Equipment identification:

_____

Date :

_____

Bending Machine

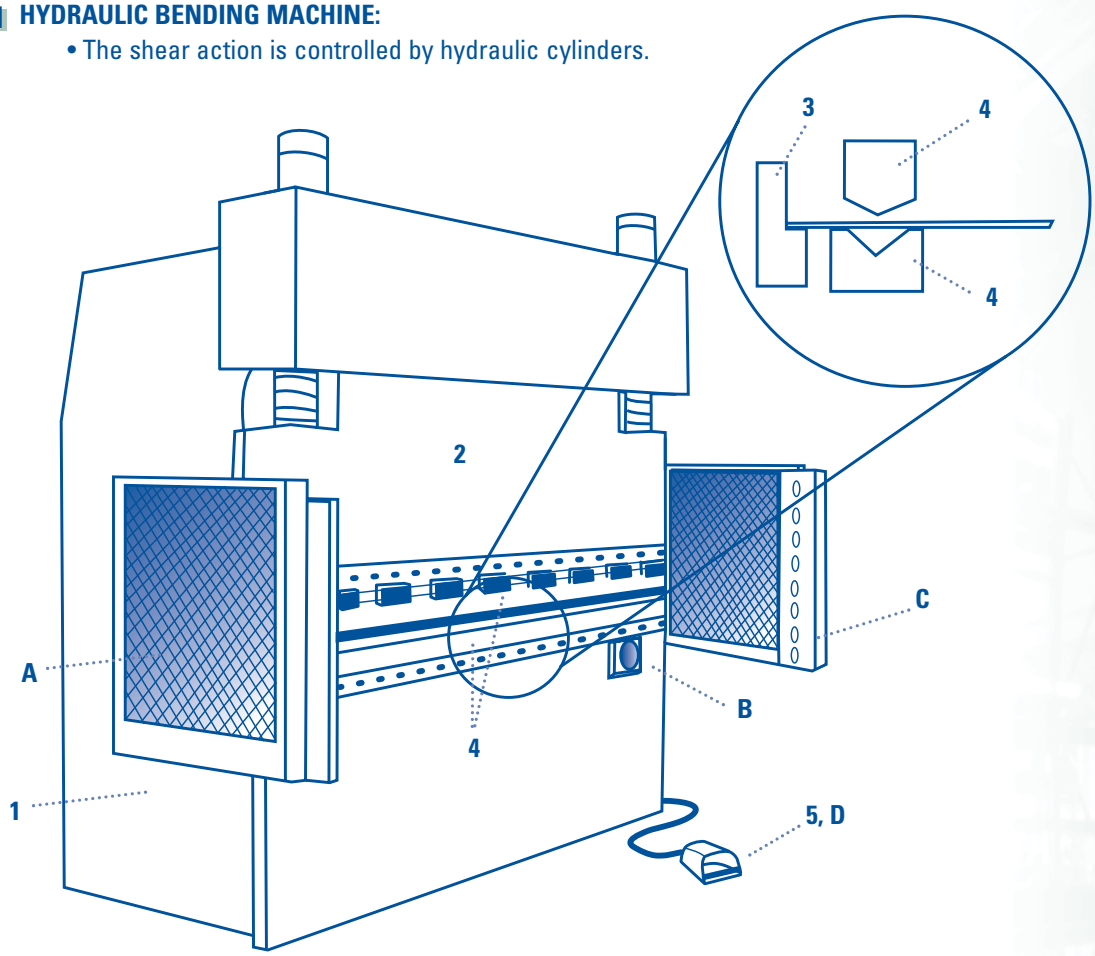
Self-Assessment Form
For Occupational Health And Safety

☐ **FRICTION-CLUTCH BENDING MACHINE:**

- The slide action is controlled by a flywheel.
- It is possible to stop the slide before the cycle has been completed.

☐ **HYDRAULIC BENDING MACHINE:**

- The shear action is controlled by hydraulic cylinders.



Hydraulic Bending Machine Parts

1 Frame
2 Ram
3 Thrust Block
4 Die Shoes
5 Pedal Control

Safety Devices

A Lateral Guards
B Emergency Stop Button
C Photo detector Security Screen
D Side- And Top-Capped Pedal Control

ASP MÉTAL ÉLECTRIQUE
Association paritaire pour la santé et la sécurité du travail
Secteur fabrication de produits en métal et de produits électriques
www.aspme.org

irsst
Institut de recherche Robert-Sauvé en santé et en sécurité du travail
www.irsst.qc.ca

IAPA
It's About Making A Difference.
Industrial Accident Prevention Association
1-800-406-IAPA (4272)
www.iapa.ca

LEGEND

Preventative Measures

- ▶ Procedural Measures
- ● Orders/instructions

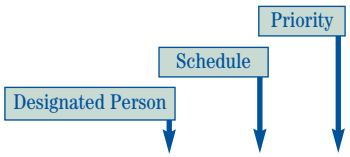
Priority Codes for applying risk measures:

- **A.** Immediate stoppage and resolution
- **B.** Resolution as soon as possible
- **C.** Resolution according to normal company procedures

The suggested preventative measures are based in part from the Workplace Health And Safety Regulations (RSST), from An Act Respecting Occupational Health and Safety (Québec LSST, S-2.1), as well as CSA Standard Z142-M90 and EN 954-1.

Mechanical Hazards

Most likely injuries: Crushing, fractures, contusions, cuts, and foreign bodies.



Preventative measures — Applicable ☑ — Not applicable N/A	Notes	Desig.	Sched.	Prior.
Risk Factor: Front Access To Danger Zone (Die Shoes)				
▶ Install photo detectors approved for safety device use (category 4). ☐				
▶ Install two-hand controls, where: - the operator must depress simultaneously both buttons to activate one press stroke, AND - the slide descent is halted as soon as the operator releases one of the buttons Must be combined to a hold-down system (magnetic thrust block, digitally controlled stops, supports, etc.). ☐				
▶ Install safety devices (e.g., two-hand controls, etc.) at a safe enough distance from the danger zone so no one can reach the danger zone before the ram has stopped. ☐				
● Use appropriately sized die and blocks according to the workpiece being bent. ☐				
● Keep the opening between die and block to a minimum. ☐				
▶ Install a clearly marked emergency stop button located near each operator. ☐				
Risk Factor: Side And Rear Access To Danger Zone				
▶ Install physical barriers with an interlocking device that: ☐ - neutralizes the shear descent when the barrier is opened, AND - maintains the barrier in the closed position while the shear is descending, AND - does not provoke shear start-up at barrier closure.				

Notes:

Mechanical Hazards (continued)

Most likely injuries: Crushing, fractures, contusions, cuts, and foreign bodies.

Preventative measures	Applicable ☑	Not applicable N/A	Notes	Desig.	Sched.	Prior.
Risk Factor: Repeat Stroke On a friction-clutch mechanical press						
▶ Install an anti-repeat stroke device.	☐					
▶ Install a dual-body safety valve in the clutch-brake hydraulic or pneumatic circuit.	☐					
▶ Add a second switch to the braking system. In case of failure in one of the switches, the bending machine trips in the top dead centre position and a new cycle cannot be actuated.	☐					
Risk Factor: Repeat Stroke On a hydraulic clutch mechanical press						
▶ Install an anti-repeat stroke device.	☐					
Risk Factor: Involuntary Action On The Pedal Control, Control Buttons Or Bar						
▶ Install recessed or flush-mounted button controls.	☐					
▶ Install a side- and top-capped foot control and encased bar control.	☐					
▶ Install as many controls as there are workers simultaneously using the bending machine. All workers must maintain their control devices depressed to initiate a press stroke.	☐					
▶ Install a by-pass device to make any unused control devices inoperative.	☐					
Risk Factor: Accidental Descent Of The Slide During Start-Up						
▶ Install a safety device to prevent a premature descent of the ram.	☐					
Risk Factor: Accidental Descent Of The Slide During Maintenance And Repairs						
● Apply lockout procedures: - disconnect all sources of energy - dissipate (purge) all residual energies and wait for the flywheel to come to a complete stop - lockout all sources of energy - validate to ensure start-up is no longer possible and that all power has been dissipated (purged).	☐					
● Place safety blocks under the ram.	☐					
Risk Factor: Access To Bending Machine Moving Parts						
▶ Install fixed guards around moving parts: flywheel, belts, gears, etc.	☐					
Risk Factor: Handling Badly Burred Workpieces						
● De-burr plate workpieces.	☐					
● Wear cut-resistant gloves.	☐					
Risk Factor: Falling Metal Plate						
● Wear CSA-approved safety footwear with steel-capped toes and steel upper plate for metatarsal protection.	☐					

Mechanical Hazards (continued)

Most likely injuries: Crushing, fractures, contusions, cuts, and foreign bodies.

Preventative measures Applicable ☑ Not applicable N/A	Notes	Desig.	Sched.	Prior.
Risk Factor: Workpiece Movement During Bending				
▶ Install positioning blocks, magnetic thrust blocks, supports, etc. so the operator need not hold the workpiece with his/her hands. ☐				
● Use thumb pressure to steady workpiece. Do not hold the workpiece between your fingers. ☐				
▶ Install a dual-speed control on hydraulic bending machines (ram speed is reduced during bending). ☐				
● The operator must position himself/herself so as to not get struck by the workpiece during bending. ☐				
Risk Factor: Flying Particles Or Fragments				
● Adjust to proper clearance during die installation. ☐				
● Properly secure the die shoes on both the ram and the bed. ☐				
● Wear CSA-approved safety glasses with lateral protection. ☐				

Notes:

Ergonomic Hazards

Most likely injuries: Musculo skeletal disorders, backaches.

Preventative measures — Applicable ☑ Not applicable N/A	Notes	Desig.	Sched.	Prior.
Risk Factor: Handling Of Heavy And Bulky Workpieces				
▶ Supply mechanical handling devices (hoist, suction cups, etc.) suitable to the weight and dimensions of the workpieces. ☐				
▶ Install equipment to aid the feeding of workpieces, such as: roller conveyor, roller-ball table, trestles, elevating table, etc. to help feed workpieces in the machine. ☐				
▶ Install a tripod, supports or an adjustable table in front of the bending machine to support the weight of large plates. ☐				
● Ask for help from another worker when help is needed. ☐				
Risk Factor: Strain During Tooling and Re-Tooling Of Die Shoes				
▶ Supply a dolly with lift table. ☐				
● Use die shoes sized according to workpieces. ☐				
Risk Factor: Straining Working Positions				
▶ Supply reclining baskets, elevating tables or receptacles to assist in accessing workpieces. ☐				
▶ Install a foot control to enable the operator to shift positions. ☐				
Risk Factor: Insufficient Lighting				
▶ Install sufficient lighting to ensure good visibility in the work area. ☐				
Risk Factor: Static Standing Work				
▶ Supply appropriate seating if suitable for such work. ☐				
▶ Supply an anti fatigue mat. ☐				

Chemical Hazards

Most likely injuries: Dermatitis.

Preventative measures — Applicable ☑ Not applicable N/A	Notes	Desig.	Sched.	Prior.
Risk Factor: Exposure To Lubricants				
● Consult MSDS documentation. ☐				
▶ Select lubricants that have little effect on skin. ☐				
● Wear gloves that are approved for the products used. Ensure the gloves are also cut resistant and provide good grip to workpieces. ☐				
● Use barrier lotions. ☐				

Electrical Hazards

Most likely injuries: Electrocution

Preventative measures	Applicable ☑	Not applicable N/A	Notes	Desig.	Sched.	Prior.
Risk Factor: Contact With Parts Normally Or Accidentally Energized						
▶ Install an isolating switch near the bending machine, with clear markings.	☐					
● Apply lockout procedures: - disconnect all sources of energy - lockout all sources of energy - validate to ensure start-up is no longer possible.	☐					
● Never lockout an isolating switch box in the ON position. The isolating switch must open the circuit (circuit in the OFF position) at all times.	☐					
▶ Install control devices powered by very low voltage (30 volts or less).	☐					
● Check the power supply cables insulation and the bending machine grounding circuit.	☐					

Notes:

Completed by: