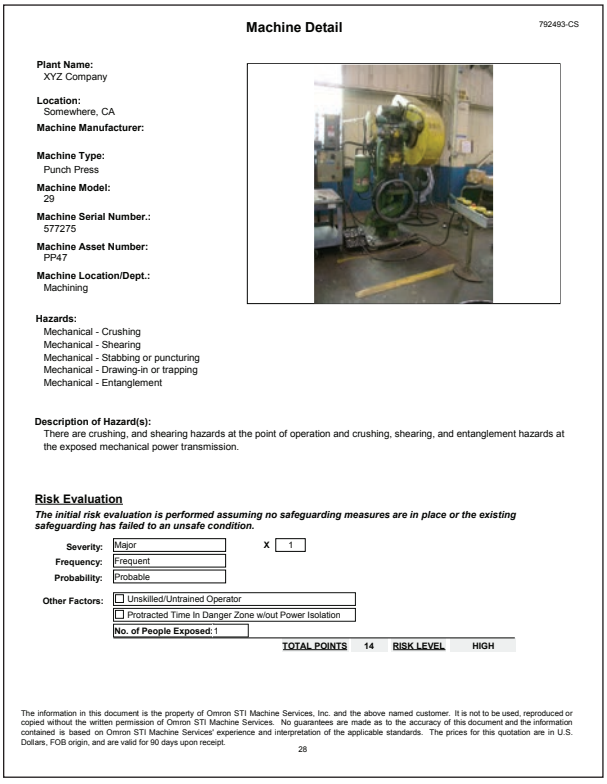
Risk Level Identification – The process of interacting with your operators and maintenance personnel to understand the intended use of the machine, the tasks and hazards, and the level of risk associated with their operation of the equipment.

Risk Reduction – The application of protective measures in a manner that both reduces the risk to a tolerable level and achieves compliance with applicable regulations and standards. The goal is to have a machine that is both safe and productive.

4. What information should be derived from the assessment report?

As mentioned, the assessment is a two part process and you will want to make sure that the report addresses both parts. It is very important to ensure that the assessment company provides you with a written report that contains usable information and includes a specific and detailed strategy on how to guard the machine correctly to achieve maximum safety and productivity. At a minimum, the report should contain information such as:

1. Applicable safety standards or regulations reviewed and considered during the assessment.
2. Overview of the assessment process and method used to determine the risk level for each machine.
3. Explanation of the risk reduction requirements that will be applied based on risk level.
4. Machine identification (manufacturer, type, model number, serial number, asset number, location, etc).
5. Types of hazards associated with the machine.
6. Description of the hazards associated with the machine.
7. Risk factors and model used to determine the risk level for the machine.
8. Risk reduction (safeguarding measures) performance requirements to achieve compliance, based on the risk level for this machine.
9. Safety-related control system (safety circuits) performance requirements to achieve compliance, based on the risk level for this machine.
10. Residual risk level for this machine if the recommended safeguarding measures are installed in accordance with all applicable regulations and standards (estimated risk level after guarding using the assessor's detailed recommendations).
11. Risk reduction (safeguarding) recommendations with detailed written information covering the type and location of the safeguarding measures recommended and a description of how they will be applied to reduce the risk to a tolerable level of risk.
12. A drawing showing the guarding strategy concept and approximate location of the guards and safety devices on the machine.



Machine Detail 792493-CS

Plant Name: XYZ Company
Location: Somewhere, CA
Machine Manufacturer:
Machine Type: Punch Press
Machine Model: 29
Machine Serial Number.: 577275
Machine Asset Number: PP47
Machine Location/Dept.: Machining

Hazards:
Mechanical - Crushing
Mechanical - Shearing
Mechanical - Stabbing or puncturing
Mechanical - Drawing-in or trapping
Mechanical - Entanglement

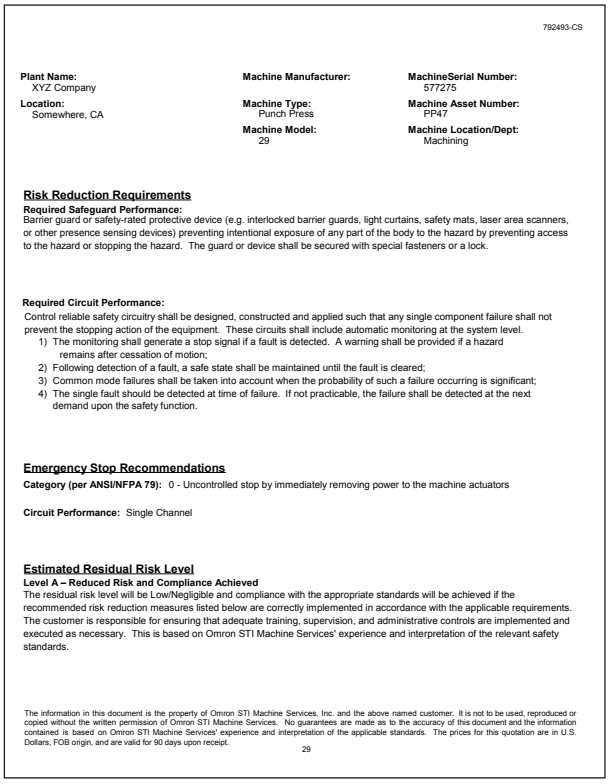
Description of Hazard(s):
There are crushing, and shearing hazards at the point of operation and crushing, shearing, and entanglement hazards at the exposed mechanical power transmission.

Risk Evaluation

The initial risk evaluation is performed assuming no safeguarding measures are in place or the existing safeguarding has failed to an unsafe condition.

Severity:	Major	X 1
Frequency:	Frequent	
Probability:	Probable	
Other Factors:	☐ Unskilled/Untrained Operator	
	☐ Protracted Time In Danger Zone w/out Power Isolation	
	No. of People Exposed: 1	
	TOTAL POINTS 14	RISK LEVEL HIGH

This is an example of the first page in the Machine Detail Section of the machine safeguard assessment report. This page would show a photo of the machine that was assessed, list the machine's identification information, types of hazards associated with the machine, description of the hazards, risk level and score using the 3 risk factors of Severity, Frequency, and Probability.



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Risk Reduction Requirements

Required Safeguard Performance:
Barrier guard or safety-rated protective device (e.g. interlocked barrier guards, light curtains, safety mats, laser area scanners, or other presence sensing devices) preventing intentional exposure of any part of the body to the hazard by preventing access to the hazard or stopping the hazard. The guard or device shall be secured with special fasteners or a lock.

Required Circuit Performance:
Control reliable safety circuitry shall be designed, constructed and applied such that any single component failure shall not prevent the stopping action of the equipment. These circuits shall include automatic monitoring at the system level.
1) The monitoring shall generate a stop signal if a fault is detected. A warning shall be provided if a hazard remains after cessation of motion;
2) Following detection of a fault, a safe state shall be maintained until the fault is cleared;
3) Common mode failures shall be taken into account when the probability of such a failure occurring is significant;
4) The single fault should be detected at time of failure. If not practicable, the failure shall be detected at the next demand upon the safety function.

Emergency Stop Recommendations

Category (per ANSI/NFPA 79): 0 - Uncontrolled stop by immediately removing power to the machine actuators

Circuit Performance: Single Channel

Estimated Residual Risk Level

Level A – Reduced Risk and Compliance Achieved
The residual risk level will be Low/Negligible and compliance with the appropriate standards will be achieved if the recommended risk reduction measures listed below are correctly implemented in accordance with the applicable requirements. The customer is responsible for ensuring that adequate training, supervision, and administrative controls are implemented and executed as necessary. This is based on Omron STI Machine Services' experience and interpretation of the relevant safety standards.

Sample second page of the machine detail section: This page lists the standard's requirements based on the associated risk level. It includes the safeguarding performance requirements, the safety system or interface requirements, emergency stop requirements, and estimated residual risk if the recommended guards and devices are installed correctly. The key being correctly!

5. Are there different types of assessments?

Yes! And it is very important to clearly understand the type of assessment that you will be getting. There are basically four types of assessments.

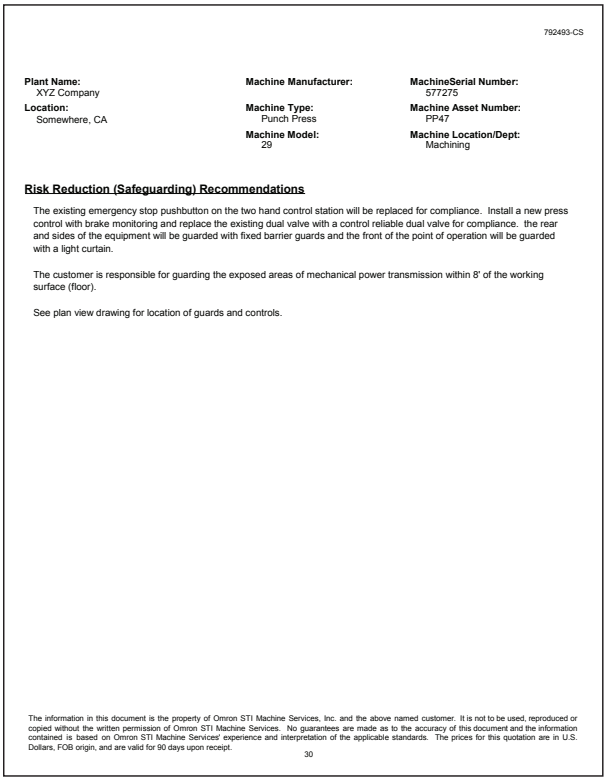
1. Compliance Assessment
2. Compliance Assessment with Generalized Recommendations
3. Risk Reduction (Product Oriented Solution)
4. Machine & Process Safeguarding Assessment and Risk Reduction Solution **(Best Value and Most Usable)**

Compliance Assessment:

- Classified by:
  - Identifies compliance issues (typically comprised of intensive documentation)
  - Sometimes includes risk level identification (not always)
  - Provides no solution (risk reduction)
- Performed by:
  - Safety 'consultants' (typically with OSHA experience or CSP certification, not necessarily with a specialization in machine safeguarding)
  - Software packages (assign levels of risk / compliance based on static list of questions)
- Cost:
  - Relatively high
- Value:
  - Low (only identifies mostly obvious deficiencies)

Compliance Assessment w / Generalized Recommendations:

- Classified by:
  - Identifies compliance issues (typically comprised of intensive documentation)
  - Sometimes includes risk level identification (not always)
  - Provides general solutions for risk reduction, but not specific enough to be used as a comprehensive guideline for budgeting
- Performed by:
  - Safety 'consultants' (typically with OSHA experience or CSP certification, not necessarily with a specialization in machine safeguarding)
- Cost:
  - Relatively high



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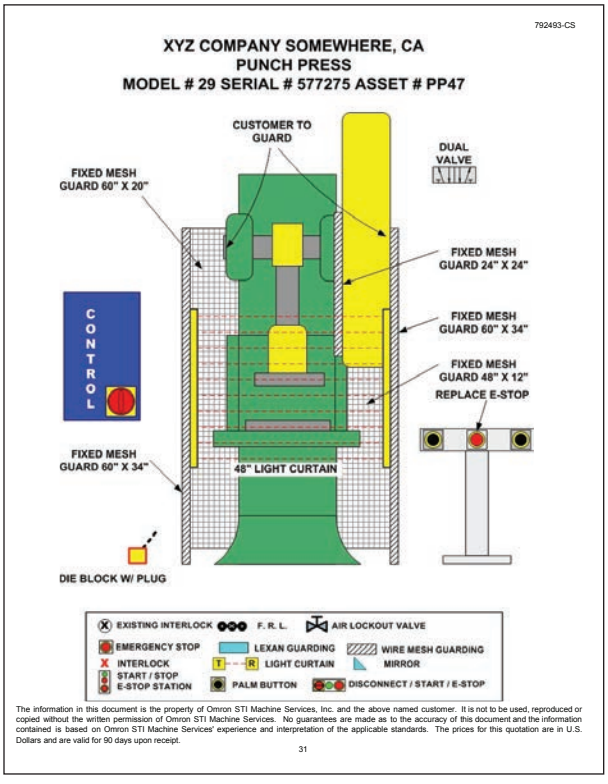
Risk Reduction (Safeguarding) Recommendations

The existing emergency stop pushbutton on the two hand control station will be replaced for compliance. Install a new press control with brake monitoring and replace the existing dual valve with a control reliable dual valve for compliance. the rear and sides of the equipment will be guarded with fixed barrier guards and the front of the point of operation will be guarded with a light curtain.

The customer is responsible for guarding the exposed areas of mechanical power transmission within 8' of the working surface (floor).

See plan view drawing for location of guards and controls.

Sample third page of the Machine Detail Section: This page lists the risk reduction recommendations, giving detailed information about the types of guards and devices, including the approximate location of the guards and devices necessary to bring the machine into compliance.



Sample fourth page of the machine detail section: This page is designated as a plan view drawing (top or front view) that will show approximate location, size and dimensions of the necessary guards and devices to bring the machine into compliance. This assists in showing the machine guarding concept.

- Value:
  - Moderate (identifies mostly obvious deficiencies with general solutions, but not enough information to identify an accurate cost)

Risk Reduction (Product-oriented solution):

- Classified by:
  - Identifies a possible solution (solution typically revolves around product offering of 3rd party conducting assessment)
  - Provides no justification or documentation (risk assessment)
- Performed by:
  - Safety component manufacturers / representatives / distributors (typically based on fitting products immediately available to all applications — a "square peg in a round hole."
- Cost:
  - Relatively inexpensive ('disguised quote') Sometimes free!
- Value:
  - Low (only identifies partial solutions based on capabilities of 3rd party)

Machine & Process Safeguarding Assessment and Risk Reduction Solution:

- Classified by:
  - Identifies existing risk level based on application and use of equipment
  - Determines performance requirements of safeguarding system based on level of identified risk
  - Evaluates existing safeguards to performance requirements identified
  - Provides solution to achieve required performance level
  - Prioritizes action list based on combination of risk level and compliant safeguards already in place
- Performed by:
  - Qualified safety experts specializing in safeguarding machinery
  - Experts on applicable regulations, directives, and standards
  - True solution providers capable of offering turn-key integration
- Cost:
  - Moderate
- Value:
  - High (provides required document (risk level assessment) that justifies performance requirements and finds solutions based on achieving high safety and productivity)

6. How do I qualify a vendor to perform my assessments?

1. Make sure the vendor has extensive experience conducting machine safeguarding risk level assessments in accordance with all applicable standards.
2. The company should be able to provide you with a sample assessment report.
3. The company should provide a reference list of companies and contacts of where machine safeguarding assessments were conducted in the last 2 years equivalent to the approximate size and scope of your needed assessment.
4. The vendor should be able to provide an insurance certificate for Professional Liability or Errors & Omissions insurance.
5. The company should provide a written report of the assessment findings to include identified risk levels that validate the detailed risk reduction strategies to bring the risk to a tolerable level.
6. A vendor that is an active member of various trade organizations and participates on various industry consensus standards can provide compliance with existing as well as future safeguarding requirements.

7. Questions to ask yourself to help determine if you need an assessment.

1. Are you confident that your machines are safeguarded to the relevant standards and would pass an inspection by a regulatory inspector?
2. Have all steps been taken to prevent injuries from process equipment?
3. Has a documented machine safeguarding assessment been done to verify compliance with applicable regulations and standards?
4. When was the last assessment preformed in your facility and who preformed said assessment?

If you are not sure of the answers to these questions or if any of the answers is no, then maybe it is time to start with an assessment.

Remember, in most cases you will get what you pay for. If a vendor will do the assessment for free, ask what is the catch and what level of usable documentation (assessment report) will you be receiving for free. According to the standards, the whole idea of conducting a documented assessment is to create a usable plan that identifies the hazards and risk levels along with a risk reduction strategy commensurate to the hazards for each machine assessed. The more detailed the risk reduction strategy, the more valuable the report.

Visit **www.omron-ap.com/mse** to find out more.

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