

DEPARTMENT OF MECHANICAL ENGINEERING

Name of SOP	P8 Uniaxial Tensile Test (Instron 1140)
Effective Date	September 14, 2004 Rev. January 21, 2008
Author	Joe Verhaeghe
Reason for SOP	Risk of dropping heavy object and pinch points.
Approved by (supervisor)	Ron Lodewyks
Date reviewed by JHSC	February 13, 2008

Definitions

Terms	
acronyms	RMM – Risk Management Manual JHSC - Joint Health and Safety Committee Chair - Chair of Mechanical Engineering EOHSS - Environmental Occupational Health & Safety Service

Requirements

<p>Applicable OSHA regulations and / or codes of practice.</p> <ol style="list-style-type: none"> 1. OSHA code. 2. McMaster University Risk Management Policies
<p>Training and competency.</p> <ol style="list-style-type: none"> 1. Training provided by technical staff in the Mechanical Engineering Department. 2. Competency is shown by the individual after training

Description of the Task

Location and time of work	Mechanical engineering lab, during normal working hours
Individuals and skills required	Students, no special skills
Equipment and supplies required	Instron 1140 10 pound weights
Personal protective equipment required	safety glasses
<p>Sequential steps to complete the work safely.</p> <p>Power Up Sequence</p> <ol style="list-style-type: none"> 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. <p>Set Speed Sequence</p> <ol style="list-style-type: none"> 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. <p>System Reset Control Sequence</p> <ol style="list-style-type: none"> 1. This sequence may be used to turn off “MOTOR” light, if light stays on after emergency stop has be 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 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

Adding Weights CAUTION: Weights are 4.5Kg (10lbs)

1. Using both hands move weight from weight storage to flat surface
2. With one hand lift "WEIGHT STABILIZER" and with the other hand place weight on holder
3. Ensure the center raised part and writing of the weight is on top
4. Ensure the top weight is rotated 180 degree with respect to the weight directly underneath. This ensures the weight will not fall off.
5. Ensure the "WEIGHT STABILIZER" fits properly over the top weight

Removing Weights CAUTION: Weights are 4.5Kg (10lbs)

1. With one hand lift "WEIGHT STABILIZER"
2. With the other hand Rotate the weight so the slot is away from you
3. With the same hand remove the weight and place on flat surface
4. Replace the "WEIGHT STABILIZER"
5. Using both hands move weight from flat surface to weight holder

Load Cell Calibration

1. Ensure POWER is OFF
2. Adjust lower limit stop to "LOWER TEST" position
3. Adjust upper limit stop to "CALIBRATE UPPER LIMIT"
4. Remove upper jaw. See instruction above "Removing Upper Jaw"
5. Remove lower jaw. See instruction above "Removing Lower Jaw"
6. Raise crosshead to "CALIBRATE UPPER LIMIT". See instruction above "Moving Crosshead Up or Down"
7. Install WIEGHT HOLDER in crosshead.
8. Add weights as required. See instruction above "Adding Weights"
9. Remove weights as required. See instruction above "Removing Weights"
10. Install upper jaw. See instruction above "Install Upper Jaw"
11. Install lower jaw. See instruction above "Install Lower Jaw"

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 ¾ 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

1. Apply first aid as required
2. Notify Mechanical Engineering technical staff immediately
3. For all injuries complete a "Injury/Incident Report" and provide a copy to the Chair and EOHSS
4. In case of critical injury call security (dail 88).
5. In case of critical injury notify EOHSS immediately, ext 24352

Spill response

Equipment shutdowns.

1. Ensure "POWER" switch is "OFF"
2. Unplug machine from 120VAC outlet

Environmental Responsibility**Waste disposal procedures**

Place and scrap in the recycle bins

Building air quality

No effects

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