



Machine Risk Assessment

<Date>

Prepared for

<Name>

<Company>

<Address>

<City>, <State> <Zip>

Prepared by

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Machine Risk Assessment Methodology

At the inception of the project, the project parameters are clearly defined, with the identification of hazards associated with machine safeguarding set as the key objective. High level suggestions are provided for eliminating hazards and reducing risks. Given the complexity of equipment and manufacturing processes, more detailed equipment surveys may be required to recommend an engineered solution for worker safety and risk reduction.

The scope of the assessments includes operational states (run, set-up, shutdown), who could be harmed (operators, other employees), what could be damaged (property, equipment, productivity, environment) or other specific tasks performed by the operators and equipment. Adequately assessing machine safeguarding relies on the experience and expertise of the operator familiar with the tasks and hazards associated with the equipment or process. The assessment team should include knowledge of different disciplines, representing a variety of experience and expertise and the team may include (but are not limited to): operators, maintenance personnel, engineers, safety managers, component or equipment suppliers or key management.

Information required for a proper assessment includes (but is not limited to) equipment specifications and which level equipment information provided and utilizing the skills and expertise of team members, potential hazards are identified. Relevant standards used to evaluate hazards include but are not limited to the following:

OSHA 29 CFR sections with which an employer (user) must comply:

1910.211	Definitions
1910.212	General requirements for all machines
1910.213	Woodworking machinery requirements
1910.215	Abrasive wheel machinery
1910.216	Mills and calendars in the rubber and plastics industry
1910.217	Mechanical power presses
1910.219	Mechanical power transmission presses
1910.147	The control of hazardous energy (lockout/tagout)

ANSI B11 **Machine guarding standards**


NFPA 79 **Electrical standard for industrial machinery**

The steps in the machine safeguarding assessment process may vary depending on the complexity of the equipment and processes involved by generally are as follows:

1. Identify date, location and assessment team members
2. List initial hazards associated with machinery
3. Photograph machine/process
4. Identify the machinery for which the assessment has been made (specifications, limits and intended use)
5. List any relevant assumptions (loads, strengths, safety factors)
6. List information on which the hazard identification was based
7. List identified tasks or hazards
8. Photograph identified tasks or hazards
9. Suggest risk reduction measures to eliminate hazard or reduce risk
10. Indicate residual hazards after suggested risk reduction measures
11. Assess criticality of hazard
 - a. **Critical** = need immediate action to reduce risk and improve operator safety,
 - b. **Mandatory** = Action required to reduce risk and improve operator safety and to comply with OSHA/ANSI standards,
 - c. **Compliant** = No action required
12. Validation of implemented hazard/risk reduction measures, including person responsible and date of validation

The suggested hazard elimination or risk reduction method is derived from the Hazard Control Hierarchy.

The Hazard Control Hierarchy

	Protective Measure	Examples	Influence on Risk Factors	Classification
<p style="text-align: center;">Most Preferred</p>  <p style="text-align: center;">Least Preferred</p>	Elimination or Substitution	<ul style="list-style-type: none"> Eliminate pinch points (increase clearance) Intrinsically safe (energy containment) Automated material handling (robots, conveyors, etc.) Redesign the process to eliminate or reduce human interaction Reduced energy Substitute less hazardous chemicals 	<ul style="list-style-type: none"> Impact on overall risk (elimination) by affecting severity and probability of harm May affect severity of harm, frequency of exposure to the hazard under consideration, and/or the possibility of avoiding or limiting harm depending on which method of substitution is applied. 	Design Out
	Guards and Safeguarding Devices	<ul style="list-style-type: none"> Barriers Interlocks Presence sensing devices (light curtains, safety mats, area scanners, etc.) Two hand control and two-hand trip devices 	<ul style="list-style-type: none"> Greatest impact on the probability of harm (Occurrence of hazardous events under certain circumstance) Minimal if any impact on severity of harm 	Engineering Controls
	Awareness Devices	<ul style="list-style-type: none"> Lights, beacons, and strobes Computer warnings Signs and labels Beepers, horns, and sirens 	<ul style="list-style-type: none"> Potential impact on the probability of harm (avoidance) No impact on severity of harm 	Administrative Controls
	Training and Procedures	<ul style="list-style-type: none"> Safe work procedures Safety equipment inspections Training Lockout / Tagout / Tryout 	<ul style="list-style-type: none"> Potential impact on the probability of harm (avoidance and/or exposure) No impact on severity of harm 	
	Personal Protective Equipment (PPE)	<ul style="list-style-type: none"> Safety glasses and face shields Ear plugs Gloves Protective footwear Respirators 	<ul style="list-style-type: none"> Potential impact on the probability of harm (avoidance) No impact on severity of harm 	

Machine Risk Assessment Report

1. Summary of all assessed equipment
2. Machine assessment information sheet for each machine assessed
3. Machine assessment worksheet for each machine assessed
4. Machine assessment analysis with criticality, suggested risk reduction action and status for validation and tracking

Machine Risk Assessment Summary

Location	Manufacturer	Description	Hazard Level	Suggested Actions
PLANT 13	COATING SYSTEMS GROUP	AO ROBOTIC CELL	CRITICAL	NO ACTIONS REQUIRED, ACCESS TO DANGER ZONES WELL PROTECTED
PLANT 13	OKUMA	OKUMA MACHINING CENTER 21A	CRITICAL	PoO WELL PROTECTED, WOULD RECOMMEND ADDITION OF BUMP SWITCH ON DOOR LEADING EDGE FOR
PLANT 13	ARBOGA	ALUMINUM PUCKER MACHINE NOT OPERATIONAL AT TIME OF REVIEW	NA	INSTALL HARD GUARDS AROUND CONVEYOR
PLANT 13	LINK ENG.	EI DYNAMOMETER	CRITICAL	NO ACTIONS REQUIRED, ACCESS TO DANGER ZONES WELL PROTECTED
PLANT 13	LINK ENG.	84" DYNAMOMETER	CRITICAL	NO ACTIONS REQUIRED ON DYNO, ACCESS TO DANGER ZONES WELL PROTECTED. IMPROVE HYDRAULIC PUMP
PLANT 13	LINK ENG.	SHAFT DYNAMOMETER	CRITICAL	INTERLOCK DOORS, REPAIR 110V WIRING, REPAIR ESTOPS
PLANT 13	LINK ENG.	120MI DYNAMOMETER	MANDATORY	REPAIR ESTOPS
PLANT 13	LINK ENG.	120MI2 DYNAMOMETER	MANDATORY	(1) ESTOP MISSING YELLOW BACKGROUND
PLANT 13	LINK ENG.	120 ROLL DYNAMOMETER	MANDATORY	INSTALL ADDITIONAL ESTOPS IN WORK ZONE
PLANT 13	LINK ENG.	150K ROLL DYNAMOMETER	MANDATORY	INSTALL ADDITIONAL ESTOPS IN WORK ZONE
PLANT 13	LINK ENG.	FPTM DYNAMOMETER	MANDATORY	CONFIRM INTERLOCK ON INERTIA DOOR AND INSTALL INTERLOCK ON CLAM SHELL COVER
PLANT 13	LINK ENG.	COMBINED LOAD DYNAMOMETER	MANDATORY	INTERLOCK ACCESS DOORS AND PANELS, INSTALL ADDITIONAL ESTOPS
PLANT 13 MACHINE SHOP	WOTON	HORIZONTAL BORING MACHINE	MANDATORY	INTERLOCKED SPINDLE SHIELD, TIMER FOR SPINDLE STOP FOR POWER DROP OUT
PLANT 13 MACHINE SHOP	NARDINI	HORIZONTAL LATHE	MANDATORY	INTERLOCKED SPINDLE SHIELD, INSTALL CROSS SLIDE SHIELD, INSTALL LEAD SCREW COVERS
PLANT 13 MACHINE SHOP	MAZAK	QT25 CNC LATHE	MANDATORY	LIMIT SPINDLES TO 50RPM WHEN INTERLOCK IS IN OVERRIDE

MACHINE ASSESSMENT INFORMATION

CUSTOMER:	ABC COMPANY	
LOCATION:	SOUTH BEND	
SCOPE OF ASSESSMENT:	Current State	
DATE	9/7/2016	
ASSESSMENT NO	A-41724	
ASSESSOR	ZAISER	
MANUFACTURER	LINK ENG	
MACHINE NO	84" DYNO	
MODEL NO		
SERIAL NO		
ENERGY SOURCES	ELECTRIC/HYDRAULIC	
ELECTRICAL SCHEMATICS	No	
HYDRAULIC SCHEMATICS	No	
PNEUMATIC SCHEMATICS	No	
SUPPLY VOLTAGE	480	
CONTROL VOLTAGE	110	
E-STOP CATEGORY	0	
MAIN MOTOR SIZE		HP
MAIN DISCONNECT SIZE		AMPS
MACHINE ACTUATION	Push Button	
MACHINE LOADING	Manual	
MACHINE UNLOADING	Manual	



GENERAL COMPLIANCE EVALUATION

	COMPLIANT			COMMENTS
	YES	NO	N/A	
HISTORY OF INJURIES	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
EMERGENCY STOP(S)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DROPOUT PROTECTION	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
CONTROL VOLTAGE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SAFETY RATED DEVICES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SAFETY CONTROL SYSTEM	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	RECOMMEND UPGRADE TO "CONTROL RELIABLE" SAFETY COMPONENTS
ENERGY ISOLATION MEANS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
DISCONNECT LOCKABLE IN "OFF" ONLY	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
BARRIER GUARDS	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	INTERLOCKED ACCESS DOORS, VIDEO CAMERAS, WALK AROUND
MACHINE IS SECURED TO FLOOR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SPINDLE RUN DOWN TIME CHECKED	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
STOP TIME MEASUREMENT PERFORMED	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

IF MACHINE IS A POWER PRESS

DUAL MONITORED VALVE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BRAKE MONITOR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Machine Assessment Worksheet – 84" Dyno



MACHINE ASSESSMENT WORKSHEET

CUSTOMER:	ABC COMPANY
MANUFACTURER:	LINK ENG
MACHINE NO :	84" DYNO
MODEL NO :	0
SERIAL NO :	0
SCOPE OF ASSESSMENT:	Current State

DATE : 9/7/2016

BEFORE RISK REDUCTION

- | | | |
|-----------------------|---|--|
| <u>TASK</u> | <input type="checkbox"/> Assembly/Installation | <input checked="" type="checkbox"/> Housekeeping |
| | <input checked="" type="checkbox"/> Setup/Changeover | <input type="checkbox"/> Machine Fault/Reset |
| | <input checked="" type="checkbox"/> Machine Operation | <input type="checkbox"/> Machine Jam Recovery |
| | <input checked="" type="checkbox"/> Maintenance/Troubleshooting | <input type="checkbox"/> Dismantaling/Disposal |
| <u>HAZARDS</u> | <input checked="" type="checkbox"/> Mech/Projectile | <input type="checkbox"/> Electrical/Other |
| | <input type="checkbox"/> Mech/Cutting-Severing | <input type="checkbox"/> Control System Failure |
| | <input type="checkbox"/> Mech/Crushing | <input type="checkbox"/> Environmental/Chemical |
| | <input type="checkbox"/> Mech/Pinching | <input type="checkbox"/> Environmental/Thermal |
| | <input type="checkbox"/> Mech/Stabbing-Puncture | <input type="checkbox"/> Environmental/Ergonomic |
| | <input checked="" type="checkbox"/> Mech/Entanglement | <input type="checkbox"/> Environmental/Fire-explosion |
| | <input type="checkbox"/> Mech/Friction-Abrasion | <input type="checkbox"/> Environmental/Fluid |
| | <input type="checkbox"/> Mech/Wear-Breakage | <input type="checkbox"/> Environmental/Noise-Vibration |
| | <input type="checkbox"/> Mech/Unexpected Startup | <input type="checkbox"/> Environmental/Chemical |
| | <input type="checkbox"/> Mech/Other | <input type="checkbox"/> Non-Compliance Issue |
| | <input type="checkbox"/> Electrical/Shock-Electrocution | <input type="checkbox"/> Slips/Trips/Falls |
| | <input type="checkbox"/> Electrical/Burns | <input type="checkbox"/> Lockout/Tagout |
| | <input type="checkbox"/> Electrical/Arc Flash | <input type="checkbox"/> _____ |
| | <input type="checkbox"/> Electrical/Noise | <input type="checkbox"/> _____ |

DESCRIPTION OF HAZARDS/ISSUES

Machine Assessment Analysis – 84” Dyno



Machine Assessment Analysis

MACHINE NAME: LINK ENG

MACHINE NUMBER: ABC COMPANY

MACHINE FAMILY: TEST EQUIPMENT

SOUTH BEND

ASSESSORS NAME(S): ZAISER

OSHA
1910.212

TASK	HAZARD	COMMENTS	Hazard Level	Risk Reduction Method(s)	Status	Photo
General	Mech/Entanglement	INTERLOCKED ACCESS, REMOTE CAMERAS	Critical	Adjustable Hard Guard	Open	1
General	Mech/Projectile	INTERLOCKED ACCESS, REMOTE CAMERAS	Critical	Adjustable Hard Guard	Open	2
General	Mech/Entanglement	OPEN ROTATING DRIVE SHAFT ON HYRAULIC PUMP	Critical	Adjustable Hard Guard	Open	3

