

**MECHANICAL ENGINEERING UNDERGRADUATE LABORATORY STANDARD
OPERATING PROCEDURE (SOP)**

Name of SOP	RSW Resistance Spot Welder Laboratory
Effective Date	March 30, 2004 Rev. January 21, 2008
Author	M.P. Sklad/Joe Verhaeghe
Reason for SOP	Risk of burn Risk of eye injury Risk of pinching body parts
Approved by (supervisor)	Ron Lodewyks
Date approved by JHSC	February 13, 2008

Definitions

Terms	none
acronyms	RMM – Risk Management Manual JHSC - Joint Health and Safety Committee

Requirements

Applicable OSHA regulations and / or codes of practice. RMM – Eyeglass policy
Training and competency. Training provided by technical staff in the Mechanical Engineering Department. Competency is shown by the individual after training.

Description of the Task

Location and time of work	JHE314 during normal working hours
Individuals and skills required	Graduate Students, none
Equipment and supplies required	Spot Welder with Medar controller Instron Model 1140
Personal protective equipment required	Safety glass

Sequential steps to complete the work safely.

General safety instructions

1. All users must obey the safety instructions and warnings posted on the welder.
2. The operator only should access the welder work area when the control stop button on the control panel is in pressed down position (the welder is off).
3. Never trigger the welding cycle without a sample of the material placed between the electrodes.
4. If the alert red light is on, press the Fault reset button. If the alert light stays on do not attempt to operate the welder and report the fault to the technicians in JHE205.

Operation of the welder:

1. Turn on the computer with the welding sequence programs and check whether the programs exist.
2. Turn on air supply
3. Turn on water supply
4. Push in the control stop button (welder off)
5. Lift carefully the protective shield
6. Place the sample between the electrodes
7. Close the protective shield
8. Unlock the power switch
9. Turn the power on
10. Pull out the control stop button (welder on)
11. Select program sequence
12. Set toggle switch “Weld/No weld” to the “Weld” position”
13. Press “Weld Start” button

MECHANICAL ENGINEERING UNDERGRADUATE LABROTORY STANDARD OPERATING PROCEDURE (SOP)

14. Push in the stop control button (welder off)
15. Lift the protective shield and remove the sample avoiding touching the hot weld spot

Operation of the Instron 1140

Power Up Sequence

1. Ensure "Emergency stop" is disengaged. (rotate clockwise ¼ turn)
2. Turn on power switch located on right side of controller . All lights will turn on for 6 seconds and go off. Motor light turn on for 12 seconds and off. Note if motor light stays on ensure "Emergency stop" is disengaged.

Set Speed Sequence

1. With power turn on press "SPEED" on control panel (speed light lites)
2. Enter speed (mm/Min.) on numeric keypad, press enter and display will start blinking.
3. Press "ENTER", display will stop blinking.

System Reset Control Sequence

1. This sequence may be used to turn off "MOTOR" light, if light stays on after emergency stop has been disengaged.
2. Press "S1" on control panel.
3. Press "0" and "ENTER" on control panel.
4. "Motor" light should now be off.

Moving Crosshead Up and Down Using Jog.

1. Ensure upper and lower stop are located correctly
2. Ensure "Displacement Sensor" is located correctly and will not be damaged.
3. Ensure everyone is clear of machine
4. Press "JOG UP" and "JOG DOWN" as required.

Moving Crosshead Up or Down During Test

5. Ensure upper and lower stop are located correctly
6. Ensure everyone is clear of machine
7. Ensure correct speed is set. (see set speed sequence)
8. Press UP or DOWN button as required
9. Press STOP button to stop movement
10. Press "Emergency Stop" switch before making any adjustment to crosshead, jaw, inserting or removing specimen

Removing Upper Jaw CAUTION: The jaw weight 8.5 Kg (20 lbs)

1. Move crosshead between "TEST UPPER LIMIT" and "TEST LOWER LIMIT". See instruction above "Moving Crosshead Up or Down Using Jog"
2. Press "Emergency Stop" switch
3. Grasp jaw with one hand and push up
4. Using the other hand remove holding pin
5. Using both hands lower jaw and place on flat surface

Installing Upper Jaw CAUTION: The jaw weight 8.5 Kg (20 lbs)

1. Move crosshead between "TEST UPPER LIMIT" and "TEST LOWER LIMIT". See instruction above "Moving Crosshead Up or Down"
2. Turn POWER switch OFF
3. Using both hands insert jaw in holder
4. Hold jaw in position with one hand and insert holding pin with the other hand

Removing Lower Jaw CAUTION: The jaw weight 8.5 Kg (20 lbs)

1. Move crosshead between "TEST UPPER LIMIT" and "TEST LOWER LIMIT". See instruction

MECHANICAL ENGINEERING UNDERGRADUATE LABROTORY STANDARD OPERATING PROCEDURE (SOP)

- above "Moving Crosshead Up or Down"
2. Turn POWER switch OFF
 3. Remove holding pin for lower jaw
 4. Using both hands to remove jaw and place jaw on flat surface

Install Lower Jaw CAUTION: The jaw weight 8.5 Kg (20 lbs)

1. Move crosshead between "TEST UPPER LIMIT" and "TEST LOWER LIMIT". See instruction above "Moving Crosshead Up or Down"
2. Turn POWER switch OFF
3. Using both hands insert jaw in holder
4. Insert holding pin

Tensile Test

1. Ensure POWER is OFF
2. Set the lower crosshead stop to "TEST LOWER LIMIT"
3. Set the upper crosshead stop to "TEST UPPER LIMIT"
4. Turn POWER ON
5. Move crosshead to proper position to insert specimen. See instruction above "Moving Crosshead Up or Down"
6. Press "STOP" when crosshead reaches position
7. NOTE: at least $\frac{3}{4}$ of the jaw should grab the specimen
8. Ensure POWER is OFF
9. Insert specimen and tighten jaws
10. Install extensometer if required
11. Adjust crosshead speed to 1
12. Move crosshead UP as required. See instruction above "Moving Crosshead Up or Down"

Contingency Plan and Reporting

Accident / injury response

Report to Technical staff, room JHE205, ext. 24628.

In Case of Critical Injuries

1. Shutdown equipment, secure area to prevent further injury
2. Immediately arrange for medical and emergency assistance by calling Security at "88". Phone in JHE 316 (departmental office phone may be used)
3. Apply first aid as required
4. Notify Mechanical Engineering technical staff immediately
5. For all injuries complete a "Injury/Incident Report" and provide a copy to the Chair and EOHSS
6. In case of critical injury notify EOHSS immediately, ext 24352

Spill response

Equipment shutdowns.

1. Push in the stop control button (welder off)
2. Turn off the water
3. Turn off the air
4. Turn off the power
5. Lock the power switch
6. Turn of f POWER switch on Instron 1140

Environmental Responsibility

Waste disposal procedures

Deposit used sample in recycle bin

Building air quality

Procedure does not effect air quality

MECHANICAL ENGINEERING UNDERGRADUATE LABROTORY STANDARD OPERATING PROCEDURE (SOP)

References (OHSA/ regulations, EPA and Municipal environmental regulations, McMaster University Program/ Policy, Material Data Sheets (MSDS)).

1. RMM #301 Standard Operating Procedure
2. RMM #300 Safety Orientation and Training Program
3. RMM #310 Eye Protection
4. RMM #309 Laboratory safety manual

Distribution

1. Trained teaching assistant who is the lab operator
2. Technical Staff of Mechanical Engineering
3. Mechanical Engineering Chair
4. Faculty of Engineering JHSC