


Read Chapter 13. Become familiar with the risk assessment techniques presented in the chapter. Case Study #1 risk assessment is completed and provided as an example. Complete Case study # 2 and 3 and submit the file to your instructor.  

Chapter 13 – Machine Safety Risk Assessment Case Study

1. **List of hazards and definitions** – The hazards and definitions are listed in the Excel document in the tab entitled “Hazard Definitions”. The hazard types were derived from the materials provided from the program and my own research.
2. **Sample risk assessment matrix/methodology** – The ANSI Z590.3 Prevention through Design methodology and matrix were selected for this final project. The matrix and risk definitions are listed in the Excel document in the tab entitled “Risk Definitions and Matrix.” A modified machine safety risk assessment method using preliminary hazard analysis (PHA) format is used in the risk assessment worksheet found in the Excel document. This involves 1) an estimated initial “Raw Risk” of each hazard without any controls; 2) a “Current State” risk level considering existing controls; and 3) a “Future State” of each hazard considering additional controls selected. The acceptable level for risk is below 15 on a 1 to 25 scale as shown in the tab “Risk Definitions and Matrix.”
3. **Complete three risk assessments using the Case Study format and risk assessment matrix methodology** – The three case studies are de-identified for client confidentiality and are included in this document and in the companion Excel document under their listed tabs. The case studies are numbered along with individual hazard numbers which are listed in the risk register. The case studies each contain Critical to Safety (STS) risk.
4. **Create a Risk Assessment Team** – The team consisted of a facilitator, the organization’s safety, health and environmental leader; the production manager; the maintenance manager; the lead engineer of the facility; and operators of the jobs assessed. Team members have some previous experience in performing hazard identification and risk assessment. Prior to the assessment, the team was trained in the specifics of this project including:
 - a. Risk assessment methodology
 - b. hazard type definitions
 - c. risk definitions for severity and likelihood, and protection factors of controls
 - d. risk matrix (5 x 5)
 - e. acceptable risk level
 - f. hierarchy of risk controls (adapted from ANSI Z590.3)
5. **Complete the initial risk determination** – For each case study hazard, the “Raw Risk” without any controls was determined and entered into the risk assessment worksheet.
6. **Initial controls and residual risk** – For each case study hazard, the existing control measures were identified, documented and considered in determining the “Current State” Risk Levels which were entered into the worksheet.
7. **Additional controls and revised residual risk** – For each case study hazard, additional controls measure using the Hierarchy of Controls were selected and agreed upon, and used to determine the “Future State” Risk Levels which were entered into the worksheet.

8. **Risk Register** - A risk register listing each case study hazard, current and future state risk levels, and action due dates is included in the Excel document.

Case Studies

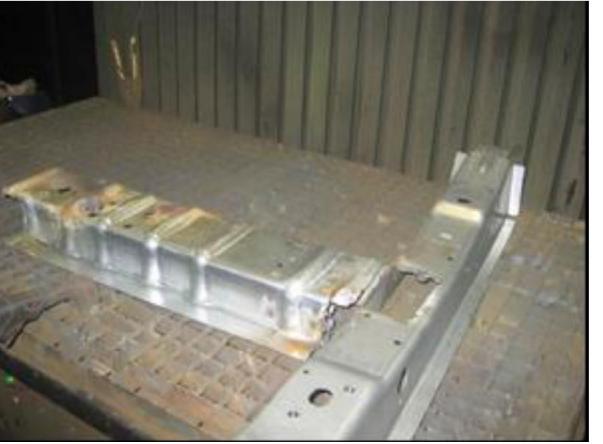
The organization is a global manufacturer of automobile parts with robotic welding machines and fabrication. The facility has approximately 400 employees.

Three work areas were assessed including the Quality Control Weld Laboratory Plasma Cutter workstation; the QC Weld lab weld destruct workstation; and the Finishing department parts washer.

In the Excel document, each case study is described briefly along with photographs as to the basic activities, the existing controls measures, and agreed upon controls needed. Case #1 – QC Lab Plasma Cutting.

Case Study #1 – Plasma Arc Cutting (PAC) in Teardown Area

Plasma cutter working at cutting table performing plasma cutting of pieces; Local exhaust table system to collect metal particulate/dust; Welding screens behind cutting table; PPE (flame/cut resistant gloves and sleeves, ANSI Z87.1 eye protection, Face shield tinted "WP96C - Dark"); grounded electrical unit. Operator was observed with face shield tilted up to see point of cutting.



Case Study #2 – Weld Destruct Lab (Teardown)

Operator picks a piece (robotic weld assembly weighing approximately 20 lbs.) from bin (floor level) and places in manual table vice, tightens vice and begins breaking/chiseling welds for testing. The operator uses a pneumatic hand held chisel gun and hammers. The QC lab has sound dampening walls and ceiling coverings. The worker wears a pair of vibration dampening gloves; ANSI Z.87.1 eye protection; cut resistant sleeves/gloves; hearing protection; and dust mask. Upon completion of the destructive testing, the part is sent to chemical testing. The tested assembly is taken out of the vice, and placed in a four level rack.



Case Study #3 – Wash Station WS1

One operator loading pieces onto slow moving conveyor of washer; second operator unloading pieces and placing into fixture of oven.

Enclosed system containing hot water and KOH solution; slow speed of conveyor; machine guarding on in running nip points; distance between unloading point and oven fixture allow turning with feet rather than twisting in place; light weight pieces handled at waste height; cut resistant gloves and sleeves; ANSI Z87.1 eye protection; hard toe shoes

